



**2003**

# **YEAR BOOK AUSTRALIA**



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**2003**

**YEAR BOOK  
AUSTRALIA**



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**AUSTRALIA**

Dennis Trewin  
Australian Statistician

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Cover: Summertime panorama of the Murray River from Murtho Lookout, near Renmark, South Australia. The Murray is the principal river of Australia and flows through New South Wales, Victoria and South Australia. Photograph by John P. Baker <[www.johnbaker.apex.net.au](http://www.johnbaker.apex.net.au)>.

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# Preface

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Year Book Australia is the principal reference work produced by Australian Bureau of Statistics (ABS). It provides a comprehensive and detailed statistical overview of various aspects of the economy and social conditions in Australia, together with their administrative and legislative background. In addition, it contains descriptive matter dealing with Australia's government, international relations, defence, geography and climate.

The first Official Year Book of the Commonwealth was published in 1908, although individual Australian states and colonies had been producing year books for several decades previously.

This 85th edition of Year Book Australia has environmental issues, and particularly sustainable development, as a major theme. A number of articles throughout this edition address aspects of Australia's environment.

The statistics contained in this edition are the most recent available at the time of its preparation. In many cases, the ABS web site <<http://www.abs.gov.au>> and the web sites of other organisations provide access to more recent statistics. The sources of information are shown throughout and at the end of chapters of the Year Book, while the ABS *Catalogue of Publications and Products* (1101.0) lists all current publications of the ABS.

ABS publications draw extensively on information provided freely by individuals, businesses, governments and other organisations. Their continued cooperation is very much appreciated.

Particular thanks and appreciation are extended to those organisations which have kindly supplied material for inclusion in this 2003 edition of Year Book Australia.

I also take the opportunity to extend my thanks to the many ABS staff who contribute each year to the preparation and production of the Year Book.

Australian Bureau of Statistics  
Canberra  
January 2003

Dennis Trewin  
Australian Statistician



# Introduction

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Year Book Australia provides a comprehensive overview of the economic and social conditions of contemporary Australia. Environmental issues, and particularly sustainable development, are a major theme of this 2003 edition. It is a statistically oriented publication with sufficient background information to establish a context for the statistics and to assist in understanding and interpreting them.

Many of the statistics are derived from the ABS, the official statistical agency which produces the Year Book. However, a great deal of the information is also contributed by other, predominantly government, organisations. The official nature of the contributors to the Year Book ensures a high degree of objectivity and reliability in the picture presented of contemporary Australia.

The Year Book also presents some historical and international perspectives on Australia.

This current (85th) edition is the latest in a long series of Year Books extending back to the first edition in 1908. This series provides a valuable source of information on the state of Australia at any point in this period.

*Year Book Australia 2003* is also available on CD-ROM. Its contents are included in *Australia Now* on the ABS web site at <<http://www.abs.gov.au>>. The Year Book is also the source for *Australia at a Glance* (1309.0).

## Finding information

The contents pages at the beginning of the Year Book and preceding each chapter provide a guide to the broad subjects contained in each chapter. The index assists in locating information on more specific subjects. A list of articles which have appeared in previous editions is contained at the end of the Year Book. A collection of articles is included in *Australia Now* on the ABS web site.

The tables and graphs in a chapter are numbered and the text is cross-referenced, as necessary, to the table or graph to which it relates.

## Further information

While the statistics and descriptive information contained in the Year Book provide a comprehensive overview of Australia, they

represent only a relatively small part of the statistics and other information available. The Year Book is aimed primarily at providing a ready and convenient source of reference, both to those familiar and unfamiliar with a particular subject. In other words, because of the range of subjects, and limitations on the size of the Year Book, it aims at breadth rather than depth of information.

For those requiring information in greater depth, the Year Book also serves as a directory to more detailed sources, with the source shown for each statistical table, graph and map. Where the ABS is the source, the title and catalogue number of the relevant publication are quoted. For other sources, the name of the organisation is shown, and the publication title where appropriate. Relevant ABS and other publications are also listed at the end of each chapter, together with a selection of relevant web sites. A useful complementary publication is the ABS *Catalogue of Publications and Products* (1101.0) which lists all current publications and products of the ABS.

Year Books or Statistical Summaries produced by the ABS for each state or territory provide information similar to that contained in Year Book Australia, for the state or territory concerned.

As well as the information included in this Year Book, the ABS may have other relevant data available on request. Charges are generally made for such information. Inquiries should be made to the National Information and Referral Service on 1300 135 070.

The annual reports of government departments and agencies also provide a valuable source of more detailed information on subjects covered in the Year Book.

For a variety of reasons, it is not possible for all statistics in the Year Book to relate to the latest or the same year. Readers wishing to obtain or clarify the latest available statistics should contact the relevant source.

## Comments from readers

The ABS endeavours to keep the balance of the contents of the Year Book in line with the ever-changing nature of the nation. For this reason comments on the adequacy and balance

of the contents of the Year Book are welcomed and should be directed to the attention of the Editor of the Year Book, Australian Bureau of Statistics, Locked Bag 10, Belconnen ACT 2616.

### **Symbols and abbreviations**

The following symbols and abbreviations, are shown in tables and graphs:

'000	thousand
\$'000	thousand dollars
\$m	million dollars
\$b	billion dollars
%	percentage
—	nil or rounded to zero (including null cells)
..	not applicable
*	subject to high standard errors and should be used with caution
**	subject to sampling variability too high for practical purposes (i.e. relative standard error greater than 50%)
<	less than
°C	degrees Celsius
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> -e	carbon dioxide equivalent
Gg	gigagram
GJ	gigajoule
GL	gigalitre
ha	hectare
kg	kilogram
km	kilometre
km <sup>2</sup>	square kilometre
km <sup>3</sup>	cubic kilometre
kt	kilotonne
kWh	kilowatt hour
L	litre
m	metre

m <sup>2</sup>	square metre
m <sup>3</sup>	cubic metre
MB	megabyte
mill.	million
ML	megalitre
mm	millimetre
Mt	megatonne
no.	number
n.a.	not available
n.e.c.	not elsewhere classified
n.e.i.	not elsewhere included
n.e.s.	not elsewhere specified
n.f.d.	not further defined
n.p.	not for publication
n.y.a.	not yet available
p.a.	per annum
PJ	petajoule
t	tonne
excl.	excluding
FTE	full-time equivalent
incl.	including
SAR	special administrative region
VET	vocational education and training

The following abbreviations are used for the titles of the Australian states and territories and Australia:

NSW	New South Wales
Vic.	Victoria
Qld	Queensland
WA	Western Australia
SA	South Australia
Tas.	Tasmania
NT	Northern Territory

ACT Australian Capital Territory

Aust. Australia

Yearly periods shown, for example, as 2000, refer to the year ended 31 December 2000; those shown, for example, as 2000–01, refer to the year ended 30 June 2001. Other yearly periods are specifically indicated. The range of years shown in the table headings, for example, 1901 to 1999–2000, indicates the period covered, but

does not necessarily imply that each intervening year is included or that the yearly period has remained the same throughout the series.

Values are shown in Australian dollars (\$) or cents (c) unless another currency is specified.

Where figures have been rounded, discrepancies may occur between sums of the component items and totals.



# Towards sustainability — an overview

---

The Johannesburg World Summit on Sustainable Development in 2002 marked 10 years since the first summit in Rio de Janeiro in 1992. The year 2003 is the International Year of Freshwater.

Given these milestones, and the importance and topicality of sustainable development and environmental issues generally, the ABS decided to make environmental issues, and particularly sustainable development, a major theme of the 2003 edition of Year Book Australia. A number of articles throughout this edition address environmental issues.

The purpose of this article is to draw together the threads in those articles, and thereby present a brief statistical overview of environmental issues in Australia.

Many environmental, social and sustainable economic development issues are interrelated. The article addresses them in the following order:

- rising per capita income and national wealth
- sustainable forestry
- sustainable fisheries and marine ecosystems
- sustainable mining
- sustainable land and water use, and protecting Australia's biodiversity
- energy, greenhouse gases and climate change
- impacts of industrial activities, and of households.

## What do we mean by sustainable development?

The World Commission on Environment and Development (1987) defined Ecologically Sustainable Development as:

development which meets the needs of the present without compromising the ability of future generations to meet their own needs.

The National Strategy for Ecologically Sustainable Development commits all Australian governments to the following three core objectives:

- to enhance individual and community wellbeing and welfare by following a path of economic development that safeguards the welfare of future generations
- to provide for equity within and between generations
- to protect biological diversity and maintain essential ecological processes and life support.

These objectives in turn suggest the following kinds of economic and environmental aims:

- rising national wealth per capita as well as income per capita — to achieve both implies replacing any natural resources used with alternative resources of an equal value
- using natural resources prudently and efficiently — this implies not using renewable resources (such as forests and wild fisheries) in excess of their natural regeneration. It also implies not consuming other resources (such as groundwater and surface water, fossil fuels and other mineral resources) beyond a critical level
- maintaining biodiversity, and not using sink functions beyond their assimilative capabilities
- minimising human contributions to global warming.

These aims provide the sustainability backdrop to the articles on environmental issues in this edition of Year Book Australia.

## Rising per capita income and national wealth

At the World Summit on Sustainable Development, many countries attached a high priority to improving the material wellbeing of their residents. *Chapter 29, National accounts* illustrates that, for Australia, progress has been strong in this area. Two indicators compiled for *Measuring Australia's Progress, 2002* (1370.0) show this to be the case. Graph S1 shows a strong and continuous rise in real net national disposable income per head since 1992. Graph S2 shows, for real national net worth per head, that

while there have been some fluctuations over this period, the trend has been strongly positive. The growth in both these indicators suggests that broadly the needs of the present generation are being met (through increasing levels of income) and that the needs of future generations are not being compromised (to the extent that national wealth, which underpins future national income, is increasing).

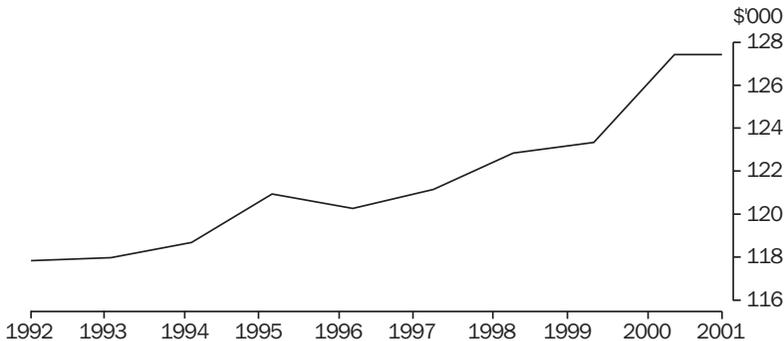
Frameworks for measuring progress and wellbeing are discussed in an article *Beyond GDP: Towards wider measures of wellbeing* in *Chapter 29, National accounts*.

**S1 REAL NET NATIONAL DISPOSABLE INCOME PER CAPITA**



Source: ABS 2002b.

**S2 REAL NATIONAL NET WORTH PER CAPITA(a) — At 30 June**



(a) Reference year for chain volume estimates is 1999-2000. Data are not available prior to 1992.

Source: ABS 2002b.

## Sustainable forestry

Two articles, *Sustainable forest management* and *Forest conservation*, in *Chapter 17, Forestry and fishing* describe the framework and processes used in Australia to manage Australia's forest resources in a way that strikes a reasonable balance between the economic, ecological, social and cultural values of forests for current and future generations.

The Montreal Process, established in 1994, is being used as a tool to assist in monitoring and reporting on Australia's progress toward sustainable forest management.

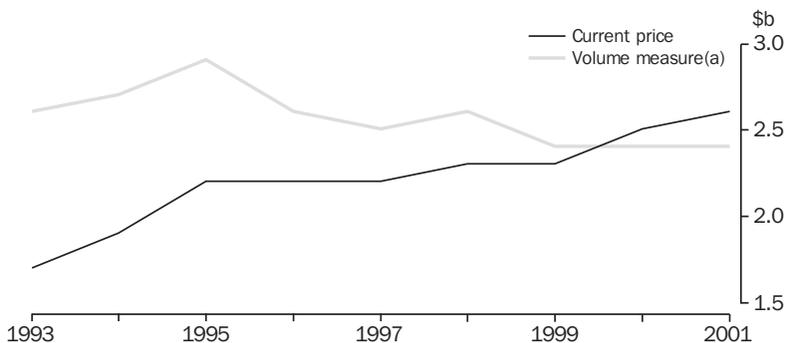
A number of threatening processes directly or indirectly jeopardise the health and vitality of forest ecosystems. These include clearing and fragmentation of habitats, mining, timber harvesting, the impact of invasive species, altered fire regimes, and climate change.

In recognition of the potentially adverse impacts of these threatening processes on Australia's forests, the Commonwealth Government and the state and territory governments have moved to protect Australia's forest ecosystems through forest conservation. About 26.8 million hectares (ha) of native forest are protected and conserved in reserves, representing 16% of Australia's remaining native forest estate.

Establishing a conservation reserve system is one of the key objectives of the Regional Forest Agreement (RFA) process implemented through the 1990s. The RFA process added 2.9 million ha to the existing estate of forest reserves, giving RFA regions a total of 10.4 million ha of forest in conservation reserves. This increased the reserved forest area in RFA regions by about 39%. More than 8.5 million ha are within formal dedicated conservation reserves. The RFAs increased old-growth forest protection across the 10 RFA regions by about 42%, from 2.4 million ha to 3.4 million ha. As a consequence, about 68% of existing old-growth forests in RFA regions have been reserved.

Unfortunately neither the Montreal indicators nor the information publicly available from the RFAs indicate the degree to which native forest timber resources are being depleted. The best available information is in an article in the June quarter 2002 edition of *Australian National Accounts: National Income, Expenditure and Product* (5206.0). This shows that the real or volume estimates of native standing timber available for production fell by 8% between 1993 and 2001 (graph S3), but appear to have stabilised in recent years.

**S3 NATIVE FOREST ASSETS — As at 30 June**



(a) Reference year for volume measure is 1999–2000.

Source: ABS 2002a.

## Sustainable fisheries and marine ecosystems

An article *Fishing and the environment*, in *Chapter 17, Forestry and fishing*, discusses the extent to which Australian fisheries stocks are being managed in a sustainable manner and the effects of fishing on habitat and non-target species.

It shows that fisheries production of a number of species has been declining since the late 1980s. Reasons for declines in some fisheries include overfishing, use of non-selective fishing gear, loss of habitat, pollution, natural disasters, and the complexity of Australia's marine jurisdiction, which hinders management of fish stocks.

An article *Aquaculture and the environment* in the same chapter discusses Australia's rapidly expanding aquaculture industry (production rose by 146% in the decade to 2000–01, compared to a rise of 46% in the total gross value of fisheries production) and its environmental impacts. Aquaculture takes some pressure off wild fisheries, but it has the potential to alter coastal foreshores, estuaries, mangroves, salt marshes, and marine and other aquatic environments. The main environmental impacts of aquaculture are water pollution, pest species, the strain placed on wild fish populations for brood and feed purposes, and the culling of natural predators. The potential also exists to introduce diseases and for farmed exotic fish to escape into the wild.

*Chapter 14, Environment* discusses population and human settlement pressures on Australia's marine and coastal area (one of the largest in the world, extending over some 16 million square kilometres), which hosts a wide variety of habitats including estuaries and mangroves, dunes and beaches, rocky and coral reefs, seagrasses, gulfs and bays, seamounts, and a huge area of continental shelf. At 30 June 1996, 83% of Australia's population lived within 50 km of the coast. All states except the Northern Territory and South Australia are experiencing higher rates of population growth and urban development within 3 km of the coast than elsewhere within the state (Newton et al. 2001). The coastal strip is an ecologically sensitive zone, and urban sprawl, and pollution of rivers, lakes and seas, were described by the Resource Assessment Commission as the two most important problems faced by the coastal zone (RAC 1993).

Australia's estuaries in particular face a number of pressures from urban and industrial development in coastal areas, and from disturbance through land use and vegetation clearance in catchments. For example, estuaries are often used for dumping, sand or water extraction, and construction of marinas, ports and canal estates, and are susceptible to changes in natural flows caused by the construction of dams and weirs. Such pressures threaten the condition of estuaries by causing excess nutrient concentrations, sedimentation, loss of habitat, weed and pest infestation, and the accumulation of pollutants.

Another focus of the Environment chapter is coral reefs, which are among the most productive and complex ecosystems in the world. The Great Barrier Reef is the largest coral reef in the world, consisting of about 3,000 individual reefs covering an area of 345,950 square kilometres.

Australian coral reefs face a variety of pressures. These include: run-off of sediment and nutrients at a number of coastal locations, which is steadily increasing through human activities (primarily from the effects of agriculture and land use practices, as well as increasing industrial and urban development); increased recreational and commercial fishing; increasing pressure from tourism developments; threats from invasive and pest species such as the crown of thorns starfish; and coral bleaching, possibly due to global warming (SoE 2001). The article *Sustainable tourism in the Great Barrier Reef Marine Park* following *Chapter 22, Tourism* addresses management of the impacts of tourism on the Park.

## Sustainable mining

The article *Mining and the environment* in *Chapter 18, Mining* briefly discusses the main environmental impacts of mineral mining, such as wastes, and the rate of resource use (where the supply of minerals depends on the rate of resource use, which is affected by the economic life of mineral deposits and the rate at which new reserves are discovered). The article also summarises environmental management initiatives, such as the use of legislation, environmental impact assessments, environmental

protection expenditure, rehabilitation and industry self-regulation.

Data from the national balance sheet, presented in the *Chapter 29, National accounts*, show that the quantity of economically viable mineral reserves is increasing (as new discoveries are made and new technologies and lower production costs make existing reserves more profitable).

## Sustainable land and water use, and protecting Australia's biodiversity

Since European settlement of Australia, around 100 million ha of forest and woodland have been cleared, mostly for agricultural production (NFI 1998), and land continues to be cleared for agriculture. Today around 456 million ha, or 59% of land in Australia, are used for agriculture, making it the dominant form of land use. Agriculture is also the largest consumer of water in Australia; in 1996–97 it accounted for 15,500 gigalitres (GL) or 70% of total water use.

This edition of Year Book Australia contains a number of articles on sustainable land and water use, and protecting Australia's biodiversity. An article *Environmental impacts of agriculture* in *Chapter 16, Agriculture* discusses land degradation and related issues, including salinity. *Chapter 14, Environment* discusses Australia's biodiversity, extent and clearing of native vegetation, and invasive species. That chapter is followed by an article *Australia's rivers*.

Some of the main findings from these articles follow.

### Australia's rivers

Water is essential for all living organisms. Australia is considered one of the driest inhabited continents. Compared to other continents, Australia is also characterised by variable climatic conditions and high levels of evapotranspiration. These factors result in a low proportion of rainfall converted to streamflow, making freshwater a valuable resource.

By world standards Australia is a dry continent with few freshwater resources. Australian rivers

are characterised by relatively low and variable flows.

In much of the intensive land use zone of Australia, catchment land use has significantly modified the physical and chemical nature of the rivers. These now carry higher than natural levels of sediment and nutrient. In some regions, the biological condition of the rivers, wetlands and groundwater dependent ecosystems has been severely impacted by the extraction of large volumes of water for agricultural, urban and industrial use.

The consumption of Australia's freshwater resources from lakes, rivers and underground aquifers has increased strongly in the last two decades. Between 1983–84 and 1996–97 national water consumption increased from 14,600 GL to 23,300 GL annually (NLWRA 2001c).

Across Australia, catchment land use and diverting water are considered the most serious threats to the ecological condition of Australia's rivers, wetlands and groundwater dependent ecosystems.

Based on state assessments of sustainable yield, the 2001 National Land and Water Resources Audit determined that 34 (11%) of Australia's 325 surface water basins are overused, with a further 50 (15%) highly developed. On the other hand, 60% of Australia's river basins have less than 30% of the nominated sustainable flow regime diverted (NLWRA 2001c). Almost all of the basins with a high volume of unused sustainable yield are in the northern parts of Australia.

Land use in the catchment, combined with how well this use is managed, is a major driver of river condition. In the non-urban regions, most of the elevated nutrient and sediment loads to rivers are a consequence of using land for agricultural production. High fertiliser application rates, and other agricultural practices, have resulted in some landscapes leaking more nutrients into the waterways than they did before the adoption of European agricultural production systems (NLWRA 2001a).

## **Environmental impacts of agriculture**

The article of this name looks at the impact of agricultural activities on the Australian environment. In particular it examines land and water use, salinity and the adoption of various land management practices.

The combined impacts of land and water use for agricultural production have been substantial. For example:

- The removal of native vegetation and the introduction of exotic species have contributed to the extinction and decline of many species of Australian wildlife (SoE 2001).
- The construction of dams and diversion of water from rivers have greatly altered water flows, reducing the amount of water flowing down rivers, and have changed the times of peak flows (ABS 2001a).
- There has been a deterioration of soil and water quality in many areas.

Salinity, sodicity and acidity are all naturally occurring conditions of Australian soils, but these have been exacerbated by agricultural activities.

In recent years salinity has gained prominence as a national environmental issue. Early results from the 2001 ABS Agricultural Census show that around 25,000 farmers have salinity and/or are managing salinity on their properties. The proportion of farms reporting managing for salinity is greater than those reporting salinity, an indication that farmers are taking action to prevent or reduce the impact of salinity on agricultural land.

The impacts of salinity extend beyond the agriculture sector. Roads, houses and water supply infrastructure can all be degraded by it. Over four states (New South Wales, Victoria, South Australia and Western Australia) the roads, buildings and/or water supply infrastructure of 68 towns are at risk of damage from salinity. Biodiversity is also at risk through the loss and degradation of native vegetation. Across Australia around 630,000 ha of native vegetation and 80 wetlands, including wetlands of international importance, are at risk (NLWRA 2001b).

One factor contributing to salinity is the rise in water tables due to increased amounts of water entering underground water bodies from irrigated land. This ultimately results in increased salt loads entering river systems. Reduced river flows, brought about by the construction of dams, weirs and water diversions, compound the problem as the flow is insufficient to dilute saline groundwater inflows (ABS 1996).

Between 1990 and 2000 the area of irrigated land increased by more than half a million ha (30%). The growth in irrigated area was greatest in Queensland, where an additional 236,000 ha (or 76%) were irrigated in 2000, compared to the area irrigated in 1990. Irrigation can also cause a decline in soil structure and water quality, while the method of irrigation used influences the efficiency of water use and impacts on the environment (Smith 1998). Impacts on water quality result from the high levels of fertiliser use in conjunction with some irrigation methods. Continued awareness of the need for greater efficiency and technological advances can be expected to improve land management practices and reduce the decline in the health of land and water assets. For example, there has been a growth in the use of irrigation methods that are more efficient in terms of water delivery. In 2000 around 30% of irrigators reported using spray, micro spray or drip irrigation methods compared to 23% in 1990.

The increasing use of more efficient irrigation methods, the implementation of salinity management activities and adoption of other land use practices are an indication that farmers are more aware of the environmental impact of their activities than in the past. Much of the impact on the environment is the result of historical land management decisions, and has taken decades to manifest. The impact of agriculture on the environment can be reduced, and there are a number of community groups and government programs dedicated to achieving this. However, it is likely that the damage already done will take decades to abate and repair.

## Australia's biodiversity

Australia is identified as one of 17 megadiverse countries. The loss of biodiversity is considered one of the most serious environmental problems in Australia.

Clearing of native vegetation is a significant threat to terrestrial biodiversity. Other threats include invasive species (i.e. pests and weeds), dryland salinity, pollution, nutrient loading and sedimentation of waterways and coastal areas, altered hydrological and fire regimes, and climate change. These processes constitute major threats to sustainable management of our ecosystems and the environment, as well as to the social and economic values of biodiversity.

Native vegetation is a key element contributing to Australia's biodiversity. In 2000, there were 5,251 protected areas in Australia, occupying 61.4 million ha and accounting for 8% of the total land area.

## Energy, greenhouse gases and climate change

Using Australia's energy resources prudently and efficiently, and minimising energy-related contributions to greenhouse gas emissions and global warming, are important environmental issues. The sorts of questions which are relevant include the extent to which Australia is energy sufficient, the extent of depletion of our reserves, and whether and how we are managing to reduce the links between economic growth on the one hand and energy use and greenhouse gas emissions on the other.

Australia has an abundance of fossil fuel and mineral energy resources which are not being depleted to any great extent by current patterns of use. The rate of energy use and the extent of greenhouse gas emissions appear no longer to be linked to gross domestic product (GDP). The factors underlying this favourable trend include: the continued growth in the dominance of service industries (relatively low users of energy and generators of greenhouse gases) in the economy, the increasing share of natural gas in overall energy use (natural gas produces less greenhouse gases per unit of energy), and continuing, albeit small, gains in how efficiently energy is used by industry and households.

The energy intensive export industries, such as heavy manufacturing and natural gas liquefaction,

have a major impact on Australia's energy use and greenhouse gas emissions. In 1994–95, goods and services produced for export accounted for 29% of energy use, either directly or indirectly.

## Energy

*Chapter 15, Energy* shows that Australia has an abundance of energy resources, and our trends of energy production and use are a reflection of this abundance. Australia's per capita energy consumption is one of the highest in the world, with a heavy reliance on fossil fuels.

Between 1990–91 and 1998–99 Australia's total energy consumption increased by 23%. Over the same period, population increased by just under 10%, and real GDP by over 34%. The aggregate energy intensity (energy consumed per unit of output) of the economy declined by around 9% from 1990–91 to 1998–99, partly due to improved energy efficiency, but mainly due to a change in the structure of the economy towards less energy intensive service industries.

Australia is far more dependent on coal for the production of electricity than most Organisation for Economic Co-operation and Development (OECD) countries. The article following the Energy chapter, *Renewable energy in 2003*, shows that 94% of domestic energy use comes from fossil fuels. In 1999, of the 6% share of total primary energy coming from renewable energy, the major contributors were biomass in the form of bagasse (39%) which was used to generate electricity and steam, wood (39%) which was used primarily for home heating, hydro-electricity (21%) and solar (1%). Renewable energy contributed 11% to electricity generation; most electricity was generated from large-scale hydro-electric schemes (ABARE 1999).

Use of natural gas constituted the fastest growing primary energy use over the 20 years 1978–79 to 1998–99. The growth of coal (black and brown) use was also above the overall trend, due primarily to the strong growth in electricity generation over the period. The consumption of crude oil has also grown significantly, reflecting the heavy use of petroleum products in the transport sector. The annual growth in consumption of renewable energy sources has declined over the years (ANZMEC 2001).

Although depletion of fossil fuels is not an important issue for Australia for the foreseeable future, many environmental benefits are to be gained from renewable energy development. Renewable energy, energy efficiency and use of cleaner fossil fuel technologies are key tools in a strategy for sustainable energy use and reductions in greenhouse gas emissions. As well as being perpetually available, renewable energy sources are low pollutants and produce very little or no net greenhouse gas emissions when operating. In Australia, government, industry and community support are driving renewable energy growth, particularly for electricity generation and transport use.

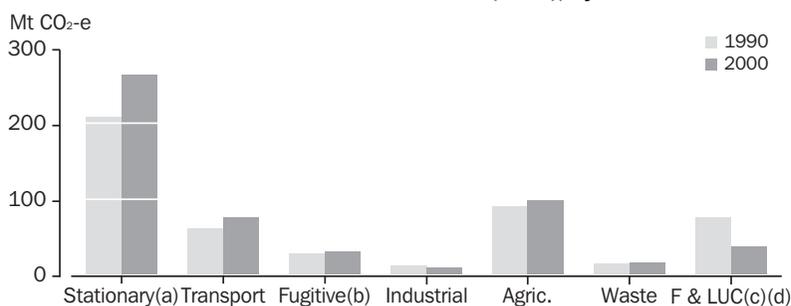
### Greenhouse gas emissions and climate change

*Chapter 14, Environment* discusses greenhouse gas emissions and climate change. It describes the history behind and targets associated with the Kyoto Protocol (an international treaty under which developed countries have agreed to limit net greenhouse gas emissions).

Developed countries are committed to reducing their greenhouse gas emissions by at least 5% from 1990 levels by the period 2008–12. In recognition of the fact that all developed countries have different economic circumstances and differing capacities to make emissions reductions, each developed country has a specific, differentiated target (AGO 2002). Australia has signed (but not ratified) the treaty, which has a target increase for Australia of 8% above 1990 levels by this time. This target includes a one-off benefit from land clearing, where reduced emissions compensate for large increases in transport and power generation.

The chapter shows that the stationary energy sector (emissions from fuel combustion in energy industries such as the electricity industry) is the biggest contributor of greenhouse gases (graph S4), accounting for 49% of net emissions in 2000, with electricity generation accounting for the majority of this sector's contributions (264 megatonnes of carbon dioxide equivalents (CO<sub>2</sub>-e)). Large reductions in emissions have taken place in the forest and land use sector.

**S4 GREENHOUSE GAS EMISSIONS (CO<sub>2</sub>-e), By sector**



(a) Stationary energy. (b) Fugitive emissions from the production and distribution of coal and gas. (c) Estimated emissions from land clearing. These assessments should be treated as indicative only due to high uncertainties in emissions estimates. (d) Forestry and land use change.

Source: AGO 2002.

*Chapter 1, Geography and climate* is followed by an article *Climate change*, and *Chapter 14, Environment* also contains some discussion of climate change.

The article *Climate change* discusses natural versus human induced climate change and whether, for example, the recent systematic drying of the south-west corner of Australia is due to some natural long-term fluctuation in (say) the southern ocean or whether it is a manifestation of large-scale geographically-anchored circulation changes forced by enhanced greenhouse warming. It makes the point that, with the current state of knowledge it will be very difficult to provide temperature and climate projections which will be sufficiently reliable to support planning for adaptation over a lengthy timescale (a century).

The discussion of climate change in *Chapter 14, Environment* suggests that one of the key factors causing environmental change is temperature. Australia's annual average temperatures have increased since 1910. Environmental impacts that may result from increasing temperatures include changed rainfall patterns, effects on vegetation distribution, the ability of areas to support land uses such as agriculture and global phenomena such as rising sea levels. Other changes include more intensive and frequent flooding (which may result in greater property damage and higher rates of erosion) and different trends in tropical cyclone activity.

## Impacts of industrial activities and of households

Through their behaviour, industries and households have direct and indirect impacts on whether natural resources are used prudently and efficiently, and on the extent of waste and pollution. A number of articles address environmental issues associated with the manufacturing, construction, transport and tourism industries and the behaviour of households.

*Chapter 19, Manufacturing* contains an article *Manufacturing and the environment*. After agriculture and mining, manufacturing has the next largest environmental impact. This industry:

- consumes considerable natural resources such as energy and water (19% of total primary

energy use and 21% of total secondary energy use in 1997–98; 1% of water used in 1996–97, the sixth highest use)

- disposes of waste into the atmosphere, rivers and oceans, or as landfill (11% of the estimated total particulate emissions reported to the National Pollutant Inventory for 2000–01; 17% of total CO<sub>2</sub>-e by Australian industries in 1997–98, the second highest source of greenhouse gas emissions after the electricity industry).

*Chapter 20, Construction* contains two articles, *The WasteWise Construction Program* and *Attitudes of residential builders to energy issues and usage*, and is followed by an article *Construction and the environment*.

The first article shows that Australians currently send approximately one tonne of construction and demolition waste per person per year to landfill. This can make up to 40% of landfill and represents a potentially valuable natural resource being wasted. Materials include metals, concrete and bricks, glass, fittings and fixtures from demolished or refurbished buildings, wood and wall panelling.

Since its beginnings in 1995 the WasteWise Construction Program has, with the cooperation of five major Australian construction companies, pioneered best practice in waste reduction and recycling. The participating organisations have successfully decreased the amount of their waste going to landfill, in some cases by more than 90%.

The second article shows that most builders are also sympathetic to the concept of the 'clean, green' home. In 2001–02 the majority of builders surveyed were installing dual flush toilets (99%), ceiling insulation (71%), wall insulation (63%), gas hot water systems (60%) and hot water temperature control (56%).

The article *Construction and the environment* discusses the significant impact on the environment of the construction of residential buildings, commercial buildings and other infrastructure. Direct impacts include use of land, materials and energy, which in turn leads to greenhouse gas emissions and the production of other

wastes. Indirect impacts include the energy consumed in providing building materials and in operating the completed buildings.

*Chapter 23, Transport* is followed by an article *Environmental impacts of Australia's transport system*. Topics covered include the use of energy and greenhouse gases by the transport system, the increasing size of the transport task, increases in fuel efficiency, and the impact of transport on wildlife, biodiversity and aquatic environments. A number of indirect impacts of transport are also discussed, such as air pollution and related illnesses, the livability of urban environments and the environmental impacts of the materials used by the transport system.

As indicated *Chapter 22, Tourism* contains an article *Sustainable tourism in the Great Barrier Reef Marine Park*.

*Chapter 14, Environment* has sections dealing with households' views and practices regarding water supply, quality and conservation, and household waste management.

The first of these shows that:

- In 2001, 73% of Australians were satisfied with the quality of tap-water for drinking.
- South Australians were the least satisfied (68%), to the extent that 10% of people indicated they did not drink any tap-water at all.
- Satisfaction with the quality of tap-water for drinking increased in most states and territories over the 1990s, the exceptions being South Australia and Tasmania.
- Australian households used 1.8 million megalitres of water in 1996–97, making households the second largest users of water after the agriculture sector.
- In 2001, 64% of households had a dual flush toilet (up from 55% in 1998), and 35% of households had a reduced flow shower head (up from 32% in 1998).
- Just over half (58%) of Australian households with a garden reported that they regularly conserve water in the garden, a further 3%

reporting that they sometimes used water saving measures. The main method used by Australian home gardeners was to water either early in the morning or late in the evening when it was cooler. The next two most common practices were to water less frequently but for longer periods (20%), and to use recycled water (18%).

The section of the Environment chapter on household waste management found that:

- Australia is among the top 10 solid waste generators within the OECD.
- The main form of waste disposal in Australia is landfill, which accounts for over 95% of solid waste disposal in some states and territories.
- The impacts of landfill disposal include: use of land that could otherwise be used for another purpose; potential leachates from toxic wastes; release of methane from the decomposition of organic wastes; and greenhouse gas emissions through the transportation of wastes to landfills, which are mostly on the fringes of cities.
- Household recycling increased in Australia during the 1990s: in 1992 around 85% of people recycled at least one item of their household waste; by 2000 the vast majority of Australians (97%) practised at least some recycling, with 7% doing so for all recyclable items.

*Chapter 15, Energy* shows that a majority (about 56%) of Australia's energy-related greenhouse gases were emitted in the production and consumption of goods and services for the purpose of household final consumption. The consumption of electricity by households indirectly produced the greatest amount of energy-related greenhouse gas emissions (17%). This was followed by direct emissions by households (14%), most of which were due to the consumption of motor vehicle fuels.

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# 1

# Geography and climate

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## Introduction

Geography is the science of the Earth's form, its physical features, climate and population, and how they relate to each other. The first part of this chapter describes Australia's land forms and topographic features and how they were formed. The second part describes the island continent's wide range of climatic conditions. The third part discusses water resources, a major factor in land form and climate which impacts on many aspects of life in Australia.

This chapter is followed by an article *Climate change*.

## Geography of Australia

### Position and area

Australia comprises a land area of about 7,692,024 square kilometres (see table 1.1). The land lies between latitudes 10° 41' south

(Cape York, Queensland) and 43° 38' south (South East Cape, Tasmania) and between longitudes 113° 09' east (Steep Point, Western Australia) and 153° 38' east (Cape Byron, New South Wales). The most southerly point on the mainland is South Point (Wilson's Promontory, Victoria) 39° 08' south. The latitudinal distance between Cape York and South Point is about 3,180 km, while the latitudinal distance between Cape York and South East Cape is 3,680 km. The longitudinal distance between Steep Point and Cape Byron is about 4,000 km.

The area of Australia is almost as great as that of the United States of America (excluding Alaska), about 50% greater than Europe (excluding the former USSR) and 32 times greater than the United Kingdom. Tables 1.2 and 1.3 show the area of Australia in relation to areas of other continents and selected countries.

### 1.1 AREA, COASTLINE, TROPICAL AND TEMPERATE ZONES

	Estimated area			Proportion of total area	
	Total km <sup>2</sup>	Total area %	Length of coastline(a) km	Tropical zone %	Temperate zone %
New South Wales	800 642	10.4	2 137	..	100
Victoria	227 416	3.0	2 512	..	100
Queensland	1 730 648	22.5	13 347	54	46
South Australia	983 482	12.7	5 067	..	100
Western Australia	2 529 875	33.0	20 781	37	63
Tasmania	68 401	0.9	4 882	..	100
Northern Territory	1 349 129	17.5	10 953	81	19
Australian Capital Territory	2 358	<1	..	..	100
Jervis Bay Territory	73	<1	57	..	100
<b>Australia</b>	<b>7 692 024</b>	<b>100.0</b>	<b>59 736</b>	<b>39</b>	<b>61</b>

(a) Includes islands.

Source: Bureau of Meteorology; Geoscience Australia 2002, *Geoscience Australia, Canberra, viewed 22 August 2002*, <<http://www.auslig.gov.au>>.

**1.2 AREAS OF CONTINENTS**

	'000 km <sup>2</sup>
Continents	
Asia	44 900
Africa	30 300
North America	24 700
South America	17 800
Antarctica	14 000
Europe	9 900
Australia and Oceania	8 500
Total landmass	150 100

Source: *Encyclopaedia Britannica*.

**1.3 AREAS OF SELECTED COUNTRIES**

	'000 km <sup>2</sup>
COUNTRIES (SEVEN LARGEST)	
Russia	17 075
Canada	9 971
United States of America	9 809
China	9 556
Brazil	8 512
Australia	7 692
India	3 204

SELECTED OTHER COUNTRIES

Belarus	208
France	547
Germany	357
Indonesia	1 919
Japan	377
Kazakhstan	2 717
Papua New Guinea	462
New Zealand	268
Ukraine	604
United Kingdom	242

Source: *Encyclopaedia Britannica*.

**Landforms and their history**

Australia is the lowest, flattest and, apart from Antarctica, the driest of the continents. Unlike Europe and North America, where some landscapes date back to 'only' 20,000 years ago, when great ice sheets retreated, the age of landforms in Australia is generally measured in many millions of years. This fact gives Australia a very distinctive physical geography. Map 1.4 shows the elevation of the Australian continent.

The continent can be divided into three parts:

- the Western Plateau
- the Central Lowlands
- the Eastern Highlands.

The Western Plateau consists of very old rocks (some over 3,000 million years old), and much of it has existed as a landmass for over 500 million years. Several parts have individual plateau names (e.g. Kimberley, Hamersley, Arnhem Land, Yilgarn). In the Perth area, younger rocks along a coastal strip are separated from the rest by the Darling Fault escarpment. The Nullabor Plain is virtually an uplifted sea floor, a limestone plain of Miocene age (about 25 million years).

The Central Lowlands stretch from the Gulf of Carpentaria through the Great Artesian Basin to the Murray–Darling Plains. The Great Artesian Basin is filled with sedimentary rocks which hold water that enters in the wetter Eastern Highlands.

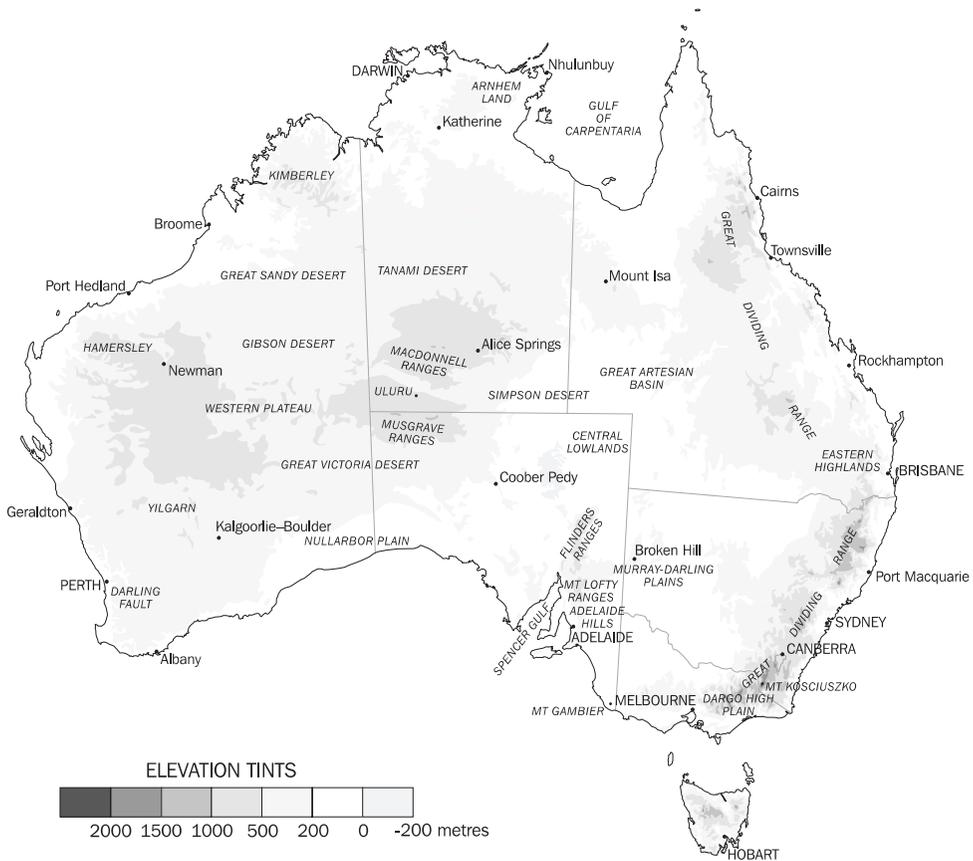
Much of the centre of Australia is flat, but there are numerous ranges (e.g. Macdonnells, Musgrave) and some individual mountains of which Uluru (Ayers Rock) is probably the best known. Faulting and folding in this area took place long ago. The area was worn to a plain, and the plain was uplifted and then eroded to form the modern ranges on today's plain. In looking at Uluru, one remarkable thing is not so much how it got there, but that so much has been eroded from all around to leave it there.

In the South Australian part of the Central Lowlands, fault movements are more recent, and the area can be considered as a number of blocks that have been moved up and down to form a series of ranges (Mt Lofty, Flinders Ranges) and hills (such as the Adelaide Hills), with the down-faulted blocks occupied by sea (e.g. Spencer Gulf) or lowlands including the lower Murray Plains.

The Eastern Highlands rise gently from central Australia towards a series of high plateaus, and even the highest part around Mt Kosciuszko (2,228 metres) is part of a plateau.

There are a few younger faults and folds, such as the Lake George Fault near Canberra, and the Lapstone Monocline near Sydney.

## 1.4 AUSTRALIA, Elevation



Source: Australian Surveying and Land Information Group, 1996.

Some plateaus in the Eastern Highlands are dissected by erosion into rugged hills, and the eastern edges of plateaus tend to form high escarpments. Many of these are united to form the Great Escarpment that runs from northern Queensland to the Victorian border. Australia's highest waterfalls (Wollombi on the Macleay, Wallaman Falls on a tributary of the Herbert, Barron Falls near Cairns, and Wentworth Falls in the Blue Mountains) all occur where rivers flow over the Great Escarpment. For most of its length the Great Dividing Range (separating rivers flowing to Central Australia from rivers flowing to the Pacific) runs across remarkably flat country. In eastern Victoria, however, the old plateau has been eroded into separate high plains (such as Dargo High Plain).

The present topography results from a long landscape history which can be started in the Permian, about 290 million years ago, when much of Australia was glaciated by a huge ice cap. After the ice melted, parts of the continent subsided and were covered with sediment to form sedimentary basins such as the Great Artesian Basin. By early Cretaceous times, about 140 million years ago, Australia was already so flat and low that a major rise in sea level divided it into three landmasses as the shallow Cretaceous sea spread over the land.

In the following Tertiary times, Australia can be regarded as a landscape of broad swells varied by a number of sedimentary basins (Murray, Gippsland, Eucla, Carpentaria, Lake Eyre and

other basins). These slowly filled up and some are now sources of coal or oil. The Eastern Highlands were uplifted at about this time.

Throughout the Tertiary, volcanoes erupted in eastern Australia. Some individual volcanoes were the size of modern Vesuvius, and huge lava plains covered large areas. Volcanic activity continued up to a few thousand years ago in Victoria and Queensland. Australia's youngest volcano is Mt Gambier in South Australia, about 6,000 years old.

Between 55 and 10 million years ago, Australia drifted across the surface of the Earth as a plate, moving north from a position once adjacent to Antarctica. There have been many changes in the climate of Australia in the past, but oddly these do not seem to be due to changing latitude (associated with global-scale plate movements). Even when Australia was close to the South Pole, the climate was relatively warm and wet, and this persisted for a long time despite changes in latitude. It was probably under this climate that the deep weathered, iron-rich profiles that characterise much of Australia were formed. Aridity only seems to have set in after Australia reached its present latitude, and the northern part was probably never arid.

Today a large part of Australia is arid or semi-arid. Sand dunes are mostly longitudinal and are aligned with dominant wind directions associated with the regular passage of high pressure cells (anticyclones). These 'highs' rotate anticlockwise and track at about 28° south in winter and 38° south in summer, resulting in predominantly south-east to easterly flows in the north and north-west to westerly flows in the south. Looking down from above, the south-east Trade Winds or 'Trades' would be those winds in the top right hand quarter of a hypothetical, stationary 'high' centred on the Australian continent.

The dunes are mostly fixed now. Stony deserts or gibber plains (covered with small stones or 'gibbers') are areas without a sand cover and occupy a larger area than the dune fields. Salt lakes occur in many low positions, in places following lines of ancient drainage. They are often associated with lunettes, dunes formed on the downwind side of lakes. Many important finds of Aboriginal prehistory have been made in lunettes. Despite the prevalence of arid conditions today, real aridity seems to be geologically young, with no dunes or salt lakes older than a million years.

The past few million years were notable for the Quaternary ice age. There were many glacial and interglacial periods (over 20) during this time, the last glacial period occurring about 20,000 years ago. In Tasmania there is evidence of three different glaciations: the last glaciation, one sometime in the Quaternary, and one in the Tertiary. On the mainland there is evidence of only the last glaciation, and the ice then covered only 25 square kilometres, in the vicinity of Mt Kosciuszko.

The broad shape of Australia has been influenced over long periods by Earth movements associated with large tectonic processes. However, much of the detail has been carved by river erosion. A significant number of Australia's rivers, like the Diamantina River, drain inland. While they may be eroding their valleys near their highland sources, their lower courses are filling up with alluvium, and the rivers often end in salt lakes which are dry for most of the time. Other rivers reach the sea, and have dissected a broad near-coast region into plateaus, hills and valleys. Many of the features of the drainage pattern of Australia have a very long history, and some individual valleys have maintained their position for hundreds of millions of years. The salt lakes of the Plateau in Western Australia are the remnants of a drainage pattern that was active before continental drift separated Australia from Antarctica.

During the last ice age, sea level was more than 100 metres lower than it is today; the current outer reef area of the Great Barrier Reef would have been the coast at that time. The rivers tended to cut down to the lower level, especially towards the sea. When the sea level rose again, some of the lower valleys were drowned, making fine harbours — like Sydney Harbour — while others tended to fill with alluvium as the sea rose, making the typical lowland valleys around the Australian coast.

Coastal geomorphology is also largely the result of the accumulation of sediment in drowned coasts. In some areas, such as Ninety Mile Beach (Victoria) or the Coorong (South Australia), there are beaches made simply from this accumulation. In much of the east there is a characteristic alternation of rocky headland and long beach, backed by plains filled with river and marine sediments.

The offshore shape of Australia, revealed in isobath contours, results mainly from the pattern of break-up of the super-continent of which Australia was once a part. In some areas, such as the Great Australian Bight, there is a broad

continental shelf bounded by a steeper continental slope. In other areas, like south-east New South Wales around Merimbula and much of the Tasmanian coastline, the continental shelf is very narrow, sometimes coming to within 20 nautical miles of the coast. The Queensland coast is bounded by a broad plateau on which the Great Barrier Reef has grown in only the last two million years. In South Australia, the continental shelf is grooved by submarine canyons.

The Australian landforms of today are thus seen to result from long continued processes in a unique setting, giving rise to typical Australian landscapes, which in turn provide the physical basis for the distribution and nature of biological and human activity in Australia.

## Rivers and lakes

As can be inferred from the elevation and relief map (map 1.4), the rivers of Australia may be divided into two major classes: those of the coastal margins with moderate rates of fall, and those of the central plains with very slight fall. Of the rivers of the east coast, the longest in Queensland are the Burdekin and the Fitzroy, while the Hunter is the longest coastal river of New South Wales. The longest river system in Australia is the Murray–Darling, which drains part of Queensland, the major part of New South Wales and a large part of Victoria, finally flowing into the arm of the sea known as Lake Alexandrina, on the eastern side of the South Australian coast. The length of the Murray is about 2,520 km, and the Darling and Upper Darling together are also just over 2,000 km long. The rivers of the north-west coast of Australia, for example, the Murchison, Gascoyne, Ashburton, Fortescue, De Grey, Fitzroy, Drysdale and Ord, are of considerable length. So also are those rivers in the Northern Territory, for example, the Victoria and Daly, and those on the Queensland side of the Gulf of Carpentaria, such as the Gregory, Leichhardt, Cloncurry, Gilbert and Mitchell. The rivers of Tasmania have short and rapid courses, as might be expected from the configuration of the land.

There are many types of lake in Australia, the largest being drainage sumps from the internal rivers. In dry seasons these lakes finally become beds of salt and dry mud. The largest are Lake Eyre 9,500 square kilometres, Lake Torrens 5,900 square kilometres and Lake Gairdner 4,300 square kilometres.

Other lake types are glacial, most common in Tasmania; volcanic crater lakes, predominantly in Victoria and Queensland; fault angle lakes, of which Lake George near Canberra is a good example; and coastal lakes formed by marine damming of valleys.

## Climate of Australia

The island continent of Australia features a wide range of climatic zones, from the tropical regions of the north, through the arid expanses of the interior, to the temperate regions of the south.

Widely known as 'The Dry Continent', the landmass is relatively arid, with 80% having a median rainfall less than 600 mm per year and 50% less than 300 mm (the average is 450 mm). Seasonal fluctuations can be large, with temperatures ranging from above 50°C to well below zero. However, extreme minimum temperatures are not as low as those recorded in other continents, due to Australia's relatively low latitude, the lack of high mountains to induce orographic cooling (which is in the order of  $-0.6^{\circ}/100$  m increase in elevation) and because of the large expanse of relatively warm surrounding oceans.

Although the climate can be described as predominantly continental, the insular nature of the landmass produces modifications to the general continental pattern.

Australia experiences many of nature's more extreme phenomena, particularly droughts, floods, tropical cyclones, severe storms and bushfires.

## Climatic controls

The generally low relief of Australia is evident in the elevation and relief map (map 1.4). Compared to other continents, Australia causes little obstruction to the atmospheric systems which control the climate. A notable exception is the eastern uplands which modify the atmospheric flow, sometimes causing the 'Easterly Dip' which is evident in some surface pressure charts.

In the winter half of the year (May–October) anticyclones, or high pressure systems, pass from west to east across the continent and may remain almost stationary over the interior for several days. These anticyclones may be 4,000 km wide and, in the Southern hemisphere, rotate anticlockwise. Northern Australia is thus influenced by mild, dry south-east winds, and southern Australia experiences cool, moist

westerly winds. The westerlies, and the frontal systems associated with extensive depressions (lows, sometimes called extra-tropical cyclones) travelling over the Southern Ocean, have a controlling influence on the climate of southern Australia during the winter season, causing rainy periods. Periodic north-west cloud bands in the upper levels of the atmosphere over the continent may interact with southern systems to produce rainfall episodes, particularly over eastern areas. Cold outbreaks, particularly in south-east Australia, occur when cold air of Southern Ocean origin is directed northwards by intense depressions having diameters up to 2,000 km. Cold fronts associated with the southern depressions, or with secondary depressions over the Tasman Sea, may produce strong winds and large day-to-day variations in temperature in southern areas, particularly in south-east coastal regions.

In the summer half of the year (November–April) the anticyclones travel from west to east on a more southerly track across the southern fringes of Australia, directing easterly winds generally over the continent. Fine, warmer weather predominates in southern Australia with the passage of each anticyclone. Heat waves occur when there is an interruption to the eastward progression of the anticyclone ('blocking') and winds back northerly and later north-westerly. Northern Australia comes under the influence of summer disturbances associated with the southward intrusion of warm moist monsoonal air from north of the intertropical convergence zone, resulting in a hot rainy season. Southward dips of the monsoonal low pressure trough sometimes spawn tropical depressions, and may prolong rainy conditions over northern Australia for up to three weeks at a time.

Tropical cyclones are strong, well-organised low pressure systems of tropical origin where average surface winds are expected to reach at least gale force (speed equivalent of 63–87 km/h) — gusts can be up to 50% higher than the average. Winds associated with severe tropical cyclones reach at least hurricane force (119 km/h) — the highest wind speed recorded in Australia was 267 km/h, which occurred with Tropical Cyclone Vance (March 1999). Tropical cyclones develop over the seas around northern Australia where sea surface temperatures exceed 26°C in summer. Interestingly, tropical cyclones do not usually form within 5° (or so) north or south of the Equator because the Coriolis Force associated

with the rotation of the Earth is close to zero in this zone and this 'twist' is important for cyclone formation. Their frequency of occurrence and the tracks they follow vary greatly from season to season. On average, about three cyclones per season directly affect the Queensland coast, and about three affect the north and north-west coasts. Tropical cyclones approaching the coast usually produce very heavy rain and high winds in coastal areas. Some cyclones move inland, losing intensity but still producing widespread heavy rainfall and, occasionally, moderate to severe damage.

The climate of eastern and northern Australia is influenced by the Southern Oscillation (SO), a see-sawing of atmospheric pressure between the northern Australian–Indonesian region and the central Pacific Ocean. This Oscillation is one of the most important causes of climatic variation after the annual seasonal cycle over eastern and northern Australia. The strength of the SO is defined by the Southern Oscillation Index, which is a measure of the difference in sea level atmospheric pressure between Tahiti in the central Pacific and Darwin in northern Australia. At one extreme of the Oscillation, the pressure is abnormally high at Darwin and abnormally low at Tahiti. Severe and widespread drought over eastern and northern Australia generally accompanies this extreme. These conditions generally commence early in the year, last for about 12 months, and have a recurrence period of two to seven years.

The above extreme is sometimes immediately preceded or followed by the opposite extreme where pressures at Darwin are abnormally low and those at Tahiti are abnormally high. In this case, rainfall is generally above average over eastern and northern Australia.

The SO is linked to sea surface temperatures (SSTs) in the Pacific Ocean. Dry extreme SO years are accompanied by above normal SSTs in the central and/or eastern equatorial Pacific and vice versa. Dry extreme years are called El Niño years (El Niño is 'baby boy' in Spanish). Wet extreme years are called La Niña years (La Niña is 'baby girl'). Continuing research into the El Niño/La Niña phenomenon is revealing the connectivity between atmospheric circulation, SSTs, currents (surface as well as deep currents) and their interaction with the landmasses. An article following the *Geography and climate* chapter of *Year Book Australia 1998* provides further detail.

## Rainfall and other precipitation

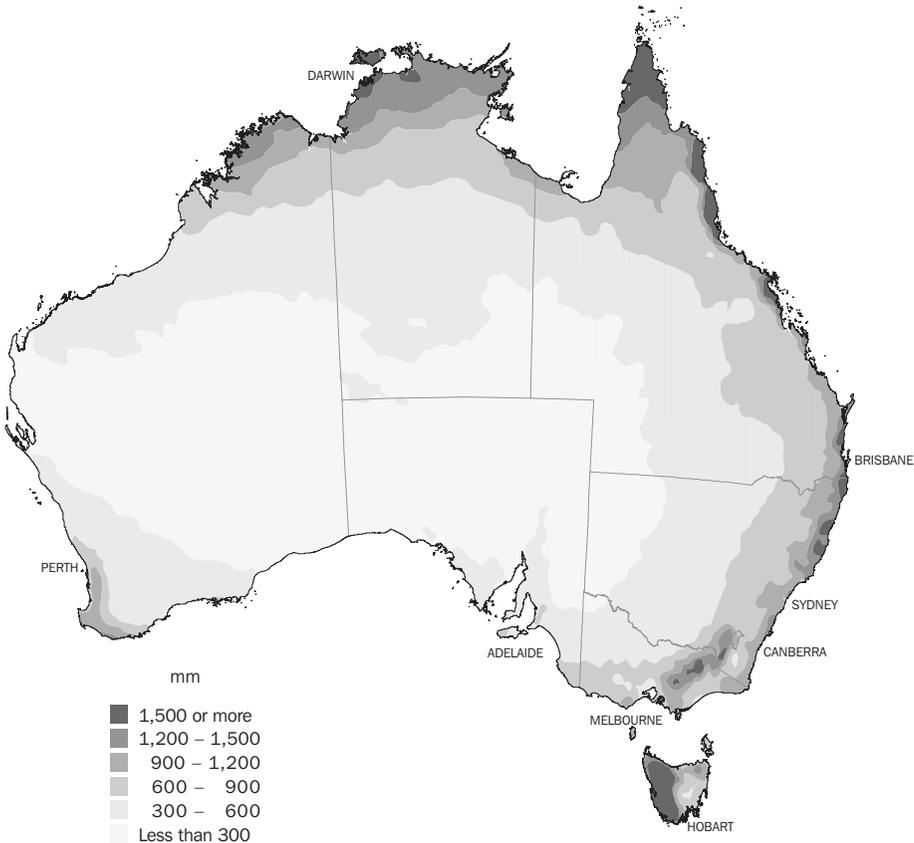
### Annual

The area of lowest rainfall is in the vicinity of Lake Eyre in South Australia, where the median annual rainfall is only about 100 mm. Another very low rainfall area is in Western Australia in the region of the Giles-Warburton Range, which has a median annual rainfall of about 150 mm. A vast region, extending from the west coast near Shark Bay across the interior of Western Australia and South Australia to south-west Queensland and north-west New South Wales, has a median annual rainfall of less than 200 mm. This region is not normally exposed to moist air masses for extended periods and rainfall is irregular, averaging only one or two days per month. However, in favourable synoptic situations, which occur infrequently over extensive parts of the region, up to 400 mm of rain may fall within a few days and cause widespread flooding.

The region with the highest median annual rainfall is the east coast of Queensland between Cairns and Cardwell, where Happy Valley has a median of 4,436 mm (43 years from 1956 to 2000 inclusive) and Babinda a median of 4,092 mm (84 years from 1911 to 2000 inclusive). The mountainous region of western Tasmania also has a high annual rainfall, with Lake Margaret having a median of 3,565 mm (76 years to 1987 inclusive).

The Snowy Mountains area in New South Wales also has a particularly high rainfall. While there are no gauges in the wettest area, on the western slopes above 1,800 metres elevation, runoff data suggest that the median annual rainfall in parts of this region exceeds 3,000 mm. Small pockets with median annual rainfall exceeding 2,500 mm also exist in the mountainous areas of north-east Victoria and some parts of the east coastal slopes. Map 1.5 shows average annual rainfall over the Australian continent.

1.5 AVERAGE ANNUAL RAINFALL



Source: Bureau of Meteorology.

**Seasonal**

As outlined earlier, the rainfall pattern of Australia is strongly seasonal in character, with a winter rainfall regime in the south and a summer regime in the north.

The dominance of rainfall over other climatic elements in determining the growth of specific plants in Australia has led to the development of a climatic classification based on two main parameters, median annual rainfall and the incidence of seasonal rainfall.

Evaporation and the concept of rainfall effectiveness are taken into account to some extent in this classification, by assigning higher median annual rainfall limits to the summer zones than to the corresponding uniform and winter zones. The main features of the seasonal rainfall are:

- marked wet summer (the 'Monsoon') and dry winter of northern Australia
- wet summer and relatively dry winter of south-eastern Queensland and north-eastern New South Wales
- uniform rainfall in south-eastern Australia — much of New South Wales, parts of eastern Victoria and southern Tasmania
- marked wet winter and dry summer of south-west Western Australia and, to a lesser extent, much of the remainder of southern Australia directly influenced by westerly circulation (sometimes called a 'Mediterranean' climate)
- an arid area comprising about half the continent extending from the north-west coast of Western Australia across the interior and reaching the south coast at the head of the Great Australian Bight.

Table 1.6 shows the monthly rainfall for all capital cities, as well as for Alice Springs and Davis Base in Antarctica.

Darwin shows the rainfall distribution pattern typical of the wet summer and dry winter seen in far northern Australia, and Brisbane the wet summer/relatively dry winter typical of south-eastern Queensland. By contrast, Adelaide and Perth show the wet winter/dry summer pattern whereas Sydney, Melbourne, Canberra and Hobart show a relatively uniform pattern of rainfall throughout the year. Alice Springs shows a low rainfall pattern throughout the year typical of arid inland areas.

Precipitation at Davis Base is mainly as snow, but is measured as water after melting. The pattern reflects the very low precipitation levels on the Antarctic continent.

**Rainday frequency**

A rainday occurs when more than 0.2 mm of rain falls in 24 hours, usually from 9 am to 9 am the next day. The frequency of raindays exceeds 150 per year in much of Tasmania (with a maximum of over 250 in western Tasmania), southern Victoria, parts of the north Queensland coast and in the extreme south-west of Western Australia. Over most of the continent the frequency is less than 50 raindays per year. The area of low rainfall with high variability, extending from the north-west coast of Western Australia through the interior of the continent, has less than 25 raindays per year. In the high rainfall areas of northern Australia, the number of raindays is about 80 per year, but heavier falls occur in this region than in southern regions.

**Rainfall intensity**

The values in table 1.7 represent intensities over only small areas around the recording points because turbulence and exposure characteristics of the measuring gauge may vary over a distance of a few metres. The highest 24-hour falls (9 am to 9 am) are listed in table 1.8. Most of the very high 24-hour falls (above 700 mm) have occurred in the coastal strip of Queensland, where a tropical cyclone moving close to mountainous terrain provides ideal conditions for spectacular falls.

The highest annual rainfalls are listed by state/territory in table 1.9.

**1.6 MONTHLY RAINFALL AND AVERAGE TEMPERATURES, Capital cities, Alice Springs and Davis Base(a)**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MEAN DAILY MAXIMUM TEMPERATURE (°C)												
Sydney	26.3	26.3	25.2	22.8	19.9	17.4	16.9	18.1	20.2	22.3	23.9	25.6
Melbourne	26.0	26.6	23.9	20.0	16.5	13.4	12.9	14.2	16.2	18.9	21.5	24.3
Brisbane	29.1	28.9	28.1	26.3	23.5	21.2	20.6	21.7	23.8	25.6	27.3	28.6
Adelaide	27.9	28.1	25.3	22.0	18.4	15.9	14.9	15.8	17.9	20.9	23.6	25.5
Perth	31.5	31.8	29.5	25.4	21.5	18.8	17.7	18.3	20.1	22.4	25.5	28.8
Hobart	22.3	22.3	20.6	18.1	15.1	12.8	12.3	13.3	15.2	17.2	18.8	20.5
Darwin	31.7	31.4	31.8	32.6	32.0	30.6	30.4	31.3	32.5	33.1	33.2	32.5
Canberra	27.7	27.0	24.4	19.8	15.3	12.1	11.2	12.9	16.0	19.2	22.4	26.0
Alice Springs	36.2	35.0	32.6	27.9	22.9	19.8	19.6	22.4	27.0	30.8	33.6	35.4
Davis Base(a)	3.0	-0.4	-5.8	-10.5	-12.8	-12.4	-14.4	-14.1	-13.3	-9.1	-2.6	2.3
MEAN DAILY MINIMUM TEMPERATURE (°C)												
Sydney	18.6	18.9	17.3	13.9	10.8	8.4	6.9	7.9	10.1	13.0	15.1	17.3
Melbourne	13.5	14.1	12.6	10.1	8.3	6.1	5.2	5.8	7.0	8.5	10.1	11.9
Brisbane	20.9	20.9	19.5	16.9	13.8	10.9	9.5	10.0	12.5	15.6	18.0	19.8
Adelaide	15.7	16.0	14.3	11.6	9.5	7.6	6.9	7.5	8.8	10.6	12.5	14.4
Perth	16.9	17.4	15.9	13.0	10.4	9.1	8.1	8.1	8.9	10.2	12.5	14.8
Hobart	11.9	12.0	10.6	8.7	6.5	4.5	4.0	4.5	5.9	7.4	9.0	10.6
Darwin	24.8	24.7	24.5	24.0	22.1	20.0	19.3	20.6	23.1	25.0	25.4	25.3
Canberra	13.0	12.9	10.7	6.6	3.2	0.9	-0.2	0.9	3.1	6.0	8.6	11.2
Alice Springs	21.4	20.7	17.5	12.6	8.4	5.3	4.1	6.1	10.2	14.8	17.9	20.2
Davis Base(a)	-1.3	-4.6	-11.0	-16.2	-19.0	-18.7	-20.5	-20.6	-20.2	-15.4	-7.8	-2.2
MEAN RAINFALL (mm)												
Sydney	100.4	110.6	121.7	106.4	98.1	123.0	69.3	80.8	62.2	72.9	82.0	74.9
Melbourne	45.7	40.7	38.7	46.6	45.6	40.6	36.9	47.2	50.7	58.6	60.1	49.1
Brisbane	157.7	171.7	138.5	90.4	98.8	71.2	62.6	42.7	34.9	94.4	96.5	126.2
Adelaide	17.8	19.0	21.8	36.1	55.6	55.1	62.7	50.6	46.8	39.9	24.8	24.3
Perth	9.1	15.3	15.3	41.1	103.9	171.2	162.2	119.5	71.0	46.8	25.4	11.2
Hobart	40.5	36.9	36.5	45.2	36.4	29.0	46.5	47.3	39.9	48.2	44.6	56.2
Darwin	425.8	354.0	321.7	101.6	21.0	1.2	1.0	5.9	15.6	72.7	139.7	249.4
Canberra	61.5	53.6	52.6	49.5	48.6	39.7	42.0	47.2	52.6	65.6	64.5	53.1
Alice Springs	38.7	43.7	33.6	18.2	19.8	14.6	14.2	10.3	8.9	21.8	25.1	36.5
Davis Base(a)	1.8	3.7	9.9	9.7	11.8	9.2	8.4	7.1	4.5	4.4	2.4	2.0

(a) Antarctica.

Source: Bureau of Meteorology 2002, Bureau of Meteorology, Melbourne, viewed 14 August 2002, <<http://www.bom.gov.au>>.**Thunderstorms and hail**

A thunderday at a given location is a calendar day on which thunder is heard at least once. The average annual number of thunderdays varies from 88 per year near Darwin to less than 10 per year over parts of the southern regions. Convectonal processes during the summer wet season cause high thunderstorm incidence in northern Australia. The generally high incidence of thunderdays (40–60 annually) over the eastern upland areas is caused mainly by orographic uplift of moist air streams.

Hail, mostly of small size (less than 10 mm diameter), occurs with winter–spring cold frontal activity in southern Australia. Summer thunderstorms, particularly over the uplands of eastern Australia, sometimes produce large hail (greater than 10 mm diameter). Large hail capable of piercing light-gauge galvanised iron occurs at irregular intervals and sometimes causes widespread damage.

## 1.7 HIGHEST RAINFALL INTENSITIES

Station	Period of record	Years of complete records	Period in hours				
			1	3	6	12	24
			mm	mm	mm	mm	mm
Adelaide	1897–2000	96	59	133	141	141	141
Alice Springs	1951–1998	46	75	87	109	160	207
Brisbane	1911–1998	87	99	142	182	266	327
Broome	1948–2000	49	157	322	429	470	497
Canberra	1937–2000	40	40	57	67	76	135
Carnarvon	1956–2000	41	44	64	83	99	121
Charleville	1953–1999	42	48	75	88	118	142
Darwin (airport)	1953–2000	42	89	160	214	263	380
Esperance	1963–1998	31	39	50	51	76	86
Hobart	1911–1999	88	28	56	87	117	168
Meekatharra	1953–2000	42	60	67	81	111	120
Melbourne	1873–2000	107	75	91	91	97	130
Mildura	1953–2000	42	53	60	68	68	91
Perth	1946–1992	45	33	63	87	113	121
Sydney	1913–2000	83	120	191	197	244	340
Townsville	1953–1999	44	131	253	361	482	564

Source: Pluviograph records in Bureau of Meteorology archives.

## 1.8 HIGHEST DAILY RAINFALLS(a)

	mm	Date
New South Wales		
Dorrigo (Myrtle Street)	809	21.2.1954
Cordeaux River	573	14.2.1898
Victoria		
Tanybryn	375	22.3.1983
Club Terrace	285	24.6.1998
Queensland(b)		
Beerwah (Crohamhurst)	907	3.2.1893
Finch Hatton PO	878	18.2.1958
South Australia		
Motpena	273	14.3.1989
Nilpena	247	14.3.1989
Western Australia		
Roebourne (Whim Creek)	747	3.4.1898
Roebuck Plains	568	6.1.1917
Tasmania		
Cullenswood	352	22.3.1974
Mathinna	337	5.4.1929
Northern Territory		
Roper Valley Station	545	15.4.1963
Angurugu (Groote Eylandt)	513	28.3.1953
Australian Capital Territory		
Lambrigg	182	27.5.1925

(a) The standard daily rainfall period is 9 am to 9 am.

(b) Bellenden Ker (Top Station) has recorded a 48-hour total of 1,947 mm on 4–5 January 1979, including 960 mm from 3 pm on the 3rd to 3 pm on the 4th. No observation was made at 9 am on the 4th.

Source: Bureau of Meteorology.

## 1.9 HIGHEST ANNUAL RAINFALLS

	Station	Year	mm
NSW	Tallowood Point	1950	4 540
Vic.	Falls Creek SEC(a)	1956	3 739
Qld	Bellenden Ker (Top Station)	2000	12 461
SA	Aldgate State School	1917	1 853
WA	Kalumburu	2000	2 288
Tas.	Lake Margaret	1948	4 504
NT	Darwin Botanic Gardens	1998	2 906

(a) State Electricity Commission.

Source: Bureau of Meteorology.

## Snow

Generally, snow covers much of the Australian Alps above 1,500 metres for varying periods from late autumn to early spring. Similarly, in Tasmania the mountains are covered fairly frequently above 1,000 metres in these seasons. The area, depth and duration are highly variable. Light snowfalls can occur in these areas at any time of year. In some years, snow falls in the altitude range of 500–1,000 metres. Snowfalls at levels below 500 metres are occasionally experienced in southern Australia, particularly in the foothill areas of Tasmania and Victoria, but falls are usually light and short lived. In some seasons, parts of the eastern uplands above 1,000 metres from Victoria to south-eastern Queensland have been covered with snow for several weeks. On sheltered slopes around Mt Kosciuszko (2,228 metres) small areas of snow may persist through summer, but there are no permanent snowfields.

## Temperature

### Average temperatures

Average annual air temperatures range from 28°C along the Kimberley coast in the extreme north of Western Australia to 4°C in the alpine areas of south-eastern Australia. Although annual temperatures may be used for broad comparisons, monthly temperatures are required for detailed analyses.

July is the month with the lowest average temperature in all parts of the continent. The months with the highest average temperature are January or February in the south and December in the north (except in the extreme north and north-west where it is November). The slightly lower temperatures of mid-summer in the north are due to the increase in cloud during the wet season.

Average monthly maximum and minimum temperatures for all capital cities, and also for Alice Springs and Davis Base in Antarctica, are shown in table 1.6.

Temperatures in Darwin in tropical northern Australia are relatively constant throughout the year. In other cities, there is a greater seasonal variation between summer and winter months. The seasonal variation in temperature, as well as the difference between maximum and minimum value in any month, is greater for the inland cities of Canberra and Alice Springs than it is for the coastal cities, where proximity to the ocean moderates temperature extremes.

### Average monthly maxima

In January, average maximum temperatures exceed 35°C over a vast area of the interior and exceed 40°C over appreciable areas of the north-west. The consistently hottest part of Australia in terms of summer maxima is around Marble Bar in Western Australia (150 km south-east of Port Hedland) where the average is 41°C and daily maxima during summer may exceed 40°C consecutively for several weeks at a time.

In July, a more regular latitudinal distribution of average maxima is evident. Maxima range from 30°C near the north coast to 5°C in the alpine areas of the south-east.

### Average monthly minima

In January, average minima range from 27°C on the north-west coast to 5°C in the alpine areas of the south-east. In July, average minima fall below 5°C in areas south of the tropics (away from the coasts). Alpine areas record the lowest temperatures; the July average low is -5°C.

### Extreme maxima

The highest extreme maxima in Australia are recorded in two regions: the Pilbara and Gascoyne regions of north-western Western Australia; and a broad belt extending from south-western Queensland across South Australia into south-eastern Western Australia. Many stations in this region have exceeded 48°C. Extreme temperatures in this southern belt are higher than those further north, due to the long trajectory over land of hot north-west winds from northern Australia, and the lower moisture levels in summer compared with northern Australia.

Most other stations in mainland Australia, except those near parts of the Queensland or Northern Territory coasts or above 500 metres elevation, have extreme maxima between 43 and 48°C. Most Tasmanian stations away from the north coast have extreme maxima between 35 and 40°C. The lowest extreme maxima are found in northern Tasmania (e.g. 29.5°C at Low Head, near George Town) and at high elevations (e.g. 27.0°C at Thredbo (Crackenback)).

While high temperatures are more common inland than they are near the coast, the highest temperatures recorded differ little between the two, except in Queensland, the Northern Territory and northern Tasmania. Notable extreme maxima observed near the coast include 50.5°C at Mardie and 49.1°C at Roebourne in Western Australia, and 49.4°C at Whyalla and 47.9°C at Ceduna in South Australia.

Extreme maximum temperatures recorded at selected stations, including the highest recorded in each state/territory, are shown in table 1.10.

**1.10 EXTREME MAXIMUM TEMPERATURES**

Station	°C	Date
New South Wales		
Wilcannia	50.0	11.1.1939
Victoria		
Swan Hill	49.4	18.1.1908
Queensland		
Cloncurry	53.1	16.1.1889
South Australia		
Oodnadatta	50.7	2.1.1960
Western Australia		
Mardie	50.5	20.2.1998
Tasmania		
Bushy Park	40.8	26.12.1945
Hobart	40.8	4.1.1976
Northern Territory		
Finke	48.3	1 & 2.1.1960
Australian Capital Territory		
Canberra (Acton)	42.8	11.1.1939

Source: Bureau of Meteorology.

**1.11 EXTREME MINIMUM TEMPERATURES**

Station	°C	Date
New South Wales		
Charlotte Pass	-23.0	18.6.1994
Victoria		
Mount Hotham	-12.8	30.7.1931
Queensland		
Stanthorpe	-11.0	4.7.1895
South Australia		
Yongala	-8.2	20.7.1976
Western Australia		
Booylgoo Springs	-6.7	12.7.1969
Tasmania		
Shannon	-13.0	30.6.1983
Butlers Gorge	-13.0	30.6.1983
Tarraleah	-13.0	30.6.1983
Northern Territory		
Alice Springs	-7.5	12.7.1976
Australian Capital Territory		
Gudgenby	-14.6	11.7.1971

Source: Bureau of Meteorology.

**Extreme minima**

The lowest temperatures in Australia have been recorded in the Snowy Mountains, where Charlotte Pass (elevation 1,760 metres) recorded  $-23.0^{\circ}\text{C}$  on 18 June 1994 (table 1.11). Outside the Snowy Mountains, the lowest extreme minima on the Australian mainland are found above 500 metres elevation in the tablelands and ranges of New South Wales, eastern Victoria and southern Queensland. Many stations in this region have recorded  $-10^{\circ}\text{C}$  or lower, including  $-14.6^{\circ}\text{C}$  at Gudgenby and  $-14.5^{\circ}\text{C}$  at Woolbrook. Temperatures below  $-10^{\circ}\text{C}$  have also been recorded in central Tasmania. At lower elevations, most inland places south of the tropics have extreme minima between  $-3$  and  $-7^{\circ}\text{C}$ , and such low temperatures have also occurred in favoured locations within a few kilometres of southern and eastern coasts, such as Sale ( $-5.6^{\circ}\text{C}$ ), Bega ( $-8.1^{\circ}\text{C}$ ), Grove ( $-7.5^{\circ}\text{C}$ ) and Taree ( $-5.0^{\circ}\text{C}$ ).

In the tropics, extreme minima below  $0^{\circ}\text{C}$  have been recorded at many places away from the coast, as far north as Herberton ( $-5.0^{\circ}\text{C}$ ). Some locations near tropical coasts, such as Mackay ( $-0.8^{\circ}\text{C}$ ), Townsville ( $0.1^{\circ}\text{C}$ ) and Kalumburu ( $0.3^{\circ}\text{C}$ ) have also recorded temperatures near  $0^{\circ}\text{C}$ . In contrast, some exposed near-coastal locations, such as Darwin, have never fallen below  $10^{\circ}\text{C}$ , and Thursday Island, in the Torres Strait, has an extreme minimum of  $16.1^{\circ}\text{C}$ .

**Heat waves**

Periods with a number of successive days having a temperature higher than  $40^{\circ}\text{C}$  are relatively common in summer over parts of Australia. With the exception of the north-west coast of Western Australia, however, most coastal areas rarely experience more than three successive days of such conditions. The frequency increases inland, and periods of up to 10 successive days have been recorded at many inland stations. This figure increases to more than 20 days in parts of western Queensland and north-west Western Australia. The central part of the Northern Territory and the Marble Bar–Nullagine area of Western Australia have recorded the most prolonged heat waves. Marble Bar is the only known station in the world where temperatures of more than  $37.8^{\circ}\text{C}$  ( $100^{\circ}\text{F}$ ) have been recorded on as many as 161 consecutive days (30 October 1923 to 7 April 1924).

Heat waves are experienced in the coastal areas from time to time. During 11–14 January 1939, for example, a severe heat wave affected south-eastern Australia: Melbourne had a record of  $45.6^{\circ}\text{C}$  on the 13th and Sydney a record of  $45.3^{\circ}\text{C}$  on the 14th. This heatwave also set record high temperatures in many other centres in New South Wales, Victoria and South Australia.

The Kimberley district of Western Australia is the consistently hottest part of Australia in terms of annual average maximum temperature. Wyndham, for example, has an annual average maximum of  $35.6^{\circ}\text{C}$ .

## Other aspects of climate

### Frost

The frequency of frost, which can cause serious losses of agricultural crops, depends on a number of factors. In coastal areas the relatively warm ocean temperatures ameliorate those on land, while distance from the Equator and elevation above sea level are major cooling influences. In addition, variations in topography can lead to local effects such as the accumulation of cold air in frost hollows. Hence frost hazard is greatest in areas which are away from the coast, are at relatively high elevations and have complex terrain which allows cold air drainage down slopes.

Parts of Australia most subject to frost are the eastern uplands from north-eastern Victoria to the western Darling Downs in southern Queensland where there may be more than 10 nights a month with readings of 0°C (or under) for three to five months of the year. On Tasmania's Central Plateau similar conditions occur for three to six months of the year. Frosts may occur within a few kilometres of the coasts except in the Northern Territory and most of the north Queensland coasts.

Frosts may occur at any time of the year over most of Tasmania, large areas of the tablelands of New South Wales and much of inland Victoria, particularly the north-east. Frosts start in April and end in October over most of the interior of the continent, and on the highlands of Queensland as far north as the Atherton Plateau. Minimum temperatures below 0°C can be experienced in most of the subtropical interior in June and July.

The median frost period over the continent varies from over 200 days per year in the south-eastern uplands areas south of the Hunter Valley, to none in northern Australia. The annual frost period generally decreases from about 100 days inland to below 50 days towards the coast in the southern regions of the continent, but there is widespread local variation. In Tasmania the frost period exceeds 300 days on the uplands and decreases to 100 days near the coast.

### Humidity

Australia is a dry continent in terms of the water vapour content or humidity of the air, and this element may be compared with evaporation to which it is related. Moisture content can be expressed by a number of parameters, of which the most commonly known is relative humidity. This can be thought of as the relative evaporating power of the air; when the humidity is low, a wet

surface, like our skin, can evaporate freely. When it is high, evaporation is retarded. People can feel this as discomfort or even stress as the body's ability to perspire (and hence cool) decreases with increasing relative humidity. The combination of high temperature and high humidity is potentially dangerous for people who are active in such conditions.

The main features of the relative humidity pattern are:

- Over the interior of the continent there is a marked dryness during most of the year, notably towards the northern coast in the dry season (May–October).
- The coastal fringes are comparatively moist, although this is less evident along the north-west coast of Western Australia where continental effects are marked.
- In northern Australia, the highest values occur during the summer wet season (December–February) and the lowest during the winter dry season (June–August).
- In most of southern Australia the highest values are experienced in the winter rainy season (June–August) and the lowest in summer (December–February).

### Global radiation

Global (short wave) radiation includes that radiation energy reaching the ground directly from the sun and that received indirectly from the sky, scattered downwards by clouds, dust particles, etc.

A high correlation exists between daily global radiation and daily hours of sunshine. On the north-west coast around Port Hedland, where average daily global radiation is the highest for Australia (640 milliwatt hours), average daily sunshine is also highest, being approximately 10 hours. Sunshine is more dependent on variations in cloud coverage than is global radiation, since the latter includes diffuse radiation from the sky as well as direct radiation from the sun. An example is Darwin where, in the dry month of July, sunshine approaches twice that of the wet (cloudy) month of January, but global radiation amounts for the two months are comparable.

### Sunshine

Sunshine here refers to bright or direct sunshine. Australia receives relatively large amounts of sunshine although seasonal cloud formations have a notable effect on its spatial and temporal distribution. Cloud cover reduces both incoming

solar radiation and outgoing long wave radiation, and thus affects sunshine, air temperature and other climatic elements on the Earth's surface.

Most of the continent receives more than 3,000 hours of sunshine a year, or nearly 70% of the total possible. In central Australia and the mid-west coast of Western Australia, totals slightly in excess of 3,500 hours occur. Totals of less than 1,750 hours occur on the west coast and highlands of Tasmania; this amount is only 40% of the total possible per year (about 4,380 hours).

In southern Australia, the duration of sunshine is greatest about December when the sun is at its highest elevation, and lowest in June when the sun is lowest. In northern Australia, sunshine is generally greatest over the period August to October prior to the wet season, and least over the period January to March during the wet season.

### **Cloud**

Seasonal changes in cloudiness vary with the distribution of rainfall. In the southern parts of the continent, particularly in the coastal and low-lying areas, the winter months are generally more cloudy than the summer months. This is due to the formation of extensive areas of stratiform cloud and fog during the colder months, when the structure of the lower layers of the atmosphere favours the physical processes resulting in this type of cloud. Particularly strong seasonal variability of cloud cover exists in northern Australia where skies are clouded during the summer wet season and mainly cloudless during the winter dry season. Cloud coverage is greater near coasts and on the windward slopes of the eastern uplands of Australia and less over the dry interior.

### **Fog**

The formation of fog depends on the occurrence of favourable meteorological elements — mainly temperature, humidity, wind and cloud cover. The nature of the local terrain is important for the development of fog and there is a tendency for this phenomenon to persist in valleys and hollows. The incidence of fog may vary significantly over distances as short as one kilometre.

Fog in Australia tends to be more common in the south than the north, although parts of the east coastal areas are relatively fog-prone even in the tropics. Incidence is much greater in the colder months, particularly in the eastern uplands. Fog may persist during the day, but rarely until the afternoon over the interior. The highest fog

incidence at a capital city is at Canberra which has an average of 47 days per year on which fog occurs, 29 of which are in the period May to August. Brisbane averages 20 days of fog per year. Darwin averages only two days per year, in the months of July and August.

### **Winds**

The mid-latitude anticyclones are the chief determinants of Australia's two main prevailing wind streams. In relation to the west-east axes of the anticyclones these streams are easterly to the north and westerly to the south. The cycles of development, motion and decay of low-pressure systems to the north and south of the anticyclones result in diversity of wind-flow patterns. Wind variations are greatest around the coasts where diurnal land and sea-breeze effects are important.

Orography affects the prevailing wind pattern in various ways, such as the channelling of winds through valleys, deflection by mountains and cold air drainage from highland areas. An example of this channelling is the high frequency of north-west winds at Hobart caused by the north-west to south-east orientation of the Derwent River Valley.

Perth is the windiest capital with an average wind speed of 15.6 km/h; Canberra is the least windy with an average wind speed of 5.4 km/h.

The highest wind speeds and wind gusts recorded in Australia have been associated with tropical cyclones. The highest recorded gust was 267 km/h at Learmonth, Western Australia on 22 March 1999 (occurring with Tropical Cyclone Vance); gusts reaching 200 km/h have been recorded on several occasions in northern Australia with cyclone visitations. The highest gusts recorded at Australian capitals were 217 km/h at Darwin and 156 km/h at Perth.

### **Droughts**

Drought, in general terms, refers to an acute deficit of water supply to meet a specified demand. The best single measure of water availability in Australia is rainfall, although parameters such as evaporation and soil moisture are significant, even dominant in some situations. Demands for water are very diverse, hence the actual declaration of drought conditions for an area will generally also depend on the effects of a naturally occurring water deficit on the principal local industries.

Since the 1860s there have been 10 major Australian droughts. Some of these major droughts could be described as periods consisting of a series of dry spells of various lengths, overlapping in time and space, and totalling up to about a decade. The drought periods of 1895–1903 (the so-called ‘Federation drought’), 1958–68, 1982–83 and 1991–95 were the most devastating in terms of their extent and effects on primary production. The latter drought resulted in a possible \$5b cost to Australia’s economy, and \$590m in drought relief by the Commonwealth Government. The remaining major droughts occurred in 1864–66 (and 1868), 1880–86, 1888, 1911–16, 1918–20 and 1939–45.

In this same period, several droughts of lesser severity caused significant losses over large areas of some states. They occurred in 1922–23 and 1926–29, 1933–38, 1946–49, 1951–52, 1970–72, 1976 and 1997–2000.

South-eastern Australia (New South Wales, southern Queensland, Victoria, Tasmania and the settled parts of South Australia) contains about 75% of the nation’s population, and droughts affecting this region have a markedly adverse impact on the economy. There have been nine severe droughts in south-eastern Australia since 1888, and these were encompassed within the major Australian droughts specified above, except for the severe drought in 1972. Drought definitions, and the area of coverage and length of droughts, together with related information, may be obtained from the article *Drought in Australia*, in *Year Book Australia 1988*.

## Floods

Widespread flood rainfall may occur anywhere in Australia, but it has a higher incidence in the north and in the eastern coastal areas. It is most economically damaging along the shorter streams flowing from the eastern uplands eastward to the seaboard of Queensland and New South Wales. These flood rains are notably destructive in the more densely populated coastal river valleys of New South Wales — the Tweed, Richmond, Clarence, Macleay, Hunter and Nepean–Hawkesbury — all of which experience relatively frequent flooding. Although chiefly caused by summer rains, they may occur in any season.

The great Fitzroy and Burdekin river basins of Queensland receive flood rains during the summer wet seasons. Much of the run-off due to heavy rain in north Queensland west of the eastern uplands flows southward through the normally dry channels of the network of rivers

draining the interior lowlands into Lake Eyre. This widespread rain may cause floods over an extensive area, but it soon seeps away or evaporates, occasionally reaching the lake in quantity. The Condamine and other northern tributaries of the Darling also carry large volumes of water from flood rains south through western New South Wales to the Murray, and flooding occurs along their courses at times.

Flood rains occur at irregular intervals in the Murray–Murrumbidgee system of New South Wales and Victoria, the coastal streams of southern Victoria and the north coast streams of Tasmania.

## Water resources

Rainfall, or the lack of it, is the most important single factor determining land use and rural production in Australia. The scarcity of both surface water and groundwater resources, together with the low rates of precipitation which restrict agriculture (quite apart from economic factors), has led to extensive programs to regulate supplies by construction of dams, reservoirs, large tanks and other storages.

The major topographical feature affecting the rainfall and drainage patterns in Australia is the absence of high mountain barriers. Australia’s topographical features encompass sloping tablelands and uplands along the east coast Main Divide, the low plain and marked depression in the interior, and the Great Western Plateau.

Only one-third of the Australian land area drains directly to the ocean, mainly on the coastal side of the Main Divide and inland with the Murray–Darling system. With the exception of the latter, most rivers draining to the ocean are comparatively short, but account for the majority of the country’s average annual discharge. Surface drainage is totally absent from some arid areas of low relief.

Australia’s large area (just under 7.7 million square kilometres) and latitudinal range (3,680 km) have resulted in climatic conditions ranging from alpine to tropical. Two-thirds of the continent are arid or semi-arid, although good rainfalls (over 800 mm annually) occur in the northern monsoonal belt under the influence of the Australian–Asian monsoon, and along the eastern and southern highland regions under the influence of the great atmospheric depressions of the Southern Ocean. The effectiveness of the rainfall is greatly reduced by marked alternation of wet and dry seasons, unreliability from year to year, high temperatures and high potential evaporation.

1.12 AUSTRALIA'S MAJOR GROUNDWATER RESOURCES

State/territory	Area of aquifers km <sup>2</sup>	Major divertible resource					Total	Abstraction during 1983-84 GL
		Fresh GL	Marginal GL	Brackish GL	Saline GL	GL		
New South Wales	595 900	881	564	431	304	2 180	242	
Victoria	103 700	469	294	69	30	862	146	
Queensland	1 174 800	1 760	683	255	144	2 840	962	
South Australia	486 100	102	647	375	86	1 210	504	
Western Australia	2 622 000	578	1 240	652	261	2 740	355	
Tasmania	7 240	47	69	8	—	124	5	
Northern Territory	236 700	994	3 380	43	10	4 420	24	
<b>Australia</b>	<b>5 226 440</b>	<b>4 831</b>	<b>6 877</b>	<b>1 833</b>	<b>835</b>	<b>14 376</b>	<b>2 238</b>	

Source: Australian Water Resources Council, 1987.

The availability of water resources controls, to a large degree, the possibility and density of settlement; this in turn influences the quality of the water through production and disposal of waste. Most early settlements were established on the basis of reliable surface water supplies and, as a result, Australia's population is concentrated along the coast, mainly in the comparatively fertile, well-watered east, south-east and far south-west.

As settlement spread into the dry inland grazing country, the value of reliable supplies of underground water was realised. Observations of the disappearance of large quantities of the rainfall precipitated on the coastal ranges of eastern Australia eventually led to the discovery of the Great Artesian Basin which has become a major asset to the pastoral industry. Development, however, has not been without costs. Significant environmental degradation and deterioration in water quality are becoming evident. Table 1.12 summarises Australia's major groundwater resources.

Permanent rivers and streams flow in only a small part of the continent. The average annual discharge of Australian rivers has been recently assessed at 387 thousand gegalitres, of which 100 thousand gegalitres are now estimated to be exploitable on a sustained yield basis. This is small in comparison with river flows on other continents.

In addition, there is a pronounced concentration of run-off in the summer months in northern Australia, while the southern part of the continent has a distinct, if somewhat less marked, winter maximum.

Even in areas of high rainfall, large variability in flow means that, for local regional development, most streams must be regulated by surface storage. However, in many areas evaporation is so great that storage costs are high in terms of yield. Extreme floods also add greatly to the cost of water storage, because of the need for adequate spillway capacity.

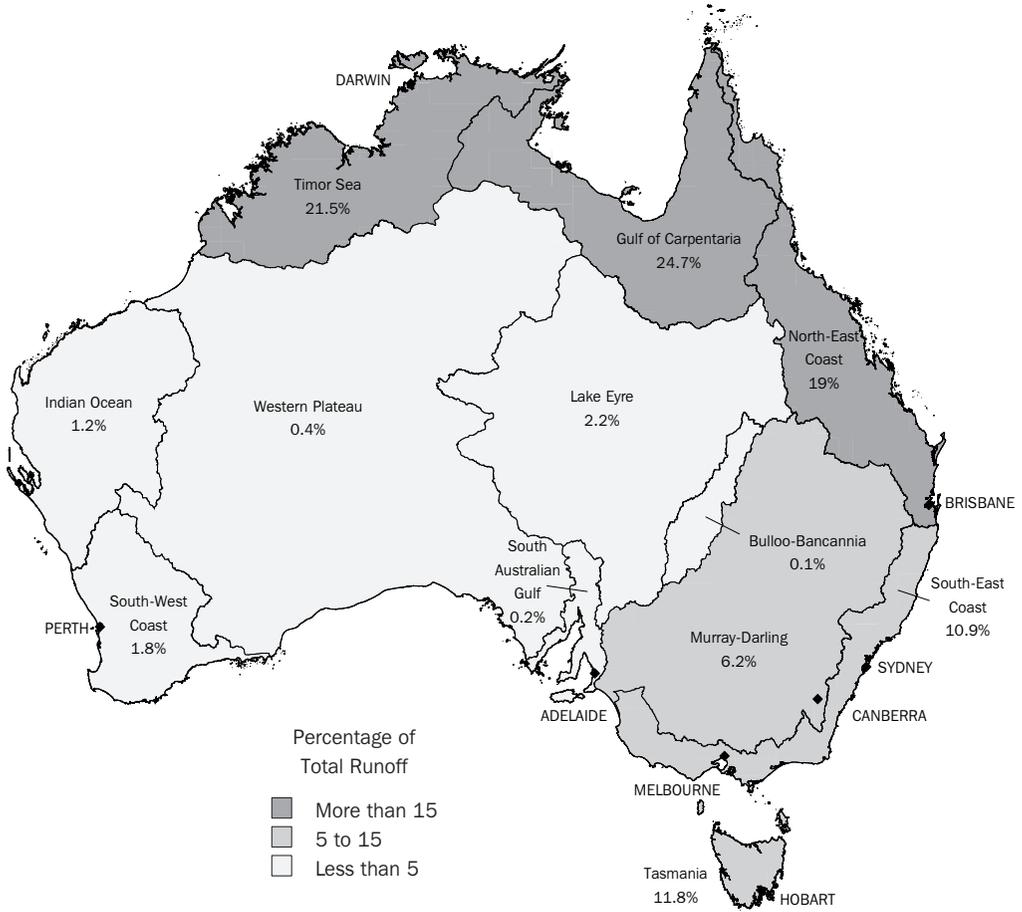
Table 1.13 provides a broad comparison of rainfall and run-off by continent. Map 1.14 shows the location of Australia's Drainage Divisions, and table 1.15 summarises Australia's surface water resources by Drainage Division. The Drainage Division with the highest intensity of run-off is Tasmania with 11.8% of the total from only 0.9% of the area. Conversely, the vast area of the Western Plateau (2,450,000 square kilometres, approximately 32% of Australia) has no significant run-off at all.

1.13 RAINFALL AND RUN-OFF OF THE CONTINENTS

Continent	Average yearly rainfall		Run-off	
	mm	mm	%	km <sup>3</sup>
Africa	690	260	38	7 900
Asia	600	290	48	13 000
Australia	465	57	12	440
Europe	640	250	39	2 500
North America	660	340	52	6 900
South America	1 630	930	57	16 700

Source: O'Brien WT, McGregor A & Crawshaw B 1983, 'In-stream and Environment Issues', 'Water 2000: Consultant's Report No. 9', AGPS, Canberra.

1.14 DRAINAGE DIVISIONS AND RUN-OFF



Source: National Land and Water Resources Audit, 2000.

## 1.15 SURFACE WATER RESOURCES

Drainage division	Area	Mean annual run-off	Mean annual run-off	Mean annual outflow	Volume diverted
	km <sup>2</sup>	GL	%	GL	GL
North-East Coast	451 000	73 411	19.0	n.a.	3 182
South-East Coast(a)	274 000	42 390	10.9	40 591	1 825
Tasmania(b)	68 200	45 582	11.8	45 336	451
Murray–Darling(a)	1 060 000	23 850	6.2	5 750	12 051
South Australian Gulf(c)	82 300	952	0.2	797	144
South-West Coast	315 000	6 785	1.8	5 925	373
Indian Ocean	519 000	4 609	1.2	3 481	12
Timor Sea	547 000	83 320	21.5	81 461	48
Gulf of Carpentaria	641 000	95 615	24.7	24 748	52
Lake Eyre	1 170 000	8 638	2.2	n.a.	7
Bulloo-Bancannia	101 000	546	0.1	—	<1
Western Plateau	2 450 000	1 486	0.4	n.a.	1
<b>Total</b>	<b>(d)7 680 000</b>	<b>387 184</b>	<b>100.0</b>	<b>..</b>	<b>18 147</b>

(a) South-East Coast and Murray–Darling Division. The volume diverted represents the sum of available data (NSW has not reported water use for unregulated surface water management areas). (b) Tasmanian Division. Volume diverted does not include the Hydro scheme diversions. (c) South Australian Gulf Division. Mean annual outflow includes the flow from surface water management areas Willochra Creek and Lake Torrens, which do not flow to the sea, but flow into the terminal lake, Lake Torrens. (d) Total area differs slightly from that in table 1.1, due to improvements in mapping reflected in that table, but not in this table.

Source: National Land and Water Resources Audit, 2000.

To summarise, the mean annual run-off across Australia is 387 thousand gigalitres. The portion of run-off able to be diverted for use is very low compared to that in other continents, and results from the high variability of stream flow, high rates of evaporation and the lack of storage sites on many catchments. On an Australia-wide basis, only about a quarter of the divertible resource has currently been developed for use; much of the remaining resource is available in remote regions where development is impractical and uneconomic. In areas such as the Murray–Darling Division, where water is scarce, there are few resources not yet developed, and management is focusing on greater efficiency in water use.

Water resources are assessed within a framework comprising four levels:

- The *total* water resource is the volume of water present in the environment, measured as mean annual run-off for surface water, and mean annual recharge for groundwater.
- The *divertible* resource is the portion of run-off and recharge which can be developed for use.
- The *developed* resource is the portion of the divertible resource which has been developed for use.
- Resource *utilisation* is a measure of the portion of the developed resource which is actually used.

Emphasis is given to the second level of assessment, the divertible resource, as the prime measure of the resource. The divertible resource is defined as the average annual volume of water which, using current technology, could be removed from developed or potential surface water or groundwater sources on a sustained basis, without causing adverse effects or long-term depletion of storages.

Australia's water resources are managed by a large number of resource management agencies, irrigation authorities, metropolitan water boards, local government councils and private individuals. State authorities dominate the assessment and control of water resources as, under the Commonwealth Constitution, primary responsibility for management of water rests with the individual state governments. The Commonwealth Government is responsible for matters relating to the territories, and participates indirectly through financial assistance or directly in the coordination or operation of interstate projects through bodies such as the Murray–Darling Basin Commission.

A description of the management, main storage and use of water resources across the states and territories is contained in the chapter *Water resources* in the 1994 and earlier editions of Year Book Australia.

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Geoscience Australia, <<http://www.ga.gov.au>> and <<http://www.auslig.gov.au>>

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# Climate change

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*This article was contributed by Professor John W Zillman AO. Professor Zillman has been Director of Meteorology since July 1978. He has served as Principal Delegate of Australia to the Intergovernmental Panel on Climate Change since 1994 and has been President of the World Meteorological Organization since 1995.*

There is a lot of confusion in the world about climate change. The first purpose of this article is to explain what is meant by 'climate' and 'climate change' in order to understand why so much of the discourse on the subject seems like the dialogue of the deaf — why the proponents of alternative perspectives still appear to be talking past each other on even very basic issues of climate science and policy; and why it has proved so difficult to achieve consensus on practical strategy for reducing whatever adverse long-term impacts humans may be having on climate and helping the world to prepare for whatever future the global climate system delivers over the coming decades and coming centuries.

The second purpose is to look back over the 20th century and show how Australian climate has changed in the past; and then to summarise what can, at present, be said, and what can not be said, about how it might change over the century ahead.

## The meaning of climate change

We all have an intuitive sense of what we mean by climate. It is both our synthesis of the weather we have experienced in the past and our expectation of what it will be like in the future, at a particular place and time of year. Our recollections of the past are not so much of the monthly or yearly averages of temperature, humidity, cloud, wind and rainfall, but of the impacts on significant occasions in our lives of their hour-to-hour, day-to-day and week-to-week variability; and especially of the extreme events — the severe storms, the gales, the heatwaves and the droughts and floods — from which these long-term averages derive. We remember that we have had both hot and cold summers in the past and we sense that we must expect them again in the future. Those with long memories recall the years of widespread drought in the 1960s just as they do the floods of the 1970s and 1990s. And

there are few Australians over fifty who have not asserted that 'the weather these days isn't like it was when I was young'.

The statistics of Australia's meteorological records tend to bear out these subjective impressions and, in a very real sense, the climate has always been changing — from year-to-year, decade-to-decade, and century-to-century. We also know from proxy — mainly geological — evidence that it has been changing also on much longer timescales, from thousands to millions of years, as the Earth moved into and out of the great ice ages of the past before returning to the more benign climates of the present ten-thousand-year-long Holocene 'interglacial'.

Contemporary Earth system science can explain most of the features of present-day climate and how it has changed over time: why the tropics are warm and the polar regions cold; how the 'greenhouse effect' of water vapour, carbon dioxide and other trace gases in the atmosphere keeps the Earth's surface some 70°C warmer than it is 10 km above, where jet aircraft fly, and some 33°C warmer than it would be, on average, if there were no radiatively active gases in the atmosphere; how the large-scale distribution of the continents modifies the north-south overturning of the atmosphere and oceans that is driven by the solar heating of the equatorial belt; and, perhaps most significantly of all, how the instabilities in the jet streams generated by the north-south overturning provide the energy source for most of the day-to-day weather phenomena that make up our climate. Because of the differing natural timescales of the atmosphere and ocean and the strength of the coupling between them, the explanation of the mechanisms of climate involves an integrated scientific understanding of the entire Earth system, consisting of the

atmosphere, the oceans, and the land surface and inland waters and of all the physical, chemical and biological processes that take place within them.

If this is the nature and origin of climate, what then do we mean by 'climate change'? Until a few decades ago, the term 'climate change' was mostly taken to mean the major astronomically-induced shifts from ice-age to interglacial on timescales of tens to hundreds of thousands of years or, less usually, systematic change of the long-term (by international convention, 30 years) statistics of the climate elements (temperature, pressure, wind, rain, etc.) sustained for several decades or longer.

The situation became greatly confused in the early 1990s as a result of the emerging concern that, in addition to the natural variability of climate on all timescales, the build-up of greenhouse gases in the atmosphere from the burning of fossil fuel and other human activities may be leading to systematic long-term increase of globally-averaged surface temperature (via an enhanced greenhouse effect) and other irreversible changes in climate. With its focus on human interference with the working of the climate system, the United Nations Framework Convention on Climate Change, signed by more than 150 countries at the 1992 Rio Earth Summit, defined climate change as 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'.

Thenceforth, to those who speak and listen in the language of the Convention, any statement that climate change is occurring has meant that it is attributable to human activity. The scientific community, however, have taken a different approach. The Intergovernmental Panel on Climate Change (IPCC), the assessment body set up in 1988 by the World Meteorological Organization and the United Nations Environment Programme to provide objective, expert assessment of the state of understanding of the science, impacts and response strategy for climate change, has defined climate change as 'any change in climate over time whether due to natural variability or as a result of human activity'. It is this (IPCC) usage which is adopted here with the purpose of summarising what can be said about past and future climate change in Australia as a result of both natural variability and human interference with the global climate system.

## The controls on Australian climate

The broad-scale controls on Australian climate are shown schematically in figure S1.1. The two major influences are:

- the north-south overturning of the atmosphere that generates the mid-latitude jet stream and the succession of 'highs' and 'lows' that move across southern Australia from west to east, bringing the never-ending succession of fronts, troughs, warm northerlies, cold southerlies, rain and fine weather
- the slow east-west overturning of the atmosphere across the tropical Pacific that is driven by the ocean temperature differences between the warm western Pacific and cool eastern Pacific Ocean, and which fluctuates on an approximately two to seven-year timescale as the central and eastern Pacific warms and cools with the irregular cycle of El Niño and La Niña events.

In El Niño years, when the central and eastern Pacific are warm, the ascent and cloudiness over the western Pacific are suppressed and there is a lower probability of rain-bearing systems affecting northern and eastern Australia. La Niña events, on the other hand (which are characterised by an unusually cold eastern Pacific and a warm western Pacific), usually mean a higher probability of rain-bearing systems and flooding over northern and eastern Australia.

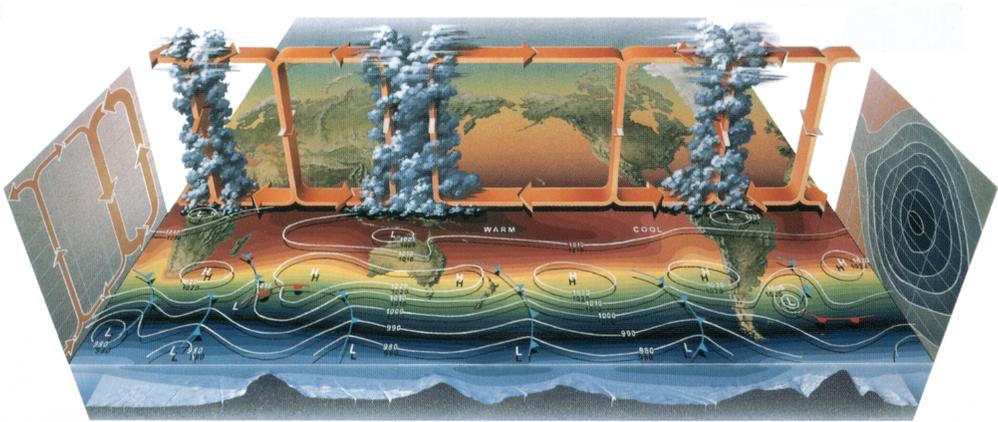
## Climate change over the past century

The 20th century witnessed some major fluctuations and trends in Australian temperature and rainfall as well as in a host of other characteristics of Australian climate. Graph S1.2 shows the annual mean temperature averaged across Australia on the basis of a network of high-quality observing stations and presented in terms of anomalies (departures) from the 1961–90 'normal'. It is evident that, with the notable exception of 2000 and 2001, most years of the past two decades have been above the 1961–90 normal and approximately half a degree warmer than the average for the first half of the century. The general warming trend over

the 20th century is evident in both summer and winter temperatures as well as in daily maxima and minima, with night-time minimum temperatures generally rising faster than daytime maxima. The distinct warming trend of the past half-century, evident in graph S1.2 which is of the same general magnitude as the observed globally-averaged warming described in the recent Third Assessment Report of the IPCC (IPCC 2001a) is not, however, uniform across

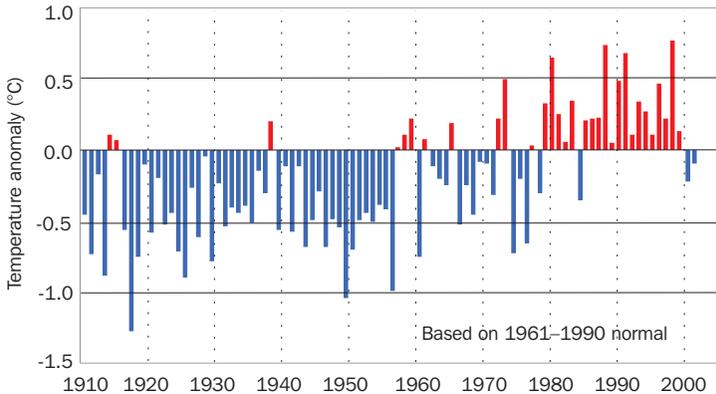
Australia, as can be seen in map S1.3. Whereas parts of Queensland have warmed by more than one degree over the past 50 years (with the greatest warming evident in the night time minima), parts of New South Wales and Victoria and large areas of north-west Australia have experienced only minimal warming, or have actually cooled, over the period.

**S1.1 LARGE-SCALE CONTROLS ON AUSTRALIAN CLIMATE**



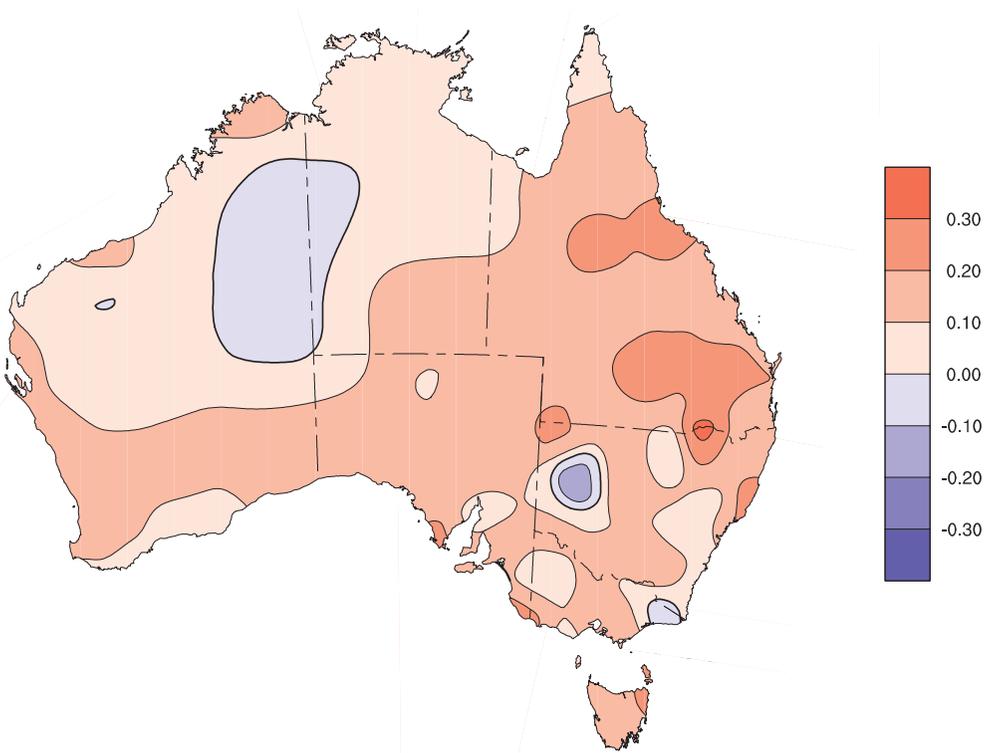
Note: The solar heating of the tropics drives the north-south (Hadley) overturning of the atmosphere (shown schematically on the left), which generates the meandering westerly jet stream (wind speed cross section shown on the right with wind speeds of a few hundred km per hour in the jet core) and the migratory weather-producing lows and highs of the middle latitudes. The east-west (Walker) circulation of the tropics is driven primarily by the temperature differences between the warm western and cool eastern Pacific Ocean. Its season-to-season and year-to-year fluctuations (and occasional reversal) exert a major influence on the occurrence of cloud and rain producing systems in Australian longitudes.

**S1.2 CHANGES OF ANNUAL MEAN TEMPERATURE**



Note: The changes of annual mean temperature (°C) averaged over Australia since 1910. Temperatures are shown as departures from the 1961-90 'normal'.

### S1.3 AVERAGE TREND IN ANNUAL MEAN TEMPERATURE (°C/10 yrs) — 1950–2001



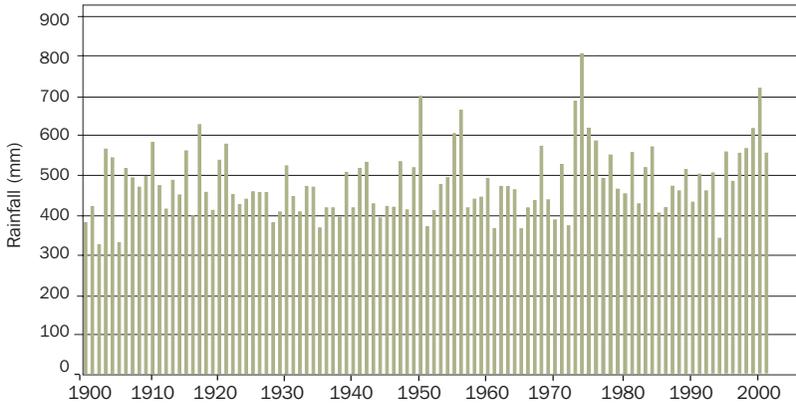
Note: Pink and red areas have experienced average warming over the period while blue areas have experienced a cooling trend.

The long-term record of area-average rainfall over Australia is shown in graph S1.4, which highlights the large year-to-year and decade-to-decade variability of rainfall with long, dry periods following Federation and again in the 1920s, 1930s, 1940s and 1960s, and above-average rain in the mid 1950s and 1970s and for most of the past decade. While there is a very slight long-term trend towards increased rainfall for Australia as a whole, the pattern is highly variable from region to region and, over the past 50 years, most of central and north-west Australia has got wetter, while south-west Western Australia, Victoria and much of New South Wales and Queensland have got drier (map S1.5).

### The cause of the observed change

Much of the Australian and international climate research effort over recent decades has been aimed at developing sufficiently reliable models of the global climate system to enable scientists to find out how much of the observed change over the past century is the result of various forms of natural variability and how much can be attributed confidently to the influence of human activities; and then to use those models to provide an indication as to how climate might evolve over the next century, both as a result of natural processes and in response to human influences through greenhouse gas emissions or in other ways.

## S1.4 MEAN ANNUAL RAINFALL



Note: It is evident that, for the country as a whole, the rainfall has changed markedly from year-to-year and decade-to-decade, with the very wet years of the 1970s and over the period 1997–2001 suggesting a slight long-term trend towards a wetter Australia.

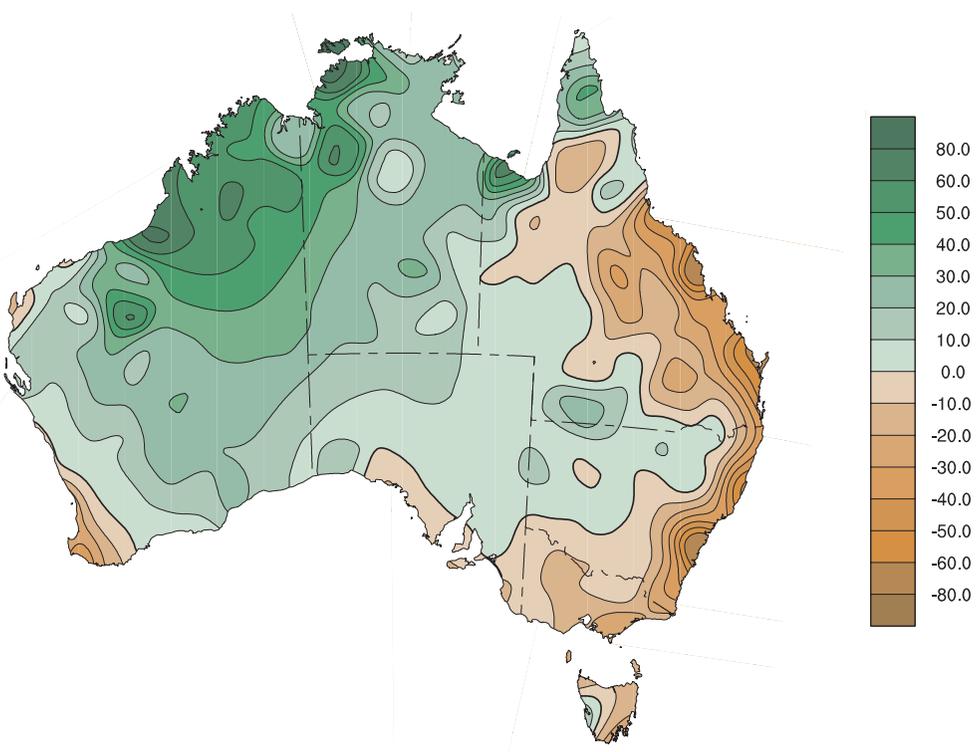
At the global level, the IPCC, in its Third Assessment Report, has concluded, on the basis of the longer and more closely scrutinised temperature record and new model estimates of both natural variability and climate system response to forcing by natural processes (e.g. volcanoes and changes in solar output) and human influences (especially emission of greenhouse gases and aerosols), that 'there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities' (IPCC 2001a).

Although it is more difficult to demonstrate on a sound scientific basis and there may still be extraneous influences (e.g. from the so-called 'urban heat island' effect) in even the high quality data sets on which graph S1.2 is based, there appears to be good reason to believe that the overall warming trend over Australia over the past half century is also largely a result of enhanced greenhouse warming. It is almost impossible, however, to separate out the effect of human influence from natural factors on smaller space and time scales in, say, explaining why Queensland has warmed more than parts of New South Wales (map S1.3). In the absence of any convincing basis for attribution of the geographic pattern of warming to human influence (albeit some plausible physical hypotheses have been

advanced), the presumption must be in favour of natural processes as the primary explanation of the spatial variability of the observed rate of warming over Australia.

It is impossible to determine, with any confidence, at this stage whether the spatial pattern of trend in rainfall (map S1.5) is the product of processes associated with natural large-scale and long-term fluctuations in the oceanic and atmospheric circulation of the Southern Hemisphere (the so-called Antarctic circumpolar wave, natural long-term variability of the El Niño–Southern Oscillation mechanisms or the like) or whether the circulation changes causing these patterns of rainfall trend (and at least part of the associated pattern of temperature trends) are an early manifestation of the systematic shifts in climate patterns that some global climate models suggest should be expected from the build-up of atmospheric greenhouse gas concentrations over the past century. Some features of the pattern (drying in south-west Western Australia and Victoria) are, however, broadly consistent with the majority of presently available model projections under an enhanced greenhouse warming scenario.

### S1.5 AVERAGE TREND IN TOTAL RAINFALL (mm/10 yrs) — 1950–2001



Note: The average trend (mm/decade) in annual total rainfall over Australia over the past half century, showing the strong trend towards wetter conditions over north-west Australia and a drying trend over much of eastern Australia and the southwest corner.

## Impacts of climate change

Considerable research has been carried out over the past century on the impacts of climate change on the Australian environment, economy and way of life (Gibbs 1978; Pittock et al. 1978; Maunder 1989); and in particular on Australian water resources and agriculture. One of the most important components has been the work on assessment of the probability and return periods of extreme rainfall events of various magnitude for design of dams and other long-term water resource-related infrastructure.

The Australasian chapter of the IPCC Special Report on Regional Impacts of Climate Change (IPCC 1998) and the corresponding section of the Third Assessment Report on Impacts, Adaptation and Vulnerability (IPCC 2001b) provide an overview of present knowledge of both past and

prospective impacts of climate change in such sectors as water supply, ecosystems and conservation, food and fibre, settlements and industry, and human health.

It is clear from the experience of the past century that the challenge of living with climate change in Australia has not so much been that of adapting to long-term trends resulting from human activity, but rather that of planning and managing for the large natural year-to-year and decade-to-decade variability of rainfall and other characteristics of Australian climate. The lessons learned from this experience will be critical to the 21st century challenge of living with whatever human-induced long-term change is superimposed on the continuing natural variability.

## Modelling anthropogenic climate change

The major challenge faced by climate scientists, called on to advise policymakers on how increasing anthropogenic emissions of carbon dioxide and other greenhouse gases will affect future global and regional climate, focuses on the construction of sufficiently soundly-based and demonstrably reliable global climate models to simulate how the real atmosphere and ocean would respond to a range of possible future emissions of greenhouse gases and aerosols through the 21st century. The IPCC's Third Assessment Report (IPCC 2001a, b) has indicated that some 20 to 30 models around the world have reached a sufficient level of sophistication and reliability to justify confidence in their assessment of the sensitivity of the large scale features of global climate (global mean temperature, rainfall etc.) to increasing greenhouse gas emissions, but that it is still not possible to attach much confidence to the models' projections of the anthropogenic component of climate change at the regional level.

The use of these climate models to explore possible future anthropogenic climate change is based on the rigorous, but widely misunderstood, methodology of feeding a range of emission *scenarios* (not *predictions*) into atmospheric chemistry models to produce concentration *scenarios* (not *predictions*) which are then used, in turn, to produce corresponding *projections* (not *predictions*) of how the enhanced greenhouse effect would be expected to modify the real climate. This methodology avoids the impossible task of trying to predict a future which would itself be significantly influenced by society's response to the prediction. It enables us to gain an understanding of the sensitivity of the global climate system to increasing (or decreasing) emissions without making any assumption about the actual likelihood of one future emission profile relative to another. A schematic summary of the global warming and sea level projections for the 21st century included in the IPCC's Third Assessment Report (IPCC 2001a) is shown in graph S1.6.

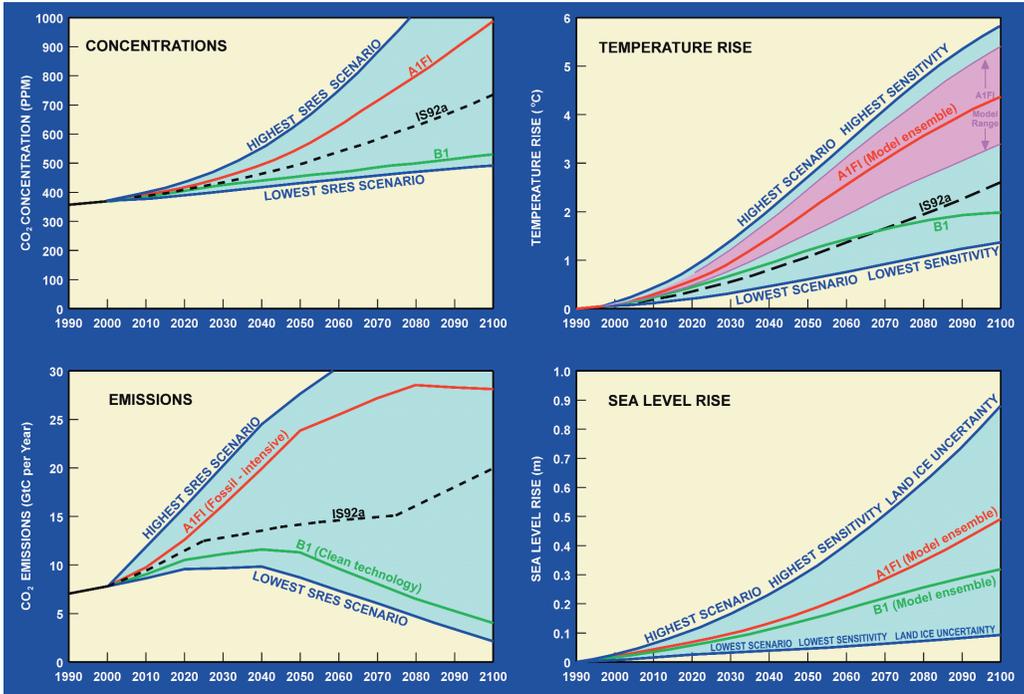
## The current state of knowledge

The current state of the science of climate change is reported comprehensively in the Third Assessment Report (IPCC 2001a). The key conclusions, which the IPCC includes in its Summary for Policymakers, are the following:

- An increasing body of observations gives a collective picture of a warming world and other changes in the climate system.
- Emissions of greenhouse gases and aerosols due to human activities continue to alter the atmosphere in ways that are expected to affect the climate.
- Confidence in the ability of models to project future climate has increased.
- There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.
- Human influences will continue to change atmospheric composition throughout the 21st century.
- Global average temperature and sea level are projected to rise under all IPCC SRES (Special Report on Emissions Scenarios) scenarios.
- Anthropogenic climate change will persist for many centuries.

Despite the exhaustive process of peer review and the IPCC policy of explicitly identifying areas of uncertainty and disagreement in its reports, there is a substantial body of sceptical literature taking issue with its main conclusions (e.g. Lomborg 2001). While much of this appears to be based on misunderstanding of the IPCC reports (e.g. confusion between the IPCC and Convention definitions of 'climate change', failure to understand the significance of the difference between scenarios, projections and predictions and even failure to understand the implications of the basic physics of the greenhouse effect), other critics have focused on perceived inconsistencies in the observational record and the various well-known sources of uncertainty in physical processes and model limitations<sup>1</sup>. While it is expected that the Fourth Assessment Report, due in 2006–07, will bring both new confidence and new sources of uncertainty, the conclusions of the Third Assessment Report remain the most up-to-date and most reliable summary of the state of knowledge of the science of climate change (Zillman 2001).

### S1.6 MODELLED SENSITIVITY OF GLOBAL MEAN TEMPERATURE AND SEA LEVEL TO GREENHOUSE GAS EMISSIONS



Note: The graphs show, for a wide range of emission scenarios (the lowest, highest and two 'illustrative' scenarios — A1FI (fossil intensive) and B1 (clean technology) — published in the IPCC Special Report on Emission Scenarios (SRES) (IPCC 2000)), the carbon dioxide emission profiles to 2100 (bottom left), the resulting carbon dioxide concentrations (top left), the model projections of global mean temperature rise (top right) and sea level rise (bottom right). The temperature panel provides an indication of the range of uncertainty of the projections resulting from the different climate sensitivities of the individual models (pink shading) as well as the model mean projections for the A1FI and B1 scenarios and the envelope of climate change projections associated with the envelope of emission scenarios included in the IPCC Report.

## Future climate change over Australia

By contrast with short-term weather prediction which has achieved increasingly high levels of skill over the past 50 years, climate prediction is still in its infancy as a science (WMO 2002). While a number of empirical systems for assessing the probability of above or below normal rainfall and temperature are employed operationally (e.g. by the National Climate Centre of the Commonwealth Bureau of Meteorology) for producing usefully skilful seasonal climate outlooks, and coupled atmosphere–ocean models are now available which can predict the broad evolution of ocean temperature and other climate patterns for six to twelve months ahead, most of the forecast skill runs out beyond a year or so and it is not possible to indicate likely

climate patterns, either globally or for individual geographic regions, with much confidence on longer timescales.

Given contemporary understanding of the mechanisms of global and regional climate, the most confident statement that can be made about the next decade and the next century is that Australia must expect to continue to experience the major El Niño- and La Niña-associated multi-year fluctuations of temperature and rainfall which have earned it its reputation for climate extremes and its image as a land of 'droughts and flooding rains'. There is, as yet, no sound scientific basis for predicting any specific change to this year-to-year and decade-to-decade variability, which must be expected to continue to be the dominant climatic influence on Australia's environment, economy and way of life. But it

is certainly possible that some large-scale fluctuation, outside the range of experience of the past two hundred years of instrumental records, will manifest itself in Australian climate patterns over the next century.

The next most confident thing that we can say about future climate change in Australia is that there seems likely to be a general warming trend, as a result of the inevitable continued build-up of greenhouse gases in the atmosphere, of up to perhaps a few degrees over the century, superimposed on whatever temporal and spatial change (including short-term variability) occurs as a result of natural processes. While the IPCC Third Assessment Report (IPCC 2001a) has indicated that, *for the full range of greenhouse gas emission scenarios considered by the IPCC*, and allowing for uncertainties in the climate models 'the globally averaged surface temperature is projected to increase by 1.4 to 5.8°C over the period 1990 to 2100' and that 'it is very likely that nearly all land areas will warm more rapidly than the global average', it is clearly not possible, at this stage, to know how *actual emissions* will increase (or decrease) over the next hundred years, and therefore how large will be the globally averaged temperature rise due to enhanced greenhouse warming. It is even more difficult, given the possibility of significant rearrangement of the large-scale circulation (e.g. through changes in the behaviour of the El Niño–La Niña cycle) to predict the actual temperature rise (and any associated change in rainfall) over Australia as a whole. And it is quite impossible, given all these uncertainties and the still substantial limitations of the climate models, to indicate what the enhanced greenhouse effect might mean by way of *regional* changes of rainfall patterns for the individual states and territories. While the IPCC Third Assessment Report (IPCC 2001a) includes some broad indications of the extent and nature of inter-model consistency in the projections of temperature and rainfall trends for northern Australia (north of 28°S) and southern Australia separately, for two different SRES emission scenarios (A2 and B2 which fall broadly within the envelope of the A1FI and B1 scenarios of graph S1.6, with A2 producing larger

concentrations and greater warming than B2) for summer and winter (table S1.7), it seems that little can be said, with any confidence, about future climate change on the scale of the individual states of Australia at this stage.

While other, higher resolution, assessments have been undertaken for a range of global emission scenarios and using a number of different models to indicate the corresponding range of projected changes in regional climate (e.g. Whetton et al. 2002), which provide a basis for sensitivity studies as an aid to planning for adaptation to future climate, these regional model *projections* should *not* be interpreted as *predictions* of the human-induced component of future climate change and certainly not as predictions of future climate. It may still be decades before that is likely to be done with confidence, and it is not yet possible to say whether it will ever be done with reliability.

## The challenges ahead

The attribution of observed climate change to human activities and the projection of human impacts on future climate are likely to remain controversial, but progress in both areas will be essential to planning for efficient adaptation to future climate. Until, for example, we know whether the recent systematic drying of the south-west corner of Australia (Indian Ocean Climate Initiative Panel 2002; see also map S1.5) is due to some natural long-term fluctuation in (say) the southern ocean — in which case we would expect rainfall to increase again in the future; or whether it is a manifestation of large-scale geographically-anchored circulation changes forced by enhanced greenhouse warming — in which case we would expect the drying trend to continue — it will be very difficult to provide a reliable basis for planning for adaptation on the century timescale. The importance and urgency of better monitoring and modelling of Australian climate cannot be overstated.

### 1.7 INTER-MODEL CONSISTENCY OF THE PROJECTIONS OF FUTURE TEMPERATURE AND RAINFALL CHANGE — Northern and southern Australia

Scenario	Summer		Winter	
	Temperature	Rainfall	Temperature	Rainfall
Northern Australia				
A2	0	0	+	-
B2	0	0	+	-
Southern Australia				
A2	0	+	0	-
B2	0	0	0	-

Note: A summary of inter-model consistency of the projections of future temperature and rainfall change separately for northern Australia (north of 28°S) and southern Australia for the IPCC A2 and B2 emission scenarios. The results are from nine models used by the IPCC. A '0' means that there is little consistency between models on the size or sign of the projection. In the case of temperature, this means that the model projected *regional* warming may be either above or below the model projected *global* warming and, in the case of rainfall, it means that some models project a rainfall increase and others a rainfall decrease. A '+' means that at least seven of the nine models agree on greater than global average warming (for the model concerned) or a small projected rainfall increase (between 5 and 20%). Similarly a '-' sign means that at least seven of the nine models agree on a small (between 5% and 20%) decrease in rainfall.

## Endnote

1. *Chapter 14, Environment* refers to even more recent concerns raised about some of the underlying assumptions associated with the scenarios outlined in the Third Assessment Report (ed.).

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*This chapter was contributed by the Department of the Parliamentary Library of the Parliament of the Commonwealth of Australia.*

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## Introduction

Australia has a federal system of government within which there are four divisions: Commonwealth, state, territory and local government.

This chapter outlines the basic features of the Australian system of government, including:

- the constitutional basis of government
- the Sovereign
- the Governor-General
- the Commonwealth Parliament
- the Commonwealth Government
- the Australian Public Service
- Commonwealth elections
- state government
- territory government — self-governing
- territory government — non-self governing
- local government
- the party system.

It also provides details of the Commonwealth ministry, and of the state and territory political leaders.

The chapter concludes with an article *Should the House of Representatives have four-year terms?*

## The constitutional basis of government

Australia is a constitutional democracy based on a federal division of powers. The constitutional basis of government consists of:

- the Commonwealth Constitution, including amendments made to that Constitution
- legislation passed by the Commonwealth Parliament and the state and territory parliaments
- High Court judgments
- state and territory Constitutions, including amendments
- significant conventions of responsible government adopted from the system of government in use in the United Kingdom (the ‘Westminster’ system) that are in use at both the Commonwealth and state levels of government.

## Commonwealth Constitution

The national Constitution is found in the *Commonwealth of Australia Constitution Act 1900* (UK), a British Act that became law in July 1900 and came into force on 1 January 1901.

Amendment of the written Commonwealth Constitution is by Act of Parliament followed by public referendum. Any proposed law for the alteration of the Constitution must be passed by an absolute majority of each House of Parliament (except in circumstances specified in Section 128 of the Constitution which permits a referendum to proceed if passed by only one chamber). It must also be submitted to a referendum of the electors in each state and territory. An amendment must be approved by a majority of the voters in a majority of the states and by a majority of all voters.

Since 1901, 44 proposals have been submitted to referenda. The consent of the electors has been given in regard to eight matters:

1906 — election of senators

1910 — state debts

1928 — state debts

1946 — social services

1967 — Aboriginal people

1977 — Senate casual vacancies

1977 — retirement age for federal judges

1977 — the right of territory electors to vote in constitutional referenda.

Each state and territory has its own Constitution found in legislation. Where a law of a state is inconsistent with a law of the Commonwealth, the latter law prevails and the former law is, to the extent of the inconsistency, invalid (for state and territory government, see later sections).

## The Sovereign

Since 7 February 1952, the Australian Sovereign has been Queen Elizabeth the Second.

On 6 November 1999 a vote to establish Australia as a republic was put to a national referendum. The proposal was defeated, with 54.9% of electors voting against it.

## The Governor-General

The Governor-General is the representative of the Sovereign, appointed by the Sovereign on the advice of the Australian Prime Minister.

### Powers and functions

The Governor-General exercises the executive power of the Commonwealth of Australia on the advice of the Prime Minister. Certain other powers and functions conferred by the Constitution include the powers to:

- appoint times for holding the sessions of the Parliament
- prorogue Parliament
- dissolve the House of Representatives
- cause writs to be issued for general elections of members of the House of Representatives
- assent in the Queen's name to a proposed law passed by both houses of the Parliament
- choose and summon executive councillors, who hold office during the Governor-General's pleasure
- appoint ministers of state for the Commonwealth of Australia.

In addition, the Governor-General, as the Queen's representative, is Commander-in-Chief of the Defence Forces. Many Acts of the Commonwealth Parliament provide that the Governor-General may make regulations to give effect to such Acts. The Governor-General may also be authorised by statute to issue proclamations, for example, to declare an Act in force. The Governor-General has been given power by statute to legislate for certain of the Australian territories.

The Governor-General also has what are referred to as 'reserve powers'. These may be used without the advice of the Prime Minister, but are used only in times of political uncertainty.

### Holders of office

The present Governor-General is His Excellency the Right Reverend Dr Peter John Hollingworth, AO, OBE.

Those persons who have held the office of Governor-General from the inception of the Commonwealth of Australia until 1988 are pictured in *Year Book Australia 1988*. Pictures of all holders of the office can be found in the

*Government* section of *Australia Now* on the ABS web site <<http://www.abs.gov.au>>.

## The Commonwealth Parliament

Commonwealth legislative power is vested in the Commonwealth Parliament, comprising the House of Representatives (150 members) and the Senate (76 members).

### The powers of Parliament

Apart from the constitutional requirement that all financial legislation must originate in the House of Representatives, and that the Senate cannot amend such legislation, the two houses have similar powers. The fact that the Senate can reject financial legislation makes it one of the most powerful upper houses in the world.

Australia having a federal system means that the powers of the Commonwealth Parliament are limited to areas of national importance. Among the powers granted by the Constitution are trade and commerce, taxation, postal services, foreign relations, defence, immigration, naturalisation, quarantine, currency and coinage, weights and measures, copyright, patents and trade marks. High Court decisions and Commonwealth-state agreements have seen the Commonwealth gain influence in regard to various matters including industrial relations, financial regulation, companies and securities, health and welfare, and education.

### The functions of Parliament

Parliament has five primary functions:

- to provide for the formation of a government
- to make the law
- to provide a forum for popular representation
- to scrutinise the actions of government
- to provide a forum for the alternative government.

The *formation of a government* is the most important outcome of a general election. Either the government is returned, by virtue of retaining a majority of seats in the House of Representatives, or the opposition party or coalition of parties wins a majority of seats, resulting in the formation of a new government. The Prime Minister always sits in the House of Representatives.

The Hon. JW Howard, MP (Liberal Party of Australia) has been Prime Minister since March 1996.

More than half of Parliament's time is taken up with the *consideration of proposed legislation*. Between 150 and 250 bills are passed each year. Most bills are not contentious, either being 'machinery' legislation necessary for the orderly processes of government, or bills that propose alterations to existing legislation. Most of the bills are government bills; private members' legislation is rare.

The *representation of the people* is an important role of members of the House of Representatives and senators. Looking after their constituents occupies a great deal of their time. The relative importance of this role may be judged by the high proportion of time spent by MPs in their electorates and away from Parliament. During the 1990s the Parliament averaged 64 sitting days per year.

The *scrutiny* function is seen most obviously in the formal periods of Question Time, in both houses, that are a part of each day's sitting. Question Time is the best-known part of parliamentary proceedings, and is attended by many of the visiting public. Less well-known is the activity of a range of parliamentary committees which are established in order that Parliament's legislative, inquiry and scrutiny functions can be carried out more thoroughly and with the benefit of expert advice. These committees undertake the scrutiny of government operations as well as frequent inquiries into a range of current issues.

In Westminster system governments, such as Australia's, the Opposition has a recognised and formal status, being recognised in the Standing Orders of the Parliament and in legislation. The Opposition is seen as the *alternative government* and typically forms a 'shadow Cabinet' of MPs who prepare themselves to take on the reins of government. The Opposition also has the role of acting as the main critic of the government and of offering to the community an alternative set of policies.

The Hon. SF Crean, MP (Australian Labor Party) has been Leader of the Opposition since November 2001.

## The Commonwealth Government

### Prime Minister

After an election, the Governor-General sends for the leader of the party, or coalition, which has secured a majority in the House of Representatives, and commissions that person to assume the office of Prime Minister and to form a government. The incoming Prime Minister then goes about the process of finding members of his or her parliamentary party or coalition to serve as ministers in the Government.

The office of Prime Minister is not recognised by the formal Constitution, being a conventional part of the constitutional arrangements.

The Prime Minister has the following powers:

- nominates the Governor-General
- is the sole source of formal advice for the Governor-General
- advises the Governor-General when Parliament should be dissolved
- has responsibility for setting the date for House of Representatives elections
- allocates positions in the Cabinet
- is chairperson of Cabinet.

### Ministers

It is customary for all ministers to be members of parliament, and if a minister is not, it is obligatory for that minister to become an MP within three months of his/her appointment. Reshuffles of the ministry may occur at any time between elections. Ministers are invariably members of the same party or coalition as the Prime Minister.

The 56 Commonwealth ministries since Federation are listed in table 2.1.

In most cases, new governments are formed after general elections have been held to determine the composition of the House. A new government could also be formed on any occasion between elections if the majority party changes its leader, or loses its majority (e.g. as a result of a by-election), or is defeated in an important vote in the House.

## 2.1 COMMONWEALTH MINISTRIES SINCE 1901

Number of Ministry	Ministry	Period of office	Party
1	Barton	1 January 1901 to 24 September 1903	Protectionist
2	Deakin	24 September 1903 to 27 April 1904	Protectionist
3	Watson	27 April 1904 to 17 August 1904	Australian Labor Party
4	Reid–McLean	18 August 1904 to 5 July 1905	Free Trade–Protectionist
5	Deakin	5 July 1905 to 13 November 1908	Protectionist
6	Fisher	13 November 1908 to 2 June 1909	Australian Labor Party
7	Deakin	2 June 1909 to 29 April 1910	Protectionist–Free Trade–Tariff Reform
8	Fisher	29 April 1910 to 24 June 1913	Australian Labor Party
9	Cook	24 June 1913 to 17 September 1914	Liberal
10	Fisher	17 September 1914 to 27 October 1915	Australian Labor Party
11	Hughes	27 October 1915 to 14 November 1916	Australian Labor Party
12	Hughes	14 November 1916 to 17 February 1917	Nationalist Labour
13	Hughes	17 February 1917 to 8 January 1918	Nationalist
14	Hughes	10 January 1918 to 9 February 1923	Nationalist
15	Bruce–Page	9 February 1923 to 22 October 1929	Nationalist–Country Party
16	Scullin	22 October 1929 to 6 January 1932	Australian Labor Party
17	Lyons	6 January 1932 to 7 November 1938	United Australia Party
18	Lyons	7 November 1938 to 7 April 1939	United Australia Party
19	Page	7 April 1939 to 26 April 1939	Country Party–United Australia Party
20	Menzies	26 April 1939 to 14 March 1940	United Australia Party
21	Menzies	14 March 1940 to 28 October 1940	United Australia Party–Country Party
22	Menzies	28 October 1940 to 29 August 1941	United Australia Party–Country Party
23	Fadden	29 August 1941 to 7 October 1941	Country Party–United Australia Party
24	Curtin	7 October 1941 to 21 September 1943	Australian Labor Party
25	Curtin	21 September 1943 to 6 July 1945	Australian Labor Party
26	Forde	6 July 1945 to 13 July 1945	Australian Labor Party
27	Chifley	13 July 1945 to 1 November 1946	Australian Labor Party
28	Chifley	1 November 1946 to 19 December 1949	Australian Labor Party
29	Menzies	19 December 1949 to 11 May 1951	Liberal–Country Party
30	Menzies	11 May 1951 to 11 January 1956	Liberal–Country Party
31	Menzies	11 January 1956 to 10 December 1958	Liberal–Country Party
32	Menzies	10 December 1958 to 18 December 1963	Liberal–Country Party
33	Menzies	18 December 1963 to 26 January 1966	Liberal–Country Party
34	Holt	26 January 1966 to 14 December 1966	Liberal–Country Party
35	Holt	14 December 1966 to 19 December 1967	Liberal–Country Party
36	McEwen	19 December 1967 to 10 January 1968	Liberal–Country Party
37	Gorton	10 January 1968 to 28 February 1968	Liberal–Country Party
38	Gorton	28 February 1968 to 12 November 1969	Liberal–Country Party
39	Gorton	12 November 1969 to 10 March 1971	Liberal–Country Party
40	McMahon	10 March 1971 to 5 December 1972	Liberal–Country Party
41	Whitlam	5 December 1972 to 19 December 1972	Australian Labor Party
42	Whitlam	19 December 1972 to 11 November 1975	Australian Labor Party
43	Fraser	11 November 1975 to 22 December 1975	Liberal–Country Party
44	Fraser	22 December 1975 to 20 December 1977	Liberal–Country Party
45	Fraser	20 December 1977 to 3 November 1980	Liberal–Country Party
46	Fraser	3 November 1980 to 7 May 1982	Liberal–Country Party
47	Fraser	7 May 1982 to 11 March 1983	Liberal–Country Party
48	Hawke	11 March 1983 to 13 December 1984	Australian Labor Party
49	Hawke	13 December 1984 to 24 July 1987	Australian Labor Party
50	Hawke	24 July 1987 to 4 April 1990	Australian Labor Party
51	Hawke	4 April 1990 to 20 December 1991	Australian Labor Party
52	Keating	20 December 1991 to 24 March 1993	Australian Labor Party
53	Keating	24 March 1993 to 11 March 1996	Australian Labor Party
54	Howard	11 March 1996 to 21 October 1998	Liberal–National Party of Australia
55	Howard	21 October 1998 to 26 November 2001	Liberal–National Party of Australia
56	Howard	26 November 2001	Liberal–National Party of Australia

Source: Department of the Parliamentary Library.

## Cabinet

In practice, government policy is determined by the most senior ministers meeting in a body known as Cabinet. Such meetings are chaired by the Prime Minister. The Governor-General does not attend such meetings. Cabinet is not a body that is recognised by the formal Constitution, being a conventional part of the constitutional arrangements. Despite this, Cabinet effectively controls not only the legislative program, but also the departments of state. In effect, therefore, Cabinet is the dominant political and administrative element in Australia's national government. Ministers not included in Cabinet are referred to collectively as the Outer Ministry.

Particulars of the Third Howard Ministry, comprising Cabinet ministers and the Outer Ministry, are shown in table 2.2.

## The Australian Public Service

The Australian Public Service provides policy advice to the Commonwealth Government and facilitates the delivery of programs to the community. The Australian Public Service is part of the broader public sector, which includes parliamentary staff, statutory authorities, a separate public service for each of the states and territories, and local government employees. As at November 2001, some 1,552,500 Australians, 16.9% of the employed work force, worked in the public sector.

There are currently eighteen departments in the Australian Public Service. Each department is managed by a chief executive officer, or secretary, who is responsible to the relevant minister for the efficient, effective and ethical use of resources. The minister, in turn, takes political responsibility for the actions of the department. Each department administers particular legislation that is specified in Administrative Arrangements. The

management of financial and human resources is governed by Commonwealth legislation such as the *Financial Management and Accountability Act 1997* and the *Public Service Act 1999*. Public servants are required to uphold the values and standards of behaviour specified in the *Public Service Act 1999*. These include responsiveness to the Government, high ethical standards, accountability, impartiality, merit in employment, integrity, courtesy, lawfulness, confidentiality and the proper use of resources. As well as answering to the relevant minister, the Australian Public Service is accountable to the Australian community through a variety of mechanisms including parliamentary committees, administrative law, the Ombudsman and the Auditor-General.

Over the last two decades, the Australian Public Service has undergone substantial change, both in its internal management processes and in its methods of service delivery. Examples of management changes include the introduction of accrual budgeting in the 1999–2000 Budget, an emphasis on reaching performance targets, the costing of government 'outputs', the imposition of capital use charges, the devolution of responsibility to departments and more flexible employment practices. Examples of changes to service delivery include the trend towards providing information and other services on the Internet, increased contracting of service delivery to the private sector and the establishment of customer service charters.

Public resources are harnessed by the public sector to give practical effect to government policies. Traditionally, this process has been known as public administration. Increasingly, it is known as public management, reflecting the growing expectation that public sector managers will take responsibility for achieving results, as well as the increasing emphasis on efficiency.

## 2.2 THIRD HOWARD MINISTRY — At July 2002

## CABINET MINISTERS

Prime Minister	The Hon. JW Howard, MP
Minister for Transport and Regional Services and Deputy Prime Minister	The Hon. JD Anderson, MP
Treasurer	The Hon. PH Costello, MP
Minister for Trade	The Hon. MA Vaile, MP
Minister for Foreign Affairs	The Hon. AJG Downer, MP
Minister for Defence and Leader of the Government in the Senate	Senator the Hon. RM Hill
Minister for Communications, Information Technology and the Arts, and Deputy Leader of the Government in the Senate	Senator the Hon. RKR Alston
Minister for Employment and Workplace Relations	The Hon. AJ Abbott, MP
Minister for Immigration and Multicultural and Indigenous Affairs	The Hon. PM Ruddock, MP
Minister for the Environment and Heritage (Vice-President of the Executive Council)	The Hon. Dr DA Kemp, MP
Attorney-General	The Hon. DR Williams, AM, QC, MP
Minister for Finance and Administration	The Hon. NH Minchin, MP
Minister for Agriculture, Fisheries and Forestry	The Hon. WE Truss, MP
Minister for Family and Community Services and Minister Assisting the Prime Minister for the Status of Women	Senator the Hon. AE Vanstone
Minister for Education, Science and Training	The Hon. Dr BJ Nelson, MP
Minister for Health and Ageing	Senator the Hon. KCL Patterson
Minister for Industry, Tourism and Resources	The Hon. IE Macfarlane, MP

## OUTER MINISTRY

Minister for Regional Services, Territories and Local Government	The Hon. CW Tuckey, MP
Minister for Revenue and Assistant Treasurer	Senator the Hon. HL Coonan
Minister for Veterans' Affairs and Minister Assisting the Minister for Defence	The Hon. DS Vale, MP
Minister for the Arts and Sports	Senator the Hon. CR Kemp
Minister for Employment Services	The Hon. MT Brough, MP
Minister for Citizenship and Multicultural Affairs	The Hon. GD Hargrave, MP
Minister for Justice and Customs	Senator the Hon. CM Ellison
Special Minister of State	Senator the Hon. E Abetz
Minister for Forestry and Conservation	Senator the Hon. ID Macdonald
Minister for Children and Youth Affairs	The Hon. LJ Anthony, MP
Minister for Science (Deputy Leader of the House)	The Hon. PJ McGauran, MP
Minister for Ageing	The Hon. KJ Andrews, MP
Minister for Small Business and Tourism	The Hon. JB Hockey, MP
Parliamentary Secretary to the Prime Minister	The Hon. JM Kelly, MP
Parliamentary Secretary to the Cabinet	The Hon. PN Slipper, MP
Parliamentary Secretary to the Minister for Transport and Regional Services	Senator the Hon. RLD Boswell
Parliamentary Secretary to the Treasurer (Manager of Government Business in the Senate)	Senator the Hon. IG Campbell
Parliamentary Secretary to the Minister for Foreign Affairs	The Hon. CA Gallus, MP
Parliamentary Secretary to the Minister for Defence	The Hon. FE Bailey, MP
Parliamentary Secretary to the Minister for the Environment and Heritage	The Hon. Dr SN Stone, MP
Parliamentary Secretary to the Minister for Finance and Administration	The Hon. PN Slipper, MP
Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry	Senator the Hon. JM Troeth
Parliamentary Secretary to the Minister for Family and Community Services	The Hon. RA Cameron, MP
Parliamentary Secretary to the Minister for Health and Ageing	The Hon. PM Worth, MP
Parliamentary Secretary to the Minister for Industry, Tourism and Resources	Mr WG Entsch, MP

Source: *Department of the Parliamentary Library.*

## Commonwealth elections

### Franchise

Any Australian citizen aged 18 and over, or British subject who was on the Commonwealth Roll as at 25 January 1984, is qualified to enrol and vote at Commonwealth elections. Residence in an

electorate for a period of one month before enrolment is necessary to enable a qualified person to enrol. Enrolment and attendance at a polling place on polling day (except under certain lawful exceptions) are compulsory for all eligible persons.

## Parliamentary terms

Members of the House of Representatives are elected for a maximum term of three years, though elections may be called earlier. Senators have fixed terms of six years. Normally half the Senate retires every three years, and elections for the Senate are usually held at the same time as elections for the House of Representatives, though they need not be.

At times of disagreement between the House of Representatives and the Senate, both houses may be dissolved and an election called for both houses. Six of the forty Commonwealth elections have been double dissolution elections.

Table 2.3 shows the number and terms of all parliaments since Federation.

## Electorates

For the purpose of House of Representatives elections each state or territory is divided into single-member electorates corresponding in number to the number of members to which the state or territory is entitled. In Senate elections the whole state or territory constitutes a single electorate.

Redistributions of House of Representatives electorates must be held at least every seven years. A redistribution must take into account current and projected enrolments, community of economic, social and regional interests, means of communication and travel, physical features and area, and existing electorate boundaries. Within each state and territory the electorates must, as far as possible, be equal in numbers of electors. There is usually a variation in size of electorates from one state or territory to another.

The Electoral Commissioner determines the representation entitlements of the states and territories during the 13th month after the first meeting of a new House of Representatives. Determinations are based on the latest population statistics as provided by the Australian Statistician. The representation entitlements of the states and territories at the 1999 determination are shown in table 2.4, which also shows the total size of the House of Representatives at the time of the following election. Tasmania has a constitutional entitlement to five members of the House of

Representatives based on it being a state at the time of Federation in 1901. The Australian Capital Territory and the Northern Territory have gained representation since 1901, and current legislation provides a minimum representation of one member of the House of Representatives for each.

### 2.3 COMMONWEALTH PARLIAMENTS

Number of Parliament	Date of opening	Date of dissolution
1	9 May 1901	23 November 1903
2	2 March 1904	5 November 1906
3	20 February 1907	19 February 1910
4	1 July 1910	23 April 1913
5	9 July 1913	30 July 1914(a)
6	8 October 1914	26 March 1917
7	14 June 1917	3 November 1919
8	26 February 1920	6 November 1922
9	28 February 1923	3 October 1925
10	13 January 1926	9 October 1928
11	6 February 1929	16 September 1929
12	20 November 1929	27 November 1931
13	17 February 1932	7 August 1934
14	23 October 1934	21 September 1937
15	30 November 1937	27 August 1940
16	20 November 1940	7 July 1943
17	23 September 1943	16 August 1946
18	6 November 1946	1 October 1949
19	22 February 1950	19 March 1951(a)
20	12 June 1951	21 April 1954
21	4 August 1954	4 November 1955
22	15 February 1956	14 October 1958
23	17 February 1959	2 November 1961
24	20 February 1962	1 November 1963
25	25 February 1964	31 October 1966
26	21 February 1967	29 September 1969
27	25 November 1969	2 November 1972
28	27 February 1973	11 April 1974(a)
29	9 July 1974	11 November 1975(a)
30	17 February 1976	8 November 1977
31	21 February 1978	19 September 1980
32	25 November 1980	4 February 1983(a)
33	21 April 1983	26 October 1984
34	21 February 1985	5 June 1987(a)
35	14 September 1987	19 February 1990
36	8 May 1990	8 February 1993
37	4 May 1993	29 January 1996
38	30 April 1996	31 August 1998
39	10 November 1998	8 October 2001
40	12 February 2002	..

(a) A dissolution of both the Senate and the House of Representatives.

Source: Department of the Parliamentary Library.

## 2.4 REPRESENTATION ENTITLEMENTS, 1999 Determination

State/territory	Seats
New South Wales	50
Victoria	37
Queensland	27
Western Australia	15
South Australia	12
Tasmania	5
Australian Capital Territory	2
Northern Territory	2
<b>Total</b>	<b>150</b>

Source: Department of the Parliamentary Library.

## 2001 election

Parliament was dissolved on 8 October 2001 and an election called for 10 November 2001, for the House of Representatives and half the Senate. At that election the Liberal–National Party coalition was returned to office.

The numbers of electors enrolled for the 2001 election are shown in table 2.5.

The state of the parties in the Commonwealth Parliament at November 2002 is shown in table 2.6.

First preference votes cast for the major political parties in each state and territory at the 2001 election for each House of the Commonwealth Parliament are shown in tables 2.7 and 2.8.

## 2.5 COMMONWEALTH PARLIAMENTARY ELECTION OF 10 NOVEMBER 2001, Electors enrolled

State/territory	
New South Wales	4 227 937
Victoria	3 234 874
Queensland	2 336 698
South Australia	1 039 025
Western Australia	1 206 422
Tasmania	331 675
Northern Territory	111 022
Australian Capital Territory	221 184
<b>Australia</b>	<b>12 708 837</b>

Source: Department of the Parliamentary Library.

## 2.6 STATE OF THE PARTIES, Commonwealth Parliament — November 2002

<b>House of Representatives</b>	
Liberal Party	68
Australian Labor Party	64
National Party	13
Country Liberal Party	1
Independent	3
The Greens	1
<i>Total</i>	150
<b>Senate</b>	
Liberal Party	31
Australian Labor Party	28
National Party	3
Australian Democrats	7
The Greens	2
Country Liberal Party	1
One Nation	1
Independent	3
<i>Total</i>	76

Source: Department of the Parliamentary Library.

**2.7 COMMONWEALTH PARLIAMENTARY ELECTIONS, House of Representatives votes — 10 Nov 2001**

	NSW	Vic.	Qld	SA	
First preference votes					
Liberal Party	1 272 208	1 154 493	767 959	430 441	
National Party	349 372	91 048	192 454	..	
Country Liberal Party	..	..	..	..	
Australian Labor Party	1 380 822	1 230 764	730 914	316 362	
Australian Democrats	160 706	184 564	90 679	98 849	
The Greens	180 079	174 396	73 467	34 141	
Pauline Hanson's One Nation	180 813	37 812	148 932	44 574	
Others	264 460	81 938	101 847	13 340	
<i>Formal votes</i>	3 788 460	2 955 015	2 106 252	937 707	
Informal votes	217 169	122 575	106 995	55 040	
<i>Total votes recorded</i>	4 005 629	3 077 590	2 213 247	992 747	
	WA	Tas.	NT	ACT	Aust.
First preference votes					
Liberal Party	449 036	114 283	..	65 651	4 254 071
National Party	11 052	..	..	..	643 926
Country Liberal Party	..	..	36 961	..	36 961
Australian Labor Party	402 927	145 305	39 111	95 215	4 341 420
Australian Democrats	50 581	13 785	4 795	16 266	620 225
The Greens	64 939	24 052	3 665	14 335	569 074
Pauline Hanson's One Nation	67 992	8 847	3 486	5 576	498 032
Others	38 268	1 746	3 143	5 623	510 365
<i>Formal votes</i>	1 084 795	308 018	91 161	202 666	11 474 074
Informal votes	56 134	10 856	4 436	7 386	580 591
<i>Total votes recorded</i>	1 140 929	318 874	95 597	210 052	12 054 665

Source: Department of the Parliamentary Library.

**2.8 COMMONWEALTH PARLIAMENTARY ELECTIONS, Senate votes — 10 Nov 2001**

	NSW	Vic.	Qld	SA	
First preference votes					
Liberal-National Party	1 620 235	1 155 854	..	..	
Liberal Party	..	..	750 416	440 431	
National Party	..	..	196 845	..	
Country Liberal Party	..	..	..	..	
Australian Labor Party	1 299 488	1 073 667	682 239	321 422	
Australian Democrats	240 867	228 272	143 942	121 989	
The Greens	216 522	71 605	215 400	44 055	
Pauline Hanson's One Nation	169 139	174 817	71 102	33 385	
Christian Democratic Party	72 697	17 162	22 703	..	
Others	260 495	196 890	67 430	5 733	
<i>Formal votes</i>	3 879 443	2 918 267	2 150 077	967 015	
Informal votes	142 281	173 592	65 450	30 556	
<i>Total votes recorded</i>	4 021 724	3 091 859	2 215 527	997 571	
	WA	Tas.	NT	ACT	Aust.
First preference votes					
Liberal-National Party	..	..	..	..	2 776 089
Liberal Party	443 597	119 720	..	70 475	1 824 639
National Party	26 015	..	..	..	222 860
Country Liberal Party	..	..	40 680	..	40 680
Australian Labor Party	377 547	113 709	36 500	86 331	3 990 903
Australian Democrats	64 773	14 273	6 796	22 072	842 984
The Greens	77 757	10 169	4 353	4 485	644 346
Pauline Hanson's One Nation	64 736	42 568	3 978	14 825	574 550
Christian Democratic Party	13 809	..	..	3 602	129 973
Others	37 295	8 223	755	3 684	580 505
<i>Formal votes</i>	1 105 529	308 662	93 062	205 474	11 627 529
Informal votes	41 025	10 493	2 640	4 924	470 961
<i>Total votes recorded</i>	1 146 554	319 155	95 702	210 398	12 098 490

Source: Department of the Parliamentary Library.

## State government

Each state experienced a period of colonial self-government prior to the achievement of Federation. The fact of Australia having a federal system of government means that significant powers are held by the state and territory governments.

### State governors

The governor is the representative of the Sovereign, appointed by the Sovereign on the advice of the relevant state premier. The governor exercises the executive power of his or her state on the advice of the premier. Other powers and functions are similar to the powers exercised at the Commonwealth level by the Governor-General.

In addition, governors have been invested with various statutory functions by state Constitutions and the *Commonwealth Australia Act 1986*, as well as under the Acts of the parliaments of the states. Governors may administer the prerogative of mercy by the reprieve or pardon of criminal offenders, and may remit fines and penalties due to the Crown in right of their state.

In the performance of his/her functions generally, the governor of a state acts on the advice of ministers.

The governor also has what are referred to as 'reserve powers'. These may be used without the advice of the premier, but are used only in times of political uncertainty.

The governors of the states at July 2002 are shown in table 2.9.

### State parliaments

Each state is governed by a ministry headed by a premier. The state Cabinet, chaired by the Premier, is the centre of political and administrative power in each state.

Each state has a formal Opposition, with the same role as at the Commonwealth level, headed by an opposition leader.

Tables 2.10 and 2.11 set out the state premiers and opposition leaders at July 2002.

Five of the six Australian states have a bicameral parliament. In Queensland there is a single house. The lower houses in New South Wales, Victoria, Queensland and Western Australia are entitled Legislative Assembly. In South Australia and Tasmania the term is House of Assembly. The title of all upper houses is Legislative Council.

The members of the parliaments of each state are elected by the residents of that state using either the alternative vote (preferential voting) or the single transferable vote variant of proportional representation.

#### 2.9 GOVERNORS OF THE STATES — July 2002

New South Wales	Her Excellency the Professor Marie Bashir, AC
Victoria	John Landy, AC, MBE
Queensland	His Excellency Major-General Peter Arnison, AO
Western Australia	His Excellency Lieutenant-General John Murray Sanderson, AC, AM
South Australia	Her Excellency Mrs Marjorie Jackson Nelson, AC, MBE
Tasmania	His Excellency the Honourable Sir Guy Green, AC, KBE

Source: Department of the Parliamentary Library.

#### 2.10 PREMIERS, States — July 2002

New South Wales	The Hon. RJ Carr, MP (ALP)
Victoria	The Hon. SP Bracks, MP (ALP)
Queensland	The Hon. P Beattie, MP (ALP)
Western Australia	The Hon. GI Gallop, MP (ALP)
South Australia	The Hon. M Rann, MP (ALP)
Tasmania	The Hon. JA Bacon, MP (ALP)

Source: Department of the Parliamentary Library.

#### 2.11 OPPOSITION LEADERS, States — July 2002

New South Wales	JG Brogden, MP (LP)
Victoria	RKB Doyle, MP (LP)
Queensland	MJ Horan, MP (NP)
Western Australia	The Hon. CJ Barnett, MP (LP)
South Australia	Hon. RG Kerin, MP (LP)
Tasmania	MT Hidding, MP (LP)

Source: Department of the Parliamentary Library.

The state of the parties in each of the state and territory parliaments is set out in table 2.12.

The extent of state legislative powers is defined by the Commonwealth and state Constitutions, and includes education, police, public health, public transport, agriculture, roads and the overseeing of local government.

### 2.12 STATE OF THE PARTIES, States and territories — July 2002

	Seats
<b>NEW SOUTH WALES</b>	
Legislative Assembly	
Australian Labor Party	55
Liberal Party	20
National Party	13
Independent	5
<i>Total</i>	93
Legislative Council	
Australian Labor Party	16
Liberal Party	9
National Party	4
Christian Democratic Party	2
The Greens	2
Australian Democrats	1
One Nation Party	1
Others	7
<i>Total</i>	42
<b>VICTORIA</b>	
Legislative Assembly	
Australian Labor Party	44
Liberal Party	35
National Party	6
Independent	3
<i>Total</i>	88
Legislative Council	
Liberal Party	24
Australian Labor Party	14
National Party	6
<i>Total</i>	44
<b>QUEENSLAND</b>	
Legislative Assembly	
Australian Labor Party	66
National Party	12
Liberal Party	3
One Nation Party	2
Independent	6
<i>Total</i>	89

...continued

### 2.12 STATE OF THE PARTIES, States and territories — July 2002 — *continued*

	Seats
<b>SOUTH AUSTRALIA</b>	
House of Assembly	
Australian Labor Party	23
Liberal Party	20
National Party	1
Independent	3
<i>Total</i>	47
Legislative Council	
Liberal Party	9
Australian Labor Party	7
Australian Democrats	3
Independent	3
<i>Total</i>	22
<b>WESTERN AUSTRALIA</b>	
Legislative Assembly	
Australian Labor Party	32
Liberal Party	16
National Party	5
Independent	4
<i>Total</i>	57
Legislative Council	
Australian Labor Party	13
Liberal Party	12
The Greens	5
One Nation	3
National Party	1
<i>Total</i>	34
<b>TASMANIA</b>	
House of Assembly	
Australian Labor Party	14
Liberal Party	10
The Greens	1
<i>Total</i>	25
Legislative Council	
Australian Labor Party	5
Independent	10
<i>Total</i>	15
<b>NORTHERN TERRITORY</b>	
Legislative Assembly	
Australian Labor Party	13
Country Liberal Party	10
Independent	2
<i>Total</i>	25
<b>AUSTRALIAN CAPITAL TERRITORY</b>	
Legislative Assembly	
Australian Labor Party	8
Liberal Party	7
Australian Democrats	1
The Greens	1
<i>Total</i>	17

Source: Department of the Parliamentary Library.

## Territory government

### Self-governing

The Australian Capital Territory and the Northern Territory are self-governing polities with powers almost matching those of the original states. The Northern Territory has been working towards full statehood, though a referendum on the question was rejected by Northern Territory voters in 1998. Norfolk Island controls its own treasury and raises revenue under its own system of laws. Generally, Commonwealth laws do not apply to Norfolk Island unless expressed to do so, but where any Norfolk Island legislation is in conflict with ordinances made by the Governor-General, such legislation is deemed null and void. Norfolk Islanders may enrol for Commonwealth elections in the electoral division they nominate, with some exceptions.

The Northern Territory and Norfolk Island both have an administrator of the territory, appointed by the Governor-General (table 2.13).

#### 2.13 ADMINISTRATORS, Territories — July 2002

Northern Territory	His Honour John Christopher Anictonatis, OAM
Norfolk Island	His Honour Anthony J Messner

Source: Department of the Parliamentary Library.

The Australian Capital Territory has neither administrator nor governor. Each territory has an elected Legislative Assembly, with a wide range of powers. Each territory has a government headed by a chief minister (table 2.14). The Northern Territory and the Australian Capital Territory have an opposition headed by an opposition leader (table 2.15).

#### 2.14 CHIEF MINISTERS, Territories — July 2002

Northern Territory	The Hon. CM Martin, MLA (ALP)
Australian Capital Territory	The Hon. J Stanhope, MLA (ALP)
Norfolk Island	RC Nobbs

Source: Department of the Parliamentary Library.

#### 2.15 OPPOSITION LEADERS, Territories — July 2002

Northern Territory	The Hon. DG Burke, MLA (CLP)
Australian Capital Territory	The Hon. G Humphries, MLA (LP)

Source: Department of the Parliamentary Library.

### Non-self governing

Jervis Bay Territory, and the external territories of the Cocos (Keeling) Islands, Christmas Island, Coral Sea Islands and Ashmore and Cartier Islands, make up the non-self governing territories of Australia.

The resident communities in each of Jervis Bay Territory, the Cocos (Keeling) Islands and Christmas Island are provided with an extensive range of government services. Each of the Cocos (Keeling) Islands and Christmas Island has an elected local government, and residents may vote in Commonwealth parliamentary elections in the electoral division of Lingiari, Northern Territory. Residents of Jervis Bay are enrolled in the electoral division of Fraser, Australian Capital Territory.

### Local government

Local government has a limited constitutional position in Australia, being organised under state or territory legislation upon broadly similar lines across Australia. The main variation is the existence of various councils in the Northern Territory that are based on rural Aboriginal communities. There are no local councils in the Australian Capital Territory, where the territory government has direct responsibility for local services. Local government in Australia is unlike that in many other political systems, for it provides an unusually narrow range of services.

Each state and the Northern Territory has a number of local government areas, known variously as cities, towns, municipalities, boroughs, shires or districts. The generic local body is the council. In May 2001 there were 687 local councils. Most councillors and aldermen are elected by local residents, though councils may be dismissed by state governments and occasionally are.

Within each local government area various local services are provided, though there are many variations between states as well as between urban and rural councils. The Brisbane City Council is responsible for the provision of services across most of Brisbane; by contrast,

many small rural councils provide a relatively small number of services. Among the local responsibilities are the management of health, sanitary and garbage services, road, street and bridge construction, water supply and sewerage, museums, fire brigades, harbour services and local libraries. The scope of local government duties differs a great deal around the nation, for in all states many of these duties are performed either directly by the state government or through semi-government authorities, known in Australia as statutory authorities. The provision of household water, for instance, is typically undertaken by a statutory authority operating under state legislation.

## Political parties

### The party system

An Australian party system had begun to develop during the last years of the colonial period in the 1890s, to the extent that most seats in the first parliament were won by candidates from just three major groups. The outline of the modern system can be seen as early as 1909 when a fusion of the major non-Labor parties formed the first Liberal Party. This was confirmed in the election in the following year, which saw the election dominated by the Liberal and Australian Labor parties. In 1919 the Country Party won a significant number of seats, and by 1922 it was participating in a coalition government. Since that time the Australian party system has been dominated by the contest between Labor and a coalition of the Liberal and National (formerly Country) parties. Many minor parties have contested House of Representatives elections, but have not seriously threatened the dominance of the three major parties.

Since 1949 the use of proportional representation for Senate elections has given minor parties a realistic chance of winning Senate seats, and the major parties have rarely controlled the upper house since the election of 1964.

### Parties and Parliament

The idea that Parliament ‘controls’ ministers, as well as government policy and the departments and statutory bodies which implement these policies, is a concept which had more relevance in the 19th century than it does today. Stable majority party government in the 20th century is perhaps the main reason for the decline in

absolute parliamentary control as well as for the decline in the influence of Parliament relative to that of the Executive.

The impact of parties can be seen clearly in the operations of each house of Parliament, particularly in the legislative process. Many questions and queries may be raised in the House of Representatives, and amendments are often moved. However, because governments enjoy a majority in the House, questions may be avoided, amendments cannot be forced, and whether or not the Opposition’s views are accepted depends on the wishes of the government of the day.

It is a different story in the Senate, where no government has enjoyed a majority since 1981. If the Government wants legislation to be passed by the Senate it often has to agree to amendments proposed by the Opposition and minor parties. It is for this reason that the Senate is far more active than the House in sending proposed legislation to committees.

## National anthem and colours of Australia

A national song poll was held on 21 May 1977. Voting was preferential and, after the distribution of preferences, ‘Advance Australia Fair’ became the national song of Australia.

His Excellency, the Governor-General of the Commonwealth of Australia, issued the following Proclamation on 19 April 1984:

I, SIR NINIAN MARTIN STEPHEN,  
Governor-General of the Commonwealth of  
Australia, acting with the advice of the Federal  
Executive Council, hereby declare:

(a) that the anthem ‘God Save The Queen’ shall henceforth be known as the Royal Anthem and be used in the presence of Her Majesty The Queen or a member of the Royal Family;

(b) that the National Anthem shall consist of the tune known as ‘Advance Australia Fair’ with the following words:

*Australians all let us rejoice,  
For we are young and free,  
We’ve golden soil and wealth for toil;  
Our home is girt by sea;  
Our land abounds in nature’s gifts  
Of beauty rich and rare,  
In history’s page, let every stage*

*Advance Australia Fair.  
In joyful strains then let us sing,  
Advance Australia Fair.*

*Beneath our radiant Southern Cross  
We'll toil with hearts and hands;  
To make this Commonwealth of ours  
Renowned of all the lands;  
For those who've come across the seas  
We've boundless plains to share;  
With courage let us all combine  
To Advance Australia Fair.  
In joyful strains then let us sing,  
Advance Australia Fair.*

(c) that the Vice-Regal Salute to be used in the presence of His Excellency the Governor-General shall consist of the first four bars and the last four bars of the tune known as 'Advance Australia Fair';

(d) that the National Anthem shall be used on all official and ceremonial occasions, other than occasions on which either the Royal Anthem or the Vice-Regal Salute is used; and

(e) that green and gold (Pantone Matching System numbers 116C and 348C as used for printing on paper) shall be the national colours of Australia for use on all occasions on which such colours are customarily used.

## Reference notes

The Australian Constitution is reproduced in Year Book Australia from time to time, the latest being the 1998 edition.

In *Year Book Australia 1924* the names are given of each ministry up to the Bruce–Page Ministry together with the names of the successive holders of portfolios therein. *Year Book Australia 1953* contains a list which covers the period between 9 February 1923, the date on which the Bruce–Page Ministry assumed power, and 31 July 1951, showing the names of all persons who held office in each ministry during that period. The names of members of subsequent ministries are listed in issues of *Year Book Australia 1953* to 1975–76 inclusive, and in successive issues from 1980.

For further details of referendums see *Year Book Australia 1966*, pages 66–68, *Year Book Australia 1974*, pages 90–91, *Year Book Australia 1977–78*, pages 72–73 and *Year Book Australia 1986*, pages 55–56.

Particulars of voting at Senate elections and elections for the House of Representatives up to 1998 appear in earlier issues of Year Book Australia. Full details are contained in the *Election Statistics* issued by the Electoral Commissioner following each election.

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- Department of the Parliamentary Library, <<http://www.aph.gov.au/library>>
- House of Representatives, <<http://www.aph.gov.au/house/index.htm>>
- Parliamentary Education Office, <<http://www.peo.gov.au>>
- Senate, <<http://www.aph.gov.au/Senate/index.htm>>

# Should the House of Representatives have four-year terms?

*This article was contributed by Scott Bennett of the Information and Research Services section of the Parliamentary Library, Canberra.*

*The article is an abridged version of Parliamentary Library Research Paper No. 4, 2000–01, 'Four-year Terms for the House of Representatives?'. From 1965 to 1998 Mr Bennett lectured in Political Science at the University of NSW, the Royal Military College and the Australian National University. He has published extensively in the area of Australian politics and political history.*

During the first months of 2002 there was much community discussion on the question of whether House of Representatives terms should be extended, possibly to four years. This is a question of long standing in Australia.

## Background to the four-year term issue

### Australian lower house terms

There has been a trend to four-year terms in the Australian states and territories, with only Queensland and the Australian Capital Territory retaining three-year terms.

### What is the 'best' term for a national lower house?

Is there some optimum length for the term of a national lower house? What is the situation in other nations? According to a study published by the Inter-Parliamentary Union in 1993, the overwhelming number of national lower houses have terms of four or five years. Relatively few have a three-year term, and the United States of America House of Representatives is the only lower house with a two-year term. Table S2.1 gives the figures, and where possible includes examples of liberal democracies in each category.

### S2.1 NATIONAL LOWER HOUSE TERMS

Length (years)	no.	Examples
2	1	United States of America
3	13	Including Australia, New Zealand, Sweden
4	55	Including Austria, Belgium, Denmark, Germany, Japan
5	76	Including Canada, France, Ireland, Italy, United Kingdom
6	3	Morocco, Nicaragua, Sri Lanka

Source: Inter-Parliamentary Union, 'Electoral Systems. A World-Wide Comparative Study', Geneva, 1993.

What is the best length for a parliamentary term? Despite figures showing that four- or five-year terms are most preferred, the answer is far from clear cut, and a lack of research data does not help in the search for an answer.<sup>1</sup> The best guidance that the Inter-Parliamentary Union can give poses the problem to be solved:

In theory, elections to a Parliament should not be so infrequent that they fail to reflect the opinions of the electorate, nor be so frequent that they are likely to produce excessive discontinuities in the process of government.<sup>2</sup>

The question is, therefore, how Australia can balance a preference for stable government with the countervailing need to maintain democratic practices.

## Over the years

Three-year terms were generally favoured throughout the process of constitution-writing in the 1890s. This presumably reflected the fact that five of the colonies had three-year terms at the time; only Western Australia had four-year terms. The initial draft at the 1897–98 Convention had provided for a four-year term, but this was reduced while the draft was in committee. By comparison with other issues, however, this was not a matter which stirred much debate among the constitution founders.

The Commonwealth Constitution (s. 28) therefore stated that:

Every House of Representatives shall continue for three years from the first meeting of the House, and no longer, but may be sooner dissolved by the Governor-General.

Despite the near-unanimity of the Constitution writers, over the years there have been many calls to increase the House of Representatives term. Although some have called for five-year terms, most have expressed a preference for terms of a maximum of four years:

- The Royal Commission into the Constitution (1927–29) recommended that the life of Parliament be increased to ‘at least four years’.<sup>3</sup>
- In 1982 the Reid Committee of Review into Commonwealth Administration expressed a hope that the Parliament ‘might see fit to adopt improved arrangements for conducting its business — even to the point of proposing constitutional reform to allow for four-year parliaments’.<sup>4</sup>
- At the Adelaide session of the Australian Constitutional Convention (1983) a recommendation for a four-year term was made.<sup>5</sup>
- A recommendation for four-year terms was made by the Constitutional Commission in 1988.<sup>6</sup>
- Prime Minister John Howard (Liberal Party) spoke on the question during the 1998 Commonwealth election, stating that he thought it ‘a good idea to have a longer period of time to deal with medium and longer term issues’. He also stated his belief that ‘there is a lot of support in the Australian community’ for such an alteration to parliamentary terms.<sup>7</sup>

- In April 2000 Senator Andrew Murray (Australian Democrats) introduced a bill for four-year terms, claiming that the longer term ‘has received support from all political parties, from a variety of institutions and political commentators and increasingly, strong support from the business sector and the public at large’.<sup>8</sup>
- In June 2000 the Joint Standing Committee on Electoral Matters received a number of submissions favouring a four-year term. The Committee reiterated its 1997 support, ‘so as to facilitate better long-term planning by government and ensure consistency with state jurisdictions and cost savings’.<sup>9</sup>
- In early 2002 the *Sydney Morning Herald* and Melbourne’s *Age* newspapers both called for four-year terms.<sup>10</sup>
- In April 2002 the Liberal Party declared its support for the longer term.<sup>11</sup>

In 1988, Roy Morgan Research Centre survey found 56% of Australians supportive of four-year terms; 38% were said to be opposed.<sup>12</sup> It is likely that such views are at least as strongly held today.

## Two amendment attempts

In 1983 the Commonwealth Parliament passed the necessary legislation for five constitutional referenda that were to be held on 25 February 1984. Despite most senators and members being in favour of the second of the five — to extend the maximum life of the House of Representatives to four years — the Hawke Government eventually deferred the five referenda indefinitely.<sup>13</sup> Two of the proposals were later put to referendum at the same time as the 1984 Commonwealth election, but the others, including the four-year term proposal, were never put to the people.

In September 1988, voters were presented with a constitutional amendment which proposed replacing the current term with a maximum term of four years. Frustratingly for advocates of the longer term, however, the Hawke Government confused the issue by including in the proposed change a reduction of Senate terms to four years as well as a provision for simultaneous elections, the latter of which had been defeated on three previous occasions. Voters

could not pick which of the three aspects to support or reject, for they were required to vote YES or NO for the entire package. Voter opposition to changes to the Senate term, as well as to simultaneous elections, meant that eventually fewer than one-third of the electorate supported the change.<sup>14</sup>

**Length of parliaments since 1901**

Because the House of Representatives term is for maximum terms only, and because of the convention that prime ministers can call elections virtually whenever they choose, the 39 completed parliaments have had terms of greatly varying length (table S2.2). The 1910 election was held three years and 122 days after the 1906 election, while the break between the 1946 and 1949 elections was three years and 73 days. At the other end of the scale, eight elections have been held less than two years after the previous election, though four of these (1914, 1951, 1974, 1975) were double dissolution elections which cannot be called within six months of the expiry of the House, and are therefore far more likely to be announced early in a parliament than are ‘normal’ elections. The remaining four parliaments (ending in 1929, 1955, 1963, 1984) averaged 18 months, with the shortest period being the 10 months and 25 days between the 1928 and 1929 elections. Because of various constitutional provisions there is no constitutional barrier to an election being held more than three years after the previous election. There have, in fact, been 10 such occasions, most recently in 2002. The fact that more than one-quarter of all elections have been held after an interval greater than three years, suggests that if successive prime ministers were of a mind to do so, the elapsed time between elections could always be three years or slightly longer.

**S2.2 ELAPSED TIME BETWEEN HOUSE OF REPRESENTATIVES ELECTIONS**

Elapsed time	Date of election
Over 3 years	1910, 1913, 1922, 1928, 1937, 1946, 1949, 1954, 1972, 2002
2 years 9 months — 3 years	1906, 1925, 1940, 1943, 1958, 1961, 1966, 1969, 1980, 1993, 1996
2 years 6 months — 2 years 9 months	1903, 1917, 1919, 1934, 1987(a), 1990, 1998
2 years 3 months — 2 years 6 months	1983(a)
2 years — 2 years 3 months	1931
1 year 6 months — 2 years	1955, 1963, 1975(a), 1977, 1984
1 year — 1 year 6 months	1914(a), 1951(a), 1974(a)
Under 1 year	1929

(a) Double dissolution elections.

Source: Australian Electoral Commission, ‘Electoral Pocket Book’, Canberra, 1999, pp. 66–71.

Since 1901 the average elapsed time between elections has been 30.7 months, though if the six double dissolution elections are not counted, this figure climbs to 32.5 months. If we look at specific periods, we note that there has been a marked reduction in term length during the past 30 years. The average for all elections drops to 28.5 months, though the holding of four double dissolution elections no doubt distorts the figures. Even with these four elections removed from the figures, the average parliament has lasted only 31 months (see table S2.3).

**S2.3 AVERAGE ELAPSED TIME BETWEEN HOUSE OF REPRESENTATIVES ELECTIONS**

Period	All elections	Double dissolution elections excluded
	months	months
1901–2002	30.7	32.5
1901–1949	32.3	33.3
1949–2002	29.3	31.6
1901–1928	33.1	35.0
1928–1949	31.4	No double dissolutions in this period
1949–1972	30.4	32.3
1972–2002	28.5	31.0

Source: Australian Electoral Commission, ‘Electoral Pocket Book’, Canberra, 1999, pp. 66–71.

These figures suggest that parliamentary terms have been shortening over the long haul. There is, however, no reason why this should be so. Since the 1972 election Australia had a period (1974–87) during which House terms averaged only 25.8 months, yet the average length for elections between 1990 and 2001 was 34.5 months. As noted later in the article, a key factor in the whole issue of House of Representatives terms is the political reality that prime ministers will always be seeking to call elections at times of maximum benefit to their party or coalition.

Despite this, even if all parliaments were to run full term, the question still remains: is a 'three-year' term too short for a modern national lower house?

## The case for four-year maximum terms

Over the years a number of the points once made in favour of four-year maximum terms have fallen into disuse, as can be seen in the report of the 1927–29 Royal Commission into the Constitution. At that time the commissioners believed that the three-year period was inadequate for Australia in view of:

- the great size of the country
- the large area of some electorates
- the large number of important problems with which Parliament had to deal
- the impact of a short time between electoral contests
- the necessity of the Prime Minister attending Imperial Conferences from time to time.<sup>15</sup>

Only the deleterious effect of a short period between elections remains an important argument.

Modern critics of the status quo tend to focus on at least seven specific benefits they claim will flow from an extension of House of Representatives terms to four years. It must be noted, however, that most of these are essentially unprovable.

It is also important to note that recent suggestions have referred to four-year *maximum* terms for the House of Representatives. If this change were to be made, there would be no expectation that each term would always last four years. As table S3.2 suggests, most terms

would be less. If prime ministers followed previous practice, however, then the House usually would not be dissolved earlier than six months prior to its term expiring. The net impact therefore would be that the usual length of a House term would have been extended by a year — and any term that did run for the full term would, obviously, be a bonus. In order to guarantee a full four-year term, *fixed* terms would be necessary (for fixed terms, see below).

## Policy-making

A long-standing claim holds that longer terms would encourage governments to introduce policies that were long-term rather than merely politically expedient. There is a widespread view that increasing the term for the House would enable governments to enjoy the luxury of being able to take 'more responsible, long-term views' than is possible when the next election is quite likely to be less than two years away. The commonly-heard view of the typical three-year term is that governments:

... tend to spend their first year settling in; begin taking tough and far-sighted decisions in the second year; and then effectively shut up shop in the third year because it is getting too close to the next election.<sup>16</sup>

This aspect of the governmental system can cause frustration within the bureaucracy. As the Queensland Constitutional Review Commission put it in 2000:

It has been said that under a three-year term, the first budget is devoted to paying off the promises made at the previous election and the third budget in anticipating the promises to be made at the forthcoming election. Consequently, only one budget out of three, the second, is likely to address important, long term policies without the contamination of short-term political considerations.<sup>17</sup>

Quite clearly, there is 'little time to engage simply in good government'.<sup>18</sup>

Associated with this, it is argued that four-year terms would give governments longer to weather any adverse responses to the implementation of policies seen as necessary though unpopular. It is said that this would be especially valuable in the area of economic management.

## Business confidence

It is claimed that longer terms would enhance business confidence. The private sector has long complained that national elections disrupt their long-term planning, with deleterious effects upon the national economy. It has been noted, for instance, that retail sales drop in the period before a Commonwealth election. Calls for longer terms in New Zealand have also tended to come from business organisations.<sup>19</sup>

The Business Council of Australia has been a keen advocate of a longer term. Former president of the Council, Sir Roderick Carnegie, has stated:

The uncertainties created by frequent elections and consequent shifts in Government policy in turn have an adverse effect on business confidence and business investment. Very few other democratic nations suffer this disadvantage as most have maximum parliamentary terms that are significantly longer than that of Australia.<sup>20</sup>

According to Ron Brunton of the Institute of Public Affairs, business support for such a change also has a political dimension. He believes that government stability is less important for business than 'the desire for a longer period of return on all the time and resources they spend in cultivating the party in power'.<sup>21</sup>

## Cost of elections

The longer the period between elections, the greater the saving for the taxpayers forced to foot the election bill.<sup>22</sup> With national elections now costing about \$100m, a great deal would be saved by having fewer national elections.

## Voter dislike

It is often said that Australians dislike the frequency with which they are required to vote, something that is believed to be linked to a distaste for the tough nature of our party and electoral politics. Fewer Commonwealth elections would reduce this to some extent. A former Professor of Politics at La Trobe University, Joan Rydon, has stated that any reduction in the number of elections should be seen as part of a process of 'reducing the adversary nature of our party politics'.<sup>23</sup>

## Bringing the House of Representatives into line

A change to four-year terms would bring the House of Representatives term into line with most state and territory lower house terms. In both Queensland and the Australian Capital Territory there has been recent discussion about the possibility of changing from three- to four-year terms. If this occurs, the House of Representatives would be the only Australian lower house retaining the shorter term.

## The local member

Former MHR, Jim Snow (Australian Labor Party), has claimed that at the electorate level the current system does little for the representative function that is so important a part of the MP's duties. He believes that three-year terms may make local members adept at campaigning, but they do not encourage them to work in a sustained way on long-term problems: 'Members are tempted to become show ponies rather than watch dogs'.<sup>24</sup>

## Political debate

Might longer periods between elections raise the standard of political debate? It has been wondered if such a period might 'create more opportunity for genuinely bipartisan discussion of a wider range of issues [than is normally the case]'.<sup>25</sup>

## What to do with Senate terms?

Any discussion of longer House of Representatives terms raises the important question of how such terms would be coordinated with the terms of the members of the Senate. Simultaneous elections are not a constitutional requirement, but they save money, and only six of 40 House elections have been held alone — the last was 30 years ago. The Australian experience has therefore been that the three-year/six-year model makes it relatively easy to hold both elections on the same day. However, if the House of Representatives maximum term became four years, with no alteration of Senate terms, simultaneous elections would be much rarer.

Although there has been much agreement about the need to lengthen the lower house term, there is far less consensus about what should be done with the term for the upper house. The proposal which seems to have most popular support would increase the House term by a year and the Senate term by two years, with the coordination of election dates for the houses being optional, as has always been the case. The major doubt about this change is whether extending senators' terms to eight years would be accepted by voters. Might it be seen as 'cynical and self-serving by a somewhat jaded electorate'?<sup>26</sup> Is an eight-year term just too long? While praising the idea of four-year House terms, the *Melbourne Age* has described eight years between elections as 'a strange concept of democracy'.<sup>27</sup> Professor James Crawford has noted that:

An eight-year term for Senators is a very long one, which stretches any notion that parliamentary office is the result of a more-or-less current mandate from the electorate.<sup>28</sup>

Former senator Reg Withers (Liberal Party) asserted that if senators gained a longer term it would 'almost be as good as being a tenured academic or a tenured public servant'.<sup>29</sup> Major parties might also reject the idea of some minor party senators holding a seat for such a length of time. This has been an issue in New South Wales since the 1999 election following the election of some Legislative Council members with very small shares of the vote.<sup>30</sup>

Despite such views, this change would see the maintenance of a system very much like the current arrangements, and might, therefore, be the easiest to sell to an electorate traditionally sceptical of constitutional change. There have been many politicians who have supported it. Former deputy prime minister, Tim Fischer (National Party), for example, has expressed his support and, incidentally, the support of his party as well.<sup>31</sup> Peter McGauran (National Party) has acknowledged the difficulty of selling eight-year Senate terms to a sceptical public, but sees it as a question of overall benefit to the Parliament and, hence, the nation. For him, the advantages of the four-year House term outweigh the disadvantages of longer Senate terms.<sup>32</sup> Another MP has noted that to introduce four-year terms for the House probably leaves one with little option other than to double the Senate's term.<sup>33</sup>

It is perhaps relevant to note that eight-year upper house terms were introduced in four states during the period 1972 and 1987. It is sometimes

stated that extending senators' terms in this way would weaken party discipline, but there is no evidence from the states that this would be so. Senators seeking re-election would still need party preselection, and an undisciplined performance would not be the way to guarantee continued party support.

The Australian Labor Party has taken the view that it would be preferable to make this change if there were also the introduction of simultaneous elections, as well as a reduction in the power the Senate holds to destroy a government that controls the House of Representatives.<sup>34</sup> The journalist Paul Kelly is another who has argued against such a change while ever Senate powers remain intact: 'Any proposal to marry the Senate's existing powers with even less frequent Senate elections is the worst [proposal] imaginable'.<sup>35</sup>

The question of Senate terms is therefore uncertain, and it may prove to be the area in which it is most difficult to get wide enough support to make any alteration in the term of the national lower house.

## Five-year maximum terms?

If an argument in favour of lengthening the House of Representatives term is that this would give government and business longer to plan and introduce policies, should the maximum term be increased from three to five years? The lower houses in Ireland, France, Canada and the United Kingdom all have terms of this length. Table S3.1 shows that more nations have five-year parliaments than any other term. Five-year terms have not been unknown in Australia. In the 19th century five of the colonies had five-year terms at some stage. Legislation passed in Tasmania in 1936 introduced such a term for the House of Assembly, and this remained in place until 1969. In 1937 South Australia also introduced five-year terms, though it reverted to the three-year term two years later, following public criticism.

Some Australians have argued for a five-year term for the national lower house. As early as 1925, William Higgs MHR (Nationalist) noted that the average length of a parliament was two and one half years, and spoke of the difficulties this caused for members. The time spent on electioneering made the

performance of parliamentary duties, particularly in such a large country, extremely difficult. Higgs called for an increase in House terms to five years and Senate terms to ten years, asserting that:

Trade, commerce, and industry would profit by the change, and members of Parliament would be able to give more time to the study of Commonwealth problems.<sup>36</sup>

In 1955 a member of the House of Representatives, WM Bourke (Australian Labor Party–Anti-Communist) also made a call for a five-year term.<sup>37</sup>

Elaine Thompson of the University of New South Wales believes a move from three- to five-year terms would be too great a change for the electorate to accept, primarily because of concerns about a perceived reduction in the democratic elements of the political system. At the same time, she acknowledges that five-year terms might be expected to give greater stability and improved government ‘efficiency’.<sup>38</sup> It is noteworthy that there have been 20 elections in Australia in the past 50 years, compared with only 13 in the United Kingdom and 16 in Canada.

As Higgs appreciated, five-year House terms also open up the particularly awkward question of what to do with Senate terms. Should they be ten years, with half retiring every five years? Five-year terms in parallel with House terms? Equal to two House terms? Any of these would probably be seen as too long, creating a Senate that was said to be ‘out of touch’ with the electorate. If the present fixed Senate term of six years was retained, this would result in the holding of many more elections, something that would fly in the face of the aim of reducing the number of elections.

On balance, it is unlikely that many members of parliament would support an increase from three- to five-year terms. Even in the United Kingdom there has been a significant amount of sentiment expressed that the House of Commons term of a maximum five years is too long.<sup>39</sup>

### **Should the three-year maximum term be retained?<sup>40</sup>**

In a dissenting note to the 1929 Royal Commission on the Constitution, three members refused to accept the need for any increase in the House of Representatives term. They claimed that the three-year term was ‘quite long enough’, and

noted that it was ‘in the control of members’ to alter their fixation with preparing themselves for the next Commonwealth election. Their concern was with democracy:

The greater the control of Parliament by the electors the better for the people, and the lengthening of the term of Parliament tends to weaken this control.<sup>41</sup>

Former prime minister Keating (Australian Labor Party) has also referred to the question of democracy, claiming that the Australian democratic system is ‘very robust’ because ‘every three years or less’ the voters have a chance to change the parliament, and hence the government.<sup>42</sup> The historian Geoffrey Blainey believes it would be a ‘harsh penalty’ to deprive the Australian people of the right after three years to dismiss an incompetent or lacklustre government.<sup>43</sup> Similarly, Senator Brian Harradine (Independent) has said that ‘it is important that the people are given the chance regularly to audit what the government is doing by voting it in or out of office’. Harradine would seek to create a climate in which parliaments are allowed to run their full three-year term.<sup>44</sup> Keating has also described senators as ‘substantially unrepresentative of both the polity and the wider community’, due to each state having an equal number of senators. He believes that to lengthen the Senate term would take it further from political relevance, particularly later in an eight-year term.<sup>45</sup>

Others have observed that the solution to the ‘problem’ of shortened parliamentary terms lies with the prime ministers who have often reduced the term of Parliament by calling early elections. The Clerk of the Senate, Harry Evans, has said that if prime ministers could restrain themselves, at a stroke we would have longer, and therefore, more stable parliaments. Nearly 20 years ago, three political scientists felt able to assert that it had ‘never’ been the case that Australians were bothered by elections every three years. The problem, they claimed, lay with prime ministers who did not allow the Parliament to last the full term: ‘It is the constant possibility of premature parliamentary elections that is so destructive of good government’.<sup>46</sup>

One difficulty with moving from the three-year term is the lack of evidence that such a change would actually bring the

benefits that are claimed. Surprisingly, there appears to have been no research undertaken on the consequences of the change to four-year terms that occurred in four of the Australian states in the 1970s and 1980s. There is also a lack of international evidence in regard to this aspect of legislative behaviour, no doubt because political scientists have regarded it as a settled question in most countries. Even were research to be done, however, the findings could only be speculative. Claims are made about the deleterious impact of three-year terms upon the Australian economy, but as far as can be ascertained there is no methodologically sound study that establishes, without doubt, that economic performance has been materially affected by a legislative term. Australian business interests have not made any effort to substantiate their claims with hard evidence.

A second problem relates to the contention that the existing term has a deleterious impact upon legislative performance. Critics point to the rush to legislate before the end of a parliament, but seem not to consider the possibility that the shorter term acts as a strong motivating instrument to get planning under way and legislation passed promptly. In addition, extending the House term to four years would not necessarily see the improved pursuit of medium- and long-term planning strategies. In many cases lengthy periods may be required after the passage of legislation before policies are seen to be producing results. The required lead time may be far longer than four years and the difference between three- and four-year terms may therefore be quite marginal.

In summary, although there is a lot of sentiment in favour of the four-year term, most of it is based on speculation rather than hard evidence. Some, at the least, might prefer to stick with what is known rather than take the punt on longer terms.

## Modifying Westminster — four-year fixed terms?

Some argue that the power to choose the election date gives a substantial advantage to the Prime Minister, allowing 'arbitrary, partisan and capricious early elections'.<sup>47</sup> It is clear that while the House has provision for a maximum term, politics is going to remain in the equation, whether the term is three or four years. It has been argued that a four-year maximum term is:

The worst of all possible worlds. It gives an extra year to a government without accountability to the people and yet the opportunity for a prime minister to call an early election at will still remains.<sup>48</sup>

Accordingly, it can be argued that the only way to eradicate this problem is to introduce fixed terms. Even in the United Kingdom there have been occasional proposals to introduce fixed term parliaments to remove this prime ministerial prerogative.<sup>49</sup> In her study of the length of lower house terms, Thompson saw merit in three-year fixed terms, primarily on the grounds of their retaining 'more accountability', with governments being 'sensitive to the need for re-election throughout their term, rather than just at the end'.<sup>50</sup>

There has, though, been more interest in four-year fixed terms. Former South Australian attorney-general Chris Sumner (Australian Labor Party) is one who sees an important step forward in the removal of the partisan advantage enjoyed by incumbents in their choice of election date.<sup>51</sup> Evans has pointed out that a change to fixed terms would also help provide a solution if the Supply problems of 1975 were to be repeated. The insertion into the Constitution of a fixed House term, that could only be shortened by a motion constitutionally identified as a motion of no confidence, would withdraw the usefulness of blocking or rejecting Supply as a parliamentary tactic.<sup>52</sup>

The Australian Labor Party developed an interest in fixed terms in the late 1970s, and the New South Wales Labor Opposition supported the change to fixed terms in the 1995 referendum held in that state.<sup>53</sup> Former national leader, Gough Whitlam, still calls for fixed four-year terms for every Australian parliament, Commonwealth and state.<sup>54</sup> Whitlam has warned that the rising costs of campaigning leaves the process open to corruption: 'The cost of campaigns is the greatest source of political corruption confronting the Western democracies'. He wonders if creating fixed terms of parliaments would lessen the possible danger.<sup>55</sup>

One Labor proposal for fixed terms was in fact passed by the Senate in November 1982. This particular model involved simultaneous House and half-Senate elections on the third

Saturday in November every third year. The only exceptions to this would be (a) when a government was defeated in the House on a formal vote of no confidence, and (b) when a double dissolution was called following a deadlock between the houses. If an extraordinary election were forced by either (a) or (b), the incoming government would be able only to see out the term of its predecessor to the normal date for a general election.<sup>56</sup> Geoffrey Lindell, Professor of Law at Melbourne University, has described what he sees as the advantages of such a system:<sup>57</sup>

- While not taking away any of the Senate's powers over money bills, it would make their use irrelevant, for blocking of such legislation by the Senate could not force an early election.
- There would be a reduction in the opportunities for the use of 'vice-regal discretion' as occurred in 1975.
- A prime minister would not be able to manipulate election dates for reasons that are 'purely arbitrary, partisan or capricious'.<sup>58</sup>

By contrast, some Coalition politicians, such as former prime minister Malcolm Fraser and Peter Durack (both Liberal Party), have been determined opponents of fixed terms, seeing them as 'inappropriate, ineffective and dangerous'. In particular, they believe that fixed terms do not sit well with the Westminster system of government where 'it is axiomatic that a government be able to appeal to the electorate at any time' when it is felt to be necessary.<sup>59</sup>

It is this point about the modification of the Westminster model that is of great concern to some critics. Former chief justice Dixon has pointed out that in our system of government, we 'insist on the dependence of Cabinet upon Parliament'. Furthermore, our governmental arrangements provide that 'if a difficulty arises between the executive government and Parliament, it shall be resolved by an appeal to the people'.<sup>60</sup> This is not possible under fixed term arrangements, except when the constitutional change is written so as to allow for earlier elections if a substantive no-confidence motion is passed.<sup>61</sup> Former law lecturer, and later Labor minister for justice, Michael Tate, is another who has expressed doubts, focusing on the conventions of responsible government. He has particularly wondered what such a change would do to the office of the Prime Minister. At present a Prime Minister can go to the people if

circumstances warrant it, and Tate believes this power ought not be thrown away lightly. For example, if a Prime Minister is being frustrated by the Opposition, 'he ought to be able to go to the people and renew his mandate' — it is what Professor Don Aitkin has described as the 'flexibility' that exists in the Westminster model.<sup>62</sup>

David Clune of the New South Wales Parliamentary Library has noted other consequences. He maintains that if fixed terms are introduced then the Vice-Regal reserve powers have to be excluded, or else their existence must be acknowledged in the relevant legislation and constitutional amendment. The New South Wales Parliament took the latter option when fixed terms were introduced in that state, arousing strong opposition. Clune also notes that under a fixed term 'a government could be fixed to an election in inauspicious or unfortunate circumstances that militate unfairly against its chances of re-election'.<sup>63</sup>

Not all on the Coalition side of politics are opposed to fixed terms. In New South Wales the change to fixed terms seems to have been accepted by the Liberal and National Parties, with no pressures to repeal the legislation. Former Liberal senator David Hamer has suggested that the idea of a fixed three-year term — with the unchanged fixed Senate term of six years — would be a way of avoiding the criticism that would be heard if the Senate term were increased to eight years.<sup>64</sup>

An interesting point made by the English academic, David Butler, that is usually not referred to in the Australian context, relates to the issue of the cost of elections. Butler has noted that flexible election dates — as in Australia — tend to produce shorter, and therefore cheaper, campaigns. Uncertainty over the date of an election means that there is usually little to be gained by an Opposition beginning to campaign well before the Prime Minister's announcement.<sup>65</sup> The Labor 'mini-campaign' of 1971 remains the only example in Australian electoral history. By contrast, a well-known feature of United States of America national elections — all of which are fixed term — is just how long the campaigning can take. This is not only because of fixed terms, but is certainly exacerbated by that aspect of the system.

Writing nearly 20 years ago, Uhr claimed that while few Commonwealth MPs opposed four-year terms, ‘there is a considerable number of opponents to the notion of a fixed parliamentary term’.<sup>66</sup> The position is probably still as Uhr described it, despite the Joint Standing Committee on Electoral Matters receiving a number of submissions in favour of fixed terms in recent years.

## A mixed system?

In an effort to find a path through the thicket, some support has been heard for a mixed constitutional arrangement, which would combine elements of both maximum and fixed-term arrangements. The model usually referred to would give the House of Representatives a maximum term of four years, with the House not dissolvable during the first three years after an election. This restriction on early dissolution would be subject to some exceptions.<sup>67</sup> This is the constitutional arrangement introduced in Victoria in 1984 and South Australia in 1985, and it has been recommended for introduction in Queensland by both the Queensland Constitutional Review Commission and the Parliament’s Legal, Constitutional and Administrative Review Committee.<sup>68</sup>

In Victoria the Legislative Assembly cannot be dissolved during the first three years unless:

- the Assembly passes a resolution expressing a lack of confidence in the government
- the Legislative Council fails to pass, or rejects, an appropriation (supply) bill for ordinary annual services within one month of its being sent from the Legislative Assembly
- a deadlock between the two houses develops over a bill deemed by the Legislative Assembly to be a ‘Bill of special importance’.

Legislative Council terms are equivalent to two terms of the Assembly, with half of the Council resigning at each election.<sup>69</sup>

In South Australia the Legislative Assembly cannot be dissolved during the first three years unless:

- a motion of no confidence in the government is passed in the House of Assembly
- a motion of confidence in the government is rejected by the House of Assembly

- a bill ‘declared by resolution of the House of Assembly’ to be of special importance is passed by the House, but rejected by the Legislative Council
- the governor is acting in pursuance with the double dissolution provisions of the *Constitution Act 1934* (SA).

As with Victoria, Legislative Council terms are equivalent to two terms of the Assembly, with half of the Council resigning at each election.<sup>70</sup>

It can be suggested that this constitutional arrangement brings together several major benefits. Longer terms would presumably have the effect of bringing more stability and predictability to the political system, but a Prime Minister would still have the flexibility of choosing the election day, albeit only in the fourth and final year of each parliament. The period of uncertainty and indecision that inevitably affects governments prior to an election could be restricted to just the last quarter of a parliamentary term.<sup>71</sup> The *Melbourne Age* has suggested that this model is a ‘useful’ guide to reform in Canberra, combining, as it does ‘the benefits of certainty and consistency of tenure without denying political parties their craving for flexibility’.<sup>72</sup>

Senator Richard Alston (Liberal Party) has described this model as having ‘considerable appeal’, for he sees it as protecting the staggered electoral arrangement for the Senate which he describes as a safeguard for Senate independence.<sup>73</sup>

## A note on implementation

Despite there being much support for four-year terms, it is by no means certain that voters would support the question in a constitutional referendum. Although a referendum for four-year terms passed comfortably in New South Wales in 1981, four-year term referenda were defeated nationally in 1988 and in Queensland in 1991. It seems that if an amendment on any topic is to be accepted by the voters, it needs to appear as non-controversial as possible. There certainly needs to be no division between the major parties.<sup>74</sup>

In regard to any proposal to increase House of Representatives terms, two obvious objections would be that:

- parliamentarians were merely seeking to give themselves longer parliamentary terms
- the government of the day hoped to benefit from the change.

On the first, there would seem to be little that could be done to lessen any possible impact this might have in a society that is said to be endemically suspicious of politicians.

In regard to the second objection it would probably be prudent to have the amendment worded so that the change could not be waved away simply as a change being made solely to benefit the government of the day. Perhaps the first extended term should not begin for the following House of Representatives, but for the next after that?

## In conclusion

What are the main aspects of the debate on extended terms for the House of Representatives?

### Commonwealth elections

- Some Australian opinion-leaders believe the number of Commonwealth elections needs to be reduced, on the grounds of cost and governmental and economic stability.

### House of Representatives terms

- Most of those calling for longer House of Representatives terms over the years have agreed on the need for four-year maximum terms.

- There seems to be little support for five-year terms.
- The main opposition to an extended term is likely to be based on democratic grounds.
- There is a great deal of uncertainty about fixed parliamentary terms, largely on the basis of the possible undermining of the Westminster aspects of our political system, though the recent change to fixed terms in New South Wales gives an opportunity to assess this.
- Some observers have wondered about the merits of the Victorian and South Australian models which combine maximum term and fixed term elements.

### Senate terms

- Although some see it as less than ideal, many supporters of four-year House of Representatives terms support an increase in Senate terms to eight years, either fixed or maximum.
- However, critics from within both the Coalition and the Labor Party are doubtful about longer Senate terms on democratic grounds. Some in the Labor Party would support such a change only if there was a parallel reduction in Senate powers.
- Reduction of Senate terms would be controversial, largely because of a desire to retain staggered elections.
- There is probably no support for a four-year/six-year House and Senate term pattern.

## Endnotes

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# 3

# International relations

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## Introduction

Australia's international relations are driven by its core national interests — the security of the Australian nation and the prosperity and wellbeing of the Australian people.

Australia's international relations give high priority to: the Asia-Pacific region; bilateral relationships with the United States of America, Japan, Indonesia, China and other key partners; international trade liberalisation; and support for the World Trade Organization (WTO) and Asia-Pacific Economic Cooperation (APEC). Australia's global interests require broad international engagement. The priority Australia attaches to its relationships with the countries of the Asia-Pacific region does not diminish the important interests Australia pursues in the Americas, Europe and elsewhere.

In addition to maintaining and developing strong bilateral relationships, Australia advances its international interests by participating in regional and global institutions and forums. For example, the negotiation of multilateral trade agreements enhances access to foreign markets for Australian exports. Australia also has a strong national interest in guarding against the spread of weapons of mass destruction, especially in the Asia-Pacific region, and works to achieve this objective through international regimes dealing with non-proliferation and arms control.

Our international relations are also shaped by economic globalisation. Globalisation provides opportunities for internationally competitive economies, but also brings challenges for political and economic management. Globalisation blurs the division between foreign and domestic policy, increases competitive pressures in markets, and makes globally based trade rules and disciplines even more important.

Australia's engagement with Asia is extensive and has been built over many decades. Australia continues to seek closer engagement with Asia because of the profound mutual benefits that flow from our relations with countries of the region. What happens in our own region affects us more deeply and more quickly than events that occur in most other areas of the world. Australia has substantial trade and economic interests at stake in the region. Despite the global economic downturn, Australia's trade with regional economies has remained stable or continued to grow. East Asia takes more than 50%

of all our merchandise exports and others are transported through the region to markets elsewhere in the world.

The Government is preparing to publish Australia's second foreign and trade policy White Paper, *Advancing the National Interest* following significant changes to Australia's international environment since the first White Paper of 1997. *Advancing the National Interest* will examine how Australia can best use its considerable credentials and attributes to advance its national interests in an increasingly globalised and fluid international environment.

## Australia's credentials and place in the international system

In its international relations, Australia uses its assets — economic, strategic and cultural — as well as its reputation as a responsible, constructive and practical country. The values which Australia brings to its international relations are the values of a liberal democracy. These have been shaped by national experience and given vigour through cultural diversity. They include the rule of law, freedom of the press and the accountability of the government to an elected parliament.

Australia has a modern industrial economy with a sophisticated manufacturing and services base. The Australian economy has been performing strongly, despite economic downturn and slower growth in some of our leading export markets. Over the past decade, Australia has been the sixth fastest growing economy in the Organisation for Economic Co-operation and Development (OECD), outperforming the United States of America, Canada and most countries in the European Union (EU).

Australia has a strong skills base, high quality education and training institutions, advanced physical infrastructure, and high rates of information technology use. Strong civil institutions underpin a free society and encourage free enterprise. Australia's cultural diversity gives Australian society a vigour and capacity to adapt rapidly to new opportunities. It is also a rich source of language and other skills which help us do business in a global economy.

Australia's defence capability is significant in regional terms. Australia has a broadly based relationship with the United States of America, whose strategic engagement and commitment underwrite the stability of East Asia.

## **Australia's bilateral relationships**

As a nation with global interests, Australia deals with countries in many regions. The countries which engage Australia's interests most substantially are those which influence the strategic and economic environment. These include the three major powers and largest economies of the Asia-Pacific region — the United States of America, Japan and China — and Australia's neighbour, Indonesia. Australia also has significant relationships with the other states of the Association of South-East Asian Nations (ASEAN), the EU and its member states, the Republic of Korea and, in the South Pacific, New Zealand and Papua New Guinea (PNG).

### **United States of America**

The relationship between Australia and the United States of America is based on a strong commitment to democracy, security and an open trading system. The relationship complements and reinforces Australia's practical commitment to the Asia-Pacific region.

Within the alliance of the ANZUS Treaty, Australia and the United States of America cooperate closely in a range of areas to promote their own security and to contribute to broader regional and global security. The 50th anniversary of the signing of the Treaty occurred in 2001. Australia invoked the Treaty for the first time in September 2001 following the terrorist attacks in the United States of America. The bilateral relationship is underpinned by a program of high-level visits and consultations. The Australian Prime Minister visited the United States of America three times in financial year 2001–02.

Australia's and the United States of America's shared strategic interests and values are complemented by dynamic trade and investment links. The United States of America is one of Australia's leading trading partners and the most important in terms of two-way services trade and investment flows. The United States of America and Australia are discussing the possibility of negotiating a bilateral free trade agreement. People-to-people ties, including educational and cultural links, are extensive and wide-ranging.

### **Japan**

Japan is the world's second largest economy and, as such, plays a primary economic and political role in our immediate region. Australia works hard to encourage close dialogue with Japan on a wide range of economic, political and strategic issues and the development of policies which are mutually reinforcing. Japan is Australia's leading merchandise trading partner, accounting for 16% by value of our total merchandise trade in 2001–02. It is a significant investor in Australia and our second largest source of in-bound tourism behind New Zealand.

Like Australia, Japan supports the long-term strategic engagement of the United States of America in the Asia-Pacific region. Japan also shares our interest in advancing APEC as a primary vehicle for economic cooperation in the Asia-Pacific region. The Australian Prime Minister's visit to Japan in August 2001 and the Japanese Prime Minister's visit to Australia in May 2002 helped build on the strong links between the two countries. Australia and Japan have agreed to discuss deeper economic linkages, including through a possible bilateral trade and economic agreement.

### **China**

China's importance to Australia grows along with China's increasing economic, political and strategic engagement with the Asia-Pacific region and the global economy. China's relations with the countries of the Asia-Pacific region, particularly Japan and the United States of America, play a vital role in shaping the security context for the region. Australia encourages and supports Chinese participation in organisations which promote dialogue and cooperation on regional security issues.

The 30th anniversary of the establishment of diplomatic relations between Australia and China occurred in 2002. The Australian Prime Minister visited China in May 2002. In March 2002 the Chinese Foreign Minister visited Australia, the first visit by a Chinese Foreign Minister since 1992. The Chairman of China's National People's Congress, visited Australia in September 2002.

Over the last 10 years China has moved from being the tenth to the third largest merchandise trade partner with Australia, and the trade and investment relationship is expanding. Australia and China have agreed to negotiate a framework agreement which will explore opportunities to broaden and deepen the economic relationship. New opportunities to broaden the trade and

investment relationship between the two countries should also flow from China's accession to the WTO in November 2001. In August 2002 the Chinese Government awarded a major gas supply contract to an Australian consortium, the largest foreign contract ever awarded to an Australian company. Under the agreement, which is worth up to \$25b, Australia will supply three million tonnes of liquid natural gas each year for 25 years beginning in 2005.

Within the parameters of the one-China policy Australia also pursues important economic and trade interests with Taiwan, our ninth largest merchandise trading partner.

### Indonesia

As one of Australia's nearest neighbours, the relationship with Indonesia has long been one of our most important. The relationship is based on government-to-government links, expanding trade and investment and regional cooperation. Australia also maintains a large-scale bilateral program of economic, technical and humanitarian assistance to Indonesia.

Productive, high-level ministerial contact in recent years has helped Australia and Indonesia work together on regional challenges. The Australian Prime Minister visited Indonesia twice in 2001–02. In February 2002 the Australian and Indonesian foreign ministers jointly chaired a Regional Ministerial Conference on People Smuggling, Trafficking in Persons and Related Transnational Crime. Australia also facilitated the inaugural trilateral ministerial meeting between Indonesia, East Timor and Australia in 2002. This meeting marked an important step toward improving regional stability and security.

Indonesia is Australia's tenth largest market for merchandise exports and our eighth largest source of imports. In 2001–02, two-way merchandise trade reached its highest point.

### Korean Peninsula

Relations between Australia and Republic of Korea (ROK) have become increasingly complementary and productive in recent years, reflecting a growing commonality of interests, shared emphasis on the importance of the Asia-Pacific region and mutual recognition of the benefits of close cooperation. The ROK is an important trading partner for Australia and the third largest merchandise export market. The Fourth Australia–Korea Forum, hosted by Australia in July 2002, built on the strong relationship between the two countries.

Australia has a vital interest in rapprochement on the Korean Peninsula and welcomes high-level dialogue between the ROK and the Democratic People's Republic of Korea (DPRK). Working closely with key regional partners, Australia has promoted stability in North Asia by engaging the DPRK in political dialogue and providing humanitarian assistance through multilateral organisations. Australia resumed diplomatic relations with the DPRK in May 2000 and the DPRK opened an embassy in Canberra in May 2002.

### Association of South East Asian Nations (ASEAN)

ASEAN is the key regional political institution in South-East Asia and has been instrumental in promoting regional political harmony and stability for over 30 years. Australia values greatly its close relationship with ASEAN as a grouping, and with its member states (Brunei Darussalam, Burma, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand and Vietnam). Australia's relations with ASEAN cover trade and investment, as well as cooperation in the technical, cultural, defence and educational fields. Australia is also involved in the ASEAN Regional Forum, which promotes regional security dialogue and confidence building, as well as the ASEAN Post-Ministerial Conference. Australia's trade with ASEAN countries grew strongly in 2001–02, surpassing levels achieved before the financial crises hit the region in 1997.

### East Timor

As the world's newest nation and close neighbour, East Timor is important to Australia. Australia worked closely with the United Nations (UN) and the East Timorese people in support of East Timor's stable transition to independence in May 2002, and continues to play a leading role in the UN post-independence mission in East Timor.

Australia established full diplomatic relations and opened an embassy on the first day of independence. The Australian Prime Minister attended the independence celebrations and the President of East Timor visited Australia in June 2002. Australia and East Timor signed the Timor Sea Treaty which provides an equitable basis for development of oil and gas resources in the Timor Sea. The Treaty will promote stability and economic development for East Timor. Australia is also one of East Timor's largest aid donors.

## **New Zealand**

Australia and New Zealand have traditionally been natural allies and friendly rivals. Migration, trade and defence ties have helped shape the relationship. More than a million Australians and New Zealanders crossed the Tasman Sea in 2001 as tourists, for business purposes, or to visit family members. The Australia New Zealand Closer Economic Relations Trade Agreement (CER), which took effect in 1983, created a free-trade area between the two countries. New Zealand is Australia's fifth largest merchandise trading partner. At a government-to-government level, the relationship is more extensive than with any other country. The respective prime ministers hold formal talks frequently; foreign ministers have met formally twice yearly for a number of years and the trade and defence ministers meet their counterparts annually.

## **The South Pacific**

Australia has a strong interest in the stability and economic viability of the island states of the Pacific. These countries face significant development challenges and, in some cases, political instability. Australia is the largest donor of development assistance to the South Pacific and is a major trade and investment partner for these countries. Australia supports local efforts to advance development and, where necessary, restore stability, in cooperation with other countries and institutions that have a long-term interest in the region.

Australia pursues a close, constructive and friendly bilateral relationship with PNG aimed at promoting political stability, effective governance and economic self-reliance there. Australia provided training and assistance in support of the 2002 elections. We worked quickly to engage the newly elected government and underline our commitment to support ongoing reform efforts. Australia provides civilian and defence force personnel to the multinational Peace Monitoring Group in Bougainville, which is supporting the peace process paving the way to autonomy for the province.

Australia provided substantial assistance to the Solomon Islands in the wake of unrest in 2000. Australia facilitated ceasefire and peace talks and led an International Peace Monitoring Team which supported implementation of a peace agreement. Australia is helping the Solomon Islands Government address continuing problems of lawlessness and economic decline.

In October 2001, following democratic elections in Fiji, Australia lifted bilateral sanctions introduced after the May 2000 coup and normalised the bilateral relationship.

## **Europe**

Australia has close ties with many countries in Europe. The EU is a leading participant in key forums such as the G8 (Group of Eight), and the states of Europe make valuable contributions to leading multilateral organisations such as the UN, the WTO and the OECD. As one of the key economic centres of the world, Europe is important to Australia's trading interests. The EU as a common market is Australia's most significant trading partner and the largest foreign investor in Australia.

In 2001–02 the United Kingdom was Australia's sixth largest merchandise trading partner. It is also the second largest single country investor in Australia and the second largest destination for outward investment from Australia.

The key central and eastern European markets for Australia are Russia, Poland, Hungary, the Czech Republic and Romania, while the smaller transition economies — Slovenia, the Slovak Republic and Bulgaria — also offer trade opportunities for Australia. Australia's relations with these and other regional countries have developed rapidly in recent years, and will continue to do so as many of them prepare to become members of the EU.

## **South Asia**

India is growing in strategic and economic importance in global and regional affairs and is an increasingly important dialogue partner for Australia. During 2002 heightened tensions between India and Pakistan threatened peace and stability in the region. Australia contributed to international diplomatic efforts to lower tensions between the two countries.

Australia restored defence ties with Pakistan, which had been suspended following that country's 1998 nuclear tests, in recognition of its constructive role in the international campaign against terrorism. Australia participated in the US-led international intervention in Afghanistan against the Taliban regime and the associated Al Qaida terrorist network. In 2002 Australia re-accredited a non-resident ambassador to Kabul, and Afghanistan established its first resident embassy in Canberra. Australia pledged

\$50.7m in aid to Afghanistan, our second largest contribution to an international humanitarian relief effort.

### Canada and Latin America

Australia's relationship with Canada is mature, productive and broadly based. The two countries have been trading for more than 100 years and established formal diplomatic links 60 years ago. In addition to the active trade and investment relationship, Australia and Canada cooperate closely on international security, trade and environmental issues.

Trade and investment relations between Australia and the countries of Latin America have expanded in recent years. The size and diversity of the markets in the region offer significant opportunities for Australian exporters and investors. The Australian Government also pursues a productive relationship with Latin American countries on a range of international political and economic issues.

### The Middle East and Africa

Australia has growing commercial interests in the Middle East, a significant destination for Australian agriculture, services and manufactured exports. The Middle East has been the fastest growing regional market for Australian exports over the past decade. Australia's most significant relationship in Africa is with South Africa, which is a growing market for Australia's commercial interests and provides a base for trade with all the countries of the Southern African Development Community.

### Australia's security interests

Australia's national security and its economic interests are inextricably linked to the security and stability of the Asia-Pacific region. The key components of Australia's security strategy are maintaining a strong national defence capability, the security alliance with the United States of America, developing bilateral defence and security relationships with countries throughout the Asia-Pacific region, and strengthening multilateral security links in the region, especially the ASEAN Regional Forum (ARF).

Regular bilateral security dialogues with key countries in the Asia-Pacific region, and with key partners beyond the region, provide an opportunity to share views on a wide range of regional and global security issues, promote transparency and reinforce Australia's

commitment to working cooperatively with regional countries on security issues. The terrorist attacks in the United States of America in September 2001 heightened the regional and international focus on security, anti-terrorism and weapons of mass destruction. This was reinforced by the bombing attacks that killed and injured many Australians and others in Bali in October 2002.

The ARF is an important means of encouraging a sense of strategic community in the region. It complements bilateral links when dealing with global and regional security issues and has a role in encouraging regional support for international regimes against the proliferation of weapons of mass destruction. In 2002 Australia negotiated bilateral agreements promoting closer cooperation on counter-terrorism with Indonesia, Thailand and Malaysia.

Australia continues to play an active role in strengthening the international regimes to prevent the proliferation of nuclear, chemical and biological weapons and of missiles. An important Australian objective is to ensure that these regimes are implemented effectively in our region. Australia also encourages adherence to the international regime banning the use, stockpiling, production and transfer of anti-personnel landmines.

### Australia's economic interests

Australia's economic wellbeing and growth depend on a competitive domestic economy and access to foreign markets. Trade policy, industry policy and microeconomic reform all work to provide Australian business with the competitive foundations and opportunities to thrive in an increasingly globalised marketplace.

As with Australia's security interests, Australia's economic interests are most closely engaged in the Asia-Pacific region. In 2001, 72% of Australia's merchandise exports and half of Australian direct foreign investment went to APEC member countries.

Australian trade policy combines bilateral, regional and multilateral efforts that aim to advance Australia's commercial interests, particularly by securing market access. Strategies focus on reducing barriers and developing markets for Australian exports, services and investment.

The WTO is of particular significance to Australia. It is the major forum for global trade liberalisation and, through its rules and disciplines, provides a predictable and more transparent environment for business. It also provides an important means of resolving trade disputes. Australia leads the Cairns Group of WTO member countries seeking fair trade in agricultural products.

The launch of the new round of WTO trade negotiations in Doha, Qatar in November 2001 met a key trade policy goal of Australia. The Doha Declaration gives specific commitment to negotiations on a wide range of issues, including services, industrial products, intellectual property, WTO rules (including anti-dumping), dispute settlement and some trade and environment issues. Ministers set an ambitious timeframe for the negotiations to be concluded by 1 January 2005. A key objective for Australia will be the elimination of export subsidies and significant cuts to domestic support that distort trade in agriculture, as well as significant improvements to market access.

Australia is pursuing several initiatives for free trade agreements (FTAs) with major trading partners which complement our multilateral and regional trade liberalisation efforts. These negotiations aim to deliver substantial market access gains for Australian businesses that could not be achieved in a similar timeframe by other means. We are currently negotiating FTAs with Singapore and Thailand, and are working towards negotiations on an FTA with the United States of America. ASEAN, Australia and New Zealand endorsed a framework for the ASEAN Free Trade Area (AFTA) — CER Closer Economic Partnership.

APEC is a significant regional forum for Australia. APEC economies are committed to achieving free and open trade and investment by 2010 for industrialised economies and by 2020 for developing economies. Australia is committed to achieving this goal, which would bring considerable long-term benefits for Australia and the region. Australia is working in the short and medium terms to ensure substantial progress in the liberalisation programs of individual APEC economies. APEC is the only regional forum

which brings together leaders from across the Asia-Pacific region. APEC meetings encourage dialogue between member countries and provide high-level networking opportunities, thereby increasing the level of trust and confidence among regional countries.

## **Australia's engagement with the United Nations (UN) system**

Australia pursues important national interests in the UN system. The principal body, the General Assembly and its committees, is complemented by specialised agencies like the World Health Organization, and affiliated organisations, such as the International Atomic Energy Agency. Under the UN Charter the Security Council has primary responsibility for maintaining international peace and security.

Australia places high priority on the UN's efforts to promote multilateral cooperation in core areas: international peace and security; the development of international legal instruments and norms; the provision of humanitarian assistance; and protection of the environment and sustainable development. Priorities over the past year have included establishment of an International Criminal Court and strengthening multilateral cooperation on people smuggling and anti-terrorism.

Reform of the UN is an important objective for Australia. Our aim is to ensure that the UN system can respond effectively to changing circumstances in a stable or declining budgetary environment.

## **The Commonwealth**

Australia also values the Commonwealth, an association of 54 countries dedicated to promoting political principles of importance to Australia: democracy, good governance and the rule of law. Australia hosted the CHOGM (Commonwealth Heads of Government Meeting) in March 2002 and the Australian Prime Minister is the current Commonwealth Chair-in-Office. Australia is one of the largest contributors to the Commonwealth.

## Australia's human rights policy

Australia takes an active and constructive approach to improving human rights internationally through: targeting development cooperation programs; supporting the establishment of national human rights institutions and good governance; encouraging multilateral, regional and bilateral discussion of human rights issues; and working to develop and strengthen the effectiveness of regional and international human rights institutions and instruments. Australia has been elected to serve on the UN Commission on Human Rights for a three-year term from 2003. In addition to working through multilateral forums, Australia promotes human rights through bilateral dialogues with individual countries. Australia has held bilateral discussions with China and Vietnam and agreed to hold similar discussions with Iran.

## The role of DFAT in Australia's international relations

The Department of Foreign Affairs and Trade (DFAT) is the principal source of advice to the Government on foreign and trade policy issues and is the agency primarily responsible for implementing the Government's foreign and trade policies.

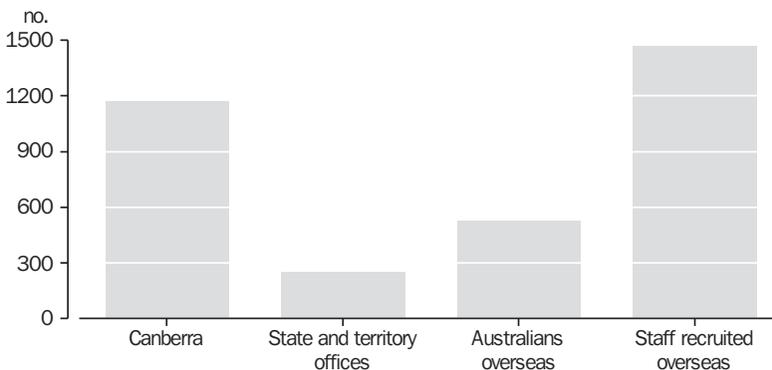
Its aim is to advance the interests of Australia and Australians internationally. The department's staff in Canberra, in state and territory offices in Australia, and Australian diplomatic missions around the world, work towards the achievement of four primary outcomes:

- Australia's national interests protected and advanced through contributions to international security, national economic and trade performance, and global cooperation
- Australians informed about and provided access to consular and passport services in Australia and overseas
- public understanding in Australia and overseas of Australia's foreign and trade policy and a positive image of Australia internationally
- efficient management of the Commonwealth overseas-owned estate.

## Location and number of DFAT staff

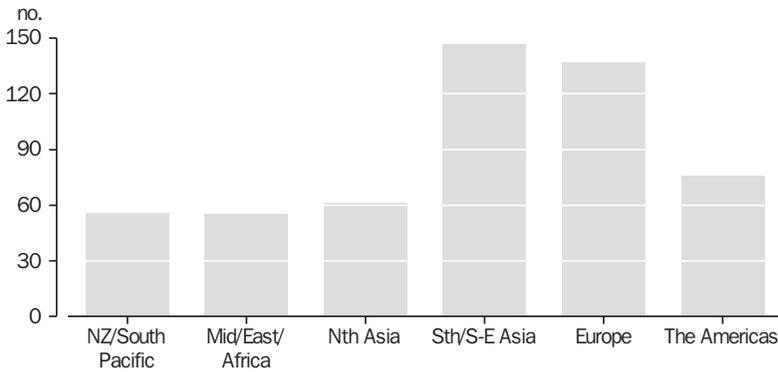
Graph 3.1 shows the location of DFAT staff. Graph 3.2 shows the number of Australia-based DFAT staff overseas by region.

3.1 AUSTRALIA-BASED DFAT STAFF — June 2002



Source: Department of Foreign Affairs and Trade.

3.2 LOCATION OF AUSTRALIA-BASED DFAT STAFF OVERSEAS — June 2002



Source: Department of Foreign Affairs and Trade.

## Services to the Australian community

DFAT provides a range of services to the Australian community. The department provides 24-hour consular and passport services to Australians travelling overseas and their families in Australia through its network of overseas missions and honorary consulates, the consular operations centre in Canberra and consular cooperation arrangements with other countries. The services the department provides include: assisting Australians who are hospitalised, imprisoned or require welfare assistance overseas; helping family members when Australian travellers die or go missing; and coordinating evacuations from international trouble spots.

Consular services are available to Australians at 164 locations overseas. The department keeps Australian travellers informed about international developments through media briefings and travel advice notices. In 2001–02 the department helped more than 24,000 Australians in difficulty.

The department provides secure travel documents to eligible Australians under the authority of the *Passports Act 1938* (Cwlth). Passport services are provided through passport offices located in Australia's major cities and diplomatic and consular missions overseas.

## Public information services

DFAT provides a range of information services to the Australian public and media. It also promotes an accurate, positive and up-to-date image of Australia internationally focusing on technical capabilities, record of innovation, achievements in science and industry, and cultural diversity. On 31 December 2001 the ABC Asia-Pacific (ABCAP) television service began broadcasting news and information to countries in the Asia-Pacific region. DFAT manages the contract between the Government and ABCAP.

Detailed information about Australia's foreign and trade policy can be accessed through the DFAT web site, <<http://www.dfat.gov.au>>. The department also produces hard copy publications on many foreign and trade policy issues, which are available from the department or from Commonwealth government bookshops. Officials from the department provide regular media briefings on issues of the day. Further information and links are listed in the Bibliography.

## The Australian Overseas Aid Program

The Australian Overseas Aid Program aims to advance our national interest by assisting developing countries to reduce poverty and achieve sustainable development. Australian aid focuses on providing practical, well-targeted development assistance to the Asia-Pacific region and responds selectively to needs in South Asia, Africa and the Middle East. The aid program is an integral part of Australia's engagement in the Asia-Pacific region and a practical demonstration of our commitment to helping build regional stability and prosperity. The aid program is also an expression of the conviction of the Australian people that it is right for Australia to help the millions of people, especially among our neighbours, whose lives are afflicted by extreme poverty.

In 2002–03 the Australian Government is providing an estimated \$1.815b in Official Development Assistance (ODA). Details of ODA distribution are set out in table 3.3. Australia's ODA to gross national income ratio for 2002–03 is estimated to be 0.25%, above the latest (2001) donor average of 0.22%.

Further information and publications on the Australian Government's aid program can be sourced from the web sites <<http://www.ausaid.gov.au>> and <<http://globaled.ausaid.gov.au>> of the Australian Agency for International Development (see next section), and the web site of the Australian Centre for International Agricultural Research (ACIAR), <<http://www.acair.gov.au>>.

## The Australian Agency For International Development (AusAID)

AusAID administers the bulk of Australia's aid program. It is an administratively autonomous agency within the Foreign Affairs and Trade portfolio. AusAID's principal organisational functions are: to provide professional policy advice and support to the Government on aid policy, program directions and international development issues; and to develop and implement programs of assistance in partnership with developing countries, international agencies, non-government organisations (NGOs) and Australian businesses.

## Key sectors of the aid program

The aid program provides assistance in five key sectors:

- governance (includes improving economic and financial management, strengthening law and justice, increasing public sector effectiveness and developing civil society)
- agriculture and rural development
- health
- education
- infrastructure.

Activities in these sectors are underpinned by a commitment to environmental sustainability and gender equity.

Country and regional strategies, which are developed in consultation with partner governments, are the primary means through which sectoral priorities are translated into programs on the ground. Strategies take account of partner government priorities, Australia's strengths, and the activities of other donors. Within the sectoral framework, development assistance programs in partner countries comprise a range of activities. These include the provision of Australian goods and services, training and academic student scholarships, food aid and support for NGOs.

## Country programs

### Papua New Guinea (PNG)

Australia's aid program with PNG is the largest aid program Australia has with any one country. Australia's aid to PNG seeks to support PNG's economic and social development by focusing on governance, health, education, infrastructure, sustainable management of natural resources, and the consolidation of the peace process in Bougainville.

Australia is supporting a wide-ranging program of public sector reforms being undertaken by the PNG Government. In 2002–03 Australia is providing \$30m through the contestable PNG Incentive Fund, rewarding agencies and institutions that demonstrate a proven track record in program and financial management.

Work in the education sector is assisting PNG to maximise the benefits that information technologies can provide. Australia is helping PNG to improve infrastructure maintenance and promote sustainable management in the forestry sector. Australia is supporting the Bougainville Provincial Administration as it moves towards autonomous government, and is assisting the social reintegration of ex-combatants.

### The Pacific region

Pacific Island Countries (PICs) face significant development challenges as a result of their economic and environmental vulnerability. Countries in the Pacific lack diversity in terms of production and export sectors, making them especially vulnerable to economic shocks and crop failure. Already facing the dual challenges of expanding populations and limited viable agricultural land, PICs are particularly susceptible to natural disasters and environmental deterioration. Furthermore, as small countries they often lack adequate capacity in their public or private sectors to cope with the range of challenges presented by the rapidly globalising world. They do not have access to a sufficiently large pool of people with the technical, administrative and managerial skills a modern state requires.

Australia's long-term objective is to help PICs achieve the maximum possible degree of self-reliance. Australia's assistance is principally provided in governance and economic reform, education and training, environment and natural resources, health and private sector development. In countries such as the Solomon Islands, where tension and conflict have erupted, Australia is working through the aid program to address the causes of the tension and provide short-term support while working with the country to improve social and economic conditions in the longer term.

### 3.3 AUSTRALIAN AID FLOW — 2002–03(a)

	\$m
Papua New Guinea	351.4
Pacific	
Fiji	19.7
Vanuatu	22.1
Solomon Islands	36.2
Samoa	15.8
Tonga	11.4
Kiribati	11.1
Other and regional	48.7
Total	165.0
Nauru additional(b)	6.8
East Asia	
Indonesia	121.6
East Timor(c)	36.0
Vietnam	72.2
Philippines	63.0
China	55.5
Cambodia	39.6
Thailand	21.6
Laos	19.0
Other and regional	42.3
Total	470.8
South Asia	
Bangladesh	35.6
India	22.1
Sri Lanka	11.4
Nepal	7.8
Pakistan	4.2
Other and regional	28.8
Total	110.0
Africa and Other	
Africa	60.1
Middle East	11.9
Other	60.7
Total	132.7
Reconciliation to Official Development Assistance (ODA)	
Other Government Department (OGD) unallocated(d)	143.1
Core contributions to multilateral organisations, other ODA(e)	434.8
<b>Total Official Development Assistance (cash)</b>	<b>1 814.6</b>

(a) Budget estimate for 2002–03. (b) Nauru additional represents additional funding appropriated under 2001–02 additional estimates and a new measure for 2002–03 to meet the \$10m pledge of assistance agreed between the Nauru and Australian governments in December 2001. (c) Shows East Timor aid program only as OGD East Timor is included in OGD unallocated. (d) OGD unallocated includes ODA eligible expenditure by other government departments which has not been allocated to a particular country or region. (e) Includes adjustment of \$6.5m for non-ODA eligible expenditure and other adjustments.

Source: AusAID.

## East Asia

This year will be challenging for many East Asian countries. Achieving significant economic growth and poverty reduction is likely to remain problematic. Key factors will be the health of the world economy and the demand for regional exports. The global economic slowdown impacted significantly in 2001–02, with regional growth of around 4.3% in calendar year 2001, compared with around 7.6% in 2000.

In East Asia, Australia has bilateral programs with Indonesia, Vietnam, the Philippines, China, Cambodia, East Timor, Thailand, Laos, Burma and Mongolia. The aid program in Indonesia is Australia's second largest. Over the period 2001–03 Australian aid aims at addressing poverty reduction, sustainable economic recovery and democratisation in Indonesia. Australia is helping the newly independent East Timorese government to improve service delivery and public administration as well as supporting major programs in rural development, water supply and sanitation. In Vietnam Australia is supporting governance reforms by providing targeted policy advice and short-term training as well as continuing to address the needs of the rural poor. In the Philippines and China the livelihoods of the rural poor are also a focus, particularly in the southern islands of the Philippines and the west of China.

The Asia regional program complements Australia's bilateral assistance by addressing trans-boundary development challenges and strengthening regional cooperation and economic integration. Priority is given to governance (including economic management, trade and related economic integration issues and social protection) and health (including HIV/AIDS). Regional program activities aim to assist economic growth, while building capacity to address the needs of some of the poorest and most marginalised people in the region. International trade is crucial to sustainable development and poverty reduction in the region. Australia is assisting partner countries to engage effectively in the new round of multilateral trade negotiations agreed at the WTO meeting in Doha in November 2001.

## South Asia

In South Asia, Australia has bilateral programs with Bangladesh, India, Sri Lanka, Nepal, Pakistan, Maldives and Bhutan. To be effective and deliver quality outcomes, Australian aid to South Asia is focused on a few key sectors including basic education, water and sanitation, and natural

resource management. Building capacity to assist women and children in the region is a particular theme. Australian assistance aims to enhance human capital and improve service delivery, support reform and assist in strengthening governance, and increase the ability of governments to address the needs of vulnerable groups.

## Africa and the Middle East

The development challenges facing Africa are enormous. Recurrent drought, food insecurity, illiteracy, poor health services and high rates of HIV/AIDS are often exacerbated by conflict, poor governance and a lack of social and economic investment. To help African countries meet these challenges, Australian aid focuses on governance, education and HIV/AIDS in southern Africa. This includes assistance to the African Virtual University in Nairobi to provide greater access to quality educational courses at lower cost, support to build the capacity of communities to combat gender violence and reduce poverty, and promotion of capacity building for government agencies in South Africa.

Australia's aid program to the Middle East continues to address the urgent social and economic situation in the West Bank and Gaza, through the United Nations Relief and Works Agency and Australian and local Palestinian NGOs.

## Global programs

### Multilateral and international organisations

Australia's support for multilateral and international organisations extends the reach of the aid program and leverages the benefits Australia's assistance can deliver. Australia supports a range of development banks, the Heavily Indebted Poor Countries Initiative, UN agencies, including the World Food Program, UN Children's Fund and UN Development Program, as well as Commonwealth development agencies. Through support to international health programs Australia addresses persistent global health challenges, including tuberculosis, poor reproductive health, HIV/AIDS and polio, and emerging challenges such as non-communicable diseases, violence against women and mental health. Australia is also supporting international environment programs including the Global Environment Facility and the Montreal Protocol Multilateral Fund, to address the challenges of

climate change, conservation of biological diversity, ozone layer depletion and persistent organic pollutants.

### **Emergency and humanitarian assistance**

Australia's emergency, humanitarian and refugee programs aim to mitigate the adverse impacts of conflict, natural and other disasters on vulnerable populations. To ensure effective responses to conflict and disasters Australia works in cooperation with international and domestic partners to improve preparedness and risk reduction strategies, especially in the Asia-Pacific region. The program focuses on preparedness through analysis and planning; increasing indigenous capacity to prepare for and respond to disasters; increasing Australian government and non-government capacity to respond to a broad range of crises; and greater engagement with multilateral humanitarian agencies.

### **Non-government organisation activities and volunteer programs**

#### **Activities**

NGOs play a key role in the provision of Australian aid to developing countries. Through their strong links with communities in developing countries and partnerships with local organisations, NGOs are well placed to strengthen civil society and build longer term sustainable development at the grassroots level. NGOs have also been successful in mobilising public support and voluntary contributions for aid, and in engaging the Australian community in aid activities.

#### **Volunteer programs**

Since the 1960s, when the Australian aid program first directly funded volunteers, they have been a key part of the human face of Australian aid. Volunteers help to reduce poverty through skills transfer and institutional strengthening, and enhance Australian community participation and interest in the aid program. Australia supports three types of volunteer services: short-term business volunteers; longer term community volunteers (through Australian Volunteers International); and short-term youth volunteers (through the Australian Youth Ambassadors for Development Program). The Youth Ambassadors program develops partnerships with Australian organisations, and with education, community

and government sectors through the placement of young Australians on development assignments throughout the Asia-Pacific region.

### **Australian Centre for International Agricultural Research (ACIAR)**

ACIAR is a statutory authority within the Foreign Affairs and Trade portfolio. As a part of Australia's aid program it assists Australian researchers, institutions and international research centres to develop solutions to agricultural problems in order to reduce poverty, improve food security and enhance natural resources management to the benefit of developing countries and Australia. Collaboration with researchers in developing countries is integral to all ACIAR projects, and ACIAR provides training and infrastructure to help build the capacity of these countries to undertake and apply research.

Funding for ACIAR in 2002–03 is \$46.3m. This supports more than 180 bilateral research projects across the Asia-Pacific region with a primary focus in South-East Asia. ACIAR's bilateral projects focus on agricultural systems economics and management, agricultural development policy, crop sciences, animal sciences, post-harvest technologies, land and water resources, forestry and fisheries. The major bilateral partners of ACIAR are China, Indonesia, Vietnam, India, PNG, the Philippines and Thailand. Under its multilateral program ACIAR also supports international agricultural research centres through grants that link them to Australia's agricultural research organisations. Another component of ACIAR's work involves funding training and development to assist progress and implementation of its research. This is primarily achieved through a small program of postgraduate fellowships provided to developing country scientists for study at Australian universities.

### **The network of Australian diplomatic and consular missions overseas**

DFAT manages an extensive network of Australian diplomatic and consular missions abroad (tables 3.4–3.7), supporting Australia's international interests and providing consular and passport services. The department's central office is in Canberra and it also maintains offices in all of the state capitals and in Darwin, as well as Newcastle and Thursday Island.

**3.4 AUSTRALIAN EMBASSIES, HIGH COMMISSIONS AND CONSULATES MANAGED BY DFAT(a)  
— 30 June 2002**

Country	Post	Country	Post
Argentina	Buenos Aires	Malta	Valetta
Austria	Vienna	Mauritius	Port Louis
Bangladesh	Dhaka	Mexico	Mexico City
Barbados	Bridgetown	Nepal	Kathmandu
Belgium	Brussels	Netherlands	The Hague
Brazil	Brasilia	New Caledonia	Noumea
Brunei	Bandar Seri Begawan	New Zealand	Wellington
Burma	Rangoon	Nigeria	Lagos
Cambodia	Phnom Penh	Pakistan	Islamabad
Canada	Ottawa	Papua New Guinea	Port Moresby
Chile	Santiago de Chile	Philippines	Manila
China, Peoples Republic of	Beijing	Poland	Warsaw
	Guangzhou	Portugal	Lisbon
	Hong Kong SAR	Russia	Moscow
	Shanghai	Samoa	Apia
Croatia	Zagreb	Saudi Arabia	Riyadh
Cyprus	Nicosia	Singapore	Singapore
Denmark	Copenhagen	Solomon Islands	Honiara
East Timor	Dili	South Africa	Pretoria
Egypt	Cairo	Spain	Madrid
Federated States of Micronesia	Pohnpei	Sri Lanka	Colombo
Fiji	Suva	Sweden	Stockholm
France	Paris(b)	Thailand	Bangkok
Germany	Berlin	Tonga	Nuku'alofa
Greece	Athens	Turkey	Ankara
Hungary	Budapest	United Arab Emirates	Abu Dhabi
India	New Delhi	United Kingdom	London
Indonesia	Jakarta	United States of America	Washington DC
	Bali		Honolulu
Iran	Tehran		Los Angeles
Ireland	Dublin		New York
Israel	Tel Aviv		Chicago
Italy	Rome	Vanuatu	Port Vila
Japan	Tokyo	Vatican City	Vatican City(c)
Jordan	Amman	Venezuela	Caracas
Kenya	Nairobi	Vietnam	Hanoi
Kiribati	Tarawa		Ho Chi Minh City
Korea, Republic of	Seoul	Yugoslavia	Belgrade
Laos	Vientiane	Zimbabwe	Harare
Lebanon	Beirut		
Malaysia	Kuala Lumpur		

(a) The Australian Chamber of Commerce and Industry maintains an office in Taipei. The staff at the office include employees seconded from the Department of Foreign Affairs and Trade, Austrade, the Department of Education, Science and Training, and the Department of Immigration and Multicultural and Indigenous Affairs. The Australian Government also maintains a Representative Office in Ramallah. The office manages dealings with the Palestinian Authority in the West Bank and Gaza and has responsibility for Australia's development assistance program for the Palestinians. (b) The permanent delegation to UNESCO is located within the Embassy in Paris. (c) Embassy to the Holy See.

Source: Department of Foreign Affairs and Trade.

### 3.5 MULTILATERAL MISSIONS — As at 30 June 2002

	Post
OECD	Paris
UN	Geneva
	New York
	Vienna
WTO	Geneva

Source: Department of Foreign Affairs and Trade.

### 3.6 CONSULATES MANAGED BY AUSTRADE — 30 June 2002

Country	Post
Brazil	Sao Paulo
Canada	Toronto
Germany	Frankfurt
India	Mumbai
Italy	Milan
Japan	Fukuoka
	Nagoya
	Osaka
	Sapporo
	Sendai
New Zealand	Auckland
Peru	Lima
Romania	Bucharest
Turkey	Istanbul
United Arab Emirates	Dubai
United States of America	Atlanta
	San Francisco

Source: Department of Foreign Affairs and Trade.

### 3.7 CONSULATES HEADED BY HONORARY CONSULS — 30 June 2002

Country	Post	Country	Post
Angola	Luanda	Mozambique	Maputo
Bolivia	La Paz	Norway	Oslo
Brazil	Rio de Janeiro	Pakistan	Karachi
Bulgaria	Sofia	Papua New Guinea	Lae
Canada	Vancouver	Russia	St Petersburg
Colombia	Bogota		Vladivostok
Czech Republic	Prague	Slovenia	Ljubljana
Ecuador	Guayaquil	South Africa	Cape Town(a)
Estonia	Tallinn		Durban
Finland	Helsinki	Spain	Barcelona
Former Yugoslav Republic of Macedonia	Skopje		Seville
French Polynesia	Papeete	Thailand	Chiang Mai
Greece	Thessaloniki		Koh Samui(a)
Ghana	Accra	Ukraine	Kyiv
Indonesia	Balikpapan(a)	United Kingdom	Edinburgh
	Kupang(a)		Manchester
	Medan	United States of America	Boston(a)
Korea, Republic of	Busan		Denver
Latvia	Riga		Detroit
Lithuania	Vilnius		Houston
Malaysia	Kota Kinabalu		Miami
	Kuching		Seattle
	Penang	Uruguay	Montevideo
Mexico	Guadalajara		
	Monterrey		

(a) Currently vacant.

Source: Department of Foreign Affairs and Trade.

## Bibliography

Much information about Australia's foreign and trade policy can be accessed through the DFAT web site, <<http://www.dfat.gov.au>>. The department also produces hard copy publications on many foreign and trade policy issues, which are available from the department (Telephone: Canberra 02 6261 1111) or from Commonwealth government bookshops. The web site contains a browsable list of topic categories, as well as a continually updated current issues list. Documents of interest can be found on the web site by using its search facility. They include:

*Advancing the National Interest: White Paper on Australia's Foreign and Trade Policy*

*Department of Foreign Affairs and Trade Annual Report 2001–2002*

*Department of Foreign Affairs and Trade Corporate Plan 2000–2002*

*Hints for Australian Travellers*

*Portfolio Budget Statements 2002–2003*

*Trade Outcomes and Objectives Statement 2002*

For hints and information for Australians travelling overseas, see <<http://www.dfat.gov.au/consular/hints/index.html>>

For information about services and assistance the department provides to Australian travelling overseas, see <<http://www.dfat.gov.au/publications/ausos/index.html>>

For information on the Asia-Pacific television service, visit <<http://www.abcasiapacific.com>>

For more detailed information about Australia's bilateral relationships, visit <<http://www.dfat.gov.au/geo/fs>>

For specific trade and investment information, see <<http://www.dfat.gov.au/facts/index.html>> and <<http://www.tradewatch.dfat.gov.au>>

For publications by the Economic Analytical Unit, see <<http://www.dfat.gov.au/eau>>

For a list of DFAT statistical publications, see <<http://www.dfat.gov.au/publications/statistics.html>>

For consular and passport information, see <<http://www.dfat.gov.au/travel/index.html>>

For information on Australia's international treaty commitments, see <<http://www.austlii.edu.au/au/other/dfat>>

For information on Australia's human rights policy, see <<http://www.dfat.gov.au/hr>>

For information on Australia's international environmental activities, see <<http://www.dfat.gov.au/environment>>

For links to web sites of the Australian foreign missions overseas, see <<http://www.embassy.gov.au/>>

## Related web sites

Australian Agency for International Development (AusAID) <<http://www.ausaid.gov.au>>. AusAID's site contains a range of information, including:

hot topics, <<http://www.ausaid.gov.au/hottopics>>

country information, <<http://www.ausaid.gov.au/country>>

publications, <<http://www.ausaid.gov.au/publications>>

Global Education, <<http://globaled.ausaid.gov.au>>

Australian Centre for International Agricultural Research, <<http://www.acair.gov.au>>

Australian Safeguards and Non-proliferation Office, <<http://www.asno.dfat.gov.au>>

Australian Trade Commission (Austrade), <<http://www.austrade.gov.au>>. There are separate home pages geared to Australian users, <<http://www.austrade.gov.au/Australian>>, and international users, <<http://www.austrade.gov.au/international>>

Business in APEC, <<http://www.bizapec.gov.au>>

Export Finance and Insurance Corporation (EFIC), <[http://www.efic.gov.au/export\\_finance\\_policy](http://www.efic.gov.au/export_finance_policy)>



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*This chapter was contributed by the Department of Defence.*

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## Introduction

The Australian Defence Forces (ADF) and the Department of Defence (hereafter referred to as 'Defence') are currently operating at an unprecedented level of activity, due primarily to the events of 11 September 2001, the resulting war against terrorism, increased concentration on border protection and unauthorised boat arrivals, and Australia's continued commitments in East Timor. This chapter outlines Defence's objectives and direction from the Government, the strategic environment in which Australia operates, Defence's capabilities and operations, and its financial and human resources. Also included are articles on the aftermath of the events of 11 September 2001, and on the Reserve forces and the Cadet scheme.

## Outcome and strategic objectives

The outcome the Government requires from Defence is 'the defence of Australia and its national interests'. This reflects the broad requirements for Defence in a complex modern strategic environment. The outcome recognises the reality that activities detrimental to Australia's security and national interests may not necessarily involve the use of armed force. Hostile foreign intelligence activities, or economic aggression, deliberate introduction by a foreign power of non-weaponised biological agents, or cyber attack on economically or militarily sensitive cyber-sites, are activities that do not involve the use of armed force, but may be extremely damaging to Australia and its national interests.

As outlined in *Defence 2000 — Our Future Defence Force* (the Defence White Paper), available at <<http://www.defence.gov.au/whitepaper/>>, the Government has identified for Defence four strategic tasks, which guide the development of defence capabilities. These are:

- to be capable of defending Australian territory from any credible attack, without relying on help from the combat forces of any other country
- to have Defence Forces able to make a major contribution to the security of Australia's immediate neighbourhood
- to be able to contribute effectively to international coalitions of forces to meet crises beyond Australia's immediate neighbourhood where Australia's interests are engaged
- to undertake regular or occasional tasks in support of wider national interests.

## Strategic environment

In the increasingly globalised world of which Australia is a part, the attacks of 11 September 2001 were a challenge to the order that underpins our security and prosperity. The war against terrorism, and a heightened awareness of terrorism and transborder crime, have been the dominant feature of the past year.

## Global environment

The global environment continues to be dominated by globalisation and the strategic importance of the United States of America. Since the events of 11 September 2001 (see the article following this section), there has also been an increased international focus on transnational threats, particularly those related to acts of terrorism, from traditional assaults such as bombings, to future possibilities such as cyber or biological attacks. A common approach to terrorism and greater cooperation between major powers have resulted, although deep-rooted causes of rivalry and tensions remain.

## Regional environment

Regionally, the climate has also been affected by the increased security concerns, cooperative measures and differing stances on the war against terrorism. Enduring issues such as governance, economic management and social cohesion, however, remain the primary strategic concerns in the region.

## Domestic environment

While the attacks in September 2001 changed Australia's strategic environment in some important ways, a major attack on Australia remains only a remote possibility. Peacetime national tasks to ensure Australia's security have become increasingly important. There is an increased emphasis on domestic security resulting from the 11 September attacks, with anti-terrorism efforts being invigorated. Border protection, again a transnational problem, has become the other major domestic security issue, with coastal surveillance, unauthorised boat arrivals, smuggling (both of people and goods), quarantine evasion and intrusions on Australian sovereignty (e.g. illegal fishing in Australian waters) all being targeted.

## 11 September 2001 — consequences for defence

On 11 September 2001, two civilian passenger aircraft were flown into the World Trade Center in New York, a third into the Pentagon in Washington and a fourth crashed into a field in Pennsylvania. This terrorist attack claimed over 3,000 lives, and caused a shift in the worldwide focus on security. Australia, like most of the international community, was left feeling shocked and insecure, forcing a rethink of both security and national defence.

In Australia, national security has been reviewed and tightened with a focus on deterring and detecting terrorist attempts. Defence has been involved in this process in concert with other government agencies, through both individual and cooperative measures and task forces. The incident response regiment, an army unit originally created for the 2000 Olympics, has been reconstituted and is designed to help detect and react to explosives and chemical, biological and radiological threats. The Government has also increased Australia's military counter-terrorist capability, with two new counter-terrorist units based at Holsworthy Barracks in Sydney, which have the capability to respond to national security threats. These units are the incident response regiment, which will be able to respond to chemical, biological, radiological, nuclear or explosive incidents both domestically and in support of Australian forces deployed overseas, and an east coast based tactical assault group which is an elite unit able to deploy at short notice to respond to a terrorist incident, such as a hostage siege.

The most obvious repercussion of 11 September 2001 has been the war against terrorism. Australia was one of the first nations to offer assistance in the emerging coalition against terrorism. The ANZUS Treaty was invoked for the first time in its 50-year history, not only to demonstrate Australia's support and commitment to our major ally, but also in recognition of the common threat represented by terrorism. Australia will remain involved in the coalition against terrorism into the future, as the threat posed by terrorism and transnational crime will require vigilance and perseverance for an indeterminate period.

Australia deployed over 1,550 personnel to contribute to the war against terrorism. These forces were committed to combined operations against the terrorist groups responsible for the 11 September attacks, to support the forces of the United States of America and other coalition partners in the campaign, and to provide protection for key coalition forward bases.

The Australian Defence Forces have performed conspicuously well within the international coalition. Australian special forces deployed to fight in Afghanistan have proved to be a welcome and highly effective contribution. Navy and Air Force units have played a less visible but important and successful role in supporting the land forces and participating in related coalition operations.

## Capabilities

### Current capabilities

Defence maintains a force structure with the following major combat elements:

- a surface combatant force consisting of six Adelaide Class guided missile frigates (FFG) and three ANZAC Class frigates rising to eight, together with onboard helicopters (this capability will be enhanced with the introduction of Seasprite helicopters,
- scheduled to be at full capability by the end of 2004), supported by a replenishment ship and an oil tanker
- a patrol boat force of 15 Fremantle Class patrol boats
- a submarine capability consisting of five Collins Class submarines, rising to six
- capabilities for mine warfare, amphibious lift, and hydrographic and oceanographic operations
- Special forces consisting of a special air service regiment, a high-readiness commando battalion and a Reserve commando battalion

- mechanised, motorised and light infantry forces, including a reconnaissance regiment equipped with Australian light armoured vehicles, a tank regiment, a mechanised infantry battalion, a medium artillery regiment, a motorised infantry battalion group, a field artillery regiment, three infantry battalions, a field artillery regiment, an armoured personnel carrier squadron, and engineer and logistic support
- signals, surveillance and specialist support, particularly logistics support, construction engineering, and topographical, electronic warfare, incident response and intelligence support systems
- a re-roled and re-tasked Reserve force designed to sustain, reinforce and, to a lesser degree, rotate personnel and equipment
- a capability for air strike/reconnaissance provided by F-111 aircraft, crews and weapon systems
- a capability for fighter operations provided by F/A-18 Hornet aircraft, crews and weapon systems
- strategic surveillance, involving sensors and battle management elements, including air traffic control radars, tactical air defence radars, the Jindalee Radar Facility and three tactical operations centres
- a maritime patrol capability, involving P-3C aircraft, crews and weapon systems
- the provision of airlift aircraft, crews and weapon systems, and air combat support wings.

For further details of the components of Defence capabilities, see the *Defence Annual Report 2001–02*, Chapter 2, available at <<http://www.defence.gov.au/budget>>.

### Future capabilities

To ensure that Australia will have the forces needed to achieve the tasks outlined in the Defence White Paper, the Government has formulated the Defence Capability Plan, a detailed, costed plan for Australia's military capabilities over the next 10 years, with broad guidance on major capability directions over this period. The aim is to provide the ADF with clear, long-term goals for the development of our armed forces, and the funding needed to achieve those goals.

In light of the changes in Australia's strategic environment, the Government has decided to review the adequacy of Defence's current and planned capabilities to manage the broader range of potential contingencies that may arise, and the ability of Defence to sustain its operations. Defence's first Annual Strategic Review will be submitted to the Government in late 2002.

Described below are some of the major acquisition projects over the next decade:

- Two squadrons (around 20–24 aircraft) of armed reconnaissance helicopters are planned to enter service from 2004–05. These will constitute a major new capability for the Army, providing deployable, flexible, high-precision, and highly mobile firepower and reconnaissance.
- An additional squadron (about 12 aircraft) of troop-lift helicopters will provide extra mobility for forces on operations. In particular, these helicopters will enhance the capability to operate off the amphibious lift ships, HMAS *Manoora* and *Kanimbla*. These helicopters are planned to enter service around 2007.
- New air defence missile systems will supplement the existing RBS-70 and replace the existing Rapier systems, giving comprehensive ground-based air defence coverage to deployed forces. These systems are planned to enter service from around 2005 and 2009 respectively.
- In 2006, 20 new 120 mm mortar systems mounted in light armoured vehicles will enter service.
- A new thermal surveillance system and tactical uninhabited aerial vehicles to provide surveillance for deployed forces are planned to enter service from around 2003 and 2007 respectively.
- The acquisition of four airborne early warning and control aircraft, with the possibility of acquiring a further three aircraft later in the decade. These aircraft will make a major contribution to many aspects of air combat capability, significantly multiplying the combat power of the upgraded F/A-18 fleet.
- The acquisition is planned of up to five new-generation air-to-air refuelling aircraft, which would provide the capacity to refuel not only the F/A-18 aircraft, but also the F-111 and airborne early warning and control aircraft over a wide area of operations. These aircraft will also provide a substantial air cargo capability, and are planned to enter service around 2006.

- A major program to provide better electronic warfare self-protection from missiles for the transport aircraft and helicopters is planned by around 2004.
- The FFGs are planned to be replaced when they are decommissioned from 2013 by a new class of at least three air-defence capable ships. It is expected that these ships will be significantly larger and more capable than the FFGs. The project is scheduled to commence in 2005–06.
- Australia has decided to participate in the development phase of the F-35 Joint Strike Fighter, with the expectation that the F-35 would be the most likely aircraft to provide Australia's future air combat capability, replacing the current fleets of F/A-18 Hornet and F-111 aircraft.

## Operations

With tasks and responsibilities stemming from Australia's commitment to the international coalition against terrorism, its ongoing security roles in East Timor and Bougainville, and its role in the interception of illegal immigrants and in the maintenance of border integrity, Defence is at its highest level of activity since the Vietnam War. Defence also has personnel involved in United Nations and other peacekeeping missions around the world: in the former Yugoslavia, the Sinai, Israel, Syria, Lebanon, Sierra Leone, Ethiopia, Eritrea, and the Middle East. This high operational tempo will continue, with the Government making a strong commitment to strengthen Australia's defences, fight the war against terrorism and further protect Australia's borders.

Tables 4.1–4.3 detail current ADF operations which are ongoing in nature. (For further details of ADF operations, see the operations tables in Chapter 2 of the *Defence Annual Report 2001–02* or the *Portfolio Budget Statements 2002–03*, both available at <<http://www.defence.gov.au/budget>>.)

### 4.1 AUSTRALIAN DEFENCE FORCE, Major operations(a)

Operation	Objective
Slipper October 2001 — continuing	To contribute to the United States-led operation against international terrorism.
Damask 1991 — periodic and continuing	To contribute to the Multinational Maritime Interception Force in the Persian Gulf in support of United Nations sanctions against Iraq.
Belisi II April 1998 — continuing	To support the Peace Monitoring Group in Bougainville by contributing specialist medical, logistic, communications and transport capabilities.
Citadel May 2002 — continuing	The ADF contribution to the Post-Independence UN Mission of Support in East Timor.

(a) Correct as at 30 August 2002.

Source: *Department of Defence*.

#### 4.2 AUSTRALIAN DEFENCE FORCE, Surveillance and regional operations(a)

Operation	Objective
Relex I and Relex II September 2001 — continuing	To conduct air and surface patrols across Australia's northern approaches to deter unauthorised boat arrivals. Operation Relex 1 ceased on 14 March 2002 to enable information concerning the operation to be declassified for the Senate Select Committee on a Certain Maritime Incident.
Gaberdine August 2001 — continuing	To provide support to the Department of Immigration and Multicultural and Indigenous Affairs to manage any increase in unauthorised boat arrivals.
Cranberry August 2001 — continuing	To conduct surveillance in northern Australia supporting the civil surveillance program within the area of operation.
Estes 1980 — continuing	To conduct surface patrols in Bass Strait. Since the successful implementation of the Bass Strait traffic separation scheme, there has been no requirement for ADF surface patrols to continue; however, RAN ships regularly transit the area.
Gateway 1981 — continuing	To conduct aerial surveillance of the northern Indian Ocean and South China Sea approaches to Australia.
Mistral 1998 — continuing	To support Australian sovereign rights and fisheries law enforcement in the Southern Ocean by contributing to the Southern Ocean fisheries patrols.
Solania 1988 — continuing	To contribute to South West Pacific regional engagement via aerial fisheries patrols.
Prowler 1996 — continuing	To collect military geographic information in northern Australia.

(a) Correct as at 30 August 2002.

Source: *Department of Defence*.

#### 4.3 AUSTRALIAN DEFENCE FORCE, Non-regional operations(a)

Operation	Objective
Paladin 1956 — continuing	To contribute to the United Nations Truce Supervisory Organisation in the Middle East. This force of unarmed military observers supervises, observes and reports on the various cease-fire arrangements, truces and peace treaties that have been negotiated between Israel and neighbouring Arab nations since 1948.
Mazurka 1992 — continuing	To provide personnel to the Multinational Force and Observers to monitor the security arrangements in the Sinai.
Osier March 1997 — continuing	To deploy Army personnel as part of the Stabilisation Force in Bosnia–Herzegovina and Croatia, and Kosovo Force in Kosovo. In both cases, personnel serve as individuals attached to United Kingdom forces.
Pomelo January 2001 — continuing	To contribute to United Nations peacekeeping efforts in Africa as part of the United Nations Mission in Ethiopia/Eritrea.
Husky January 2001 — continuing	To contribute to the nation building efforts in Sierra Leone via the International Military Advisory and Training Team.

(a) Correct as at 30 August 2002.

Source: *Department of Defence*.

## Resources

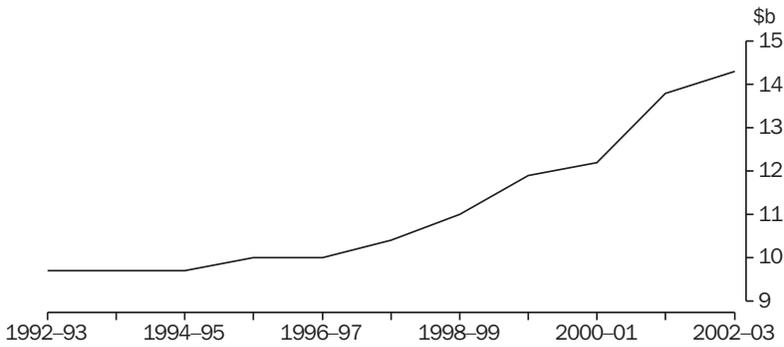
In the decade preceding 2001–02 Defence funding remained relatively stable in real terms. Increases over this period, evident in graph 4.4, reflect maintenance of the Defence funding base against inflationary and unfavourable foreign exchange influences.

Defence funding was increased in the 2001–02 budget (and forward estimates) to address a number of specific priorities detailed in the Defence White Paper. The White Paper provided a funding commitment for Defence and injects some \$28b over the decade from 2001–02. This funding injection equates to an increase of some 3% average real growth per annum over the period.

In addition to the implementation of the White Paper, the Government has given a number of specific directions to Defence to meet emerging strategic priorities. These include the conduct of operations to protect Australia’s borders, a contribution to the international coalition fighting terrorism, and enhancement of domestic counter terrorism capabilities. Defence was provided with some \$730m to address these and other emerging priorities in 2002–03.

Graph 4.5 reflects the significance of both employee costs and the investment in specialist military equipment and infrastructure in delivering Defence capability. Increases in operating costs in 2001–02 and 2002–03 are attributable to the enhanced operational tempo associated with operational undertakings such as those occurring in East Timor and the war on terrorism.

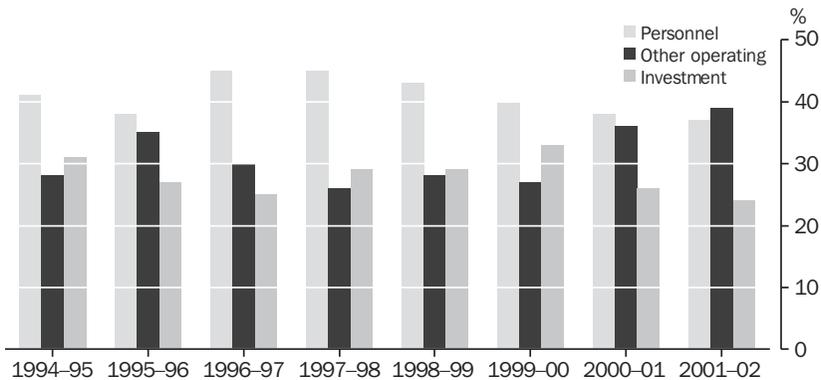
4.4 DEFENCE OUTLAYS(a)



(a) 2001–02 and 2002–03 are estimates.

Source: Department of Defence.

4.5 DEFENCE OUTLAYS, By category(a)



(a) 2001–02 is an estimate.

Source: Department of Defence.

Defence spending by Australia's traditional strategic partners, the United States of America and the United Kingdom, has been declining subsequent to the end of the Cold War. Over the period 1992–2001, the United States of America and United Kingdom defence expenditure as a proportion of GDP declined from 4.8% to 3.2% and from 3.8% to 2.5% respectively. These downward trends may stabilise as a result of the events of 11 September 2001 and a changing strategic picture. The United Kingdom, for example, has recently concluded its 2002 spending review, which has resulted in a planned spending increase of some \$10b over the period 2002–03 to 2005–06. Australia's defence expenditure as a proportion of GDP is shown in graph 4.6.

From a regional perspective, Australia has tended to spend more on defence than its neighbours. The ASEAN nations (Association of South-East

Asian Nations — Indonesia, Malaysia, Singapore, Thailand, Philippines and Vietnam), all spend less than Australia (table 4.7).

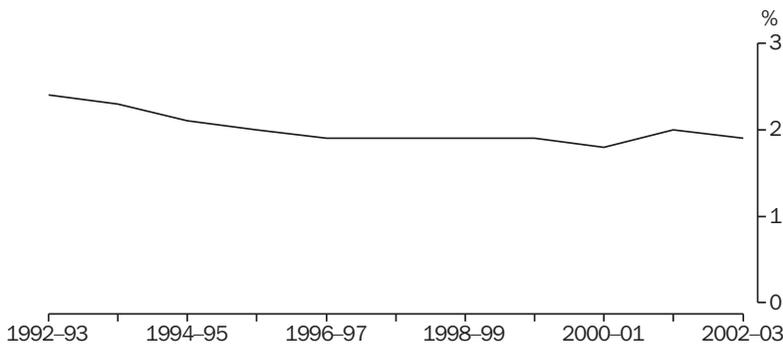
## The White Paper

The White Paper is the Government's long-term security direction and capability enhancement framework for Defence. Within the context of the Government's strategic objectives, it identifies the most important Defence priorities and establishes the primary priority as the defence of Australia.

In doing so, the White Paper provides guidance on those elements of capability required to meet the Government's strategic objectives. It aligns the acquisition of new equipment and the future needs of the workforce with realistic interpretations of available resources and the challenges faced by Defence and industry in making the best use of science and technology.

For further detail on Defence's strategic objectives, see the *Portfolio Budget Statements 2002–03* at <<http://www.defence.gov.au/budget/01-02/index.html>>.

4.6 DEFENCE OUTLAYS, Proportion of GDP(a)



(a) 2001–02 and 2002–03 are estimates.

Source: Department of Defence.

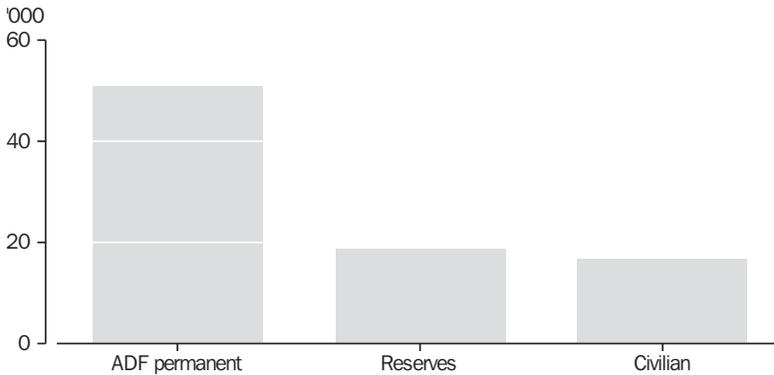
4.7 REAL DEFENCE SPENDING(a)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	US\$b	US$b	US$b	US$b	US$b	US$b	US$b	US$b	US$b	US$b	US$b
<b>Australia</b>	<b>6.2</b>	<b>6.4</b>	<b>6.8</b>	<b>7.1</b>	<b>7.0</b>	<b>7.2</b>	<b>7.2</b>	<b>7.3</b>	<b>7.5</b>	<b>7.7</b>	<b>7.9</b>
Malaysia	2.0	2.0	2.2	2.2	2.4	2.5	2.2	1.8	2.0	1.9	2.3
Indonesia	2.1	2.3	2.3	2.5	2.6	2.9	2.9	2.3	2.4	2.3	2.2
Singapore	3.1	3.4	3.4	3.5	4.0	3.9	4.3	5.0	5.3	5.1	5.4
Thailand	3.0	3.4	3.4	3.7	3.8	3.9	3.6	2.9	2.6	2.7	2.6
Philippines	0.8	0.8	0.9	1.0	1.1	1.1	1.0	0.9	0.9	1.2	1.2
Vietnam	—	1.2	1.0	1.6	1.4	1.9	2.0	1.6	1.7	2.1	2.2

(a) Data calculated in US\$billion 1995.

Source: Defence Intelligence Organisation, 'Defence Economic Trends in the Asia Pacific 2001'.

4.8 DEFENCE TOTAL STAFFING — 2001-02



Source: Department of Defence.

People

With over 85,000 people, Defence is one of Australia's largest employers. As shown in graph 4.8, over half this workforce (58%) are full-time ADF personnel. In addition, a significant proportion (22%) are employed in the ADF Reserves (consisting of almost 80% Army personnel) and a further 19% are civilians. Table 4.9 represents the division of Defence personnel across these categories.

The table shows the distribution of ADF personnel across the three Services. Army personnel represent almost half the full-time ADF, and 80% of the Reserves, with the remaining personnel divided between the Navy and the Air Force.

4.9 AUSTRALIAN DEFENCE FORCE STAFFING, By Service — 2001-02

	ADF full-time	ADF Reserves
Navy	12 598	1 544
Army	25 012	15 669
Air Force	13 322	1 655
<b>Total</b>	<b>50 932</b>	<b>18 868</b>

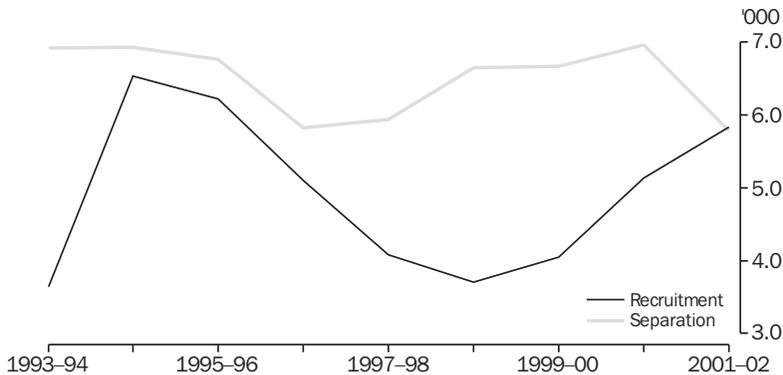
Source: Department of Defence.

## Recruitment and retention

The ADF has experienced difficulty in recent years in maintaining personnel numbers. This has resulted from relatively high separation rates and an inability to achieve recruiting targets in order to compensate. A reversal of this downward trend

finally occurred in 2001–02 (see graph 4.10), with recruitment figures marginally higher than separation rates over the year. This is good news for the ADF, but the trend needs to continue into the coming years to be considered a success, and there remain shortages in specialist areas across the Services that still need to be addressed.

4.10 AUSTRALIAN DEFENCE FORCE, Recruitment and separation



Source: Department of Defence.

## Reserves and Cadets

### Reserves

The Australian Defence Forces (ADF) Reserves make up over a quarter of the total ADF and play a vital role in Australia's defence capability. The role of the Reserves is changing to suit the needs of a modern defence force. They are no longer viewed as solely a mobilisation base in times of major conflict. Reserves also contribute to operations arising at short notice, help sustain operations, assist in domestic peacetime operations and provide additional capacity to support periods when the ADF requires extra personnel to accommodate training and operational schedules.

This has been illustrated by recent deployments of Reserves to East Timor and Bougainville, as well as support to the 2000 Olympic and Paralympic Games. The November 2002 battalion rotation to East Timor, for the first time, will include a Reserve-based company.

The Government has acknowledged the changing place of the Reserves in the Defence White Paper. Like the Cadet program, the

importance of the Reserves was emphasised in the White Paper, with initiatives outlined to improve legislation on their employment, training opportunities, recruitment and retention strategies, and links to the broader community.

### Cadets

The ADF Cadets is a youth training organisation that provides leadership and initiative training while developing the interest of young people in the ADF. The program is aimed at youth between the ages of twelve and a half and eighteen, and is conducted within a military context in schools and other community settings. There are currently around 25,000 Cadets participating in the program across Australia.

The Cadet scheme performs the dual functions of developing the individual and strengthening the ADF. Cadets cultivate personal and team qualities that will benefit them, and their communities, regardless of what path they choose in later life, as well as fostering community spirit and service in participants.

At the same time, the scheme provides a tangible link for the ADF to the wider community, encouraging community involvement with and support for the ADF. Nor is this the only benefit of the scheme to the ADF. The 1999 ADF census revealed that 22% of full-time ADF members, and 25% of active Reserves, were involved in the Cadet scheme

prior to joining the Services, and the retention rate for Service personnel previously involved in the Cadets is also proportionally higher.

The Government recognised the value of Cadets to the community and the ADF in the Defence White Paper, with funding being boosted to \$30m per year by 2002 in order to expand and improve the scheme.

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Minister for Defence, *Portfolio Budget Statements 2002–03*. Available at  
<<http://www.defence.gov.au/budget/01-02/index.html>>

### Defence web sites

Department of Defence, <<http://www.defence.gov.au/>>

Minister for Defence, <<http://www.minister.defence.gov.au/>>

### Related web sites

Australian Strategic Policy Institute, <<http://www.aspi.org.au/>>

Commonwealth Department of Foreign Affairs and Trade, <<http://www.dfat.gov.au/>>

Commonwealth Department of Immigration and Multicultural and Indigenous Affairs,  
<<http://www.immi.gov.au/>>

Commonwealth Department of Veterans' Affairs, <<http://www.dva.gov.au/>>



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## Introduction

Population statistics are measures of the size, growth, composition and distribution of the population as well as the components that shape population change. Although population statistics are not in themselves indicators of wellbeing, they underpin the discussion of a wide range of issues relating to the population, including immigration, cultural diversity, ageing and population sustainability.

The changing size and distribution of Australia's population have implications for service provision and delivery in areas such as health, education, housing and the labour market. Population trends underlie many social changes and assist in the planning of social and economic policy. The size, composition and distribution of the population are also important with respect to environmental issues and outcomes.

The principal source of data on the Australian population is the Census of Population and Housing, which has been conducted at five-yearly intervals since 1961. The most recent census was in 2001, and some results from it are included in this chapter.

## Population size and growth

This section examines the size, growth, distribution and age structure of the Australian population. There is an emphasis on changes over time, especially changes in the growth rate of the population.

As shown in table 5.1, Australia's estimated resident population at June 2001 was just under 19.5 million, an increase of 1.4% over the previous year.

Australia's growth rate of 1.3% for the 12 months to June 2000 was the same as the overall world growth rate. As shown in table 5.2, growth rates for Japan (0.2%), Germany (0.3%), the United Kingdom (0.3%) and New Zealand (0.5%) were considerably lower than that of Australia. In contrast, the populations of Singapore (with a growth rate of 3.6%), Papua New Guinea (2.5%), Hong Kong (SAR of China) (1.8%), Indonesia (1.7%) and India (1.6%) grew at faster rates than Australia's population.

## Population size

Australia's population of 19.5 million at June 2001 was around 2.2 million greater than in 1991 and over 15.7 million more than the 1901 population of 3.8 million. Graph 5.3 shows the growth in Australia's population since 1788. The main component of Australia's population growth has been natural increase (the difference between births and deaths), which has contributed about two-thirds of the total growth since the beginning of the 20th century. Net overseas migration has also contributed to natural increase, albeit indirectly, through children born to migrants. Components of population growth are discussed in more detail in the next section.

### 5.1 ESTIMATED RESIDENT POPULATION AND COMPONENTS OF POPULATION CHANGE(a)

Year ended 30 June	Population								
	Births(a)	Deaths(a)	Natural increase(a)	Net permanent and long-term movement	Category jumping(b)	Net overseas migration(c)	At end of period	Increase(d)	Increase
	'000	'000	'000	'000	'000	'000	'000	'000	%
1996	250.4	126.4	124.0	109.7	-5.5	104.1	18 310.7	239.0	1.3
1997	253.7	127.3	126.4	94.4	-7.3	87.1	18 537.9	227.1	1.2
1998	249.1	129.3	119.9	79.2	7.2	86.4	18 759.6	221.7	1.2
1999	250.0	128.3	121.7	96.5	-11.4	85.1	18 984.2	224.6	1.2
2000	249.3	128.4	120.9	107.3	-8.2	99.1	19 225.3	241.2	1.3
2001	248.7	128.9	119.8	n.y.a.	n.y.a.	109.7	19 485.3	259.9	1.4

(a) Numbers of births and deaths are on a year of occurrence basis and differ from those shown in the births and deaths sections of this chapter. (b) An adjustment for the effect of persons whose duration of stay (category) differs from their stated intentions, entailing a reclassification from short-term to permanent/long-term or vice versa. (c) Net overseas migration is the sum of the net permanent and long-term movement plus category jumping. (d) The difference between total growth and the sum of natural increase and net migration during 1996–2001 is due to preliminary intercensal discrepancy.

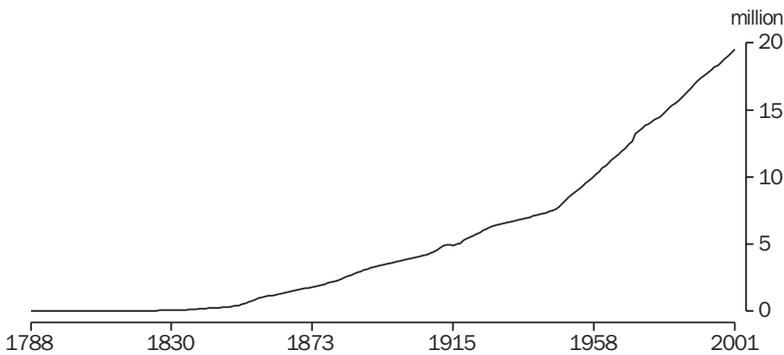
Source: Australian Demographic Statistics (3101.0).

5.2 POPULATION SIZE AND RATE OF GROWTH FOR SELECTED COUNTRIES

Country	Population as at June		Increase %
	1999 million	2000 million	
<b>Australia</b>	<b>19.0</b>	<b>19.2</b>	<b>1.3</b>
China	1 250.5	1 261.8	0.9
Canada	31.0	31.3	1.0
Germany	82.6	82.8	0.3
Hong Kong (SAR of China)	7.0	7.1	1.8
India	997.9	1 014.0	1.6
Indonesia	221.1	224.8	1.7
Japan	126.3	126.6	0.2
Korea, Republic of	47.0	47.5	0.9
New Zealand	3.8	3.8	0.5
Papua New Guinea	4.8	4.9	2.5
Singapore	4.0	4.2	3.6
Taiwan	22.0	22.2	0.8
United Kingdom	59.4	59.5	0.3
United States of America	273.1	275.6	0.9
World	6 002.5	6 080.1	1.3

Source: Australian Demographic Statistics (3101.0); Statistics New Zealand, 'National Population Estimates'; US Bureau of the Census, 'International Data Base'.

5.3 POPULATION OF AUSTRALIA



Source: Australian Demographic Statistics (3101.0); Australian Demographic Trends (3102.0); Official Year Book of the Commonwealth of Australia 1901–1910.

Table 5.4 shows that population growth has not occurred evenly across the states and territories. At Federation, South Australia had nearly twice the population of Western Australia, which in turn had only slightly more people than Tasmania. However, in 1982 Western Australia surpassed South Australia as the fourth most populous state.

**Population growth**

Population growth results from natural increase and net overseas migration (net permanent and long-term arrivals and departures plus an adjustment for category jumping (see footnote (b) to table 5.1)).

Australia’s population grew from 3.8 million at the beginning of the 20th century to 19.5 million in 2001. During the 1950s Australia experienced consistently high rates of growth, with an average annual increase of 2.3% from 1950 to 1959, while during the 1930s Australia experienced relatively low growth (0.9%).

Natural increase has been the main source of the growth since the beginning of the 20th century, contributing two-thirds of the total increase between 1901 and 2001. Net overseas migration, while a significant source of growth, is more volatile, fluctuating under the influence of government policy as well as political, economic and social conditions in Australia and the rest of the world.

5.4 POPULATION

30 June	NSW '000	Vic. '000	Qld '000	SA '000	WA '000	Tas. '000	NT '000	ACT '000	Aust.(a) '000
1901	1 361.7	1 203.0	502.3	356.1	188.6	171.7	4.8	..	<b>3 788.1</b>
1911	1 660.4	1 319.4	617.5	410.8	287.8	188.6	3.3	1.8	<b>4 489.5</b>
1921	2 103.4	1 535.7	766.4	497.1	333.9	212.0	3.9	2.6	<b>5 455.1</b>
1931	2 554.5	1 799.5	926.8	575.8	432.2	224.0	5.0	8.6	<b>6 526.5</b>
1941	2 798.3	1 933.5	1 038.3	600.3	474.8	239.7	10.1	15.0	<b>7 109.9</b>
1951	3 278.0	2 276.6	1 227.7	732.4	580.3	286.2	15.6	24.9	<b>8 421.8</b>
1961	3 918.5	2 930.4	1 527.5	971.5	746.8	350.3	44.5	58.8	<b>10 548.3</b>
1971	4 725.5	3 601.4	1 851.5	1 200.1	1 053.8	398.1	85.7	151.2	<b>13 067.3</b>
1981	5 234.9	3 946.9	2 345.2	1 318.8	1 300.1	427.2	122.6	227.6	<b>14 923.3</b>
1991	5 898.7	4 420.4	2 961.0	1 446.3	1 636.1	466.8	165.5	289.3	<b>17 284.0</b>
1999	6 438.6	4 700.7	3 508.6	1 499.2	1 854.4	472.0	194.2	313.8	<b>18 984.2</b>
2000	6 520.2	4 759.0	3 570.3	1 506.8	1 879.9	472.1	197.4	317.0	<b>19 225.3</b>
2001	6 609.3	4 822.7	3 635.1	1 514.9	1 906.1	472.9	200.0	321.7	<b>19 485.3</b>

(a) The population for Australia includes Other Territories in 1999, 2000 and 2001. Other Territories include Jervis Bay Territory, previously included with the ACT, as well as Christmas Island and the Cocos (Keeling) Islands, previously excluded from population estimates for Australia.

Source: 1901–91: *Australian Historical Population Statistics – on AusStats (3105.0.65.001)*; 1999–2001: *Australian Demographic Statistics (3101.0)*.

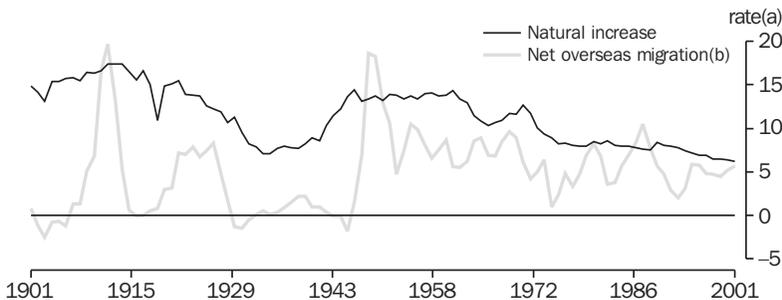
The yearly growth rates due to natural increase and net overseas migration from 1901 to 2001 are shown in graph 5.5.

In 1901 the rate of natural increase was 14.9 persons per 1,000 population. Over the next four decades the rate increased (to a peak of 17.4 per 1,000 population in the years 1912, 1913 and 1914), then declined (to a low of 7.1 per 1,000 population in 1934 and 1935). In the mid to late 1940s the rate increased sharply as a result of the beginning of the baby boom and the immigration of many young people who then had children in Australia, with a plateau of rates of over 13.0 persons per 1,000 population for every year from 1946 to 1962.

Since 1962, falling fertility has led to a fall in the rate of natural increase. In 1971 the rate was 12.7 persons per 1,000 population; a decade later it had fallen to 8.5. In 1996 the rate of natural increase fell below 7 for the first time, with the downward trend continuing from then on. ABS population projections indicate that continued low fertility, combined with the increase in deaths from an ageing population, will result in natural increase falling below zero sometime in the mid 2030s.

Since 1901, the crude death rate has fallen from 12.2 deaths per 1,000 population to 6.6 in 2001. Crude birth and death rates from 1901 to 2001 are shown in graph 5.6.

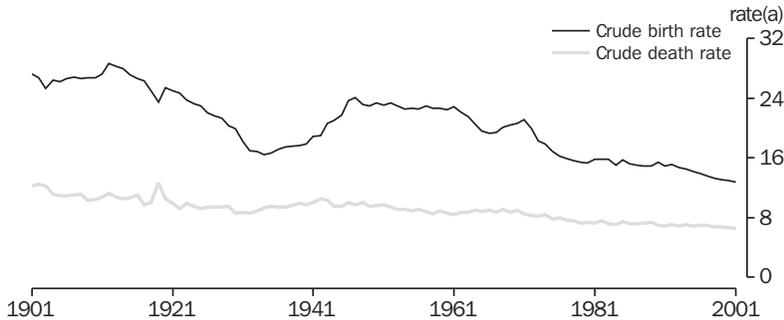
5.5 COMPONENTS OF POPULATION GROWTH



(a) Rate per 1,000 population. (b) Excludes movements of troops for the periods 1914–20 and 1939–47.

Source: *Australian Demographic Statistics (3101.0)*; *Australian Historical Population Statistics – on AusStats (3105.0.65.001)*.

## 5.6 COMPONENTS OF NATURAL INCREASE



(a) Rate per 1,000 population.

Source: *Australian Demographic Statistics (3101.0)*; *Australian Historical Population Statistics – on AusStats (3105.0.65.001)*.

## Aboriginal and Torres Strait Islander population

There are no accurate estimates of the population of Australia before European settlement. Many estimates were based on post-1788 observations of a population already reduced by introduced diseases and other factors. Smith (1980) estimated the absolute minimum pre-1788 population at 315,000. Other estimates have put the figure at over 1 million, while recent archaeological finds suggest that a population of 750,000 could have been sustained.

Whatever the size of the Indigenous population before European settlement, it declined dramatically under the impact of new diseases, repressive and often brutal treatment, dispossession, and social and cultural disruption and disintegration (*Year Book Australia 1994*). The decline of the Indigenous population continued well into the 20th century.

More recently, changing social attitudes, political developments, improved statistical coverage, and a broader definition of Indigenous origin have all contributed to the increased likelihood of people identifying as being of Aboriginal or Torres Strait Islander origin. This is reflected in the large increases in the number of people who are identified as Indigenous in each census, increases in excess of those which can be attributed to natural increase in the Indigenous population. Table 5.7 shows the distribution of the Indigenous population by state and territory between 1901 and 2001.

The Indigenous population has a much younger age structure than that of the total Australian population (see graph 5.8), with 39% of the

population aged under 15 (compared to 21% for the total population), and only 3% aged over 65 (compared to 13% of the total population). In 2001, the median age of the Indigenous population was 21 years, compared to 36 years for the total population.

This age structure is largely a product of high fertility and high mortality among the Indigenous population. Although the total fertility rate among Indigenous women has fallen in recent decades, from around six babies per woman in the 1960s to 2.1 babies per woman in 2001, it remains higher than the total fertility rate among the total female population (1.7 babies per woman in 2001). The high mortality experienced by the Indigenous population is reflected in life expectancy at birth, which in 1998–2000 was about 56 years for males and 63 years for females — around 20 years less than the respective life expectancies of all males and females in Australia in 1998–2000.

While most of the total Australian population is concentrated along the east and (to a lesser extent) the south-west coasts, the Indigenous population is much more widely spread (see map 5.9). About 90% of Australia's Indigenous population live in areas covering 23% of the continent whereas 90% of Australia's total population are contained within just 2.2% of the continent. This reflects the fact that Indigenous people are much more likely to live in remote areas than the rest of the population, and that there is a higher level of urbanisation among the non-Indigenous population than the Indigenous population. However, most Indigenous people live in urban areas of Australia.

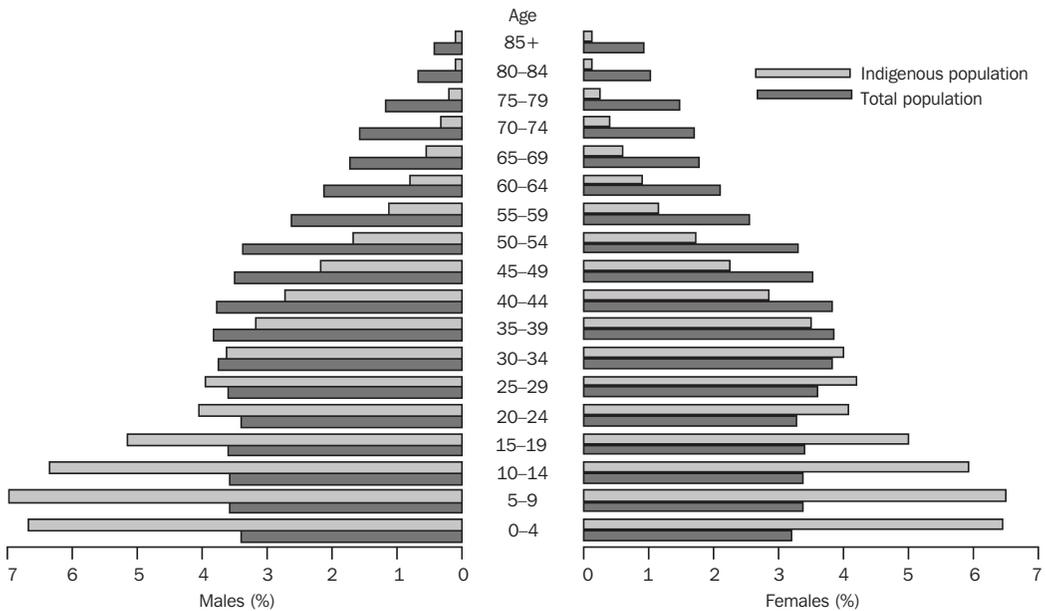
5.7 ESTIMATES OF THE INDIGENOUS POPULATION(a)

	1901(b)		1991(c)		1996(d)		2001(e)	
	no.	%	no.	%	no.	%	no.	%
New South Wales	7 434	8.0	75 020	26.5	109 925	28.5	135 319	29.4
Victoria	652	0.7	17 890	6.3	22 598	5.9	27 928	6.1
Queensland	26 670	28.6	74 214	26.2	104 817	27.2	126 035	27.4
South Australia	5 185	5.6	17 239	6.1	22 051	5.7	25 620	5.6
Western Australia	30 000	32.1	44 082	15.6	56 205	14.6	66 069	14.4
Tasmania	157	0.2	9 461	3.3	15 322	4.0	17 442	3.8
Northern Territory	23 235	24.9	43 273	15.3	51 876	13.4	57 550	12.5
Australian Capital Territory	..	..	1 616	0.6	3 058	0.8	3 941	0.9
<b>Australia</b>	<b>93 333</b>	<b>100.0</b>	<b>282 979</b>	<b>100.0</b>	<b>386 049</b>	<b>100.0</b>	<b>460 140</b>	<b>100.0</b>

(a) Australian estimates for 1996 and 2001 include Other Territories. ACT estimates for 1991 include Jervis Bay. (b) Estimates in 1901 based on separate state censuses. WA number was estimated without an enumeration of the Indigenous population. (c) Estimate based on the 1991 Census of Population and Housing. (d) Estimate based on the 1996 Census of Population and Housing. (e) Preliminary estimate based on the 2001 Census of Population and Housing.

Source: *Experimental Estimates of Indigenous Australians, Electronic Delivery (3238.0.55.001)*; *Experimental Estimates of the Aboriginal and Torres Strait Islander Population (3230.0)*; *Occasional Paper: Population Issues, Indigenous Australians (4708.0)*; *Population Distribution, Aboriginal and Torres Strait Islander Australians (4705.0)*.

5.8 AGE STRUCTURES OF THE INDIGENOUS AND TOTAL POPULATIONS — 2001



Source: *Experimental Estimates of Indigenous Australians, Electronic Delivery (3238.0.55.001)*.

Population projections

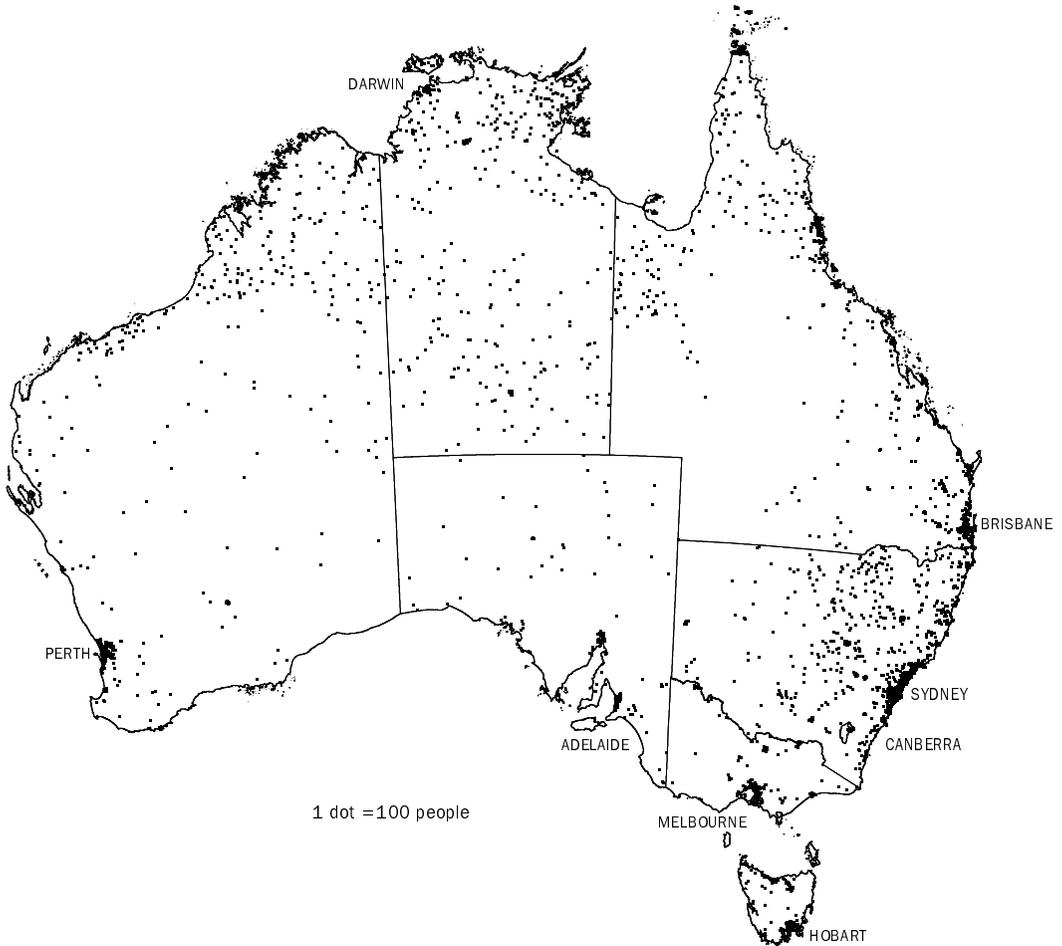
The ABS has published projections of the Australian population to the year 2101, based on a combination of assumptions concerning future levels of births, deaths and migration. Three main series of projections have been published, based on differing levels of these variables.

Series I assumes an annual net overseas migration gain of 110,000, high net internal migration gains and losses for states and territories and a total fertility rate of 1.75 babies per woman by 2008–09, then remaining constant. Series II assumes an annual net overseas migration gain of 90,000, medium net internal migration gains and losses for states and territories, and a total fertility rate falling to 1.6 babies per woman by 2008–09, then remaining constant. Series III assumes an

annual net overseas migration gain of 70,000, generally small net internal migration gains and losses for states and territories, and a total fertility rate falling to 1.6 births per woman in 2008–09, then remaining constant. All series assume that the 1986–96 rate of improvement in life expectancy of 0.30 years per year for males and 0.22 years for females continues for the next five years and then declines gradually, resulting in life expectancy at birth of 83.3 years for males and 86.6 years for females in 2051. After this it is assumed to remain constant.

Graph 5.10 shows that Australia’s population is projected to grow from 19 million in 1999 to between 24.1 and 28.2 million in 2051. By 2101 the population is projected to rise to between 22.6 and 31.9 million. The rate of population growth is projected to vary at different times during the projection period, with a clear long-term declining trend from 1.2% in 1998–99 to between 0.0% and 0.4% by 2050–51 and to between –0.1% and 0.2% by 2100–01. The reason for this slowing in growth is mainly a projected decline in the natural increase (births minus deaths) of the population, as a result of the increasing number of deaths occurring in a rapidly ageing population as well as low and declining fertility levels.

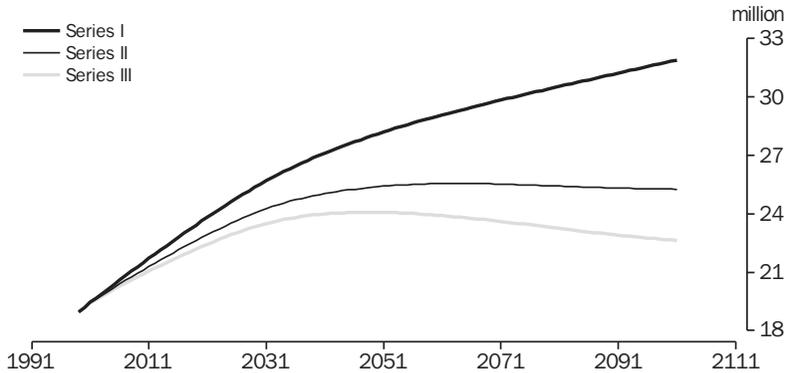
5.9 DISTRIBUTION OF THE INDIGENOUS POPULATION(a) — 2001



(a) Represents a random distribution within Statistical Local Area boundaries.

Source: ABS data available on request, 2001 Census of Population and Housing.

## 5.10 PROJECTED POPULATION — As at 30 June



Source: Population Projections, Australia, 1999 to 2101 (3222.0).

## 5.11 ACTUAL AND PROJECTED POPULATION — 30 June

	1999	2021			2051		
	Actual '000	Series I '000	Series II '000	Series III '000	Series I '000	Series II '000	Series III '000
Capital city/balance of state							
Sydney	4 041.4	5 143.2	5 039.7	4 986.9	6 215.8	5 857.8	5 704.7
Balance of New South Wales	2 370.3	2 696.0	2 560.7	2 493.7	2 785.8	2 390.0	2 206.0
<i>Total New South Wales</i>	<i>6 411.7</i>	<i>7 839.2</i>	<i>7 600.4</i>	<i>7 480.6</i>	<i>9 001.6</i>	<i>8 247.8</i>	<i>7 910.7</i>
Melbourne	3 417.2	4 101.6	4 081.8	4 177.5	4 492.6	4 393.2	4 638.8
Balance of Victoria	1 295.0	1 324.9	1 337.3	1 371.5	1 135.5	1 154.0	1 238.3
<i>Total Victoria</i>	<i>4 712.2</i>	<i>5 426.5</i>	<i>5 419.0</i>	<i>5 549.0</i>	<i>5 628.1</i>	<i>5 547.3</i>	<i>5 877.1</i>
Brisbane	1 601.4	2 364.4	2 215.5	2 083.3	3 311.0	2 864.1	2 510.9
Balance of Queensland	1 910.9	2 824.7	2 593.2	2 453.0	3 917.9	3 237.2	2 862.8
<i>Total Queensland</i>	<i>3 512.4</i>	<i>5 189.1</i>	<i>4 808.7</i>	<i>4 536.2</i>	<i>7 229.0</i>	<i>6 101.3</i>	<i>5 373.7</i>
Adelaide	1 092.9	1 142.2	1 172.3	1 221.2	1 031.1	1 102.2	1 228.6
Balance of South Australia	400.2	421.3	390.5	367.7	392.0	308.3	248.5
<i>Total South Australia</i>	<i>1 493.1</i>	<i>1 563.6</i>	<i>1 562.8</i>	<i>1 588.9</i>	<i>1 423.1</i>	<i>1 410.5</i>	<i>1 477.1</i>
Perth	1 364.2	1 929.5	1 817.5	1 725.2	2 565.4	2 231.5	1 981.8
Balance of Western Australia	496.8	682.6	650.7	611.0	912.3	806.3	692.7
<i>Total Western Australia</i>	<i>1 861.0</i>	<i>2 612.1</i>	<i>2 468.2</i>	<i>2 336.2</i>	<i>3 477.7</i>	<i>3 037.8</i>	<i>2 674.5</i>
Hobart	194.2	202.0	187.1	169.0	186.7	146.2	99.7
Balance of Tasmania	276.1	283.1	254.9	239.3	249.0	173.1	131.6
<i>Total Tasmania</i>	<i>470.3</i>	<i>485.2</i>	<i>442.0</i>	<i>408.2</i>	<i>435.7</i>	<i>319.3</i>	<i>231.3</i>
Darwin	88.1	145.4	129.3	104.5	242.8	192.2	121.2
Balance of Northern Territory	104.8	163.2	135.8	123.2	263.9	177.4	141.8
<i>Total Northern Territory</i>	<i>192.9</i>	<i>308.7</i>	<i>265.0</i>	<i>227.7</i>	<i>506.6</i>	<i>369.5</i>	<i>263.0</i>
<i>Total Australian Capital Territory</i>	<i>310.2</i>	<i>397.9</i>	<i>356.5</i>	<i>309.6</i>	<i>489.3</i>	<i>371.7</i>	<i>248.3</i>
<i>Total capital cities</i>	<i>12 109.5</i>	<i>15 426.1</i>	<i>14 999.5</i>	<i>14 777.3</i>	<i>18 534.7</i>	<i>17 159.0</i>	<i>16 533.9</i>
<i>Total balance of states and territories(a)(b)</i>	<i>6 857.3</i>	<i>8 399.7</i>	<i>7 927.0</i>	<i>7 662.9</i>	<i>9 660.0</i>	<i>8 249.6</i>	<i>7 525.1</i>
<b>Australia(b)</b>	<b>18 966.8</b>	<b>23 825.9</b>	<b>22 926.4</b>	<b>22 440.2</b>	<b>28 194.7</b>	<b>25 408.5</b>	<b>24 059.0</b>

(a) Excludes Balance of ACT. (b) Includes Other Territories.

Source: Population Projections, Australia, 1999 to 2101 (3222.0).

The populations of most states and territories are expected to increase from 1999 to 2051, with the largest increases projected for the Northern Territory (between 36% and 163%), followed by Queensland (between 53% and 106%) and Western Australia (between 44% and 87%) which are well above those of Australia (between 27% and 49%).

Tasmania and South Australia are the only states where the population is projected to decline under each projection series. Tasmania's population is projected to decline by between 7% and 51% by 2051, from 470,300 in 1999 to between 231,300 and 435,700 in 2051. South Australia's population is projected to be between 1,410,500 and 1,477,100 persons in 2051, a decline of between 1% and 6% from its 1999 level of 1,493,100.

These projections are summarised in table 5.11.

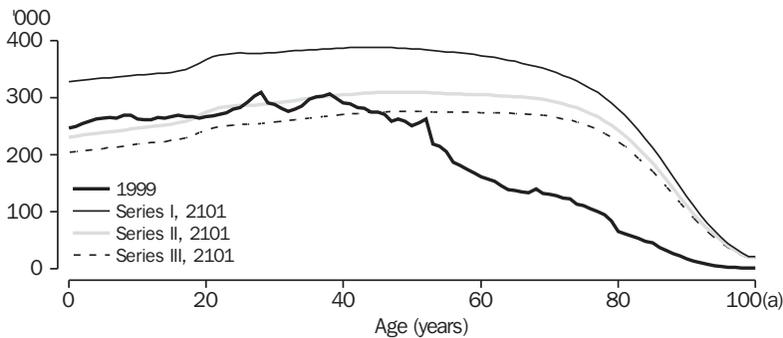
The projections show that the ageing of the population, already evident, is set to continue. The 1999 median age of 34.9 years is projected to increase to between 43.6 and 46.5 years in 2051 and to between 44.0 and 46.6 years in 2101.

The age structure of the population will change noticeably by 2101. Graph 5.12 shows a heavier concentration in the ages 50 years and over and smaller increases or slight declines in the younger ages.

The proportion of the population aged 65 years and over is expected to increase substantially, from 12% in 1999 to between 24% and 27% in 2051 and to between 25% and 28% in 2101. The proportion aged 85 years and over is expected to almost quadruple, from a little over 1% in 1999 to around 5% in 2051 and around 6% in 2101.

Table 5.13 summarises changes from 1901 to 1999, and projections to 2101, in population size, age structure, and proportion living in capital cities.

5.12 AGE STRUCTURE OF THE POPULATION



(a) The 100 years age group includes all ages 100 years and over and therefore is not strictly comparable with single year ages in the rest of the graph.

Source: *Population by Age and Sex, Australian States and Territories (3201.0); Population Projections, Australia, 1999 to 2101 (3222.0).*

5.13 POPULATION, Summary indicators

	Units	1901	1947	1971	1999	2021(a)	2051(a)	2101(a)
Total population	'000	3 773.8	7 579.4	13 067.3	18 966.8	22 926.4	25 408.5	25 254.1
Proportion of population aged								
0–14 years	%	35.1	25.1	28.7	20.7	16.1	14.4	14.4
15–64 years	%	60.8	66.8	63.0	67.1	65.5	59.6	58.6
65–84 years	%	3.9	7.7	7.8	11.0	16.3	21.0	21.3
85+ years	%	0.1	0.4	0.5	1.3	2.1	5.1	5.7
Males per 100 females	no.	110.1	100.4	101.1	99.1	99.2	98.8	99.4
Median age	years	22.5	30.7	27.5	34.9	41.2	46.0	46.1
Proportion living in capital cities	%	36.8	51.2	63.2	63.8	65.4	67.5	n.a.

(a) Series II population projections.

Source: *Australian Demographic Statistics (3101.0); Australian Demography, 1947; Census of the Commonwealth of Australia, 1911; Population Projections, Australia, 1999 to 2101 (3222.0).*

## Population distribution

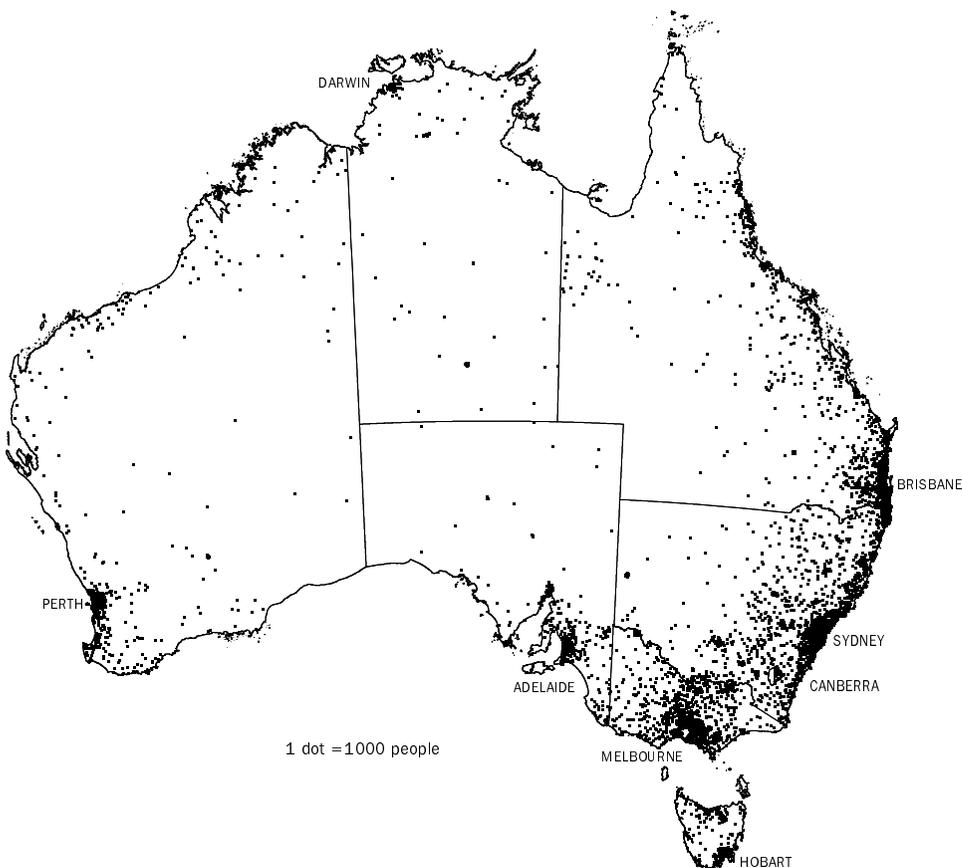
Most of Australia's population is concentrated in two widely separated coastal regions. By far the largest of these, in terms of area and population, lies in the south-east and east. The smaller of the two regions is in the south-west of the continent. In both coastal regions the population is concentrated in urban centres, particularly the state and territory capital cities.

Australia's population density at June 2001 was 2.5 people per square kilometre. The highest population density was in inner areas adjacent to city centres, such as Sydney (C) - Remainder (8,400 people per square kilometre), Waverley (A) (6,900) and North Sydney (A) (5,700) in Sydney,

and Port Phillip (C) - St Kilda (5,500) in Melbourne. At the other extreme, there were around 250 Statistical Local Areas (SLAs) in Australia with less than one person per square kilometre. The distribution of Australia's population is shown in map 5.14.

New South Wales remained the most populous state, with 6.6 million people at June 2001. From 1996 to 2001 the fastest growth occurred in the Northern Territory, which grew over the five years by a total of 10.0%, followed by Queensland (8.9% over five years) and Western Australia (8.0% over five years). Tasmania's population declined over the five years to June 2001 (down by -0.3% over five years) (see table 5.15).

5.14 POPULATION(a) DISTRIBUTION — 2001



(a) Estimated resident population.

Source: ABS data available on request, 2001 Census of Population and Housing.

The main factor changing the distribution of Australia's population has been internal migration. During 2000–01, 380,600 people moved from one state or territory to another, 13,200 more than in the previous year (367,400).

In 2000–01, Victoria, Queensland and the Australian Capital Territory recorded net interstate migration gains. All other states, and the Northern Territory, experienced net losses due to interstate migration, although this was offset in all cases by growth due to natural increase and net overseas migration.

Table 5.16 sets out the estimated resident population in major population centres at June 1996 and 2001. Australia's capital cities accounted for 66% of Australia's population growth between 1996 and 2001, the most significant increases

being on the outskirts of these metropolitan regions. Of all the capital cities, Sydney and Melbourne had the largest growth in the five years to 2001, with increases of 273,600 and 205,500 people respectively. The fastest capital city population growth over the 1996–2001 period occurred in Darwin, by an average of 2.5% per year, followed by Brisbane (1.7%).

Many of Australia's inner city areas, especially in the larger cities, grew rapidly in the five years to June 2001. The Local Government Area (LGA) of the City of Sydney recorded Australia's highest average annual growth rate of 18.1%. The LGAs of Perth (up 7.3% per year) and Melbourne (up 5.6% per year) also experienced rapid growth between 1996 and 2001. The inner-Brisbane SLAs of Fortitude Valley - Inner and City - Inner were among the fastest-growing SLAs in Queensland over this period.

### 5.15 POPULATION GROWTH RATES

Year ended 30 June	NSW %	Vic. %	Qld %	SA %	WA %	Tas. %	NT %	ACT %	Aust. %
<b>NATURAL INCREASE RATE</b>									
1996	0.66	0.63	0.77	0.51	0.80	0.53	1.59	1.00	0.69
1997	0.69	0.63	0.77	0.47	0.80	0.52	1.50	0.99	0.69
1998	0.63	0.60	0.73	0.45	0.76	0.44	1.51	0.92	0.65
1999	0.64	0.58	0.71	0.45	0.79	0.56	1.44	0.94	0.65
2000	0.63	0.59	0.70	0.42	0.75	0.44	1.40	0.89	0.64
2001	0.62	0.56	0.70	0.37	0.74	0.50	1.42	0.90	0.62
<b>NET OVERSEAS MIGRATION RATE</b>									
1996	0.78	0.57	0.40	0.25	0.71	0.08	0.32	0.13	0.58
1997	0.60	0.46	0.38	0.21	0.69	0.05	0.30	-0.02	0.48
1998	0.56	0.45	0.41	0.23	0.71	0.02	0.34	-0.03	0.47
1999	0.58	0.46	0.34	0.14	0.67	0.02	0.50	-0.15	0.45
2000	0.63	0.53	0.46	0.23	0.70	0.08	0.45	-0.08	0.52
2001	0.71	0.58	0.46	0.24	0.79	0.03	0.50	—	0.57
<b>NET INTERSTATE MIGRATION RATE</b>									
1996	-0.24	-0.28	1.00	-0.42	0.23	-0.55	0.18	-0.22	..
1997	-0.19	-0.10	0.60	-0.31	0.35	-0.77	0.98	-1.04	..
1998	-0.22	0.03	0.53	-0.22	0.26	-0.84	-0.23	-0.87	..
1999	-0.23	0.09	0.50	-0.19	0.10	-0.78	-0.48	-0.39	..
2000	-0.24	0.14	0.54	-0.32	-0.04	-0.63	-0.45	-0.27	..
2001	-0.26	0.17	0.55	-0.28	-0.14	-0.54	-0.84	0.10	..
<b>TOTAL POPULATION GROWTH</b>									
1996	1.27	0.95	2.25	0.33	1.82	0.16	2.42	1.13	1.32
1997	1.31	0.93	1.75	0.51	1.78	-0.13	3.05	0.40	1.24
1998	1.19	1.03	1.68	0.61	1.68	-0.29	1.87	0.49	1.20
1999	1.22	1.09	1.58	0.56	1.51	-0.09	1.71	0.89	1.20
2000	1.27	1.24	1.76	0.51	1.37	0.01	1.67	1.03	1.27
2001	1.37	1.34	1.82	0.53	1.39	0.18	1.33	1.48	1.35

Source: Australian Demographic Statistics (3101.0).

## 5.16 ESTIMATED RESIDENT POPULATION IN MAJOR CENTRES

	1996	2001	Change(a)
	'000	'000	%
Capital City Statistical Division			
Sydney	3 881.1	4 154.7	1.4
Melbourne	3 283.3	3 488.8	1.2
Brisbane	1 520.0	1 653.4	1.7
Adelaide	1 078.4	1 110.5	0.6
Perth	1 295.1	1 397.0	1.5
Greater Hobart	195.7	197.8	0.2
Darwin	95.8	108.2	2.5
Canberra	307.9	321.3	0.9
Statistical District			
Newcastle (NSW)	463.4	494.4	1.3
Gold Coast-Tweed (Qld/NSW)	354.1	426.4	3.8
Canberra-Queanbeyan (ACT/NSW)	345.1	364.4	1.1
Wollongong (NSW)	255.7	271.1	1.2
Sunshine Coast (Qld)	156.4	185.7	3.5
Geelong (Vic.)	152.2	160.1	1.0
Townsville (Qld)	122.4	134.6	1.9
Cairns (Qld)	106.7	113.4	1.2
Toowoomba (Qld)	102.0	109.3	1.4
Launceston (Tas.)	98.8	98.8	—
Albury-Wodonga (NSW/Vic.)	92.7	97.9	1.1
Ballarat (Vic.)	79.1	83.8	1.1
Bendigo (Vic.)	74.2	79.7	1.4
Burnie-Devonport (Tas.)	79.2	77.6	-0.4
Bathurst-Orange (NSW)	71.6	76.0	1.2
La Trobe Valley (Vic.)	75.5	75.3	-0.1
Mackay (Qld)	61.1	64.8	1.2
Rockhampton (Qld)	64.5	63.4	-0.3
Mandurah (WA)	50.0	60.1	3.8
Bundaberg (Qld)	54.1	56.9	1.0
Wagga Wagga (NSW)	51.4	52.1	0.3
Bunbury (WA)	42.4	50.2	3.4
Coffs Harbour (NSW)	42.1	46.1	1.8
Mildura (Vic.)	41.1	45.0	1.8
Shepparton (Vic.)	41.1	44.9	1.7
Tamworth (NSW)	40.8	42.4	0.8
Hervey Bay (Qld)	35.9	39.7	2.0
Gladstone (Qld)	37.3	39.2	1.0
Port Macquarie (NSW)	32.7	38.1	3.1
Dubbo (NSW)	33.0	35.2	1.3
Geraldton (WA)	29.7	31.5	1.2
Lismore (NSW)	31.4	31.0	-0.3
Nowra-Bomaderry (NSW)	28.7	30.5	1.2
Warrnambool (Vic.)	27.4	29.6	1.6
Kalgoorlie/Boulder (WA)	29.0	29.5	0.3

(a) Average annual growth rate.

Source: Australian Demographic Statistics (3101.0).

Other major population centres experiencing significant population increases between 1996 and 2001 were the Statistical Districts of Gold Coast-Tweed on the Queensland–New South Wales border, and Mandurah in Western Australia, both of which grew by 3.8%, while Sunshine Coast in Queensland and Bunbury in Western Australia increased by an average 3.5% and 3.4% per year respectively. Rapid population growth was also recorded in most LGAs elsewhere along the Queensland, New South Wales and Victorian coastline and in some LGAs in the south-west corner of Western Australia.

Some areas of Australia have experienced significant population decline in recent years. While some of the population declines have occurred in established suburbs within capital cities and major urban centres, the fastest population decline has occurred in rural areas. Most of this decline has been caused by net migration loss. Such population loss is associated with technological, social and economic changes and industry restructuring in local economies.

In 1901, 64% of Australians lived outside capital cities. This proportion fell steadily, and from 1962 only 40% lived outside capital cities. Between 1976 and 2001 the decline appeared to have halted, with a slight increase in the proportion of people living in the balance of states and territories (see graph 5.17), which may have been due to people moving to coastal regions and other urban centres.

## Population age–sex structure

Since the turn of the 20th century the population of all ages has grown significantly, but it has also aged. This is illustrated in graph 5.18 for the years 1901 and 2001.

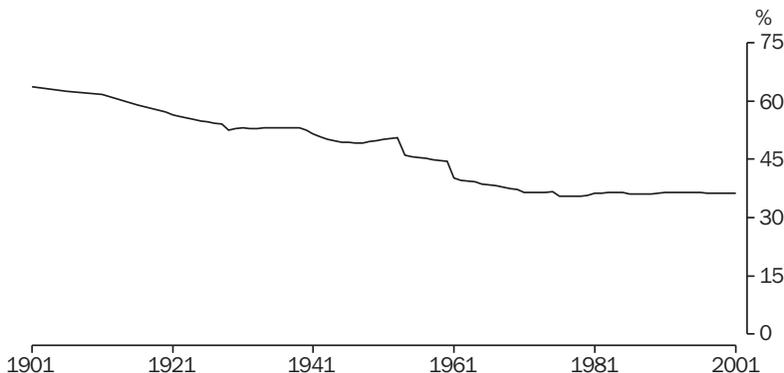
Since the first half of the 20th century, Australians have been having smaller families. This is reflected in a fall in the proportion of children (aged under 15 years) within the population from 35% in 1901 to 21% in 2001. Conversely, the proportion of the population aged 65 years and over has increased markedly, from 4% in 1901 to 13% in 2001. These features are shown in graph 5.19.

## Births

Since 1901 Australia has experienced two long periods of fertility decline: from 1907 to 1934, and from 1962 to the present. For the first decade of the 20th century the total fertility rate remained at around 3.7 to 4.0 babies per woman, then consistently declined over the next two and a half decades. By 1934, during the Great Depression, the total fertility rate had fallen to 2.1 babies per woman. It then increased during the second half of the 1930s, as women who had deferred child-bearing in the Depression years began to have children. Fertility increased through World War II and the 1950s, and peaked in 1961 when the total fertility rate reached 3.5 babies per woman (see graph 5.20).

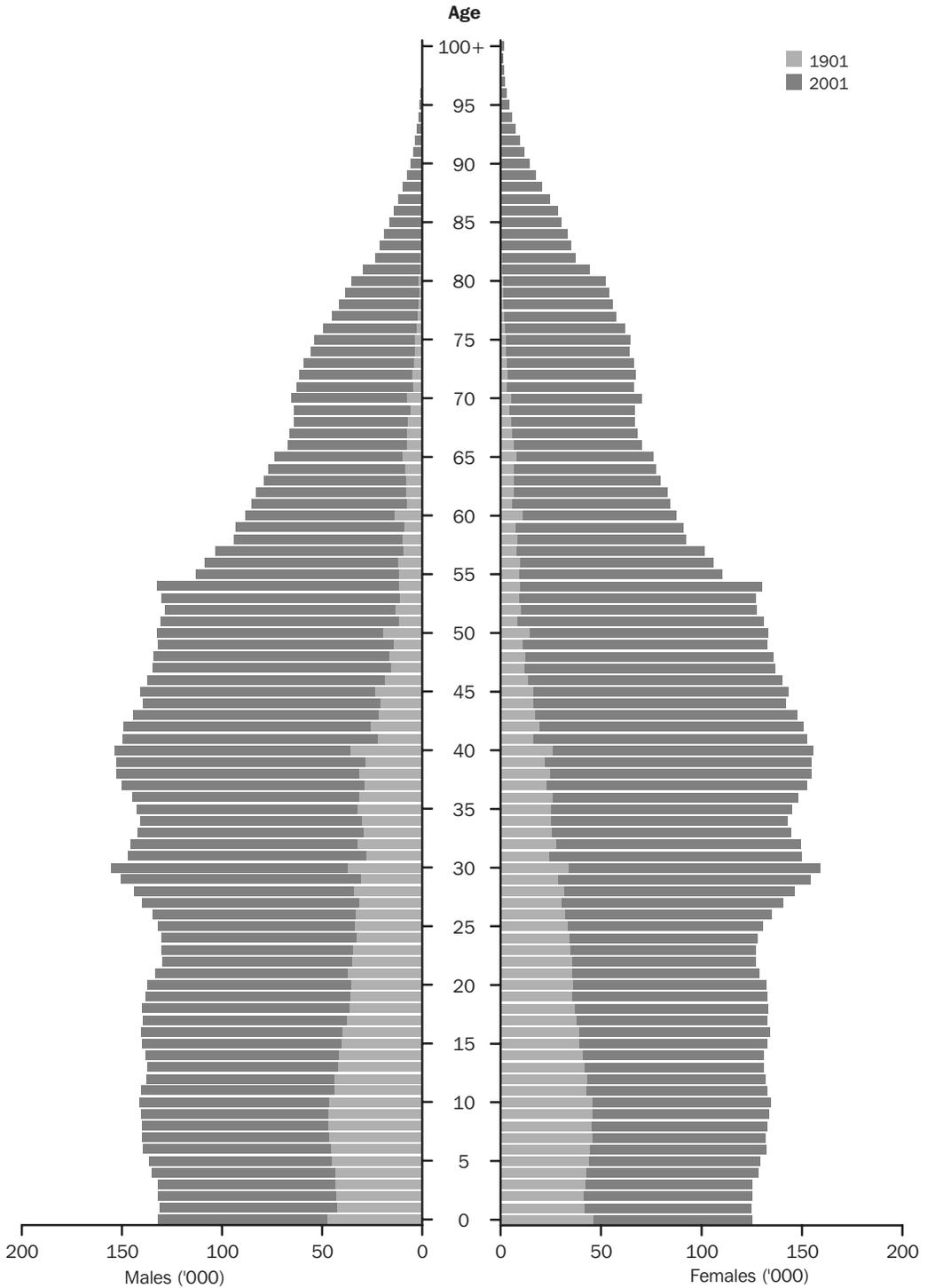
After the 1961 peak the total fertility rate fell rapidly to 2.9 babies per woman in 1966. This fall can be attributed to changing social attitudes, in particular a change in people's perception of desired family size, facilitated by the oral contraceptive pill becoming available.

5.17 POPULATION IN BALANCES OF STATES AND TERRITORIES



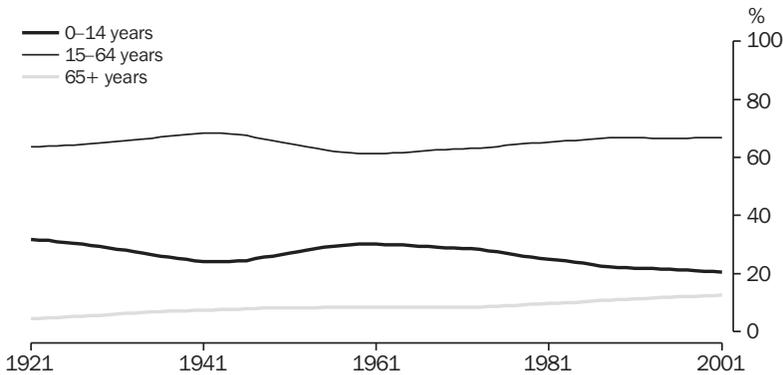
Source: Australian Historical Population Statistics – on AusStats (3105.0.65.001).

5.18 PROFILE OF AUSTRALIA'S POPULATION, By age and sex — 1901 and 2001



Source: Census of the Commonwealth of Australia, 1911; Population by Age and Sex, Australian States and Territories (3201.0).

## 5.19 POPULATION, By age groups



Source: Australian Demographic Statistics (3101.0); Australian Demography.

During the 1970s the total fertility rate dropped again, falling to below replacement level (2.1 babies per woman) in 1976, where it has remained since. This fall was more marked than the fall in the early 1960s and has been linked to the increasing participation of women in education and the labour force, changing attitudes to family size, lifestyle choices and greater access to contraceptive measures and abortion.

According to United Nations projections, the world average total fertility rate for 2000–05 will be 2.68 babies per woman, declining from the relatively constant five births per woman that existed until the late 1960s and early 1970s. However, total fertility rates for individual countries vary remarkably. Many factors can influence a country's fertility rate, such as differences in social and economic development and the use of contraceptives. In general, developing countries have higher fertility rates while developed countries usually have lower rates.

While Australia's total fertility rate for 2000 of 1.75 babies per woman is well below the world's average, it is comparable to that of other developed countries, most of which have also experienced sustained fertility decline. According to the United Nations estimated average total fertility rates for 2000–05, Armenia, Bulgaria, Latvia and Ukraine share the lowest total fertility rate (1.10) followed by Spain (1.13), and Slovenia

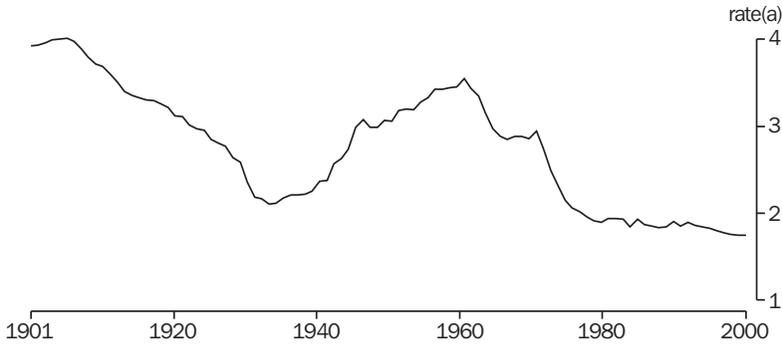
and the Russian Federation (each 1.14). In contrast, the West African and Asian countries have relatively high fertility rates, with Niger (8.00) and Yemen (7.60) the highest.

Over the past 50 years the total fertility rate has declined for most countries. Of the selected countries shown in graph 5.21, the total fertility rates of the Asian countries have shown the largest declines. Singapore and China experienced large declines in the total fertility rate of 5.0 and 4.4 children per woman respectively, between 1950–55 and 2000–05.

Australian women continue to delay child-bearing. The median age at child-bearing has increased from 26.6 years in 1980 to 28.3 years in 1990, then to 29.8 years in 2000 (graph 5.22). In 1980 most births were to women aged 25 years and over, with 8.0% of all births to women aged 25 years. In 2000, most births were by women aged 29 years and over, with 7.6% of all births to women aged 28 years and 7.4% of all births to women at 29 years. Over the past 20 years there has been a fall in the proportion of births to teenage mothers, from 7.8% in 1980 to 4.6% in 2000. Conversely, the proportion of births to women aged 40 years and above has increased, from 0.8% in 1980 to 2.6% in 2000.

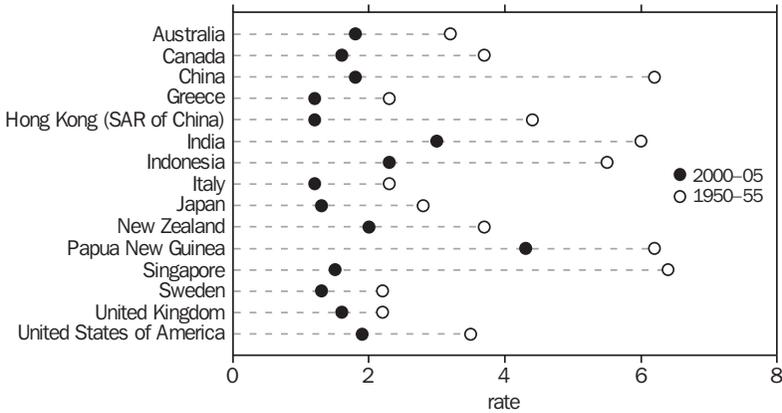
Table 5.23 brings together summary measures of fertility for census years between 1901 and 1986, and individual years between 1990 and 2000.

5.20 TOTAL FERTILITY RATE



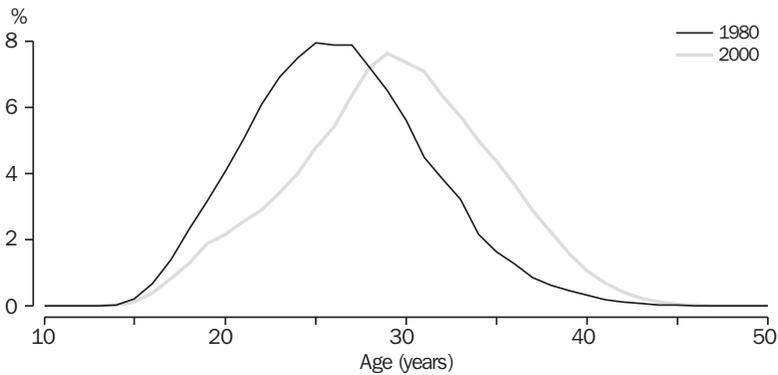
(a) Average number of babies per woman according to the age-specific fertility rates for each year.  
 Source: *Australian Demographic Trends* (3102.0); *Births, Australia* (3301.0); Hugo 2001.

5.21 INTERNATIONAL TOTAL FERTILITY RATES



Source: United Nations Population Division, 'World Population Prospects: The 2000 Revision'.

5.22 AGE DISTRIBUTION OF WOMEN HAVING BABIES



Source: *Births, Australia* (3301.0).

## 5.23 SELECTED SUMMARY MEASURES OF FERTILITY

Year ended 31 December	Registered births	Crude births(a)	Total fertility(b)	Ex-nuptial births(c)
	no.	rate	rate	%
1901	102 945	27.2	(d)3.93	n.a.
1911	122 193	27.2	(d)3.69	5.8
1921	136 198	25.0	3.12	4.7
1933	111 269	16.8	2.17	4.7
1947	182 384	24.1	3.08	4.0
1954	202 256	22.5	3.19	4.0
1961	239 986	22.8	3.55	5.1
1966	223 731	19.3	2.89	7.4
1971	276 361	21.6	2.95	9.3
1976	227 810	16.2	2.06	10.1
1981	235 842	15.8	1.94	13.2
1986	243 408	15.2	1.87	16.8
1990	262 648	15.4	1.91	21.9
1991	257 247	14.9	1.86	23.0
1992	264 151	15.1	1.89	24.0
1993	260 229	14.7	1.86	24.9
1994	258 051	14.5	1.85	25.6
1995	256 190	14.2	1.83	26.6
1996	253 834	13.9	1.80	27.4
1997	251 842	13.6	1.78	28.1
1998	249 616	13.3	1.76	28.7
1999	248 870	13.1	1.75	29.2
2000	249 636	13.0	1.75	29.2

(a) Number of births expressed as a proportion of the total population; the rate is per 1,000 population. (b) The number of children a woman would bear during her lifetime if she experienced current age-specific fertility rates at each age of her reproductive life. (c) Proportion of total live births which were ex-nuptial. (d) Estimated total fertility rate.

Source: *Australian Demographic Trends* (3102.0); *Births, Australia* (3301.0); *Hugo* 2001.

## Deaths

Over the past century, the average life expectancy of a new-born boy has increased from 55 years in 1901–10 to 77 years in 1998–2000. Likewise, the average life expectancy of a new-born girl has increased from 59 to 82 years during the same period (graph 5.24). These represent an increase of 21.4 years for boys and 23.2 years for girls. The increase in life expectancy is due to lower death rates at all ages.

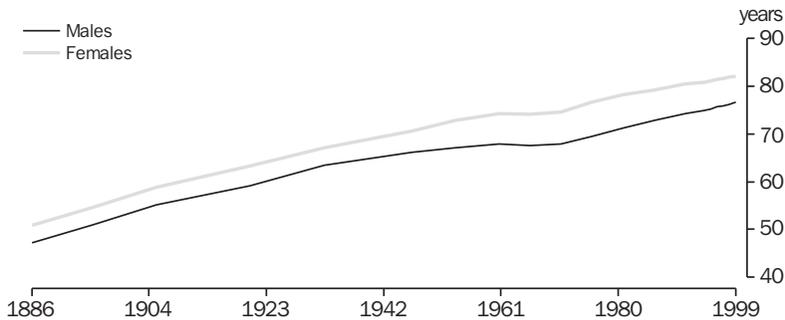
The reduction in mortality in the early part of the 20th century has been attributed to improvements in living conditions, such as better water supply, sewerage systems, food quality and health education. The continuing reduction in mortality in the latter half of last century has been attributed to improving social conditions, and to advances in medical technology such as mass immunisation and antibiotics.

The past two decades in particular have seen further increases in life expectancy. These increases are due in part to lower infant mortality, fewer deaths among young adults from motor

vehicle accidents and fewer deaths among older men from heart disease. The reduction in the number of deaths from heart disease has been related to behavioural changes, such as dietary improvements and reduced smoking.

During the 20th century the life expectancy of new-born girls was consistently higher than that of new-born boys. Up until the early 1930s, a new-born girl had a life expectancy approximately four years greater than a new-born boy, with this difference peaking at about seven years in the 1970s and early 1980s, largely due to significant declines in heart disease, stroke and respiratory disease mortality among women, combined with a slight decline in male life expectancy from accidents among males aged 15–24 years and from heart disease among 45–84 year old males. In recent years, the gap in life expectancy between new-born males and females has narrowed to about five years (5.4 years in 1998–2000). This can be attributed to the large reductions in death rates of males aged 45 years and over, and particularly to the reduction in heart disease deaths among males.

## 5.24 LIFE EXPECTANCY AT BIRTH



Note: The years shown are the midpoints in ranges of years, for example, 1886 is the midpoint of the range 1881–90 and 1999 is the midpoint of the range 1998–2000.

Source: *Deaths, Australia (3302.0)*.

The increase in life expectancy for older persons has implications for retirement planning and income policies. Since 1980, life expectancy of 65 year olds has increased from 14 years for males and 18 years for females, to 17 years for males and 20 years for females.

Australians have an average life expectancy which compares well with that experienced in other developed nations. Among the countries shown in table 5.25, the life expectancy at birth of Australian males and females (77 and 82 years respectively) was exceeded only by that in Japan (both males and females), Hong Kong (SAR of China) (both males and females) and France (females). The life expectancy of new-born babies in Australia was higher than in New Zealand, the United Kingdom, Canada and the United States of America.

The standardised death rate removes the effect of different age structures of the population, and allows a more meaningful comparison of the death rates of different sub-populations. Over the past 20 years, standardised death rates for Australia and all states and territories have decreased by about one-third (table 5.26).

Of the states and territories, the Northern Territory has had the highest standardised death rate in the country for the last two decades. This can largely be attributed to high death rates among the Indigenous population. In 2000, the highest standardised death rates for both males and females were recorded in the Northern Territory, with 10.8 deaths per 1,000 standard population for males and 7.0 deaths per 1,000 standard population for females. The Australian Capital Territory recorded the lowest

standardised death rate for males (6.0), while Western Australia had the lowest standardised death rate for females (4.3).

Table 5.27 brings together summary measures of mortality for census years between 1901 and 1986, and individual years between 1991 and 2000.

## 5.25 LIFE EXPECTANCY AT BIRTH, Selected countries — 1999

	Males years	Females years
<b>Australia(a)</b>	<b>76.6</b>	<b>82.0</b>
Canada	75.9	81.4
China	68.3	72.5
France	74.5	82.3
Germany	74.3	80.6
Hong Kong (SAR of China)	76.7	82.2
India	62.4	63.3
Indonesia	63.9	67.7
Italy	75.2	81.6
Japan	77.3	84.1
Korea, Republic of	70.9	78.4
Netherlands	75.3	80.7
New Zealand	74.8	80.1
Papua New Guinea	55.4	57.3
Singapore	75.2	79.6
United Kingdom	75.0	80.0
United States of America	73.9	79.7

(a) Reference period for Australia is 1998–2000.

Source: *Deaths, Australia (3302.0)*; *United Nations Development Programme 2000*.

## 5.26 STANDARDISED DEATH RATES(a)

	1980			1990			2000		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
New South Wales	11.6	6.7	8.8	9.5	5.7	7.4	7.2	4.6	5.8
Victoria	11.4	6.5	8.6	9.0	5.5	7.0	6.9	4.4	5.5
Queensland	10.9	6.3	8.4	9.0	5.4	7.0	7.1	4.5	5.7
South Australia	10.5	6.0	8.0	9.0	5.4	7.0	7.3	4.5	5.8
Western Australia	10.9	6.4	8.4	8.4	5.1	6.6	6.9	4.3	5.4
Tasmania	12.4	7.0	9.4	10.2	6.1	7.9	7.8	4.9	6.2
Northern Territory	13.0	10.4	11.6	14.2	8.5	11.3	10.8	7.0	8.9
Australian Capital Territory	10.2	6.3	8.0	8.2	5.5	6.7	6.0	4.4	5.1
<b>Australia(b)</b>	<b>11.3</b>	<b>6.5</b>	<b>8.6</b>	<b>9.2</b>	<b>5.6</b>	<b>7.2</b>	<b>7.1</b>	<b>4.5</b>	<b>5.7</b>

(a) Deaths per 1,000 standard population. The standard population used is the June 1991 population. (b) Includes Other Territories.

Source: *Deaths, Australia (3302.0)*.

## 5.27 SELECTED SUMMARY MEASURES OF MORTALITY

Year ended 31 December	Registered deaths no.	Crude death rate(b)	Infant mortality rate(c)	Life expectancy at birth(a)	
				Males years	Females years
1901	46 330	12.2	103.6	55.2	58.8
1921	54 076	9.9	65.7	59.2	63.3
1933	59 117	8.9	39.5	63.5	67.1
1947	73 468	9.7	28.5	66.1	70.6
1954	81 805	9.1	22.5	67.1	72.8
1961	88 961	8.5	19.5	67.9	74.2
1966	103 929	9.0	18.7	67.6	74.2
1971	110 650	8.5	17.3	68.3	74.8
1976	112 662	8.0	13.8	69.4	76.4
1981	109 003	7.3	10.0	71.4	78.4
1986	114 981	7.2	8.8	72.9	79.2
1991	119 146	6.9	7.1	74.4	80.4
1992	123 660	7.1	7.0	74.5	80.4
1993	121 599	6.9	6.1	75.0	80.9
1994	126 692	7.1	5.9	75.0	80.9
1995	125 133	6.9	5.7	75.5	81.1
1996	128 719	7.0	5.8	75.5	81.3
1997	129 350	7.0	5.3	75.9	81.4
1998	127 202	6.8	5.0	76.3	81.8
1999	128 102	6.8	5.7	76.6	82.0
2000	128 291	6.7	5.2	77.1	82.3

(a) Data for 1901 are based on the period 1901–10. Data for 1921–66 are based on three-year averages, with the year shown being the midpoint of the range. Data for 1971 onwards are based on individual years. (b) Per 1,000 population. (c) Per 1,000 live births.

Source: *Australian Demographic Trends (3102.0)*; *Deaths, Australia (3302.0)*.

## International migration

Overseas migration has played an important role in changing Australia's population. Between 1995 and 2000, 1.4 million people arrived in Australia intending to stay for one year or more (table 5.28). This includes permanent (settler) arrivals, Australian residents returning from an overseas trip of 12 months or more, and overseas visitors intending to stay 12 months or more in Australia. About 879,000 people left Australia for overseas on a permanent or long-term basis in the five years to June 2000, including Australian

residents emigrating or going overseas for 12 months or more, and overseas visitors leaving Australia after staying for 12 months or more. In 1999–2000, for the first time, net long-term movement made a greater contribution to net overseas migration than did net permanent movement (56,100 people compared with 51,200).

Because population estimates include permanent and long-term movers and exclude short-term movers, adjustments are required for the net effect of changes in travel intention from short-term to permanent/long-term and vice

versa. For example, an Australian resident may state on departure an intention to stay abroad for less than 12 months (a short-term movement). If this resident remains overseas for 12 months or more, he or she has changed travel category from short- to long-term and is regarded as a category jumper. Estimates for category jumping ensure that the estimated population reflects the population who usually live in Australia.

There has been a significant change in the source countries of permanent arrivals, with settlers arriving from more diverse regions of the world since the mid 1990s compared to the late 1960s. In the five years to June 1970 almost half (46%) of settler arrivals to Australia were born in the United Kingdom and Ireland, and the top six countries of birth represented 75% of all settler arrivals in Australia. In the five years to June 2000, the United Kingdom and Ireland contributed 12% of settlers and the top six countries of birth represented 54% of settler arrivals. New Zealand contributed the largest number of settlers in the five years to June 2000: 80,600 persons, or 18% of the total (table 5.29).

In 1999–2000, 92,300 people arrived in Australia intending to settle, the majority of these (57%) arriving as part of the Migration Program. Another 8% arrived as part of the Humanitarian Program, while 34% were eligible to settle in Australia because of their New Zealand citizenship. The remaining 1% were in other categories such as overseas-born children of Australian citizens.

The number of visas issued to prospective settlers varies significantly from year to year. So too does the balance between the types of visas issued. Skilled migration is a volatile component of the migration intake. Table 5.30 shows that in the six years to 1999–2000, the proportion of settlers arriving under the skilled migration category ranged from 23% in 1994–95 to 35% in 1999–2000. Of skilled migrants arriving in 1999–2000, 24% came from Europe (about three-quarters of whom were from the United Kingdom and Ireland), while South-East Asia and Africa (excluding North Africa) contributed 18% each. North-East Asia (16%) and Southern Asia (15%) also contributed relatively high proportions of skilled immigrants to Australia during 1999–2000.

In 1999–2000, 22% of settlers came as part of the family component of Australia's immigration program. The birthplaces of these immigrants partly reflect past migration patterns. About 24% were born in Europe, 23% were born in South-East Asia, and a further 18% were born in North-East Asia.

Of the 7,300 settlers arriving as part of the Humanitarian Program, 3,300 (46%) came from Europe, almost all of whom were from Southern and Eastern Europe (in particular, Bosnia–Herzegovina and Croatia). A further 2,500 immigrants (35%) arriving on humanitarian visas were born in North Africa and the Middle East.

#### 5.28 NET OVERSEAS MIGRATION COMPONENTS — Five years ended 30 June

	1985	1990	1995	2000
<b>Arrivals</b>				
Permanent (settlers)	468 052	616 139	462 605	438 633
Long-term				
Australian residents	269 673	272 723	346 239	391 295
Overseas visitors	158 983	226 047	311 384	536 297
<b>Total</b>	<b>896 707</b>	<b>1 114 875</b>	<b>1 120 228</b>	<b>1 366 225</b>
<b>Departures</b>				
Permanent departures	109 889	108 003	142 385	166 771
Long-term				
Australian residents	242 559	269 080	332 683	391 231
Overseas visitors	112 637	150 421	237 421	321 246
<b>Total</b>	<b>465 093</b>	<b>527 501</b>	<b>712 489</b>	<b>879 248</b>
Category jumping	11 779	70 139	–96 011	–25 231
<b>Net overseas migration</b>	<b>443 393</b>	<b>657 513</b>	<b>311 728</b>	<b>461 746</b>

Source: Australian Historical Population Statistics – on AusStats (3105.0.65.001).

### 5.29 COUNTRY OF BIRTH OF SETTLER ARRIVALS — Five years ended 30 June

	'000	%
1970		
United Kingdom and Ireland	371.5	46.2
Yugoslavia	73.7	9.2
Italy	61.9	7.7
Greece	53.1	6.6
New Zealand	22.8	2.8
Germany	19.0	2.4
All birthplaces	804.1	100.0
1980		
United Kingdom(a)	86.2	25.0
New Zealand	39.8	11.6
Vietnam	30.6	8.9
Lebanon	18.4	5.3
South Africa	10.2	3.0
Malaysia	8.4	2.4
All birthplaces	344.7	100.0
1990		
United Kingdom(a)	107.0	17.4
New Zealand	82.5	13.4
Vietnam	38.9	6.3
Philippines	36.3	5.9
Hong Kong (SAR of China)	27.5	4.5
Malaysia	26.6	4.3
All birthplaces	616.1	100.0
2000		
New Zealand	80.6	18.4
United Kingdom(a)	48.1	11.0
China (excl. SARs and Taiwan)	36.3	8.3
Former Yugoslav Republics	28.3	6.5
South Africa	21.4	4.9
India	16.4	3.7
All birthplaces	438.6	100.0

(a) Excludes Ireland.

Source: ABS data available on request, *Overseas Arrivals and Departures Collection*; Department of Immigration and Multicultural Affairs, 'Australian Immigration — Consolidated Statistics', No. 8, 1976.

### Asia-born arrivals

Over the last two decades, the countries of Asia (South-East Asia, North-East Asia and Southern Asia regions) have become an increasingly important source of both settler and long-term visitor arrivals.

Before the 1970s the number of settlers from Asia was small, but following the final dismantling of the White Australia Policy in the early 1970s, and the acceptance of refugees from the Vietnam war, the number of migrants from Asia began to increase.

Generally, the level of permanent arrivals from Asia has followed the patterns of total permanent arrivals, reflecting the constraints of the Migration and Humanitarian Programs. The proportion of Asia-born arrivals has fluctuated markedly, peaking in 1991–92 (51%, or 54,400 arrivals) (see graph 5.31). In 1999–2000 a total of 31,100 settlers born in Asia (34% of all settler arrivals) arrived in Australia.

Graph 5.32 shows that levels of long-term visitor arrivals from Asia have increased greatly over the last 10 years, after being very low during the 1970s and early 1980s. Arrivals in 1999–2000 (70,100 or 53% of all long-term visitor arrivals) were over 10 times as high as in 1979–80 and almost three times as high as in 1989–90. The main reason for this growth has been the increasing number of students travelling to Australia from Asia for educational purposes. In 1999–2000 three-quarters of all Asia-born long-term visitor arrivals were for education.

**5.30 SETTLER ARRIVALS, By eligibility category**

	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
Family	37 078	46 458	36 490	21 142	21 501	19 896
Skill	20 210	20 008	19 697	25 985	27 931	32 350
Humanitarian	13 632	13 824	9 886	8 779	8 790	7 267
New Zealand	13 618	16 234	17 501	19 393	24 680	31 610
Other	2 890	2 615	2 178	2 028	1 241	1 149
<b>Total</b>	<b>87 428</b>	<b>99 139</b>	<b>85 752</b>	<b>77 327</b>	<b>84 143</b>	<b>92 272</b>

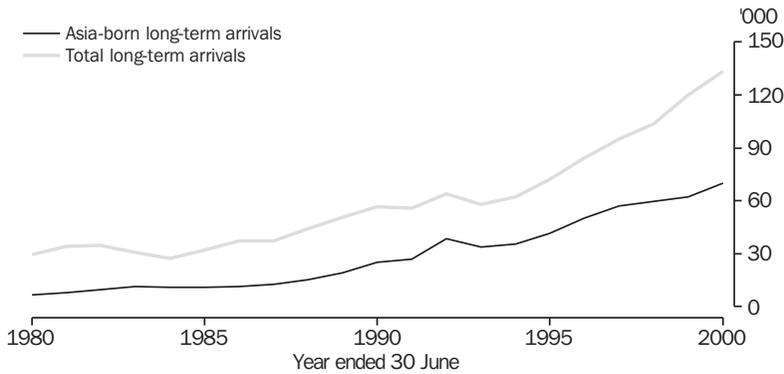
Source: Department of Immigration and Multicultural Affairs, 'Immigration Update'.

**5.31 ASIA-BORN SETTLER ARRIVALS, Proportion of all settler arrivals**



Source: Migration, Australia (3412.0); Overseas Arrivals and Departures, Australia (3401.0).

**5.32 LONG-TERM ARRIVALS OF THE ASIA-BORN**



Source: Migration, Australia (3412.0); Overseas Arrivals and Departures, Australia (3401.0).

## Country of birth

Since the end of World War II Australia has experienced large yearly increases in population due to a combination of high fertility and high levels of migration. In 1947 the proportion of the population born overseas was 10%, but by June 2000 this proportion had increased to 24% (table 5.33). As well as this increase, there has been a diversification of the population. In 1947, 81% of the overseas-born population came from the main English speaking countries (the United Kingdom and Ireland, New Zealand, South Africa, Canada and the United States of America), mainly from the United Kingdom and Ireland. By June 2000, only 39% of the overseas-born population had been born in the main English speaking countries.

For the last few decades, the Italian, Greek and Dutch-born populations in Australia have been declining. The major migration flows from these countries occurred immediately after World War II, and there has been relatively little

migration more recently. As these populations have moved into the older age groups, they have experienced high numbers of deaths. Furthermore, small numbers of people are returning to their countries of birth in their retirement.

Population estimates for 2000 identified 24% of the population as overseas-born. The 1996 Census showed that 27% of persons born in Australia had at least one overseas-born parent; that is, they were second generation Australians. The variety and size of second generation populations reflect past migration and intermarriage patterns. In long-established overseas-born populations, such as those from the United Kingdom and Ireland, and from northern and southern Europe, second generation Australians account for more than half of the total population. In more recently arrived groups, such as persons born in Vietnam and China, second generation Australians form a smaller part of the birthplace group. This is illustrated in table 5.34.

**5.33 MAIN COUNTRIES OF BIRTH OF THE POPULATION**

	1901(a)	1947(a)	1954(a)	1961(a)	1971(a)	1981(b)	1991(b)	2000(b)
	'000	'000	'000	'000	'000	'000	'000	'000
United Kingdom and Ireland	679.2	541.3	664.2	755.4	1 081.3	1 175.7	1 244.3	(c)1 164.1
New Zealand	25.8	43.6	43.4	47.0	74.1	175.7	286.4	374.9
Italy	5.7	33.6	119.9	228.3	288.3	285.3	272.0	241.7
Former Yugoslav Republics	n.a.	5.9	22.9	49.8	128.2	156.1	168.0	210.0
Vietnam	n.a.	n.a.	n.a.	n.a.	(d)0.7	43.4	124.8	174.4
China	29.9	6.4	10.3	14.5	17.1	26.8	84.6	168.1
Greece	0.9	12.3	25.9	77.3	159.0	153.2	147.4	141.2
Philippines	n.a.	0.1	0.2	0.4	2.3	15.8	79.1	123.0
Germany	38.4	14.6	65.4	109.3	110.0	115.2	120.4	120.2
India	7.6	n.a.	12.0	14.2	28.7	43.7	66.2	110.2
Malaysia	n.a.	1.0	2.3	5.8	14.4	32.5	79.9	97.6
Netherlands	0.6	2.2	52.0	102.1	98.6	100.5	100.9	90.6
South Africa	n.a.	5.9	6.0	7.9	12.2	28.0	55.8	80.1
Lebanon	n.a.	n.a.	3.9	7.3	23.9	52.7	78.5	79.9
Poland	n.a.	6.6	56.6	60.0	59.5	62.1	69.5	68.3
Indonesia	n.a.	n.a.	3.6	6.0	7.7	16.4	35.4	67.6
United States of America	7.4	6.2	8.3	10.8	26.8	30.6	49.5	65.0
Hong Kong (SAR of China)(e)	0.2	0.8	1.6	3.5	5.4	16.3	62.4	56.3
Total overseas-born	852.4	743.2	1 285.8	1 778.3	2 545.9	3 110.9	3 965.3	4 517.3
Australia	2 908.3	6 835.2	7 700.1	8 729.4	10 173.1	11 812.3	13 318.8	14 639.8
<b>Total population(f)</b>	<b>3 773.8</b>	<b>7 579.4</b>	<b>8 986.5</b>	<b>10 508.2</b>	<b>12 719.5</b>	<b>14 923.3</b>	<b>17 284.0</b>	<b>19 157.0</b>

(a) Census counts. (b) Estimated resident population at 30 June. (c) Excludes Ireland. (d) Includes Cambodia and Laos for 1971. (e) Includes Macau. (f) Includes country of birth 'Not stated' and 'At sea' for 1901 to 1971.

Source: *Australian Historical Population Statistics – on AusStats (3105.0.65.001); Migration, Australia (3412.0).*

## 5.34 FIRST AND SECOND GENERATION AUSTRALIANS — 1996(a)

Country	Overseas-born	Second generation Australians	Total
	'000	'000	'000
United Kingdom	1 072.6	1 444.5	2 517.0
Italy	238.2	333.9	572.1
New Zealand	291.4	200.0	491.4
Former Yugoslav Republics	175.4	131.3	306.7
Greece	126.5	153.9	280.5
Germany	110.3	139.3	249.6
Netherlands	87.9	142.5	230.4
Vietnam	151.1	46.8	197.8
Lebanon	70.2	82.6	152.8
Ireland	51.5	95.1	146.6
China	111.0	40.2	151.2
Philippines	92.9	35.2	128.1
India	77.6	43.8	121.3
Malaysia	76.3	30.6	106.8
South Africa	55.8	28.1	83.9
<b>Total</b>	<b>3 901.9</b>	<b>3 365.5</b>	<b>7 267.4</b>

(a) 1996 Census counts.

Source: ABS data available on request, 1996 Census of Population and Housing.

## Marriages and divorces

### Marriages

Marriage rates in Australia have fluctuated since 1901, broadly following the pattern of prevailing economic and social conditions. The crude marriage rate (the annual number of registered marriages per 1,000 population) has fallen in times of depression or recession (e.g. in the 1930s), and increased in other times such as the immediate post-war years of the early 1920s and late 1940s. Marriage rates have also increased during times of war. The 2001 crude marriage rate of 5.3 marriages per 1,000 population was the lowest rate on record. The previous lowest rate was 5.8 per 1,000, recorded in 1997. The highest crude marriage rate ever recorded was 12.0 per 1,000 in 1942.

The crude marriage rate has been declining since 1970. This decline in the marriage rate can be mainly attributed to changes in attitudes to marriage and living arrangements that have occurred since then.

The fluctuations in the crude marriage rate between 1901 and 2001 are shown in graph 5.35.

Marriage rates for the unmarried population (per 1,000 not currently married men or women aged 15 years and over) have also fallen over time. This long-term downward trend has been evident since these rates first became available in 1976. The marriage rate for men was 63 per 1,000 in 1976 while the rate for women was 61 per 1,000. In 2000 these rates fell to 34 and 32, respectively.

Recent trends show that Australians are marrying later. The median ages of brides and bridegrooms at first marriage have increased from 21.1 and 23.4 years respectively in 1971 to 26.9 and 28.7 years in 2001 (graph 5.36). Part of this increase can be attributed to the increasing incidence of de facto marriages. Another factor is that young people are staying in education longer.

In 2001, 66% of marriages had a groom older than the bride, and 23% of brides were older than grooms. However, there was a strong tendency for couples to be about the same age, with 45% of couples being within two years of each other, and only 10% being 10 or more years apart in age (graph 5.37).

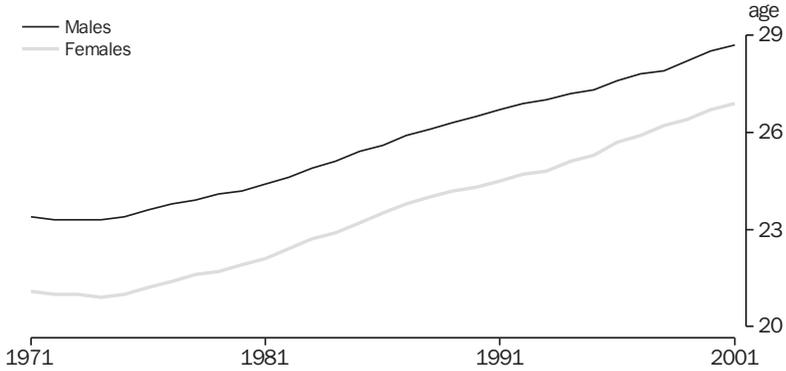
5.35 CRUDE MARRIAGE RATE



(a) Rate per 1,000 population.

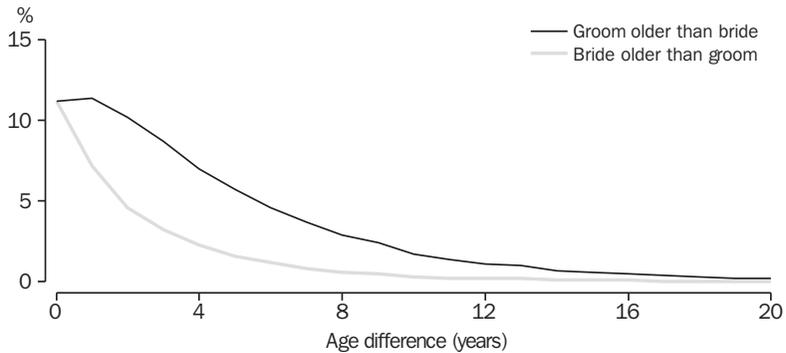
Source: Australian Social Trends (4102.0); Marriages and Divorces, Australia (3310.0).

5.36 MEDIAN AGE AT FIRST MARRIAGE



Source: Marriages and Divorces, Australia (3310.0).

5.37 BRIDE AND GROOM AGE DIFFERENCE AT MARRIAGE, Proportion of all marriages — 2001



Source: Marriages and Divorces, Australia (3310.0).

Table 5.38 brings together summary measures of marriages for census years between 1901 and 1991, and individual years between 1992 and 2001.

### De facto relationships

Between 1992 and 1997, the number of people in de facto relationships rose by 6.4% from 710,800 to 756,500 people. In 1997, de facto partners

represented 9.1% of all persons living in couple relationships (up from 8.5% in 1992) and 5.3% of persons aged 15 years and over (the same as in 1992). The proportion in de facto relationships peaked among people aged 25–29. It was also high in the adjacent age groups and then fell away to lower levels with increasing age (graph 5.39). Of all de facto partners in 1997, 56% were aged 20–34.

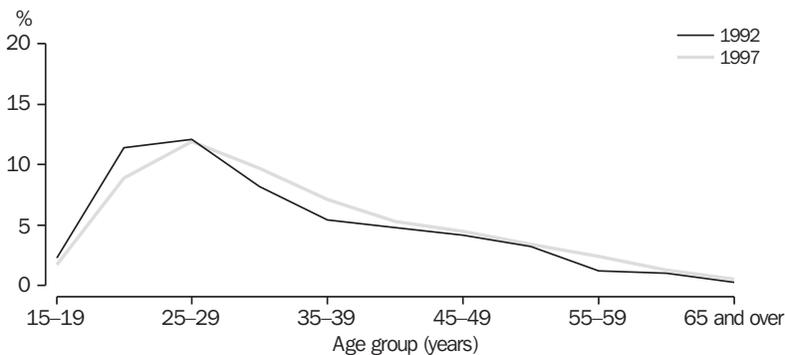
**5.38 SELECTED SUMMARY MEASURES OF MARRIAGES**

Year ended 31 December	Registered marriages no.	Crude marriage rate(a)	Median age at marriage	
			Bridegroom years	Bride years
1901	27 753	7.3	n.a.	n.a.
1921	46 869	8.6	27.7	24.5
1933	46 595	7.0	27.0	23.7
1947	76 457	10.1	26.0	23.0
1954	71 229	7.9	25.6	22.6
1961	76 686	7.3	24.9	21.8
1966	96 061	8.3	24.2	21.5
1971	117 637	9.2	23.8	21.4
1976	109 973	7.9	24.9	22.2
1981	113 905	7.6	25.9	23.3
1986	114 913	7.2	27.3	24.9
1991	113 869	6.6	28.4	26.0
1992	114 752	6.6	28.7	26.3
1993	113 255	6.4	28.8	26.4
1994	111 174	6.2	29.0	26.6
1995	109 386	6.1	29.2	26.8
1996	106 103	5.8	29.6	27.2
1997	106 735	5.8	29.7	27.5
1998	110 598	5.9	29.8	27.7
1999	114 316	6.0	30.1	27.9
2000	113 429	5.9	30.3	28.3
2001	103 130	5.3	30.6	28.6

(a) Per 1,000 population.

Source: Australian Demographic Statistics (3101.0); Marriages and Divorces, Australia (3310.0).

**5.39 DE FACTO PARTNERS IN THE POPULATION**



Source: ABS data available on request, 1992 Survey of Families in Australia; 1997 Family Characteristics Survey.

De facto partnering has arisen as an alternative living arrangement prior to, or instead of marriage, and following separation, divorce or widowhood. Some couple relationships, such as that between a boyfriend and girlfriend who live together but do not consider their relationship to be marriage-like, are classified as de facto.

Of all people in de facto relationships in 1997, 69% had never been in a registered marriage, and 29% were either separated or divorced. The likelihood of being never married was higher among those aged under 35, counterbalanced by higher proportions of separated and divorced de facto partners aged 35 and over (graph 5.40). In 1997, 46% of de facto couples had children, compared with 39% in 1992.

**Divorces**

For most of the 20th century there was a slow but steady rise in the divorce rate, increasing from annual averages of 0.1 divorces per 1,000 population between 1901 and 1910 to

0.8 per 1,000 between 1961 and 1970. However, the most important factor involved in the higher divorce rates in the latter quarter of the century was the introduction of the *Family Law Act 1975* (Cwlth) which came into operation on 5 January 1976. This legislation allows only one ground for divorce: irretrievable breakdown of the marriage, measured as the separation of the spouses for at least one year. Following the implementation of this law, there was a large increase in the divorce rate in 1976. The rate then declined until 1979 as the backlog of applications was cleared. Since then the crude divorce rate has fluctuated between 2.4 and 2.9 divorces per 1,000 population (graph 5.41). The crude divorce rate in 2001 was 2.8 per 1,000 population. The pattern of divorces per 1,000 married couples is very similar; in 2000 there were 12.0 divorces per 1,000 married men or women.

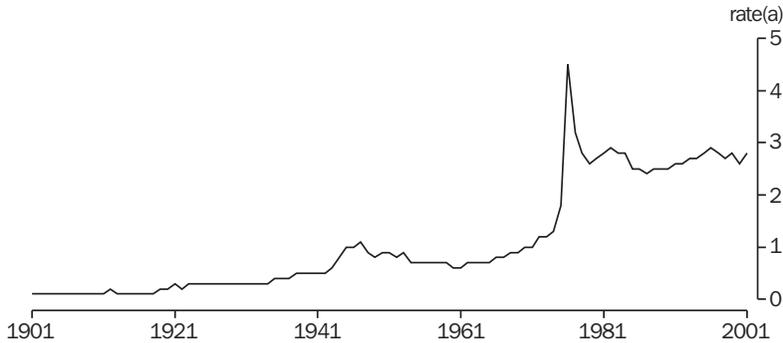
Table 5.42 brings together summary measures of divorces granted in census years between 1901 and 1991, and individual years between 1992 and 2001.

**5.40 PERSONS IN DE FACTO RELATIONSHIPS — 1997**



Source: *Family Characteristics, Australia* (4442.0).

## 5.41 CRUDE DIVORCE RATE



(a) Rate per 1,000 population.

Source: *Marriages and Divorces, Australia* (3310.0).

## 5.42 SELECTED SUMMARY MEASURES OF DIVORCES

Year ended 31 December	Divorces granted no.	Crude divorce rate(a)	Median age at date decree made absolute	
			Husband years	Wife years
1901	398	0.1	n.a.	n.a.
1921	1 490	0.3	n.a.	n.a.
1933	1 954	0.3	n.a.	n.a.
1947	8 705	1.1	n.a.	n.a.
1954	6 457	0.7	37.8	34.5
1961	6 712	0.6	38.7	35.9
1966	9 859	0.8	40.4	36.9
1971	12 947	1.0	37.9	34.4
1976	63 230	4.5	36.2	33.1
1981	41 412	2.8	35.5	32.8
1986	39 417	2.5	37.5	34.7
1991	45 652	2.6	38.4	35.5
1992	45 729	2.6	38.7	35.9
1993	48 363	2.7	39.3	36.4
1994	48 312	2.7	39.7	36.8
1995	49 712	2.8	40.0	37.1
1996	52 466	2.9	40.2	37.4
1997	51 288	2.8	40.3	37.6
1998	51 370	2.7	40.5	37.8
1999	52 566	2.8	40.9	38.2
2000	49 906	2.6	41.4	38.6
2001	55 330	2.8	41.8	39.1

(a) Per 1,000 population.

Source: *Australian Demographic Statistics* (3101.0); *Marriages and Divorces, Australia* (3310.0).

## Households and families

At June 2001 there were an estimated 7.4 million households in Australia, which were home to 19.0 million Australians, or 97% of the resident population. Over the past 90 years the number of households has increased by an average 2.4% per year, compared to 1.6% average increase per year in the population over the same period. Reflecting the disproportionate growth in

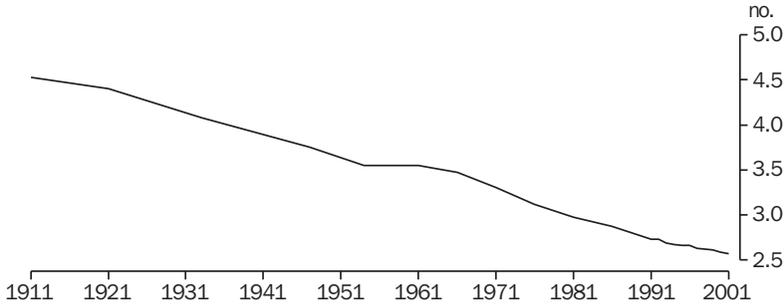
households is the fall in average size of households — from 4.5 in 1911 to 2.6 in 2001 (graph 5.43). Much of the decline in the number of persons per household this century can be attributed to reductions in completed family size, and the associated increase in one- and two-person households over the period. The number of one-person households has grown largely from the ageing of the population, while a combination of ageing, increased childlessness

among couples and an increase in the number of one-parent families has contributed to the increase in the number of two-person households.

In 1976, 60% of families were made up of couples with children. By 2001 this had fallen to 41% (see graph 5.44). Part of this change can be attributed

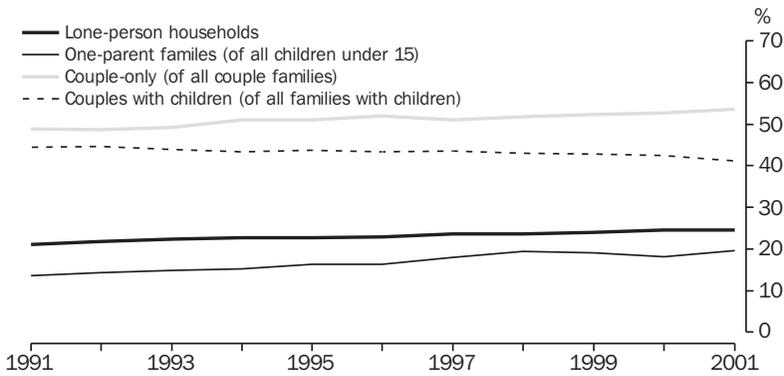
to the increase in one-parent families with dependent children, but most of the change is due to the increase in the proportion of couple-only families. People are having children later in life, and are living longer. They are spending more time living in couple-only families, both before they have children and after their children have left home.

**5.43 AVERAGE HOUSEHOLD SIZE, Persons per household**



Source: Australian Demographic Statistics (3101.0); Census of Population and Housing, 30 June 1981: Summary Characteristics of Persons and Dwellings, Australia (2443.0); Household Estimates, Australia (3229.0); Year Book Australia 1988 (1301.0).

**5.44 SELECTED LIVING ARRANGEMENTS**



Source: Australian Social Trends, 2002 (4102.0).

## Household and family projections

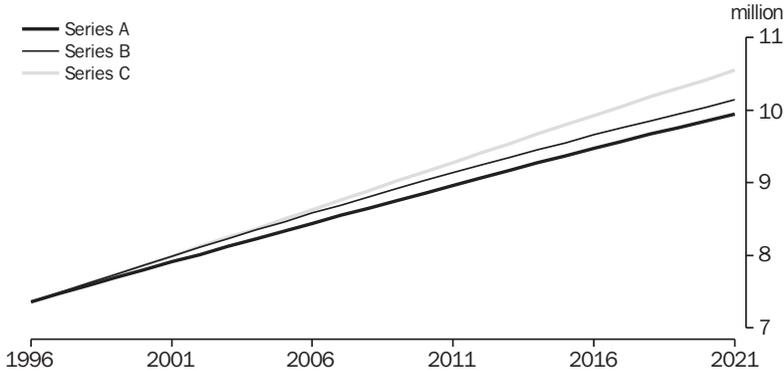
Household and family projections are estimates of future numbers of households and families, based on assumptions about changing living arrangements of the population. The ABS has published three series of projections for the years 1996–2021 (it will publish new projections based on the results of the 2001 Census late in 2003). These series are based on varying assumptions about trends in living arrangements. In Series A the pattern of living arrangements of individuals is the same as in 1996. In Series B and C, recent trends in the patterns of living arrangements are incorporated into the projections. In Series B the average annual rate of change in living arrangements experienced between 1986 and

1996 is applied in reducing levels (in full between 1996 and 2001, in fractions to 2011, and then held constant to 2021). In Series C the rate of change experienced between 1986 and 1996 is applied in full throughout the projection period.

### Household types

The projections show continuing growth in the number of households in Australia in the period 1996–2021. The number of households is projected to increase from 6.9 million in 1996 to between 9.4 and 10.0 million in 2021 (graph 5.45). This represents a growth in the number of households of between 38% and 46% between 1996 and 2021, compared to a projected 24% increase in the population over the same period.

5.45 PROJECTED NUMBER OF HOUSEHOLDS



Source: Household and Family Projections, Australia, 1996 to 2021 (3236.0).

Average household size in Australia is projected to decline from 2.6 persons in 1996 to between 2.2 and 2.3 persons per household in 2021. The projected decrease in average household size reflects the projected rise in the proportion of lone-person households and couples without children. Lone-person households are projected to grow by between 1.7% and 3.1% per year between 1996 and 2021 to comprise between one-quarter and one-third of all household types by 2021. The ageing of the population, increases in divorce and separation, and delaying marriage, are all contributing factors to the growth in lone-person households (Hugo 1999). While lone-person households are projected to grow the fastest of all household types, family households are projected to remain the predominant household type. Family households are projected to grow by between 0.9% and 1.2% per year over the 1996–2021 period, to comprise between 62% and 71% of all household types in 2021, compared to 73% of all households in 1996 (graph 5.46).

**Family types**

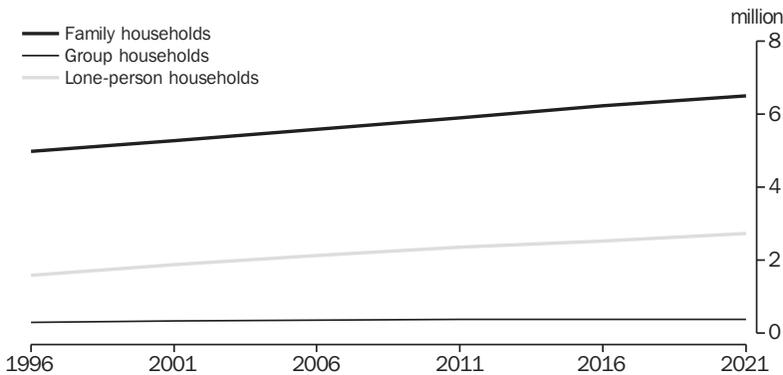
The number of couple families with children is projected to either grow slowly or decline slowly, depending on the series employed. This trend is related both to the rapid increase in couple

families without children, and the increase in one-parent families, and is driven by ageing, the decline in fertility and increased marital break-up. In Series A, couple families with children are projected to grow from 2.5 million in 1996 to around 3.1 million in 2021, while in Series C (full continuation of recent trends), couple families with children are projected to decline to 2.0 million in 2021 (table 5.47).

Of all family types, couple families without children are projected to increase most rapidly over the period 1996–2021. Couple families without children are projected to grow from 1.7 million in 1996 to between 2.7 and 2.9 million in 2021, with an average annual growth of between 1.7% and 2.1%. In Series B and C, couple families without children are projected to surpass couple families with children as the most common family type by the year 2016.

One-parent families are projected to increase from 742,000 families in 1996 to between 966,000 and 1.2 million in 2021, representing average annual growth of between 1.1% and 2.0% over the period. Female one-parent families, which made up 85% of all one-parent families in 1996, are projected to maintain or slightly increase this proportion in 2021.

**5.46 PROJECTED NUMBER OF HOUSEHOLDS, By household type: Series B**



Source: Household and Family Projections, Australia, 1996 to 2021 (3236.0).

## 5.47 PROJECTED NUMBER OF FAMILIES, By family type

	1996 '000	2001 '000	2006 '000	2011 '000	2016 '000	2021 '000
<b>Series A</b>						
Couple families with children	2 483.8	2 660.7	2 798.2	2 902.1	2 985.7	3 054.7
Couple families without children	1 735.1	1 894.2	2 078.2	2 281.1	2 482.5	2 658.8
<i>One-parent families</i>	742.3	797.1	845.7	889.6	929.6	966.2
One-parent families, male parent	114.9	126.3	136.4	145.2	152.8	159.6
One-parent families, female parent	627.4	670.8	709.3	744.4	776.8	806.6
Other families	94.4	98.4	103.7	109.3	114.3	118.2
<i>Total</i>	5 055.6	5 450.4	5 825.8	6 182.1	6 512.1	6 798.0
<b>Series B</b>						
Couple families with children	2 483.8	2 448.1	2 471.4	2 513.5	2 589.8	2 654.0
Couple families without children	1 735.1	1 952.5	2 168.7	2 389.9	2 597.5	2 782.2
<i>One-parent families</i>	742.3	852.5	929.2	987.7	1 028.9	1 066.4
One-parent families, male parent	114.9	129.6	141.3	150.9	158.7	165.6
One-parent families, female parent	627.4	722.9	787.9	836.8	870.2	900.9
Other families	94.4	96.7	101.3	105.6	108.3	109.1
<i>Total</i>	5 055.6	5 349.7	5 670.6	5 996.7	6 324.4	6 611.8
<b>Series C</b>						
Couple families with children	2 483.8	2 448.1	2 366.3	2 252.1	2 122.6	1 988.1
Couple families without children	1 735.1	1 952.5	2 195.8	2 455.0	2 712.3	2 946.5
<i>One-parent families</i>	742.3	852.5	956.2	1 054.1	1 146.3	1 231.4
One-parent families, male parent	114.9	129.6	142.6	153.6	163.0	170.4
One-parent families, female parent	627.4	722.9	813.6	900.4	983.3	1 061.0
Other families	94.4	96.7	102.5	110.1	117.4	123.1
<i>Total</i>	5 055.6	5 349.7	5 620.8	5 871.2	6 098.6	6 289.2

Source: Household and Family Projections, Australia, 1996 to 2021 (3236.0).

## Citizenship

Citizenship is a relatively recent concept for Australia as a nation, having its origins in the *Australian Citizenship Act 1948* (Cwlth). Prior to this, Australians were British subjects. Since the inception of the Australian Citizenship Act on Australia Day in 1949, more than three million people born overseas have acquired Australian citizenship. For these people, citizenship is voluntary, expressing a commitment to the laws and principles of Australia, and respect for its land and its people. It confers the opportunity to participate more fully in Australian society, giving the right to vote, to apply for public office, and to hold an Australian passport and therefore leave and re-enter Australia freely.

Australian citizenship law and policy have been amended many times since their inception to reflect a more inclusive approach to the acquisition of Australian citizenship, with recent changes in policy towards creating more opportunities for young adults to acquire

citizenship (Department of Immigration and Multicultural and Indigenous Affairs 2001a). All migrants who meet set criteria are encouraged to become Australian citizens. Children acquire Australian citizenship at birth if at least one parent is an Australian citizen or a permanent resident of Australia.

The 2001 Census indicated that almost three-quarters (74%) of people born overseas who had been resident in Australia for two years or more were Australian citizens. There were high proportions of Australian citizens among people born in Greece (97%). However, this citizenship rate is influenced by the age and period of residence of people from Greece. For Australians born in Greece, most (83%) arrived in Australia in 1970 or earlier, and three-quarters are aged 50 years and over. The longer overseas-born people reside in Australia, and consequently the older they get, the more likely it is that they have acquired Australian citizenship.

Standardising gives the rates that would be expected if a given overseas-born population had the same profile of age and period of residence in Australia as the total overseas-born population (see table 5.48). Based on standardised rates, people born in the Philippines, Vietnam and China were the most likely to become Australian citizens. Unstable or changing political conditions in these countries may result in a greater desire for Australian citizenship than for people born in other countries.

In contrast, people born in the United Kingdom and New Zealand were less likely to be Australian citizens. This may be because 'the shared language, and strongly similar legal, political, and industrial arrangements of Australia and the other Anglo-American countries lead these immigrants to feel less need to make a choice of national identity' (Evans 1988).

Even though the proportion of Australian residents born in the United Kingdom who take up Australian citizenship is comparatively small, people born in the United Kingdom comprise the largest group of overseas-born in Australia. In keeping with this, British citizens were the largest group to be granted Australian citizenship in 2000–01 (see table 5.49). Former British, Irish and New Zealand citizens have been among the largest sources of Australian citizens since the early 1970s, when legislative changes and visa requirements prompted many Commonwealth citizens to apply for Australian citizenship. Other residents who were granted Australian citizenship in 2000–01 were likely to have come from Asian countries, such as Chinese, Vietnamese, Indian and Filipino nationals (together comprising 19% of citizenship grants), citizens of South Africa (4%) and Bosnia–Herzegovina (4%). These figures reflect immigration from these countries in recent years, with China, South Africa, India and the Philippines all in the top 10 birthplaces for overseas-born people who have arrived in Australia since 1996.

#### 5.48 CITIZENSHIP RATES, Overseas-born people resident in Australia for two years or more — 2001

Selected birthplace	Persons	Citizenship rate(a)	Standardised citizenship rate(b)
	'000	%	%
Philippines	90.4	90.4	92.1
Vietnam	141.8	95.3	91.5
China (excludes SARs and Taiwan Province)	114.2	80.3	90.1
Greece	108.3	97.1	89.2
Italy	204.6	79.5	65.2
United Kingdom	951.5	65.6	64.3
Germany	100.5	76.5	59.7
Netherlands	78.7	78.3	55.5
New Zealand	281.5	37.7	45.3
<b>Total overseas born(c)</b>	<b>3 560.3</b>	<b>74.4</b>	<b>74.4</b>

(a) People for whom citizenship was not stated were excluded prior to the calculation of percentages. (b) The rates of citizenship that would be expected if a given overseas-born population had the same age and period of residence profile as the total overseas-born population. (c) Excludes people whose birthplace was not stated, inadequately described, not elsewhere classified or at sea.

Source: ABS data available on request, 2001 Census of Population and Housing.

### 5.49 FORMER NATIONALITY, People granted Australian citizenship — 2000–01

Country of former nationality or citizenship	no.	%
United Kingdom	12 474	17.3
New Zealand	11 007	15.3
China(a)	6 890	9.6
South Africa	2 992	4.2
Bosnia–Herzegovina	2 661	3.7
India	2 335	3.2
Philippines	2 211	3.1
Vietnam	1 953	2.7
Iraq	1 862	2.6
Sri Lanka	1 672	2.3
Fiji	1 398	1.9
Yugoslavia, Federal Republic of	1 175	1.6
Malaysia	1 057	1.5
United States of America(b)	1 004	1.4
Korea	966	1.3
Taiwan	894	1.2
Iran	827	1.1
Afghanistan	798	1.1
Croatia	767	1.1
Ireland	682	0.9
Somalia	667	0.9
Lebanon	665	0.9
Indonesia	659	0.9
Yugoslavia (former)	626	0.9
Canada	615	0.9
Turkey	591	0.8
Pakistan	556	0.8
Italy	534	0.7
Malta	478	0.7
Thailand	474	0.7
Cambodia	466	0.6
Russian Federation	415	0.6
Sudan	414	0.6
Singapore	387	0.5
Chile	323	0.4
Germany	321	0.4
Bangladesh	319	0.4
Portugal	318	0.4
Former Yugoslav Republic of Macedonia	317	0.4
Ukraine	284	0.4
Romania	259	0.4
Egypt	259	0.4
Other nationalities	5 332	7.4
Stateless	861	1.2
Not stated/other	305	0.4
<b>Total</b>	<b>72 070</b>	<b>100.0</b>

(a) People's Republic of China including citizens of Hong Kong and Macau SARs. (b) Includes American Samoa.

Source: Department of Immigration and Multicultural and Indigenous Affairs, 'Annual Report, 2000–2001'.

## Religion

In 1983, the High Court of Australia defined religion as 'a complex of beliefs and practices which point to a set of values and an understanding of the meaning of existence'.

At the time of European settlement, the Aboriginal inhabitants followed their own religions which were animistic in nature, involving beliefs in spirits behind the forces of nature, and the influence of ancestral spirit beings.

During the 1800s, European settlers brought their traditional churches to Australia. These included the Church of England (now the Anglican Church), and the Methodist, Catholic, Presbyterian, Congregationalist and Baptist churches.

Section 116 of the 1900 Act to constitute the Commonwealth of Australia (Australian Constitution) provides that:

The Commonwealth of Australia shall not make any law establishing any religion, or for imposing any religious observance, or for prohibiting the free exercise of any religion, and no religious test shall be required as a qualification for any office or public trust under the Commonwealth.

With the exception of a small but significant Lutheran population of Germanic descent, Australian society in 1901 was predominantly Anglo-Celtic, with 40% of the population being Church of England, 23% Catholic, 34% other Christian and about 1% professing non-Christian religions. While the population had more than doubled by 1954, the denominational mix had changed little.

Further waves of migration helped to reshape the profile of Australia's religious affiliations over subsequent decades. The impact of migration from Europe in the aftermath of World War II led to increases in affiliates of the Orthodox Churches, the establishment of Reformed bodies, growth in the number of Catholics (largely from Italian migration), and the creation of ethnic parishes among many other denominations. More recently, immigration from South-East Asia and the Middle East has expanded Buddhist and Muslim numbers considerably, and increased the ethnic diversity of existing Christian denominations.

In response to the 2001 Census question, Australians' stated religious affiliations were: 27% Catholic, 21% Anglican, 21% other Christian denominations and 5% non-Christian religions.

Just over one-quarter of all Australians either stated that they had no religion, or did not adequately respond to the question.

A question on religious affiliation has been asked in every census taken in Australia, with the voluntary nature of this question having been specifically stated since 1933. In 1971, the instruction 'if no religion, write none' was introduced. This saw a seven-fold increase in the proportion of Australians stating they had no religion, from the previous census year. Since 1971, this proportion has progressively increased, reaching 16% in 2001. Table 5.50 provides a summary of the major religious affiliations at each census since 1901.

Between 1996 and 2001, Catholic affiliates increased by 4% and Baptist affiliates by 5%. However, as the Australian population grew by 6% during this period, the actual proportion of the population professing affiliation to these denominations remained virtually unchanged. The most notable decreases in Christian affiliation occurred for Churches of Christ (decreasing by 18%), the Uniting Church (decreasing by 7%), and Presbyterian and Reformed (decreasing by 6%). An increase was seen for Pentecostal affiliation, which increased by 11% between 1996 and 2001 (from 174,720). A substantial increase, associated with immigration from South Eastern Europe, was also seen for the Orthodox Churches, with the number of Orthodox affiliates increasing by 7% (from 497,015).

Affiliates of religions other than Christianity have shown the largest proportional increases since the 1996 Census, although they still comprised a relatively small proportion of the population in 2001 (5%). Stated affiliation to Buddhism increased by 79%, to Hinduism by 42%, to Islam by 40% and to Judaism by 5%. These changes partly resulted from trends in immigration. Although the most common religious affiliation of immigrants is Christianity, affiliates of other religions are more highly represented among recent immigrants than in the total population. Between 1996 and 2001, there were just over half a million new arrivals to Australia. Of these, 9% were affiliated to Islam, 9% to Buddhism, 5% to Hinduism and 1% to Judaism.

In 2001, 82% of Australians aged 65 years and over identified themselves as Christian. This proportion was lower among younger age groups, with 60% of 18–24 year olds having identified themselves as Christian. Indeed, while 15% of all Christian affiliates were aged 65 years and over, 8% were aged between 18 and 24 years. In contrast, the other religions have a younger age profile. While 6% of Buddhist affiliates were aged 65 years and over in 2001, 13% were aged between 18 and 24 years. The largest group of Buddhist affiliates was 35–44 year olds. Similar trends were evident for Hindu and Muslim affiliates. In the 2001 Census, people in the 18–24 years age group were the most likely to state that they had no religion (20%).

### 5.50 MAJOR RELIGIOUS AFFILIATIONS

Census year	Christianity				Other religions	No religion	Not stated/ inadequately described	Total
	Anglican	Catholic	Other	Total				
	%	%	%	%	%	%	%	'000
1901	39.7	22.7	33.7	96.1	1.4	0.4	(a)2.0	3 773.8
1911	38.4	22.4	35.1	95.9	0.8	0.4	(a)2.9	4 455.0
1921	43.7	21.7	31.6	96.9	0.7	0.5	(a)1.9	5 435.7
1933	38.7	19.6	28.1	86.4	0.4	0.2	12.9	6 629.8
1947	39.0	20.9	28.1	88.0	0.5	0.3	11.1	7 579.4
1954	37.9	22.9	28.5	89.4	0.6	0.3	9.7	8 986.5
1961	34.9	24.9	28.4	88.3	0.7	0.4	10.7	10 508.2
1966	33.5	26.2	28.5	88.2	0.7	0.8	10.3	11 599.5
1971	31.0	27.0	28.2	86.2	0.8	6.7	6.2	12 755.6
1976	27.7	25.7	25.2	78.6	1.0	8.3	11.4	13 548.4
1981	26.1	26.0	24.3	76.4	1.4	10.8	11.4	14 576.3
1986	23.9	26.0	23.0	73.0	2.0	12.7	12.4	15 602.2
1991	23.8	27.3	22.9	74.0	2.6	12.9	10.5	16 850.3
1996	22.0	27.0	21.9	70.9	3.5	16.6	9.0	17 752.8
2001	20.7	26.6	20.7	68.0	4.9	15.5	11.7	18 769.2

(a) Includes 'object to state'.

Source: ABS data available on request, *Census of Population and Housing*.

Table 5.51 shows the distribution of religious groupings by the number and percentage of affiliates at the 1996 and 2001 censuses, and the change which occurred during that five-year period.

## Languages

Even though English is Australia's national language, due to cultural diversity in the population over 200 languages are spoken in the community. Languages other than English are not only spoken by migrants who have settled in Australia from all over the world; more than 60 different languages are spoken by Aboriginal and Torres Strait Islander Australians. The 2001 Census indicated that 2.8 million people (16% of the population) spoke a language other than English at home (see table 5.52), which represents an increase of 213,100 people or 8% since 1996.

Over 50,000 people spoke an Australian Indigenous language (including Australian Creoles), which equates to 12% of all Indigenous Australians and 0.3% of the total Australian population. Two-thirds of Indigenous people in the Northern Territory and 17% of Indigenous people in South Australia spoke an Indigenous

language at home. The three Indigenous languages with the most speakers were Kriol (an Australian Creole) and two Central Australian languages: Pitjantjatjara and Warlpiri.

In 2001 the five most commonly spoken languages other than English were Italian, Greek, Cantonese, Arabic (including Lebanese) and Vietnamese, with speakers of these languages together comprising 7% of the total population. The popularity of these languages is associated with immigration over the last 50 years from countries where these languages are spoken. While the number of settler arrivals from countries such as Italy and Greece was high at the end of World War II, large numbers of settler arrivals from Lebanon and Vietnam arrived during the 1970s and 1980s, and from China in the 1990s (Department of Immigration and Multicultural and Indigenous Affairs 2001c).

Greek, Arabic and Italian speakers had the largest proportions of Australian-born speakers, reflecting the fact that these languages were mainly brought to Australia 20 or more years ago and have been maintained among their children. Languages spoken by migrants arriving in Australia more recently, such as Mandarin and Filipino, had a smaller proportion of Australian-born speakers.

### 5.51 RELIGIOUS AFFILIATION

	1996		2001		Change
	'000	%	'000	%	
Christianity					
Anglican	3 903.3	22.0	3 881.2	20.7	-0.6
Baptist	295.2	1.7	309.2	1.6	4.8
Catholic	4 799.0	27.0	5 001.6	26.6	4.2
Churches of Christ	75.0	0.4	61.3	0.3	-18.2
Jehovah's Witness	83.4	0.5	81.1	0.4	-2.8
Lutheran	250.0	1.4	250.4	1.3	0.2
Orthodox	497.0	2.8	529.4	2.8	6.5
Pentecostal	174.7	1.0	194.6	1.0	11.4
Presbyterian and Reformed	675.5	3.8	637.5	3.4	-5.6
Salvation Army	74.1	0.4	71.4	0.4	-3.7
Uniting Church	1 334.9	7.5	1 248.7	6.7	-6.5
Other Christian	420.6	2.4	497.9	2.7	18.4
Buddhism	199.8	1.1	357.8	1.9	79.1
Hinduism	67.3	0.4	95.5	0.5	41.9
Islam	200.9	1.1	281.6	1.5	40.2
Judaism	79.8	0.4	84.0	0.4	5.2
Other religions	68.6	0.4	92.4	0.5	34.6
No religion	2 948.9	16.6	2 906.0	15.5	-1.5
Not stated/Inadequately described	1 604.7	9.0	2 187.7	11.7	36.3
<b>Total</b>	<b>17 752.8</b>	<b>100.0</b>	<b>18 769.2</b>	<b>100.0</b>	<b>5.7</b>

Source: ABS data available on request, 1996 and 2001 Censuses of Population and Housing.

5.52 PEOPLE WHO SPOKE A LANGUAGE OTHER THAN ENGLISH AT HOME — 2001

	Males	Females	Persons	Proportion born in Australia(a)	Persons as a proportion of population
	'000	'000	'000	%	%
Italian	175.4	178.2	353.6	42.7	2.0
Greek	131.8	132.0	263.7	50.9	1.5
Cantonese	108.2	117.1	225.3	20.0	1.3
Arabic (including Lebanese)	108.7	100.6	209.4	43.2	1.2
Vietnamese	86.1	88.1	174.2	25.5	1.0
Mandarin	67.0	72.2	139.3	12.2	0.8
Spanish	45.2	48.4	93.6	22.7	0.5
Tagalog (Filipino)	30.8	48.1	78.9	8.8	0.4
German	35.7	40.8	76.4	19.4	0.4
Macedonian	36.6	35.4	72.0	38.6	0.4
Croatian	35.2	34.6	69.9	34.0	0.4
Polish	27.1	31.9	59.1	20.0	0.3
Australian Indigenous languages	25.1	25.9	51.0	99.6	0.3
Turkish	25.7	25.0	50.7	39.7	0.3
Serbian	24.8	24.4	49.2	22.1	0.3
Hindi	24.4	23.4	47.8	13.5	0.3
Maltese	20.5	20.9	41.4	28.7	0.2
Netherlandic	18.3	21.9	40.2	14.6	0.2
All other languages(b)	352.4	368.5	720.9	19.0	4.0
<b>Total</b>	<b>1 378.9</b>	<b>1 437.6</b>	<b>2 816.5</b>	<b>29.5</b>	<b>15.8</b>

(a) Persons whose birthplace was not stated, inadequately described, not elsewhere classified or at sea were excluded prior to the calculation of percentages. (b) Excludes languages that were not stated, inadequately described, and non-verbal so described.

Source: ABS data available on request, 2001 Census of Population and Housing.

English proficiency among people who spoke a language other than English at home varied with the age of the speaker and according to whether he or she was born in Australia (see table 5.53). Around 88% of all people aged under 25 years who spoke a language other than English at home spoke English well or very well, compared with 60% of those aged 65 years and over.

People born in Australia who spoke a language other than English at home were generally more likely to speak English well or very well than the total population speaking other than English at home. Overall, 91% of those born in Australia spoke English well or very well, compared with 82% of the total population speaking other than English at home.

5.53 PROFICIENCY IN ENGLISH, People who spoke a language other than English at home — 2001

	Units	Age group (years)				Total
		0-24	25-44	45-64	65 and over	
Total population speaking other than English at home						
Speaks English well or very well	%	88.1	87.2	77.1	59.9	81.6
Does not speak English well	%	8.4	11.5	20.1	29.5	14.9
Does not speak English at all	%	3.5	1.3	2.8	10.7	3.5
Total	%	100.0	100.0	100.0	100.0	100.0
Total(a)	no.	860 401	930 520	671 549	354 019	2 816 489
Australian-born population speaking other than English at home						
Speaks English well or very well	%	86.7	97.4	92.9	81.3	90.5
Does not speak English well	%	8.6	2.3	6.1	14.2	6.5
Does not speak English at all	%	4.6	0.3	1.0	4.5	3.0
Total	%	100.0	100.0	100.0	100.0	100.0
Total(b)	no.	493 439	259 214	46 531	9 807	808 991

(a) Includes 45,000 people who did not state how well they spoke English. (b) Includes 20,000 people who did not state how well they spoke English.

Source: ABS data available on request, 2001 Census of Population and Housing.

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## Introduction

The information contained in this chapter presents a picture of the labour market in Australia. In June 2002, 63.8% of the adult population in Australia were directly involved in the labour market (i.e. working or looking for work). Unlike other statistics that have a particular economic or social focus, labour statistics cut across both dimensions, and in so doing they provide useful insights into economic and community life in Australia.

This chapter provides a broad overview of the Australian labour market. It briefly describes key labour statistics concepts and measures (e.g. employment, unemployment, job vacancies, earnings, industrial disputes); highlights the main features of the Australian labour market in 2001–02; examines developments in the Australian labour market over the medium- and long-term; and presents more detailed analysis of a number of issues related to and/or impacting on the Australian labour market.

## Labour market statistics

The labour market can be viewed from a number of perspectives. Most labour market statistics focus on some aspect of labour demand or labour supply. In Australia, business surveys are the primary source of data on labour demand. The types of data collected through business surveys include labour costs, earnings, jobs and job vacancies. Population censuses and household surveys constitute the primary sources of information about the size and characteristics of labour supply. Information obtained through these types of collections includes data on current and previous labour force experience, as well as demographic data, such as age, sex, family status and country of birth. Diagram 6.1 illustrates the range of ABS labour statistics available from household and business surveys, and broadly how they relate to the labour market.

For the purpose of compiling Australian labour market statistics, the population is restricted to persons in the civilian population aged 15 years and over. This practice is based on international guidelines for the collection of labour statistics.

The concepts and definitions underlying Australian labour statistics are based on the conventions, recommendations and guidelines developed and maintained by the International

Labour Organisation and the United Nations Statistical Office. Australian labour statistics comply in almost every respect with these international standards.

## The labour force

Fundamental to the measurement of employment and unemployment is the concept of the labour force. The labour force represents the key official measure of the total supply of labour available to the labour market during a given period. It is equivalent to the supply of labour available for the production of economic goods and services. Therefore, persons in the labour force are also referred to as the 'currently economically active population'.

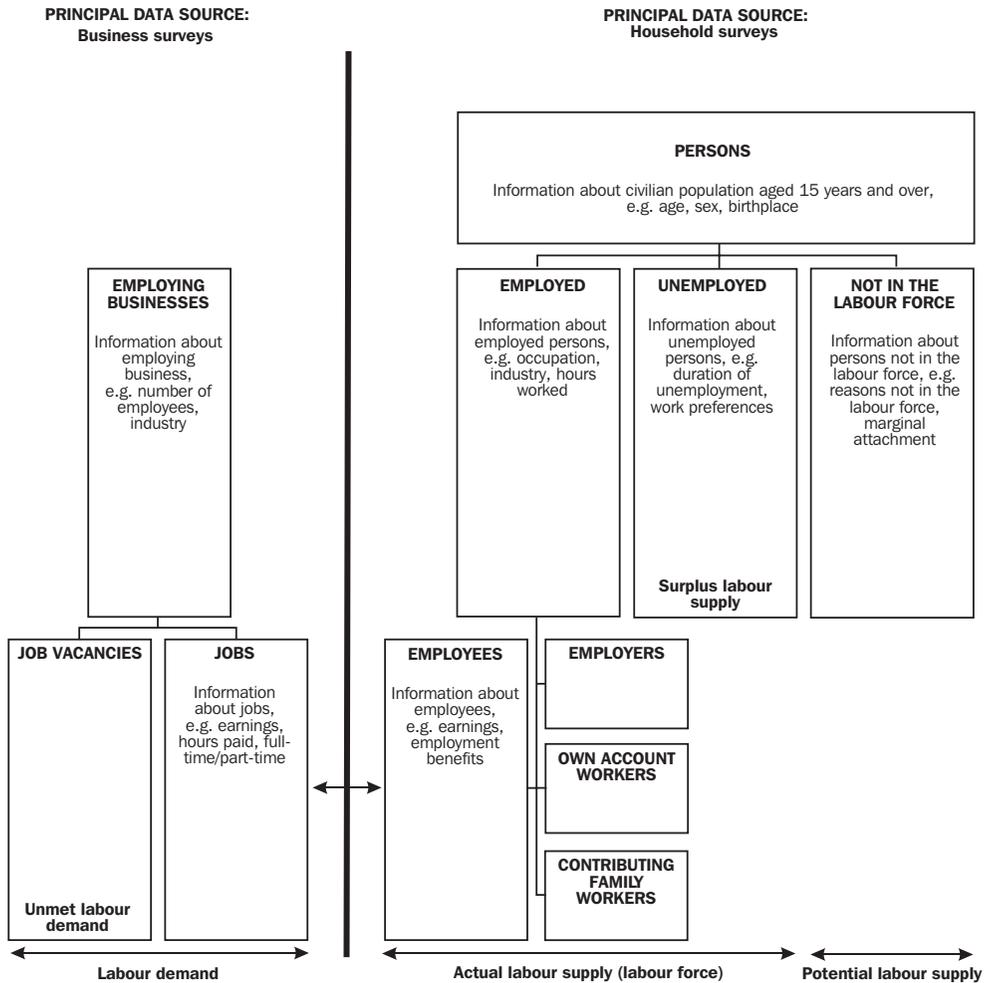
The labour force is divided into two broad groups — the employed and the unemployed. A person not classified as employed or unemployed is classified as not in the labour force (not economically active). The framework for classifying persons into these three basic categories (employed, unemployed, not in the labour force) is illustrated in diagram 6.2. Further details about the Australian labour force framework, and the specific criteria for classifying persons to these three basic categories, are available in *Labour Statistics: Concepts, Sources and Methods, 2001* (6102.0).

## Characteristics of the labour force

The size and composition of the labour force are constantly changing. Changes in the size of the labour force are caused by changes in labour force participation as well as changes in the adult population. Between June 2001 and June 2002 the labour force grew by 1.5%. During the same period the civilian population aged 15 and over grew 1.4%. The difference between these two rates is explained by changes in the participation rate over the same period.

The labour force participation rate is one of the most important indicators for analysing the overall level of labour market activity. The participation rate is calculated by dividing the total number of persons in the labour force by the total number of persons in the civilian population aged 15 years and over. Analysis of participation rates, particularly in terms of age, sex and family status, provides the basis for monitoring changes in the size and composition of the labour supply.

6.1 THE AUSTRALIAN LABOUR STATISTICS FRAMEWORK

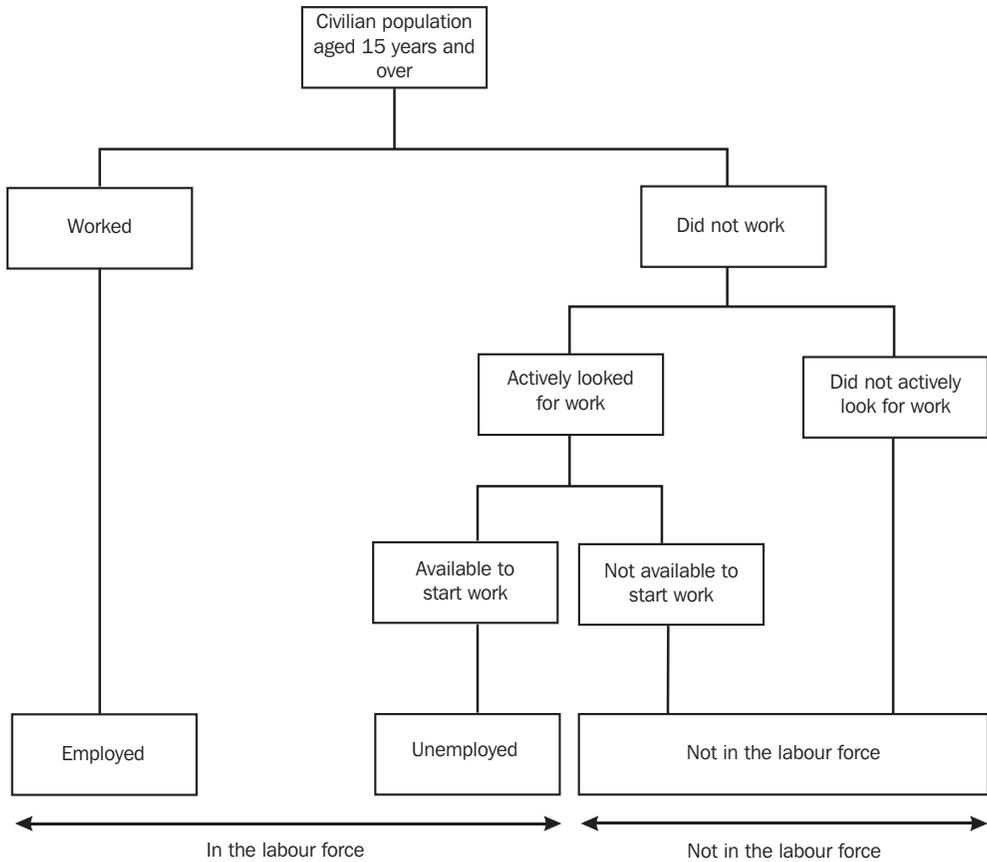


Source: *Labour Statistics: Concepts, Sources and Methods, 2001 (6102.0)*.

During the last two decades the overall labour force participation rate has increased slowly. It rose from a level of 61% in June 1982 to 64% in June 2002. The main force behind the long-term rise in the labour force participation rate has been an increase in the female participation rate. The female participation rate increased from 45% in June 1982 to 55% in June 2002. In contrast, the male participation rate fell from 77% to 72% over the same period. Graph 6.3 shows male and female participation rates between June 1982 and June 2002. The graph illustrates the convergence of male and female participation rates over time.

Underlying these contrasting trends in male and female participation rates are varying movements in the age-specific participation rates. As seen in table 6.4, male and female participation rates are similar in the 15–19 year age group. The low participation rate for persons in this age group reflects the fact that many young people are in full-time education and not in the labour force. Participation rates for males and females then rise as young people move from education and training to employment. For males, participation rates peak in the 25–34 and 35–44 age groups. Female participation rates peak in the 20–24 year age group.

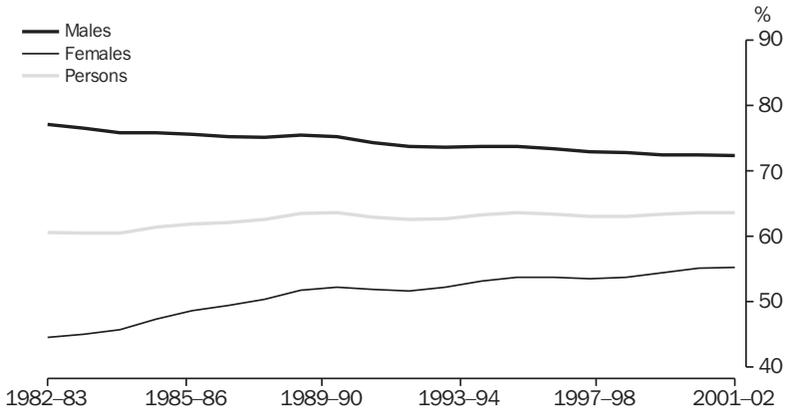
6.2 THE AUSTRALIAN LABOUR FORCE FRAMEWORK(a)



(a) The rules for determining whether a person is classified as employed, unemployed or not in the labour force are detailed in 'Labour Statistics: Concepts, Sources and Methods, 2001' (6102.0), paragraphs 2.12 to 2.23.

Source: Labour Statistics: Concepts, Sources and Methods, 2001 (6102.0).

6.3 LABOUR FORCE PARTICIPATION RATES: Annual averages



Source: Labour Force, Australia (6203.0).

## 6.4 LABOUR FORCE PARTICIPATION RATES, By age: Annual averages

Age group (years)	Males			Females		
	1984-85 %	2001-02 %	Change %	1984-85 %	2001-02 %	Change %
15-19	60.9	59.3	-2.6	58.8	60.0	2.0
20-24	90.2	86.1	-4.5	73.1	77.4	5.9
25-34	94.8	91.5	-3.6	56.2	70.6	25.6
35-44	94.6	91.4	-3.4	60.1	71.4	18.8
45-54	90.1	87.7	-3.3	50.7	71.2	40.4
55-64	61.2	61.8	0.1	20.3	38.4	89.2
65 and over	9.2	10.3	12.0	2.2	3.4	54.5
<b>All age groups</b>	<b>75.9</b>	<b>72.4</b>	<b>-4.6</b>	<b>45.7</b>	<b>55.3</b>	<b>21.0</b>

Source: ABS data available on request, Labour Force Survey.

Examining changes in age-specific participation rates for women between 1984-85 and 2001-02, more women are remaining in the labour force during the child-bearing years. In 1984-85, the female participation rate fell from 73.1% for the 20-24 year age group to 56.2% for the 25-34 year age group, a decline of 16.9 percentage points. In 2001-02, the participation rate declined from 77.7% for the 20-24 year age group to 70.6% for the 25-34 year age group, and remained virtually unchanged through to the 45-54 year age group.

Examining changes in age-specific participation rates for men between 1984-85 and 2001-02, for all age groups up to and including the 45-54 year age group, participation rates declined between the two periods. Going against the trend toward declining male participation rates, the participation rates for men over 55 years of age increased between 1984-85 and 2001-02, reflecting a trend toward later retirement.

Within Australia, labour market participation varies across states and territories and across capital cities and regional areas. Table 6.5 shows broad regional participation rates. In 2001-02 the highest participation rate for 15-64 year olds was in the Northern Territory and the lowest was in Tasmania.

6.5 LABOUR FORCE PARTICIPATION RATES(a)  
— 2001-02

	Capital city %	Balance of state %	All regions %
New South Wales	65.0	58.3	62.6
Victoria	64.5	61.5	63.7
Queensland	66.2	64.1	65.0
South Australia	60.3	61.3	60.6
Western Australia	65.7	68.7	66.5
Tasmania	57.6	58.8	58.3
Northern Territory	..	74.3	74.3
Australian Capital Territory	..	71.6	71.6
<b>Australia</b>	<b>64.6</b>	<b>62.3</b>	<b>63.7</b>

(a) Participation rate calculated using population estimates which exclude those in institutions.

Source: ABS data available on request, Labour Force Survey.

Table 6.6 shows changes in labour force status (i.e. employed, unemployed, not in the labour force) between 1996-97 and 2001-02. During this period the total number of persons employed grew by 9.9% to 9.2 million. This comprised an increase of 6.0% in the level of full-time employment and an increase of 21.3% in the level of part-time employment. Part-time employed persons now account for 27.9% of all employed persons. Women dominate the part-time labour force, accounting for 71.3% of part-time workers.

The unemployment rate declined gradually from 8.3% in 1996-97 to 6.4% in 2000-01. During 2001-02, the unemployment rate rose slightly to 6.6%, although this was still well below the 1996-97 rate. Over this six-year period, the unemployment rate for women has remained consistently below that for men.

## 6.6 LABOUR FORCE STATUS, Civilian population: Annual averages

	Employed			Unemployed			Labour force '000	Civilian population '000	Unemployment rate %	Participation rate %
	Full-time '000	Part-time '000	Total '000	Full-time '000	Part-time '000	Total '000				
<b>MALES</b>										
1996–97	4 205.1	561.2	4 766.3	395.4	52.3	447.7	5 214.0	7 108.4	8.6	73.4
1997–98	4 243.5	584.8	4 828.3	380.7	52.9	433.6	5 262.0	7 214.3	8.2	72.9
1998–99	4 301.6	622.1	4 923.6	352.3	52.1	404.4	5 328.0	7 323.7	7.6	72.7
1999–2000	4 397.0	636.2	5 033.2	307.6	56.1	363.8	5 397.0	7 441.1	6.7	72.5
2000–01	4 421.7	684.3	5 106.0	308.7	57.0	365.8	5 471.8	7 550.2	6.7	72.5
2001–02	4 419.1	741.3	5 160.4	318.1	62.9	381.1	5 541.5	7 656.5	6.9	72.4
<b>FEMALES</b>										
1996–97	2 071.0	1 566.6	3 637.7	221.1	96.1	317.2	3 954.9	7 347.0	8.0	53.8
1997–98	2 085.3	1 604.9	3 690.3	212.8	91.3	304.1	3 994.4	7 450.5	7.6	53.6
1998–99	2 130.5	1 649.2	3 779.7	192.5	94.8	287.3	4 067.0	7 555.3	7.1	53.8
1999–2000	2 193.6	1 713.0	3 906.7	177.0	93.7	270.7	4 177.4	7 665.8	6.5	54.5
2000–01	2 269.4	1 754.4	4 023.9	163.7	95.9	259.7	4 283.5	7 767.2	6.0	55.1
2001–02	2 232.4	1 839.2	4 071.6	180.9	94.8	275.7	4 347.3	7 867.2	6.3	55.3
<b>PERSONS</b>										
1996–97	6 276.1	2 127.9	8 404.0	616.5	148.4	764.9	9 168.9	14 455.3	8.3	63.4
1997–98	6 328.8	2 189.8	8 518.6	593.5	144.3	737.8	9 256.4	14 664.8	8.0	63.1
1998–99	6 432.1	2 271.3	8 703.4	544.7	146.9	691.7	9 395.0	14 879.0	7.4	63.1
1999–2000	6 590.7	2 349.2	8 939.9	484.6	149.8	634.5	9 574.3	15 106.9	6.6	63.4
2000–01	6 691.2	2 438.8	9 129.9	472.5	153.0	625.5	9 755.4	15 317.4	6.4	63.7
2001–02	6 651.5	2 580.5	9 232.0	499.1	157.7	656.8	9 888.8	15 523.7	6.6	63.7

Source: ABS data available on request, Labour Force Survey.

## 6.7 LABOUR FORCE STATUS, By country of birth: Annual average — 2001–02

Birthplace	Employed			Unemployed '000	Labour force '000	Not in labour force '000	Unemployment rate %	Participation rate(a) %
	Full-time workers '000	Total '000	Total '000					
Born in Australia	4 950.8	6 970.9	484.8	7 455.8	3 605.8	6.5	67.4	
Born overseas	1 700.8	2 261.1	171.9	2 433.0	1 769.0	7.1	57.9	
Mainly English speaking countries	713.5	944.0	55.3	999.4	560.0	5.5	64.1	
Other than mainly English speaking countries	987.3	1 317.1	116.6	1 433.7	1 209.0	8.1	54.3	
<b>Total</b>	<b>6 651.6</b>	<b>9 232.0</b>	<b>656.8</b>	<b>9 888.9</b>	<b>5 374.8</b>	<b>6.6</b>	<b>64.8</b>	

(a) Participation rate calculated using population estimates which exclude those in institutions.

Source: ABS data available on request, Labour Force Survey.

In 2001–02 there were 9.9 million people in the Australian labour force, of whom 24.6% were born overseas (table 6.7). The labour force participation rate for persons born overseas was 57.9% compared with 67.4% for persons born in Australia. Migrants from mainly English speaking countries participated in the labour force at a higher rate than those from predominantly non-English speaking countries. The unemployment rate for migrants from mainly English speaking countries (5.5%) was lower than that for persons born in Australia (6.5%). The unemployment rate for migrants from mainly English speaking countries was also much lower than the unemployment rate among migrants

from predominantly non-English speaking backgrounds.

Table 6.8 provides an overview of labour force status of persons at June 2002, according to the family relationship within the household. For couple families with dependants present, 83% of husbands (or partners) were employed full-time, compared with 25% of wives (or partners) (with a further 37% of wives employed part-time). Just over half of male lone parents with dependants (56%) were employed full-time compared with 21% of female lone parents with dependants. The unemployment rate for husbands and for wives was lower than for all other groups.

## 6.8 LABOUR FORCE STATUS, Relationship in household(a) — June 2002

	Employed		Unem- ployed '000	Labour force '000	Not in labour force '000	Civilian population aged 15 and over '000	Unemploy- ment rate %	Participation rate %
	Full-time '000	Total '000						
<b>MALES</b>								
<i>Family member</i>	3 636.1	4 261.5	255.8	4 517.3	1 551.9	6 069.2	5.7	74.4
<i>Husband or partner</i>	2 977.7	3 290.7	117.9	3 408.6	1 096.0	4 504.6	3.5	75.7
With dependants	1 727.1	1 861.8	68.8	1 930.6	157.3	2 087.9	3.6	92.5
Without dependants	1 250.6	1 428.9	49.1	1 478.0	938.8	2 416.8	3.3	61.2
<i>Lone parent</i>	72.4	84.0	6.6	90.6	43.0	133.6	7.3	67.8
With dependants	45.1	54.3	5.0	59.3	20.5	79.9	8.4	74.2
Without dependants	27.3	29.7	*1.6	31.3	22.4	53.7	5.1	58.2
Dependent student	*3.5	182.9	31.5	214.4	273.7	488.1	14.7	43.9
Non-dependent child(b)	513.3	616.5	84.8	701.4	89.6	790.9	12.1	88.7
Other family person	69.2	87.4	15.0	102.4	49.5	151.9	14.6	67.4
<i>Non-family member</i>	647.0	777.7	79.3	857.0	394.2	1 251.2	9.3	68.5
Lone person	391.8	465.7	38.7	504.4	302.9	807.4	7.7	62.5
Not living alone	255.2	312.0	40.6	352.6	91.2	443.9	11.5	79.4
<b>Total</b>	<b>4 283.0</b>	<b>5 039.3</b>	<b>335.1</b>	<b>5 374.4</b>	<b>1 946.1</b>	<b>7 320.4</b>	<b>6.2</b>	<b>73.4</b>
<b>FEMALES</b>								
<i>Family member</i>	1 716.4	3 425.2	222.6	3 647.7	2 543.1	6 190.8	6.1	58.9
<i>Wife or partner</i>	1 271.7	2 456.2	93.6	2 549.8	1 790.6	4 340.4	3.7	58.7
With dependants	508.1	1 254.9	52.2	1 307.1	689.1	1 996.3	4.0	65.5
Without dependants	763.6	1 201.3	41.4	1 242.7	1 101.5	2 344.1	3.3	53.0
<i>Lone parent</i>	150.2	312.7	48.0	360.7	348.1	708.9	13.3	50.9
With dependants	110.5	251.1	43.6	294.7	230.7	525.4	14.8	56.1
Without dependants	39.7	61.6	4.4	66.0	117.5	183.5	6.7	36.0
Dependent student	4.6	236.7	35.8	272.5	238.6	511.1	13.1	53.3
Non-dependent child(b)	250.4	360.2	36.2	396.4	55.3	451.7	9.1	87.7
Other family person	39.5	59.3	9.0	68.3	110.4	178.7	13.1	38.2
<i>Non-family member</i>	404.1	557.0	38.6	595.7	678.9	1 274.6	6.5	46.7
Lone person	247.5	329.5	21.7	351.2	593.7	944.8	6.2	37.2
Not living alone	156.6	227.6	16.9	244.5	85.3	329.8	6.9	74.1
<b>Total</b>	<b>2 120.4</b>	<b>3 982.2</b>	<b>261.2</b>	<b>4 243.4</b>	<b>3 222.0</b>	<b>7 465.4</b>	<b>6.2</b>	<b>56.8</b>
<b>PERSONS</b>								
<i>Family member</i>	5 352.5	7 686.7	478.3	8 165.0	4 095.0	12 260.0	5.9	66.6
<i>Husband, wife or   partner</i>	4 249.4	5 746.9	211.5	5 958.4	2 886.6	8 845.1	3.6	67.4
With dependants	2 235.2	3 116.8	121.0	3 237.8	846.4	4 084.2	3.7	79.3
Without dependants	2 014.2	2 630.1	90.5	2 720.7	2 040.2	4 760.9	3.3	57.1
<i>Lone parent</i>	222.7	396.7	54.6	451.3	391.2	842.4	12.1	53.6
With dependants	155.6	305.4	48.6	354.0	251.2	605.3	13.7	58.5
Without dependants	67.1	91.3	6.0	97.3	139.9	237.1	6.2	41.0
Dependent student	8.1	419.7	67.2	486.9	512.4	999.2	13.8	48.7
Non-dependent child(b)	763.6	976.8	121.0	1 097.7	144.9	1 242.7	11.0	88.3
Other family person	108.7	146.7	24.0	170.7	159.9	330.6	14.0	51.6
<i>Non-family member</i>	1 051.0	1 334.7	118.0	1 452.7	1 073.1	2 525.8	8.1	57.5
Lone person	639.3	795.2	60.4	855.6	896.6	1 752.2	7.1	48.8
Not living alone	411.8	539.5	57.6	597.1	176.5	773.6	9.6	77.2
<b>Total</b>	<b>6 403.5</b>	<b>9 021.4</b>	<b>596.3</b>	<b>9 617.7</b>	<b>5 168.1</b>	<b>14 785.8</b>	<b>6.2</b>	<b>65.0</b>

(a) Civilians who were residents of private dwellings where family status was determined. Generally relationship in household is determined for more than 90% of all civilians aged 15 and over. (b) Aged 15 and over.

Source: Labour Force, Australia, June 2002 (6203.0).

## Labour force experience

The Labour Force Experience Survey examines labour force activity over a 12-month period. It is a biennial survey of persons in Australia aged 15–69 years. The survey provides information about how many weeks each person spent working, looking for work or not in the labour force, and some additional variables about persons involved in these activities. Information from the latest survey relates to the year ending February 2001.

Data from the Labour Force Experience Survey provide additional insights into labour market activity that are not available from data sources measuring labour market activity at a particular point in time. For example, during the 12 months to February 2001, about 59% of persons aged 15–69 were employed at any given point in time. Quite a different picture of the labour market is obtained by examining the labour force experience of persons aged 15–69 years over the same 12-month period. Over the year ended February 2001, about 74% of people worked at some time during the year. Similarly, examining unemployment data for the 12 months to February 2001, the unemployment rate at any given point in time during the year was around 6.8%; however, 17.5% of persons aged 15–69 were looking for work at some time during the year.

The contrast between point in time data (the currently economically active population) and labour force experience data (i.e. the usually active population) is illustrated in graph 6.9. The graph compares unemployment data from the monthly Labour Force Survey with the proportion of people who experienced unemployment at some time during the year. Data are compared over six 12-month periods during the past decade (i.e. those periods for which Labour Force Experience Survey data are available). The proportion of people who looked for work at some time in the previous 12 months was highest in March 1993, corresponding with a high unemployment rate. The number of people searching for work has declined steadily since March 1993. While the longitudinal data provide greater insight into labour market activity, they do not change the overall picture of the state of the labour market.

Table 6.10 summarises the labour market experience of persons aged 15–69 in Australia during the year to February 2001. The table distinguishes between those people who changed their labour force status during the year and those who did not. It shows that 72.3% of persons aged 15–69 did not change their labour force status during the 12 months to February 2001. The remaining 27.7% changed their labour force status at some time during the year. Of those people who did not change their labour force status during the year, 67.7% spent the entire year working.

### 6.9 UNEMPLOYMENT EXPERIENCE



(a) Calculated as the number of unemployed persons as a percentage of the labour force.  
 (b) Annual average for the 12 months to February. (c) Calculated as the number of persons who looked for work at some time during the year as a percentage of persons in the labour force at some time during the year.

Source: *Labour Force, Australia* (6203.0); *Labour Force Experience, Australia* (6206.0).

## 6.10 LABOUR FORCE EXPERIENCE — Year ending February 2001

	Units	Males	Females	Persons
<i>No change in labour force status during the year</i>	%	73.3	71.2	72.3
Not in the labour force at any time during the year	%	15.1	28.9	22.0
In the labour force for the whole year				
Worked whole year	%	56.5	41.3	48.9
Looked for work all year	%	1.7	1.1	1.4
<i>Change in labour force status during the year</i>	%	26.7	28.8	27.7
<i>Worked part of the year(a)</i>	%	24.5	25.2	24.8
Worked 1 to under 26 weeks	%	6.4	7.5	6.9
Worked 26 to under 39 weeks	%	4.4	4.7	4.6
Worked 39 to under 52 weeks	%	13.8	13.0	13.4
<i>Other(b)</i>	%	2.2	3.6	2.9
Total	%	100.0	100.0	100.0
Number	'000	6 722.6	6 691.3	13 413.9

(a) Labour force status during rest of the year not specified. (b) Looked for work for part of the year, not in the labour force the rest of the year.

Source: *Labour Force Experience, Australia, February 2001* (6206.0).

Also included among those who did not change their labour force status during the year were a number of people who remained outside the labour force for the entire year (22.0%). This category was dominated by women, with almost twice as many women as men not active in the labour force at any time during the year.

In addition to those people who worked for the whole year and those who remained outside the labour force for the whole year, there was a relatively small group of persons aged 15–69 who looked for work for the whole year (1.4% or 188,500 persons).

Of those persons aged 15–69 who changed their labour force status during the year, 90% worked for part of the year. More than half of the population in this group worked between 39 and 52 weeks. In addition, two-thirds of those who worked for part of the year spent the rest of the year not in the labour force.

Altogether, about 1.7 million Australians looked for work at some time during the year ended February 2001. Table 6.11 shows the time they spent looking for work and the number of different periods during which they looked for a job. Of those people who looked for work during the year, 53.3% spent less than three months searching for a job. However,

10.9% of job searchers spent the entire year looking for work without finding a job. In terms of the number of spells looking for work, 72.2% of job searchers had only one spell looking for work, but 10.6% of those who looked for work had four or more periods during which they looked for a job.

## 6.11 PERSONS WHO LOOKED FOR WORK AT SOME TIME DURING THE YEAR — Year ending February 2001

	'000	%
<i>Time spent looking for work</i>		
1 to under 4 weeks	318.6	18.4
4 to under 13 weeks	603.0	34.8
13 to under 26 weeks	267.5	15.5
26 to under 39 weeks	212.2	12.3
39 to under 52 weeks	140.8	8.1
52 weeks	188.5	10.9
<i>Number of spells looking for work</i>		
One	1 249.8	72.2
Two	194.4	11.2
Three	102.8	5.9
Four or more	183.6	10.6
<b>Total</b>	<b>1 730.6</b>	<b>100.0</b>

Source: *Labour Force Experience, Australia, February 2001* (6206.0).

## Persons employed

People are considered to be employed if they were in paid work for one hour or more in the reference week, or were contributing family workers working an hour or more. Those people who were absent from work in the reference week are also considered to be employed (unless they had been on unpaid leave for more than four weeks). This section contains information about people who are employed, including whether they worked full-time or part-time, and details about the industry and occupation they work in.

Relating employment levels to population levels enables evaluation of the strength of job growth compared to population growth. The measure relating these two levels is the employment/population ratio. Its usefulness lies in the fact that, while movements in the employment level reflect net changes in the levels of persons holding jobs, movements in the ratio reflect net changes in the number of persons employed relative to changes in the size of the population.

The overall employment/population ratio rose from 58.1% in 1996–97 to 59.5% in 2001–02; the latter represents a slight fall from 59.6% recorded in 2000–01 (table 6.12). In 2001–02, the employment/population ratio for males was considerably higher than for females (67.4% compared to 51.8%), which reflects the higher participation of males in the labour force.

### Full-time and part-time employment

In the Labour Force Survey, employed persons are regarded as either full-time or part-time, depending on the number of hours worked. Full-time workers are those who worked 35 hours or more during the reference week of the Labour Force Survey, or who usually worked 35 hours or more each week (in all jobs). Part-time workers are those who usually worked less than 35 hours a week and who did so during the reference week.

Graph 6.13 shows annual percentage increases in part-time and full-time employment since 1979–80. For most of this period part-time and full-time employment have followed much the same pattern. The major exceptions to this have been 1981–82 to 1982–83 and from 1999–2000 onwards. While the patterns of change have been similar, in every year part-time employment has increased at a greater rate than full-time employment in each year (or decreased at a lesser rate during the recession of the early 1990s).

As part-time employment has been increasing at a faster rate than full-time employment over this period, it follows that the proportion of part-time employed persons has also risen over the period. The proportion of part-time employed persons has steadily increased, from 16% in 1979–80 to 28% in 2001–02.

Following a period of strong economic growth in the late 1980s and early 1990s, and the subsequent recession of the early 1990s, employment growth fluctuated considerably. In 1991–92, both full-time employment (up 5%) and part-time employment (up 13%) recorded strong increases. In 1992–93, as the impact of the recession and its effects on the demand for labour were felt in the labour market, full-time employment and part-time employment both fell strongly, recording decreases of 8% and 6% respectively.

In 2001–02 there were 9,232,000 employed persons, with 72.0% working full-time (table 6.14). Males were far more likely than females to work full-time (85.6% to 54.8%). Part-time work was most prevalent among the younger (aged 15–19) and older (65 and over) age groups (66.2% and 52.3% respectively). For females, at least a third of each age group worked part-time, with the 20–24 and 25–34 year age groups having the lowest proportion of part-time workers (37.0% and 34.2% respectively).

**6.12 EMPLOYED PERSONS(a), Employment/population ratios(b)**

	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02
	%	%	%	%	%	%
Males	67.1	66.9	67.2	67.6	67.6	67.4
Females	49.5	49.5	50.0	51.0	51.8	51.8
<b>Persons</b>	<b>58.1</b>	<b>58.1</b>	<b>58.5</b>	<b>59.2</b>	<b>59.6</b>	<b>59.5</b>

(a) Data have not been revised to reflect definitional changes in the Labour Force Survey questionnaire introduced in April 2001. Data collected from April 2001 onwards are not strictly comparable with data collected in earlier periods. For further information, see 'Information Paper: Implementing the Redesigned Labour Force Survey Questionnaire' (6295.0). (b) The employment/population ratio for any group is the number of employed persons expressed as a percentage of the civilian population aged 15 and over in the same group.

Source: ABS data available on request, Labour Force Survey.

6.13 EMPLOYED PERSONS, Percentage change in annual average employment



Source: ABS data available on request, Labour Force Survey.

6.14 EMPLOYED PERSONS, Full-time and part-time workers: Annual average(a) — 2001-02

	Units	Age group (years)								Total
		15-19	20-24	25-34	35-44	45-54	55-59	60-64	65 and over	
<b>MALES</b>										
Full-time workers	'000	145.4	415.3	1 129.0	1 182.4	1 027.4	313.6	146.1	60.0	4 419.1
Part-time workers	'000	191.8	122.6	109.3	93.1	86.5	47.1	42.3	48.7	741.3
<b>Total</b>	<b>'000</b>	<b>337.1</b>	<b>537.9</b>	<b>1 238.3</b>	<b>1 275.5</b>	<b>1 113.9</b>	<b>360.7</b>	<b>188.4</b>	<b>108.7</b>	<b>5 160.4</b>
Proportion of part-time workers	%	56.9	22.8	8.8	7.3	7.8	13.1	22.4	44.8	14.4
<b>FEMALES</b>										
Full-time workers	'000	81.9	302.6	634.0	517.2	519.9	124.6	38.7	13.4	2 232.4
Part-time workers	'000	252.7	177.7	329.0	485.7	383.2	123.3	55.7	31.7	1 839.2
<b>Total</b>	<b>'000</b>	<b>334.6</b>	<b>480.3</b>	<b>963.1</b>	<b>1 003.0</b>	<b>903.1</b>	<b>247.9</b>	<b>94.5</b>	<b>45.1</b>	<b>4 071.6</b>
Proportion of part-time workers	%	75.5	37.0	34.2	48.4	42.4	49.8	59.0	70.3	45.2
<b>PERSONS</b>										
Full-time workers	'000	227.3	717.9	1 763.0	1 699.6	1 547.3	438.2	184.9	73.4	6 651.5
Part-time workers	'000	444.5	300.3	438.3	578.9	469.7	170.4	98.0	80.4	2 580.5
<b>Total</b>	<b>'000</b>	<b>671.8</b>	<b>1 018.2</b>	<b>2 201.3</b>	<b>2 278.5</b>	<b>2 017.0</b>	<b>608.6</b>	<b>282.8</b>	<b>153.8</b>	<b>9 232.0</b>
Proportion of part-time workers	%	66.2	29.5	19.9	25.4	23.3	28.0	34.6	52.3	27.9

(a) Annual averages based on monthly data.

Source: ABS data available on request, Labour Force Survey.

### Employment by industry and occupation

The distribution of employed persons across industries and occupations, and the changes over time, provide an important insight into the structure of the labour market. Graph 6.15 provides information on the proportion of employed persons, by industry, for the years 1986-87 and 2001-02.

Since 1986-87, the industry composition of the labour market has changed considerably. Historically, the Manufacturing industry has been the dominant employing industry, but its contribution to the number of employed persons has been declining. As recently as 1990-91, the Manufacturing industry was the largest employer; however, it is now second to Retail trade, which has 15% of employed persons. Manufacturing has fallen from 16% of all employed persons in 1986-87, and 15% in 1990-91, to 12% in 2001-02. Employment in other traditional

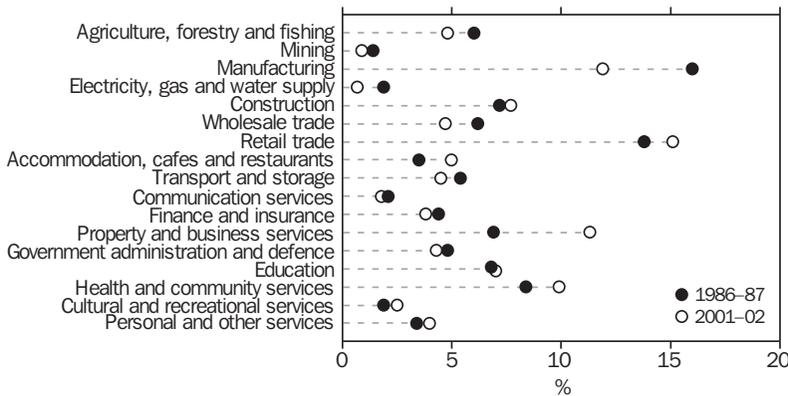
commodity-based industries, such as Agriculture, forestry and fishing, and Mining, has also declined over this period.

Over the same period, service-based industries have increased their share of employed persons. Property and business services has increased markedly, from 7% to 11% of employed persons, to now rate as the third biggest employing industry, while Health has risen from 8% to 10%, and Accommodation, cafes and restaurants from 3% to 5%.

Table 6.16 shows the number of employed persons in each occupation by age. In 2001–02, the most common occupation was Professionals (18.5%), followed by Intermediate clerical, sales and service workers (17.1%). Advanced clerical and service workers was the least prevalent occupation (4.3%).

There is a correlation between age and occupation, with a higher proportion of employed persons in the younger age groups employed in the lower skilled occupations, and older age groups employed in the more highly skilled occupations.

6.15 EMPLOYED PERSONS, By industry(a)



(a) Classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC).

Source: Labour Force, Australia (6203.0).

6.16 EMPLOYED PERSONS, By occupation(a): Annual average(b) — 2001–02

	Units	Age group (years)								All age groups
		15–19	20–24	25–34	35–44	45–54	55–59	60–64	65 and over	
Managers and administrators	%	0.4	1.7	5.9	8.9	10.2	12.2	15.5	28.0	7.8
Professionals	%	1.7	13.7	21.9	20.4	20.7	18.8	17.7	18.7	18.5
Associate professionals	%	2.6	8.0	12.5	13.0	13.8	13.5	13.0	12.2	11.8
Tradespersons and related workers	%	12.6	16.4	14.2	12.5	11.0	10.3	12.1	7.7	12.8
Advanced clerical and service workers	%	1.1	3.3	4.4	4.6	5.0	5.4	4.6	5.3	4.3
Intermediate clerical, sales and service workers	%	16.5	23.8	17.5	16.6	16.2	14.8	11.7	8.7	17.1
Intermediate production and transport workers	%	7.0	7.2	8.4	9.7	8.8	9.4	9.6	6.3	8.6
Elementary clerical, sales and service workers	%	39.9	15.9	7.1	6.1	5.9	6.1	6.7	5.8	9.8
Labourers and related workers	%	18.3	10.0	8.1	8.2	8.3	9.4	9.0	7.3	9.2
All occupations	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	'000	664.1	1 011.7	2 192.6	2 277.6	2 017.0	609.7	282.5	152.2	9 207.3

(a) Classified according to the Australian Standard Classification of Occupations (ASCO). (b) Annual average of quarterly data.

Source: Labour Force, Australia, June 2002 (6203.0).

This is particularly evident in the lower age groups. Of all employed persons aged 15–19, 39.9% were employed as Elementary clerical, sales and service workers, and a further 18.3% as Labourers and related workers. However, in the 20–24 year age group, the proportions in these occupations were lower (15.9% and 10.0% respectively), with 23.8% employed as Intermediate clerical, sales and related workers and 13.7% employed as Professionals (compared to 16.5% and 1.7% in the 15–19 year age group respectively).

In contrast, less than 1% of 15–19 year olds and 2% of 20–24 year olds were Managers and administrators, while at the other end of the age spectrum, in the age group 65 years and over, the highest proportion were Managers and administrators (28.0%).

There are large gender differences in occupations, with females dominating clerical occupations, for example, Advanced clerical and service workers, Intermediate clerical, sales and service workers, and Elementary clerical, sales and service workers; and males dominating the trades, for example, Tradespersons and related workers and Intermediate production and transport workers (graph 6.17). For example, a higher proportion of males were employed as Tradespersons and related workers (21% compared to 3% for females), while a higher

proportion of females were employed as Intermediate clerical, sales and service workers (28% compared to 8% for males).

### Persons unemployed

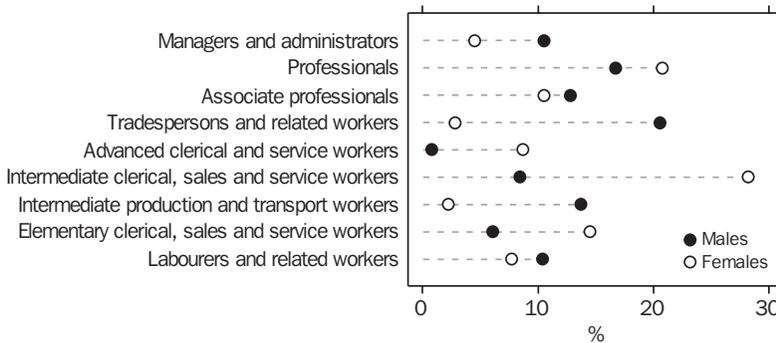
In the Labour Force Survey, people are considered to be unemployed if they satisfy three criteria: they are not employed; they are available for work; and they are taking active steps to find work.

Two important measures of unemployment are the number of persons unemployed and the unemployment rate. The unemployment rate is defined as the number of unemployed persons expressed as a percentage of the labour force.

The unemployment rate has fluctuated over the past 20 years, with two significant periods of high unemployment reflecting the recessions of the early 1980s and early 1990s (graph 6.18). The unemployment rate peaked at 10.7% in December 1992, and has generally fallen over the rest of the 1990s, standing at 6.3% in June 2002.

Historically, the unemployment rate for males has been lower than for females. However, just prior to the recession of the early 1990s, when unemployment increased dramatically, the male unemployment rate increased to a level above the female unemployment rate, and has remained higher ever since.

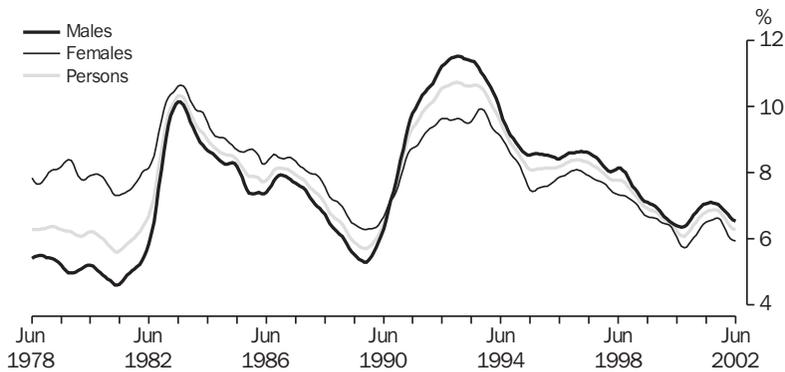
6.17 EMPLOYED PERSONS, By occupation(a) — 2001–02



(a) Classified according to the Australian Standard Classification of Occupations (ASCO).

Source: *Labour Force, Australia, June 2002* (6203.0).

## 6.18 UNEMPLOYMENT RATE: Trend estimates



Source: ABS data available on request, Labour Force Survey.

Unemployment rates vary across states (table 6.19). For 2001–02, the average unemployment rate was 6.6%, with the Australian Capital Territory (4.6%), New South Wales (6.1%), Victoria (6.3%) and Western Australia (6.5%) all below the national average. Tasmania (8.8%) and Queensland (7.9%) both recorded unemployment rates well above the national average.

There are also differences in the rates of unemployment between the capital cities and regional areas. In 2001–02, the unemployment

rate for all capital cities was 6.3%, compared to 7.3% for all regional areas. New South Wales had the largest difference, with Sydney recording an unemployment rate of 5.2%, while for the rest of New South Wales the rate was 8.0%. In contrast, South Australia, Western Australia and Tasmania all recorded lower unemployment rates in regional areas than in their capitals.

The number of unemployed persons increased from 647,700 in 2000–01 to 656,800 in 2001–02 (table 6.20). This represents the first annual increase since the peak of 914,100 in 1992–93.

## 6.19 UNEMPLOYMENT RATE: Annual average — 2001–02

	NSW	Vic.	Qld	SA	WA	Tas.	NT(a)	ACT(a)	Aust.
	%	%	%	%	%	%	%	%	%
Capital city	5.2	6.2	7.9	7.1	6.5	8.8	..	..	6.3
Balance of state	8.0	6.4	7.9	6.7	6.3	8.7	6.8	4.6	7.3
<b>All regions</b>	<b>6.1</b>	<b>6.3</b>	<b>7.9</b>	<b>7.0</b>	<b>6.5</b>	<b>8.8</b>	<b>6.8</b>	<b>4.6</b>	<b>6.6</b>

(a) All included in balance of state.

Source: ABS data available on request, Labour Force Survey.

## 6.20 UNEMPLOYED PERSONS(a), Duration of unemployment: Annual average

Weeks	Units	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02
Under 8	%	29.3	27.9	29.8	34.0	35.8	35.0
8 to under 26	%	24.8	23.9	23.3	23.6	25.7	28.3
26 to under 52	%	16.7	16.6	14.9	13.8	13.9	14.3
52 to under 104	%	13.2	14.5	13.4	10.8	9.7	9.0
104 and over	%	16.0	17.2	18.5	17.9	14.9	13.4
Total	%	100.0	100.0	100.0	100.0	100.0	100.0
Number	'000	792.4	764.2	718.2	661.4	647.7	656.8

(a) Data have not been revised to reflect definitional changes in the Labour Force Survey questionnaire introduced in April 2001. Data collected from April 2001 onwards are not strictly comparable with data collected in earlier periods. For further information, see 'Information Paper: Implementing the Redesign Labour Force Survey Questionnaire' (6295.0).

Source: ABS data available on request, Labour Force Survey.

In 2001–02, 63.3% of unemployed persons had been unemployed for less than 26 weeks, while 22.4% had been unemployed for 52 weeks or more (long-term unemployed). In contrast, in 1997–98, 51.8% of unemployed persons had been unemployed for less than 26 weeks, while 31.7% were long-term unemployed.

Educational qualifications have a significant bearing on labour market prospects. Table 6.21 shows that, as the level of educational attainment decreases, the unemployment rate increases, from 2.8% for those with a bachelor degree or higher to 11.0% for those who had completed

Year 10 or below. It also shows the relationship between the level of highest educational attainment and duration of unemployment. Of unemployed persons with a bachelor degree or above, 13% were long-term unemployed, compared to 30% of those who had completed Year 10 or below.

Unemployed persons can encounter a variety of difficulties in finding work, as shown in table 6.22. The most commonly reported difficulties were 'Considered too young or too old by employers' (11.7%), 'Insufficient work experience' (11.6%) and 'Too many applicants for available jobs' (11.5%).

### 6.21 UNEMPLOYED PERSONS, Educational attainment(a) and duration of unemployment — July 2001

Duration of current period of unemployment (weeks)	Units	Level of highest educational attainment						All unemployed persons
		Bachelor degree or above	Advanced diploma or diploma	Certificate	Year 12(b)	Year 11(b)	Year 10 or below(b)	
1 to under 8	%	41.3	38.3	31.3	33.2	30.8	30.3	32.2
8 to under 26	%	27.7	22.1	37.3	31.0	30.8	25.5	28.7
26 to under 52	%	18.3	20.4	9.6	20.3	15.8	14.1	15.6
52 to under 104	%	3.8	5.1	10.0	7.4	10.7	10.1	8.9
104 and over	%	8.8	13.6	11.8	8.1	11.9	20.0	14.6
Total(c)	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number(c)	'000	52.0	23.5	71.9	123.7	83.4	254.1	613.0
Unemployment rate(d)	%	2.8	4.3	5.1	7.4	9.4	11.0	6.9

(a) The levels of education are not necessarily listed in order from highest to lowest. See paragraphs 15–17 of the Explanatory Notes in 'Education and Work, Australia' (6227.0) for further details on how highest educational attainment is determined.

(b) Includes persons who are currently undertaking school study. (c) Includes no educational attainment and level not determined.

(d) From 'Education and Work, Australia' (6227.0).

Source: *Education and Work, Australia, May 2001* (6227.0); *Job Search Experience, Australia, July 2001* (6222.0).

### 6.22 UNEMPLOYED PERSONS, Main difficulty in finding work — July 2001

	Units	Males	Females	Persons
Too many applicants for available jobs	%	11.9	10.9	11.5
Lacked necessary skills or education	%	11.1	9.4	10.4
Considered too young or too old by employers	%	12.2	11.0	11.7
Insufficient work experience	%	9.6	14.5	11.6
No vacancies at all	%	12.4	8.1	10.7
No vacancies in line of work	%	12.1	7.9	10.3
Too far to travel, transport problems	%	7.4	5.8	6.8
Own ill health or disability	%	6.7	4.3	5.7
Language difficulties	%	2.6	*2.1	2.4
Unsuitable hours	%	2.5	8.5	5.0
Difficulties with childcare, other family responsibilities	%	*0.3	4.4	2.0
Other difficulties(a)	%	3.7	3.1	3.4
No difficulties reported	%	7.7	9.8	8.5
Total	%	100.0	100.0	100.0
Number	'000	363.2	249.8	613.0

(a) Includes persons who reported difficulties because of ethnic background.

Source: *Job Search Experience, Australia, July 2001* (6222.0).

The proportions of males and females who reported most of the more common difficulties are largely similar. However, females were more likely to report insufficient work experience as their main difficulty (14.5% compared to 9.6% for males), as well as difficulties that relate to concerns outside of the workplace, such as 'Unsuitable hours' (8.5% to 2.5%) and 'Difficulties with childcare, other family responsibilities' (4.4% to 0.3%). Males were more likely to report their main difficulty as being related to the availability of work, for example, 'No vacancies at all' (12.4% compared to 8.1% for females) and 'No vacancies in line of work' (12.1% compared to 7.9% for females).

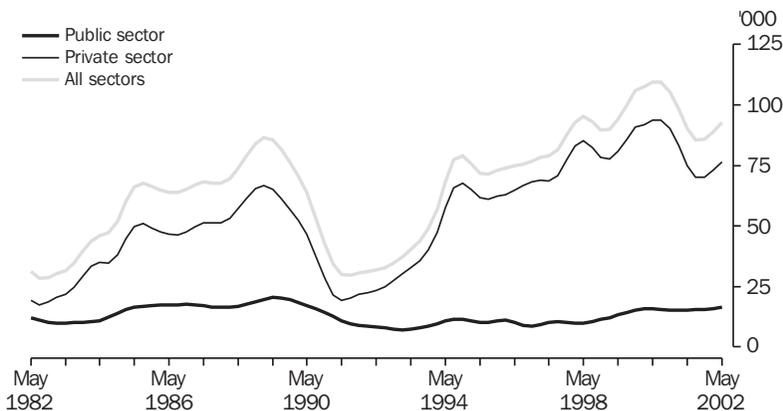
## Job vacancies

Job vacancy statistics can be used to assess changes in the demand for labour. The ABS conducts a quarterly Job Vacancies Survey. In this survey, a job vacancy is defined as a job available for immediate filling on the survey reference day and for which recruitment action has been taken by the employer. Recruitment action includes efforts to fill the vacancy by advertising, posting factory notices, notifying public or private employment agencies or trade unions, and contacting, interviewing or selecting applicants already registered with the business.

Graph 6.23 provides trend estimates of job vacancies, including the private and public sectors, for the period May 1982 to May 2002. It shows that, after peaking at 86,400 in February 1989, the estimated number of job vacancies in Australia fell rapidly to a low of 29,700 in August 1991. Vacancies subsequently rose to a new peak of 109,300 in May and August 2000. Public sector job vacancies have increased recently, standing at 16,300 in May 2002, after declining to below 10,000 through much of the 1990s. In contrast, the number of job vacancies in the private sector has been far more volatile. After reaching a low of 19,100 in May 1991, private sector job vacancies climbed to 93,800 in August 2000, the highest level recorded to that point.

Table 6.24 shows that the number of job vacancies (original estimates) increased from 83,400 in May 2001 to 88,800 in May 2002. The overall increase in job vacancies of 5,400 was spread unevenly across the industries, with eight industries recording a decrease, six recording an increase, and two remaining unchanged. The largest increases occurred in Construction (by 4,400), Retail trade (by 3,500) and Manufacturing (by 1,600). The largest decreases were recorded in Wholesale trade (by 2,200), Finance and insurance (by 1,200) and Cultural and recreational services (by 1,100).

6.23 JOB VACANCIES: Trend estimates



Source: *Job Vacancies, Australia* (6354.0).

## 6.24 JOB VACANCIES, By industry(a) — May

	1997	1998	1999	2000	2001	2002
	'000	'000	'000	'000	'000	'000
Mining	1.5	1.1	1.1	0.8	1.2	1.1
Manufacturing	7.5	8.3	12.2	12.2	8.4	10.0
Electricity, gas and water supply	0.3	0.2	0.3	0.4	0.3	0.3
Construction	5.9	7.8	4.6	4.4	3.4	7.8
Wholesale trade	6.4	7.6	6.6	5.2	5.9	3.7
Retail trade	9.0	15.5	9.0	8.3	7.9	11.4
Accommodation, cafes and restaurants	6.0	4.5	8.9	8.5	6.1	6.5
Transport and storage	0.7	1.7	2.7	2.9	1.5	2.4
Communication services	0.3	0.3	1.2	1.5	0.6	0.4
Finance and insurance	5.0	3.1	3.1	5.2	4.9	3.7
Property and business services	13.1	22.5	17.2	20.0	15.3	15.8
Government administration and defence	3.3	3.8	4.7	4.9	5.9	5.7
Education	2.8	3.7	3.1	6.7	3.6	2.8
Health and community services	7.9	7.7	7.7	9.7	11.0	11.0
Cultural and recreational services	1.9	1.2	3.1	2.9	2.9	1.8
Personal and other services	1.2	3.5	3.4	8.4	4.5	4.2
<b>All industries</b>	<b>72.7</b>	<b>92.5</b>	<b>88.9</b>	<b>102.1</b>	<b>83.4</b>	<b>88.8</b>

(a) Classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC).

Source: *Job Vacancies, Australia* (6354.0).

The job vacancy rate is the number of job vacancies expressed as a percentage of the number of employees plus the number of vacancies. The job vacancy rate for Australia was 1.16% in May 2002, compared to 1.10% in May 2001 and 1.36% in May 2000 (table 6.25). The job vacancy rate varied considerably across the states and territories in May 2002, with the Australian Capital Territory recording the highest job vacancy rate (1.97%) and Queensland the lowest (0.74%). Western Australia recorded the largest increase between May 2001 and May 2002 (0.89% to 1.24%), while Queensland recorded the largest decrease (1.03% to 0.74%).

## Characteristics of employment

Australia's workforce continues to change. There is an increasing diversity of employment arrangements, more flexible working time patterns, and an increase in the extent of part-time hours within Australia. This section looks at working arrangements, specifically employment types, overtime and locations of work, and hours worked.

## 6.25 JOB VACANCY RATE — May

	1997	1998	1999	2000	2001	2002
	%	%	%	%	%	%
New South Wales	1.04	1.06	1.38	1.67	1.16	1.22
Victoria	0.77	1.20	1.05	1.28	1.11	1.28
Queensland	1.20	1.46	0.87	1.22	1.03	0.74
South Australia	0.68	0.58	0.82	0.95	0.99	1.28
Western Australia	1.44	1.89	1.15	1.08	0.89	1.24
Tasmania	1.14	0.45	1.37	0.77	0.89	0.84
Northern Territory	1.52	2.35	1.52	1.51	1.79	1.60
Australian Capital Territory	0.79	1.13	1.64	2.02	1.64	1.97
<b>Australia</b>	<b>1.01</b>	<b>1.22</b>	<b>1.15</b>	<b>1.36</b>	<b>1.10</b>	<b>1.16</b>

Source: *Job Vacancies, Australia* (6354.0).

## Working arrangements

Working arrangements include employment arrangements, flexibility of hours worked, and the location where work is performed. Measures of working arrangements supplement measures of hours of work, full-time and part-time status, and other classifications of jobholders, and are useful in understanding changing workplace employment conditions.

This section discusses three aspects of working arrangements: employment type, overtime and location of work.

## Employment types

In the Forms of Employment Survey of November 2001, the ABS collected information on the structure and incidence of different employment arrangements, as well as data on aspects of job tenure, job security and control over working arrangements. Employed persons, excluding contributing family workers and persons working for payment in kind only, were classified to one of five employment types on the basis of their main job, that is, the job in which they usually worked the most hours. The employment types are: employees with paid leave entitlements; self-identified casuals; employees without paid leave entitlements (who did not identify as casual); owner managers of incorporated enterprises; and owner managers of unincorporated enterprises.

There were 9,058,500 employed persons surveyed in November 2001. The predominant employment type was employees with paid leave entitlements (58.1%). Other large groups were self-identified casuals (20.0%) and owner managers of unincorporated enterprises (12.5%).

Table 6.26 shows that the predominant employment type changes as employees age. Young persons aged 15–19 years were most likely to identify themselves as being casually employed (66.3%), while 16% of employed persons in all other age groups were self-identified casuals. People aged 20–64 were most likely to be employees with paid leave entitlements — over 60% of all employed persons in these age groups fitted into that category. The incidence of employment type being owner manager increased with age — 30% of all persons aged 45 and over were owner managers compared to 14% of persons aged under 45. Those aged 65–69 were more likely to be owner managers (56%).

Graph 6.27 shows that although the proportion of employed persons who were employees with paid leave entitlements was similar for males (59%) and females (57%), more females identified themselves as casual employees (27%) than males (15%). In contrast, the proportion of males working in their own business was higher than for females (24% compared to 13%).

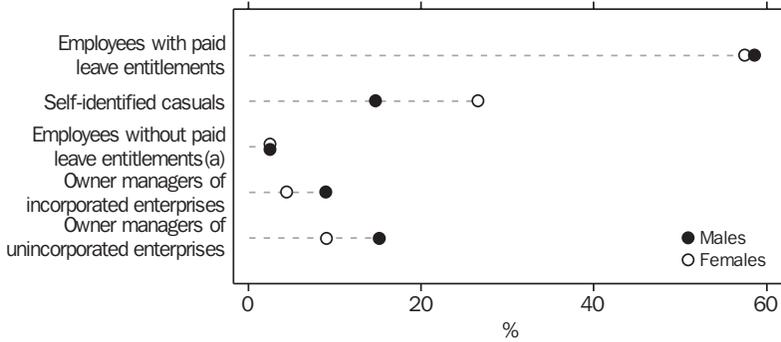
**6.26 EMPLOYMENT TYPE, Employed persons(a) — November 2001**

	Units	Age group (years)							All age groups
		15–19	20–24	25–34	35–44	45–54	55–64	65–69	
Employees with paid leave entitlements	%	28.3	60.1	67.2	60.6	59.2	50.2	22.7	58.1
Self-identified casuals	%	66.3	32.1	15.8	14.6	12.1	14.0	18.9	20.0
Employees without paid leave entitlements (who did not identify as casual)	%	4.0	3.2	2.7	2.3	1.9	2.2	*3.0	2.5
Owner managers of incorporated enterprises	%	**0.1	0.6	3.8	8.5	11.0	12.5	18.8	6.9
Owner managers of unincorporated enterprises	%	1.2	4.0	10.6	14.1	15.7	21.1	36.7	12.5
Total	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	'000	656.6	1 000.1	2 172.4	2 260.1	2 005.7	871.5	92.1	9 058.5

(a) Excluding persons who were contributing family workers and employees who worked for payment in kind only, in their main job.

Source: *Forms of Employment, Australia, November 2001* (6359.0).

6.27 EMPLOYMENT TYPE — November 2001



(a) Who did not identify as casual.

Source: *Forms of Employment, Australia, November 2001* (6359.0).

Overtime

Overtime refers to the work undertaken that is outside, or in addition to, ordinary working hours in an employee's main job, whether paid or unpaid.

As seen in table 6.28, almost one-third of all employees (33.0%) worked overtime on a regular basis. Males (39.3%) worked overtime on a regular basis more often than females (25.4%). Females (73.3%) were more likely to have not worked any overtime than males (58.9%).

6.28 WHETHER OVERTIME IS WORKED ON A REGULAR BASIS(a), In main job — November 2000

	Units	Males	Females	Persons
Worked on a regular basis	%	39.3	25.4	33.0
Not worked on a regular basis	%	1.8	1.3	1.6
Overtime not worked	%	58.9	73.3	65.5
Total	%	100.0	100.0	100.0
Number	'000	4 198.1	3 517.5	7 715.6

(a) Refers to employees aged 15 and over.

Source: *Working Arrangements, Australia, November 2000* (6342.0).

Table 6.29 shows that full-time employees were much more likely to work overtime on a regular basis than part-time employees (40.8% compared to 12.1%). While males working full-time are more likely to work overtime on a regular basis than females, males and females working part-time show the same incidence of working overtime on a regular basis (12.1%).

6.29 WORKING OVERTIME ON A REGULAR BASIS(a), In main job — November 2000

	Males	Females	Persons
	%	%	%
Full-time employees	43.5	35.9	40.8
Part-time employees	12.1	12.1	12.1
All employees	39.3	25.4	33.0

(a) Refers to employees aged 15 and over.

Source: *Working Arrangements, Australia, November 2000* (6342.0).

Table 6.30 shows that between 1995 and 1997, of those employees who usually work overtime in their main job, the proportion receiving overtime pay decreased from 40.7% to 37.7%, but then increased to 38.4% in 2000. Unpaid overtime remained constant from 1995 to 1997 (around 35%) and then decreased to 33.5% in 2000.

6.30 WHETHER OVERTIME IS PAID, Employees who usually work overtime in main job(a)

	Units	August 1995	August 1997	November 2000
Paid overtime	%	40.7	37.7	38.4
Included in salary package	%	19.7	22.7	21.2
Time off in lieu	%	4.0	3.8	5.2
Unpaid overtime	%	34.8	34.9	33.5
Other arrangements	%	0.8	0.9	1.7
Total	%	100.0	100.0	100.0
Number	'000	2 386.2	2 281.4	2 543.8

(a) Refers to employees aged 15 and over.

Source: *Working Arrangements, Australia* (6342.0).

## Locations of work

Locations of work refers to the different types of places where people work. These include traditional workplaces, such as offices, factories and other business premises; homes, including both own homes and other homes; travelling workers who have no fixed location; and other locations including parks, beaches, streets and forests.

Persons employed at home are defined as employed persons who worked all or most hours at home and employees who had an arrangement with their employer to work some hours at home, in their main or second job.

In June 2000, there were 8,589,400 employed persons at work during the reference period, of whom 83.9% worked mainly at business premises (table 6.31). Females were more likely than males to work mainly at their own home (8.4% compared to 6.1%) and at business premises (87.4% compared to 81.2%). Males were more likely to travel as their main location of work (6.9% compared to 1.4%).

Table 6.32 shows the main location of work in main job by employment status. Of employees, 89.3% worked mainly at business premises and just 3.4% worked at their own home. In contrast, 40.5% of own account workers worked mainly at business premises and 35.5% worked at their own home. Contributing family workers had the highest proportion working at their own home (50.1%). Own account workers had the highest proportion of travelling workers (9.1%).

### 6.31 MAIN LOCATION OF WORK IN MAIN JOB(a), Employed persons at work in reference week — June 2000

	Units	Males	Females	Persons
Own home(b)	%	6.1	8.4	7.1
Employer's or client's home	%	4.3	2.1	3.3
Business premises	%	81.2	87.4	83.9
Travelling	%	6.9	1.4	4.5
Other	%	1.5	0.7	1.2
Total	%	100.0	100.0	100.0
Number	'000	4 380.8	3 758.6	8 589.4

(a) The main location of work is the place where the most hours were worked during the survey reference week, in their main job. (b) Includes another home.

Source: *Locations of Work, Australia, June 2000 (6275.0)*.

## Hours worked

Hours of work are defined as the number of hours that employed persons have actually worked in all jobs during the reference week, not necessarily the hours paid for. Hours data have a wide range of uses, for example, to calculate productivity, and to monitor working conditions, quality of life and living standards of employed persons. Information on hours of work allows the ABS to classify employed persons as full-time or part-time, and also to identify underemployed persons (in conjunction with measures of those 'wanting to work').

### 6.32 MAIN LOCATION OF WORK IN MAIN JOB, Employed persons at work in reference week — June 2000

	Units	Employee	Employer	Own account worker	Contributing family worker
Own home(a)	%	3.4	21.6	35.5	50.1
Employer's or client's home	%	2.2	9.0	12.7	*2.9
Business premises	%	89.3	63.4	40.5	41.5
Travelling	%	4.1	4.1	9.1	*1.5
Other	%	1.0	1.8	2.2	*3.8
Total	%	100.0	100.0	100.0	100.0
Number	'000	7 496.0	292.7	732.8	67.9

(a) Includes another home.

Source: *Locations of Work, Australia, June 2000 (6275.0)*.

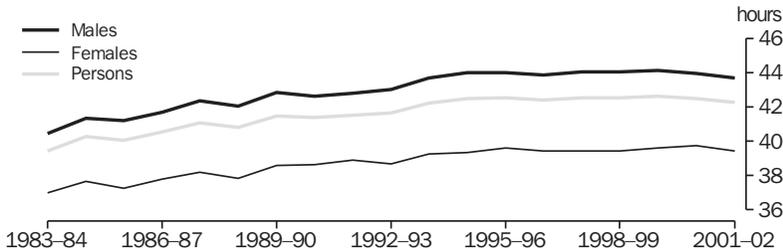
Average weekly hours worked is defined as aggregate hours worked by a group of employed persons during the reference week divided by the number of employed persons in that group. Graph 6.33 shows that the average weekly hours worked by full-time employed persons rose from 39.5 in 1983–84 to 42.5 in 1994–95, an increase of 8%. However, from 1995–96 to 2000–01 the average weekly hours worked by full-time employed persons remained almost unchanged (42.5 to 42.6). In 2001–02 there was a slight fall in the average to 42.3 hours per week for full-time employed persons.

As shown in graph 6.34, the average weekly hours worked in full-time employment differed across occupations, although in almost all occupations,

males worked between three and five hours longer than females. The greatest difference was in the occupation Managers and administrators where on average males worked 5.3 hours per week longer than females. The smallest difference was in Tradespersons and related workers where on average males worked 1.7 hours per week longer than females.

Persons employed as Managers and administrators recorded the highest average weekly hours for full-time employment for both males (51 hours per week) and females (46), followed by Associate professionals (47 and 43). The occupation with the lowest average weekly hours worked was Labourers and related workers (40 hours per week for males and 37 for females).

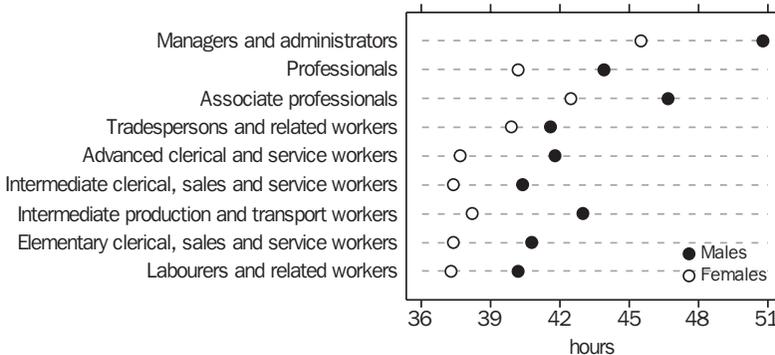
**6.33 AVERAGE WEEKLY HOURS WORKED(a), Full-time employed persons: Annual average**



(a) Data have not been revised to reflect definitional changes in the Labour Force Survey questionnaire introduced in April 2001. Data collected from April 2001 onwards are not strictly comparable with data collected in earlier periods. For further information, see 'Information Paper: Implementing the Redesigned Labour Force Survey Questionnaire' (6295.0).

Source: ABS data available on request, Labour Force Survey.

**6.34 AVERAGE WEEKLY HOURS FOR FULL-TIME EMPLOYED PERSONS, By occupation(a): Annual average — 2001–02**



(a) Classified according to the Australian Standard Classification of Occupations (ASCO).

Source: Labour Force, Australia, June 2002 (6203.0).

Table 6.35 shows that the average weekly hours worked for males (39.8) was almost 11 hours greater than for females (29.0). This was due partly to males working longer average weekly hours in full-time employment (43.7) than females (39.5), and also because females were more likely than males to work part-time.

**6.35 EMPLOYED PERSONS, Average weekly hours worked(a): Annual average(b) — 2001–02**

	Males hours	Females hours	Persons hours
Full-time workers	43.7	39.5	42.3
Part-time workers	16.2	16.4	16.3
Full-time and part-time workers	39.8	29.0	35.0

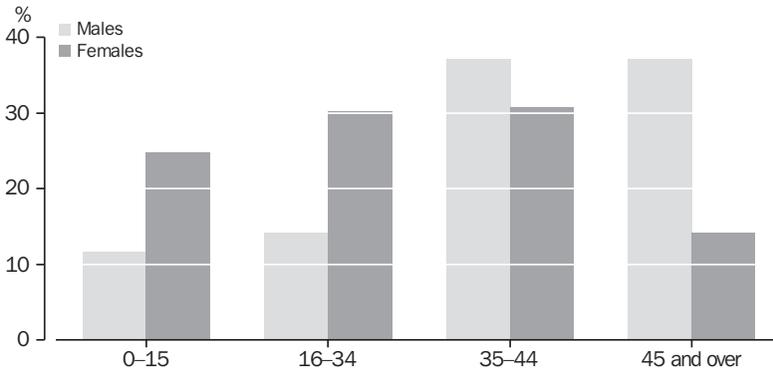
(a) The estimates refer to actual hours worked, not hours paid for. (b) Annual averages based on quarterly data.

Source: *Labour Force, Australia, June 2002* (6203.0).

Graph 6.36 shows that in May 2002, 37% of employed males worked between 35 and 44 hours per week, and a further 37% worked more than 45 hours per week. In contrast, 14% of employed females worked more than 45 hours per week. Most females worked between 16 and 44 hours per week, with 30% working between 16 and 34 hours, and 31% between 35 and 44 hours.

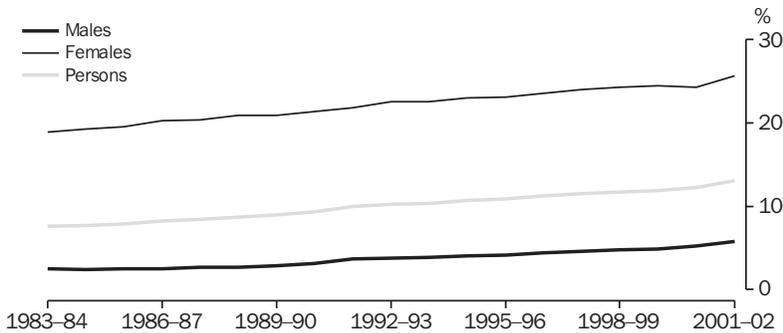
Graph 6.37 shows that, from 1983–84 through to 2001–02, there was a steady increase in the number of hours worked by part-time workers as a percentage of the total number of hours worked. In 1983–84, 8% of all hours worked were in part-time employment; however, in 2001–02 this had risen to 13%. For males, 6% of the total number of hours worked were attributed to part-time employment in 2001–02, whereas for females the proportion was much greater (26%).

**6.36 AVERAGE WEEKLY HOURS WORKED — May 2002**



Source: *Labour Force, Australia, May 2002* (6203.0).

**6.37 PART-TIME HOURS AS A PROPORTION OF TOTAL HOURS WORKED:**  
Annual average



Source: *Labour Force, Australia* (6203.0).

## Work-related injuries

People in the work force may experience injury or illness as the result of an incident in the workplace. Information about the incidence of work-related injury or illness was collected in the Work-related Injuries Survey, conducted in September 2000 as a supplement to the monthly Labour Force Survey. The survey provides a range of information on work-related injury or illness, including details about the incidence (rate) of work-related injury or illness, number of days/shifts absent from work due to the injury or illness and whether the person experiencing the injury or illness received workers' compensation or some other form of financial assistance.

For the purposes of the survey, work-related injuries or illnesses are broadly defined as those injuries or illnesses sustained as a result of work activities, or on a journey to or from work, or by aggravation of pre-existing conditions where employment was a contributory factor.

During the year ending September 2000, 477,800 Australian workers experienced a work-related injury or illness. This represents 5% of persons who worked at some time during this year. As seen in table 6.38, the work-related injury rate for males (59.8 per 1,000) was almost double that of females (36.1 per 1,000).

**6.38 WORK-RELATED INJURIES OR ILLNESSES**  
— Year ending September 2000

	Experienced a work-related injury or illness in the last 12 months	Worked at some time during the year	Work-related injury/illness rate(a)
	'000	'000	per 1,000 persons
Males	323.9	5 418.5	59.8
Females	154.0	4 268.7	36.1
<b>Persons</b>	<b>477.8</b>	<b>9 687.3</b>	<b>49.3</b>

(a) The work-related injury or illness rate is the number of persons who experienced a work-related injury or illness during the previous 12 months per 1,000 persons who had worked at some time during that period.

Source: *Work-Related Injuries, Australia, September 2000* (6324.0).

Of the 477,800 persons who experienced a work-related injury or illness during the year ending September 2000, almost half (45.6%) applied for or received workers' compensation (table 6.39). Males were more likely to apply for or receive workers' compensation than females (47.5% compared to 41.6%). For those who did not apply for workers' compensation, about half reported that the main reason for not applying for workers' compensation was 'minor injury only/not considered necessary'. A further 7.7% reported that they were not covered, or they were not aware of the existence of a workers' compensation benefit.

**6.39 WORKERS' COMPENSATION APPLICATIONS(a) — Year ending September 2000**

	Males	Females	Persons
	%	%	%
Main reason did not apply for workers' compensation			
Not covered or not aware of workers' compensation benefit	9.0	5.1	7.7
Did not think eligible	4.4	5.4	4.7
Minor injury only/not considered necessary	25.4	29.2	26.7
Negative impact on current or future employment	1.7	3.5	2.3
Inconvenient/required too much effort/paperwork	3.6	3.8	3.6
Employer agreement to pay cost	2.3	*2.6	2.4
Other/don't know	6.1	8.9	7.0
<i>Total</i>	52.5	58.4	54.4
Applied for or received workers' compensation	47.5	41.6	45.6
<b>Total</b>	100.0	100.0	100.0

(a) Refers to most recent work-related injury or illness.

Source: *Work-Related Injuries, Australia, September 2000 (6324.0)*.

**6.40 WORKERS' COMPENSATION APPLICATIONS(a), Absences from work — Year ending September 2000**

Days or shifts absent from work	Units	Males	Females	Persons
None	%	16.4	18.1	16.9
Part of a day/shift	%	4.4	*4.3	4.4
One to four days	%	27.3	28.6	27.7
Five to ten days	%	14.7	15.5	14.9
More than ten days	%	37.0	33.6	36.1
<b>Total</b>	%	100.0	100.0	100.0
Number	'000	135.9	53.5	189.4

(a) Refers to most recent work-related injury or illness.

Source: *Work-Related Injuries, Australia, September 2000 (6324.0)*.

**6.41 WORK-RELATED INJURY OR ILLNESS — Year ending September 2000**

Industry	Persons who experienced a work-related injury	Employed persons(a)	Proportion who experienced a work-related injury(b)
	'000	'000	%
Agriculture, forestry and fishing	29.0	444.0	6.5
Mining	7.0	79.2	8.8
Manufacturing	91.8	1 444.4	6.4
Electricity, gas and water	*3.8	65.0	5.8
Construction	49.1	713.4	6.9
Wholesale trade	18.4	454.3	4.1
Retail trade	54.1	1 306.2	4.1
Accommodation, cafes and restaurants	26.6	459.0	5.8
Transport and storage	32.7	418.6	7.8
Communication services	9.7	175.0	5.5
Finance and insurance	7.4	329.6	2.2
Property and business services	25.3	1 070.3	2.4
Government administration and defence	14.4	349.1	4.1
Education	25.2	634.4	4.0
Health and community services	52.9	852.0	6.2
Cultural and recreational services	12.1	221.0	5.5
Personal and other services	18.4	332.8	5.5
<b>Total</b>	<b>477.8</b>	<b>9 348.3</b>	<b>5.3</b>

(a) From the Labour Force Survey conducted in August 2000. (b) Data on work-related injuries and employed persons not strictly comparable due to differences in timing.

Source: *Labour Force, Australia (6203.0)*; *Work-Related Injuries, Australia, September 2000 (6324.0)*.

Table 6.40 indicates the number of days or shifts absent from work for persons who applied for and received workers' compensation. Of the 189,400 persons who applied for and received workers' compensation, more than one-third (36.1%) had more than 10 days off work, while 27.7% were absent from work for between one and four days. In contrast, 16.9% of persons who applied for and received workers' compensation reported that they were not absent from work as a result of the injury or illness.

Table 6.41 shows that the incidence of work-related injury or illness varied according to industry of employment. Mining recorded the highest incidence of work-related injury or illness, with 8.8% of employed persons experiencing a work-related injury or illness, followed by Transport and storage (7.8%) and Construction (6.9%). Agriculture, forestry and fishing and Manufacturing also recorded high incidences of work-related injury or illness. In contrast, Finance and insurance (2.2%) and Property and business services (2.4%) both recorded a low incidence of work-related injury or illness.

## Earnings and benefits

The ABS concept of earnings is based on the definition adopted by the twelfth International Conference of Labour Statisticians in 1973. Earnings are considered to be remuneration to employees, for time worked or work done, as well as remuneration for time not worked (e.g. paid annual leave). Many employees also receive other benefits in addition to earnings, including sick leave, long-service leave and superannuation.

Statistics on earnings are of interest to evaluate the standard of living of workers, and to make policy decisions regarding income redistribution, social welfare, taxation and wage fixation. Comprehensive earnings statistics are required by all levels of government, social and labour market analysts, industrial tribunals, trade unions, employer associations, academics and international agencies. Information about the benefits received by workers provides a broader picture of working conditions, and of rewards provided for work done.

The ABS produces a range of statistics on earnings paid to workers. The Survey of Average Weekly Earnings (AWE) and the Survey of Employee Earnings and Hours (EEH) both provide a statistical measure of the gross remuneration paid to employees. The Survey of Employee Earnings, Benefits and Trade Union Membership, which is run as a Labour Force Supplementary Survey, provides information about the earnings of employees, as well the number and type of employee benefits received by workers. It does not, however, quantify the value of these benefits.

The wage cost index (WCI) measures the changes to wages and salaries of a representative mix of employee jobs. Unlike the AWE and EEH surveys,

the WCI is unaffected by changes in the quantity or quality of work performed. The ABS is currently developing a labour price index, which will also reflect changes in the price of 'non-wage' components (e.g. superannuation and workers' compensation) which contribute to the cost to employers of employing labour. It is expected that the labour price index will be published from late 2004.

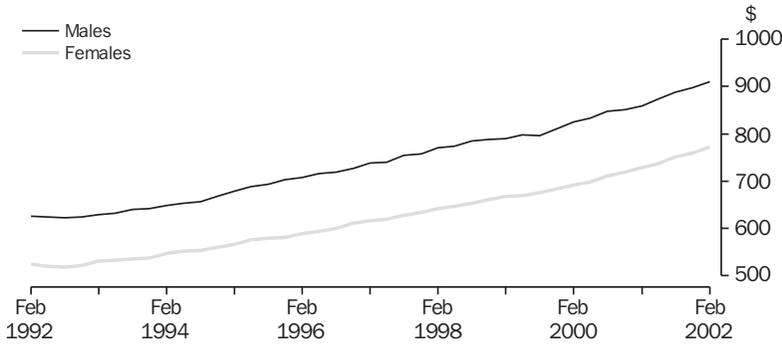
## Level of earnings

Data on the level of earnings reflect the variations within different population groups, and across industries and occupations, providing a more detailed picture of their comparative experiences. Differences in earnings are also of interest in reflecting the strength of labour demand and supply.

The AWE provides an estimate of the gross weekly earnings paid to employees by measuring earnings during a one-week reference period in the middle month of a quarter (excluding irregular earnings not related to the reference period).

The AWE collects three types of earnings data. Average weekly ordinary-time earnings for full-time adult employee jobs (commonly referred to as AWOTE) relate to that part of total earnings attributable to award, standard or agreed hours of work. A second measure of full-time adult total earnings includes both ordinary-time and overtime pay. A third measure includes all earnings (both full-time and part-time) for all employees (both adult and junior). The focus on adult full-time jobs reduces the variability of the measure, and can be used to provide an indication of how underlying earning levels are changing over time.

6.42 AVERAGE WEEKLY ORDINARY-TIME EARNINGS(a)



(a) For full-time adult employees.

Source: Average Weekly Earnings, Australia (6302.0).

Graph 6.42 shows AWOTE from February 1992 to February 2002. In dollar terms, male earnings increased more than female earnings in the 10 years to February 2002 (male earnings increased by \$285.30 to \$910.50 whereas female earnings increased by \$248.20 to \$772.10). In February 2002, female earnings were at 85% of male earnings. This represents a slight increase from 84% recorded in February 1992.

As shown in table 6.43, the difference between male and female average weekly earnings was least for AWOTE (females earned 85% of the male figure of \$910.50) and greatest for All employees total earnings (females earned 66% of the male figure of \$823.30). The latter difference reflects the inclusion of part-time employees, as a greater proportion of female employees work part-time. In 2001–02, 45% of female employees worked part-time compared to 14% of male employees.

6.43 AVERAGE WEEKLY EARNINGS — February 2002

	Males \$	Females \$	Persons \$
Full-time adult ordinary-time earnings	910.50	772.10	860.50
Full-time adult total earnings	961.80	783.80	897.50
All employees total earnings	823.30	543.10	687.60

Source: Average Weekly Earnings, Australia, February 2002 (6302.0).

Table 6.44 displays the male and female average weekly ordinary-time earnings for full-time adults by state in February 2002. Males recorded higher average weekly earnings than females across all states, although the degree of difference between male and female earnings varied by state. The smallest difference between male and female earnings occurred in South Australia with females earning 89% of the corresponding male figure of \$831.00, and the largest difference was in Western Australia with female earnings 79% of male earnings of \$927.30.

The Mining industry recorded the largest average weekly ordinary-time earnings for full-time adults in February 2002 of \$1,370.50. The industry with the lowest average was Retail trade, with earnings of \$643.50, followed closely by Accommodation, cafes and restaurants (\$669.30).

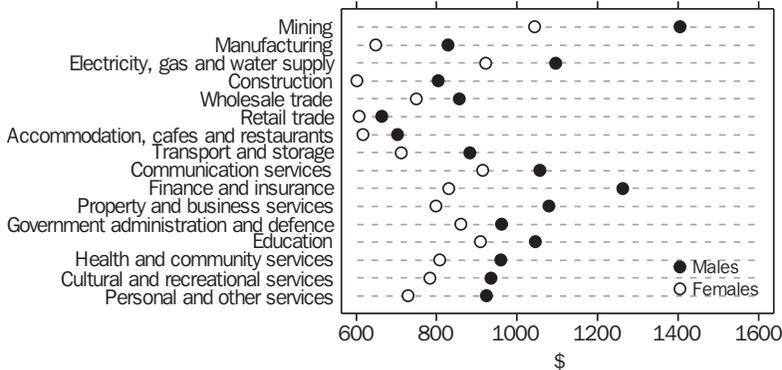
Earnings by industry followed similar trends for both males and females, although males earned more on average in every industry (graph 6.45). Full-time adult females earned approximately two-thirds of male full-time adult ordinary-time earnings in the Finance and insurance industry (66%), rising to approximately 91% in the Retail trade industry.

**6.44 AVERAGE WEEKLY EARNINGS — February 2002**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
Full-time adult ordinary-time earnings	\$	\$	\$	\$	\$	\$	\$	\$	\$
Males	960.10	903.00	847.20	831.00	927.30	830.50	869.90	1 014.90	910.50
Females	802.50	777.90	725.30	741.80	736.70	716.10	757.40	874.00	772.10
<b>Persons</b>	<b>901.60</b>	<b>860.00</b>	<b>802.20</b>	<b>801.50</b>	<b>859.20</b>	<b>788.80</b>	<b>836.60</b>	<b>951.90</b>	<b>860.50</b>

Source: Average Weekly Earnings, Australia, February 2002 (6302.0).

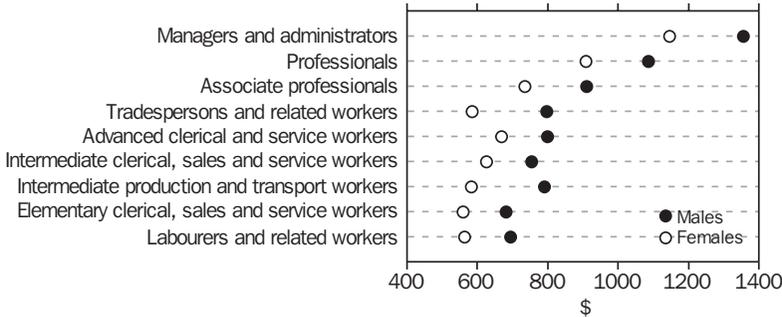
**6.45 AVERAGE WEEKLY ORDINARY-TIME EARNINGS(a),  
By industry(b) — February 2002**



(a) For full-time adult employees. (b) Classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC).

Source: Average Weekly Earnings, Australia, February 2002 (6302.0).

**6.46 AVERAGE WEEKLY TOTAL EARNINGS(a), By occupation(b) — May 2000**



(a) For full-time adult employees. (b) Classified according to the Australian Standard Classification of Occupations (ASCO).

Source: Employee Earnings and Hours, Australia, May 2000 (6306.0).

Data on average weekly earnings are also available from the biennial EEH survey. This survey provides additional classifications of the data, such as category of employee, type of earnings and occupation. Average weekly total earnings for full-time adult employees by occupation are presented in graph 6.46. For both males and females, Elementary clerical, sales and service workers earned the lowest average weekly

earnings of all the occupations (\$682 for males and \$561 for females), whereas the highest earnings were for Managers and administrators (\$1,356 for males and \$1,146 for females).

Men had higher average earnings than women in each occupation. For full-time adult employees, the proportional difference between male and female average weekly total earnings was smallest

for Managers and administrators (average earnings of females were 85% those of males) and greatest for Tradespersons and related workers (73%).

The earnings level of a worker is a function of the employer's demand for labour, the availability of suitably qualified workers in the labour market and the skill level of the individual worker. For many occupations, there is a relationship between average weekly earnings for full-time employees and the unemployment rate.

Graph 6.47 plots average weekly earnings for full-time employees against a scaled unemployment rate. In May 2000, it appeared that a low unemployment rate for an occupation tended to be associated with a higher level of average weekly earnings. Managers and administrators, Professionals and Associate professionals had the highest average weekly earnings and the lowest unemployment rates, while Tradespersons had lower wages and relatively high unemployment. However, this relationship does not always hold, for example, Intermediate production and transport workers had relatively high average weekly earnings (\$761), yet also had the second highest unemployment rate (4.4%).

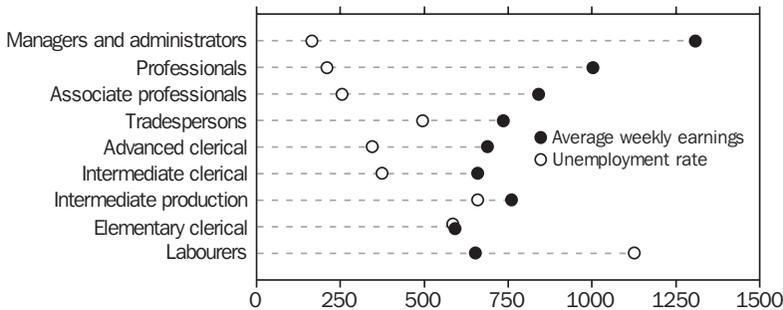
### Changes in the price of labour

Changes in the price of labour are derived from quality adjusted average hourly rates of pay (excluding bonuses) of a representative sample of employee jobs. These data are compiled to form the WCI, which is published by the ABS each quarter. The WCI is a 'pure' price index which measures changes over time in wage and salary costs in the Australian labour market. The WCI is unaffected by changes in the quality and quantity of work performed.

As shown in table 6.48, increases in the indexes for total hourly rates of pay excluding bonuses varied across sectors and across states and territories. In the 12 months to March 2002, public sector wages grew at 3.4% and private sector wages grew at 3.1%. The percentage growth (from the corresponding quarter of the previous year) of public sector wages has been higher than the growth in private sector wages since the March quarter 2000.

For the states, the highest annual percentage increase in wages from the March quarter 2001 to the March quarter 2002 was recorded by Victoria (3.4%) and the lowest was recorded by Western Australia (2.8%). Tasmania recorded the smallest annual growth in the private sector WCI (2.8%), although it recorded the largest growth in the public sector WCI (4.3%).

**6.47 AVERAGE WEEKLY EARNINGS(a) AND UNEMPLOYMENT(b) RATE(c),  
By occupation(d) — May 2000**



(a) For full-time adult employees. (b) Persons unemployed for less than two years are classified to occupation of their last full-time job. Occupation is not obtained for persons unemployed for more than two years. (c) Multiplied by 150. (d) Occupation classified according to Australian Standard Classification of Occupations (ASCO).

Source: *Employee Earnings and Hours, Australia, May 2000 (6306.0); Labour Force, Australia (6203.0).*

## 6.48 TOTAL HOURLY RATES OF PAY EXCLUDING BONUSES, By sector

	Index numbers(a)					Percentage change from corresponding quarter of previous year
	March qtr 2001	June qtr 2001	September qtr 2001	December qtr 2001	March qtr 2002	March qtr 2002
<b>PRIVATE</b>						
New South Wales	112.0	112.7	114.2	114.9	115.6	3.2
Victoria	111.1	112.1	113.6	114.2	114.9	3.4
Queensland	110.7	111.1	112.1	113.1	113.9	2.9
South Australia	110.5	111.0	112.2	113.1	114.1	3.3
Western Australia	111.9	112.8	113.4	114.2	115.1	2.9
Tasmania	109.3	109.8	111.0	111.7	112.4	2.8
Northern Territory	109.5	109.7	111.3	112.1	112.7	2.9
Australian Capital Territory	111.6	112.1	113.6	114.2	115.0	3.0
Australia	111.4	112.1	113.4	114.1	114.9	3.1
<b>PUBLIC</b>						
New South Wales	114.1	114.5	115.6	116.1	117.9	3.3
Victoria	111.7	112.7	113.6	114.1	115.6	3.5
Queensland	112.9	114.2	115.6	115.9	116.5	3.2
South Australia	112.7	113.0	113.8	116.1	116.8	3.6
Western Australia	111.2	111.5	112.5	113.4	114.5	3.0
Tasmania	109.8	111.2	112.5	112.9	114.5	4.3
Northern Territory	111.7	111.7	112.1	115.5	115.8	3.7
Australian Capital Territory	110.0	110.3	112.0	112.7	113.1	2.8
Australia	112.6	113.3	114.4	115.1	116.4	3.4
<b>ALL SECTORS</b>						
New South Wales	112.5	113.1	114.5	115.2	116.1	3.2
Victoria	111.2	112.2	113.6	114.2	115.0	3.4
Queensland	111.2	111.9	113.0	113.9	114.6	3.1
South Australia	111.1	111.6	112.6	113.9	114.8	3.3
Western Australia	111.8	112.5	113.2	114.0	114.9	2.8
Tasmania	109.5	110.3	111.5	112.1	113.1	3.3
Northern Territory	110.3	110.5	111.6	113.3	113.9	3.3
Australian Capital Territory	110.6	111.0	112.6	113.3	113.8	2.9
Australia	111.7	112.4	113.6	114.4	115.2	3.1

(a) Base of each index: September quarter 1997 = 100.0.

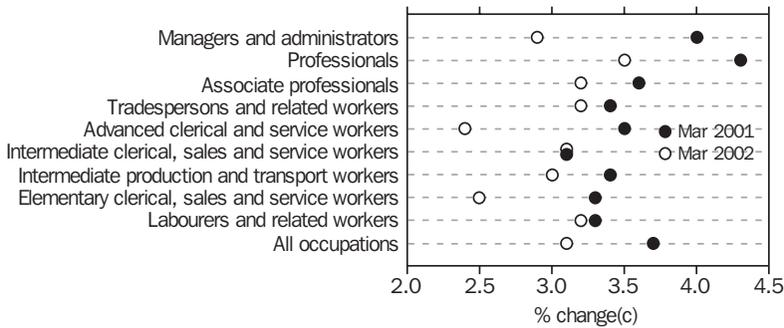
Source: Wage Cost Index, Australia (6345.0).

For Australia, the annual wages growth to March 2001 was greater than the annual growth to March 2002 (3.7% compared to 3.1%). In both periods, annual wages growth for Professionals (4.3% to March 2001 and 3.5% to March 2002) was greater than the growth for other occupations. As shown in graph 6.49, in March 2002 Advanced clerical and service workers (2.4%) and Elementary clerical and service workers (2.5%) recorded the lowest annual growth rates.

Annual growth by industry is shown in graph 6.50. Although the annual growth rate of the WCI was lower to March 2002 than for the previous year for some industries, the rate of growth in wages increased in Mining, Electricity, gas and water supply, Finance and insurance, Health and community services, and Personal and other services.

For the 12 months to March 2002, Electricity, gas and water supply had the highest rate of wages growth (4.6%). Transport and storage had the lowest rate of wages growth, of 2.4% for the 12 months to March 2002.

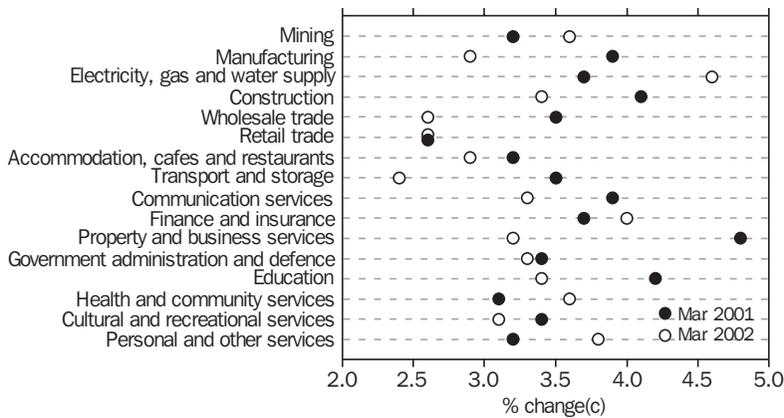
6.49 TOTAL HOURLY RATES OF PAY(a), By occupation(b)



(a) Excluding bonuses. (b) Classified according to the Australian Standard Classification of Occupations (ASCO). (c) Percentage change since corresponding quarter of previous year.

Source: Wage Cost Index, Australia (6345.0).

6.50 TOTAL HOURLY RATES OF PAY(a), By industry(b)



(a) Excluding bonuses. (b) Classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC). (c) Percentage change since corresponding quarter of previous year.

Source: Wage Cost Index, Australia (6345.0).

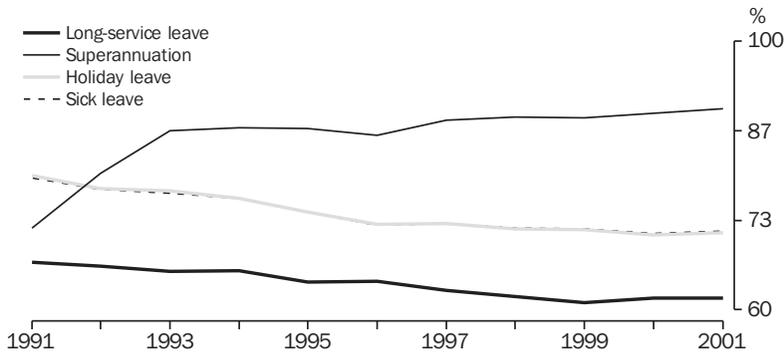
### Non-wage benefits

Among the most common types of non-wage benefits received by employees are superannuation, holiday leave, sick leave and long-service leave. Data on these employment benefits are collected in the Survey of Employee Earnings, Benefits and Trade Union Membership, covering the nature and type (but not the value) of benefits. These data are used to monitor the level of non-wage costs in employment.

In August 2001, 98% of the 5,454,800 full-time employees received one or more of the standard employment benefits in their main job. In comparison, 77% of the 2,317,300 part-time employees received one or more standard employment benefits.

As shown in graph 6.51, superannuation coverage increased from 72% of all employees in 1991 to 90% in 2001 (see the next section for further information). During the same period, there has been a decline in the proportion of employees entitled to paid holiday or sick leave (80% of all employees in 1991 to 73% in 2001).

6.51 EMPLOYEES IN MAIN JOB, By type of benefit received



Source: *Employee Earnings, Benefits and Trade Union Membership, Australia (6310.0); Trade Union Members, Australia (6325.0).*

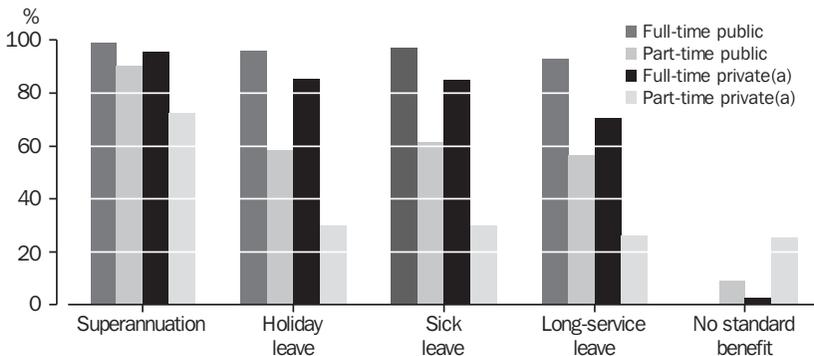
Full-time and part-time public sector employees were more likely to be entitled to benefits than their private sector counterparts (graph 6.52). The differences between public and private sector employees were much smaller for full-time employees than for part-time employees.

Part-time private sector employees were most likely to receive superannuation (73%), followed by sick and holiday leave (both at 30%), and 26% were entitled to long-service leave. One-quarter of this group of employees were not entitled to any benefits. Part-time employees in the public sector were more likely to receive a range of employee benefits, with 90% entitled to superannuation and approximately 60% entitled to each of the other benefits (59%, 61% and 56%).

For all occupations, the proportion receiving sick leave was less than the proportion receiving superannuation benefits. However, there was considerable variation among the occupations. For most occupations, more than 90% of employees receives superannuation benefits in their main job (graph 6.53). The exceptions were Elementary clerical, sales and service workers with 74% and Labourers and related workers with 80%. These two occupations were also less likely to receive sick leave (43% and 53%) than other occupations.

The incidence of entitlement to superannuation and sick leave is linked to the level of skill, with higher skilled occupations having a higher level of coverage for both superannuation and sick leave than lower skilled occupations.

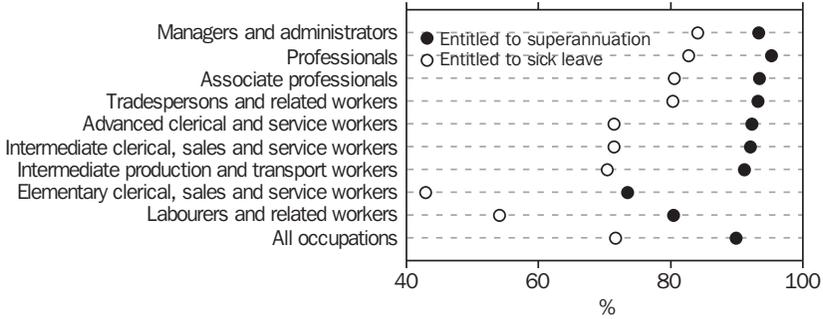
6.52 EMPLOYEES RECEIVING A BENEFIT — August 2001



(a) There were 35,200 persons for whom sector of main job could not be determined. These persons are included in the private sector.

Source: *Employee Earnings, Benefits and Trade Union Membership, Australia, August 2001 (6310.0).*

**6.53 SUPERANNUATION AND LEAVE ENTITLEMENTS, By occupation(a)**  
— August 2001



(a) Classified according to the Australian Standard Classification of Occupations (ASCO).

Source: *Employee Earnings, Benefits and Trade Union Membership, Australia, August 2001* (6310.0).

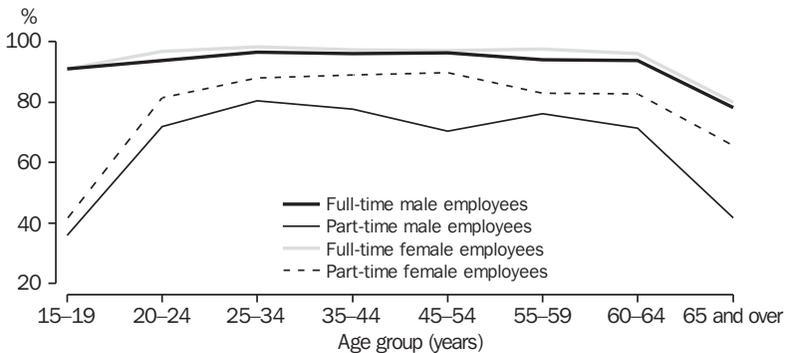
**Superannuation**

Under the Superannuation Guarantee introduced in 1992, employers are obliged to make superannuation contributions on behalf of most employees. As seen in graph 6.51, this has resulted in an increase in superannuation coverage provided by employers. There are some exempt employees: for example, employers are not obliged to contribute to superannuation for employees aged less than 18 years who are working not more than 30 hours a week, or for employees with low earnings. Young part-time employees (aged 15–19) are often exempt employees under the Superannuation Guarantee legislation. This is reflected in estimates of superannuation coverage for August 2001 — 36% of males and 41% of females in this age group received superannuation benefits in their job.

The lower coverage of superannuation for young employees is also the result of more young employees working in industries and occupations with lower wages (see table 6.16).

Graph 6.54 presents the proportion of employees entitled to superannuation in August 2001. Generally, the proportion of male and female full-time employees entitled to superannuation was similar, with females having slightly higher coverage in the 20–24 year and 55–59 year age groups. The proportion of male and female full-time employees entitled to superannuation was higher than that of their part-time counterparts. While 75% of part-time employees receive superannuation benefits, 96% of full-time employees were entitled to superannuation benefits.

**6.54 ENTITLED TO SUPERANNUATION — August 2001**



Source: *Employee Earnings, Benefits and Trade Union Membership, Australia, August 2001* (6310.0).

Male and female full-time employees receive superannuation benefits from their employer at the same rate, but part-time males are less likely to receive superannuation (63%) than their female counterparts (80%). In each age group, females working part-time were more likely to be entitled to superannuation benefits than males working part-time. In the 65 and over age group, 66% of females and 42% of males were entitled to superannuation benefits, although this age group represented less than 1% of the population (73,700 employees).

The degree of superannuation coverage provided by employers continued to increase between 1996 and 2001, and across industries. In 2001, superannuation was provided to 99% of persons employed in Mining, while 80% were covered in Accommodation, cafes and restaurants and 77% in Retail trade (graph 6.55). Accommodation, cafes and restaurants, and Retail trade also have the lowest average earnings (see graph 6.45).

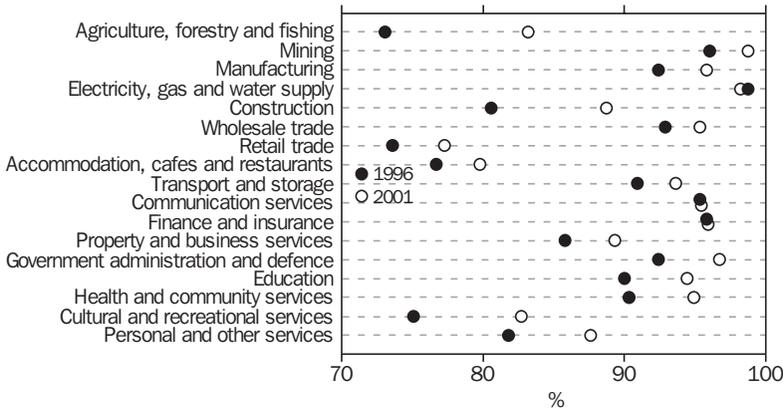
**Other employee benefits**

Similar proportions of employees are entitled to paid sick leave and paid holiday leave (72%). However, long-service leave is less commonly offered by employers (61.8% of employees) (table 6.56).

The total number of employees receiving leave benefits fell between 1996 and 2001, although full-time employees were still more likely to receive these benefits than part-time employees. Sick and holiday leave benefits were available to 87% of full-time employees and 75% received long-service leave. The proportion of part-time employees receiving benefits rose between 1996 and 2001, from 31% to 34% for those receiving holiday and sick leave benefits and from 26% to 31% for those receiving long-service leave benefits.

Fewer females are entitled to leave benefits (i.e. sick leave and/or holiday leave) in their main job. However, full-time females are more likely to receive leave benefits than full-time males (90% compared to 86%), and part-time females are more likely to receive leave entitlements than part-time males (41% compared to 19%).

**6.55 EMPLOYEES ENTITLED TO SUPERANNUATION IN MAIN JOB, By industry(a)**



(a) Classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC).

Source: *Employee Earnings, Benefits and Trade Union Membership, Australia (6310.0)*.

**6.56 EMPLOYEES IN MAIN JOB(a), By type of benefit received**

	Units	Working full-time		Working part-time		All employees	
		August 1996	August 2001	August 1996	August 2001	August 1996	August 2001
<b>MALES</b>							
Superannuation	%	93.4	95.5	52.5	63.0	88.0	90.3
Paid holiday leave	%	87.0	85.9	15.6	18.2	77.5	75.1
Paid sick leave	%	86.7	85.7	15.6	19.1	77.3	75.1
Paid long-service leave	%	77.3	73.7	11.4	16.5	68.5	64.5
No benefits	%	3.8	2.8	43.6	34.7	9.1	7.9
Total number of employees	'000	3 385.4	3 515.0	518.0	669.3	3 903.3	4 184.3
<b>FEMALES</b>							
Superannuation	%	94.9	97.1	70.7	80.2	84.3	89.3
Paid holiday leave	%	90.3	90.1	36.6	40.5	66.8	67.3
Paid sick leave	%	90.0	90.2	36.7	41.2	66.7	67.7
Paid long-service leave	%	80.9	77.7	30.8	36.3	59.0	58.6
No benefits	%	2.3	1.4	26.6	18.2	12.9	9.1
Total number of employees	'000	1 777.2	1 939.8	1 381.6	1 648.0	3 158.8	3 587.8
<b>PERSONS</b>							
Superannuation	%	93.9	96.1	65.8	75.2	86.0	89.9
Paid holiday leave	%	88.1	87.4	30.9	34.1	72.7	71.5
Paid sick leave	%	87.9	87.3	30.9	34.8	72.6	71.7
Paid long-service leave	%	78.5	75.1	25.5	30.5	64.3	61.8
No benefits	%	3.3	2.3	31.2	22.9	10.8	8.4
Total number of employees	'000	5 162.6	5 454.8	1 899.6	2 317.3	7 062.1	7 772.2

(a) Excludes persons attending school.

Source: *Employee Earnings, Benefits and Trade Union Membership, Australia (6310.0)*.

## Industrial relations

Industrial relations can be regarded as the relationships and interactions in the labour market between employers and employees (and their representatives), and the intervention in these relations by governments, government agencies and tribunals (e.g. the Australian Industrial Relations Commission).

Historically, governments have regulated the Australian labour market, with any changes to the structure or processes underpinning the industrial relations environment generally following social change and adjustment in the Australian economy. For most of the last century, highly centralised Commonwealth and state tribunal-based systems of conciliation and arbitration shaped employee–employer relationships. However, since the late 1980s, the industrial relations environment in Australia has undergone significant change, and is now characterised by more decentralised arrangements.

The field of industrial relations is complex and diverse, and is not easily measured for statistical purposes. The ABS collects information on a

number of topics to provide an insight into the state of the industrial relations environment, including trade union membership and industrial disputes.

## Industrial disputes

An industrial dispute is a state of disagreement over a particular issue or group of issues between employees and employers. Industrial disputes comprise strikes, which are a withdrawal from work by a group of employees; and lockouts, which are a refusal by an employer or group of employers to permit some or all of their employees to work.

This section presents statistics on industrial disputes involving the loss of 10 working days or more at the establishments where the stoppage occurred. Working days lost refers to working days lost by workers directly or indirectly involved in disputes at those establishments. Directly involved employees are those who actually participated in the dispute, while indirectly involved employees are those who were stood down at the establishment where the stoppages occurred, but who were not themselves parties to the dispute.

6.57 INDUSTRIAL DISPUTES



Source: *Industrial Disputes, Australia (6321.0)*.

The number of working days lost per year, and the number of employees involved, have fluctuated from year to year, but have demonstrated a significant downward trend over the last two decades (graph 6.57). While there has been a downward trend in the levels of industrial disputation, certain years have gone against the trend, namely 1988, 1991 and 1996.

The number of working days lost in 2001 was 393,100, a fall of over 16% on 2000 (table 6.58). Over the same period the total number of employees involved in industrial disputes (either directly or indirectly) fell by over 30% to 225,700. While the numbers of working days lost have been declining over the last six years, the number of disputes has actually been increasing. This indicates that the relative size of disputes, in terms of the length of the dispute or the numbers involved, is decreasing. For example, in 1996 there was an average of 1,710 working days lost per dispute, while in 2001 there was an average of 582 working days lost per dispute.

6.58 INDUSTRIAL DISPUTES

	Disputes no.	Employees involved '000	Working days lost '000
1996	543	577.7	928.5
1997	447	315.4	534.2
1998	519	348.4	526.3
1999	731	461.1	650.5
2000	698	325.4	469.1
2001	675	225.7	393.1

Source: *Industrial Disputes, Australia (6321.0)*.

Table 6.59 shows that the number of working days lost per thousand employees has declined over the last five years, although there have been fluctuations in a number of industries. Since 1996 the number of working days lost per thousand employees has fallen from 131 to 50. However, Manufacturing has gone against this trend, increasing from 216 to 406 working days lost per thousand employees.

Coal mining continues to be the industry most affected by industrial disputation, with a total of 956 working days lost per thousand employees; however, this is considerably lower than the 7,171 working days lost per thousand employees recorded in 1996. The Construction industry, and the Education; Health and community services industry have fluctuated from year to year, although they have been generally falling. Construction fell from 892 to 275 working days lost per thousand employees between 1996 and 2001.

**6.59 WORKING DAYS LOST PER THOUSAND EMPLOYEES(a)**

Industry	1996 '000	1997 '000	1998 '000	1999 '000	2000 '000	2001 '000
Mining						
Coal	7 171	4 206	2 732	1 445	1 933	956
Other	73	19	23	35	60	33
Manufacturing						
Metal products; Machinery and equipment	146	189	71	282	170	258
Other	70	107	106	120	121	148
Construction	892	290	524	381	234	275
Transport and storage; Communication services	43	101	114	42	52	27
Education; Health and community services	187	73	57	165	79	8
Other industries(b)	17	11	7	7	9	7
<b>All industries</b>	<b>131</b>	<b>75</b>	<b>72</b>	<b>87</b>	<b>61</b>	<b>50</b>

(a) Classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC). (b) Includes: Agriculture, forestry and fishing; Electricity, gas and water supply; Wholesale trade; Retail trade; Accommodation, cafes and restaurants; Finance and insurance; Property and business services; Government administration and defence; Cultural and recreational services; and Personal and other services.

Source: *Industrial Disputes, Australia* (6321.0).

**Trade union membership**

A trade union is defined as an organisation consisting predominantly of employees, of which the principal activities include the negotiation of rates of pay and conditions of employment for its members. In August 2001 there were 1,902,700 employees who were trade union members in their main job. As shown in table 6.60, this represents 24.5% of all employees, down from 24.7% in August 2000. The public sector has a higher rate of unionisation, with 47.9% of employees having trade union membership, compared to 19.2% in the private sector. A higher proportion of males than females are trade union members (26.0% to 22.7%).

Trade union membership in Australia experienced growth throughout much of the 20th century, peaking at 61% in 1962 (graph 6.61). Between 1962 and 1970 trade union membership declined rapidly. This was followed by increasing membership during the 1970s. However, since then the proportion of employees who were trade union members has steadily declined.

**6.60 TRADE UNION MEMBERSHIP  
— August 2001**

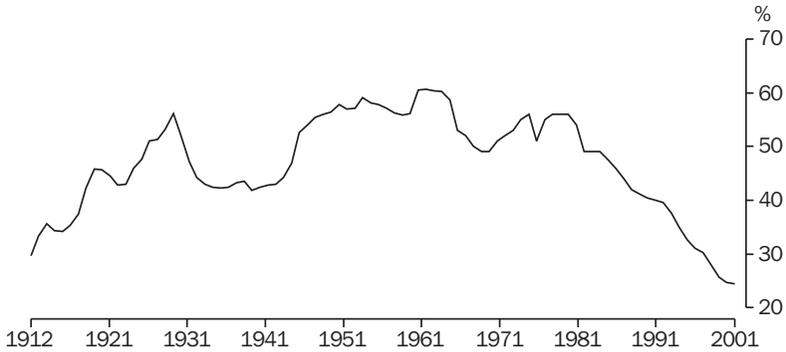
Sector	Males	Females	Persons
	%	%	%
Public	51.9	44.5	47.9
Private	21.2	16.6	19.2
All sectors	26.0	22.7	24.5

Source: *Employee Earnings, Benefits and Trade Union Membership, Australia, August 2001* (6310.0).

Some of the factors contributing to the decline in trade union membership include the changing workplace relations environment and the changing industry composition of the labour market, for example, declines in employment levels in traditionally highly unionised industries and the emergence of industries that are not highly unionised.

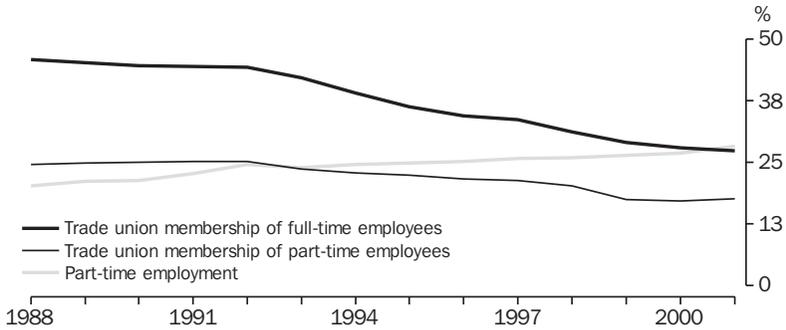
Another factor in the decline in trade union membership is the increases in part-time and casual employment which historically have been less unionised than full-time employment. Graph 6.62 shows that the proportion of part-time employees has increased from 20% in 1988 to 28% in 2001. Over this same period the proportion of full-time and part-time employees who were trade union members has decreased, with trade union membership of full-time employees declining from 46% to 27%, and trade union membership of part-time employees declining from 25% to 18%.

6.61 TRADE UNION MEMBERSHIP



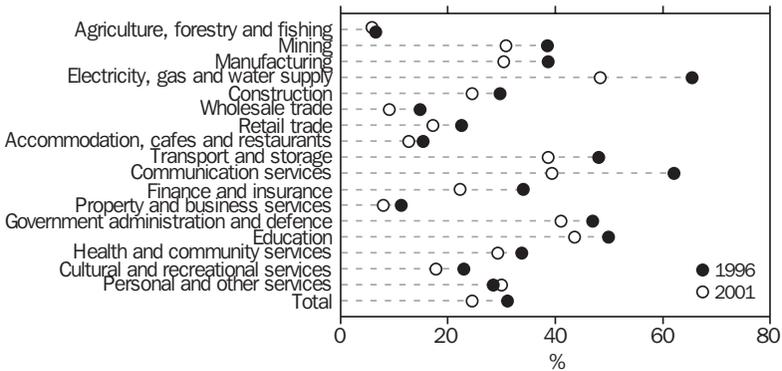
Source: *Employee Earnings, Benefits and Trade Union Membership, Australia (6310.0)*; *Labour Report, 1912-1958*; *Trade Union Members, Australia (6235.0)*.

6.62 TRADE UNION MEMBERSHIP, Full-time and part-time employees



Source: *Employee Earnings, Benefits and Trade Union Membership, Australia (6310.0)*; *Labour Force, Australia (6203.0)*.

6.63 EMPLOYEES WHO WERE TRADE UNION MEMBERS, By industry(a)



(a) Classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC).

Source: *Employee Earnings, Benefits and Trade Union Membership, Australia (6310.0)*.

The level of trade union membership varies considerably across industries, with Electricity, gas and water supply (48%), Education (44%) and Government administration and defence (41%) being the most unionised (graph 6.63). The least unionised industries were Agriculture, forestry and fishing (6%), Property and business services (8%) and Wholesale trade (9%).

Between 1996 and 2001, 16 of the 17 industries experienced a drop in their rate of unionisation. The largest falls occurred in the more unionised industries, with the proportion of employees who were trade union members in Communication

services falling from 62% to 39%, Electricity, gas and water supply from 65% to 48%, Finance and insurance from 34% to 22%, and Transport and storage from 48% to 39%. Over this period, the rate of union membership increased marginally in Personal and other services, from 29% to 30%.

While the fall in the proportion of trade union members in Communication services was greater than in Manufacturing, the fall in Manufacturing had a more significant impact on the overall number of trade union members, as Manufacturing has a much higher level of employment.

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*Education and Work, Australia* (6227.0)  
*Employee Earnings and Hours, Australia* (6306.0)  
*Employee Earnings, Benefits and Trade Union Membership, Australia* (6310.0)  
*Forms of Employment, Australia* (6359.0)  
*Industrial Disputes, Australia* (6321.0)  
*Job Search Experience, Australia* (6222.0)  
*Job Vacancies, Australia* (6354.0)  
*Labour Force, Australia* (6203.0)  
*Labour Force Experience, Australia* (6206.0)  
*Labour Report, 1912 to 1958*  
*Labour Statistics: Concepts, Sources and Methods, 2001* (6102.0), available in the Statistical Concepts Library on the ABS web site <<http://www.abs.gov.au>>  
*Locations of Work, Australia* (6275.0)  
*Trade Union Members, Australia* (6325.0)  
*Wage Cost Index, Australia* (6345.0)  
*Working Arrangements, Australia* (6342.0)  
*Work-Related Injuries, Australia* (6324.0)

### Web sites

- Centrelink, <<http://www.centrelink.gov.au>>  
Commonwealth Department of Employment, Workplace Relations and Small Business (DEWRSB), <<http://www.dewrsb.gov.au>>  
International Labour Organisation (ILO), <<http://www.ilo.org>>

# 7

# Income and welfare

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## Introduction

The economic wellbeing or standard of living of individuals and families is largely dependent on the economic and social resources available to provide for their consumption of goods and services and for participation in society. Such resources may be in the form of cash income received from wages and salaries or investments, or as income support from government. Other factors can also contribute to the level of consumption of goods and services, including using personal resources such as savings, services such as aged care, respite care and child care from government and welfare organisations, and assistance from family and friends.

Government programs aim to help the economically disadvantaged to achieve social and economic outcomes and to participate in society. Such programs include those of the Department of Family and Community Services (FaCS), which provides income security for the retired, people with disabilities, carers, unemployed people, students, families with children, and Indigenous Australians. Other departments provide income support for other special groups, such as war veterans, war widows and their families, and students. In addition to cash income, government programs also help those with low incomes to meet payments for housing through rent assistance, and for a range of goods and services through pensioner concession and health cards, and other services aimed at helping people in personal and social hardship. Other types of

programs aim to provide assistance with employment, and advocacy for people with disabilities.

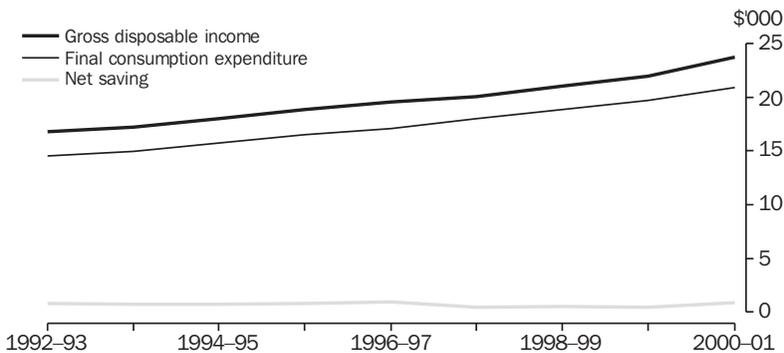
This chapter provides information on the levels and sources of income of Australia's population and on the levels and patterns of expenditure on consumer goods and services. Further information is provided on the main income support programs of the Commonwealth Government, describing the eligibility requirements, numbers of beneficiaries and government expenditure on these programs. It covers these in four sections: Income support programs of the FaCS; Community support programs of the Department of Family and Community Services; Aged care programs of the Department of Health and Ageing; and services provided by the Department of Veterans' Affairs.

## Household income and expenditure

### Aggregate income and expenditure

An overview of the income, expenditure and wealth of Australian residents is available from the Australian System of National Accounts. Selected aggregates relating to households are presented in graph 7.1. Between 1992–93 and 2000–01, gross household disposable income per capita and household final consumption expenditure per capita have been steadily growing. More information is available in *Chapter 29, National accounts*.

**7.1 HOUSEHOLD INCOME, EXPENDITURE AND NET SAVING,**  
Current price (per capita)



Source: Australian System of National Accounts (5204.0).

## Income distribution

Aggregate measures of household income and expenditure provide a broad picture of the economic wellbeing of Australians, but it is also of interest to examine the extent to which economic wellbeing differs between different groups within society. The sources used to compile the national accounts usually do not provide the detail needed to undertake such analysis. Instead, data need to be collected in household surveys such as the surveys of income and expenditure periodically conducted by the ABS. However, the surveys do not collect information from people living in institutions such as boarding houses, nursing homes, gaols, etc.

Tables 7.2 and 7.3 provide a number of indicators of income distribution derived from the Survey of Income and Housing Costs. The preparation of measures to describe differences in economic wellbeing presents a number of conceptual and practical challenges.

The main determinant of a person's economic wellbeing is usually the income to which they have access, either directly or as a member of a family in which income is shared. But some people have access to savings from past income or other sources of wealth, and low levels of income may not imply low levels of economic wellbeing. Similarly, proprietors of unincorporated businesses who report low or even negative business income may not be experiencing low levels of economic wellbeing. Their business income is defined as their net profit (or loss), but the business may expect, and be financed to cope with, a period of low income such as that associated with a poor season or temporary high costs flowing from business start up or expansion. Studies have shown that households reporting very low incomes also often report expenditure levels that are higher than households with slightly higher incomes. Consequently, in the following tables, low income households are defined to include those falling in the 10–30% range of the income distribution and exclude those falling in the bottom 10%.

Income can take a number of forms, some of which are difficult to quantify in household surveys. To date, ABS household surveys have

usually been restricted to collecting cash income data and have not regularly collected comprehensive information on income received in the form of fringe benefits (including employer contributions to employee superannuation), nor the notional income that can be conceived of as being received by people who own their homes.

Relative economic wellbeing also reflects relative economic needs. Most importantly, people sharing accommodation will not normally need as much income to attain a given standard of living as people living alone. In order to reflect the sharing of income between family members and to enable adjustment for the lower economic needs of people sharing accommodation, the following analysis is on an equivalised income per household basis rather than an income per capita basis. Equivalising income estimates is a means of standardising them to take account of the varying size and composition of households.

Table 7.2 shows some of the measures more commonly used to assess the distribution of income. Most of the movements have been small, showing little or no overall change in the level of income inequality among households during the period 1994–95 to 1997–98. Real income increased for all groups of households during the period. Real income of the low income households increased by 5%, with a 5% increase for the middle income group and 6% for the high income group. Similarly there have not been significant changes in the share of income received by high and low income households.

The Gini coefficient (a commonly used summary measure of income distribution) also shows minimal change. The Gini coefficient is a single number that summarises the distribution. It takes values between zero and one (0 and 1) — higher values indicate greater inequality in the distribution of income; lower values indicate greater equality. While a little lower during the intervening years the coefficient in both 1994–95 and 1997–98 was the same at 0.32.

Table 7.2 spans the period 1994–95 to 1997–98. Estimates for more recent periods are currently under review (see the article 'Household Income and its Distribution' in *Australian Economic Indicators*, April 2001(1350.0)).

## 7.2 HOUSEHOLD EQUIVALISED DISPOSABLE INCOME(a)

	Units	1994–95	1995–96	1996–97	1997–98
Mean weekly income for selected groups of households(b)					
Low income(c)	\$	408	408	427	427
Middle income(d)	\$	687	680	707	720
High income(e)	\$	1 556	1 518	1 561	1 642
Share of total income received by households with					
Low incomes(c)	%	10.2	10.4	10.5	10.2
High incomes(e)	%	39.1	38.6	38.3	39.2
Gini coefficient(f)	ratio	0.320	0.315	0.309	0.322

(a) All estimates have been adjusted using the Organisation for Economic Co-operation and Development equivalence scales.

(b) Adjusted for changes in the consumer price index; values presented in 1997–98 dollars. (c) Households in the 2nd and 3rd income deciles after being ranked by their equivalised income. (d) Households in the 3rd quintile (5th and 6th deciles) after being ranked by their equivalised income. (e) Households in the top income quintile (9th and 10th deciles) after being ranked by their equivalised income. (f) A summary measure of income distribution that lies between 0 and 1. As the measure approaches the value of 1, income inequality increases, and vice versa.

Source: *Measuring Australia's Progress (1370.0)*.

Comparing households of various types in low and high income groups helps to characterise the types of households most likely to be economically disadvantaged. Households are classified in several ways in table 7.3, presenting data for 1997–98. The patterns shown could be expected to be broadly representative of the patterns seen throughout the 1990s. There are some substantial differences in the representation of certain household composition types in low and high income groups. One-parent families in one-family households with dependent children, for example, were over-represented (11%) in the

low income group (those in the second and third lowest deciles of the income distribution) and under-represented (1%) in the highest income group (those with income in the top two deciles of the income distribution). Possibly associated with their age and employment circumstances, couples without children were over-represented in the highest income group and under-represented in the middle of the income distribution. Lone-person households were over-represented in the lowest income group and many would have been receiving the age pension.

## 7.3 HOUSEHOLD CHARACTERISTICS OF SELECTED INCOME GROUPS(a) — 1997–98

	Units	Low income (2nd and 3rd deciles)	Middle income (5th and 6th deciles)	High income (9th and 10th deciles)	All households
Household composition					
One-parent family in one-family households with dependent children	%	11	8	1	7
Couples in one-family households					
Couples without children	%	25	22	31	23
Couples with dependent children only	%	18	34	18	25
Other couples in one-family households	%	5	14	17	12
Other family households	%	4	6	6	6
Non-family households					
Lone persons	%	36	13	18	23
Group households	%	1	5	7	4
<i>Total</i>	%	100	100	100	100
Principal source of household income					
Wages and salaries	%	13	66	86	54
Own unincorporated businesses	%	4	6	8	6
Government pensions and allowances	%	79	15	1	30
Other sources	%	5	13	6	8
<i>Total(b)</i>	%	100	100	100	100
<b>Average number of earners(c)</b>	no.	0.3	1.2	1.9	1.1

(a) Households have been ranked from high to low income groups according to their equivalised disposable income. (b) Total includes households with zero or negative income. (c) Includes persons receiving income from wages or salary or have their own unincorporated business.

Source: *Measuring Australia's Progress, 2002 (1370.0)*.

In contrast, while significant proportions of households in the lowest and highest income groups were couples in one-family households with dependent children only (18% in both groups), households of this type were over-represented among middle income households (34% of all middle income households). In terms of the principal source of household income, households in the low income group (i.e. with income in the second and third lowest deciles of the income distribution) were, as might be expected, most likely to have government pensions and allowances as their major source of income (79% of households). In sharp contrast to those in the low income group, most households (93%) in the highest income group had employment-related income (from wages or salaries or their own unincorporated business) as their principal source of income. The number of earners (i.e. with employment-related income) present in a household is an important determinant of household income. Clearly those with two or more earners will tend to have higher incomes than those with only one earner. In 1997–98, the average number of earners per household in the low income group was 0.3 persons, which contrasts with 1.2 and 1.9 earners per household in the middle and high income groups respectively.

## Household expenditure

People's income provides one indicator of their standard of living. However, it does not always accurately indicate command over goods and services, particularly when income is variable or expenditure can be financed through running down assets or acquiring debts. In these cases, the levels and patterns of household expenditure can provide an alternative indicator of living standards.

The latest household expenditure information available is from the 1998–99 Household Expenditure Survey. This was the sixth major survey of its kind undertaken by the ABS. It collected detailed information on the expenditure, income and characteristics of households in Australia.

The household is the usual unit of analysis for expenditure because it is assumed that sharing of the use of goods and services occurs at this level. If smaller units are adopted, for example, person or income unit, then it is difficult to attribute the use of both shared items such as accommodation and household goods, and of expenditure on items consumed by others, such as food.

In 1998–99, Australian households spent an average of \$699 per week on goods and services (table 7.4). The level and pattern of expenditure differ between households, reflecting characteristics such as income, household composition, household size and location.

Predictably the level of household expenditure differs between households with differing income levels. In 1998–99, households in the lowest income quintile (i.e. the 20% of households with the lowest incomes) spent \$344 per week on goods and services, compared with \$1,171 spent by households in the highest income quintile. Households in these quintiles had average (mean) gross weekly incomes of \$156 and \$1,109 respectively. Since the Household Expenditure Survey does not collect information on all forms of income and expenditure, and since there are significant timing differences between the different components of income and expenditure collected, caution should be exercised in comparing the income and expenditure data. Nevertheless, for both the lowest quintile and the second quintile, average weekly household income as measured in the survey is less than average weekly household expenditure. This does not necessarily mean that these households are spending beyond their means. Some of the households in these quintiles will have had higher income in the past and so can finance their expenditure by drawing on past savings. This is especially so for retired people. Other households may take out loans in the expectation of higher incomes at a later time. The lowest quintile also includes households who reported zero or negative income. These households' losses from their unincorporated businesses or investments equalled or were greater than their income from all other sources. In general this group can draw on economic resources other than income to maintain their standard of living, at least in the short term.

The composition of a household's weekly expenditure is also affected by the level of household income. For example, food and non-alcoholic drinks accounted for 19.4% of the expenditure on goods and services of households in the lowest income quintile, compared to 16.6% for households in the highest income quintile. In general, the proportion spent on housing, household services, domestic fuel and power and tobacco products also declined as household income rose, while the proportion spent on transport, recreation, clothing and footwear, and alcohol increased.

## 7.4 HOUSEHOLD EXPENDITURE AND CHARACTERISTICS — 1998–99

	Units	Gross weekly income quintile group					All households
		Lowest 20%	Second quintile	Third quintile	Fourth quintile	Highest 20%	
Upper boundary of quintile group	\$	300	550	881	1 364	..	..
Mean gross weekly household income	\$	156	411	709	1 109	1 982	874
Mean age of reference person	years	59	53	43	42	43	48
Average number of persons in the household	no.	1.51	2.34	2.75	3.05	3.33	2.60
Household composition (% of households)							
Couple, one family							
Couple only	%	18.1	38.8	20.0	23.4	22.5	24.6
Couple with dependent children only	%	5.2	13.8	31.1	37.0	31.8	23.8
Other couple, one-family households	%	1.6	6.1	9.6	14.8	26.8	11.8
One-parent, one family with dependent children							
One-parent, one family with dependent children	%	7.3	14.0	7.0	2.6	1.1	6.4
Other family households	%	1.7	4.8	7.2	6.4	6.8	5.4
Lone person	%	64.9	19.0	21.6	11.3	4.8	24.2
Group households	%	1.3	3.5	3.4	4.6	6.2	3.8
<i>Total</i>	%	100.0	100.0	100.0	100.0	100.0	100.0
Expenditure (as % of total expenditure)							
Current housing costs (selected dwelling)	%	16.2	15.0	15.6	13.8	12.0	13.9
Domestic fuel and power	%	3.7	3.3	2.7	2.3	2.0	2.6
Food and non-alcoholic beverages	%	19.4	20.3	18.9	18.0	16.6	18.2
Alcoholic beverages	%	2.1	2.5	2.7	2.9	3.4	2.9
Tobacco products	%	1.9	2.2	1.8	1.4	1.1	1.5
Clothing and footwear	%	3.7	3.8	3.8	4.6	5.5	4.6
Household furnishings and equipment	%	6.4	6.1	6.0	5.5	6.3	6.0
Household services and operation	%	7.9	6.7	5.9	5.7	5.2	5.9
Medical care and health expenses	%	5.0	5.0	4.4	4.7	4.5	4.6
Transport	%	14.0	15.1	16.0	18.3	17.8	16.9
Recreation	%	10.9	11.9	12.2	12.2	14.2	12.7
Personal care	%	2.0	1.9	1.8	2.0	2.1	2.0
Miscellaneous goods and services	%	6.9	6.2	8.2	8.4	9.3	8.2
<i>Total</i>	%	100.0	100.0	100.0	100.0	100.0	100.0
Average weekly expenditure on all goods and services	\$	344	477	648	853	1 171	699
Estimated number of households	'000	1 404.3	1 441.9	1 425.3	1 425.9	1 425.5	7 122.8

Source: Household Expenditure Survey, Australia: Detailed Expenditure Items, 1998–99 (6535.0).

## An ageing Australia

Like many other developed countries, Australia is experiencing fundamental changes in its demographic structure. This is characterised by three significant trends:

*Growing longevity* — Life expectancy at birth has increased from 66.1 years in 1947 to 76.2 years in 1999 for men, and from 70.6 years to 81.8 years over the same period for women. These trends have been driven by lower mortality rates at all ages.

*Declining fertility* — In 1976, the total fertility rate (TFR) fell below replacement level (2.1 births per woman) and has fallen even lower since. A record low of 1.7 births per woman occurred in 1999, and the TFR is predicted to fall further still.

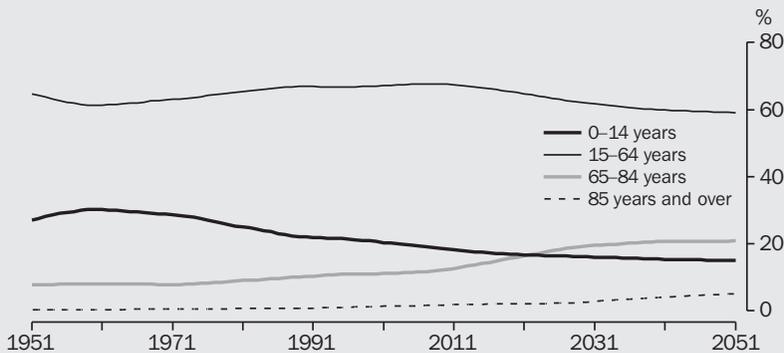
*'Baby boomer' progression* — The peak of this large generation (born between 1946 and 1966) will be entering the over 65 age group between 2011 and 2031.

These factors have contributed to an ageing population, which in turn may be categorised in two ways. The term 'numerical ageing' refers to the absolute increase in the number of people aged over 65 years. In the Australian context, the number of people aged over 65 is expected to grow from 2.3 million in 1999 to between 6.2 million and 7.9 million by 2051. Alternatively, 'structural ageing' refers to the relative increase, or growing proportion, of older people within the total population (see graph 7.5). This reflects the impact of falling fertility on population age structures; as the proportion of people aged under 15 falls, the proportion of Australians aged over 65 years increases. The proportion of people aged over 65 years is expected to grow from 12% of the population in 1999 to around a quarter of the population by 2051. The over 85 age group is expected to almost quadruple as a proportion of the population, from 1.3% today to around 5% by 2051. On the other hand, the proportion of the population currently considered to be of labour force age (those aged between 15 and 64) is expected to fall from 67% in 1999 to around 59% by 2051.

While any forecast in relation to future population size and structure requires assumptions about future levels of mortality, fertility and immigration, it appears that Australia's population outlook over the next few decades is likely to be dominated by structural ageing.

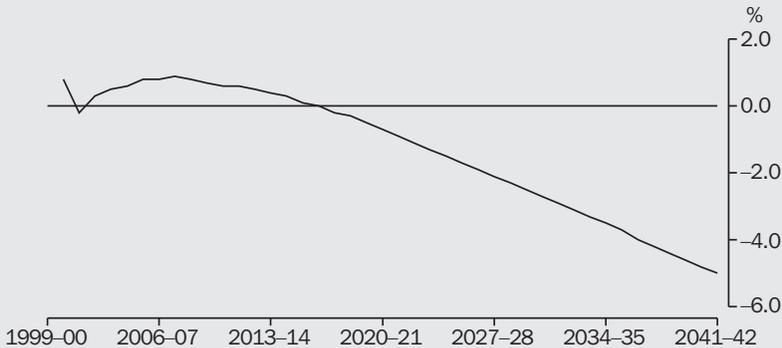
Ageing presents challenges and opportunities for individuals, families, communities, businesses and governments. The social dimensions may include changes to caring and disability support needs, housing demands and recreation patterns. The economic dimensions are likely to be equally complex. *Budget Paper No. 5, Intergenerational Report*, released as a part of the 2002–03 Commonwealth Budget, provides a detailed overview of the long-term sustainability of government finances in the context of structural ageing. The report shows that fiscal pressure on the Commonwealth Budget is expected to build, with the most significant impact first emerging in around 15 years from now. By 2041–42, the gap between spending and revenue is expected to reach 5% of gross domestic product in the absence of any major policy shifts (graph 7.6).

### 7.5 POPULATION IN AGE GROUPS



Source: Australian Historical Population Statistics — on AusStats (3105.0.65.001); Population Projections, Australia, 1999–2101 (3222.0).

### 7.6 PROJECTION OF COMMONWEALTH GOVERNMENT FISCAL PRESSURE, Proportion of gross domestic product



Source: Department of the Treasury, 'Budget Paper No. 5, Intergenerational Report 2002-03'.

A key to addressing this challenge lies in managing government costs in the areas of health and welfare, as well as maintaining strong economic growth. Critical to this will be future rates of workforce participation, particularly among older workers. Greater workforce participation among older Australians may contain government welfare outlays by improving self-provision for retirement and reducing the risk of older Australians entering long-term income support. In addition, boosting workforce participation rates among older Australians is also expected to help sustain economic growth by offsetting the expected decline in labour force supply.

In many ways the economic and social opportunities and challenges of projected population ageing are inseparable. Public attitudes towards older Australians, either within the workplace or in broader aspects of community life, will be critical to how our society responds to structural ageing. Since most other developed countries are much further down the ageing track than Australia, we are fortunately well placed to learn about how other communities deal with the pressures and benefits of adapting to an ageing population.

## Services provided by the Department of Family and Community Services (FaCS)

### Introduction to the income support system

The Australian income support system provides financial assistance to a variety of groups, including families, job seekers, the aged, people with a disability, carers, mature age people, students and Indigenous Australians. Almost two-thirds of Australian families with children or dependants benefit from family assistance and

4.4 million individuals are direct beneficiaries of the FaCS portfolio's income support payments. Recent and ongoing reforms to the income support system in Australia aim to improve social and economic participation, while retaining a strong and effective safety net for people unable to support themselves.

The main income support payments provided by the Commonwealth for the financial years 1998-99 to 2001-02 are listed in table 7.7. Details of the payments in effect in the 2001-02 financial year, together with associated statistics, are presented in this chapter.

## 7.7 INCOME SUPPORT PAYMENTS(a)

	1998-99 \$'000	1999-2000 \$'000	2000-01 \$'000	2001-02 \$'000
Family assistance				
Family Allowance(b)	6 391 490	6 573 857	-39 532	-37 291
Family Tax Payment(b)	546 217	531 927	-2 286	-3 348
Family Tax Benefit(b)	..	..	10 076 463	10 927 703
Maternity Allowance(c)	167 085	195 809	217 899	216 887
Double Orphan Pension	1 725	1 779	1 977	1 976
Youth and student support				
Youth Allowance	1 843 498	2 002 830	2 101 915	2 213 719
Austudy	287 173	253 870	249 258	280 794
Student Financial Supplement	259 745	290 681	161 510	500 967
Fares Allowance	690	569	644	525
Child care support				
Child Care Benefit(d)	..	..	1 037 137	1 315 912
Child Care Cash Rebate(d)	117 000	164 447	-14 597	63
Child Care for eligible parents undergoing training(e)	4 599	11 050	7 301	11 067
Labour market assistance				
Newstart Allowance	5 370 669	4 954 450	4 918 349	5 078 220
Parenting Payment	5 402 944	5 494 230	5 325 681	5 571 718
Mature Age Allowance	401 698	367 250	352 596	364 210
Partner Allowance	590 185	646 460	728 679	817 599
Widow Allowance	227 289	270 825	324 919	389 550
Bereavement Allowance	734	782	719	813
Pensioner Education Supplement	44 601	49 571	58 248	65 784
Special Benefits	99 585	98 704	114 778	119 811
Support for people with a disability				
Disability Support Pension	4 920 223	5 253 241	5 849 799	6 404 351
Mobility Allowance	46 137	52 096	59 367	67 852
Wife Pension (DSP)	534 069	479 205	446 564	401 969
Sickness Allowance	93 043	83 881	95 554	93 724
Support for carers				
Carer Payment	307 506	369 723	480 944	595 810
Carer Allowance(f)	..	412 334	533 247	645 722
Support for the aged				
Age Pension	13 569 056	14 037 940	15 616 477	16 665 653
Aged Persons Savings Bonus	..	..	1 581 231	23 723
One-off Payment to Seniors	..	..	536 581	(e)10 454
Self Funded Retirees' Supplementary Bonus	..	..	582 828	28 519
Widow Class B Pension	105 694	89 849	84 296	59 787
Wife Pension (age)	243 433	240 751	233 080	216 160
<b>Total Special Appropriations(g)</b>	<b>41 825 371</b>	<b>42 926 761</b>	<b>51 753 433</b>	<b>53 118 246</b>

(a) Outlays on Pensions, Allowances and Family Tax Benefits include expenditure on Rent Assistance. Details of Rent Assistance are included in 'Chapter 8, Housing'. (b) Family tax benefit replaced Family Allowance and Family Tax Payment on 1 July 2000. (c) Maternity Allowance includes Maternity Immunisation Allowance. (d) Child Care Benefit commenced on 1 July 2000 and incorporated the Child Care Cash Rebate. (e) Not included in the Special Appropriations total as they are Other Administered Expenses. (f) Carer allowance was introduced on 1 July 1999. It combined Child Disability Allowance with Domiciliary Nursing Care Benefit, which was the responsibility of the Department of Health and Ageing. (g) Components do not add to total as some minor allowances and appropriation adjustments are excluded. Payments under the 'State Grants Housing Act 1971' (Cwlth) are included in the total.

Source: Department of Family and Community Services.

Most allowance types are adjusted once or twice a year in line with movements in the consumer price index (CPI) to maintain purchasing power. Pension payments are adjusted in line with the CPI and male total average weekly earnings (MTAWE), ensuring the single pension rate does not fall below 25% of MTAWE. Many income support payments are subject to income, assets and activity tests, to ensure that benefits are targeted to those in greatest need. Details of the rates in effect at 30 June 2002 are listed in table 7.8.

Since September 1997, Centrelink has delivered most income support payments on behalf of FaCS. Centrelink is a statutory agency established to deliver a range of Commonwealth services to the Australian community. It operates under the *Commonwealth Services Delivery Agency Act 1997* (Cwlth). Centrelink provides advice about payment entitlements, provides referrals to Centrelink specialist staff for additional assistance, and may refer customers to other departments, agencies or community organisations where appropriate. The Department of Veterans' Affairs delivers the Service Pension to eligible veterans and their families.

Numbers of income support customers referred to in this chapter generally relate to June of the reference year. These numbers are taken from extracts of administrative data as close to 30 June as possible. However, the dates of extracts can vary between payment types. All financial data refer to the full financial year.

## Income support programs

### Family Assistance

Family Assistance policies are formulated to provide income support to families to assist with the costs of raising children, including newborns, in a way that recognises the needs and choices of both single and dual income families.

Family Tax Benefit Part A helps people with the cost of raising dependent children. It is paid to families with children up to 21 years and young people between 21 and 24 who are studying full-time (and not receiving Youth Allowance or a similar payment).

Family Tax Benefit Part B provides extra assistance for families with only one main income earner, particularly those with children under five. It is paid to families for children up to the age of 16 and children aged between 16 and 18 years who are studying full-time.

During 2001–02, Family Tax Benefit Part A was paid to 1.8 million families to provide support for 3.5 million children, and Family Tax Benefit Part B was paid to 1.2 million families to provide support for 2.3 million children.

Both payments are administered by the Family Assistance Office and are available as a direct payment from Centrelink, either fortnightly or as a lump sum, or via tax instalment deductions or an end of year lump sum payment through the tax system. Both payments are subject to income tests. Some Family Tax Benefit recipients can receive fortnightly payments for part of the tax year with the balance as a lump sum at the end of the tax year.

Maternity Allowance is a one-off lump sum paid at around the time of the birth of a baby, designed to help meet the costs associated with the birth. Claimants must be eligible for Family Tax Benefit Part A. There is also a Maternity Immunisation one-off payment. To be eligible for this, claimants must have been paid Maternity Allowance or be eligible for Family Tax Benefit Part A.

Double Orphan Pension is a not means tested and is a payment for children with at least one deceased parent, who cannot have contact with the other parent (for example, because that parent is a long-term prisoner or their whereabouts is unknown).

Table 7.9 shows the number of recipients and expenditure for Family Assistance.

**7.8 MAXIMUM RATES FOR INCOME SUPPORT  
PAYMENTS AND BENEFITS**  
— As at 30 June 2002

	\$
Age Pension(a)	
Single	421.80
Couple(b)	352.10
Age Pension Savings Bonus	variable
Austudy(a)	
Single or partnered, no children	301.70
Single, with children	395.30
Partnered, with children	331.30
Bereavement Allowance(c)	421.80
Carer Allowance(a)	85.30
Child Care Benefit	
Approved care(d)	
Non-school age child	2.58
School age child	2.19
Registered care(d)	
Non-school age child	0.43
School age child	0.37
Disability Support Pension(a)	
Single	421.80
Couple(b)	352.10
Double Orphan Pension(a)	42.80
Education Entry Payment(e)	208.00
Family Tax Benefit Part A(a)	
For each dependent child	
Aged under 13 years	122.92
Aged 13–15 years	155.82
Aged 16–17 years	39.48
Aged 18–24 years	53.06
Family Tax Benefit Part B(a)	
Age of youngest child	
Aged under 5 years	105.56
Aged 5–15 years	73.64
Aged 16–18 years and full-time students	73.64
Maternity Allowance One-off lump sum, per birth	798.72
Maternity Immunisation Allowance One-off lump sum	208.00
Mobility Allowance	64.40
Newstart Allowance(a)	
Single	
Aged 21 or over, no children	369.00
Aged 21 or over, with children	399.00
Aged 60 or over, after 9 months	399.00
Partnered(b)	332.80
Parenting Payment(a)	
Sole parents	421.80
Partnered parents	332.80

For footnotes see end of table.

...continued

**7.8 MAXIMUM RATES FOR INCOME SUPPORT  
PAYMENTS AND BENEFITS**  
— As at 30 June 2002 — *continued*

	\$
Partner Allowance(a)	332.80
Pensioner Education Supplement(a)	
At least 50% study load	62.40
At least 25% study load	31.20
Student Financial Supplement Scheme	
Maximum loan, per year	7 000.00
Youth Allowance(a)	
Single, no children	
Aged under 18 years, at home	165.10
Aged 18 years and over, at home	198.60
Away from home	301.70
Single with children	395.30
Partnered with no children	301.70
Partnered with children	331.30

(a) Per fortnight. (b) Each. (c) Per fortnight for a maximum of seven fortnights. (d) Per hour. (e) One-off.

Note: For Carer Payment, Widow Class B Pension, Wife Pension (Age) and Wife Pension (DSP) see Age Pension. For Mature Age Allowance, Sickness Allowance, Widow Allowance see Newstart Allowance; and for Special Payment generally as for Newstart/Youth Allowance.

Source: Centrelink.

**Youth and student support**

Youth and student support policy is aimed at promoting a family orientation in developing youth policy. It is formulated to help low- to middle-income families by providing income support for young people undertaking education or training or seeking work. The policy is also trying to develop new partnership arrangements within and across levels of government and with community organisations to support innovations in youth and family support arrangements around young people's transitions to independence and adulthood.

Youth Allowance is the main income support payment for people aged 16–20 years actively seeking employment and for full-time students 16–24 years old. It is subject to an individual income and assets test and a parental income and assets test. A person may be exempt from the parental test if they meet the Youth Allowance independence criteria. In addition a person must undertake approved activities that may include full-time study or a combination of activities such as job search, work for the dole, literacy and numeracy courses, part-time education, part-time employment and voluntary work. People on Youth Allowance may be required to undertake Mutual Obligation activities.

## 7.9 RECIPIENTS AND EXPENDITURE FOR FAMILY ASSISTANCE(a)

	Units	2000–01	2001–02
<b>Family Tax Benefit</b>			
Centrelink			
Recipients(b)			
Part A — fortnightly instalments	no.	1 801 285	1 795 355
Part B — fortnightly instalments	no.	1 181 069	1 199 233
Lump sum payments(c)	no.	n.a.	40 319
Total payments (Part A and Part B)	\$'000	10 076 463	10 927 703
Australian Taxation Office			
Recipients(b)			
Paid by tax instalment deduction or on assessment	no.	n.a.	80 326
Reconciliation credits	no.	n.a.	n.a.
Payments			
Paid by tax instalment deduction or on assessment(d)	\$'000	(e)11 000	171 380
Reconciliation credits(d)	\$'000	n.a.	164 570
Maternity Allowance			
Recipients	no.	210 120	212 237
Payments	\$'000	217 899	216 887
Maternity Immunisation Allowance			
Recipients	no.	203 939	206 803
Payments(f)	\$'000	n.a.	n.a.
Double Orphan Pension			
Recipients	no.	1 242	1 207
Payments	\$'000	1 977	1 976

(a) Refers to total payments in the year ending 30 June. (b) Recipients who claimed assistance using more than one payment method for the year are included in each category. (c) Includes recipients of Family Tax Benefits reconciliation credits. (d) Data are presented on an accruals accounting basis. Most Australian Taxation Office payments of Family Tax Benefit are paid on assessment of taxation returns. Thus, most payments made in 2001–02 relate to the taxpayer's entitlements for the previous financial year. (e) Estimated. (f) Separate expenditure figures are not available for Maternity Allowance and Maternity Immunisation Allowance.

Source: Department of Family and Community Services; Department of the Treasury.

The rate of Youth Allowance is determined on whether the person is single, partnered, if they have children, if they live at home or need to live away from home.

Austudy payment is paid to students 25 years and over whose financial circumstances are such that without financial help, full-time study would not be possible. The rate of Austudy is dependent on whether the person is single or partnered, whether they have children and whether the person is a 'long-term income support student'.

There is also a Student Financial Supplement Scheme that gives students the option of increasing their income while studying. Students

surrender one dollar of income support for two dollars of fully refundable repayable loan that is repaid on an income contingent basis. The scheme helps remove barriers to participation in education.

Eligible students receiving Youth Allowance, Austudy or Pensioner Education Supplement, who usually live away from home, will receive a Fares Allowance which contributes to travel costs.

Table 7.10 shows the number of Youth and Student Support recipients and expenditure by payment type.

## 7.10 RECIPIENTS AND EXPENDITURE FOR YOUTH AND STUDENT SUPPORT

	Units	May 1999	June 2000	June 2001	June 2002
Youth Allowance					
Full-time students	no.	303 747	308 883	308 549	308 169
Other	no.	84 156	83 071	86 404	87 327
Total	no.	387 903	391 954	394 953	395 496
Total payments(a)	\$'000	1 843 498	2 002 830	2 101 915	2 213 719
Austudy					
Recipients	no.	47 170	42 838	41 992	41 007
Total payments(a)	\$'000	287 173	253 870	249 258	280 794
Student financial supplement payments(a)	\$'000	259 745	290 681	161 510	500 967
Fare allowance payments(a)	\$'000	690	569	644	525

(a) Year ending 30 June.

Source: Department of Family and Community Services.

## Child Care Support

Child Care Support policies have been developed to help families to participate in the economic and social life of the community through providing support for child care.

Child Care Benefit (CCB), which replaced Childcare Assistance and the Childcare rebate from 1 July 2000, helps families with the cost of child care, with financial assistance proportionally higher for lower income families. Eligible families can have the benefit paid directly to the child care service to reduce their ongoing fees. Alternatively they can receive the benefit as a lump sum refund at the end of the financial year. Families using registered carers (i.e. informal care provided by a friend or neighbour), rather than formal care in an approved service, are eligible for the minimum rate of CCB. This is paid for up to 50 hours per week of work-related child care.

The Jobs, Education and Training (JET) Program helps some people on particular payments from Centrelink (including parents, widows, carers) gain new skills or update existing skills, and improve their chances of gaining employment. JET Child Care provides extra assistance to eligible customers who need help finding suitable affordable child care. Assistance is provided through the JET child care network and is called Child Care for Eligible Parents Undergoing Training.

Table 7.11 shows the number of Child Care Support recipients and expenditure by payment type.

## 7.11 RECIPIENTS(a) AND EXPENDITURE FOR CHILD CARE SUPPORT

	1999		2000		2001		2002	
	no.	\$'000	no.	\$'000	no.	\$'000	no.	\$'000
Child Care Benefit(b)								
Approved service	..	..	..	..	630 156	1 037 137	n.a.	1 315 912
Registered carers	..	..	..	..	47 236	..	n.a.	..
Child Care for Eligible Parents Undergoing Training	5 395	4 599	8 592	11 050	13 276	7 301	(c)18 352	11 067

(a) Number of families. (b) Families can receive Child Care Benefit for both approved child care and registered care. (c) Does not include five months of data for NT and seven months of data for ACT.

Source: Department of Family and Community Services.

## Labour Market Assistance

Labour Market Assistance policies are designed to help support people of working age through providing income support to those seeking work or undertaking other activities such as training or community work or caring for children. Most income support payments are subject to a means test, which assesses family income and assets.

There are two main income support payments for Labour Market Assistance: Newstart Allowance (NSA) and Parenting Payment.

NSA is paid to people aged 21–64 years who are unemployed and actively searching for work. They must be willing to undertake suitable paid work, which includes full-time, part-time or casual employment. They may also qualify if undertaking a vocational training course, participating in a labour market program or undertaking other agreed activities.

NSA jobseekers may be asked to undertake Mutual Obligation activities, in addition to their job search, after six months of unemployment and annually thereafter. Mutual Obligation requires people to take part in activities to improve their skills and work habits. It aims to enhance the person's job prospects and competitiveness in the labour market, promotes involvement in community work and facilitates transition from welfare to employment. From 1 July 2002, Mutual Obligation requirements apply to all job seekers up to 49 years of age.

Parenting Payment is paid to single and partnered low-income parents who are primary carers for children under 16. The policy recognises the important contribution made by parents caring for children at home and aims to avoid parents' future choices being limited by long periods out of the workforce.

Other payments for Labour Market Assistance include: Mature Age Allowance, Partner Allowance, Widow Allowance, Bereavement Allowance and Special Benefit. Mature Age Allowance, Partner Allowance and Widow Allowance all recognise the labour market difficulties faced by some older unemployed people who have no recent workforce experience. Bereavement Allowance is a short-term payment for recently widowed people without dependent children, payable for up to 14 weeks. Special Benefit provides assistance to people in severe financial need and for whom no other pension, allowance or other support is available.

Pensioner Education Supplement, Education Entry Payment and Employment Entry Payment provide supplementary financial assistance to help with the costs of taking up study and entering the work force.

Table 7.12 shows the number of Labour Market Assistance recipients by expenditure and payment type.

## 7.12 LABOUR MARKET ASSISTANCE

	Units	May 1999	June 2000	June 2001	June 2002
<b>Newstart Allowance</b>					
Short-term (less than 12 months)					
Males	no.	171 764	143 659	165 451	146 965
Females	no.	77 469	62 695	67 460	60 094
Persons	no.	249 233	206 554	232 911	207 059
Long-term (12 months and over)					
Males	no.	273 366	247 366	222 548	222 789
Females	no.	106 290	98 959	85 545	94 024
Persons	no.	379 656	346 325	308 093	316 813
Total payments(a)	\$'000	5 370 669	4 954 450	4 918 349	5 078 220
<b>Parenting Payment</b>					
Single					
Males	no.	(b)27 128	28 463	32 429	33 889
Females	no.	(b)357 814	368 851	392 187	402 750
Persons	no.	(b)384 942	397 314	424 616	436 639
Total payments(a)	\$'000	3 266 957	3 407 804	3 861 774	4 145 834
Partnered(c)					
Persons	no.	(b)622 321	595 837	214 721	201 585
Total payments(a)	\$'000	2 135 987	2 086 426	1 463 907	1 425 884
<b>Mature Age Allowance</b>					
Recipients	no.	47 360	42 106	39 296	39 906
Total payments(a)	\$'000	401 698	367 250	352 596	364 210
<b>Partner Allowance</b>					
Recipients	no.	81 804	89 580	92 438	100 833
Total payments(a)	\$'000	590 185	646 460	728 679	817 599
<b>Widow Allowance</b>					
Recipients	no.	27 822	32 982	36 908	40 910
Total payments(a)	\$'000	227 289	270 825	324 919	389 550
<b>Special Benefit</b>					
Recipients	no.	11 808	10 971	12 495	12 811
Total payments(a)	\$'000	99 585	98 704	114 778	119 811
<b>Bereavement Allowance</b>					
Recipients	no.	n.a.	n.a.	n.a.	n.a.
Total payments(a)	\$'000	734	782	719	813
<b>Pensioner Education Supplement</b>					
Recipients	no.	n.a.	n.a.	n.a.	n.a.
Total payments(a)	\$'000	44 601	49 571	58 248	65 784

(a) Ending 30 June. (b) Numbers for Parenting Payments are for June 1999. (c) From 1 July 2000 the basic component of Parenting Payment (partnered) was incorporated into Family Tax Benefit. As a result 375,233 customers were transferred from Parenting Payment (partnered) to Family Tax Benefit Part B.

Source: Department of Family and Community Services.

### Support for people with a disability

The policy to support people with disabilities is designed to promote independence and self-reliance through the provision of rehabilitation services, specialist employment services and other services for people with a disability. It also aims to help support people with a disability with limited means through the provision of income support.

Disability Support Pension (DSP) is the main form of income support for people with a physical, intellectual or psychiatric impairment resulting in an inability to work for at least 30 hours per week at award wages, or be retrained for work, for at least two years. DSP is income and assets tested. However, the permanently blind are exempt from the income test. DSP for people aged 21 years and over is paid at the same rate as Age Pension. Youth rates

apply to those aged under 21 years. These are largely tied to Youth Allowance rates, but include a supplement of \$85.30 per fortnight. Youth rates are not subject to parental income or assets tests.

From September 2002, the Better Assessment and Early Intervention Australians Working Together measure provides for an increased focus on the assessment of work capacity for people who are ill, injured or have a disability and on the early identification of interventions, such as rehabilitation and employment assistance, to help people maximise their economic and social participation.

Other support for people with a disability includes Mobility Allowance and Sickness Allowance. Mobility Allowance is intended to help those who are involved in paid work, vocational training or voluntary work or a combination of some of these, who are unable to use public transport without substantial assistance. Sickness Allowance may be paid to people between 21 and Age Pension age, who are temporarily unable to work or continue with their full-time study due to illness or injury but who have a job or study to return to.

Wife Pension (DSP) provides an income for a woman who is a partner of a DSP recipient, is aged below Age Pension age and is not receiving any other payment in her own right. This payment is gradually being phased out, with new grants of Wife Pension ceasing after 30 June 1995.

Table 7.13 shows the number of recipients of support for people with a disability, and expenditure by payment type.

### Support for carers

There are two forms of Commonwealth financial assistance that may be available in a caring situation — Carer Payment and Carer Allowance.

Carer Payment provides income support to people who, due to the demands of their caring role, are unable to support themselves through substantial workforce participation. Carer Payment is subject to income and assets tests and is paid at the same rate as other social security pensions.

Carer Allowance is a supplementary payment that is available to people who provide daily care and attention at home for an adult or child with a disability or severe medical condition. Carer Allowance is not income or assets tested. It can be paid in addition to a social security income support payment.

**7.13 SUPPORT FOR PEOPLE WITH A DISABILITY**

	Units	June 1999	June 2000	June 2001	June 2002
Disability Support Pension					
Males	no.	373 340	382 412	392 354	406 893
Females	no.	204 342	219 981	231 572	252 022
Persons	no.	577 682	602 393	623 926	658 915
Total payments(a)	\$'000	4 920 223	5 253 241	5 849 799	6 404 351
Wife Pension (DSP)					
Recipients	no.	68 523	59 172	51 225	44 238
Total payments(a)	\$'000	534 069	479 205	446 564	401 969
Mobility Allowance					
Recipients	no.	31 001	35 154	37 574	41 456
Total payments(a)	\$'000	46 137	52 096	59 367	67 852
Sickness Allowance					
Recipients	no.	(b)11 181	10 733	10 942	9 522
Total payments(a)	\$'000	(b)93 043	83 881	95 554	93 724

(a) Ending 30 June. (b) 1999 data for Sickness Allowance based on May 1999.

Source: Department of Family and Community Services.

Table 7.14 shows the number of support for carer recipients and expenditure by payment type.

### Support for the aged

Policies relating to support for the aged are designed to help retirees make best use of their own financial resources to maintain their standard of living, and to support the aged with limited means through providing income support. They are also intended to provide information and foster opportunities for older people to participate in the community.

The principal form of support is the Age Pension. Age Pension age for men is 65 and for women is being progressively raised to 65 by 2014. The qualifying age for women depends on their date of birth, with the minimum age increasing by six months at two year intervals until it reaches 65 for those born on or after 1 January 1949.

Other payments available for older Australians include Wife Pension and Widow B Pension. These payments were designed to provide financial assistance to women below the pension age who are either the partner of an age pensioner or who have lost the financial support of a male partner through death, separation or divorce. The concepts behind these payments have been updated to reflect a more modern society and consequently these payments have been closed to new entrants. From 1 July 1995 for Wife Pension, and from 21 March 1997 for Widow B Pension, payments have been confined to women already receiving the payment on those dates.

The ageing of the Australian population will increase the financial commitment of the Australian economy to support the aged. It is expected that Age Pension expenditure will increase from 3.0% of gross domestic product to 4.6% by 2050.

Table 7.15 shows the number of recipients and expenditure by payment type for support for the aged.

#### 7.14 SUPPORT FOR CARERS(a)

	Units	1999	2000	2001	2002
<b>Carer Payment</b>					
Recipients	no.	40 070	47 550	57 190	67 260
Total payments	\$'000	307 506	369 723	480 944	595 810
<b>Carer Allowance(a)</b>					
Recipients	no.	..	194 887	246 337	283 753
Total payments	\$'000	..	412 334	533 247	645 722

(a) Year ending 30 June. (b) Carer Allowance was introduced on 1 July 1999. It combined Child Disability Allowance with Domiciliary Nursing Care Benefit, which was the responsibility of the Department of Health and Ageing.

Source: Department of Family and Community Services.

#### 7.15 SUPPORT FOR AGED(a)

	Units	1999	2000	2001	2002
<b>Age Pension(b)</b>					
Males	no.	634 112	654 557	684 219	710 170
Females	no.	1 081 680	1 075 303	1 101 335	1 100 609
Persons	no.	1 715 792	1 729 860	1 785 554	1 810 779
Total payments(a)	\$'000	13 569 056	14 037 940	15 616 477	16 665 653
<b>Widow B Pension</b>					
Recipients	no.	10 518	8 892	6 456	5 130
Total payments(a)	\$'000	105 694	89 849	84 296	59 787
<b>Wife Pension (Age)(b)</b>					
Recipients	no.	32 196	31 406	26 476	23 730
Total payments(a)	\$'000	243 433	240 751	233 080	216 160

(a) Year ending 30 June. (b) Includes the Pension Savings Bonus Scheme from 1 July 1998 (first payments were made in 1999-2000); and amounts paid by the Department of Veterans' Affairs in relation to the Aged Pension, related Wife Pension and Disability Support Pension.

Source: Department of Family and Community Services.

## Other support programs

### Family assistance

Family assistance support programs help support and strengthen families through services to enhance family relationship, lower the incidence of family breakdown and prevent child abuse.

The Stronger Families and Communities Strategy aims to strengthen communities by investing in prevention, early intervention and capacity building. Commencing in 2000–01 the Strategy will run for four years, fund community-based projects for strengthening families, develop better relationship and parenting skills, and provide more responsive child care options. A longitudinal study of child health and development was also initiated under the Strategy.

The Commonwealth Government has been funding the Family Relationships Services Program (FRSP) since the early 1960s. The Program aims to enable children, young people and adults to develop and sustain safe, supportive and nurturing family relationships and to minimise the emotional, social and economic costs associated with disruption to family relationships. The Attorney-General's Department (A-G's) contributes part of the funding for the FRSP.

Early Intervention and Parenting projects are aimed at preventing child abuse, improved parenting skills and strengthening families. A key focus of these projects is meeting the special needs of families in rural and remote areas, Indigenous families and families from multicultural backgrounds. Opportunities are also provided for children under five, and their carers, to interact with other children and their carers.

The Commonwealth Financial Counselling Program provides free financial counselling services to people in low-income groups experiencing financial crises due to circumstances such as unemployment, sickness, credit over-commitment and family breakdown.

### Youth and student support

Youth and Community Support programs develop new partnerships within and across levels of government and with community organisations to support innovations in youth and family support arrangements around young people's transition to independence and adulthood.

The Strengthening and Supporting Families Coping with Illicit Drug Use Measure provides funding to state and territory governments to provide services to families where a young person is suffering from the effects of illicit drug use.

Reconnect is an early intervention program for young people, aged between 12 and 18 years, who are homeless or at risk of homelessness, and their families. Reconnect services offer counselling, adolescent mediation and practical support to both young people and their families.

The Youth Activities Services Program provides innovative structured activities and positive peer support programs after school, over the weekend and during vacations for 11–16 years olds in disadvantaged areas.

The Youth Activities Services Family Liaison Worker Program provides practical support and guidance for young people aged 11–16 and their families, to help them deal with difficulties such as family conflict and lack of communication, and refer them to specialist services as required.

The JET program is an early intervention program providing assistance to young people aged between 15 and 21 years (with an emphasis on 15–19 year olds) who are homeless, at risk of becoming homeless, ex-offenders, refugees or wards of the state.

The Green Corps Program provides young people aged between 17 and 20 years with the opportunity to work on environmental and heritage conservation projects, while undertaking accredited training.

### Child support

The Child Support Scheme is a joint FaCS and A-G's scheme, administered by the Child Support Agency (CSA). It aims to improve financial support for children of separated parents by obtaining contributions from paying parents for the support of their children, in accordance with their capacity to pay. Parents may make private arrangements for child support to be paid, or have it collected by the CSA. Parents are required to take reasonable steps to obtain child support if they wish to receive Family Tax Benefit Part A at more than the basic rate.

The total amount of child support transferred between parents in 2001–02 was \$1,450m. This includes child support that the CSA assessed and parents transferred privately, and child support the CSA assessed and collected.

**Child care**

Child care support policies are designed to help families balance their work and parenting roles by providing flexible child care services to promote quality child care, contributing to the development and education of children; and provide a focus for early intervention initiatives for vulnerable families and children.

Child care services include centre-based long-day care, family day care, in-home care, before and after school hours care, vacation care, occasional care, and Multi-functional Aboriginal Children's Services. Flexible services that can combine various models of care are also available to meet the needs of families in rural and remote areas. There were 500,027 Commonwealth funded places, across all child care support services, at December 2001.

**Housing support**

Housing support policies are in place to assist low and moderate income householders access appropriate affordable housing, and provide supporting initiatives to assist homeless people.

The Supported Accommodation Assistance Program is a joint Commonwealth and state/territory government program, which provides transitional, supported accommodation and a range of related support services to people who are homeless or at imminent risk of homelessness. It also aims to resolve crisis situations, re-establish family links where appropriate and re-establish the capacity of clients to live independently of the program.

FaCS housing programs are discussed further in *Chapter 8, Housing*.

**Community support**

Community support programs and policies cover a wide range of goals and outcomes. They include developing community capacity and self-reliance by supporting leadership, volunteering and innovative local responses. Another goal is to help people in rural and regional areas to access services that support their special needs and to take advantage of opportunities. They are also designed to help improve the living conditions of Indigenous peoples and other culturally and linguistically diverse communities. Other goals and outcomes involve encouraging partnerships between business, community and government sectors, helping in crisis situations and assisting low-income families and individuals with living costs.

Initiatives under the Stronger Families and Communities Strategy such as the National Skills for Volunteers Program, provide capacity building support to communities. The National Skills for Volunteers Program supports volunteers by providing skills development grants and training resources to community organisations.

The Emergency Relief Program provides grants to charitable, community and religious organisations so that they can assist individuals and families in emergency financial crisis. The program also provides training support for paid and voluntary workers in the sector. The Volunteer Management Program provides funding for centres to provide referral services to community organisations and training for volunteer managers.

Remote Area Allowance offsets some of the additional costs associated with living in remote areas of Australia. It recognises that income support customers do not receive the full benefits of the zone tax offset amounts that are available to taxpayers. A quarterly Telephone Allowance payment is paid to pensioners, long-term allowance customers and eligible Commonwealth Seniors Health Card holders to assist with the cost of domestic telephone services. Pharmaceutical Allowance is paid to pensioners and some other income support customers to help with the cost of Pharmaceutical Benefit Scheme prescription items.

Commonwealth Concessions Cards, the Pensioner Concession Card, the Health Care Card and the Commonwealth Seniors Health Card, are also part of Community Support policies. They are issued mainly to assist eligible individuals and/or their families with the cost of Pharmaceutical Benefits Scheme prescription items.

**Labour market assistance**

Labour market assistance policies are designed to foster a culture of self-reliance in the community by promoting appropriate understanding, expectations and behaviours.

The Australians Working Together (AWT) initiative, which is being progressively implemented from 1 July 2002, provides assistance to people of workforce age including job seekers, parents, people with disabilities, the unemployed, mature age people and Indigenous Australians. Initiatives include a Working Credit to encourage people on income support to take up full-time, part-time or irregular casual work,

Training Credits, a Literacy and Numeracy Training supplement, more places in employment services and initiatives to assist Indigenous Australians.

The Personal Support Program (PSP), which commenced on 1 July 2002, helps those people on income support payments who face multiple non-vocational obstacles to employment. These barriers include homelessness, drug and alcohol problems, psychiatric disorders or domestic violence problems. The PSP has broad objectives that recognise social as well as economic participation. Social outcomes are often more achievable and appropriate to participants with these sorts of multiple barriers to employment.

JET is a joint program of the FaCS, the Department of Employment and Workplace Relations and the Department of Education, Science and Training. JET is a voluntary program that assists with skill development and entry or re-entry into the paid workforce. Assistance provided includes: development of a plan to achieve labour market readiness; access to education, training and employment assistance; referrals to government and community services; and child care assistance. People receiving Parenting Payment, Widow Allowance, Partner Allowance, Widow B Pension, Carer Payment and some Special Benefit recipients are eligible to participate in JET.

The Voluntary Work Initiative was introduced in 1996 and aims to improve the take-up and effectiveness of voluntary work among income support customers of working age, particularly Newstart and Youth Allowance customers. Initiatives are also being developed that aim at increasing take-up by Indigenous customers and customers of a multicultural background, as well as extension of the program to meet the needs of new AWT customers from 1 July 2002. Volunteering Australia manages the scheme on behalf of the FaCS.

### **Support for people with a disability**

The *Disability Services Act 1986* (Cwlth) was introduced to expand opportunities for the participation of people with disabilities. Under the Act, the Commonwealth Government provides grants for the provision of services to people with disabilities, particularly in the labour market.

Under the Commonwealth/State Disability Agreement, the Commonwealth has responsibility for the provision of employment services for people with disabilities. Disability employment services assist people with disabilities in job search and job placement, and provide individualised on-the-job training and support. The Commonwealth also provides funds to assist the states and territories in the planning, policy setting and management of accommodation and other related services for people with disabilities. Areas such as advocacy and research and development continue to be a responsibility of both levels of government.

In 1994 the Commonwealth Disability Strategy was adopted as a 10-year policy and planning framework for Commonwealth government departments and authorities, to improve access to their programs, services and facilities for people with disabilities. The Strategy was adopted in response to the *Commonwealth Disability Discrimination Act 1992* (Cwlth), which makes discrimination on the grounds of disability unlawful.

Programs for Support for People with a Disability include the Disability Employment Assistance Program and the Employer Incentives Strategy. The Disability Employment Program provides funding for job seekers with disabilities to find and maintain employment. The Employer Incentives Strategy encourages employers to provide durable job opportunities for people with a disability, including workplace modifications, supported wage assessments and grants to address change in business recruitment practices.

Support is also provided through Rehabilitation Services to improve function and independence in people with a disability so that they can remain in or return to suitable employment, and live independently. Advocacy is another program designed to enable people with a disability to more fully participate in community life, and achieve and maintain their rights as citizens. The Advocacy program involves families of individuals where possible and appropriate.

Print and Caption Translation Services assists people with a disability to access recreation information, captioned television news and videos. It also subsidises the production of printed material in formats accessible to people, who by reason of their disability, are unable to access information provided in print medium.

## Aged care programs of the Department of Health and Ageing

### National Strategy for an Ageing Australia

Recognising the significant implications of population ageing across a number of public policy areas, the Commonwealth Government has developed a National Strategy for an Ageing Australia. The National Strategy Framework document identifies key issues, a number of goals and some broad, practical actions to meet these goals. It provides a basic framework to address current issues facing older people and to prepare for future demographic changes as Australia's population ages over the next 50 years. It also highlights that the ageing of Australia's population is an issue for all Australians — governments, businesses, community organisations, and individuals.

The themes of the National Strategy cover:

- healthy ageing issues — health promotion, physical activity
- independence and self provision issues — retirement income, pensions and superannuation
- world class care issues — health and care issues across the spectrum
- employment for mature age workers issues
- attitude, lifestyle and community support issues — housing, transport, lifelong learning, tourism, business opportunities, families and intergenerational issues
- ongoing action on ageing matters by government, business, community and professional organisations and individuals will be necessary over the short, medium and longer term.

Current Commonwealth initiatives include the *Intergenerational Report*, the development of a mature age workers strategy, and legislation to prohibit discrimination on the basis of age.

### Residential Aged Care Program

The aim of the Residential Aged Care Program is to enhance the quality of life of older Australians through support for the provision of a cohesive framework of high quality and cost effective residential care services for frail older people.

Aged care places are allocated in proportion to the number of people aged 70 years and older.

The Government subsidises the costs for each person in a residential care setting. The level of funding depends on the care needs of the resident. Also, residents can be asked to pay fees and charges. Each aged care home that provides care is required to meet specific care standards and to be accredited by the Aged Care Standards and Accreditation Agency in order to receive Commonwealth government funding. Capital funding is available on a competitive basis to support residential aged care where the aged care provider is unable to fund necessary building works. Commonwealth government expenditure on residential aged care in 2001–02 is shown in table 7.16.

**7.16 COMMONWEALTH EXPENDITURE ON RESIDENTIAL AGED CARE — 2001–02(a)**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.(b)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Residential care (recurrent)(b)	1 441.9	973.0	698.9	382.8	322.6	117.1	11.8	39.2	3 987.3
Residential care (capital)(c)	7.0	4.6	2.8	0.8	1.5	1.8	1.2	0.1	19.7

(a) Includes expenditure by the Department of Health and Ageing and the Department of Veterans' Affairs, in accrual terms.

(b) Total for Australia does not include payment of \$3.982m expensed to central office. Allowance has been made for the timing and rounding of payments. Due to the department's financial reporting system, these figures may change. (c) Allowance has been made for rounding of payments.

Source: Department of Health and Ageing.

## Community care programs

### Home and Community Care (HACC) Program

The HACC Program is a joint Commonwealth/state cost-shared program which provided \$1b nationally for the 2001–02 financial year to service provider organisations. Of the total, the Commonwealth made available \$615m or 60%, the states and territories providing the remaining 40%.

The Commonwealth provides funding for HACC, but the day-to-day administration, priority setting and approval of project allocations is the responsibility of the state and territory governments.

The aim of the HACC Program is to provide basic maintenance and support services to enable frail older people, and younger people with disabilities, to remain living in their home and the community and to prevent premature admission to long-term residential care. HACC funded services also assist the carers of these groups. The types of HACC funded services available include home maintenance and modification, as well as domestic assistance, food services, personal care, community nursing, transport and respite care.

### Commonwealth Carelink Program

Nationally, over 60 Commonwealth Carelink Centres provide information about local community aged care, disability and other support services to over 9,000 clients each month. Clients include care professionals including general practitioners, service providers, individuals and their carers. Total program funding of \$41m is provided from 1999 to 2003.

### Community Aged Care Packages Program

Community Aged Care Packages are funded by the Commonwealth to provide a community alternative to low level residential care to assist frail older people with complex needs to remain living in the community.

Service providers use a case management approach to develop and monitor care delivery to eligible older people. One of the great benefits of the Community Aged Care Packages Program is its flexibility in service delivery which is designed to meet individual needs. This flexibility enables people to be given assistance through a package of care services which may include personal care, assistance with preparing meals, home help and assistance with transport.

By June 2002, there have been 26,650 packages approved under the program. Total cash expenditure for 2001–02 was approximately \$250m.

### Aged Care Assessment Program

The Commonwealth provides grants to state and territory governments specifically to operate Aged Care Assessment Teams (ACATs). In 2001–02, the Commonwealth Government contributed \$40m for the operation of 123 ACATs throughout Australia, as well as an evaluation unit in each state.

ACATs assess the care needs of people. The main professional groups represented on ACATs are geriatricians, social workers, nurses, physiotherapists, occupational therapists, psychologists and psychogeriatricians.

ACATs assess the whole care needs of an individual, using a multi-disciplinary and multi-dimensional approach. As part of the holistic assessment process, a person's medical, physical, social, psychological and restorative care needs are assessed before a care approval is made. ACATs are also well positioned to provide advice on aged care services and to act as an interface between aged care services and the health care system.

Clients need to be assessed as eligible by an ACAT before they can receive a Commonwealth subsidy for residential care, a Community Aged Care Package, or flexible care.

### Assistance with Care and Housing for the Aged (ACHA) Program

The ACHA Program assists frail, low-income older people who are renting, are in insecure/inappropriate housing or are homeless, to remain in the community by accessing suitable housing linked to community care.

The Commonwealth contributes recurrent funds to organisations that provide support through paid workers and/or volunteers, assisting clients to access and be maintained in secure and affordable housing. The primary role of program workers is to link clients to appropriate mainstream housing and/or care services.

In 2001–02 the program funded 46 projects nationally from an allocation of \$3m. The funding for each project varies according to identified community need, the number of staff employed by individual services and the tenure of employment (i.e. full-time or part-time). Most

projects are located in inner city areas where there is a concentration of frail elderly people living in insecure accommodation.

### **National Respite for Carers Program (NRCP)**

The aim of the NRCP is to contribute to the support and maintenance of caring relationships between carers and their dependent family and friends. It provides information, respite care and other support or assistance appropriate to carers' individual needs and circumstances, and those of the people for whom they care.

Funding for the NRCP increased from \$19m in its inception year, 1996–97, to \$88m in 2001–02. The NRCP funds Commonwealth Carer Resource Centres, Commonwealth Carer Respite Centres and respite services.

Commonwealth Carer Resource Centres, located in each state and territory, were established to act as a point of contact for carers seeking information and advice about the full range of services, support and assistance that is available to carers.

A national network of over 90 Commonwealth Carer Respite Centres and regional office outlets has been established to improve coordination of respite service provision and help meet emergency and unplanned respite needs. Commonwealth Carer Respite Centres provide carers with a single contact point for respite care assistance whether the respite service required is in an aged care facility, in the community or in the carer's home. The NRCP also provides funding for over 400 carer respite services, which include in-home, family-based, centre-based and peer support services, to supplement mainstream respite services offered through the HACC and other state-based programs as well as local government and community initiatives.

### **Extended Aged Care at Home (EACH) Program**

The EACH Program commenced as a three-year pilot in 1998 to test the feasibility of providing the equivalent to high level residential age care to people living at home. There are currently 10 provider organisations with a total of 290 approved places.

EACH service providers are required to deliver individually tailored, coordinated packages of care in keeping with a client's care plan. Services can include, but are not limited to, the following: personal care including continence care;

specialist nursing care and 24-hour emergency assistance; support for people with cognitive deficits; assistance with meals; and home help and maintenance.

The 2001 Budget Initiative on EACH provided an additional \$2m over two years for development work to lay the foundations for possible expansion of the EACH Program and address data management, quality and accountability issues. Through 2002–03 further development will be undertaken, including a census of EACH services in May 2002.

In the 2002 Aged Care Approvals Round, 160 EACH packages have been allocated to provide for a moderate expansion of the EACH Program. The expansion is planned to target Tasmania, Queensland and the Northern Territory, none of which hosted a pilot program. This expansion will build provider familiarity with the program, and provide an Australia-wide base for program development.

### **Day Therapy Centres (DTC) Program**

The DTC Program has been in operation since 1988 when rationalisation of nursing home funding led to the separate funding of the therapy function. There are 151 service providers across Australia providing a wide range of therapy services to frail older people living in the community and to residents of Commonwealth funded aged care homes. Funding provided by the Government in 2001–02 was \$29m.

In the 2001–02 Budget, as part of the 'Increasing Care and Diversity for Frail Older Australians' package the Government provided an additional \$4m over four years to enhance the DTC Program. This initiative will turn DTC much more towards outreach into the community and prevention of premature entry into high level care, particularly for those older people with dementia.

### **National Continence Management Strategy**

The 'Staying at Home — Care and Support for Older Australians 1998' package included \$15m over four years to address the needs for improved continence management for older Australians through the National Continence Management Strategy. Under this Strategy, a number of national research and service development initiatives are being trialed to complement existing continence care.

The Commonwealth Government also funds the Continence Aids Assistance Scheme (CAAS) which was established to assist people of working age who have a permanent disability-related incontinence condition. CAAS currently provides a subsidy to eligible individuals of \$465 per annum. CAAS funding for 2002–03 is \$11m.

### Commonwealth Hearing Services Program

The role of the Commonwealth Hearing Services Program is to purchase services for eligible people with a hearing impairment. The administration of the Commonwealth Hearing Services Program is the responsibility of the Office of Hearing Services (OHS), a branch within the Aged and Community Care Division in the Department of Health and Ageing.

Access to hearing services for eligible adults is provided through the Hearing Services Voucher System. Eligible adults include holders of Pensioner Concession Cards, holders of Repatriation Health Cards issued to Veterans for conditions that include hearing loss, Sickness Allowees, dependants of the above categories, Commonwealth Rehabilitation Services Australia clients undergoing a vocational rehabilitation program and referred by their case manager, and serving Defence personnel. OHS purchases hearing services from accredited public and private sector providers. Voucher System expenditure in 2001–02 was \$134m.

There are 139 accredited hearing services providers contracted by the OHS to provide services under the Hearing Services Voucher System. Services are provided at 462 permanent sites and around 880 visiting sites throughout Australia by qualified hearing services practitioners (audiologists and audiometrists). OHS also has supply contracts with 15 hearing devices suppliers for the supply of quality hearing devices into the Program.

In addition, the Government funds Australian Hearing Services to provide specialised hearing services for children and young adults under the age of 21 years, and to ensure access to appropriate hearing services for eligible adults with special needs. These clients include those who live in remote locations, who are Aboriginal or Torres Strait Islander people, or who have complex hearing needs. Funding is also provided to Australian Hearing Services to undertake, through its research arm, the National Acoustic Laboratories, research to increase understanding of issues related to hearing loss, hearing

rehabilitation and the harmful effects of noise. Total funding of these Community Service Obligation activities in 2001–02 was \$28m.

## Services provided by the Department of Veterans' Affairs (DVA)

The Repatriation Commission determines services provided to veterans, via the *Veterans' Entitlements Act 1986 (VEA)* (Cwlth). The DVA provides the administrative machinery through which the Commission operates. The Commission, comprising three full-time members, has the following functions:

- to grant pensions and other benefits and provide treatment for veterans, their dependants and other eligible persons
- to advise the minister on the operation of the VEA
- generally to administer the VEA, subject to the control of the minister.

The VEA also gives the Commission the power to take necessary actions in connection with the performance of its functions, duties and powers. The responsible minister under the VEA is the Minister for Veterans' Affairs. The minister does not have any powers to direct the Commission beyond the power to approve various actions of the Commission.

The Commission currently provides services to more than half a million veterans and members of the Australian Defence Force (ADF), their partners, widows/widowers and children. The Commission has no staff of its own. DVA provides the administrative machinery through which the Commission operates.

Repatriation benefits are provided under the VEA for eligible service that includes:

- wartime service (World War I, World War II, and certain post World War II conflicts including eligible South East Asia service such as Korea, Malaysia and Vietnam)
- peacekeeping service
- Merchant Navy service during World War II
- peacetime service between 1972 and 1994 — it should be noted that the administration of the Military Compensation and Rehabilitation Service, which covers peacetime service prior to 1972 and post 1994, was transferred from Defence to DVA in December 1999.

Under the *Papua New Guinea (Members of the Forces Benefits) Act 1957* (Cwlth), Indigenous inhabitants of Papua New Guinea who served in the Australian forces during World War II, and members of the Royal Papuan Constabulary and New Guinea Police Force who also served in that conflict, are eligible for compensation-type benefits.

Members of other Commonwealth countries' forces and allied veterans are generally not eligible for compensation-type benefits from DVA in respect of their service, unless they were domiciled in Australia immediately before their enlistment. However, they may qualify for a DVA income support payment (see the *Income support* section).

Qualifications for receiving subsidised housing loans, granted under the Defence Service Homes Act, generally depend on service with the ADF in World War I or World War II, or specified service in Korea, Malaya, South East Asia, Namibia, the Middle East for the Kuwaiti crisis, Cambodia, the former Yugoslavia, or East Timor, and for service in the Regular Defence forces on or after 7 December 1972, provided the person's first service in the forces was before 15 May 1985. Certain civilians may also be eligible.

More detailed information on repatriation allowances, benefits and services is available from DVA.

## Compensation Program

The principal objective of the Compensation Program is to ensure that eligible veterans, their war widows and widowers, and their dependants, have access to appropriate compensation and income support in recognition of the effects of war or defence service. Compensation is administered under four sub-programs — the Compensation Sub-Program, the Income Support Sub-Program, the Housing Sub-Program and the Veterans' Review Board.

## Compensation Sub-Program

The main benefits provided through Compensation are the Disability Pension and the War/Defence Widow(er)s' Pension. Table 7.17 shows the number of pensions at 30 June 2002 and the four preceding years.

The Disability Pension compensates persons for incapacity resulting from eligible war, defence or peacekeeping service. General Rate Disability Pensions range from 10% up to and including 100%, depending on the degree of war-caused or service-related incapacity. Higher rates of pension — extreme disablement adjustment, intermediate and special rates — are available. The Intermediate Rate Pension and Special Rate Pension include components designed to recompense the veteran for loss of earnings. A veteran who is blind or who has certain amputations because of war-caused or service-related conditions is granted the Special Rate of pension without any reference to employment.

Compensation is also available to compensate dependants for the death of a spouse or parent as a result of eligible service. The compensation is available as War/Defence Widow(er)s' Pensions, Dependants' Pensions and Orphans' Pensions.

Various ancillary benefits may also be provided, including attendant allowance (paid to carers), clothing allowance, decoration allowance, loss of earnings allowance, recreation transport allowance, vehicle assistance scheme, goods and services tax (GST) exemption on cars and car parts, bereavement payment and funeral benefit.

Dependent children of ADF members who have been killed or severely injured were given access to educational guidance and counselling from the Veterans' Children Education Boards from 1 January 2001. Long Tan bursaries are available for the children of Vietnam veterans. From 1 January 2001 the children of Vietnam veterans are eligible for Veterans' Children Education scheme (VCES) benefits where the child is diagnosed as having a depressive disorder or if the opinion of an appropriately qualified professional is that the child is vulnerable.

## 7.17 DISABILITY AND WAR WIDOWS' PENSIONERS — As at 30 June

Recipient	1998	1999	2000	2001	2002
Incapacitated veterans	161 829	162 810	162 730	162 505	159 425
Wives and widows(a)	65 442	60 864	56 596	51 148	47 016
Children	3 752	3 337	3 165	1 690	1 404
War widows and widowers(b)	100 746	104 553	107 953	110 656	113 059
Orphans	420	414	410	382	344
Other dependants	771	735	683	657	600
<b>Total</b>	<b>332 960</b>	<b>332 713</b>	<b>331 537</b>	<b>327 038</b>	<b>321 848</b>

(a) Wives of still living veterans and widows of deceased veterans who have not died from an accepted war caused condition.

(b) Widows and widowers of deceased veterans who have died from an accepted war caused condition.

Source: Department of Veterans' Affairs.

Table 7.18 shows the number of disability pensioners at 30 June 2002 by conflict type. In this table, a person is allocated to the conflict relating to the first disability claim they lodged, regardless of later claims by the person relating to either earlier or later conflicts in which they served.

Table 7.19 shows the number of disability pensions at 30 June 2002 and for the nine preceding years.

The VCES (see tables 7.20 and 7.21) provides financial help, guidance and counselling to certain students up to 25 years of age. To be eligible a student must be the child of a veteran, an Australian mariner, or a member of the Forces, who is (or has been) in receipt of a Special Rate or Extreme Disablement Adjustment Disability Pension. Children of former prisoners of war, of veterans, or of Australian mariners whose death has been accepted as war-caused, are also eligible. Benefits include education allowances and other forms of assistance appropriate to the particular type and stage of education.

## 7.18 DISABILITY PENSIONERS — 30 June 2002

	World War I	World War II(a)	Seaman's War Pension	Korea/Malaya	FESR(b)	Vietnam	Peacetime forces	Gulf War(c)	East Timor	Others	Total
General Rate — from 10% to 100%	3	76 082	458	4 925	2 075	12 899	22 175	138	371	382	119 508
Intermediate Rate	—	414	1	52	13	311	192	—	1	—	984
Special Rate (TPI or equivalent)	—	8 027	8	1 598	540	14 248	1 922	24	29	27	26 423
Extreme Disablement Adjustment	—	11 714	84	532	62	100	11	—	—	7	12 510
<b>Total</b>	<b>3</b>	<b>96 237</b>	<b>551</b>	<b>7 107</b>	<b>2 690</b>	<b>27 558</b>	<b>24 300</b>	<b>162</b>	<b>401</b>	<b>416</b>	<b>159 425</b>

(a) Includes interim forces. (b) Far East Strategic Reserve. (c) A number of veterans of the Gulf War are officially recorded as members of the Defence/Peacekeeping forces.

Source: Department of Veterans' Affairs.

## 7.19 DISABILITY AND WAR WIDOWS' PENSIONS

	Disability pensions in force at 30 June				
	Incapacitated veterans(a)	Dependants of incapacitated veterans(b)	Dependants of deceased veterans(c)	Total	Annual expenditure(d) to 30 June
	no.	no.	no.	no.	\$'000
1993	156 923	96 948	83 642	337 513	1 445 308
1994	156 565	91 722	86 224	334 511	1 508 446
1995	157 298	85 837	90 039	333 174	1 570 136
1996	159 178	80 204	94 473	333 855	1 720 239
1997	160 145	74 405	98 493	333 043	1 819 338
1998	161 829	69 484	101 647	332 960	1 888 416
1999	162 810	64 486	105 417	332 713	2 067 783
2000	162 730	60 011	108 796	331 537	2 099 205
2001	162 505	53 080	111 453	327 038	2 314 052
2002	159 425	49 020	113 403	321 848	2 501 200

(a) All disability pensioners in payment. (b) Includes disability pensioners' spouse/widow(er)s, disability pensioners' children and Adequate Means of Support (AMS) incapacitated cases. (c) Includes war widow(er)s, orphans and AMS deceased cases. (d) Includes associated allowances (e.g. Income Support Supplement).

Source: Department of Veterans' Affairs.

## 7.20 VETERANS' CHILDREN EDUCATION SCHEME, Cost of education beneficiaries

	NSW(a)	Vic.	Qld	SA(b)	WA	Tas.	Aust.
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1992-93	1 612	1 093	1 198	310	645	414	<b>5 272</b>
1993-94	1 749	1 170	1 304	349	772	464	<b>5 807</b>
1994-95	1 906	1 164	1 601	372	792	492	<b>6 326</b>
1995-96	2 401	1 399	1 878	433	925	553	<b>7 590</b>
1996-97	2 914	1 695	2 430	522	1 136	621	<b>9 318</b>
1997-98	3 536	2 072	3 024	685	1 442	719	<b>11 478</b>
1998-99	3 970	2 421	3 609	812	1 714	789	<b>13 315</b>
1999-2000	3 858	2 585	3 904	976	1 919	789	<b>14 031</b>
2000-01	4 189	3 039	4 632	1 320	2 294	884	<b>16 357</b>
2001-02	4 634	3 230	5 445	1 534	2 576	903	<b>18 320</b>

(a) Includes ACT. (b) Includes NT.

Source: Department of Veterans' Affairs.

## 7.21 VETERANS' CHILDREN EDUCATION SCHEME, Number receiving benefits — At 30 June 2002

Type of training	NSW(a)	Vic.	Qld	SA(b)	WA	Tas.	Aust.
At school							
Primary(c)	278	147	486	123	210	70	<b>1 314</b>
Secondary	613	400	750	215	314	123	<b>2 415</b>
Total	891	547	1 236	338	524	193	<b>3 729</b>
Tertiary professional	273	189	381	142	255	48	<b>1 288</b>
Technical	74	102	132	—	—	19	<b>327</b>
Total	1 238	838	1 749	480	779	260	<b>5 344</b>

(a) Includes ACT. (b) Includes NT. (c) Receive an annual payment rather than the fortnightly payment received by other students.

Source: Department of Veterans' Affairs.

### Income Support Sub-Program

There are three main forms of income support pension paid by DVA:

- the Service Pension, which is similar to the Age and Disability Support Pensions paid by Centrelink
- the Partner Service Pension
- the Income Support Supplement.

All income support pensions are subject to income and assets tests except those granted to people who are blind in both eyes.

The Age Service Pension is payable to veterans with qualifying service at 60 years of age. Veterans with qualifying service may be paid the Invalidity Service Pension at any age if they are permanently incapacitated for work. Prior to 1 July 1995, the service pension was paid to female veterans with qualifying service at age 55. The Government introduced changes to the minimum age at which a female veteran can be granted an age service pension. Under the changes the minimum age is to be progressively lifted from 55–60 years in six-monthly increments every two years over the period 1995–2013. This means that the qualifying age for female veterans for age service pension at 1 July 2002 is 57 years.

For service during World War I and World War II, qualifying service generally means service in an area and at a time when the veteran incurred danger from hostile enemy forces. Qualifying service for post World War II deployments generally covers service in an operational area while allotted for duty in that area. Members of certain peacekeeping forces whose service is considered to be war-like also have qualifying service.

Veterans of other Commonwealth and Allied countries may also qualify for a service pension if they served in wars or war-like conflicts in which Australia was involved. Veterans of

Commonwealth forces must have served outside the country of enlistment or be entitled to the award of a campaign medal for service within that country. Allied veterans must have served in formally raised forces. The veteran must be an Australian resident with at least 10 years residency. A Partner Service Pension may be provided on the basis that the person is the partner or widow(er) of a veteran with qualifying service.

Income Support Supplement (ISS) is paid to war/defence widow(er)s of service pension age (60 for men, currently 57 for women). It may be paid to a widow(er) under Service Pension age if he or she has a dependent child, is caring for a severely handicapped person or is permanently incapacitated for work. The ISS is subject to income and asset testing and the War/Defence Widow(er)s' Pension is counted as income when assessing income support supplement.

The maximum Income Support Supplement was a frozen amount for many years. However, from 20 September 2002 it was unfrozen and is indexed twice a year by the same percentage as Service Pension.

All recipients of income support payments are eligible for supplementary benefits, provided by the Commonwealth Government, including some medical and hospital treatment, pharmaceutical benefits and the payment of a telephone allowance. They are also entitled to a range of concessions provided by state/territory and local governments. A number of additional supplementary benefits are also available, including Rent Assistance, Remote Area Allowance and Bereavement Payment.

Table 7.22 shows the total number of service pensions as at 30 June 2002, and table 7.23 shows the number of pensions and annual expenditure for the years 1993–2002.

## 7.22 SERVICE PENSIONS, By conflict — 30 June 2002

	World War I	World War II(a)	Korea/ Malaya and FESR(b)	Vietnam	Commonwealth and Allied	Gulf, Somalia, Cambodia	East Timor	Total
Veterans								
Old age/permanently incapacitated	5	100 068	9 712	20 163	25 024	14	2	154 988
Tuberculosis(c)	—	107	3	—	1	—	—	111
Total	5	100 175	9 715	20 163	25 025	14	2	155 099
Wives and widows	104	77 982	7 141	15 131	24 052	7	2	124 419
<b>Total</b>	<b>109</b>	<b>178 157</b>	<b>16 856</b>	<b>35 294</b>	<b>49 077</b>	<b>21</b>	<b>4</b>	<b>279 518</b>

(a) Includes Merchant Mariners and total of three unknown. (b) Far East Strategic Reserve. (c) Eligibility on these grounds ceased on 2 November 1978.

Source: Department of Veterans' Affairs.

## 7.23 SERVICE PENSIONS AND EXPENDITURE

	Pensions in force at 30 June				Annual expenditure(a) \$'000
	Veterans	Wives and widows	Total		
	no.	no.	no.		
1993	210 406	152 742	363 148	2 389 886	
1994	204 793	148 184	352 977	2 382 307	
1995	198 739	148 974	347 713	2 426 579	
1996	192 342	145 481	337 823	2 609 460	
1997	186 228	142 520	328 748	2 644 118	
1998	179 673	138 906	318 579	2 602 122	
1999	172 654	135 904	308 558	2 680 409	
2000	165 940	131 136	297 076	2 587 972	
2001	161 655	129 040	290 695	2 832 326	
2002	155 099	124 419	279 518	2 778 546	

(a) Includes associated allowances.

Source: Department of Veterans' Affairs.

### Housing Sub-Program (Defence Service Homes (DSH) Scheme)

The DSH Scheme provides financial benefits to recognise the contribution of certain men and women who have served Australia in either peacetime or wartime. The benefits include housing loan interest subsidies, comprehensive homeowners insurance cover at competitive rates, and home contents insurance (table 7.24).

The Scheme was established in 1918 as the War Service Homes Scheme. In 1972 its name was changed to the Defence Service Homes Scheme to recognise the extension of eligibility to those with qualifying peacetime service.

The Commonwealth Government sold the DSH mortgage portfolio to Westpac Banking Corporation, which became the Scheme's lender on 19 December 1988. Under the Agreement between the Commonwealth and Westpac, the Commonwealth subsidises Westpac for the low-interest loans provided. The subsidy is paid directly to Westpac and represents the difference between the concessional interest rate paid by the borrower and the agreed benchmark interest rate.

Since 1918, the Defence Service Homes Act has made provision for DSH insurance. Building insurance is available to all persons eligible under the Defence Service Homes Act or the Veterans' Entitlements Act. This benefit is also available to those who obtain assistance under the Defence Home Owner Scheme. DSH contents insurance, a comprehensive insurance package underwritten by QBE Mercantile Mutual Ltd, is available to veterans and the service community.

## 7.24 DEFENCE SERVICE HOMES SCHEME

	Units	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
Subsidised loans									
Loan accounts at 30 June	no.	101 887	96 518	91 029	80 802	73 530	69 677	63 468	57 096
Loans granted	no.	7 171	6 861	6 518	6 380	5 477	4 850	2 182	2 224
Interest subsidy	\$m	45.1	53.0	29.2	12.2	17.2	15.4	14.7	12.0
Building insurance									
Homes insured at 30 June	no.	140 508	137 012	133 711	126 799	123 068	118 430	114 369	109 517

Source: Department of Veterans' Affairs.

The maximum loan available under the DSH Scheme is \$25,000 repayable over 25 years. The interest rate on new loans is capped at 6.85% for the term of the loan. Loans can be used to buy a home or strata unit, build or extend a home, buy a right of residence in a retirement village, refinance an existing mortgage, repair or modify an existing home, or obtain granny flat accommodation on another person's property.

### Military Compensation and Rehabilitation Service (MCRS)

The objective of the MCRS is to ensure that current and former members of the ADF, who suffer an injury or disease which is causally related to employment in the ADF, are provided with compensation and rehabilitation benefits and services. The MCRS is responsible for providing benefits through the *Safety, Rehabilitation & Compensation Act 1988* (Cwlth). Table 7.25 summarises activities under the MCRS for 2001–02.

#### 7.25 MILITARY COMPENSATION AND REHABILITATION SERVICE, Activities — 2001–02

	no.
Incapacity payees at 30 June 2002 (incl. dependent children)	2 431
New primary injury claims received	6 471
New permanent impairment claims received	4 543
New rehabilitation referrals received	945
New reconsideration requests received	1 546
New applications made to the AAT	318
All accounts paid (incl. medical, household services and attendant care)	85 763

Source: Department of Veterans' Affairs.

The Safety, Rehabilitation & Compensation Act provides compensation cover for injury or disease sustained during peacetime service since 4 January 1949 and operational service since

7 April 1994. Once liability has been accepted for an injury, a range of benefits may or may not apply in an individual case:

- Weekly incapacity payments are made on the basis of ongoing evidence of loss of ability to earn at a rate of 100% of pre-injury earning capacity for 45 aggregated weeks, less the current ability to earn. After 45 weeks the rate falls to 75% of pre-injury earning capacity if the client cannot work at all, gradually rising back up to 100% if some work is possible. Government funded superannuation entitlements are deducted from the weekly compensation benefits which would otherwise be payable. Different entitlement regimes apply under transitional provisions for certain employees and periods prior to 1 December 1988.
- Permanent impairment payments are assessed in accordance with the approved guide. The minimum threshold is 10% whole of person impairment in most cases, with 100% attracting a maximum current entitlement of \$169,459. Other rates and criteria apply for impairments arising under the currency of predecessor legislation prior to 1 December 1988.
- Death benefits are payable to defined dependants of former and current members who die because of injuries arising from ADF employment. One payment up to a maximum current lump sum of \$184,865 is payable in respect of all eligible dependants. A funeral benefit of \$4,267 is also payable. A weekly amount of \$61.61 is payable to dependent children of the deceased.
- Additional Defence Act payments are available (with effect from 7 April 1994) to 'top up' payments for death of the deceased as well as permanent impairment payments to those with 'severe injuries'. The severe injury adjustment and additional death benefit increases the lump sum amount payable to \$222,138, with an additional \$55,535 for each dependent child.

- Medical benefits are payable in respect of the cost of medical treatment which is 'reasonably obtained' in relation to the accepted injury. Medical treatment is broadly defined.
- Rehabilitation services are provided where applicable in the form of programs designed to return injured employees as closely as possible to pre-injury employment, mobility and lifestyle capacity. Programs include return to work retraining, and provision of medical and other aids and appliances as well as alterations to homes and motor vehicles.
- Household Service and Attendant Care benefits are available at a statutory rate payable to ensure that eligible injured members are able to maintain their household and/or remain in their home.
- Appeal and Review mechanisms are available for clients who do not agree with a decision made by MCRS. Rights include access to an internal review followed by application to the Administrative Appeals Tribunal (AAT), with a mandatory conciliation step.

## Health Program

Health care treatment is provided to people whose disabilities have been accepted by DVA as service-related, and for pulmonary tuberculosis, post-traumatic stress disorder and malignant neoplasia whether they are service-related or not. In addition, and subject to certain conditions, health care treatment in Australia is provided to certain veterans of Australia's defence forces for all health conditions. Eligible veterans include: ex-prisoners of war; veterans and mariners of World War II aged 70 years or over who have qualifying service from that conflict; those receiving a Disability Pension at or above the maximum (100%) general rate; World War II veterans and mariners receiving both a Service Pension at any rate and a Disability Pension at 50% rate or higher; veterans, mariners or nurses who served in World War I; certain service pensioners; and returned ex-servicewomen of World War II. War widow(er)s and certain other dependants of deceased veterans are also entitled to treatment for all conditions.

Younger veterans from post-World War II conflicts have needs additional to those of their older counterparts. These needs are addressed by a range of services which include integrated out-patient, in-patient and support services for the treatment and rehabilitation of veterans with war-related mental health conditions. Intensive in-patient treatment programs are available in

each state. Community-based psychological services are provided by the Vietnam Veterans' Counselling Service and individual providers.

Assistance is available for the Vietnam veteran community through a series of recent initiatives to support veterans and their families in response to the validated findings of the Vietnam Veterans' Health Study. These include mental health support for veterans, their partners and children, assistance with treatment costs for Vietnam veterans' children with spina bifida, cleft lip/palate, adrenal gland cancer and acute myeloid leukaemia, and preventive health programs for veterans. The role of the Australian Centre for Post-traumatic Mental Health has been expanded to address mental health problems affecting the wider veteran community, and funding is being increased for research into veterans' health issues that may be the result of operational service.

Vocational rehabilitation services are available to support those who are leaving the ADF, those at risk of losing employment, and those who wish to return to the workplace. Rehabilitation Allowance may be available to people whose pension entitlement is affected — the intention is that no financial loss should be incurred by individuals taking up paid employment. Safety net arrangements enable a return to former pension status in the event that employment cannot be sustained (this applies to pensioners receiving above general rate levels of Disability Pension or Service Pension through invalidity).

With the transfer of the Repatriation General Hospitals to the states, or their sale to the private sector, hospital care is now provided through the Repatriation Private Patient Scheme. The Scheme provides acute hospital care for veterans or war widow(er)s in local facilities. Under the Scheme, a veteran or war widow(er) may be admitted directly to a local public hospital, former repatriation hospital or a contracted private Tier 1 veteran partnering hospital, as a private patient, in a shared ward, with the doctor of his or her choice.

In short, the Repatriation Private Patient Scheme has an order of preference for hospital admissions according to three tiers:

*Tier 1* — all public hospitals, all former repatriation hospitals and selected veteran partnering private hospitals in some states.

*Tier 2* — contracted private hospitals.

*Tier 3* — non-contracted private hospitals.

Financial responsibility for hospital and medical treatment in a public hospital, a former repatriation hospital or a veteran partnering private hospital is accepted by the department with no cost to the patient. Should a veteran require hospital care, the treating doctor would be able to arrange treatment at an appropriate local facility.

On a state-by-state basis the Repatriation Commission sought tenders from private hospitals to be selected as veteran partnering hospitals, which allows the same access as public hospitals and former repatriation hospitals (i.e. where no prior financial authorisation is required for admission, once eligibility is established). These hospitals have been selected by the department because they are conveniently located for most veterans, offer a full range of services at competitive rates, and perform consistently to industry-approved standards.

Under arrangements with state governments, entitled persons requiring custodial psychiatric care for a service-related disability are treated at departmental expense in state psychiatric hospitals.

Entitled persons may also be provided with dental treatment through the Local Dental Officer Scheme, which comprised 6,900 local dental officers at 1 June 2000.

Optometrical services, including the provision of spectacles, the services of allied health professionals, and a comprehensive range of aids, appliances and dressings, may be provided to entitled persons.

In addition, entitled persons may be provided with pharmaceuticals through the Repatriation Pharmaceutical Benefits Scheme.

Through the Repatriation Transport Scheme entitled persons are eligible to receive transport assistance when travelling to receive approved medical treatment.

DVA also assists the veteran community through the Veteran and Community Grants Scheme, which aims to maintain and improve the independence and quality of life of members of the veteran and ex-service community through activities and/or services that sustain and/or enhance wellbeing. The grants focus on the delivery of funding through in-home, community and residential support streams. Veteran and Community Grants provide funding for projects

that address the needs of members of the veteran and ex-service communities through a range of support initiatives. These may be through:

- promotion of health issues and healthy lifestyles
- supporting quality independent living at home
- support for carers
- reducing social isolation
- provision of financial support for high quality residential care for members of the veteran community, including support for community aged care packages.

Veteran and Community Grants are intended to provide assistance to encourage the development of projects that will become financially viable and self-sufficient. Grant funds are not provided for recurrent or ongoing financial assistance. There are three funding rounds each financial year: in July, October and March.

Following a major review of the delivery of its health services in 1999, the DVA has placed considerable emphasis on health promotion activities. Its five-year strategic plan targets seven key health priorities. As part of its health promotion activities, DVA also produces a range of health promotion resource materials for the veteran community.

In January 2001, DVA introduced the Veterans' Home Care program. This program extends the range of services provided to the veteran community to include personal care, domestic assistance, home and garden maintenance and respite care. Other services, such as delivered meals, are provided under arrangements with state and territory governments. Veterans' Home Care services are available to eligible veterans and war widow(er)s who are assessed as needing care to remain in their homes.

Veterans' Home Care has a strong preventive focus, and particularly targets veterans and war widow(er)s with low-level care needs. It is anticipated that net savings will be made from the initiative due to better health outcomes for veterans, reducing avoidable illness, injury and associated health costs. Better health will mean that veterans spend less time in hospital and need fewer medications and other high cost services. More importantly, they will be able to lead fuller, more active lives.

**Vietnam Veterans' Counselling Service (VVCS)**

The VVCS provides counselling to veterans of all conflicts and their families, as well as working with the ex-service community to promote understanding and acceptance of veterans' problems.

The VVCS is staffed by psychologists and social workers who have specialised knowledge about military service, particularly in Vietnam, and its impact on veterans and their families, especially the impact of post-traumatic stress.

Access to counselling services for rural veterans and their families was greatly improved with the establishment of the Country Outreach Program in 1988, followed soon after by a toll-free 1800 telephone link to all VVCS centres. Recent service enhancement initiatives include the creation of group programs aimed at promoting better health for veterans. Table 7.26 shows use of the VVCS.

**The Office of Australian War Graves (OAWG)**

OAWG manages the War Graves Program and maintains some 24,000 graves and memorials of Commonwealth war dead in 75 war cemeteries, plots and civil cemeteries in Australia, Papua New Guinea, Solomon Islands and Norfolk Island. OAWG also makes an annual contribution to the Commonwealth War Graves Commission, United Kingdom to assist with the maintenance of war cemeteries elsewhere in the world.

OAWG represents the Australian Government's interest in the maintenance of graves of Australian service personnel and war memorials that commemorate those Australians who died in other conflicts, in overseas countries. These include the United Nations Memorial Cemetery, Pusan, Korea, the British Commonwealth Forces Cemetery, Yokohama, Japan, and some cemeteries in Malaysia.

Another of OAWG's major tasks is the official commemoration within Australia of those Australian veterans whose death post-war is accepted as due to their war service. In recent years OAWG has processed some 7,000 commemorations annually and it is anticipated this trend will continue during 2002-03. The Office has some 236,000 memorials under perpetual maintenance.

OAWG constructs major memorials at significant locations where Australians have suffered and died. In recent years memorials have been dedicated at Hellfire Pass, Thailand; Le Hamel and Fromelles in France; and at Sandakan, North Borneo, Malaysia. The ANZAC Commemorative Site was constructed at North Beach, Gallipoli. In May 2001 the Hellenic-Australian Memorial Park was dedicated in Rethymno, Crete.

The Office also cares for war graves and cemeteries in Australia which contain the graves of foreign service personnel and civilian internees who died during the two World Wars. It also maintains the graves of, and memorials to, former prime ministers of Australia and Governors-General, on behalf of the Department of the Environment and Heritage.

**7.26 VIETNAM VETERANS' COUNSELLING SERVICE**

Type of counselling	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
Centre-based consultation	33 411	(a)30 000	(a)30 000	(a)27 000	27 421	29 991	31 603
Group session consultation	724	784	500	485	891	678	1 011
Country outreach consultation	20 723	21 523	27 000	(a)26 000	26 885	28 063	31 353

(a) Estimates.

Source: Department of Veterans' Affairs.

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- Centrelink 2002, *A Guide to Commonwealth Governments Payments, 20 March–30 June 2002*
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- Department of Health and Ageing, *Annual Report*
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- Annual Report*
  - Budget Paper No. 5, Intergenerational Report 2002–2003*
- Department of Veterans' Affairs, *Annual Report*

### Web sites

- Centrelink, <<http://www.centrelink.gov.au>>
- Commonwealth Department of Education, Science and Training, <<http://www.dest.gov.au>>
- Commonwealth Department of Employment, Workplace Relations and Small Business, <<http://www.dewrsb.gov.au>>
- Commonwealth Department of Family and Community Services, <<http://www.facs.gov.au>>
- Commonwealth Department of Health and Ageing, <<http://www.health.gov.au>>
- Commonwealth Department of Veterans' Affairs, <<http://www.dva.gov.au>>
- Office for Older Australians, <<http://www.olderaustralians.gov.au>>



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## Introduction

Housing satisfies the essential needs of people for shelter, security and privacy. Shelter is recognised throughout the world as a basic human right. The adequacy or otherwise of housing is an important component of individual wellbeing. Housing also has great significance in the national economy, with its influence on investment levels, interest rates, building activity and employment.

The ways in which Australian families and individuals are housed reflect social, political and economic factors over the last century. For example, public health concerns towards the end of the 19th century resulted in legislation in the states which gave local government the authority to make building regulations and inspect dwellings, a responsibility they have to this day. Also at that time, demand for housing exceeded supply, rents were high, and overcrowding and slum conditions continued to be a problem into the 20th century. This led to states introducing further legislation for the provision of public rental housing for low income earners. In the 1920s, the Commonwealth moved to provide financial assistance for access to home ownership to moderate and low income groups, and a number of policy initiatives over recent decades have focused on this goal. Governments have continued to actively promote home ownership as part of an overall policy directed at achieving people's self-reliance in housing, and a quality of housing adequate for their needs.

The predominance of separate, free standing houses situated on 'quarter acre blocks' within the mainland capital city areas is a feature of Australian urban development. More recently, governments have moved to promote higher housing densities, to provide greater choice of housing types and to make better use of existing infrastructure. This has resulted in changes to urban planning and building regulation. There have been some changes in the nature of housing, and efficiencies in the use of land and infrastructure. However, even within this new framework, green field developments and free standing houses still predominate. Households in

such developments are still largely reliant on the family car to access many neighbourhood facilities and services.

This chapter provides information on the types of dwellings Australians live in and their tenure arrangements, the affordability of housing, and the government assistance provided through housing and income support programs. It is based largely on information from the 1999–2000 Survey of Income and Housing Costs, but also draws on the 1999 Australian Housing Survey, house price index data, data about finance commitments for owner occupation, and administrative data relating to public housing and rent assistance. Care should be taken when comparing statistics from different sources because of differences in the timing, conceptual bases and scope of individual statistical sources.

## Types of dwellings

Table 8.1 shows the different dwelling structure types in each state and territory in 1999–2000. The table shows that the separate house is the most popular type of dwelling in Australia, making up almost 80% of all dwellings. Tasmania had the highest proportion of separate houses (87%) and the Northern Territory the lowest (70%).

Flats, units or apartments comprise 10% of dwellings in Australia. The Northern Territory (16%) had the highest proportion of flats, units or apartments, followed by New South Wales (14%). Western Australia and Tasmania had relatively low percentages of flats, units or apartments (5%).

Semidetached, row or terrace houses and townhouses accounted for 10% of dwellings in Australia. There was a substantially greater proportion of semidetached housing than of flats, units or apartments in Western Australia, South Australia and Tasmania. Conversely, New South Wales and the Northern Territory had substantially more flats, units or apartments than semidetached housing.

## 8.1 ALL HOUSEHOLDS, By dwelling structure and state/territory — 1999–2000

	Separate house	Semidetached/row or terrace house/townhouse	Flat/unit/apartment	Total(a)	Total(a)
	%	%	%	%	'000
New South Wales	75.4	9.6	14.4	100.0	2 406.0
Victoria	81.7	9.2	8.6	100.0	1 753.2
Queensland	83.3	7.1	8.0	100.0	1 335.8
South Australia	77.5	12.9	8.8	100.0	612.1
Western Australia	79.3	15.1	5.4	100.0	719.1
Tasmania	86.7	7.6	*4.6	100.0	187.6
Northern Territory(b)	70.0	*11.0	*15.5	100.0	53.8
Australian Capital Territory	78.4	*11.6	*9.5	100.0	120.5
<b>Australia</b>	<b>79.3</b>	<b>9.9</b>	<b>10.1</b>	<b>100.0</b>	<b>7 188.1</b>

(a) Includes other dwelling structure. (b) Excludes remote and sparsely settled areas.

Source: ABS data available on request, Survey of Income and Housing Costs, 1999–2000.

## Housing condition

Most Australian dwellings were reported to be in good condition in the 1999 Australian Housing Survey, with the majority of households (80%) reporting no major structural problems. For

those with problems, cracks in walls or floors were the most often reported (by 473,300 or 7% of households). Other problems were sinking or moving foundations (5%), rising damp (4%) and walls or windows out of plumb (4%) (table 8.2).

## 8.2 ALL HOUSEHOLDS, By dwelling structure and physical condition — 1999

Physical condition	Separate house '000	Semidetached '000	Flat '000	Total(a) '000
Major structural problems				
Rising damp	218.5	42.5	46.2	308.3
Major cracks in walls/floors	345.6	51.0	74.1	473.3
Sinking/moving foundations	284.9	31.4	20.5	338.3
Sagging floors	200.2	23.2	*9.4	235.8
Walls/windows out of plumb	234.2	27.1	35.1	298.4
Wood rot/termite damage	186.1	13.0	23.4	224.8
Major electrical problems	73.4	*7.8	21.7	104.2
Major plumbing problems	168.5	25.0	55.2	249.3
Major roof defect	136.7	14.7	26.8	181.2
Other problems	84.7	*8.0	25.7	121.0
Not known	61.7	12.7	25.2	99.6
No major structural problems	4 649.6	494.5	569.3	5 747.9
<i>Total(b)</i>	5 735.4	641.4	798.5	7 216.9
Need for interior repairs				
Essential and urgent need	67.0	*6.3	20.3	94.2
Essential need	172.2	26.8	37.6	239.6
Moderate need	642.8	66.3	111.8	825.3
Desirable but low need	1 611.4	153.2	205.8	1 980.1
No need	3 242.0	388.8	422.9	4 077.6
<i>Total</i>	5 735.4	641.4	798.5	7 216.9
Need for exterior repairs				
Essential and urgent need	66.7	*5.6	*7.7	80.5
Essential need	206.5	17.1	27.2	253.3
Moderate need	721.3	59.3	102.6	888.6
Desirable but low need	1 657.1	144.9	185.3	1 993.7
No need	3 083.8	414.5	475.7	4 000.7
<i>Total</i>	5 735.4	641.4	798.5	7 216.9

(a) Includes other dwelling structure. (b) Components do not add to total as more than one response is allowed.

Source: Australian Housing Survey — Housing Characteristics, Costs and Conditions, 1999 (4182.0).

Some 43% of households reported that repairs were required to the inside of their home and a similar proportion (45%) reported that repairs were required to the outside of the dwelling. However, of these, almost two-thirds reported the repair to be desirable but low need.

### Repairs and maintenance

Some 55% of households reported that repairs or maintenance had been carried out to their current dwelling within the last 12 months. The most commonly reported types of repair or maintenance were painting (31%), plumbing (24%) and electrical work (17%) (table 8.3).

### Number of bedrooms

One indicator of dwelling size is the number of bedrooms. In 1999–2000, half of all dwellings in Australia had three bedrooms, 24% had four or

more bedrooms and 20% had two bedrooms (table 8.4). Of separate houses, 58% had three bedrooms, while two bedroom dwellings were more common in semidetached houses and in flats, units and apartments (46% and 60% respectively).

Nearly one-fifth (19%) of three bedroom dwellings had only one person living in them, over a third (36%) had only two persons, a further 20% had three persons, and 18% had four persons (table 8.5). Of two bedroom dwellings, most had one or two persons living in them (43% and 40% respectively).

Information on the incidence of other types of rooms such as bathrooms, toilets, laundries and lounge/dining/family rooms is available from the 1999 Australian Housing Survey.

#### 8.3 ALL HOUSEHOLDS, By tenure and landlord type and repairs/maintenance — 1999

Type of repairs/maintenance in last 12 months	Owner		Renter					Total
	Without a mortgage	With a mortgage	State/territory housing authority	Private landlord	Total renters(a)	Rent free	Other tenure	
	'000	'000	'000	'000	'000	'000	'000	'000
Painting	835.7	912.9	93.2	327.7	452.0	31.5	27.0	2 259.1
Roof repair/maintenance	355.5	256.1	25.4	121.7	161.3	16.4	8.4	797.6
Tile repair/replacement	145.1	179.5	23.7	84.3	115.7	*6.6	5.8	452.7
Electrical work	399.0	500.6	55.2	243.2	321.8	20.8	12.4	1 254.7
Plumbing	529.6	568.6	96.6	424.4	569.9	24.9	11.0	1 704.0
Other	226.4	257.0	59.9	190.0	268.9	11.9	8.8	773.0
No repairs/maintenance(b)	1 374.4	897.3	155.1	632.6	842.6	61.0	36.8	3 212.2
<b>Total(c)</b>	<b>2 800.3</b>	<b>2 256.1</b>	<b>368.8</b>	<b>1 463.2</b>	<b>1 966.6</b>	<b>120.9</b>	<b>73.0</b>	<b>7 216.9</b>

(a) Includes other landlord type. (b) Includes households which did not know whether repairs/maintenance had been done. (c) Components do not add to total as more than one response is allowed.

Source: Australian Housing Survey — Housing Characteristics, Costs and Conditions, 1999 (4182.0).

#### 8.4 ALL HOUSEHOLDS, By dwelling structure and number of bedrooms — 1999–2000

	Separate house	Semidetached, row or terrace house, townhouse	Flat/unit/apartment	Total(a)
	'000	'000	'000	'000
One bedroom	50.2	67.3	194.0	329.1
2 bedrooms	639.7	327.0	437.3	1 421.9
3 bedrooms	3 311.1	285.7	81.0	3 691.2
4 or more bedrooms	1 696.4	28.8	*4.5	1 733.7
<b>Total(b)</b>	<b>5 697.4</b>	<b>708.9</b>	<b>725.8</b>	<b>7 188.1</b>

(a) Includes other dwelling structure. (b) Includes bedsits and dwellings with zero bedrooms.

Source: ABS data available on request, Survey of Income and Housing Costs, 1999–2000.

## 8.5 ALL HOUSEHOLDS, By number of persons and number of bedrooms — 1999–2000

	One person	Two persons	Three persons	Four persons	Five or more	Total	Total
	%	%	%	%	%	%	'000
One bedroom	77.5	19.5	*1.8	*1.1	**–	100.0	329.1
2 bedrooms	43.1	39.8	11.2	4.6	1.3	100.0	1 421.9
3 bedrooms	19.1	35.7	19.7	18.1	7.4	100.0	3 691.2
4 or more bedrooms	6.8	23.3	17.5	26.1	26.3	100.0	1 733.7
<b>Total(a)</b>	<b>24.5</b>	<b>32.7</b>	<b>16.5</b>	<b>16.2</b>	<b>10.1</b>	<b>100.0</b>	<b>7 188.1</b>

(a) Includes bedsits and dwellings with zero bedrooms.

Source: ABS data available on request, Survey of Income and Housing Costs, 1999–2000.

## Home ownership and renting

Of the 7.2 million households in Australia in 1999–2000, 71% were living in their own home, and 26% were renting their dwelling from a private landlord or a state or territory housing authority (table 8.6).

In 1999–2000, 38% of households owned their homes outright. In addition, 32% of households were paying off a mortgage or loan secured against their dwelling.

Of the almost two million households renting their dwellings, 74% were renting from a private landlord, 20% were renting from a state or territory housing authority and the remaining 6% from other landlords such as the owner/manager of a caravan park, an employer (including a government authority) or a community or church group.

Around 90% of owners lived in separate houses in 1999–2000. Of renter households, 53% lived in separate houses and 26% lived in flats, units or apartments.

Over one-third of households (34%) that owned their own home outright were couples with no children. One-parent households accounted for 6% of outright owners, and lone-person households made up 27% (based on table 8.7).

Of couple households with dependent children only, the majority (79%) were owners, while 20% were renting. Of one-parent families, 49% were home owners, 30% were renting from a private landlord and 17% were renting from a state or territory housing authority.

## 8.6 ALL HOUSEHOLDS, By dwelling structure and tenure and landlord type — 1999–2000

	Separate house	Semidetached/row or terrace house/townhouse	Flat/unit/apartment	Total(a)
Tenure and landlord type	'000	'000	'000	'000
Owner without a mortgage	2 455.4	171.7	106.2	2 758.3
Owner with a mortgage	2 094.9	134.8	78.8	2 315.7
Renter				
State/territory housing authority	216.4	106.0	79.1	402.0
Private landlord	752.0	269.0	414.7	1 446.4
Total(b)	1 040.5	394.7	510.9	1 962.8
Other tenure(c)	106.6	*7.7	29.8	151.4
<b>Total</b>	<b>5 697.4</b>	<b>708.9</b>	<b>725.8</b>	<b>7 188.1</b>

(a) Includes other dwelling structure. (b) Includes other landlord type. (c) Includes rent free and life tenure.

Source: ABS data available on request, Survey of Income and Housing Costs, 1999–2000.

## 8.7 ALL HOUSEHOLDS, By tenure and landlord type and household composition — 1999–2000

	Owner		Renter				
	Without a mortgage	With a mortgage	State/ territory housing authority	Private landlord	Total(a)	Other tenure(b)	Total
	'000	'000	'000	'000	'000	'000	'000
Couple, one family							
Couple only	936.6	448.0	37.5	236.0	287.5	22.7	1 694.9
Couple with dependent children only	369.2	984.8	47.4	272.9	345.9	*19.7	1 719.7
Couple — other(c)	414.1	315.9	24.5	57.6	92.1	n.p.	825.2
Total	1 719.9	1 748.7	109.5	566.4	725.5	45.5	4 239.7
One parent, one family(d)	166.8	152.9	113.9	199.9	326.6	*9.8	656.0
Lone person	745.4	293.2	164.0	413.4	614.8	85.2	1 738.6
Other	126.2	120.9	*14.6	266.6	295.8	*10.9	555.8
<b>Total</b>	<b>2 758.3</b>	<b>2 315.7</b>	<b>402.0</b>	<b>1 446.4</b>	<b>1 962.8</b>	<b>151.4</b>	<b>7 188.1</b>

(a) Includes other landlord type. (b) Includes rent free and life tenure. (c) Includes couples with non-dependent children and may include other family members. (d) Includes one-parent families with dependants or non-dependent children and may include other family members.

Source: ABS data available on request, *Survey of Income and Housing Costs, 1999–2000*.

Tenure patterns vary across states and territories. Victoria had the highest proportion of overall home ownership, with 76% of dwellings either being purchased or owned outright (table 8.8). The lowest proportion of overall home ownership (56%) was in the Northern Territory. The Australian Capital Territory, the Northern Territory and Western Australia had the highest proportion of households still purchasing their home (42%, 38% and 38% respectively), reflecting their younger populations.

The Northern Territory had the highest proportion of renters at 40%. This was considerably higher than the national rate of 27%. The proportion of households renting from private landlords ranged from 17% in South Australia, Victoria and Tasmania to 25% in Queensland.

The differences in tenure partly reflect differences in the age and life structures across states and territories (see the section *Housing and lifestyle*).

## 8.8 ALL HOUSEHOLDS, By tenure and landlord type and state/territory — 1999–2000

	Owner		Renter					
	Without a mortgage	With a mortgage	State/territory housing authority	Private landlord	Total(a)	Other tenure(b)	Total	Total
	%	%	%	%	%	%	%	'000
New South Wales	39.8	30.5	5.9	21.0	28.1	1.6	100.0	2 406.0
Victoria	43.6	32.0	4.1	17.0	22.1	2.3	100.0	1 753.2
Queensland	34.6	31.7	4.7	24.7	31.6	2.1	100.0	1 335.8
South Australia	37.5	32.0	9.5	16.7	28.2	*2.3	100.0	612.1
Western Australia	31.5	37.9	5.4	20.0	27.6	3.0	100.0	719.1
Tasmania	41.7	30.3	*6.5	17.0	25.1	*2.9	100.0	187.6
Northern Territory(c)	*17.7	*38.3	*9.4	*22.4	39.5	**4.5	100.0	53.8
Australian Capital Territory	25.8	42.4	*10.2	19.4	30.3	**1.6	100.0	120.5
<b>Australia</b>	<b>38.4</b>	<b>32.2</b>	<b>5.6</b>	<b>20.1</b>	<b>27.3</b>	<b>2.1</b>	<b>100.0</b>	<b>7 188.1</b>

(a) Includes other landlord type. (b) Includes rent free and life tenure. (c) Excludes remote and sparsely settled areas.

Source: ABS data available on request, *Survey of Income and Housing Costs, 1999–2000*.

## Housing costs and income

Housing costs cover different items for different types of tenure. For owners who have no mortgage, housing costs comprise the rates paid. For owners with a mortgage, housing costs comprise the value of the mortgage payments as well as property rates. For households renting their dwelling, housing costs comprise the regular rental amounts paid to landlords.

The Survey of Income and Housing Costs 1999–2000 found that housing costs for owners with a mortgage, at an average of \$210 per week, were higher than for other forms of tenure (table 8.9). Households renting from private landlords had mean weekly housing costs of \$166, compared to \$71 for tenants of state or territory housing authorities.

### 8.9 OWNER AND RENTER HOUSEHOLDS, Housing costs by household composition — 1999–2000

Tenure and landlord type	Couple, one family				One parent, one family	Lone person	Other	Total
	Couple only	Couple with dependent children only	Couple — other	Total couples, one family				
MEAN WEEKLY HOUSING COSTS (\$)								
Owner without a mortgage	20	27	25	23	22	18	33	22
Owner with a mortgage	224	219	200	217	167	178	248	210
Renter — state/territory housing authority	81	105	132	103	71	49	*76	71
Renter — private landlord	178	180	180	179	152	133	201	166
<i>Total renters(a)</i>	162	163	165	163	121	107	190	143
<b>Total owner and renter households</b>	<b>99</b>	<b>166</b>	<b>108</b>	<b>128</b>	<b>106</b>	<b>79</b>	<b>167</b>	<b>117</b>
MEAN GROSS WEEKLY INCOME (\$)								
Owner without a mortgage	721	1 240	1 489	1 017	792	394	1 143	841
Owner with a mortgage	1 294	1 274	1 660	1 349	825	768	1 599	1 254
Renter — state/territory housing authority	455	576	796	584	419	220	*831	398
Renter — private landlord	1 048	913	1 173	995	581	532	1 252	853
<i>Total renters(a)</i>	970	867	1 057	932	522	439	1 243	756
<b>Total owner and renter households</b>	<b>917</b>	<b>1 184</b>	<b>1 506</b>	<b>1 141</b>	<b>663</b>	<b>477</b>	<b>1 299</b>	<b>953</b>
MEAN HOUSING COSTS AS A PROPORTION OF INCOME (%)								
Owner without a mortgage	3	2	2	2	3	4	3	3
Owner with a mortgage	17	17	12	16	20	23	16	17
Renter — state/territory housing authority	18	18	17	18	17	23	*9	18
Renter — private landlord	17	20	15	18	26	25	16	20
<i>Total renters(a)</i>	17	19	16	18	23	24	15	19
<b>Total owner and renter households</b>	<b>11</b>	<b>14</b>	<b>7</b>	<b>11</b>	<b>16</b>	<b>17</b>	<b>13</b>	<b>12</b>
HOUSEHOLDS ('000)								
Owner without a mortgage	936.6	369.2	414.1	1 719.9	166.8	745.4	126.2	2 758.3
Owner with a mortgage	448.0	984.8	315.9	1 748.7	152.9	293.2	120.9	2 315.7
Renter — state/territory housing authority	37.5	47.4	24.5	109.5	113.9	164.0	*14.6	402.0
Renter — private landlord	236.0	272.9	57.6	566.4	199.9	413.4	266.6	1 446.4
<i>Total renters(a)</i>	287.5	345.9	92.1	725.5	326.6	614.8	295.8	1 962.8
<b>Total owner and renter households</b>	<b>1 672.1</b>	<b>1 700.0</b>	<b>822.1</b>	<b>4 194.2</b>	<b>646.3</b>	<b>1 653.4</b>	<b>542.9</b>	<b>7 036.8</b>
HOUSEHOLD AND DWELLING SIZE (no.)								
Average persons in household	2.0	4.0	3.9	3.2	2.7	1.0	3.0	2.6
Average bedrooms in dwelling	3.0	3.4	3.5	3.2	3.0	2.4	2.9	3.0

(a) Includes other landlord type.

Source: ABS data available on request, Survey of Income and Housing Costs, 1999–2000.

For many households, weekly housing costs are a significant proportion of their gross weekly income. In 1999–2000, housing costs represented 17% of gross weekly income for owners with a mortgage, 18% of gross weekly income for tenants of a state or territory housing authority and 20% of gross weekly income for tenants renting from a private landlord (table 8.9). Housing costs as a proportion of income differed depending on tenure type, landlord type and household composition (graph 8.10 and table 8.11).

See also the section *Housing costs — capital cities*, which focuses on capital city households, drawing on results from the same survey

### Housing and lifestyle

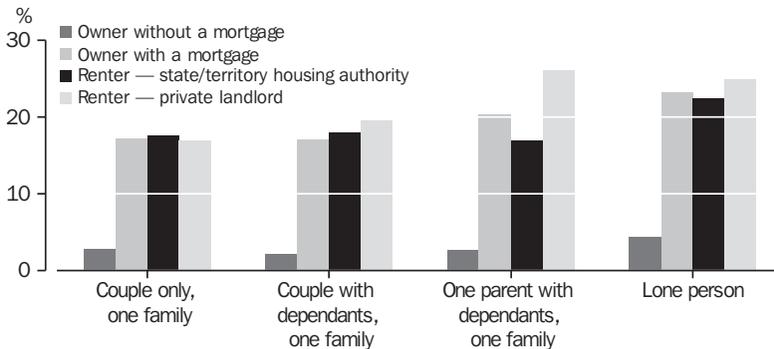
As people progress through different life-cycle stages and their family structures and financial situations change, so do their housing needs and

preferences. An understanding of the relationships between life-cycle stage, income, housing costs and level of investment in home ownership can be useful in developing policies which enable home purchase among those who would otherwise find this difficult.

There are long-term benefits in home ownership. Initially, the cost of home purchase is often far greater than renting (due to the costs of deposits and fees, as well as ongoing mortgage repayments). However, the much lower costs associated with owning a home outright, and the investment that a home represents, can be major factors in the ongoing economic wellbeing of many Australians, particularly as many retire on considerably reduced incomes.

The relationship between housing needs and life-cycle stages were explored in the 1999 Australian Housing Survey, and are the focus of this section.

**8.10 MEAN HOUSING COSTS AS A PROPORTION OF INCOME, By tenure and landlord type, and household composition — 1999–2000**



Source: ABS data available on request, Survey of Income and Housing Costs, 1999–2000.

### 8.11 OWNER AND RENTER HOUSEHOLDS, Housing costs as a proportion of income — 1999–2000

Housing costs as a proportion of income	Units	Owner without a mortgage	Owner with a mortgage	Renter			Total
				State/territory housing authority	Private landlord	Total(a)	
25% or less	%	97.6	71.4	82.1	57.9	64.5	79.8
26–30%	%	n.p.	9.0	12.2	9.3	9.5	5.7
31–50%	%	*0.5	13.2	*4.1	21.7	17.1	9.3
More than 50%	%	*0.7	5.6	*1.3	9.6	7.7	4.3
Total(b)	%	100.0	100.0	100.0	100.0	100.0	100.0
Total owner and rental households	'000	2 758.3	2 315.7	402.0	1 446.4	1 962.8	7 036.8

(a) Includes other landlord type. (b) Includes households with nil or negative total income.

Source: ABS data available on request, Survey of Income and Housing Costs, 1999–2000.

For the purpose of the survey, ongoing housing costs comprised:

- mortgage or loan repayments (secured or unsecured) where the purpose of the loan is to buy or build, add to or alter the dwelling
- rental payments
- water and general council rates
- land tax payments
- body corporate or strata title payments
- expenditure on repairs and maintenance for the dwelling.

Only payments which related to the dwelling occupied at the time of interview were included. Payments for other dwellings were not regarded as housing costs, even if the usual dwelling had been offered as security.

The survey estimated that the average weekly housing costs for all households were \$129. Outright owners (those without a mortgage) had the lowest average weekly housing costs (\$47), while those with a mortgage had the highest costs, spending an average of \$228 per week (although some of the cost for this group reflects the fact that 54% of these households chose to pay more than their minimum mortgage repayment). On average, those households which were renting paid \$146 per week in housing costs.

These measures differ somewhat from the average weekly housing costs reported in the Survey of Income and Housing Costs 1999–2000, and shown in the earlier section *Housing costs and income*, due to different populations, collection procedures and reference periods. However the orders of magnitude of the two sets of estimates are similar.

Most Australian households live in separate houses (80% in 1999). However, as with tenure, the type and size of dwellings and housing costs vary across different life-cycle groups.

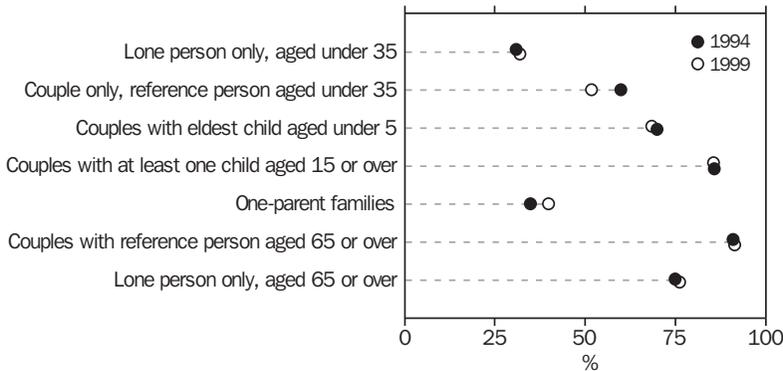
### Life cycle and housing

The life-cycle groups whose housing circumstances are discussed in this section include:

- lone person aged under 35 years
- couple only, reference person aged under 35 years
- couple, eldest child aged under 5 years
- couple, at least one dependent child aged 15 years or over
- lone-parent family with dependent children
- couple only, reference person aged 65 years or over
- lone person aged 65 years or over.

*Dependent children* are children aged under 15 years plus full-time students aged 15–24 years living with a parent and without a partner or child of their own in the household.

8.12 HOME OWNERS, By life-cycle group



Source: ABS data available on request, 1994 and 1999 Australian Housing Surveys.

The *reference person* for each household is chosen by applying, to all usual residents aged 15 years and over in the household, the selection criteria below, in order of precedence:

- the person with the highest tenure type ranked from owner without a mortgage, owner with a mortgage, renter, other tenure, or
- the person with the highest income, or
- the oldest person.

In 1999, 70% of Australian households owned their homes. The tenure of a household is strongly related to life-cycle stages, generally following a pattern of renting in early adulthood, moving to home purchase and mortgages as partnerships are formed and children are born, and owning the home outright in older age. However for some, family breakdown disrupts this pattern.

Between 1994 and 1999, the home ownership rates of various life-cycle groups showed little change. However, there were two exceptions. For young couple households without children, home ownership fell from 60% in 1994 to 52% in 1999,

while home ownership for lone-parent families increased over the period (from 35% to 40%) (graph 8.12).

### Young households (under 35 years)

In 1999, young lone-person and couple only households (those with a reference person aged under 35 years), comprised 10% of all households in Australia (each group around 5%). People in these households are generally more mobile. Many are studying or starting their careers, and are likely to be on lower incomes than they will be at later stages in their lives. In many cases, they are yet to move into home ownership.

Young lone-person households were most likely of all life-cycle groups to be renting (62%), with most of these (84%) renting from private landlords (table 8.13). Less than one-third of young lone-person households had moved into home ownership, and most that had, did so with a mortgage. However, young people are more inclined to move into home ownership as they form couples. Just over half of young couple households without children owned their own home. As was the case for young lone-person households, most of these couples had a mortgage.

#### 8.13 YOUNG PEOPLE, Selected characteristics — 1999

	Units	Household composition	
		Lone person aged under 35 years	Couple only, reference person aged under 35 years
Tenure type			
Owner without a mortgage	%	4.8	5.4
Owner with a mortgage	%	27.0	46.3
Renters	%	62.2	46.4
Average housing costs as a proportion of income			
Owner without a mortgage	%	*7.5	*9.5
Owner with a mortgage	%	26.6	20.6
Renters	%	22.8	13.8
All households	%	22.2	16.9
Proportion of income spent on housing costs(a)			
25% or less(b)	%	54.9	75.2
More than 50%	%	12.2	3.7
Proportion in a separate house	%	46.1	67.5
Average weekly housing costs			
Owner without a mortgage	\$	*53	*139
Owner with a mortgage	\$	227	324
Renters	\$	130	164
All households	\$	143	234
Average number of bedrooms in dwelling	no.	2.1	2.6
<b>Total households</b>	<b>'000</b>	<b>327.6</b>	<b>366.2</b>

(a) Households with unknown housing costs and households with nil or negative income were excluded prior to the calculation of percentages. (b) Includes households which reported no housing costs.

Source: *Australian Housing Survey — Housing Characteristics, Costs and Conditions, 1999 (4182.0)*.

In keeping with their larger household size, young couples without children lived in dwellings where the average number of bedrooms was higher than for young lone persons (2.6 compared with 2.1). Young couple households without children were also more likely than young lone-person households to live in separate dwellings (68% compared with 46%), with the majority of young singles living in semidetached dwellings or flats.

Reflecting their lower household incomes, young lone persons spent on average over a fifth (22%) of their income on housing. Young couple households without children (many of whom are on dual incomes) on average spent a lower proportion of their income on housing costs (17%) than young lone-person households, despite the fact that they had much higher average weekly housing costs (\$234 compared with \$143).

### Families with children

As families are formed and grow, housing needs and preferences change. The birth of children increases family size and often results in the household shifting back to dependence on a single income when children are very young. The trend to home purchase and moving into larger dwellings increases as couples and their children grow older. At this time, parents' incomes are likely to be higher than those in younger life-cycle groups due to their more established careers and the move of parents (mainly mothers) back into the workforce and full-time employment.

Of couple families with all children aged under 5 years, 69% were home owners (56% were paying off a mortgage) (table 8.14). Among households containing couple families with older children (at least one aged 15 years or over), home ownership was higher (86%) than for those with younger children and over a third (35%) owned their home outright.

Income levels vary considerably over a person's life cycle. Household incomes for couples, and hence their capacity to pay for larger, more expensive homes, usually increase as their children grow older. In 1999, most couple households with young children lived in separate houses and in homes with three or more bedrooms (85% and 78% respectively). However, couple households with older dependent children were even more likely to do so (96% and 97% respectively). Despite this, housing costs for

couple households with young children were generally higher (\$211 on average per week, representing 19% of their average weekly income) than for couples with older children (\$159 which constituted 10% of their weekly income). This is likely to reflect the fact that couple households with young children usually have less equity in their homes than couples with older children. The former households are also more likely to have bought their home more recently and therefore to have purchased their house at a higher price.

For those who owned a house, average weekly housing costs for couples with young children ranged from \$259 for those with a mortgage to \$116 for those without a mortgage. For couples with older children, average weekly housing costs ranged from \$225 for those with a mortgage to \$67 for those without a mortgage. In contrast, households containing couple families which were renting had similar costs regardless of the age of children present.

When families are disrupted through divorce or separation, the trend towards home ownership is often reversed, reflecting reduced household incomes and the splitting of family assets. As a result, the household may move from home ownership back to renting, and also into a smaller, more affordable home. Lone-parent households with dependent children were more likely to be renting (58%) than to own their home (40%), and they were the life-cycle group most likely to be renting through a state or territory housing authority (21%). In 1999, while most lone-parent households with dependent children lived in separate dwellings (76%) and in dwellings with at least three bedrooms (77%), these proportions were lower than for couples with dependent children.

Average weekly housing costs for lone-parent households with dependent children were \$124, or 22% of their average weekly income. Among these households, private renters paid \$152, on average, in housing costs which represented 31% of average weekly income. Lone-parent households with dependent children were more than three times as likely as couple households with at least one dependent child aged 15 years or over to spend more than 25% of their income on housing (44% compared with 13%). Just over 10% of lone-parent households with dependent children spent more than 50% of their income on housing.

## 8.14 FAMILIES WITH CHILDREN, Selected characteristics — 1999

	Units	Household composition		
		Couple with eldest child aged under 5 years	Couple with at least one dependent child aged 15 years or over	Lone parent with dependent children
<b>Tenure type</b>				
Owner without a mortgage	%	12.7	35.0	15.0
Owner with a mortgage	%	55.9	50.6	24.8
Renters	%	28.5	12.4	58.3
<b>Average housing costs as a proportion of income</b>				
Owner without a mortgage	%	9.1	4.5	7.0
Owner with a mortgage	%	21.1	13.8	24.5
Renters	%	19.4	15.2	27.4
All households	%	18.8	10.5	22.1
<b>Proportion of income spent on housing costs(a)</b>				
25% or less(b)	%	69.0	87.5	56.2
More than 50%	%	5.7	2.8	10.3
Proportion in a separate house	%	84.5	95.6	75.9
<b>Average weekly housing costs</b>				
Owner without a mortgage	\$	116	67	53
Owner with a mortgage	\$	259	225	181
Renters	\$	168	169	120
All households	\$	211	159	124
<b>Average number of bedrooms in dwelling</b>	no.	3.0	3.6	3.0
<b>Average household size</b>	no.	3.4	4.4	2.8
<b>Total households</b>	'000	<b>415.4</b>	<b>708.9</b>	<b>415.5</b>

(a) Households with unknown housing costs and households with nil or negative income were excluded prior to the calculation of percentages. (b) Includes households which reported no housing costs.

Source: Australian Housing Survey — Housing Characteristics, Costs and Conditions, 1999 (4182.0).

### Older persons (65 years and over)

Home ownership is very high among older people, with outright ownership by far the most common tenure type for Australians aged 65 years and over. The benefits of this to older people include lower housing costs, security of tenure, and having an asset that may be realised for consumption or passed on to later generations as inheritance.

In 1999, older persons living in a couple only household (those where the reference person was aged 65 years or over) had very high ownership rates (91%), with 88% owning their home outright. Older lone-person households (which are often formed after a partner dies) had a home ownership rate of 76%, with 73% owning their home outright. Older lone-person households were more likely to be renting than older couple only households (19% compared with 7%), with 10% of older people living alone renting from state or territory housing authorities.

In 1999, the average weekly income of older person households was lower than for any other life-cycle group (reflecting the likelihood that household members had retired). However, average weekly housing costs for this group were also lower than for other life-cycle groups (\$44 for couple households and \$40 for lone-person households). Even for those older person households with a mortgage, average weekly housing costs were relatively low (\$91 for older couple households and \$62 for older lone-person households) (table 8.15). This partly reflects the fact that many of these households purchased their first home some decades earlier when home prices and mortgages were considerably lower. However, for the small proportion who were renting, housing payments consumed a relatively large proportion of their incomes. The 7% of older lone-person households which were renting from private landlords spent a higher proportion of their income (49%) on housing costs than any other life-cycle group.

## 8.15 OLDER PEOPLE, Selected characteristics — 1999

	Units	Household composition	
		Couple only, reference person aged 65 years or over	Lone person aged 65 years or over
<b>Tenure type</b>			
Owner without a mortgage	%	87.6	72.8
Owner with a mortgage	%	3.8	3.3
Renters	%	6.8	19.3
<b>Average housing costs as a proportion of income</b>			
Owner without a mortgage	%	7.4	11.4
Owner with a mortgage	%	15.7	22.0
Renters	%	26.7	33.7
All households	%	8.8	15.2
<b>Proportion of income spent on housing costs(a)</b>			
25% or less(b)	%	90.1	81.6
More than 50%	%	2.7	6.0
<b>Proportion in a separate house</b>			
	%	86.5	64.8
<b>Average weekly housing costs</b>			
Owner without a mortgage	\$	38	31
Owner with a mortgage	\$	91	62
Renters	\$	103	70
All households	\$	44	40
<b>Average number of bedrooms in dwelling</b>			
	no.	2.9	2.4
<b>Total households</b>	<b>'000</b>	<b>582.5</b>	<b>681.8</b>

(a) Households with unknown housing costs and households with nil or negative income were excluded prior to the calculation of percentages. (b) Includes households which reported no housing costs.

Source: Australian Housing Survey — Housing Characteristics, Costs and Conditions, 1999 (4182.0).

Reflecting their smaller household size, the homes of older lone persons were more likely to be smaller than those of older couples. Older lone persons were less likely to live in separate dwellings than older couples (65% compared with 87%), and more likely to be living in dwellings with fewer bedrooms than older couples (2.4 bedrooms on average compared with 2.9).

For many older people, the onset of diminished health and disabilities, and the need for security and ready access to services such as public transport, are often key considerations in their choice of housing, especially after the death of a partner. The growing proportion of older persons (in particular of persons aged 80 years and over) in Australia has led to the emergence of new types of housing such as self-care dwellings in

retirement villages. In 1999, 1% of older couples and 3% of older lone persons were living in such accommodation.

### Housing costs — capital cities

In 1999–2000, the mean weekly housing costs for households in all capital cities were \$133 (table 8.16). However, there was considerable variation between capital cities. Hobart had the lowest mean housing costs at \$87 per week.

While Sydney had the highest mean housing costs for most tenure and landlord types, Canberra recorded the highest mean housing costs for total households (\$161 compared to Sydney's \$155) because of the larger proportion of households in Canberra purchasing their homes.

## 8.16 CAPITAL CITY OWNER AND RENTER HOUSEHOLDS, Housing costs — 1999–2000

Tenure and landlord type	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Canberra	All capital cities(a)
MEAN WEEKLY HOUSING COSTS (\$)								
Owner without a mortgage	26	24	24	21	18	20	30	24
Owner with a mortgage	277	225	198	163	211	144	259	228
Renter — state/territory housing authority	78	76	70	70	65	*78	*73	74
Renter — private landlord	227	168	156	143	142	*122	169	182
<i>Total renters(b)</i>	195	152	139	114	126	109	134	157
<b>Total owner and renter households</b>	<b>155</b>	<b>123</b>	<b>126</b>	<b>98</b>	<b>129</b>	<b>87</b>	<b>161</b>	<b>133</b>
MEAN GROSS WEEKLY INCOME (\$)								
Owner without a mortgage	995	1 003	835	797	870	703	1 037	945
Owner with a mortgage	1 485	1 300	1 372	1 066	1 237	1 095	1 479	1 337
Renter — state/territory housing authority	480	401	380	382	334	*470	*380	421
Renter — private landlord	1 066	927	794	817	790	*608	1 040	928
<i>Total renters(b)</i>	947	836	761	646	715	569	819	826
<b>Total owner and renter households</b>	<b>1 132</b>	<b>1 068</b>	<b>1 004</b>	<b>843</b>	<b>985</b>	<b>797</b>	<b>1 160</b>	<b>1 047</b>
MEAN HOUSING COSTS AS A PROPORTION OF INCOME (%)								
Owner without a mortgage	3	2	3	3	2	3	3	3
Owner with a mortgage	19	17	14	15	17	13	18	17
Renter — state/territory housing authority	16	19	19	18	20	17	19	18
Renter — private landlord	21	18	20	18	18	20	16	20
<i>Total renters(b)</i>	21	18	18	18	18	19	16	19
<b>Total owner and renter households</b>	<b>14</b>	<b>12</b>	<b>13</b>	<b>12</b>	<b>13</b>	<b>11</b>	<b>14</b>	<b>13</b>
HOUSEHOLDS ('000)								
Owner without a mortgage	577.3	523.5	178.3	156.7	159.6	28.9	31.0	1 664.9
Owner with a mortgage	459.4	430.4	216.9	152.3	222.3	25.1	51.1	1 578.2
Renter — state/territory housing authority	85.2	42.3	30.9	44.5	25.7	*5.9	*12.2	251.8
Renter — private landlord	352.8	236.2	161.7	82.0	109.7	*15.1	23.4	993.0
<i>Total renters(b)</i>	447.2	285.4	204.4	134.9	139.4	21.0	36.5	1 290.0
<b>Total owner and renter households</b>	<b>1 483.8</b>	<b>1 239.3</b>	<b>599.7</b>	<b>443.9</b>	<b>521.3</b>	<b>75.1</b>	<b>118.6</b>	<b>4 533.1</b>

(a) Includes households in the NT, for which disaggregated data are not acceptable for most purposes. (b) Includes other landlord type.

Source: ABS data available on request, *Survey of Income and Housing Costs, 1999–2000*.

## House prices

House price indexes enable the comparison of price changes between cities, though not the price levels themselves.

From 2000–01 to 2001–02, the price index of established houses increased in all capital cities (table 8.17).

For the fifth year in a row, Melbourne recorded the greatest rise in established house prices, increasing by 21.7% in 2001–02. Other capital city price rises were in Sydney (17.3%), Canberra (16.1%), Adelaide (14.5%), Brisbane (13.7%), Perth (8.7%), Hobart (4.4%), and Darwin (2.8%). The weighted average of

eight capitals index rose by 16.5%. This was the highest percentage increase over a financial year since 1988–89.

In 2000–01, project home prices (cost of new dwellings excluding land) rose in all capital cities (table 8.18). Canberra recorded the largest increase (5.1%), followed by Adelaide (4.4%), Melbourne (3.8%), Hobart (3.1%), Sydney (2.1%), Perth (2.1%) Brisbane (1.1%), and Darwin (1.1%). The index for the weighted average of eight capitals rose by 2.4%.

The price index of materials used in house building is discussed in *Chapter 20, Construction*.

## 8.17 PRICE INDEXES FOR ESTABLISHED HOUSES(a)

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	Weighted average of eight capital cities
INDEX NUMBER									
1999–2000	153.1	144.6	142.2	123.2	125.9	129.0	199.2	137.0	142.3
2000–01	163.8	159.1	149.4	131.1	133.9	134.2	198.7	149.1	152.8
2001–02	192.2	193.7	169.8	150.1	145.5	140.1	204.2	173.1	178.0
CHANGE FROM PREVIOUS YEAR (%)									
1999–2000	11.0	14.0	0.9	8.0	5.9	4.7	2.9	6.9	9.1
2000–01	7.0	10.0	5.1	6.4	6.4	4.0	-0.3	8.8	7.4
2001–02	17.3	21.7	13.7	14.5	8.7	4.4	2.8	16.1	16.5

(a) Reference base year 1989–90 = 100.0.

Source: *House Price Indexes: Eight Capital Cities (6416.0)*.

## 8.18 PRICE INDEXES FOR PROJECT HOMES(a)

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	Weighted average of eight capital cities
INDEX NUMBER									
1999–2000	123.1	122.0	118.2	127.2	114.8	126.2	143.2	131.9	120.7
2000–01(b)	138.4	136.9	132.0	141.9	126.2	140.7	156.8	153.5	134.9
2001–02	141.3	142.1	133.5	148.2	128.8	145.1	158.5	161.3	138.1
CHANGE FROM PREVIOUS YEAR (%)									
1999–2000	6.9	8.4	4.2	8.7	8.2	2.4	3.0	6.0	6.7
2000–01(b)	12.4	12.2	11.7	11.6	9.9	11.5	9.5	16.4	11.8
2001–02	2.1	3.8	1.1	4.4	2.1	3.1	1.1	5.1	2.4

(a) Reference base year 1989–90 = 100.0. (b) The 2000–01 data were affected by the introduction of The New Tax System, in particular, the introduction of the Goods and Services Tax (GST) from 1 July 2000.

Source: *House Price Indexes: Eight Capital Cities (6416.0)*.

## Value of dwellings

In the 1999–2000 Survey of Income and Housing Costs, owners were asked to estimate the value of their dwelling. These estimates may differ significantly from valuations made by accredited valuers and from an achievable sale price of the dwelling. The extent of the possible difference has not been measured. Therefore some care needs to be exercised in the use of these data.

The median owner-estimated value of dwellings for capital cities was \$191,600, 17% higher than the national median (\$163,300). The median value was highest in Sydney at \$294,000 and lowest in Hobart at \$116,500 (table 8.19).

## Housing finance for owner occupation

Secured housing finance commitments to owner occupiers is shown in table 8.20, split by purpose and type of lender.

The 2001–02 financial year saw very strong growth in housing finance commitments after a weak 2000–01. The upturn began during the June quarter of 2001, and continued into 2001–02. A total of 630,764 commitments were made by all lenders in 2001–02, with a value of \$96,482m. The number of commitments grew by 14% in 2001–02 over the previous year, while the value of commitments grew by 30%, taking the average loan size from \$134,300 in 2000–01 to \$153,000 in 2001–02.

**8.19 CAPITAL CITY OWNER HOUSEHOLDS, Value of dwelling(a) by dwelling structure — 1999–2000**

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Canberra	Capital city owner households(b)	Total owner households
MEDIAN VALUE OF DWELLING (\$'000)									
Separate house	302.5	176.5	152.1	128.3	197.2	117.0	168.8	194.4	163.6
Semidetached/row or terrace house/townhouse	233.3	205.2	*139.2	116.7	128.2	**99.2	*119.8	178.6	163.2
Flat/unit/apartment	256.1	148.3	*166.6	*115.4	*128.5	n.p.	*252.6	188.6	163.4
Total(c)	294.0	176.2	151.2	125.7	176.8	116.5	165.5	191.6	163.3
NUMBER ('000)									
Households	1 036.6	954.0	395.2	309.0	381.9	54.1	82.1	3 243.1	5 074.0

(a) As reported by owners. (b) Includes households in the NT, for which data are not available separately due to high sampling error. (c) Includes other dwelling structure.

Source: ABS data available on request, *Survey of Income and Housing Costs, 1999–2000*.

The recovery in construction finance commitments (already evident in the June quarter of 2001) gathered considerable strength throughout 2001, then weakened somewhat in the first half of 2002. Nevertheless, there was a 46% increase (or 24,580 commitments) in the number of construction finance commitments in 2001–02 over the previous financial year. Following a relatively moderate fall in the commitments to purchase new dwellings in 2000–01, there was a strong increase (of 14%) or 2,563 commitments in 2001–02.

The number of commitments for the purchase of established dwellings (including refinancing) continued to grow, increasing by 10.2% (or 49,325 commitments) in 2001–02.

The growth in bank commitments (9%) was far exceeded by the growth in commitments by permanent building societies (up 18%) and other lenders (up 33%). The average loan size for banks, however, increased more sharply, rising to \$155,300 in 2001–02, while the average loan sizes for building societies and other lenders were \$132,300 and \$148,400 respectively.

## Housing assistance

While most Australians are able to house themselves without government assistance, such assistance remains important for various population groups, especially low income earners and social security recipients. Housing assistance is provided by the Commonwealth Government and the state and territory governments through a range of housing and other programs.

Assistance for people with low incomes is provided through public housing, home purchase assistance and rent assistance schemes. Assistance is also provided to community organisations and local governments for refugees and crisis accommodation.

The *Housing Assistance Act 1996* (Cwlth) provides the legislative basis for the Commonwealth's provision of financial assistance to the states and territories for housing and related purposes. The Act authorises the Commonwealth to form and enter into a Commonwealth State Housing Agreement (CSHA) with the states and territories. The current CSHA commenced on 1 July 1999. Unlike the 1996 CSHA, it provides for bilateral housing agreements between the Commonwealth and each state and territory. The CSHA sets out the terms for the provision of housing assistance for rental housing, home purchase and other specific housing programs.

The Commonwealth Minister for Family and Community Services and state and territory housing ministers met in April 2002 and committed to a new CSHA to operate from July 2003. Ministers expressed their commitment to the development of positive options for a new CSHA that will create a modern, sustainable housing system; support community development and the renewal of public housing estates; support wider government outcomes in health, education and labour market reform; and stimulate private sector investment in the supply of low cost housing.

## 8.20 SECURED HOUSING FINANCE COMMITMENTS(a), By purpose and type of lender(b)

	Units	Type of lender			Total
		Banks	Permanent building societies	Other lenders(c)	
<b>CONSTRUCTION OF DWELLINGS</b>					
Dwelling units					
1998-99	no.	62 464	3 787	7 238	73 489
1999-2000	no.	65 673	3 276	6 733	75 682
2000-01	no.	44 127	2 755	6 105	52 987
2001-02	no.	66 009	3 697	7 861	77 567
Value of commitments					
1998-99	\$m	7 935	520	901	9 356
1999-2000	\$m	9 293	474	849	10 617
2000-01	\$m	6 088	412	893	7 394
2001-02	\$m	9 873	548	1 111	11 532
<b>PURCHASE OF NEWLY ERECTED DWELLINGS</b>					
Dwelling units					
1998-99	no.	17 903	282	1 963	20 148
1999-2000	no.	17 313	300	920	18 533
2000-01	no.	14 656	475	2 566	17 697
2001-02	no.	16 823	283	3 154	20 260
Value of commitments					
1998-99	\$m	2 482	37	282	2 802
1999-2000	\$m	2 666	48	127	2 841
2000-01	\$m	2 322	55	361	2 738
2001-02	\$m	3 029	39	444	3 511
<b>PURCHASE OF ESTABLISHED DWELLINGS(d)</b>					
Dwelling units					
1998-99	no.	323 840	14 917	55 779	394 536
1999-2000	no.	368 814	16 563	69 546	454 923
2000-01	no.	378 526	19 479	85 607	483 612
2001-02	no.	395 758	22 918	114 261	532 937
Value of commitments					
1998-99	\$m	41 089	1 677	6 577	49 342
1999-2000	\$m	50 919	1 825	8 750	61 495
2000-01	\$m	50 722	2 244	11 327	64 293
2001-02	\$m	61 427	2 971	17 040	81 439
<b>TOTAL</b>					
Dwelling units					
1998-99	no.	404 207	18 986	64 980	488 173
1999-2000	no.	451 800	20 139	77 199	549 138
2000-01	no.	437 309	22 709	94 278	554 296
2001-02	no.	478 590	26 898	125 276	630 764
Value of commitments					
1998-99	\$m	51 506	2 234	7 760	61 500
1999-2000	\$m	62 878	2 347	9 726	74 953
2000-01	\$m	59 132	2 711	12 581	74 424
2001-02	\$m	74 329	3 558	18 595	96 482

(a) Excludes alterations and additions. (b) Caution should be exercised in using these statistics to calculate market share because, while all banks and permanent building societies are selected, only a sample of other lenders are selected. (c) Includes wholesale lenders n.e.c. (d) Includes refinancing.

Source: ABS data available on request, Survey of Housing Finance for Owner Occupation.

Details of Commonwealth assistance provided under the CSHA for 2001–02 are set out in table 8.21.

The 1999–2003 CSHA includes a subsidiary National Housing Data Agreement outlining a commitment to the development and provision of nationally consistent data (AIHW 2000a). The National Housing Data Agreement was signed by Housing Chief Executive Officers in January 2000. The ABS and the Australian Institute of Health and Welfare (AIHW) are also signatories to the Agreement, with the AIHW providing secretariat support. The three schedules to the Agreement identify the major work areas comprising development of national minimum data sets, national performance indicators and national data definitions and standards.

During 2001–02 national data development work under the Agreement included:

- the development and data collection in respect of 2000–01 as input to the CSHA national performance reporting framework for public housing programs, the Aboriginal Rental Housing Program and community housing programs
- data collection for the three other CSHA areas of Home Purchase Assistance, Private Rental Assistance and the Crisis Accommodation Program
- the use of a national housing assistance data repository to construct national administrative unit record data for public housing and the Aboriginal Rental Housing Program
- continued development of the national housing assistance data repository to contain data for community and private rental housing assistance
- the publication of Version 1 of the National Housing Assistance Data Dictionary.

## Public housing

Public housing comprises dwellings owned and managed by state and territory housing authorities and which are made available at low cost to tenants. Rents are generally set at a maximum of 25% of income, thereby providing low cost housing to people on low incomes. The median weekly housing cost for those renting from a state or territory housing authority in 1999–2000 was \$58, compared to \$150 for those renting from a private landlord. Expenditure under the CSHA on public housing and related assistance was approximately \$1.3b in 1999–2000.

Over recent decades, public housing has been increasingly targeted towards those most in need. In 1999–2000, 402,000 households (6% of all households) were living in public housing; of these, about 82% were in the lowest 40% of the household income distribution. Government pensions and benefits were the main source of income for the majority of households in public housing.

## Home purchase assistance (HPA)

HPA is provided by some states to assist low-to-moderate income households to purchase a home or to provide help with mortgage repayments. Some of the mechanisms used to assist low-to-moderate income earners include loans, shared equity schemes, deposit assistance and mortgage relief. States offer HPA options in line with local market conditions. The emphasis given to loan products varies significantly between jurisdictions. Western Australia and South Australia placed the greatest emphasis on various forms of subsidised loan products, partly due to lower housing prices, which make home purchase feasible on lower incomes. Other jurisdictions such as New South Wales gave greater emphasis to mortgage relief for home purchasers experiencing hardship.

**8.21 COMMONWEALTH STATE HOUSING AGREEMENT, Payments to states/territories — 2001–02**

	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT	Aust.
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Base funding	268 831	196 364	155 842	80 263	66 243	24 501	22 891	18 640	<b>833 575</b>
Community Housing Program	21 589	15 927	11 943	6 299	4 982	1 561	1 037	652	<b>63 990</b>
Aboriginal Rental Housing Program	17 777	3 638	25 227	15 862	8 342	696	—	19 458	<b>91 000</b>
Crisis Accommodation Program	13 379	9 870	7 401	3 904	3 087	967	643	404	<b>39 655</b>
<b>Total</b>	<b>321 576</b>	<b>225 799</b>	<b>200 413</b>	<b>106 328</b>	<b>82 654</b>	<b>27 725</b>	<b>24 571</b>	<b>39 154</b>	<b>1 028 220</b>

Source: Department of Family and Community Services.

## Rent assistance

The Commonwealth Government pays Rent Assistance, a non-taxable income supplement, to eligible social security customers who pay rent in the private rental market. Rent can include private rent, lodgings, board and lodgings, site fees, fees to moor a vessel, or service and maintenance fees in a retirement village.

To be eligible for Rent Assistance, a customer must first pay rent above a certain threshold level, then Rent Assistance is paid at the rate of 75 cents in each dollar above the threshold, until a maximum amount is reached. Maximum rates and thresholds vary depending on a person's family situation.

Rent Assistance is indexed twice-yearly in March and September to the consumer price index.

As at June 2002, there were 943,877 income units in receipt of Rent Assistance, where an income unit is defined as a single person with or without dependants, or a couple with or without

dependants. The average rent paid by Rent Assistance customers in June 2002 was \$253 per fortnight while the average Rent Assistance received was \$72 per fortnight.

A large proportion of Rent Assistance customers are either lone persons or sole parents. In June 2002, 54% of Rent Assistance customers were single without children, 23% were single with children, 15% were couples with children and 8% were couples without children.

Under CSHA, the state and territory governments also assist low income earners with the costs of rent, bonds and relocation in the private rental market. In 2000–01 almost \$80m was provided through these arrangements.

Table 8.22 provides details of the number of Rent Assistance customers, average fortnightly rates of Rent Assistance and average fortnightly rents. Outlays on Rent Assistance are included in the total expenditure on pensions, allowance and family tax benefits — see footnote (a) to table 7.7 in *Chapter 7, Income and welfare*.

**8.22 RECIPIENTS OF RENT ASSISTANCE, Average Rent Assistance and rent paid — June 2002**

	Income units no.	Average rent assistance(a) \$ per fortnight	Average rent paid(a) \$ per fortnight
<b>Primary payment type(b)</b>			
Youth Allowance	90 741	57	191
Age Pension	151 120	66	221
Disability Support Pension	162 048	73	225
Newstart Allowance	206 317	68	231
Parenting Payment (single)	189 782	84	297
Parenting Payment (partnered)	26 160	95	354
Family Tax Benefit Part A	81 179	72	368
Other	36 530	71	239
<b>Income unit type</b>			
Single no dependants	512 426	65	203
Couple no dependants	74 547	69	281
Couple 1 or 2 dependants	95 687	80	350
Couple 3 or more dependants	40 655	90	364
Single 1 or 2 dependants	181 102	81	294
Single 3 or more dependants	34 715	94	325
Couple temporarily separated	2 227	87	260
Unknown income unit	2 518	57	190
<b>Total</b>	<b>943 877</b>	<b>72</b>	<b>253</b>

(a) Average rent assistance and average rent paid exclude customers who have no ongoing entitlement. (b) Rent assistance has been counted under a single primary payment type. The general order of priority is pensions, then allowances, then family tax benefit. For example, a couple receiving Disability Support Pension, Parenting Payment (Partnered) and Family Tax Benefit would appear as getting Rent Assistance with their Disability Support Pension.

Source: Department of Family and Community Services.

## Crisis accommodation

Governments also provide assistance in meeting the short-term accommodation needs of homeless people who are identified as a priority target group under the CSHA. The Commonwealth Government provides funding of \$40m per annum for crisis accommodation through the Crisis Accommodation Program under the CSHA. The Commonwealth Government and the state and territory governments also provide assistance to people who are homeless or at imminent risk of homelessness, through the Supported Accommodation Assistance Program (SAAP).

Within the context of the SAAP IV Bilateral Agreements 2000–05, national funding (i.e. Commonwealth and state/territory contributions) will be over \$1.4b. Total recurrent funding for the SAAP program during 2000–01 totalled \$268.8m. Such funding consisted of a Commonwealth contribution of \$157.7m and a state/territory contribution of \$111.2m.

In 2001–02, the AIHW's Supported Accommodation and Crisis Services Unit published the 2000–01 SAAP national data collection report (AIHW 2001a). The report showed that 91,200 clients were provided with support or supported accommodation through SAAP in Australia in 2000–01. These contacts comprised a total of 168,200 occasions of support in 2000–01. For 20% of support periods the main reason for seeking assistance was either usual accommodation unavailable or eviction/previous accommodation ended.

Nationally, males aged 25 years and over presenting alone at SAAP agencies accounted for the largest proportion of all support periods (34%), followed by 19% for female clients with children. Overall, 6% of support periods were for couples with or without children, while males with children accounted for 1% of all support periods. Indigenous Australians constituted 16% of SAAP clients and on average had more support periods than other clients.

For clients who specifically sought assistance to obtain independent housing there were significant changes in accommodation type before and after support. In particular, accommodation in public or community housing went from 8% of support periods before support to 21% after. The proportion of support periods in which clients were renting privately also increased (from 17% before support to 26% after) (AIHW 2001a).

## Housing assistance program for Indigenous Australians

The Aboriginal and Torres Strait Islander Commission (ATSIC) administers a number of programs to improve the living environment of Aboriginal and Torres Strait Islander Australians. Its second largest program is the Community Housing and Infrastructure Program (CHIP) which has the aim of providing appropriate, safe and affordable housing, and improving community and individual health and wellbeing.

CHIP provides funds for the construction, purchase, repair and management of community housing as well as for the provision and maintenance of housing-related infrastructure (essential services such as water, sewerage, electricity and community roads) and recurrent funding for the provision of municipal services. Through CHIP, grants are provided to:

- Indigenous community organisations from ATSIC Regional Council allocations
- state Indigenous Housing Authorities where bilateral agreements are in place
- Indigenous community organisations under the National Aboriginal Health Strategy where the financial and technical aspects of the projects are managed under Contracted Program Management arrangements.

In 2001–02, CHIP expenditure totalled \$240m, of which around half went to the provision of housing. Over 500 houses were purchased/constructed and over 1,100 upgraded/renovated. The program has a particular focus on environmental health-related infrastructure through a specific sub-program called the National Aboriginal Health Strategy (NAHS). NAHS projects are generally large-scale projects targeting priority housing and infrastructure including power, water and waste removal, mainly in rural and remote Indigenous communities. In 2001–02 more than \$90m in grant funds was provided under NAHS.

ATSIC engaged the ABS to undertake a Community Housing and Infrastructure Needs Survey (CHINS) during 2001. The timing of CHINS was to align the process with the 2001 Census. The CHINS 2001 report, which was released in May 2002, provides a comprehensive picture on Indigenous housing circumstances across all tenures at a single point in time.

ATSIC's Community Housing and Infrastructure Program supplements the efforts of state/territory governments, which also receive earmarked Indigenous housing funds from the Aboriginal Rental Housing Program (\$91m per annum) of Department of Family and Community Services (FaCS).

The Commonwealth Government, through FaCS and ATSIC, has been implementing bilateral housing agreements with state and territory governments to maximise program efficiency and effectiveness and to better coordinate all housing programs specific to Indigenous people. At 30 June 2002, agreements had been signed with the Northern Territory, Western Australia, New South Wales, the Australian Capital Territory, South Australia and Queensland, while negotiations with Tasmania and Victoria are continuing.

In December 1999, the Agreement on National Indigenous Housing Information was signed by the Chief Executive Officers of the Commonwealth and state and territory agencies administering Indigenous housing assistance (AIHW 2000b). The ABS and the AIHW are also signatories to the agreement and the AIHW provides secretariat support. The agreement provides a framework to improve how outcomes for Indigenous housing are measured, with a focus on developing national data sets.

Following the establishment in 2001–02 of the Housing Ministers' Advisory Council's Standing Committee on Indigenous Housing, the National Indigenous Housing Information Implementation Committee (NIHIC) now reports directly to this Standing Committee. The Standing Committee has responsibility for the implementation of Housing Ministers' 10-year statement *Building a better future: Indigenous Housing to 2010*. The development of data is one of the key implementation areas in the Standing Committee's work plan.

In 2001–02 the ABS and the AIHW worked with agencies responsible for Indigenous housing assistance at the Commonwealth and state/territory level to develop an Indigenous Housing Information Management Strategy and Action Plan. The strategy and action plan represent an important first stage in the process of the Standing Committee and NIHIC developing administrative data for national Indigenous housing.

## National Indigenous housing reforms

The Commonwealth State Working Group on Indigenous Housing developed processes to coordinate a national effort, and provide a valuable forum for ATSIC, the Commonwealth and the states to share information and strategies. This Group is now superseded by the Standing Committee on Indigenous Housing.

Agreement has been achieved in a number of key areas including:

- negotiation of Indigenous Housing Agreements between ATSIC, the Commonwealth and a number of state and territory governments
- creation of Indigenous Housing Authorities in the New South Wales, South Australia and Northern Territory
- maximisation of Indigenous specific housing funds for best outcomes
- an agreement on National Indigenous Housing Information for coordinating national data development and collection, and the development of an implementation strategy
- investment in the research and development into appropriate technologies for remote areas
- provision of resources to assist maintenance and repair of assets
- development of a National Skills Development Strategy to provide accredited training to the management and staff of Community Housing Organisations
- a substantially increased focus on providing sustainable housing for Indigenous people
- use of Aboriginal Rental Housing Program funds for recurrent purposes, which has led to a greater focus on effective housing management and maintenance
- a National Framework for the Design, Construction and Maintenance of Indigenous Housing which has been adopted in a number of states and territories
- improved housing standards through compliance with building construction standards and industry regulations
- introduction of Centrepay, Centrelink's voluntary direct deduction scheme, which is proving to be an effective means for Indigenous Housing Organisations (IHOs) to collect rent

- identification of strategic asset management principles and best practices for IHOs
- a new multi-measure approach to Indigenous housing need and resource allocation that reflects the diversity of need
- establishment of a Standing Committee on Indigenous Housing to implement the Ministers' statement of new directions. The Standing Committee consists of all state and territory agencies responsible for Indigenous housing as well as ATSIC and FaCS.

The Commonwealth and State Housing Ministers and the Minister for Aboriginal and Torres Strait Islander Affairs, in May 2001, agreed on a 10-year plan to improve Indigenous housing outcomes, *Building a Better Future: Indigenous Housing to 2010*. Strategies to achieve these outcomes will include: identifying and addressing unmet housing need; improving the capacity of IHOs; involving communities in planning and delivery; and achieving safe, healthy and sustainable housing.

In line with the agreed outcomes, all funding agencies, including the State Housing Authorities, will be developing strategies to achieve the agreed outcomes within their jurisdiction. This will include the development of criteria for capital and recurrent funding and, in particular, strategies for ensuring that IHOs achieve effective and efficient management practices.

### Home ownership

The ATSIC Home Ownership scheme aims to reduce the disparity between the rate of home ownership in Indigenous communities and that in the wider Australian community. The rate of home ownership for Aboriginal family and lone-person households was estimated in the 2001 Census to be 32%. This compares with a national non-Indigenous figure of 71%.

ATSIC provides home loans at concessional interest rates to Aboriginal and Torres Strait Islander families. The Home Ownership scheme targets low income families with the capacity to repay a long-term loan, but who have difficulty obtaining finance from traditional lending institutions. The loan portfolio administered by ATSIC includes 3,824 loans valued at \$316m. In 2001–02 about 494 new loans were provided.

### Other programs

The Commonwealth Government, through the Department of Health and Ageing, finances and regulates residential care for frail older people. The residential care is usually provided by the non-government sector, including religious, charitable and private sector providers. A small number of residential services are operated by the state and local government sectors. Capital assistance for upgrading or construction of facilities is made available to those aged care services catering largely for residents with special needs or on low incomes, and those in rural and remote areas of Australia (see the section *Residential aged care program* in *Chapter 7, Income and welfare*).

Under the Commonwealth/State Disability Agreement, the Commonwealth provides funds to assist the states and territories in the planning, policy setting and management of accommodation and other related services for people with disabilities. The state and territory governments are responsible for administering these services (see the section *Support for people with a disability* in *Chapter 7, Income and welfare*). Areas such as advocacy, and research and development, continue to be a responsibility of both levels of government.

The Commonwealth also funds the AIHW. The AIHW's role is to gather, analyse and disseminate national data on health and welfare services, including housing assistance, in order to support both government and community organisations' planning and policy making. The Housing Assistance unit of AIHW is involved in describing the need for, provision and use of housing assistance in Australia, supporting the development of standard terminologies, definitions and classifications for use in measuring housing assistance and contributing to the development of nationally consistent data.

In December 2001, the AIHW published *Australia's Welfare 2001: Services and Assistance* (AIHW 2001b) which contains chapters on housing assistance and services for homeless people. Included in these chapters is information examining the need for assistance, government expenditure on services and assistance, the characteristics of recipients of assistance and outcomes.

A housing authority also exists in each state and territory, which is responsible for the provision of public rental housing and often other housing related services such as home loans. These authorities are:

- New South Wales — Department of Housing
- Victoria — Department of Human Services (Office of Housing)
- Queensland — Department of Housing
- South Australia — Department of Human Services (SA Housing Trust)
- Western Australia — Department of Housing and Works (Homeswest)
- Tasmania — Department of Health and Human Services (Housing Tasmania)
- Northern Territory — Territory Housing
- Australian Capital Territory — ACT Housing.

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*Australian Housing Survey — Housing Characteristics, Costs and Conditions* (4182.0)

*Australian Social Trends* (4102.0)

*Household Investors in Rental Dwellings, Australia* (8711.0)

*House Price Indexes: Eight Capital Cities* (6416.0)

*Housing Finance for Owner Occupation, Australia* (5609.0)

*Housing Occupancy and Costs, Australia* (4130.0)

*Income Distribution, Australia* (6523.0)

### Other publications

AIHW (Australian Institute of Health and Welfare):

2000a, *The National Housing Data Agreement: a Subsidiary Agreement of the 1999–2003 Commonwealth–State Housing Agreement*, AIHW, Canberra

2000b, *The Agreement on National Indigenous Housing Information*, AIHW, Canberra

2001a, *SAAP National Data Collection Annual Report 2000–01, Australia*, AIHW, Canberra

2001b, *Australia's Welfare 2001: Services and Assistance*, AGPS, Canberra

Department of Family and Community Services, *Annual Report*, AGPS, Canberra

The latest annual reports of the state and territory government housing authorities, and the latest annual report of the Department of Family and Community Service in relation to the *Housing Assistance Act 1996* (Cwlth), show further details of government activities in the field of housing

### Web sites

Aboriginal and Torres Strait Islander Commission, <<http://www.atsic.gov.au>>

Australian Housing and Urban Research Institute, <<http://www.ahuri.edu.au>>

Australian Institute of Health and Welfare, <<http://www.aihw.gov.au>>

Commonwealth Department of Family and Community Services, <<http://www.facs.gov.au>>

Commonwealth Department of Health and Ageing, <<http://www.health.gov.au>>



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## Introduction

This chapter provides information on various aspects of the health of the Australian population and the health-related activities of government and other bodies. Data from the most up-to-date sources available are used including information collected in the 2001 National Health Survey (NHS) on the health status of Australians. This is the first in a new series of three-yearly national health surveys conducted by the ABS, with the increased frequency assisted by a funding partnership with the Department of Health and Ageing (DoHA). Data from the 2001 NHS are presented in this chapter based for the first time on the International Classification of Diseases, 10th revision (ICD-10). Data from the supplementary health survey of Aboriginal and Torres Strait Islander people were not available at time of printing. The chapter also includes information from the 1998 Survey of Disability, Ageing and Carers (SDAC) as well as mortality data from the ABS cause of death collection. Data from the SDAC are based on the International Classification of Functioning, Disability and Health, which was endorsed by the World Health Organization (WHO) in 2001.

The Australian health system has a diversity of arrangements for planning, funding, delivering and regulating health services which feature a mix of private and public sector involvement.

The Commonwealth Government, through the Health and Ageing portfolio, has primary financial responsibility for the health and ageing system, while the state and territory governments are largely responsible for the direct provision of health services, including hospitals, public health and mental health. Local governments and non-government organisations are also involved in the direct provision of health services. Private, non-salaried practitioners provide most medical, dental and allied health care. Two major national subsidy schemes, Medicare and the Pharmaceutical Benefits Scheme (PBS), are funded by the Commonwealth to cover all Australians, and are discussed in detail in the section *Health care delivery and financing*.

In recognition of the need for a national approach to public health and health promotion, the Commonwealth Government and the state and territory governments have established a National Public Health Partnership. This is a collaborative arrangement to improve the health status of Australians, in particular those population groups most at risk. Public health services, which are largely funded by

Commonwealth Government and state and territory and local governments, include activities to ensure food quality, immunisation services and communicable disease control, public health education campaigns, injury prevention, programs to reduce the use of tobacco, alcohol and illicit drugs, environmental monitoring and control, and screening programs for diseases such as breast cancer. Essential support to the health service system is given by many other agencies, including consumer and advocacy groups, professional associations for medical and paramedical practitioners as well as non-profit organisations.

Statistical and information agencies provide the information needed for evidence-based decision making and policy formation. Under the National Health Information Agreement, to which the ABS, the Australian Institute of Health and Welfare (AIHW), DoHA, and the various state and territory health authorities, are signatories, the National Health Information Development Plan (NHIDP) sets out agreed national priorities for health information to be considered by the Australian Health Ministers' Advisory Council (AHMAC). The role of AHMAC is described in the section *Health and Community Services Ministerial Council (HCSCM)*. The NHIDP is managed by the National Health Information Management Group.

## How Australians rate their health

The WHO defines health as 'a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity'. While the level of disease or infirmity can be assessed by mortality, disability and morbidity statistics, the presence of positive wellbeing is more difficult to measure.

## Health and wellbeing

In 2001, the majority of Australians aged 15 years and over considered themselves to be in good health, with 82% reporting their health status as good, very good or excellent. This is similar to the proportion reported in the previous NHS (83% in 1995). In 2001, young men aged 15–24 were most likely to consider themselves to be in good health (92%), while women aged 85 years or more were least likely to report that they were in good health (60%).

The distribution across health status categories was similar for males and females (table 9.1). As would be expected, the proportion of people reporting fair or poor health increased with age. Of those aged 15–24, 9% assessed their health as fair or poor in comparison to 34% of those aged 65 years and over. In addition, individuals' rating of their health was strongly related to their physical health. In 2001, some 96% of those without a long-term condition assessed their health as good, very good or excellent, compared to 80% of those who reported a long-term condition.

## Health status

### Morbidity

The 2001 NHS found that almost 78% of the Australian population reported having experienced one or more long-term conditions (i.e. conditions that have lasted, or are expected to last, six months or more). In most cases, respondents were asked about conditions which had been medically diagnosed. From the range of long-term conditions covered in the survey, those relating to eyesight and back problems were among the most prevalent (table 9.2). Asthma was the most commonly reported condition among those under 18 years.

#### 9.1 SELF-ASSESSED HEALTH STATUS — 2001

	Age group (years)				All age groups
	15–24	25–44	45–64	65 and over	
	%	%	%	%	%
<b>MALES</b>					
Excellent	28.6	20.4	14.4	9.9	18.6
Very good	38.3	35.5	29.1	20.2	31.9
Good	24.9	31.7	32.5	36.0	31.3
Fair/poor	8.1	12.3	24.0	33.9	18.1
<b>FEMALES</b>					
Excellent	22.1	22.9	17.2	10.6	19.1
Very good	39.8	37.8	30.9	22.5	33.7
Good	27.8	27.5	29.8	33.5	29.2
Fair/poor	10.3	11.8	22.1	33.5	18.1
<b>PERSONS</b>					
Excellent	25.4	21.7	15.8	10.3	18.9
Very good	39.1	36.7	30.0	21.4	32.8
Good	26.3	29.6	31.2	34.6	30.2
Fair/poor	9.2	12.1	23.0	33.7	18.1

Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

#### 9.2 SELECTED LONG-TERM CONDITIONS — 2001

	0–17 years	18 years and over		All persons
		Males	Females	
	%	%	%	%
Long-sightedness	4.4	25.6	30.7	22.3
Short-sightedness	4.7	23.0	29.4	20.8
Back problems	2.2	27.4	26.6	20.8
Arthritis	0.2	14.9	21.1	13.6
Asthma	13.9	8.9	12.7	11.6
Chronic sinusitis	4.9	10.2	14.9	10.7
Total/partial hearing loss	2.0	17.5	9.7	10.6
Hypertensive disease	0.1	12.5	14.4	10.1
Mental and behavioural problems	7.0	8.7	12.2	9.6
Diabetes mellitus	0.2	3.9	3.8	2.9
Neoplasms	0.1	2.5	1.8	1.6

Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

Adult females (aged 18 years and over) were more likely than males to report most of the selected long-term conditions. However, females were also more likely to consult health professionals and have conditions diagnosed. For example, in 2001 it was estimated that 27% of females had consulted a doctor in the previous two weeks, compared with 21% of males. Females also have a longer life expectancy, so that there are more females in older age groups where long-term conditions are common. Adult males had a higher prevalence of neoplasms and hearing loss. The latter may be partly attributable to the higher numbers of males working in environments where they are exposed to loud noise.

The proportion of people who reported hearing loss generally increased steadily with age (graph 9.3). Hearing loss due to the ageing process (presbycusis) and environmental exposure to noise are important causes of hearing loss. Only 1% of 0–4 year olds experienced hearing loss, which increased to 12% among 45–49 year olds, and to over 54% of people aged 85 years and over.

The prevalence of hyperopia (long-sightedness) within the population also appears to be age-related. Less than 8% of people in all age groups under 45 reported being long-sighted. However, this was significantly higher at 41% of those aged 45–49 and is higher again in age groups up to the sixties. It affects 43% of people aged 85 and over.

Age is also a major determining factor in arthritis. Less than 3% of people aged under 40 years reported arthritis, compared to 44% of those aged 60 and over.

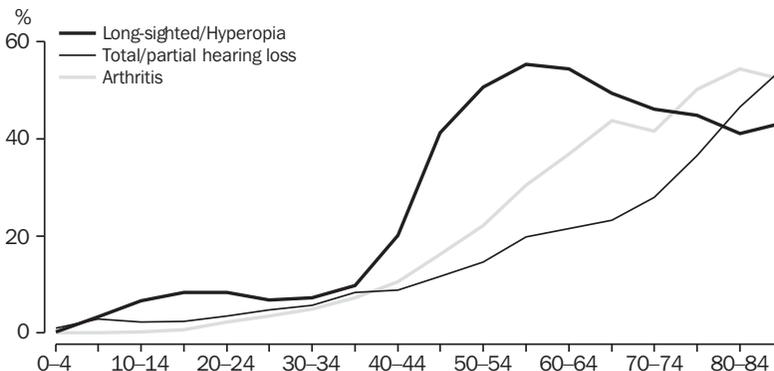
## Mortality

There were 128,291 deaths registered in 2000, consisting of 66,817 male and 61,474 female deaths. This represented an increase of 0.1% on the corresponding figure for 1999 (128,102 deaths). Malignant neoplasms and ischaemic heart diseases were the leading underlying causes of death, accounting for 28% and 21% respectively of total deaths registered (table 9.4).

During the decade up to 2000, the total number of deaths registered annually increased by approximately 7%. However, the standardised death rate of 566 deaths per 100,000 population in 2000 was 21% lower than the corresponding rate of 715 in 1990. These outcomes are consistent with continuing improvements in life expectancy in Australia.

Over the 10 years to 2000, there were quite different patterns of decline in the two leading causes of death, malignant neoplasms and ischaemic heart diseases, which together account for nearly half the total deaths. Between 1990 and 2000, the standardised death rate for malignant neoplasms decreased by 10%, while the rate for ischaemic heart diseases decreased by 39% (graph 9.5).

**9.3 SELECTED LONG-TERM CONDITIONS, By age group — 2001**



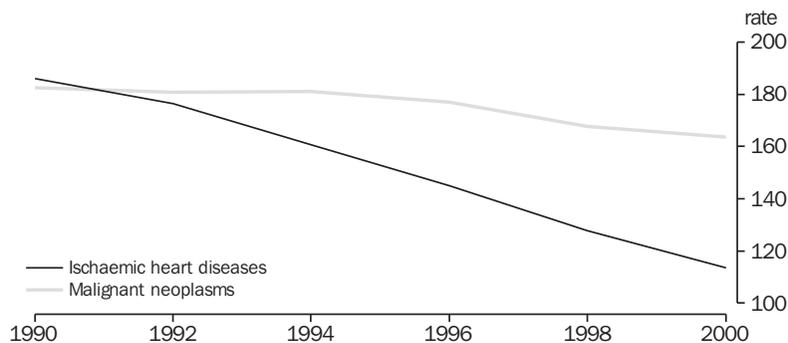
Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

## 9.4 LEADING CAUSES OF DEATH — 2000

Cause of death and ICD-10 code	Males	Females	Persons	Proportion of total deaths
	no.	no.	no.	%
<b>All causes</b>	<b>66 817</b>	<b>61 474</b>	<b>128 291</b>	<b>100.0</b>
Malignant neoplasms (cancer) (C00-C97)	20 153	15 475	35 628	27.8
Trachea, bronchus and lung (C33, C34)	4 587	2 291	6 878	5.4
Ischaemic heart diseases (I20-I25)	14 052	12 469	26 521	20.7
Cerebrovascular diseases (stroke) (I60-I69)	4 913	7 387	12 300	9.6
Chronic lower respiratory diseases (including asthma, emphysema and bronchitis) (J40-J47)	3 514	2 448	5 962	4.6
Accidents (V01-X59)	3 299	1 839	5 138	4.0
Transport accidents (V01-V99)	1 459	556	2 015	1.6
Diabetes mellitus (E10-E14)	1 594	1 412	3 006	2.3
Diseases of arteries, arterioles and capillaries (including atherosclerosis and aortic aneurysm) (I70-I79)	1 321	1 296	2 617	2.0
Intentional self-harm (X60-X84)	1 860	503	2 363	1.8
Organic, including symptomatic, mental disorders (F00-F09)	668	1 439	2 107	1.6
Influenza and pneumonia (J10-J18)	1 312	1 625	2 937	2.3
All other causes	14 131	15 581	29 712	23.2

Source: Causes of Death, Australia, 2000 (3303.0).

## 9.5 STANDARDISED DEATH RATES(a)



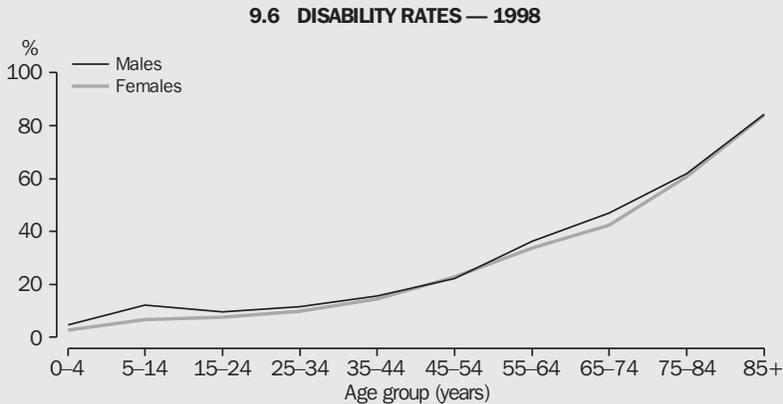
(a) Per 100,000 estimated resident population.

Source: Causes of Death, Australia (3303.0).

## Disability among adults 15–64 years

This article discusses disability and its relationship with labour force outcomes. Disability occurs when a person has an impairment or is restricted in his or her activities or participation because of health condition(s). Of particular concern are those disabilities resulting in specific restrictions which affect the core activities of self care, mobility or communication; or schooling or employment restrictions.

In 1998, there were 3.6 million people in Australia with a disability (19% of the total population), based on estimates from the ABS Survey of Disability, Ageing and Carers (SDAC). A further 3.1 million reported that they had an impairment or long-term condition that did not restrict their everyday activities. The likelihood of a person having, or developing, a disability increases with age, and is largely independent of sex. Disability rates vary from 4% for children aged 0–4 years to 84% for those aged 85 and over (graph 9.6).



Source: ABS data available on request, 1998 Survey of Disability, Ageing and Carers.

Of all people with a disability, 5% live in cared accommodation (including hospitals, nursing homes, aged care hostels and cared components of retirement villages), while the remainder lived in the general community.

People aged 15–64 years often participate in education and/or employment, and many have family responsibilities. If they also have a disability, this may increase the difficulty in managing all the responsibilities in their lives. Of all people aged 15–64 years, 17% had a disability. In contrast, of people aged 65 years or more, 54% had a disability.

### Types of restricting impairment

An impairment, in terms of the World Health Organization's International Classification of Functioning Disability and Health (ICF), can be considered to be any loss or abnormality of body functions or structures including psychological, physiological or anatomical aspects. Data from the ABS survey have been classified to five broad types, relatable to the ICF:

- psychological: nervous or emotional condition
- intellectual: difficulty in learning or understanding things
- head injury stroke or brain damage: with long-term effects that restrict everyday activities

- sensory or speech
- physical: such as chronic or recurrent pain, incomplete use of arms or fingers, disfigurement or deformity, etc.

Physical impairments are the most common of all impairment types and show a steady increase with age. Of people aged 15–64 with a disability living in the community, the proportion who reported that they were restricted by a physical impairment increased with age, from 61% for 15–24 years to 79% for those aged 55–64 years. Traffic accidents, as well as work and sporting injuries, are relatively frequent causes of this type of impairment in the 15–64 years age group.

The proportion of people with disabilities who had a sensory or speech impairment also increased with age, from 15% for 15–24 year olds to 26% for 55–64 year olds. Many people with a sensory impairment had developed industrial deafness or age-related hearing loss in the course of their working life.

In contrast, intellectual impairments are more common in younger people. This impairment type is often caused by congenital disorders such as Down Syndrome. The proportion of people with an intellectual disability declined from 32% of people aged 15–24 years to 4% of people aged 55–64 years.

### How participation in employment varies by type of restricting impairment

Government policy is designed to provide services to people who are restricted in the basic activities of daily living. A number of employment assistance programs give support to people with disabilities for job search activities and/or provide ongoing support at work. Under the Commonwealth/State Disability Agreement, the Commonwealth Government has responsibility for the planning, policy setting and management of disability employment services (primarily focused on people aged 15–64 years).

The labour force participation rate of working-age people living in the community was 76%. This rate dropped to 53% for people with a disability, ranging from only 29% for those people restricted by a psychiatric impairment to 56% for those restricted by a sensory impairment (table 9.7).

### Need for assistance with cognitive or emotional tasks

Many people with a disability live independently within the community. They may at times need assistance in some areas of their day-to-day lives. In the 1998 SDAC people were asked whether they had difficulty performing a range of day-to-day tasks and whether they needed help with them. These tasks, such as dressing, washing, walking, understanding and

communicating with others, are grouped to form a number of activities of everyday life. People may need help with one or more of these activities.

In addition, the ability of a person to make good decisions, to manage their feelings and emotions, and to establish and maintain interpersonal relationships can have a significant impact on a person's ability to access support programs (accommodation, respite, employment and others), and the outcomes of those support programs. These abilities were grouped together as cognitive or emotional tasks.

Cognitive or emotional tasks are:

- establishing, developing and maintaining relations with others
- managing feelings, emotions and consequent behaviour
- making good decisions.

These essential day-to-day tasks make a large contribution to a person's wellbeing and can be difficult at times for anyone. People with a disability, particularly those restricted by a psychological or intellectual impairment, may experience additional difficulty with these tasks and may need help from others.

The ability of a person to gain meaningful employment can be influenced by many factors, including their ability to interact with others and to make sound decisions.

**9.7 PEOPLE WITH A DISABILITY(a) RESTRICTED BY IMPAIRMENT — 1998**

Labour force status	Psychological %	Intellectual %	Head injury, stroke or brain damage %	Sensory or speech %	Physical %	All with a disability(b) %	All persons(b) %
Employed full-time	11.3	17.1	17.3	37.2	27.6	31.0	49.1
Employed part-time	10.2	12.8	12.6	13.9	15.5	16.1	20.3
<i>Total</i>	21.6	29.9	30.0	51.1	43.1	47.1	69.3
Total unemployed	7.2	8.3	6.6	4.7	6.0	6.1	6.3
<i>Participation rate</i>	28.8	38.2	36.5	55.7	49.1	53.2	75.6
Not in the labour force	71.2	61.8	63.5	44.2	50.9	46.8	24.4
<b>Total(c)</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) People aged 15–64 and living in the community. (b) The sum of the components exceeds the total because a person can report more than one impairment. (c) Includes those for which the type(s) could not be determined.

Source: ABS data available on request, 1998 Survey of Disability, Ageing and Carers.

In 1998, 8% of the 2,066,700 people aged 15–64 years with a disability living in the community reported that they needed help to make friends, interact with others, or maintain relationships; 15% needed help to cope with feelings or emotions; and 14% required assistance to make decisions or think through problems (table 9.8).

People with some impairment types are more likely to have a need for assistance with cognitive or emotional tasks than others: 72% of people with a psychological impairment needed assistance with one or more of these tasks, compared to 56% of people with an intellectual impairment. Less than half (41%) of people with head injury, stroke or brain damage required this type of assistance, and this form of assistance was needed to an even lesser extent among those restricted by a sensory or speech impairment (24%) and least of all among those restricted by a physical impairment (20%).

A person may have more than one impairment type. Some of the people with a physical or sensory impairment who needed assistance with cognitive or emotional tasks had a psychiatric or intellectual impairment as well.

Coping with feelings or emotions was most frequently reported as the area of need for assistance, ranging from 60% of people with a psychological impairment to 15% of those with a physical impairment. The least need for assistance was required with making friends, interacting with others and maintaining relationships. People with a physical impairment had the lowest need for help in each of the three tasks.

Of those who had a need for assistance with cognitive or emotional tasks because of their disability, 20% reported that they always needed such help, while 80% sometimes needed it. The highest need was among those with an intellectual impairment, with 36% of those with a need for cognitive or emotional assistance always needing help. The lowest intensity of need was among those restricted by a physical impairment, with 22% of those needing cognitive or emotional assistance reporting that they always need help.

Impairment, the need for cognitive or emotional assistance, and the level of participation in a broad range of community activities are likely to be interrelated. In 1998, people with a disability aged 15–64 years who needed cognitive or emotional assistance had lower labour force participation rates than people who did not need cognitive or emotional assistance.

The labour force participation rate declines in line with increasing need for assistance with cognitive or emotional tasks. It was lowest among those who always needed cognitive or emotional assistance (20%), was higher for those who sometimes needed cognitive or emotional assistance (41%), and was highest (47%) for people who had difficulty with at least one of the cognitive or emotional tasks but did not need help with any of them. However, people who had any difficulty with cognitive or emotional tasks were less likely to participate in the labour force than people with a disability in general (53%) (table 9.9).

### 9.8 PEOPLE WITH A DISABILITY(a), Needing assistance with cognitive or emotional tasks — 1998

Restricting impairment	Making friends, interacting with others, or maintaining relationships	Coping with feelings or emotions	Making decisions or thinking through problems	Total with a need for cognitive or emotional assistance(b)	Total(b)
	%	%	%	%	'000
Psychological	36.9	60.4	53.8	72.3	238.8
Intellectual	28.9	35.9	47.6	56.4	213.9
Head injury, stroke or brain damage	21.6	30.6	33.0	41.3	146.4
Sensory or speech	11.8	16.5	15.7	23.9	449.3
Physical	7.4	15.4	13.4	19.7	1 535.0
<b>All impairments(c)</b>	<b>8.4</b>	<b>15.4</b>	<b>13.6</b>	<b>20.5</b>	<b>2 066.7</b>

(a) People aged 15–64 and living in the community. (b) The sum of the components exceeds the total because a person can report more than one task and/or impairment. (c) Includes those for which the type(s) could not be determined.

Source: ABS data available on request, 1998 Survey of Disability, Ageing and Carers.

## 9.9 PEOPLE WITH A DISABILITY(a), By labour force status — 1998

Labour force status	Needs cognitive or emotional assistance				All people with a disability
	Always	Sometimes	Does not, but has difficulty	Does not and has no difficulty	
	%	%	%	%	%
Employed full-time	*10.2	19.7	24.7	37.3	31.0
Employed part-time	*5.5	13.6	16.6	17.4	16.1
<i>Total</i>	15.7	33.3	41.3	54.7	47.1
Total unemployed	*4.5	7.5	6.1	5.9	6.1
<i>Participation rate</i>	20.2	40.8	47.4	60.6	53.2
Not in the labour force	79.8	59.2	52.6	39.4	46.8
<i>Total</i>	100.0	100.0	100.0	100.0	100.0

(a) People aged 15–64 and living in the community.

Source: ABS data available on request, 1998 Survey of Disability, Ageing and Carers.

In the 15–64 age group, people with a disability who had no recorded difficulty with any of the three cognitive or emotional tasks had a much higher participation rate (61%), though still considerably lower than the rate for the total population (76%).

There are strong moves to encourage people with a disability to greater participation in the labour force. These findings suggest that the kinds of support needed by people who require assistance with cognitive or emotional tasks should be an important consideration in the design of programs for their better labour force integration.

## National health priority areas

The health of Australians is among the best in the world. Nationwide efforts, such as the recognition of and focus on national health priority areas, will help to ensure that this continues.

The National Health Priority Area (NHPA) initiative is a collaborative approach to dealing with a range of conditions which account for 70% of the burden of disease and cost in Australia. It is overseen by the National Health Priority Action Council, which was established as a sub-committee of AHMAC in June 2000, and comprises representatives from the Commonwealth, each of the states and territories, a representative of Indigenous peoples and a representative of consumer issues.

The establishment of diseases and conditions as national health priority areas involves a national consultation process and consideration of such things as:

- the health burden associated with the disease/condition (including incidence, prevalence, mortality, morbidity, quality of life, economic costs)

- the potential for health gain (including improved health outcomes, and potential to change behaviour)
- the potential for progress through national collaboration
- the potential for cost-effective health gain using interventions known to be effective (including existing and potential intersectoral action)
- the potential for sustainability of programs to address the health area
- the potential to reduce health inequalities.

At present six priority areas have been endorsed by Australian health ministers, covering cardiovascular health, cancer control, injury prevention and control, mental health, diabetes mellitus, and asthma. A range of program initiatives has been established, aimed at improving health outcomes in these areas. In July 2002 Australian health ministers added arthritis and musculoskeletal disease as a seventh national health priority area. The initial focus for the NHPA initiative in this area is on osteoarthritis, rheumatoid arthritis and osteoporosis.

## Cardiovascular health

Diseases of the circulatory system (also sometimes known collectively as cardiovascular disease) include all heart diseases, cerebrovascular diseases (including stroke), diseases of the arteries, arterioles and capillaries, and diseases of the veins and lymphatic vessels. Cardiovascular disease was the leading cause of burden of disease in 1996, accounting for approximately 22% of total burden (AIHW 2000a).

### Morbidity

In 2001, 22% of adult Australians (3.1 million people) were affected by circulatory conditions. Table 9.10 shows that hypertensive disease was the most prevalent of these conditions, affecting 1.9 million people (13.4%), with females more likely than males to report the disease (14.4% compared with 12.5%). However, the pattern was reversed for ischaemic heart diseases and cerebrovascular diseases.

### Mortality

In 2000, almost 40% (49,687) of all deaths were due to diseases of the circulatory system. Ischaemic heart disease accounted for 21% of all deaths, and cerebrovascular diseases a further 9.6%. Between 1990 and 2000, age-standardised death rates for diseases of the circulatory system declined by 36% for males (from 400 to 254 per 100,000 persons), 35% for females (from 263 to 172) and 35% in total (from 325 to 210).

In 2000, data on causes of death for Aboriginal and Torres Strait Islander peoples were considered to be of publishable quality for New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. In that year, the leading cause of death

among the Indigenous population was diseases of the circulatory system, which accounted for 28% of all Indigenous deaths, compared to 39% of all non-Indigenous deaths. In 1998–2000, the median age at death for Indigenous persons from cardiovascular disease was 60 years compared with 81 years for the non-Indigenous population.

These issues are discussed further in the article *Cardiovascular disease: 20th century trends*.

## Cancer control

The concept of cancer control recognises that, while it may not be possible to eradicate cancer, its impact and burden on the community can be reduced. Eight cancers have been targeted in this NHPA — lung cancer, melanoma, non-melanocytic skin cancer, colorectal cancer, non-Hodgkin's lymphoma, prostate cancer, breast cancer and cancer of the cervix. In 1996 cancer was estimated to be responsible for 19% of the total burden of disease in Australia (AIHW 2000a).

### Policy initiatives: cancer screening

Screening is currently considered to be the most effective method of reducing mortality from breast and cervical cancer. The National Program for the Early Detection of Breast Cancer was established in 1991; since 1994 it has been called BreastScreen Australia. The main aim is to detect small cancers in the breast, which are most easily treatable while in their early stages and to reduce mortality and morbidity. The program recommends that women in the target age group (50–69 years) have a mammogram every two years. Women in their forties and seventies also have access to mammography without charge through this program, but are not actively recruited (AIHW 1998).

**9.10 CIRCULATORY CONDITIONS(a), Persons aged 18 years and over — 2001**

Type of condition	Males		Females		Persons	
	'000	%	'000	%	'000	%
Hypertensive disease	886.2	12.5	1 039.5	14.4	1 905.7	13.4
Ischaemic heart diseases	199.6	2.9	152.2	2.1	351.8	2.5
Other heart disease	6.0	0.1	6.3	0.1	12.4	0.1
Tachycardia	142.2	2.0	190.8	2.6	333.0	2.3
Cerebrovascular diseases	55.9	0.8	46.2	0.6	102.1	0.7
Oedema	87.2	1.3	208.2	2.9	295.5	2.1
Diseases of the arteries/arterioles/capillaries	123.6	1.8	72.8	1.0	196.5	1.4
Diseases of veins, lymphatic vessels etc.	187.0	2.7	440.8	6.1	627.8	4.4
Other diseases of the circulatory system	23.7	0.3	41.3	0.6	65.1	0.5
Symptoms/signs involving the circulatory system	153.8	2.2	221.8	3.1	375.6	2.6
<b>All circulatory conditions(a)</b>	<b>1 349.8</b>	<b>19.4</b>	<b>1 765.2</b>	<b>24.4</b>	<b>3 115.0</b>	<b>22.0</b>

(a) Each person may have reported more than one type of condition, and therefore components may not add to totals.

Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

Although Pap smear tests have been available since the 1960s, the National Cervical Screening Program did not come into effect until 1991. The program seeks to detect the precursors to cancer or abnormalities of cells in the cervix which may lead to invasive cervical cancer. It is estimated that 90% of cervical cancers are potentially preventable (AIHW 1998).

In Budget 2000–01, the Commonwealth Government announced funding for a Bowel (Colorectal) Cancer Screening Pilot. The pilot will assess the feasibility, acceptability and cost-effectiveness of bowel cancer screening. Colorectal cancer is the most common internal cancer affecting both men and women (AIHW 2001a), and accounted for 4,712 deaths in 2000.

### Morbidity

Estimates based on information reported in the 2001 NHS show that 311,270 Australians (1.65%) currently had a medically diagnosed neoplasm. Skin cancers were the most commonly reported form of cancer for both males (0.67%) and females (0.33%). Breast cancer was reported by approximately 25,300 women. Overall, males were slightly more likely to report cancer than females.

For females, cancer prevalence peaked in the 45–54 year age group, possibly related to the peak in breast cancer prevalence in this age group. In males, cancer was most prevalent in the 65–74 year age group, reflecting in part the effect of prostate cancer (table 9.11).

The National Cancer Statistics Clearing House, within the AIHW, reported that 80,864 new cases of cancer were diagnosed in 1998. Of these, 43,595 were males and 37,269 were females — an age-standardised cancer incidence rate

(age-standardised to the 1991 Australian Population Standard) of 475 for males and 346 for females per 100,000 persons. This equates to a lifetime risk of one in three males and one in four females being directly affected by cancer (AIHW 2001a). This statistic excludes approximately 270,000 annual diagnoses of non-melanocytic skin cancers, which are the most common form of cancer in Australia, but for which data are not collected routinely by cancer registries.

Survival from cancer depends on a number of factors, including whether the cancer is fast or slow growing, its metastatic characteristics, its stage at diagnosis, the availability of appropriate treatment and other co-morbidities. The AIHW estimated that for the period 1992–97, the five-year relative survival rates for cancer were 57% for males and 63% for females (AIHW 2001b).

### Mortality

In 2000, malignant neoplasms (cancer) accounted for 35,628 deaths, which was 28% of all deaths registered. There were 20,153 male deaths and 15,475 female deaths due to cancer. Overall, cancer of the trachea, bronchus and lung was the leading cause of cancer deaths (6,878 deaths), accounting for 19% of all cancer deaths. Among males, the leading causes of cancer deaths were cancer of the trachea, bronchus and lung (23% of all male cancer deaths), prostate cancer (12%) and colon cancer (9%). Among females the leading causes of cancer deaths were breast cancer (16% of all female cancer deaths), cancer of the trachea, bronchus and lung (14%) and colon cancer (10%). Age-specific death rates for cancer increased markedly with age, and were generally greater for males than for females, apart from age groups between 25 and 54 when female deaths from breast cancer tend to occur most frequently.

#### 9.11 CANCER(a) — 2001

	Males		Females		Persons	
	'000	%	'000	%	'000	%
Malignant neoplasms						
Digestive organs	21.4	0.23	7.0	0.07	28.4	0.15
Respiratory and intrathoracic organs	12.0	0.13	2.8	0.03	14.8	0.08
Skin	62.7	0.67	31.6	0.33	94.3	0.50
Breast	..	..	25.3	0.26	..	..
Genital organs	37.4	0.40	10.3	0.11	47.7	0.25
Other and sight unknown	40.6	0.43	23.3	0.24	64.0	0.34
Benign neoplasms and neoplasms of an uncertain nature	12.1	0.13	39.2	0.41	51.3	0.27
<b>All malignant neoplasms</b>	<b>176.1</b>	<b>1.88</b>	<b>135.2</b>	<b>1.42</b>	<b>311.3</b>	<b>1.65</b>

(a) Each person may have reported more than one type of condition, and therefore components may not add to totals.

Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

### Injuries and deaths due to external causes

Injury and poisoning are broad terms that encompass the adverse effects on the human body that may result from events, whether accidental such as falls, vehicle accidents and exposure to chemicals, or intentional such as suicide attempts and assaults by other people. Such events, and the factors involved in them, are collectively known as ‘external causes’ of injury and poisoning, and are a significant source of preventable illness, disability and premature death in Australia.

Males and females, and people in different age groups, experience different levels and types of risk from injury events (risk in this sense refers to both the probability of an injury event occurring and the severity of the injuries that may result). Differences in injury risk and injury outcomes are reflected in the draft *National Injury Prevention Plan: Priorities for 2001–2003*, a key policy response to this designated priority health area. The plan identifies four priority areas: falls among persons aged 65 years and older; falls among children under 15 years of age; drowning and near drowning; and poisoning of infants and children less than 5 years of age. Although the number of deaths from these four types of injuries is relatively small, they account for a large number of hospital admissions.

Respondents to the 2001 NHS were asked about events in the previous four weeks that resulted in an injury for which they had sought medical treatment or taken some other action. Injuries data from the survey are presented in table 9.12 and highlight differences in the reporting of injury events among males and females from different age groups.

**9.12 INJURY EVENTS(a) — 2001**

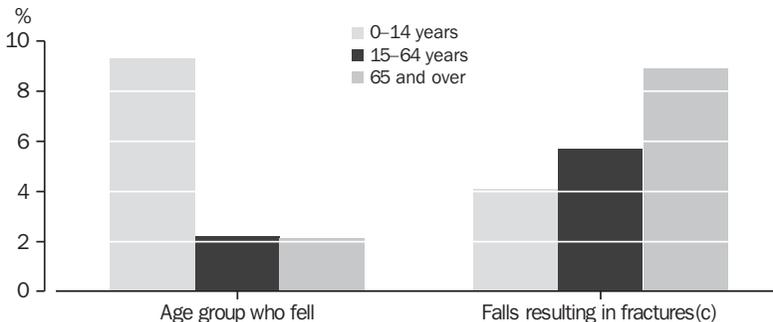
Age group (years)	Males	Females	Persons
	%	%	%
0–14	19.3	15.5	17.5
15–24	19.9	14.2	17.1
25–44	12.4	10.6	11.5
45–64	7.4	7.5	7.4
65 and over	5.2	5.9	5.6
<b>All ages</b>	<b>13.0</b>	<b>10.7</b>	<b>11.8</b>

(a) The 2001 NHS collected information on up to three injury events per person. It was possible for respondents to report more than one injury event in the previous four weeks.

Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

Falls have different consequences for older Australians; 2001 NHS data show that a low fall (of one metre or less) for a person aged 65 years and over was more likely to result in them sustaining a fracture than was the case for a younger person (graph 9.13). Further, women aged 65 years and over were most likely to sustain a fracture.

**9.13 LOW FALLS(a) RESULTING IN FRACTURES(b) — 2001**



(a) Falls of one metre or less. (b) Based on the most recent injury event. (c) Relative standard errors greater than 25% apply to the data on fractures.

Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

## Mortality

External causes were responsible for 8,098 deaths (6% of all deaths) registered in 2000 (table 9.14). Since 1990 there has been a 13% decrease in the standardised death rate for deaths from external causes, mainly due to a 37% decrease in the rate for transport accidents. In 2000 there were 2,363 deaths attributed to intentional

self harm (suicide), 5% lower than the 1999 figure and 13% lower than the record 2,723 deaths registered in 1997. Deaths as a result of suicide account for more than one in five deaths of persons aged 25–34 years (a rate of 20.1 per 100,000 persons) and 15–24 years (12.5 per 100,000). Males consistently have higher rates of death than females due to external causes.

### 9.14 EXTERNAL CAUSES OF DEATH — 2000

	no.	%	Crude death rate(a)		
			Males	Females	Persons
Suicide (intentional self-harm) (X60-X84)	2 363	29.2	19.5	5.2	12.3
Transport accidents (V01-V99)	2 015	24.9	15.3	5.8	10.5
Accidental poisoning by and exposure to noxious substances (X40-X49)	822	10.2	6.0	2.6	4.3
Falls (W00-W19)	565	7.0	3.2	2.7	2.9
Assault (X85-Y09)	313	3.9	2.1	1.2	1.6
Accidental drowning and submersion (W65-W74)	229	2.8	1.9	0.5	1.2
Other	1 791	22.1	9.8	8.9	9.3
<b>All external causes</b>	<b>8 098</b>	<b>100.0</b>	<b>57.8</b>	<b>26.8</b>	<b>42.3</b>

(a) Crude rate per 100,000 population.

Source: *Causes of Death, Australia, 2000* (3303.0).

## Cardiovascular disease: 20th century trends

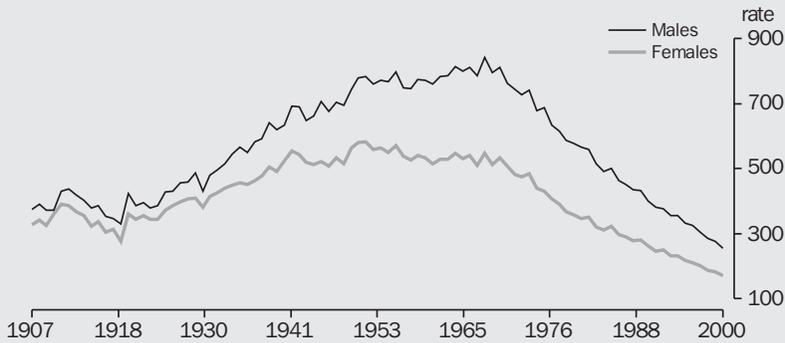
Behavioural changes and medical advances have reduced the likelihood of people dying from cardiovascular disease over the last 30 years. Yet cardiovascular disease was still the leading cause of death in Australia in 2000, accounting for 49,687 deaths (39% of all deaths registered in that year). Because much illness and premature death from cardiovascular disease is preventable, it has been a focus of public attention and health policy, and in 1996 was designated a National Health Priority Area (AIHW 2000c).

Although cardiovascular disease can be a disease and cause of death at younger ages, a much higher proportion of older people are affected by cardiovascular disease. In 2000 the majority of deaths from cardiovascular disease occurred among those aged 50 years and over.

Early in the 20th century, Australia's population had a young age structure and the proportion of deaths from cardiovascular disease was relatively low (15% in 1907). However, as the century progressed and fewer people died from infectious diseases, this proportion increased markedly, peaking at 56% in 1968, before steadily declining.

Even when the effect of age is allowed for, the pattern of rising then falling death rates from cardiovascular disease remains. The age-standardised death rate for men increased from 376 to 843 per 100,000 persons between 1907 and 1968, before falling to 256 per 100,000 persons at the close of the 20th century (graph 9.15). For women, the rate increased from 328 to 583 per 100,000 persons between 1907 and 1952, then fell to 173 in 2000.

### 9.15 DEATH RATES(a) FOR CARDIOVASCULAR DISEASE



(a) Age-standardised rate per 100,000 persons.

Source: AIHW 2000b.

## Cardiovascular disease

Cardiovascular disease, or disease of the circulatory system, comprises all diseases and conditions involving the heart and blood vessels including ischaemic heart disease, cerebrovascular disease (stroke), peripheral vascular disease and heart failure. In Australia, these diseases mostly result from impeded or diminished supply of blood to the heart, brain or leg muscles (d'Espaignet 1993).

All causes of death are classified according to the International Classification of Diseases (ICD). There have been a number of revisions of the ICD since it first came into effect in 1898. The most recent revision (ICD-10) was introduced in 1999. The chapter on circulatory disease comprises the following:

- acute rheumatic fever and chronic rheumatic heart diseases (I00-I09)
- hypertensive diseases (I10-I15)
- ischaemic heart diseases (I20-I25)
- pulmonary heart disease and diseases of pulmonary circulation (I26-I28)
- other forms of heart disease (I30-I52)
- cerebrovascular diseases (I60-I69)
- diseases of arteries, arterioles and capillaries (I70-I79)
- diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified (I80-I89)

- other and unspecified diseases of the circulatory system (I95-99).

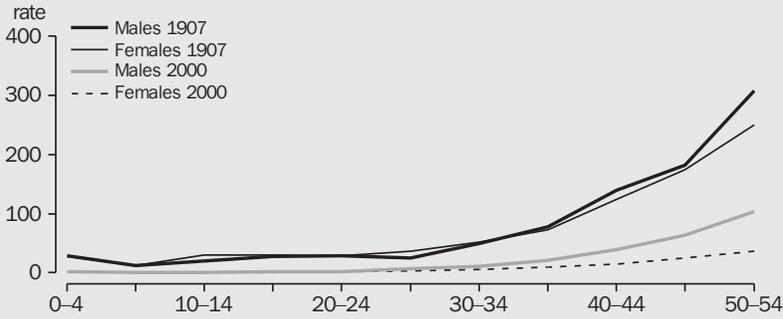
Standardised death rates enable the comparison of death rates between populations with differing age structures by relating them to a standard population. Death rates in this article have been standardised to the 1991 total population, and are expressed per 100,000 of the population.

## Trends in death rates

There were three main changes in the pattern of deaths from cardiovascular disease between the beginning and end of the 20th century (see graphs 9.16 and 9.17):

- Cardiovascular death rates are notably lower than they were at the beginning of the 20th century for all age groups except the very oldest (80 years and over).
- The decline in cardiovascular death rates across the 20th century was greater for younger than for older age groups. For example, in 1907 the death rate for both males and females aged 0–24 years from cardiovascular diseases was more than 17 times larger than in 2000.
- The age-specific death rates were substantially higher for males than for females in almost all age groups in 2000. In particular, the death rates for men aged 35–69 years were around two to three times the rates for women in those ages. There was no such systematic pattern in 1907.

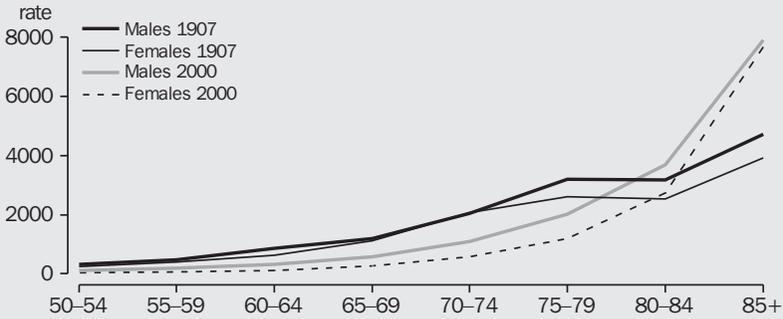
**9.16 AGE-SPECIFIC DEATH RATES(a) FOR CARDIOVASCULAR DISEASE, Age groups 0-54 years**



(a) Deaths per 100,000 people of same sex and age group.

Source: AIHW 2000b.

**9.17 AGE-SPECIFIC DEATH RATES(a) FOR CARDIOVASCULAR DISEASE, Age groups 50 years and over**



(a) Deaths per 100,000 people of same sex and age group.

Source: AIHW 2000b.

### Indigenous death rates

There is a lack of national health-related data on Aboriginal and Torres Strait Islander peoples. Based on the most reliable state and territory data (from Western Australia, South Australia and the Northern Territory), in 1996-98, Indigenous Australians died from cardiovascular disease at twice the rate of other Australians (AIHW 2001). In 2000 it was the leading cause of death among Indigenous persons (28% of Indigenous deaths). In 1998-2000, the median age at death from cardiovascular disease for Indigenous males was 57 years compared with 78 years for the non-Indigenous male population. For females, the median age for deaths from this cause was 64 years for Indigenous females and 84 years for the non-Indigenous female population. As well as

from cardiovascular disease, Indigenous people have low median ages at death from all causes of death combined, and this is reflected in the lower life expectancy of Indigenous peoples.

The higher death rate from cardiovascular disease for the Indigenous population is consistent with a number of risk factors being more common among Indigenous peoples than the total population. In 1995 Indigenous Australians were about twice as likely to smoke. Indigenous adults were also about twice as likely to consume alcohol to a high risk level, despite a lower proportion of Indigenous adults consuming alcohol, compared to non-Indigenous adults (ABS 2001). In 1994, 25% of Indigenous males aged 18 years and over and 29% of Indigenous females aged 18 years and

over were obese, compared to about 19% of all Australians aged 19 years and over in 1995 (ABS 2001).

### Leading causes of cardiovascular deaths

The two leading categories of causes of death from cardiovascular disease are ischaemic heart diseases (also called coronary heart disease) and cerebrovascular disease (stroke). Table 9.18 presents cardiovascular deaths data for selected years over the last century. Over the last three decades, ischaemic heart diseases have been the leading cause of cardiovascular death for men and women. In 2000, they accounted for 59% of men's deaths and 48% of women's deaths from cardiovascular disease. This was despite a rapid decline in death rates from ischaemic heart diseases over the last three decades. Between 1968 and 2000, the death rate for ischaemic heart diseases fell from 498 to 150 deaths per 100,000 for men, and from 250 to 84 deaths per 100,000 for women.

Stroke has been the second most common cause of cardiovascular death since 1968, accounting for 21% of men's and 28% of women's deaths from cardiovascular disease in 2000. Throughout most of the 20th century, women were more likely to die from stroke than men. This pattern was reversed by 1968. Between 1968 and 2000, the standardised male death rate from stroke fell from 184 to 54 deaths per 100,000 population, while the female rate fell from 168 to 48. This represents a fall of 71% for both men and women over the period.

### Morbidity

While the death rate from cardiovascular disease has declined, its prevalence in the population has increased. According to results from three successive national health surveys, prevalence has risen from 8% (1.1 million) in 1977–78 to 17% (2.2 million) in 1989–90 and to 21% (2.8 million) in 1995 (ABS 1995). This could be partly associated with a broad range of improvements in medical interventions, which have increased the survival rate following acute cardiovascular events and among people living with cardiovascular disease. Improved techniques for diagnosing cardiovascular disease and better public information have increased the prevention and early detection of cardiovascular disease. The introduction of specialist ambulance services and better public knowledge of rescue-emergency management techniques have better enabled people affected by cardiovascular disease to receive rapid and effective treatment when required. Moreover, with the establishment of coronary care units and developments in surgery and drugs, the in-hospital care of patients has greatly improved.

The costs of cardiovascular disease are greater than for any other disease. In 1993–94, it accounted for \$3.7b or 12% of total health costs (AIHW 2000c). In 1996, cardiovascular disease accounted for 22% of all disease burden in Australia (AIHW 1999). However, it should be recognised that the impact of cardiovascular disease is complex due to its association and co-morbidity with other conditions, particularly diabetes.

**9.18 DEATH RATES(a) FOR SELECTED TYPES OF CARDIOVASCULAR DISEASE**

Cause of death (ICD-9) codes	1907	1931(b)	1950(b)	1968(b)	2000
	rate	rate	rate	rate	rate
<b>MALES</b>					
Ischaemic heart diseases (410-414)	n.a.	n.a.	n.a.	497.5	150.2
Cerebrovascular diseases (430-438)	107.1	106.3	144.3	183.5	53.5
Hypertension (401-405)	n.a.	n.a.	59.1	20.2	4.9
Chronic rheumatic heart diseases (393-398)	n.a.	59.8	9.6	9.7	1.0
All circulatory diseases (390-459)	375.6	479.2	743.4	842.7	255.5
<b>FEMALES</b>					
Ischaemic heart diseases (410-414)	n.a.	n.a.	n.a.	249.5	84.0
Cerebrovascular diseases (430-438)	109.2	117.1	166.1	168.4	48.3
Hypertension (401-405)	n.a.	n.a.	53.5	20.6	5.0
Chronic rheumatic heart diseases (393-398)	n.a.	53.0	9.3	10.1	1.3
All circulatory diseases (390-459)	328.1	413.0	562.5	548.3	172.6

(a) Age-standardised rate per 100,000 persons. (b) 1931, 1950 and 1968 were years in which ICD revisions were implemented.

Source: AIHW Mortality Database.

## Risk factors

Studies have also attributed proportions of the total burden of disease to a range of health-related risk factors. The leading risk factors in 1996 (in terms of their contribution towards total disease burden) were tobacco smoking (10%), physical inactivity (7%), high blood pressure (5%), obesity (4%) and a lack of fruit and vegetables (3%) (AIHW 1999). All of these influence the prevalence of cardiovascular disease in particular. Smoking, physical inactivity and poor nutrition are risk factors that are associated with lifestyle choices, and these can increase the likelihood of, for example, high blood pressure, high cholesterol and obesity for an individual.

In 1998, it was estimated that 13% of all cardiovascular deaths were attributable to tobacco smoking (AIHW 2001). There has been only a slight decline in smoking rates in recent years. While 26% of Australians over 14 years old reported smoking in 1998 compared to 27% in 1995, there has been a steady trend in reduction of smoking rates since the 1970s, when smoking levels in the Australian population were around 37%.

In 1999, it was estimated that 44% of Australians aged 18–75 years (5.8 million people) did not undertake physical activity at the level recommended to obtain a health benefit. Between 1997 and 1999 there was a significant decline in the number of people reaching sufficient levels of physical exercise (from 62% to 56%) (AIHW 2001).

Good nutrition is the outcome of a complex range of dietary habits, including eating significant quantities of fruit and vegetables, and reducing intakes of saturated fat and salt. Among Australian adults, the consumption of saturated fat as a proportion of total energy intake has fallen over the past decade, and overall consumption of fats and of red meat (a source of saturated fat and dietary cholesterol)

has been declining since the late 1960s. In contrast, consumption of fruit and vegetables has increased (ABS 2000).

In 1999–2000 it was estimated that almost three million Australian adults (aged 25 years and over) had high blood pressure, or were on treatment for the condition. More than six million Australian adults had high cholesterol levels (AIHW 2001). There has been a significant decline in the proportion of people with high blood pressure (and/or receiving treatment) since the 1980s, yet there is thought to have been little change in blood cholesterol levels in the Australian population since the 1980s. This is despite the apparent trend in declining intake of saturated fats and dietary cholesterol (AIHW 2001). In the last 20 years there has also been a significant increase in the proportions of overweight and obese Australians. Of those people living in capital cities, the proportion of overweight or obese women aged 25–64 years has increased from 27% in 1980 to 45% in 1999–2000. For men the proportion increased from 48% to 65% (AIHW 2001).

## Overall trends in the prevalence of risk factors

Public health promotion programs have encouraged Australians to improve their health and reduce their risk factors. One of the results of the public response is that there have been several trends in the reduction of behavioural risk factors directly associated with cardiovascular disease over the last 30 years. This includes the reduction in smoking rates, reduction in saturated fat intake and increase in fruit and vegetable consumption. This has coincided with an overall reduction in cardiovascular death rates over this period. However, the increased prevalence of overweight and obese Australians seems likely to be related to the increase in physical inactivity. As overweight and obesity are also related to diabetes, high cholesterol and high blood pressure, a continuing increase in the prevalence of these conditions/risk factors within the Australian population is likely to influence the prevalence of cardiovascular disease.

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## Diabetes mellitus

Diabetes mellitus is the sixth leading cause of death in Australia, and contributes to significant illness and disability. In 1996 diabetes mellitus was the seventh leading cause of burden of disease in Australia, accounting for 3% of the total burden (AIHW 2000a). People with diabetes have reduced life expectancy and are more likely than people without diabetes to experience major health complications involving the eyes, kidneys, nerves and arteries (McCarthy et al. 1996). Population groups at particular risk of diabetes are older people, Indigenous people and some sections of the overseas-born population.

### Policy initiatives

As part of the 2001–02 Federal Budget, the Commonwealth Government announced funding of \$43.4m over four years to ensure a national approach to improving the prevention, earlier diagnosis and management of people with diabetes. The National Integrated Diabetes Program consists of four components that will:

- provide incentives for general practice for earlier diagnosis and best practice management of people with diabetes
- provide infrastructure and support for Divisions of General Practice to work with general practitioners and other health professionals to remove barriers to better care for people with diabetes
- engage consumers with diabetes to enable appropriate self care and support partnerships with health professionals
- support changes in the practices of health professionals.

### Types of diabetes

There are three major types of diabetes mellitus. Type 1 diabetes is marked by extremely low levels of insulin. Type 2 diabetes is marked by reduced levels of insulin, or the inability of the body to use insulin properly. Gestational diabetes, which occurs during pregnancy in about 4–6% of females not previously diagnosed with diabetes, is not usually long-term. However, for women diagnosed with gestational diabetes there is an increased risk of developing Type 2 diabetes later in life (AIHW 2000a).

### National Diabetes Register

In 1999, the National Diabetes Register was established at the AIHW, as part of the National Diabetes Strategy. The register collects information about people who have been diagnosed with insulin-treated diabetes since January 1999. The major objective of the register is to assist researchers in epidemiological studies of the causes, complications and prevention of diabetes (AIHW 2001c).

The Register has revealed that the incidence (the number of new cases in the population previously without the disease) of diabetes among 0–14 year olds is much higher than previously found in Australia. In Australia in 2000, the incidence among 0–14 year olds was 19.2 per 100,000 males and 18.6 per 100,000 females (AIHW 2001c).

### Current and long-term diabetes

Preliminary findings from the 2001 NHS indicate that 2.9% of Australians (554,200) reported that they currently had long-term diabetes (that is, it had lasted or was expected to last for six months or more) (table 9.19).

## 9.19 PEOPLE WITH LONG-TERM(a) AND CURRENT DIABETES — 2001

Type of diabetes	Males '000	Females '000	Persons '000	Persons %
Non-insulin dependent diabetes mellitus — Type 2	212.4	221.5	433.8	78.3
Insulin dependent diabetes mellitus — Type 1	48.9	46.3	95.2	17.2
Diabetes type unknown	10.2	15.0	25.2	4.5
<b>Total long-term and current diabetes(b)</b>	<b>271.5</b>	<b>282.7</b>	<b>554.2</b>	<b>100.0</b>

(a) Has lasted or is expected to last for six months or more. (b) Does not include gestational diabetes as it is not usually long-term.

Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

More females reported diabetes than males (282,700 females, 271,500 males). In terms of type of diabetes, over three-quarters of people reporting long-term current diabetes identified Type 2 diabetes (table 9.19).

### Gestational diabetes

Results from the 2001 NHS indicate that an estimated 100,820 women had been told they had gestational diabetes at some time in their lives.

### Mortality

In 2000, diabetes mellitus was the underlying cause of death in 3,006 deaths, 2.3% of all deaths registered. Of these, 1,594 deaths were males and 1,412 females. The age-standardised death rate due to diabetes was 13 per 100,000 persons (17 for males and 11 for females per 100,000 persons).

### Mental health

Although approximately 80% of the population enjoy 'good' mental health free of mental disorders, it has been estimated that mental disorders caused 13% of the total disease burden in 1996. Although mental illness is not a major direct cause of death, it is associated with a proportion of deaths due to suicide and some other conditions, and is an important cause of chronic disability. For males, substance use disorders (from alcohol or other drugs) accounted for 33% of the mental health burden, while for females affective disorders such as depression accounted for 39% of the mental health burden (AIHW 2000a).

### Policy initiatives

After completion of the initial National Mental Health Strategy (1992 to 1998), the Second National Mental Health Plan was endorsed in July 1998 as the framework for ongoing activity. The Plan is operating over a five-year period from 1998–99 to 2002–03, and is a joint initiative of the Commonwealth Government and the state and

territory governments. The National Depression Initiative (being carried forward by an independent public company called 'beyondblue') will build on priorities identified in the National Action Plan for Depression. The aims of 'beyondblue' are to increase community awareness of depressive illness, to foster greater understanding of the illness, and to support research into prevention, treatment and management approaches (Commonwealth Department of Health and Aged Care 2001a).

In the 1999–2000 Federal Budget, \$48m over five years from July 1999 was committed for a National Suicide Prevention Strategy to build on the former National Youth Suicide Prevention Strategy. While the Strategy will continue to focus on youth suicide, it will be expanded to include other high risk groups such as the elderly, people with mental illnesses, or substance use problems, prisoners, and people living in rural communities, and in Aboriginal and Torres Strait Islander communities. In the 2001–02 Federal Budget, \$120.4m over four years from July 2001 was committed to the Better Outcomes In Mental Health Care initiative which aims to increase the involvement of general practitioners in the provision of primary mental health care (Commonwealth Department of Health and Aged Care 2001b).

### Psychological distress

In the 2001 NHS, information on mental health was collected from adult respondents, using the Kessler 10 Scale (K10), a 10-item scale of current psychological distress. The K10 asks about negative emotional states in the four weeks prior to interview. The results from the K10 are grouped into four categories: low (indicating little or no psychological distress), moderate, high, and very high levels of psychological distress. Based on research from other population studies, a very high level of psychological distress, as shown by the K10, may indicate a need for professional help.

In 2001, 3.6% of the adult population reported a very high level of psychological distress. Women were more likely than men to report high (10.9% of women and 7.2% of men) and very high (4.4% of women and 2.7% of men) levels of distress. The greatest sex difference was between young women and men aged 18–24 years, with 5.4% of women having very high levels of psychological distress compared to 2.7% of men in this age group (graph 9.20). A higher proportion of both males and females aged 45–54 years reported very high levels of psychological distress compared with any other age group.

## Asthma

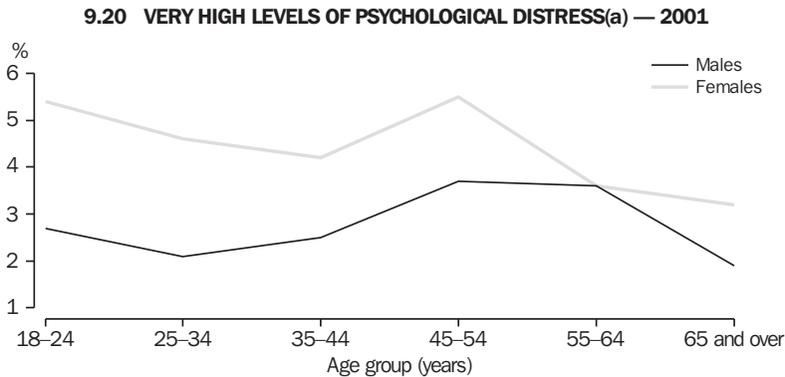
The management of asthma is an important public health issue because of the personal burden it places on those with asthma, often with onset in childhood, and the financial burden it places on the health system. In 1996, asthma was estimated to be responsible for 2.6% of the total burden of disease in Australia (AIHW 2000a).

## Policy initiatives

A national General Practitioner Asthma Initiative, which focuses on the Asthma 3+ Visit Plan, commenced in 2001 with the Commonwealth Government providing \$48.4m over four years to support general practice to better manage the clinical care of people with moderate to severe asthma. General practitioners will receive additional funds through the Practice Incentive Program for each patient with moderate to severe asthma who completes the Asthma 3+ Visit Plan. This plan includes at least three general practitioner consultations (incorporating diagnosis), a written asthma action plan, self-management education and review.

## Morbidity

The 2001 NHS estimated that 11.6% of Australians (2.20 million people) currently have long-term asthma (that is, it has lasted or was expected to last for six months or more).



(a) Based on Kessler 10 Scale (K10).

Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

As illustrated in graph 9.21, asthma is particularly prevalent in young people. The International Study of Asthma and Allergy in Childhood reported an estimated prevalence rate of approximately 25% in 6–7 year old Australian children and 29% in 13–14 year olds (ISAAC Steering Committee 1998). In the 2001 NHS, medically diagnosed asthma was more frequently reported by individuals aged less than 25 years than by individuals in older age groups. In this younger age group, asthma was more prevalent in males than females, while for those aged 25 and over the pattern was reversed and asthma was more prevalent in females than males.

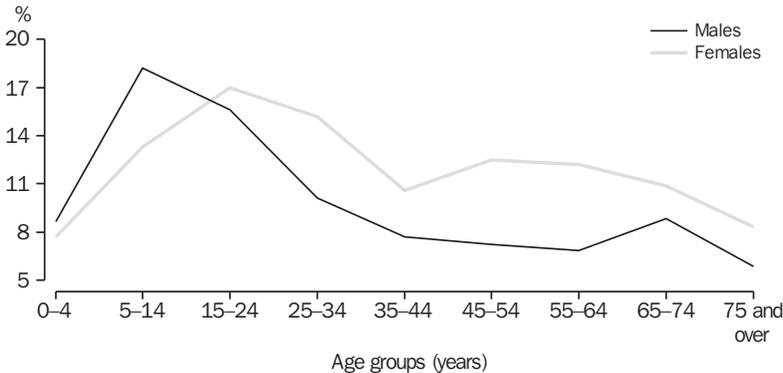
According to the Bettering the Evaluation and Care of Health (BEACH) survey, asthma is the fifth most frequently managed problem by

general practitioners, accounting for 3.2 of every 100 encounters (2.2% of all problems managed) (AIHW 1999). Asthma is also one of the top six reasons for doctors referring patients to hospital. During 1999–2000, asthma was the principal diagnosis in 47,008 hospital separations (0.8% of all hospital separations), with an average stay of 2.7 days.

**Mortality**

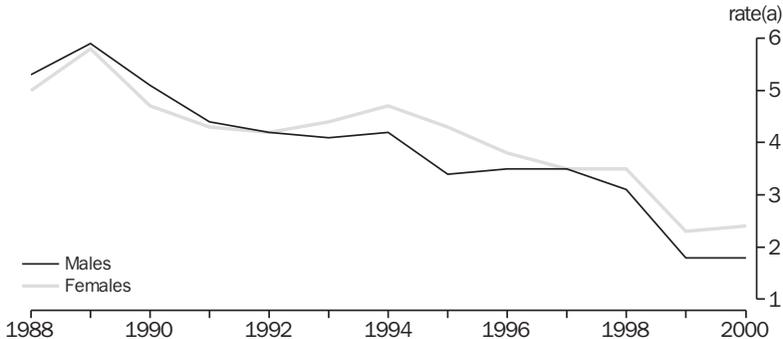
Asthma was identified as the underlying cause of 0.3% of deaths registered in Australia in 2000, when 169 males and 285 females died from the disease. The most recent peak in asthma deaths occurred in 1989, and standardised death rates for asthma have been declining since then (graph 9.22). Most asthma deaths occur in older age groups.

9.21 ASTHMA — 2001



Source: ABS data available on request, preliminary data from the 2001 National Health Survey.

9.22 STANDARDISED DEATH RATES(a) FROM ASTHMA



(a) Standardised death rate per 100,000 of the midyear 1991 population.

Source: AIHW 2000, 'Australian long term trends in mortality'.

## Communicable diseases

Communicable diseases (including infectious and parasitic diseases) are those diseases capable of being transmitted from one person to another, or from one species to another. In 2000, infectious diseases accounted for 3.6% of all deaths in Australia (4,582 deaths). Influenza and pneumonia accounted for 64% (2,937) of deaths due to communicable disease. Death rates increase with age, and were greater for males than females in most age groups. In 1999–2000, there were 12,859 hospitalisations in Australia with a primary diagnosis of communicable diseases. Influenza and pneumonia were responsible for 20% (2,591) of hospital admissions due to communicable diseases.

Under the National Notifiable Diseases Surveillance System (NNDSS), state and territory health authorities submit reports of more than 50 communicable disease notifications for compilation by the Commonwealth Department of Health and Ageing. In 2001, the diseases reported to NNDSS were revised to include cryptosporidiosis, influenza, pneumococcal disease, Japanese encephalitis, Kunjin virus, Murray Valley encephalitis, anthrax, Australian bat lyssavirus, and other lyssavirus infections. Diseases which were becoming rare or of less public health significance in Australia were removed from the NNDSS. These diseases were chancroid, lymphogranuloma venereum, hydatid disease and yersiniosis.

The provisional total of notifications to NNDSS in 2001 is 100,669, an increase on the total notifications in 2000 (89,788) (table 9.23). This increase in notifications reflects the inclusion of new diseases as outlined above. For the diseases reportable in both years, there was a 12% increase. In 2001, sexually transmitted infections were the most commonly reported communicable diseases, accounting for 27.8% of all notifications, followed by food-borne diseases (26%) and blood-borne diseases (24.8%). Chlamydia was the most commonly reported sexually transmitted infection (20,185 notifications, 72% of total), campylobacteriosis the most common food-borne disease (16,185 notifications, 61% of total) and hepatitis C (unspecified) was the most common blood-borne disease

(15,649 notifications, 62% of total). Compared with previous years there were increases in the total numbers of notifications of food-borne and vaccine preventable diseases. Increases in food-borne disease are due to a continuing increase in cases of campylobacteriosis and the inclusion in 2001 of cases of cryptosporidiosis for the first time. The total vaccine preventable diseases increased due to the inclusion of influenza and pneumococcal disease for the first time in 2001 and increases in reports of pertussis.

Decreases in notifications of measles, mumps and rubella reflect successful vaccination campaigns. Declines in tuberculosis (TB) have given Australia one of the lowest rates of TB in the world.

## HIV and AIDS

In collaboration with the state and territory health authorities and the Commonwealth Government, surveillance for human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) is conducted by the National Centre in HIV Epidemiology and Clinical Research. This centre is part of the Faculty of Medicine, University of New South Wales and is funded primarily by the Commonwealth Department of Health and Ageing through the Australian National Council on AIDS, Hepatitis C and Related Diseases.

At 31 December 2001, the cumulative number of HIV cases (since 1985) was 21,725. Also, the cumulative number of AIDS diagnoses was 8,810 (since 1981), and there had been a total of 6,174 deaths attributable to AIDS (table 9.24).

The reduced numbers of new AIDS diagnoses in recent years (table 9.24) has been due to the decline in HIV incidence that took place in the mid 1980s, and the use, since around 1996, of effective combination antiretroviral therapy for the treatment of HIV infection. In Australia, approximately 50% of all people living with HIV infection are receiving antiretroviral treatment. However, the long-term effectiveness of antiretroviral treatment remains unknown, and if treatments begin to fail for a substantial proportion of people, then AIDS incidence could increase again.

## 9.23 NATIONAL NOTIFIABLE DISEASE SURVEILLANCE SYSTEM REPORTS

Disease(d)	Notifications			Rate per 100,000 population(a)		
	1999(b) no.	2000(b) no.	2001(c) no.	1999(b) %	2000(b) %	2001(c) %
<b>Blood-borne diseases</b>						
Hepatitis B (incident)	303	395	420	1.6	2.1	2.2
Hepatitis B (unspecified)	7 218	7 918	8 312	38.4	41.8	43.2
Hepatitis C (incident)	396	441	589	2.6	2.9	3.7
Hepatitis C (unspecified)	18 798	19 607	15 649	99.1	102.3	80.6
Hepatitis D	19	27	21	0.1	0.2	0.1
Hepatitis n.e.c.	—	1	—	—	—	—
<b>Gastrointestinal diseases</b>						
Botulism	—	2	2	—	—	—
Campylobacteriosis	12 657	13 595	16 185	100.8	107.1	125.7
Cryptosporidiosis	..	..	1 631	..	..	8.4
Haemolytic uraemic syndrome	23	15	5	0.1	0.1	—
Hepatitis A	1 554	812	534	8.2	4.2	2.7
Hepatitis E	9	10	10	0.1	0.1	0.1
Listeriosis	64	67	61	0.3	0.3	0.3
Salmonellosis	7 147	6 151	7 113	37.7	32.1	36.6
Shigellosis	547	487	568	4.4	3.8	2.9
SLTEC, VTEC(e)	47	33	48	0.3	0.2	0.2
Typhoid	68	58	84	0.4	0.3	0.4
Yersiniosis	125	73	..	1.0	0.6	..
<b>Quarantinable diseases</b>						
Cholera	3	1	3	—	—	—
<b>Sexually transmissible diseases</b>						
Chlamydial infection	14 045	16 866	20 185	74.1	88.0	103.9
Donovanosis	17	12	35	0.2	0.1	0.2
Gonococcal infection	5 644	5 686	6 394	29.8	29.7	32.9
Syphilis	1 844	1 755	1 392	9.7	9.2	7.2
<b>Vaccine preventable diseases</b>						
Diphtheria	—	—	1	—	—	—
Haemophilus influenzae type b	40	28	26	0.2	0.1	0.1
Influenza	..	..	1 327	..	..	6.8
Measles	238	107	141	1.3	0.6	0.7
Mumps	172	212	114	1.1	1.4	0.6
Pertussis	4 417	5 942	9 565	23.3	31.0	49.2
Pneumococcal disease	..	..	165	..	..	8.5
Rubella	377	322	268	2.0	1.7	1.4
Tetanus	2	6	3	—	—	—
<b>Vector-borne diseases</b>						
Arbovirus infection n.e.c.	62	69	37	0.3	0.4	0.2
Barmah Forest virus infection	638	634	1 144	3.4	3.3	5.9
Dengue	132	215	184	0.7	1.1	0.9
Kunjin virus	..	..	2	..	..	—
Malaria	732	951	718	3.9	5.0	3.7
Murray Valley encephalitis	..	..	3	..	..	—
Ross River virus infection	4 416	4 200	3 235	23.3	21.9	16.7

For footnotes see end of table.

...continued

9.23 NATIONAL NOTIFIABLE DISEASE SURVEILLANCE SYSTEM REPORTS — *continued*

Disease(d)	Notifications			Rate per 100,000 population(a)		
	1999(b) no.	2000(b) no.	2001(c) no.	1999(b) %	2000(b) %	2001(c) %
<b>Zoonoses</b>						
Brucellosis	52	27	19	0.3	0.1	0.1
Hydatid infection	26	26	..	0.2	0.2	..
Leptospirosis	323	243	250	1.7	1.3	1.3
Ornithosis	84	100	140	0.9	1.1	0.7
Q fever	515	573	694	2.7	3.0	3.6
<b>Other diseases</b>						
Legionellosis	249	472	304	1.3	2.5	1.6
Leprosy	6	4	4	—	—	—
Meningococcal infection	591	621	670	3.1	3.2	3.4
Tuberculosis	1 143	1 024	927	6.0	5.3	4.8
<b>Total</b>	<b>84 743</b>	<b>89 788</b>	<b>100 669</b>	<b>..</b>	<b>..</b>	<b>..</b>

(a) Rate per 100,000 population is calculated using the estimated resident population at the midpoint (30 June) of the relevant calendar year. (b) NNDSS data for 1999 and 2000 revised after consultations with states and territories in December 2001. (c) Notifications data for the year 2001 were provisional at the date of analysis (6 July 2002). (d) Diseases reported to NNDSS from all jurisdictions except hepatitis B (unspecified) not reported from NT; incident hepatitis C not reported from Qld; campylobacteriosis not reported from NSW; donovanosis not reported from SA. Diseases under surveillance for which no notifications were received in the period 1999–2001 were plague, rabies, viral haemorrhagic fever, yellow fever, chancroid, lymphogranuloma venereum, poliomyelitis, Japanese encephalitis, anthrax, Australian bat lyssavirus, other lyssavirus n.e.c. (e) SLTEC/VTEC is shiga-like toxins and verotoxin producing *E. coli* infections.

Source: National Notifiable Disease Surveillance System.

## 9.24 NEWLY DIAGNOSED HIV CASES(a), AIDS CASES AND DEATHS FOLLOWING AIDS(b)

	Year of diagnosis										Total
	Prior to 1993	1993	1994	1995	1996	1997	1998	1999	2000	2001	
HIV cases(a)	13 953	1 078	1 015	930	915	815	760	725	746	777	<b>21 725</b>
AIDS cases(b)	4 217	845	954	809	669	381	315	189	253	178	<b>8 810</b>
AIDS deaths(b)	2 790	701	753	654	515	245	156	127	136	97	<b>6 174</b>

(a) Not adjusted for multiple reporting. Total includes 11 cases for which the date of HIV diagnosis was not reported. (b) AIDS cases diagnosed and deaths following AIDS in 1999, 2000 and 2001 were adjusted for reporting delays; AIDS cases diagnosed and deaths following AIDS in previous years were assumed to be completely reported.

Source: National Centre in HIV Epidemiology and Clinical Research, 'HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2002', National Centre in HIV Epidemiology and Clinical Research, The University of New South Wales, Sydney, NSW, 2002.

Transmission of HIV in Australia continues to be mainly through sexual contact between men (77.6%). A small percentage of diagnosed infections were associated with a history of injecting drug use (4.5%) or heterosexual contact only (10.6%) (table 9.25). Mother-to-child transmission of HIV infection remains rare in Australia.

### Children's immunisation

The Australian Childhood Immunisation Register (ACIR), which commenced operation on 1 January 1996, aims to provide accurate and comprehensive information about immunisation coverage for all children under the age of seven. The register is administered by the Health Insurance Commission (HIC) on behalf of the

Commonwealth Department of Health and Ageing and is a key component of initiatives to improve the immunisation status of Australian children.

Immunisation coverage goals for Australia for the year 2000, recommended by the National Health and Medical Research Council (NHMRC), called for 90% or more coverage of children at two years of age, and near universal coverage of children at school-entry age, against diphtheria, tetanus, pertussis (whooping cough), poliomyelitis, measles, mumps, rubella and hib (haemophilus influenza type b).

ACIR data indicated that, at 31 March 2002, 90.5% of one year olds and 87.8% of two year olds were fully immunised according to the NHMRC Recommended Immunisation Schedule. State

summaries by age group based on ACIR data are published quarterly in Communicable Diseases Intelligence bulletin.

## Health care delivery and financing

### Government role

The Commonwealth has a leadership role in policy formulation, particularly in areas such as public health, research and national information management. It funds, directly or indirectly, most non-hospital medical services, pharmaceuticals and health research. With the states and territories, it jointly funds public hospital services, and home and community care for aged and disabled persons. Residential facilities for aged

persons are funded by a number of sources, including the Commonwealth. Public health insurance is provided through Medicare, which is discussed in more detail later in this chapter.

The states and territories are primarily responsible for the delivery and management of public health services and the regulation of health care providers. They deliver public hospital services and a wide range of community and public health services. For example, some state and territory government funded organisations provide school dental care and dental care for low income earners, with other dental care being delivered in the private sector without government funding. Local governments within states deliver most environmental health programs.

### 9.25 CHARACTERISTICS OF CASES OF NEWLY DIAGNOSED HIV INFECTION(a), Number of cases and proportion of total cases

	Units	Year of diagnosis										Total(b)
		Prior to 1993	1993	1994	1995	1996	1997	1998	1999	2000	2001	
Total cases	no.	13 953	1 078	1 015	930	915	815	760	725	746	777	21 725
Males	%	93.6	92.5	90.7	91.8	91.6	89.4	87.0	89.5	89.0	87.5	92.3
State/territory												
New South Wales	%	60.7	55.4	49.7	57.9	50.0	52.8	53.6	53.1	48.4	47.6	57.6
Victoria	%	20.4	20.6	21.3	17.6	20.4	22.1	18.4	19.2	25.2	26.5	20.7
Queensland	%	8.7	12.4	16.0	12.1	16.8	14.0	13.8	17.1	15.4	13.1	10.7
South Australia	%	3.4	5.1	3.7	3.3	5.0	4.2	4.6	3.0	3.1	5.4	3.7
Western Australia	%	4.7	4.7	7.3	6.3	6.1	4.6	6.6	5.4	6.2	5.8	5.1
Tasmania	%	0.4	0.2	0.2	0.6	0.3	—	0.4	0.4	—	0.3	0.4
Northern Territory	%	0.5	0.9	0.5	0.2	0.5	1.3	1.6	0.7	0.4	0.5	0.6
Australian Capital Territory	%	1.2	0.6	1.3	1.9	0.8	1.0	1.0	1.1	1.3	0.8	1.2
Exposure category(c)												
Male homosexual contact	%	81.4	79.1	74.3	73.9	75.5	72.8	65.2	65.0	68.2	67.2	77.6
Male homosexual contact and injecting drug use	%	4.3	3.6	6.3	4.9	4.0	4.6	4.6	6.1	3.4	4.6	4.0
Injecting drug use(d)	%	4.8	3.5	3.4	4.6	2.8	3.1	3.4	5.8	4.4	5.5	4.5
Heterosexual contact	%	5.6	12.8	13.7	15.3	16.6	18.4	25.6	22.2	23.6	22.1	10.6
Haemophilia/coagulation disorder	%	2.6	—	—	0.1	—	—	0.1	0.5	—	0.1	1.6
Receipt of blood/tissue	%	1.9	0.3	0.8	0.3	0.2	0.1	0.6	0.3	—	—	1.3
Mother with/at risk of HIV infection	%	0.2	0.5	1.0	0.8	0.9	1.0	0.4	0.1	0.4	0.4	0.4
Health care setting	%	—	0.2	0.3	0.1	—	—	—	—	—	—	—
Other/undetermined	%	22.1	9.3	5.2	7.9	9.8	9.4	8.6	9.8	8.2	10.8	17.3

(a) Not adjusted for multiple reporting. (b) Total includes 11 cases for which the date of HIV diagnosis was not reported. (c) The 'Other/undetermined' category was excluded from the calculation of the percentage of cases attributed to each HIV exposure category. (d) Excludes males who also reported a history of homosexual/bisexual contact.

Source: National Centre in HIV Epidemiology and Clinical Research, 'HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2002', National Centre in HIV Epidemiology and Clinical Research, The University of New South Wales, Sydney, NSW, 2002.

Public hospitals, which provide the majority of acute care beds, are funded by the Commonwealth Government and the state and territory governments, in addition to receiving revenue from services to private patients. Large urban public hospitals provide most of the more complex types of hospital care such as intensive care, major surgery, organ transplants and renal dialysis, as well as non-admitted patient care. Public hospitals have their own pharmacies which provide medicines to admitted patients free of charge and do not attract direct Commonwealth subsidies under the PBS. This is discussed in more detail later in this chapter.

A small number of doctors and paramedical professionals are salaried employees of the various tiers of government. Many salaried specialist doctors in public hospitals are able to treat some private patients in hospital and usually contribute to the hospital a portion of the income earned from fees charged. Other doctors may contract with public hospitals to provide medical services.

### Private sector role

The strong private sector, operating in the delivery of, and insurance for, health services, receives substantial direct and indirect government subsidies. Within this sector, organisations operating for profit and not for profit play a significant role in providing health services, public health and health insurance. For example, privately owned nursing homes provide the majority of long-term aged care beds.

In the past, private hospitals tended to provide less complex non-emergency care, such as simple elective surgery. However, they are increasingly providing complex, high technology services. Separate centres for non-admitted and day-only admitted patient surgical procedures are mostly located in the private sector. This sector includes a large number of doctors and paramedical professionals who are self-employed, generally providing services such as general practice and specialist services, diagnostic imaging, pathology and physiotherapy.

Most prescribed pharmaceuticals dispensed by private sector pharmacies are directly subsidised by the Commonwealth through the PBS.

An important component of the Australian health care system is private health insurance, which can cover part or all of the hospital charges to private

patients directly, a portion of medical fees for services provided to private admitted patients in hospitals, paramedical services, some dental services and some aids such as spectacles. The Commonwealth subsidises private health insurance premiums through a 30% rebate.

### National health care system

Australia has a national system for the delivery of health care which generally covers all permanent residents of Australia. The system is financed largely by general taxes, a proportion of which is raised by an income-related Medicare levy. This is discussed in more detail in the following section.

There are five major kinds of Commonwealth health funding mechanisms:

- grants to state and territory governments under the 1998–2003 Australian Health Care Agreements to assist with the cost of providing public hospital services
- medical benefits, providing patients with rebates on fees paid to privately practising doctors and optometrists
- pharmaceutical benefits, through the PBS, providing patients with access to a broad range of subsidised medicines
- Health Program Grants to government and non-government service providers for a range of health services (e.g. radiation oncology (capital component), pathology and primary medical services). Health Program Grants are used to achieve health policy objectives such as improving access for specific population groups, influencing the growth and distribution of selected and potentially high cost services, or providing an alternative to fee-for-service arrangements, such as the Medicare and PBS
- the 30% private health insurance rebate.

In some instances, the level of benefit for medical services and prescribed pharmaceuticals may be higher if the patient is receiving an age or disability pension or other types of government support payments.

In addition to the specific funding mechanisms mentioned above, health services receive part of the Goods and Services Tax (GST) revenue, general revenue assistance and Specific Purpose Payments provided by the Commonwealth to state and territory governments.

## Medicare levy

When Medicare began in 1984, the levy was introduced as a supplement to other taxation revenue, to enable the Government to meet the additional costs of the universal national health care system, which were greater than the costs of the more restricted systems that preceded it.

The Medicare levy, which was increased from 1% to 1.25% of taxable income on 1 December 1986, increased to 1.4% on 1 July 1993 and to 1.5% on 1 July 1995.

For 2001–02, the general Medicare levy rate was 1.5% of taxable income. For persons who were not eligible for the Senior Australians' tax offset or the pensioner tax offset, no levy was payable by individuals with income less than \$14,539 per year or by families with income less than \$24,534, with a further \$2,253 per year allowed for each child. Under the Senior Australians' tax offset, no levy was payable by individuals with income less than \$20,000 or families with an income less than \$31,729. Under the pensioner tax offset, no levy was payable by individuals with income less than \$16,571 or families with income less than \$24,534. Single people with incomes above \$50,000 and families with incomes above \$100,000, with a further \$1,500 after the first child, who were not covered by private health insurance, paid a levy of 2.5% of taxable income, which includes a 1% Medicare Levy Surcharge.

From 24 May 2000, high income earners (\$50,000 single, \$100,000 families) who purchased a high front end deductible (FED) health insurance product were not exempt from the Medicare Levy Surcharge from 1 July 2000. A high FED costs over \$500 for single participants and over \$1,000 for families.

In 2000–01, revenue raised from the Medicare levy was approximately 18% of total Commonwealth health expenditure. The Australian Taxation Office estimated revenue from the Medicare levy to be \$4.6b in 2000–01.

## The Commonwealth Government's funding of hospitals

Total Commonwealth funding under the 1998–2003 Australian Health Care Agreements is currently estimated as \$31.6b over the five years to 30 June 2003.

In 2000–01 total Commonwealth funding under the Australian Health Care Agreements was around \$6.3b. Of this amount, over 98% was paid to the states and territories as Health Care Grants, while the balance was either allocated to national initiatives in areas of mental health, palliative care and casemix development or paid to those states and territories which were eligible to receive financial assistance from the National Health Development Fund.

## Total health expenditure

For 2000–01, the preliminary estimate of total expenditure on health (including both public and private sectors) was \$60.8b, compared with expenditure of \$55.7b in the previous year (table 9.26). This represented an average rate of health expenditure in 2000–01 of \$3,153 per person. In 2000–01, governments provided more than two-thirds (70%) of the funding for health expenditure, while the remaining 30% was provided by the private sector. Health expenditure in volume terms grew at an average annual rate of 4.4% between 1990–91 and 2000–01. In 2000–01, health expenditure as a proportion of gross domestic product was 9.0%. This ratio was 8.8% in 1999–2000, up from 8.7% in 1998–99.

## Hospitals

### Public hospitals

In 2000–01 there were 749 public hospitals nationally, including 23 psychiatric hospitals, compared with 729 in 1996–97. There were an average of 52,591 beds in public hospitals during 2000–01 (table 9.27), representing 68% of all beds in the hospital sector (public and private hospitals combined). Public hospital beds have declined from 3.1 beds per 1,000 population in 1996–97 to 2.7 beds in 2000–01.

The number of patient separations (discharges, deaths, and transfers) from public hospitals during 2000–01 was 3.9 million, compared with 3.6 million in 1996–97. Same-day separations accounted for 46% of total separations in 2000–01 compared with 42% in 1996–97.

## 9.26 TOTAL HEALTH EXPENDITURE(a) AND RATE OF GROWTH

	Expenditure		Rate of growth	
	Current prices	Chain volume measures(a)	Current prices	Chain volume measures(a)
	\$m	\$m	%	%
1990–91	31 267	38 004	n.a.	n.a.
1991–92	33 123	38 469	5.9	1.2
1992–93	35 098	39 893	6.0	3.7
1993–94	36 990	41 714	5.4	4.6
1994–95	39 216	43 758	6.0	4.9
1995–96	42 082	45 905	7.3	4.9
1996–97	45 195	48 224	7.4	5.1
1997–98	48 360	50 642	7.0	5.0
1998–99	51 680	53 026	6.9	4.7
1999–2000	55 668	55 668	7.7	5.0
2000–01(b)	60 779	58 490	9.2	5.1

(a) Reference year 1999–2000. Chain volume measures are discussed in detail in the section 'Chain volume or 'real' GDP' of 'Chapter 29, National accounts'. (b) Based on preliminary AIHW and ABS estimates.

Source: Australian Institute of Health and Welfare, Health Expenditure Data Base.

## 9.27 PUBLIC AND PRIVATE HOSPITALS — 2000–01

	Units	Public(a)	Private(b)	Total
Bed supply				
Facilities	no.	749	516	<b>1 265</b>
Beds/chairs(c)	no.	52 591	(d)26 153	<b>(d)78 744</b>
Activity				
Total separations	'000	3 868	2 353	<b>6 221</b>
Same day separations	'000	1 789	1 350	<b>3 139</b>
Total patient days	'000	15 732	6 919	<b>22 651</b>
Average length of stay	days	4.1	2.9	<b>3.6</b>
Average length of stay excluding all same-day separations	days	6.7	5.6	<b>6.3</b>
Average occupancy rate	%	82.0	(e)73.0	<b>(e)79.1</b>
Non-admitted patient occasions of service	'000	40 465	(e)1 814	<b>(e)42 279</b>
Staff (full-time equivalent)(c)	'000	183	46	<b>229</b>
Revenue	\$m	1 579	4 742	<b>6 321</b>
Recurrent expenditure	\$m	(f)15 545	4 467	<b>20 012</b>

(a) Acute and psychiatric hospitals. (b) Acute and psychiatric hospitals and free-standing day hospital facilities. (c) Annual average. (d) Including beds, chairs, recliners at free-standing day hospital facilities. (e) Excluding free-standing day hospital facilities. (f) Excluding depreciation.

Source: Private Hospitals, Australia, 1999–2000 (4390.0); Australian Institute of Health and Welfare, 'Australian Hospital Statistics, 2000–01'.

Total days of hospitalisation for public health patients during 2000–01 amounted to 15.7 million, a decrease of 5% since 1996–97. The average length of hospital stay per patient in 2000–01 was 4.1 days. For 1996–97 the corresponding figure was 4.5, reflecting the lower numbers of same-day patients compared with 2000–01. If same-day patients are excluded, the 2000–01 average length of stay was 6.7 days, compared with 7.1 days in 1996–97.

An average of 182,995 staff (full-time equivalent) were employed at public hospitals in 2000–01, of whom 45% were nursing staff and 9% were salaried medical officers. Revenue amounted to \$1,579m. Most of this revenue (50%) was from patients' fees and charges. Recurrent expenditure

amounted to \$15,545m, of which 63% was for salaries and wages. The difference between revenue and expenditure is made up by payments from state/territory consolidated revenue and specific payments from the Commonwealth for public hospitals, in roughly equal proportions.

## Private hospitals

There were 516 private hospitals in operation in 2000–01, comprising 275 acute hospitals, 24 psychiatric hospitals and 217 free-standing day hospital facilities. The number of acute and psychiatric hospitals has continued to decline since 1996–97 when 319 of these hospitals were in operation. In contrast, day hospital facilities have shown strong growth for several years, with only 153 in operation in 1996–97.

The average number of beds available at private acute and psychiatric hospitals for admitted patients increased by 800 (3.4%) on the previous financial year. Between 1996–97 and 2000–01, the average number of beds available increased by 7% to 24,465. There were 1.3 private hospital beds available per 1,000 population in 2000–01. The average number of beds or chairs at free-standing day hospital facilities (used mainly for short post-operative recovery periods) increased over the same five-year period by 45% to 1,688; this increase reflects the continued growth in the numbers of free-standing day hospitals.

Private hospital separations in 2000–01 totalled 2.4 million, of which 83% were from private acute and psychiatric hospitals and 17% from free-standing day hospital facilities. Same day separations accounted for 57% of all private hospital separations (compared with 46% of public hospital separations). This higher proportion of same day separations contributed to the lower average length of stay in private hospitals (2.9 days) compared to public hospitals (4.1 days) (table 9.27).

The average number of full-time equivalent staff employed at all private hospitals was 46,307, of whom 63% were nursing staff. Total operating expenditure for private acute and psychiatric hospitals during 2000–01 amounted to \$4,284m. Some 56% of this amount was spent on salaries and wages (including on-costs). Revenue received during the year was \$4,518m, of which 92.7% was received as payments from or in respect of patients. Total recurrent expenditure for free-standing day hospital facilities during 2000–01 amounted to \$183m, and revenue received during the year was \$224m.

### Hospital care under Medicare

Under the Australian Health Care Agreements between the Commonwealth Government and the state/territory governments, all eligible people are entitled to free accommodation, medical, nursing and other care as public patients in public hospitals.

Alternatively, patients may choose to be private patients in public hospitals, enabling them to elect their doctors. Medicare-eligible patients who elect to be private patients in public hospitals are charged separate fees for medical and hospital care. If patients have private insurance, this will usually cover all or part of the charges by a public hospital. Medicare pays benefits subsidising part of the cost of doctors' charges, while private insurance pays an

additional amount towards these charges and other costs (e.g. surgically implanted prostheses) incurred as part of the hospital stay.

Private patients in private hospitals are charged doctors' fees and are billed by the hospital for accommodation, nursing care and other hospital services. If the patient holds private health insurance, it will contribute to the payment of these costs. Eligible Medicare patients in private hospitals generally attract Medicare benefits for doctors' fees. There are no other Commonwealth funding and pharmaceutical benefits for prescriptions provided to private hospitals.

The rate of Medicare benefit for doctors' services provided to a private patient in hospital, or an approved day surgery, is 75% of the Medicare Benefits Schedule (MBS) fee. The MBS lists a wide range of medical service items with a scheduled fee for each item. Registered private health insurers offer insurance to Medicare-eligible patients for the difference between 75% and 100% of the Schedule fee, and in some cases an additional amount agreed with the hospital and doctor to ensure that the patient has no out-of-pocket medical cost.

### Medicare benefits for private doctors' and optometrists' services

Costs incurred by patients receiving private doctors' services, and some optometrists' services, are generally reimbursed, either fully or in part, through Medicare benefits. These benefits are administered by the Health Insurance Commission through its Medicare offices.

MBS fees are used to calculate Medicare benefit entitlements, but doctors are able to determine their own fees, provided the service is not 'bulk-billed'. If the service is bulk-billed by agreement between the doctor and patient, the doctor must accept the Medicare benefit, paid directly to the doctor, as payment in full. Of Medicare fees which are not bulk-billed, 22% were charged at a rate above the Medicare Schedule fee during 2001–02.

The rate of benefit for non-hospital medical services, such as visits to doctors in their rooms, is 85% of the MBS fee. Once the difference between the Schedule fee and benefit is more than \$55.60 (indexed annually) the benefit is the Schedule fee less \$55.60.

Under the Medicare safety-net arrangements, if in any year the sum of the 'gap' payments (being payments above the benefit level and up to the

level of the Schedule fee) for non-hospital services for an individual or registered family exceeds a specified amount (\$309.80 for 2002), all further benefits for the remainder of that year are paid at 100% of the Schedule fee.

For private medical services provided in hospital, Medicare benefits are payable at a different rate, as described in the preceding section.

Private insurers are prohibited from insuring all or part of non-hospital services which attract Medicare benefits. They may insure part of the fee for in-hospital medical services, as described in the preceding section.

### Pharmaceutical Benefits Scheme (PBS)

The Commonwealth Government provides Medicare-eligible persons with affordable access to a wide range of necessary and cost effective prescription medicines through the PBS. The following details relate to charges and safety net levels applying at 1 January 2002.

Medicare-eligible patients who do not hold a Health Care Card, Pensioner Concession Card or Commonwealth Seniors Health Card, are required to pay the first \$21.90 for each prescription item for medicines listed on the PBS. Concessional patients who hold a concession card must pay \$3.50 per prescription item.

Individuals and families are protected from large overall expenses for PBS listed medicines by safety nets. For general patients (non-cardholders), once the eligible expenditure of a person and/or their immediate family exceeds \$669.70 within a calendar year, the additional payment the patient has to make per item (co-payment) decreases from \$21.90 to the concessional co-payment rate of \$3.50.

For concessional and pensioner patients (cardholders), once their total eligible expenditure exceeds \$182.00 within a calendar year, any further prescriptions are free for the remainder of that year. All pensioners continue to have their pensions supplemented by a pharmaceutical allowance of \$2.90 per week payable fortnightly, or \$150.80 per year, to help defray their out-of-pocket pharmaceutical expenses. The allowance is not paid to other concessional beneficiaries.

Patients may pay more than the relevant co-payment where there is more than one brand of the same drug or alternative product that produces similar results. The Government subsidises on the basis of the lowest priced drug, and any difference in price due to brand or product preferences must be met by the patient. The premium cannot be counted towards the patient's safety net.

In 2001–02 the PBS had over 150 million benefit prescriptions, representing a cost to the Government of \$4,197m and a total cost, including co-payments, of \$5,003m (table 9.28).

**9.28 PBS(a), Prescription volume and cost (current dollars)**

	Prescription volume millions	Government cost \$m	Total cost(b) \$m	Prescriptions per capita no.	Average dispensed price in current prices \$
1990–91	96.3	1 171.5	1 330.5	5.6	13.82
1991–92	94.1	1 134.0	1 442.2	5.4	15.32
1992–93	106.2	1 419.5	1 779.4	6.0	16.76
1993–94	115.0	1 701.3	2 097.0	6.5	18.23
1994–95	118.7	1 897.4	2 341.9	6.6	19.73
1995–96	124.9	2 207.4	2 685.5	6.9	21.50
1996–97	124.1	2 348.3	2 878.5	6.7	23.20
1997–98	125.1	2 541.5	3 112.3	6.7	24.88
1998–99	128.9	2 795.6	3 397.0	6.8	26.35
1999–2000	138.1	3 187.2	3 839.0	7.2	27.80
2000–01	148.0	3 820.6	4 564.7	7.6	30.83
2001–02	155.0	4 197.3	5 003.3	7.9	32.29

(a) Includes PBS categories of Concessional, General, Safety Net and Emergency (Doctor's Bag) Drugs prescriptions. Excludes: (i) payments through miscellaneous services (Highly Specialised Drugs, IVF Centre Hormones, Human Growth Hormones, Safety Net Card issue costs, Aboriginal Health Services, etc.). In 2000–01 this expenditure was \$347.9m; (ii) prescription medicines subsidised by the Commonwealth under the Repatriation Pharmaceutical Benefits Scheme (RPBS) administered by the Department of Veterans' Affairs. In 2000–01, there were 14.2 million RPBS prescriptions at a cost to Government of \$371.0m. (b) Total cost consists of Government cost and patient co-payments.

Source: Commonwealth Department of Health and Ageing, Pharmaceutical Benefits Branch.

The number of PBS prescriptions per capita in 2001–02 was 7.9, compared with 7.6 in 2000–01. The number of benefit prescriptions increased by 4.7% over the previous year, and the cost to Government of these prescriptions grew by 9.9% (in current dollars).

The rate of growth in prescription numbers and their cost reflects the ongoing trend towards newer and more costly medicines. Over the 10 years from 1991–92 to 2000–01, the average PBS dispensed price doubled, from \$15.32 to \$30.83 (a 101.2% increase, in current dollars).

### Private health insurance

Private health insurance is offered by 44 registered health insurers, giving a voluntary option to all Australians for private funding of their hospital and ancillary health treatment. It supplements Australia's Medicare system, which provides a tax-financed public system that is available to all Australians. Depending on the type of cover purchased, private health insurance provides cover against all or part of hospital theatre and accommodation costs in either a public or private hospital, medical costs in hospital, and costs associated with a range of services not covered under Medicare including private dental services, optical, chiropractic, home nursing, ambulance and natural therapies.

The private health sector funds around one-third of all health care in Australia. A sustainable balance between the public and private health care sectors can ensure a high level of access and choice now and into the future.

### Health insurance coverage

The introduction of Medicare in 1984 resulted in Australians' participation in private health insurance steadily declining. The introduction of the Federal Government 30% rebate on private health insurance in 1999, and the Government's Lifetime Health Cover policy in 2000, saw participation in private hospital cover increase dramatically, with participation rates rising from 30.6% in June 1999 to 45.8% in September 2000. Rates appear now to have stabilised with a participation rate of 44.7% as at 31 March 2002 (table 9.29).

### Community rating and reinsurance

Community rating is the underlying principle of the current private health insurance system. Community rating means that people cannot be discriminated against in obtaining health insurance on the basis of health risk. It requires that in setting premiums, or paying benefits, private insurers cannot discriminate between contributors on the basis of health status, age, race, gender, sexuality, use of hospital or medical services, or general claims history.

The principle of community rating is supported by a reinsurance system within the private health insurance industry.

Reinsurance supports the principle of community rating by sharing between health insurers the hospital costs and part of the medical costs of high risk members. Insurers with a greater proportion of low risk members (generally the young) pay contributions into the reinsurance pool, while those with a greater proportion of high risk groups (the chronically ill and the aged) receive transfers from the pool.

**9.29 PERSONS WITH PRIVATE HEALTH INSURANCE, Proportion of total population**

	Year ended 30 June						Quarter ended	
	1990	1992	1994	1996	1998	2000	June 2001	March 2002
	%	%	%	%	%	%	%	%
With private hospital cover	44.5	41.0	37.2	33.6	30.6	43.0	44.9	44.7
With private ancillary cover	39.9	37.5	34.5	32.9	31.7	39.2	40.5	41.2

Source: Private Health Insurance Administration Council, 'Quarterly Statistics, March 2002'.

### Rebate on private health insurance premiums

In response to declining coverage of the population by private health insurance, from 1 January 1999 the Federal Government introduced a 30% Rebate (the Rebate) on premiums paid for private health insurance. All Australians eligible for Medicare and covered by a health insurance policy offered by a registered health fund are eligible for the Rebate. This initiative provides a 30% rebate on the cost of private health insurance premiums on hospital cover, ancillary cover and a combination of both. Since the Rebate is set at 30% of the actual cost of premiums, it keeps pace with any increases in individual fund or product premiums. The Rebate can be taken as a direct premium reduction, a refundable tax offset or a direct payment available from Medicare offices.

### Lifetime Health Cover

Lifetime Health Cover commenced in July 2000. For people aged over 30, those wishing to take out hospital cover for the first time pay a loading of 2% on top of the policy premiums for each year they are over the age of 30. People taking out hospital cover early in their lives pay lower premiums than those taking it out later in life. This rewards membership loyalty and early joining while deterring people who join health funds knowing they will need to claim for health services in the near future, but drop their membership soon afterwards. Under Lifetime Health Cover, the premiums paid by people entering private health insurance are based on the age at which they first join and, once set, remain at that rate relative to premiums for people entering at different ages. In other respects the principle of community rating is maintained.

### Recent initiatives in private health insurance

Recent initiatives include the following:

- Expansion of 'no gap' and 'known gap' cover. The 'gap' is the difference, paid by the health fund member, between fees charged by doctors for in-hospital medical services and the combined health insurance and Medicare benefits paid for those services. Private health insurers are required to continue to offer at least one no gap or known gap product to

their contributors in order to offer the 30% Rebate as a premium reduction. All private health funds meet this requirement.

- Simplified billing. This addresses the problems of multiple bills and unforeseen out-of-pocket costs for private patients. Simplified billing encourages hospitals, doctors and health funds to work together to simplify the billing process and make sure that patients are informed about any out-of-pocket costs they may have before they go into hospital. Patients benefit by receiving only one or two bills, rather than many from various doctors, and claims from health funds and Medicare are made on the patient's behalf.
- Other recent and planned initiatives, addressing affordability, product innovation, industry efficiency and consumer awareness, include:
  - improved consumer information on private health insurance
  - private sector trials of coordinated care, hospital in the home and early discharge programs
  - expanded private sector provision of outreach services
  - deregulation of prostheses pricing
  - implementation of new capital adequacy and solvency standards for the private health insurance industry.

### Household expenditure on health and medical care

Average household expenditure on health and medical care increased steadily between 1984 and 1998–99. As a proportion of total household expenditure on goods and services, health and medical care increased from 3.9% in 1984 to 4.7% in 1998–99 (table 9.30).

The Household Expenditure Survey (HES) provides estimates of expenditure on medical care and health by households across Australia. Expenditure is net of any refunds and rebates received from Medicare, private health insurance companies and employers. The ABS has undertaken the HES at five-yearly intervals since 1984. Average expenditure in this survey is calculated across all households, not just those households that spent money on specific goods or services.

**9.30 EXPENDITURE PER HOUSEHOLD ON MEDICAL CARE, Proportion of total health expenditure**

Expenditure category	1984	1988-89	1993-94	1998-99	1998-99
	%	%	%	%	\$/week
Accident and health Insurance	50.1	44.4	49.6	40.6	13.18
Hospital, medical and dental insurance	45.7	40.0	43.9	35.0	11.37
Sickness and personal accident insurance	3.3	3.5	4.5	4.6	1.48
Health practitioners' fees	26.5	31.9	24.7	30.7	9.96
General practitioner doctors' fees	3.8	3.6	2.3	2.4	0.77
Specialist doctors' fees	3.9	6.2	5.5	7.8	2.53
Dental charges	10.6	13.3	10.4	13.5	4.37
Medicines, pharmaceutical products and therapeutical appliances	20.0	20.5	22.9	24.9	8.09
Prescriptions	6.2	6.1	8.0	9.1	2.94
Other medical care and health expenses	2.2	3.2	2.8	3.8	1.23
Hospital and nursing home charges	2.2	3.1	2.5	3.0	0.96
Health as proportion of total expenditure on goods and services	3.9	4.3	4.5	4.7	..

Source: ABS data available on request, Household Expenditure Surveys (various).

Expenditure on accident and health insurance accounted for the largest percentage of total expenditure on health and medical care in each of the survey periods. However, this percentage declined markedly between 1993-94 and 1998-99 (from 50% to 41%) reflecting the decrease in hospital, medical and dental insurance from 44% of total health expenditure in 1993-94 to 35% in 1998-99. This decrease is largely due to the falling health insurance coverage, and occurred despite increases in private health insurance costs between the surveys.

While the proportion of household health expenditure spent on health practitioners' fees has remained relatively constant since 1984, expenditures on individual items have fluctuated. In particular, general practitioner doctors' fees decreased from 3.8% of total health expenditure in 1984 to 2.4% in 1998-99, while specialist doctors' fees increased from 3.9% to 7.8%.

The proportion of total health expenditure spent on medicines, pharmaceutical products and therapeutic appliances increased from 20% in 1984 to 25% in 1998-99.

### Health workforce

In 2001-02, approximately 361,900 people were employed in health occupations in Australia, comprising 3.9% of the total number of

employed persons (table 9.31). The largest components of the health work force were registered nurses (158,700), generalist medical practitioners (37,600) and enrolled nurses (25,400).

Females comprised 72.5% of the health work force. The high proportion of females in the health work force is due to their predominance in registered midwifery (100%), enrolled nursing (93.5%), registered nursing (89.4%) and physiotherapy (78.1%). Conversely, males represented 80.3% of the ambulance officers and paramedics, 74.5% specialist medical practitioners and 62.9% generalist medical practitioners.

Over one-third (36.8%) of the health work force were employed on a part-time basis, as compared to 28.0% of the total number of employed persons in Australia. Females employed on a part-time basis constitute 89.4% of the health work force, a higher proportion than females employed on a part-time basis in the total Australian work force (71.5%). Among males in health occupations, 10.6% were part-time, compared with 28.5% for the total male work force. The higher proportion of part-time workers in the health sector is a reflection of the greater number of females in the health work force, who are more likely to work part-time.

**9.31 EMPLOYED PERSONS IN HEALTH OCCUPATIONS — Averages over 2001–02(a)**

	'000	% males	% part-time workers
<i>Health professionals(b)</i>	318.6	27.5	36.2
Generalist medical practitioners	37.6	62.9	18.5
Specialist medical practitioners	17.7	74.5	14.8
Registered nurses	158.7	10.6	44.9
Registered midwives	9.1	—	58.5
Physiotherapists	11.5	21.9	37.9
Other health professionals(b)	84.0	38.0	29.7
<i>Health associate professionals</i>	43.3	27.3	41.4
Enrolled nurses	25.4	6.5	49.3
Ambulance officers and paramedics	6.9	80.3	4.3
Aboriginal and Torres Strait Islander health workers	1.9	34.4	30.2
Other health associate professionals	9.1	43.5	49.7
Total employed in health occupations(c)	361.9	27.5	36.8
Total employed in Australia	9 207.3	55.9	28.0

(a) Average calculated on quarterly estimates. (b) Includes Health service managers. (c) Includes Health professionals, Health service managers, Health associate professionals.

Source: ABS data available on request, Labour Force Survey.

## Health-related organisations

### International

#### World Health Organization (WHO)

WHO is a specialised agency of the United Nations having as its objective the attainment by all peoples of the highest possible level of health. Australia is a member of the Western Pacific Region, one of WHO's six geographic regions, and sends representatives to attend the annual World Health Assembly meeting in Geneva as well as Western Pacific Regional Committee Meetings. Australia's assessed contribution to WHO's core budget for 2002 was \$A11.7m.

#### International Agency for Research on Cancer (IARC)

The IARC was established in 1965 within the framework of the WHO. The headquarters of the agency is located in Lyon, France. The objectives and functions of the agency are to provide for international collaboration in planning, promoting and developing research in all phases of the causation, treatment and prevention of cancer. Australia's contribution to the IARC for 2001 was \$A1.7m.

### Australian government

#### Health and Community Services Ministerial Council (HCSMC)

The HCSMC was formed in 1993 by a decision of the Council of Australian Governments, bringing together the Australian Health Ministers' Conference (AHMC) and the Community Services Ministers' Conference (CSMC). This combined Council meets as necessary to deal with the wider framework of health and community service issues of interest to members of both AHMC and CSMC.

The AHMC and its advisory body, the Australian Health Ministers' Advisory Council (AHMAC), provide a mechanism through which the Commonwealth Government, state and territory and New Zealand governments discuss matters of mutual interest concerning health policy, services and programs. Neither the Conference nor the Council has statutory powers, and decisions are reached by consensus.

In 2001–02, health ministers continued to focus on areas such as: Aboriginal and Torres Strait Islander peoples' health; primary health care and aged care; national blood sector requirements; medical indemnity issues; matters associated with safety and quality in Australian health care; and health information management.

The CSMC and its advisory body, the Community Services Ministers' Advisory Council (CSMAC), operates in a similar manner concerning

community services, and welfare policy and programs. In addition, Papua New Guinea is invited to participate as an observer.

In 2001–02, the CSMC discussed a wide range of issues such as gambling addiction, services for refugees, support for Indigenous families and communities, aged care and ageing, children's services and young peoples transition to independent living.

Ministers with responsibilities for disability services matters, who are also Members of the HCSMC, meet as necessary to discuss future directions of disability services programs and services.

### **Commonwealth Department of Health and Ageing (DoHA)**

DoHA provides policy advice to the Government and manages Commonwealth government health and ageing programs. The department's mission is to lead the development of Australia's health and ageing system.

The department's vision is for a world class health and aged care system for all Australians. To achieve this vision, the department focuses on the following specific outcomes set by the Government for the Health and Ageing portfolio:

- promotion and protection of the health of all Australians and minimising the incidence of preventable mortality, illness, injury and disability
  - access through Medicare to cost-effective medical services, medicines and acute health care for all Australians
  - support for healthy ageing for older Australians, and quality and cost-effective care for frail older people and support for their carers
  - improved quality, integration and effectiveness of health care
  - improved health outcomes for Australians living in regional, rural and remote locations
  - reduced consequence of hearing loss for eligible clients and a reduced incidence of hearing loss in the broader community
  - improved health status for Aboriginal and Torres Strait Islander peoples
- a viable private health insurance industry to improve the choice of health services for Australians
  - knowledge, information and training for developing better strategies to improve the health of Australians.

The department works with other stakeholders to provide national coordination of health and ageing services. These stakeholders include consumers, providers, industry groups, professional organisations, and state and territory governments. The department works with its other portfolio agencies to achieve the portfolio outcomes. These agencies include the HIC, the AIHW, the Australia New Zealand Food Authority, Australian Hearing Services, Health Services Australia, the Australian Radiation Protection and Nuclear Safety Authority, the Private Health Insurance Administration Council, the Private Health Insurance Ombudsman, the Professional Services Review, and the Aged Care Standards and Accreditation Agency.

The Commonwealth Government appoints two ministers, and a parliamentary secretary, to the portfolio of Health and Ageing. The Minister for Health and Ageing has overall responsibility for the portfolio and has specific responsibility for Medicare benefits, hospitals, medical indemnity, the private health industry, medical workforce issues, the PBS, public health, blood and organ donation, medical research and biotechnology, health research, gene technology, Indigenous health issues, rural and regional health, Commonwealth–state relationships and the HIC. The Parliamentary Secretary to the Minister for Health and Ageing has direct carriage of matters relating to alcohol, tobacco and illicit drugs, the Therapeutic Goods Administration, the Australian Radiation Protection and Nuclear Safety Agency, the Australia New Zealand Food Authority, Health Services Australia and the Commonwealth Rehabilitation Service.

The Minister for Ageing has direct carriage of matters relating to strategies for an ageing population, as well as residential aged care, community care, hearing services and human cloning.

Health services for veterans and their dependants are the responsibility of the Minister for Veterans' Affairs in the Defence portfolio.

## Australian Institute of Health and Welfare (AIHW)

AIHW is a statutory authority within the Commonwealth Health and Ageing portfolio. The Institute's mission is 'To improve the health and well-being of Australians, we inform community discussion and decision making through national leadership in developing and providing health and welfare statistics and information'. The Institute's main functions relate to the collation and dissemination of information related to health and welfare. The AIHW works closely with the ABS and other agencies which collect data, produce statistics and undertake research and analysis in the health, community services and housing assistance fields.

The AIHW also provides statistical support to the states and territories in the health and welfare areas, primarily through AHMAC, CSMAC and the Housing Ministers' Advisory Committee, and the national information management groups which report to those advisory groups.

The five collaborating units (contracted with the organisations) extend the scope of the Institute's expertise and assist the AIHW in performing its functions:

- National Perinatal Statistics Unit (University of New South Wales)
- Dental Statistics and Research Unit (University of Adelaide)
- National Injury Surveillance Unit (Flinders University)
- General Practice Statistics and Classification Unit (University of Sydney)
- Australian Centre for Asthma Monitoring (University of New South Wales).

The Institute's Board encourages judicious collaboration with suitable organisations to enhance the Institute's ability to meet its mission. In addition, the AIHW works collaboratively with a range of agencies such as the National Centre for Classification in Health, the Australian Patient Safety Foundation and the National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases.

## National Health and Medical Research Council (NHMRC)

The NHMRC plays a major role in supporting the implementation of the Commonwealth's investment in health through its support for research, and makes an important contribution to

improved public health and safety outcomes through the dissemination of authoritative health advice.

The NHMRC is a statutory body within the Health and Ageing portfolio with principal responsibility for advising the Australian community and the Commonwealth Government, state and territory governments on standards of individual and public health, and supporting research and research training to improve those standards. The NHMRC's work involves a large number of committees that draw on Australia's leading academics and researchers as well as representatives from professional and scientific organisations, welfare, business and consumer groups and government.

The 29 members of Council are appointed by the Minister for Health and Ageing every three years, with the present triennium ending in 2003. The members are appointed under categories defined by the legislation, including expertise in fields of health, medicine and medical research, nominees of Commonwealth, state and territory health authorities and the Aboriginal and Torres Strait Islander Commission, and the Chief Executive Officer.

While the staff of the NHMRC report to an independent Chief Executive Officer, appointed by the Minister for Health and Ageing, they are also members of staff of the DoHA.

## Communicable Diseases Network Australia (CDNA)

The CDNA is the national coordinating body for the public health management of communicable diseases. CDNA's terms of reference are:

- to promote best practice management of communicable diseases
- to develop and coordinate national surveillance programs for communicable diseases
- to provide policy advice on the control of communicable diseases
- to support and strengthen training and capacity building in the communicable disease field
- to provide a resource for the investigation and control of outbreaks of communicable disease
- to liaise and support other communicable disease control agencies and programs in the region.

CDNA holds regular fortnightly teleconferences to exchange information on recent developments in the field, coordinate responses and develop policy.

### Disease registries

Disease registries exist for a range of diseases and medical procedures in Australia. The general aim is to compile a database of all cases (within a given time and place) of a particular disease. These data can be used for research, providing clinical services, developing and evaluating health prevention/intervention policies and for administration purposes. Some of the major national disease registries include:

- Australian Childhood Immunisation Register (ACIR) — the HIC collects immunisation data to provide comprehensive information on the immunisation status of all children under seven years of age living in Australia. ACIR enables parents and health care providers to check on a child's immunisation status. The Register is also used to monitor immunisation coverage levels, service delivery and disease outbreaks, <<http://www1.hic.gov.au/general/acircirhome>>.
- Australian Mesothelioma Register — compiled from notifications by health practitioners and authorities, <<http://www.nohsc.gov.au/Statistics>>.
- Australian Spinal Cord Injury Register — enables patterns and trends of spinal cord injury (SCI) to be monitored, and provides an opportunity to conduct survival studies on people with SCI.
- Cancer Registries — cancer is a notifiable disease in all states and territories of Australia. To maintain a national dataset, the National Cancer Statistics Clearing House at the AIHW receives incidence data from individual state and territory cancer registries on all cancers diagnosed among Australian residents, <<http://www.aihw.gov.au/cancer/ncsch/index.html>>.
- National Diabetes Register — based at the AIHW, provides statistics on diabetics who use insulin. The information is collected from records of people using the National Diabetic Services Scheme and the state-based registers of the Australian Paediatric Endocrine Group.
- National Cardiac Surgery Register and National Coronary Angioplasty Register — a joint project between the National Heart Foundation of Australia and the AIHW. The National Cardiac Surgery Register contains

annual data on the number of heart surgery procedures and associated deaths from cardiac surgery units around Australia. The National Coronary Angioplasty Register contains information on coronary angioplasty procedures, indications, associated complications, lesion location, success rates and adjunctive techniques such as stenting, from cardiac catheterisation units around Australia.

- National Notifiable Diseases Surveillance System — within this system, notifications are made to the state or territory health authority under the provisions of the public health legislation in their jurisdiction for more than 40 communicable diseases or disease groups. The data facilitate the detection, monitoring and control of disease outbreaks, <<http://www.health.gov.au/pubhlth/cdi/nndss/nndss1.htm>>.
- National Register of Pregnancies After Assisted Conception — contains data from all in-vitro fertilisation (IVF) centres performing IVF, gamete intrafallopian transfer and related procedures in Australia and New Zealand.

## Australian non-government

### Asthma Australia

Asthma Australia is an association of all the Asthma Foundations throughout Australia. It aims to eliminate asthma as a major cause of ill health and disruption within the community. The Asthma Foundations provide asthma education, information, research, community advocacy and support to people with asthma and their carers.

### Australian Kidney Foundation

The Australian Kidney Foundation is a national non-profit organisation which raises funds for research aimed at the prevention of kidney and urinary tract diseases. Among other activities the Foundation conducts a broad-based education program for patients, potential organ donors, medical practitioners, school students and the general community.

### Australian Red Cross

The Australian Red Cross operates a variety of community services including the collection, processing and distribution of blood and blood products to the Australian community. The Australian Red Cross Blood Service is based on donations from voluntary non-remunerated donors and is funded by the Commonwealth Government and state governments, as well as the Australian Red Cross.

**Cancer Council Australia**

The Cancer Council Australia is Australia's peak non-government national cancer control organisation. The Cancer Council Australia brings together Australia's eight state and territory cancer organisations in a joint commitment to prevent and control cancer, provide support for people affected by cancer and fund cancer research. The Council was formerly known as the Australian Cancer Society.

**Consumers Health Forum of Australia**

The Consumers Health Forum (CHF) is a national peak organisation funded by member contributions and the DoHA. The strategic direction of the forum is set by voting members which are national, state and local consumer groups. CHF nominates and supports consumer representatives on government, industry and professional committees.

**Diabetes Australia**

Diabetes Australia is part of a federation of 12 organisations — medical, education, and scientific, research and community based — coordinated and facilitated through the national office in Canberra. It offers personalised and practical assistance to benefit people with diabetes and their carers, and provides a forum for the development of national policies.

**Mental Health Council of Australia**

The Mental Health Council of Australia is the independent, non-government sector peak body established under the National Mental Health Strategy to represent and promote the interests of the mental health sector and advise on mental health in Australia.

**National Heart Foundation**

The National Heart Foundation is an independent, Australia-wide, non-profit health organisation funded almost entirely by donations from Australians. The Foundation's purpose is to improve the heart health of Australians, and to reduce disability and death from heart and blood vessel disease, by promoting and conducting research and promoting behaviour beneficial to heart and blood vessel health.

**Royal Flying Doctor Service**

The Royal Flying Doctor Service of Australia is a not-for-profit charitable service providing aeromedical emergency and primary health care services, together with communication and education assistance to people who live, work and travel in regional and remote Australia.

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Royal Flying Doctor Service, <<http://www.rfds.org.au>>

World Health Organization, <<http://www.who.int>>

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## Introduction

At the broadest level, education and training can be thought of as the lifetime process of obtaining knowledge, attitudes, skills, and socially valued qualities of character and behaviour. In this sense, education is initiated at birth, developed in schooling and other formal pathways of learning, and continued throughout adult life. Education can occur within a variety of environments, some more formal than others.

Formal learning has traditionally taken place within three major sectors: schools, vocational education and training (VET), and higher education. Typically this is characterised by delivery that is systematic, planned and organised ahead of time, and which usually involves some evaluation of achievement. However, in recent years the boundaries between these sectors have become less distinct. Many other kinds of structured learning can take place outside formal institutions and can continue after a person has completed schooling or gained trade or higher qualifications. For instance, structured learning might be undertaken in the workplace, in order to acquire, develop or upgrade work-related skills.

At the other end of the spectrum is non-formal education, which is intentional, but is delivered in an informal and unstructured way, on an ad hoc basis. It does not necessarily involve any student-teacher relationship nor evaluation of achievement. Non-formal education includes on-the-job training and self-directed learning.

Core measures of educational activity in Australia currently focus on educational resources (the inputs), participation (the process of education), attainment (the outputs) and other outcomes. The structure of this chapter reflects these core measures. It begins with the funding inputs to the different categories of education, then discusses the inputs in the form of government assistance to students, before describing the processes for each category of education, and finally educational attainment.

## Commonwealth and state government responsibilities in education

State and territory governments have the responsibility for most education and training, including the administration and substantial

funding of primary and secondary education, as well as the administration and major funding of VET.

The Commonwealth Government has special responsibilities in education and training for Aboriginal and Torres Strait Islander peoples, migrants, international relations in education, and assistance for students. It is also principally responsible for funding of higher education institutions, and provides supplementary funding for schools and for VET. The Commonwealth Government also provides special grants to the states and territories for areas of particular need. Apart from its significant financial role, the Commonwealth is also involved in promoting national consistency and coherence in the provision of education and training across Australia.

## Expenditure on education

The estimates of government expenditure on education provided in this section accord with national accounting concepts.

The accruals-based estimates in tables 10.1, 10.2, 10.3 and 10.4 reflect transactions in the period in which income is earned or expenses incurred, regardless of whether a cash payment is made. A conceptual framework, derived from the international standard *A System of National Accounts 1993*, is used for these estimates.

For the purposes of table 10.1, total expenditure on education includes expenditure on all sectors of education, such as preschool, primary, secondary, university, and technical and further education (TAFE), but excludes expenditure on courses such as vocational training programs not provided by TAFE institutions. Private expenditure data include items such as school fees, but exclude items such as school books and uniforms.

Total expenditure on education in the 2000–01 financial year was \$39,981m, with government expenditure of \$29,632m and private expenditure of \$10,349m. Education expenditure as a percentage of gross domestic product (GDP) was 5.9% in 2000–01, similar to the two preceding financial years.

## 10.1 TOTAL EXPENDITURE ON EDUCATION(a)

Expenditure on education	Units	1998-99	1999-2000	2000-01
Government expenditure(b)				
Operating expenses	\$m	31 049	32 323	34 688
Net acquisition of non-financial assets	\$m	90	301	486
less				
Sales of goods and services	\$m	4 620	5 149	5 542
Total	\$m	26 519	27 475	29 632
Private expenditure				
Household final consumption expenditure	\$m	973	1 109	1 001
Gross fixed capital formation	\$m	8 271	8 756	9 348
Total	\$m	9 244	9 865	10 349
<b>Total</b>	<b>\$m</b>	<b>35 763</b>	<b>37 340</b>	<b>39 981</b>
Gross domestic product (GDP)	\$m	591 592	629 212	672 046
Total expenditure on education as proportion of GDP	%	6.0	5.9	5.9

(a) Figures expressed in current prices. Changes between years will include price effects. (b) Total government expenditure on education derived by adding operating expenses and net acquisition of non-financial assets, then subtracting the sales of goods and services.

Source: Government Finance Statistics, Education, Australia — Electronic Delivery, 2000-01 (5518.0.55.001).

In 2000-01, government expenditure on education was 4.4% of GDP, with private education expenditure at 1.5% of GDP. In 2001, some 9,596 schools provided primary and secondary education for 3.3 million school students, 69% of whom attended government schools. VET institutions were well patronised, with 1.8 million clients, and there were 726,400 higher education students. An estimated 621,500 persons were employed in the education industry, representing 6.9% of the civilian workforce.

The total education operating expenses for all Australian governments increased by 7.3% from \$32,323m in 1999-2000 to \$34,688m in 2000-01. In the latter, total expenditure on acquisition of non-financial assets for all Australian governments, a cash measure, was \$2,275m, up from \$2,247m in 1999-2000. Cash-based private expenditure on education (which comprises household final consumption expenditure plus gross fixed capital formation) increased by 4.9%, from \$9,865m in 1999-2000 to \$10,349m in 2000-01.

Table 10.2 presents the total education expenses of governments in 2000-01 by purpose. Primary and secondary education comprised 56% of total operating expenses on education, university

education 26%, and TAFE 10%. Total operating expenses include depreciation of fixed assets, but do not include cash payments for expenditure on non-financial assets, a component of the broader financial statements.

Table 10.3 shows the components of operating expenses on education by economic transaction type in 2000-01. Employee expenses accounted for 56% of total operating expenses, with the balance largely in non-employee expenses (22%) and current transfer expenses (17%).

Total government operating expenses on education for all Australian governments in 2000-01 were \$34.7b. Total government operating expenses are greater than total government expenditure because the total expenditure figure is net of sales of goods and services, but inclusive of net acquisition of non-financial assets.

Table 10.4 summarises Commonwealth grants for education to the states and territories in 2000-01. The major beneficiary of Commonwealth grants (both current and capital) was primary and secondary education, receiving 52% of the total granted (both current and capital) for education. Universities received 37% and 9% was directed to TAFE.

## 10.2 GOVERNMENT OPERATING EXPENSES ON EDUCATION, By purpose — 2000–01

	Commonwealth	State and local	Multi-jurisdictional(a)	Total sectors	Intra-sector transfers	Australia(b)
	\$m	\$m	\$m	\$m	\$m	\$m
Primary and secondary education	5 298	19 365	—	24 663	5 174	19 490
Tertiary education						
University education	3 849	118	9 191	13 158	4 070	9 089
Technical and further education	1 102	3 416	—	4 518	930	3 588
Tertiary education n.e.c.	—	93	—	93	—	93
Total	4 951	3 627	9 191	17 769	5 000	12 769
Preschool, special, and other education	108	1 087	—	1 195	108	1 086
Transportation of students	—	763	—	763	—	763
Other education expenses	524	55	—	579	—	579
<b>Total education operating expenses</b>	<b>10 881</b>	<b>24 898</b>	<b>9 191</b>	<b>44 970</b>	<b>10 282</b>	<b>34 688</b>

(a) The multi-jurisdictional sector currently includes only universities. (b) Total for Australia equals total sectors minus intra-sector transfers.

Source: Government Finance Statistics, Education, Australia — Electronic Delivery, 2000–01 (5518.0.55.001).

## 10.3 GOVERNMENT OPERATING EXPENSES ON EDUCATION, By economic transaction — 2000–01

	Commonwealth	State and local	Multi-jurisdictional(a)	Total sectors	Intra-sector transfers	Australia(b)
	\$m	\$m	\$m	\$m	\$m	\$m
Employee expenses	63	14 319	5 203	19 585	—	19 585
Non-employee expenses	222	4 320	2 982	7 524	18	7 505
Depreciation of fixed assets	10	983	649	1 642	—	1 642
Current transfer expenses	10 210	5 140	357	15 707	9 899	5 808
Capital transfer expenses	377	136	—	513	365	148
<b>Total</b>	<b>10 881</b>	<b>24 898</b>	<b>9 191</b>	<b>44 970</b>	<b>10 282</b>	<b>34 688</b>

(a) The multi-jurisdictional sector currently includes only universities. (b) Total for Australia equals total sectors minus intra-sector transfers.

Source: Government Finance Statistics, Education, Australia — Electronic Delivery, 2000–01 (5518.0.55.001).

## 10.4 COMMONWEALTH GRANTS FOR EDUCATION — 2000–01

	\$m
Current grants to states, territories and universities	
Primary and secondary education	4 852
Technical and further education	916
Universities	3 657
Other education not definable by level	107
Total	9 532
Capital grants to states, territories and universities	
Primary and secondary education	315
Technical and further education	—
Universities	42
Other education not definable by level	1
Total	358
Total grants to states, territories and universities	
Primary and secondary education	5 167
Technical and further education	916
Universities	3 698
Other education not definable by level	108
<b>Total</b>	<b>9 889</b>

Source: ABS data available on request, Public Finance Collection.

## Funding of schools

On an accruals basis, the primary and secondary education expenses of Australian governments totalled \$19,490m in 2000–01. Expenses associated with preschool, special, and other education were \$1,086m. State, territory and local governments also contributed funds to other aspects of schooling such as student transport, totalling \$763m in 2000–01. As table 10.2 shows, preschool, primary, secondary, special school and other education expenses were largely met by state, territory and local governments.

While primary and secondary education is free in government schools in all Australian states and territories, fees may be charged for the hire of text books and other school equipment (particularly in secondary schools). Voluntary levies may also be sought from parents.

In addition to funding schools directly, most state and territory governments provide financial assistance to parents (under specified conditions) for educational expenses of school children.

Assistance includes scholarships, bursaries, and transport and boarding allowances, many of which are intended to assist low-income families. The Commonwealth Government also provides a number of assistance schemes to facilitate access to education.

### Funding of Vocational Education and Training (VET)

VET providers in receipt of public funds primarily receive revenues from the state and territory governments (57% in 2001), with additional funds being provided by the Commonwealth Government (22%). The balance of revenue (21% in 2001) comes from fee-for-service activities, ancillary trading, and student fees or charges.

Most providers charge students fees for the administration of VET courses, for tuition, for materials or for student amenities. These fees vary according to the type of course and its duration. Nationally, in 2001 around 4% of recurrent revenue for VET institutions was provided through student fees and charges. An additional 11% of total revenue was generated through services provided to full-fee paying overseas clients, employers and other individuals or organisations under contracts or commercial arrangements ('fee-for-service' arrangements).

### Funding of higher education

Most higher education institutions are funded by the Commonwealth Government under the *Higher Education Funding Act 1988* (Cwlth). In 2000 the operating revenue (before abnormals) of these institutions amounted to \$9,328m, 45% of which came from Commonwealth government grants. Commonwealth government funding is also provided to higher education institutions through various research programs, mostly on the advice of the Australian Research Council.

In addition to government funding, institutions receive payments from students who are required to contribute to the cost of their education through the Higher Education Contribution

Scheme (HECS), and from other fee-paying students. Higher education fees and charges have increased in importance in recent years. In 2000, 18% of operating revenue was raised from HECS, while other fees and charges accounted for a further 18% of income. These fees and charges included \$947m (representing 56% of the fee income) from fee-paying overseas students — a rise of 20% since 1999.

Some institutions rely more heavily than others on fees paid by overseas students. For example, the Central Queensland University, Royal Melbourne Institute of Technology University and the Curtin University of Technology in Western Australia received 25%, 23% and 23% respectively of their revenue from fee-paying overseas students. This is well above the overall national average of 10%.

### Government assistance to students

Commonwealth government assistance to students is summarised in table 10.5. Student numbers should not be totalled, as some students can receive the Student Financial Supplement Scheme (SFSS) in conjunction with one of the other payments (see the section *Student Financial Supplement Scheme*).

**10.5 STUDENT ASSISTANCE SCHEMES  
— 2000-01**

Scheme	Students no.	Assistance \$m
Youth Allowance	308 663	2 259
Austudy	41 992	242
ABSTUDY	50 451	158
Assistance to Isolated Children (AIC)	11 993	36
Youth Allowance SFSS	23 458	81
Austudy SFSS	11 084	42
ABSTUDY SFSS	6 840	35

Source: Department of Education, Science and Training;  
Department of Family and Community Services.

## Austudy and Youth Allowance

In 1998, Youth Allowance replaced AUSTUDY (now called Austudy) and a number of other payments for young people under 25 years. Youth Allowance is for full-time students under 25 years and unemployed people under 21 years. Austudy now covers full-time students 25 years and over. Youth Allowance and Austudy are administered by the Department of Family and Community Services, and delivered by Centrelink. At 30 June 2001, some 308,663 and 41,992 students benefited from Youth Allowance and Austudy respectively.

## ABSTUDY

ABSTUDY represents a major component of the Commonwealth Government's commitment, under the National Aboriginal and Torres Strait Islander Education Policy, to encourage Australian Aboriginal and Torres Strait Islander peoples to take full advantage of educational opportunities, to promote equality of education, to be involved in decision making, and to improve their educational outcomes.

The scheme provides financial assistance for eligible Australian Aboriginal and Torres Strait Islander peoples who undertake approved secondary or tertiary education courses by full-time study, by correspondence, or who undertake part-time tertiary study. There is also some assistance available to primary students aged 14 years or over who live at home. In 2000–01, ABSTUDY assisted over 50,000 students.

## Assistance for isolated children (AIC)

The AIC scheme helps the families of primary and secondary students, and tertiary students under 16 years old, who do not have reasonable daily access to an appropriate government school primarily because of their geographic isolation. An 'appropriate school' is a government school which offers the student's level of study or, if the student has special health-related or educational needs, one which provides access to the facilities, programs and/or environment required for those needs.

Apart from the additional Boarding Allowance, all AIC allowances are free from income and assets tests, but applicants must meet the eligibility criteria. In 2000–01, the AIC scheme assisted 11,993 students, and expenditure was \$36m.

## Student Financial Supplement Scheme (SFSS)

The SFSS is a voluntary loan scheme introduced in 1993. It is available to students receiving Youth Allowance, Austudy, ABSTUDY and the Pensioner Education Supplement. Dependent full-time students who are not eligible for Youth Allowance may still access a SFSS loan if parental income is below a certain threshold, which was \$61,200 in 2000–01. Loan repayments do not commence until five years after the loan is taken out and only when income reaches a certain level (\$32,918 in 2000–01).

During 2000–01, 41,382 students took up the SFSS option, receiving \$158m in loans. Students receiving Youth Allowance took out \$81m in SFSS loans, Austudy recipients took out \$42m in SFSS loans, and ABSTUDY recipients \$35m in loans.

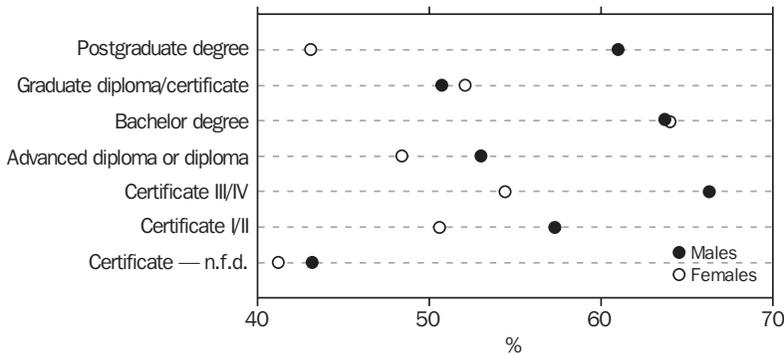
## Financial assistance — from the student's perspective

As well as federal and state government grants, students may receive financial support for their studies from other sources. Some will receive financial support from multiple sources including employers, family members, unions, professional associations, foreign governments, etc.

In 2001, 56% of the 1.9 million non-school students studying for educational qualifications received some form of financial support for their study — 59% of male and 54% of female students. Some 64% of both males and females in bachelor degree courses received financial support, but only 51% of males and 52% of females studying for a graduate diploma or graduate certificate received support (graph 10.6).

For males, the highest level of financial support was for study towards a certificate III or IV, with 66% of this group (which includes the majority of trade apprenticeships) receiving support. Only 54% of females studying at this level received financial support. Similarly, the disparity in financial support between males and females is apparent among those undertaking postgraduate degrees; in 2001 some 61% of males received support compared to 43% of females.

10.6 STUDENTS RECEIVING FINANCIAL SUPPORT FOR STUDY — 2001



Source: ABS data available on request, Survey of Education, Training and Information Technology, 2001.

Just under 53% of employed non-school students (1.4 million) received financial support for their study including 26% who received some support directly from their employer (table 10.7). Both unemployed students (132,100) and students not in the labour force (363,100) received the same level of financial support (65%). However, the source of this support varied, with government being the main source of financial support for unemployed students, whereas for those not in the labour force approximately equal proportions received support from government and elsewhere.

Preschool students

Introduction

Preschool generally refers to education provided for children in the year prior to the first year of full-time primary school, is largely sessional, and operates only during school terms for children three years of age to school starting age.

Preschools may be operated by government, community organisations or the private sector. Preschool programs may also be provided in long day child care centres. Data about preschools are from the ABS Child Care Survey (results published in *Child Care, Australia* (4402.0)) which is conducted every three years. However, there is some undercounting of the number of children attending preschool in this survey. Reasons for this include differences in terminology and starting ages of preschool between states and territories, and the fact that children who are attending a preschool program within a child care centre may not be separately identified in the survey.

Data on Indigenous preschool students are from the National Indigenous Preschool Census (NIPC) which is conducted annually by Data Analysis Australia on behalf of the Department of Education, Science and Training. The purpose of the NIPC is to allocate Commonwealth funding to preschools for Indigenous students. The two data sources are not directly comparable due to differences in scope and collection methodology.

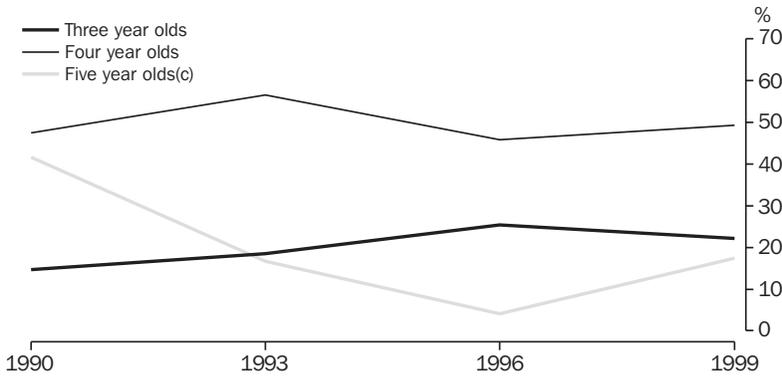
10.7 TYPE OF FINANCIAL SUPPORT RECEIVED BY STUDENTS(a) — 2001

	Source of financial support received for study			Received no financial support	All students(b)
	Employer	Government	Other		
Labour force status	'000	'000	'000	'000	'000
Employed full-time	311.4	42.8	58.1	384.9	747.5
Employed part-time	44.7	165.6	202.0	270.4	634.4
<b>Total</b>	<b>356.1</b>	<b>208.4</b>	<b>260.1</b>	<b>655.3</b>	<b>1 381.9</b>
Unemployed	*2.2	63.2	28.9	45.2	132.1
Not in the labour force	*3.6	131.8	127.7	126.9	363.1
<b>Total</b>	<b>361.8</b>	<b>403.4</b>	<b>416.7</b>	<b>827.4</b>	<b>1 877.1</b>

(a) Non-school students studying for educational qualifications. (b) As students may receive financial support from more than one source, components may not add to the total.

Source: Education and Training Experience, Australia, 2001 (6278.0).

10.8 PRESCHOOL PARTICIPATION(a)(b)



(a) The survey was conducted in November 1990, June 1993, March 1996 and June 1999.  
 (b) Shown as a proportion of the relevant age group. (c) Does not take into account five year olds attending school.

Source: Child Care, Australia (4402.0).

Attendance

In 1999, some 231,600 children attended preschool, with four year olds representing 56% of all preschool students. This compares with 267,200 attendees in 1990, when four year olds represented 44% of preschool students.

There is no national policy on the provision of preschool education, the responsibility for this lying with individual states and territories. The age at which children may attend preschool varies, reflecting the different school commencement ages in each jurisdiction. The proportion of three year olds attending preschool increased between 1990 and 1999, peaking at 25% in 1996 (graph 10.8). There was some fluctuation in the proportion of four year olds attending preschool between 1990 and 1999, with a high of 57% in 1993 and a low of 46% in 1996. In 1990, 42% of five year olds attended preschool (however, this does not take into account five year olds attending school).

This proportion dropped between 1990 and 1996, then increased to 17% in 1999. The 1990 and 1999 Child Care Surveys were conducted in November, which may account for the higher proportion of five year olds in those years, while the 1996 survey was conducted in March, which may account for the higher proportion of three year olds in 1996.

The changing focus of long day care to include an educational component may account for some of the changes in the participation of four year olds at preschool. While the proportion of four year olds attending preschool has fluctuated somewhat between 1990 and 1999, the proportion attending long day care centres has increased steadily (from 10% in 1990 to 22% in 1999) (table 10.9).

10.9 PARTICIPATION OF FOUR YEAR OLDS

Type of care	Units	November 1990	June 1993	March 1996	November 1999
Preschool	%	47.4	56.6	45.9	49.2
Long day care	%	10.3	11.8	14.0	21.7
Total in preschool /long day care	'000	143.6	174.8	154.4	186.1

Source: Child Care, Australia (4402.0).

Indigenous preschool students

In 2000, Indigenous students represented 5% of total preschool enrolments, as counted in the NIPC. The number of Indigenous children attending preschool increased by 18% from 10,000 in 1996 to 11,800 in 2000. As with all children, the highest preschool participation rate for Indigenous children was for four year olds (48% in 2000) (table 10.10).

**10.10 INDIGENOUS PRESCHOOL PARTICIPATION(a)**

Year	3 years and under	4 years old	5 years and over	Total children '000
	%	%	%	
1996	15.9	49.2	47.0	10.0
2000	15.8	47.6	31.9	11.8

(a) Shown as a proportion of the relevant age group.

Source: Department of Education, Science and Training, 'Data Analysis Australia 1997 & 2001, National Indigenous Preschool Census'.

## Primary and secondary education

### School attendance

School attendance is compulsory throughout Australia between the ages of 6 and 15 years (16 years in Tasmania). Most children start primary school at 5 years of age.

Each state and territory has developed its own approach to schooling, particularly in relation to the structure of Pre-year 1 education and the transition from primary to secondary schooling. Primary schooling in most states and territories begins with a preparatory or kindergarten year, followed by 6 or 7 primary grades, then a further 5 or 6 years to complete a full secondary course of study. In total, most states and territories offer 13 years of schooling (except Queensland and Western Australia, which offer 12 years).

Commencing in 2002, students in Pre-year 1 in Western Australia have been attending school full-time, and the data will be included in *Schools, Australia, 2002* (4221.0) for the first time. While the final 2 years of schooling generally fall outside the compulsory stage of education, in 2001 some 87% of full-time secondary students remained at school until Year 11 and 73% remained until Year 12.

### School organisation and operation

Primary schooling provides a general elementary program lasting for seven or eight years until Year 6 or Year 7. Students enter secondary schools at Year 7 in some state (or territory) systems and at Year 8 in others. Primary and secondary schools are usually separate institutions, but in some areas there are central or area schools which provide both levels of schooling. In Tasmania and the Australian Capital Territory, the final two years of government schooling are undertaken at separate secondary colleges.

Generally, schools in Australia have a considerable degree of autonomy. Most states and territories have established regional administrations which are responsible for matters such as planning school buildings and deploying staff, while a central curriculum unit provides general guidelines on course planning. Typically, individual schools determine teaching and learning approaches within the given guidelines and offer various course options. The assessment of students varies across states and territories, some having a completely school-based assessment system, while others combine school-based assessment with external examinations.

### Primary schooling

In early primary education, the main emphasis is on the development of basic language and literacy skills, simple arithmetic, moral and social education, health training and some creative activities.

In the upper primary years the focus is on development of the skills learned in earlier years. English, mathematics, social studies, science, music, art and craft, physical education and health are studied. There are also optional subjects such as religious instruction, foreign and community languages, and music.

### Secondary schooling

In some systems the first one or two years of secondary school consist of a general program which is undertaken by all students, although there may be some electives. In later years, a basic core of subjects is retained, with students able to select additional optional subjects. In other systems, students select options from the beginning of secondary school.

In senior secondary years, a wider range of options is available in the larger schools and there is an increasing trend towards encouraging individual schools to develop courses suited to the needs and interests of their students, subject to accreditation and moderation procedures. There is also an increasing emphasis on the incorporation of vocational programs into the senior secondary curriculum. School students may obtain certificates in VET as part of their senior study and undertake some parts of their programs in the workplace.

Students reaching the minimum school leaving age may leave school and seek employment, or enrol in a vocational course with a VET institution, such as a TAFE institution or a private business

college. For many VET courses, completion of Year 10 of secondary school is a minimum entry requirement. For those continuing to the end of secondary school (Year 12), opportunities for further study are available at higher education institutions, VET institutions and other educational institutions. Students' eligibility to enter higher education institutions is assessed during, or at the end of, the final two years of secondary schooling.

### Other schooling arrangements

Children may be exempted from the requirement of compulsory attendance at a school if they live too far from a school or have a disability. These children receive tuition through a variety of educational delivery mechanisms, including distance education, Schools of the Air, and use of computer and facsimile technologies.

Children of some Indigenous groups in remote areas of the Northern Territory, who live in small decentralised communities such as outstations or homeland centres, receive schooling from Indigenous teaching assistants supported by visiting teachers from established schools.

Boarding facilities are available at some non-government schools, mainly in the larger towns and cities. A small number of government schools, in particular those catering for groups such as Indigenous people, have residential hostels close by.

Children may receive tuition at home, but must apply to their state or territory Department of Education for permission. They must be enrolled

as a student at a day school and be available when required for assessment against the regular school year curriculum.

Special education is provided by government and non-government authorities in special classes or units in regular schools, by withdrawal from regular classes for periods of intensive assistance by special staff, or in specialist schools. In all states and territories, and particularly in New South Wales, Queensland and Victoria, parents have formed voluntary organisations to establish additional schools catering for their children's special needs. The Commonwealth Government provides funds to states and territories, non-government authorities and community groups to assist in the provision of services and upgrading of special education facilities.

### Schools, students, and teaching staff

There were 9,596 schools operating in Australia in August 2001, 72% of which were government schools. There were 152,138 full-time equivalent (FTE) teaching staff employed in government schools (69% of all teachers), and a further 69,789 employed in non-government schools (table 10.11).

In 2001, 3.3 million students were attending primary and secondary schools on a full-time basis, comprising 2.2 million (69%) in government schools and 1.0 million (31%) in non-government schools. Between 1991 and 2001, the number of students attending government schools increased by 30,993 (1.4%) while the number of students attending non-government schools increased by 162,011 (19%) (table 10.12).

#### 10.11 SCHOOLS, STUDENTS AND TEACHING STAFF — August 2001

	Government schools	Non-government schools			All schools
		Catholic	Other	Total	
	%	%	%	%	'000
Schools	72.3	17.7	10.0	27.7	9.6
Students(a)					
Males	69.2	19.6	11.2	30.8	1 663.5
Females	68.3	20.2	11.5	31.7	1 604.6
Persons	68.8	19.9	11.4	31.2	3 268.1
FTE of teaching staff(b)					
Males	67.2	17.5	15.3	32.8	73.3
Females	69.2	18.8	12.0	30.8	148.6
Persons	68.6	18.4	13.1	31.4	221.9

(a) Full-time students only. (b) Full-time teaching staff plus full-time equivalent (FTE) of part-time teaching staff.

Source: *Schools, Australia, 2001* (4221.0).

10.12 STUDENTS(a)(b)						
Category of school	1991 '000	1997 '000	1998 '000	1999 '000	2000 '000	2001 '000
Government schools						
Males	1 137.1	1 140.9	1 144.8	1 148.4	1 149.8	1 151.9
Females	1 080.1	1 089.2	1 094.6	1 099.2	1 098.5	1 096.3
Persons	2 217.2	2 230.1	2 239.4	2 247.7	2 248.3	2 248.2
Non-government schools						
Males	431.4	473.9	482.4	491.7	501.2	511.6
Females	426.5	467.7	476.9	487.3	497.9	508.3
Persons	857.9	941.6	959.3	979.0	999.1	1 019.9
All schools						
Males	1 568.5	1 614.8	1 627.2	1 640.1	1 651.0	1 663.5
Females	1 506.6	1 556.9	1 571.4	1 586.5	1 596.4	1 604.6
Persons	<b>3 075.1</b>	<b>3 171.6</b>	<b>3 198.7</b>	<b>3 226.6</b>	<b>3 247.4</b>	<b>3 268.1</b>

(a) Full-time students only. (b) At August School Census date each year.

Source: *Schools, Australia* (4221.0).

Table 10.13 shows the percentage of school students in 2001 by level of education. Of all primary school students, 72.4% attended government schools while 27.6% attended non-government schools. At the secondary level,

attendance at government schools was 63.7% and at non-government schools 36.3%. One-fifth of all school students attended Catholic schools (18.9% of primary school students and 21.2% of secondary school students).

### 10.13 STUDENTS(a), By level of education — August 2001

Level/year of education	Government schools %	Non-government schools			All schools		
		Catholic %	Other %	Total %	Males %	Females %	Persons '000
Primary							
Pre-year 1(b)	71.2	20.5	8.2	28.8	51.3	48.7	189.6
Year 1	72.6	19.2	8.2	27.4	51.4	48.6	269.7
Year 2	72.8	19.2	8.0	27.2	51.3	48.7	267.8
Year 3	72.6	19.2	8.2	27.4	51.1	48.9	268.6
Year 4	72.7	18.9	8.4	27.3	51.2	48.8	266.6
Year 5	71.9	19.2	9.0	28.1	51.1	48.9	267.9
Year 6	71.5	19.0	9.5	28.5	51.2	48.8	264.8
Year 7 (Qld, SA, WA, NT)	73.5	15.6	10.9	26.5	51.2	48.8	101.3
Ungraded	83.8	2.7	13.5	16.2	65.0	35.0	16.1
Total	72.4	18.9	8.7	27.6	51.3	48.7	1 912.4
Secondary							
Year 7 (NSW, Vic., Tas., ACT)	62.3	23.5	14.2	37.7	51.1	48.9	160.5
Year 8	63.8	21.3	14.9	36.2	51.0	49.0	258.0
Year 9	64.3	21.0	14.7	35.7	51.1	48.9	254.9
Year 10	64.3	20.8	14.9	35.7	50.7	49.3	251.8
Year 11	63.2	20.7	16.1	36.8	48.9	51.1	223.4
Year 12	61.1	22.1	16.8	38.9	47.4	52.6	188.1
Ungraded	88.8	3.9	7.3	11.2	61.1	38.9	19.0
Total	63.7	21.2	15.1	36.3	50.3	49.7	1 355.7
<b>Total</b>	<b>68.8</b>	<b>19.9</b>	<b>11.4</b>	<b>31.2</b>	<b>50.9</b>	<b>49.1</b>	<b>3 268.1</b>

(a) Full-time students only. (b) Pre-year 1 does not include Qld and WA.

Source: *Schools, Australia, 2001* (4221.0).

Graph 10.14 shows student/teacher ratios at government and non-government schools by level, in 1991 and 2001. These ratios represent the number of full-time students divided by FTE teaching staff. In 1991, non-government schools had a higher student/teacher ratio than government schools. By 2001 the difference between government and non-government schools was minimal (14.8 and 14.6 students per teacher, respectively). The greatest change in the student/teacher ratio was for Catholic primary schools, where the ratio declined from 21.9 students per teacher in 1991 to 18.8 students per teacher in 2001.

### Apparent retention rates

Apparent retention rates are important measures of the performance of education systems and related government policies. The apparent retention rate is an estimate of the percentage of students of a given cohort who continued to a particular level or year of education. For instance, in 2001 the apparent retention rate of full-time secondary school students from Year 7/8 to Year 12 was 73%. As in previous years, the

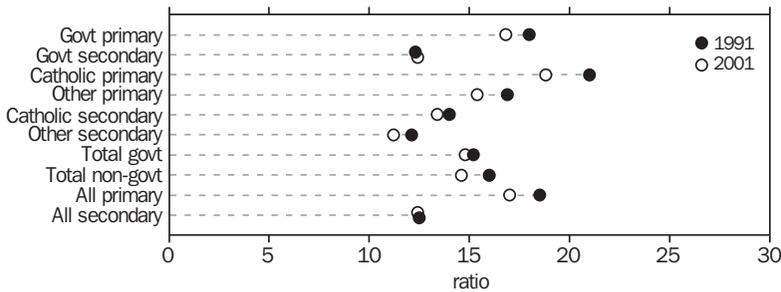
apparent retention rate for female students remains higher than the corresponding rate for male students.

Table 10.15 shows apparent retention rates from Year 10 to Year 12 rather than from the commencement of secondary schooling, where attendance due to age requirements is most likely compulsory. Retention rates have been calculated for full-time students, and for all students (full-time and part-time), who continued to Year 12 from their respective cohort at Year 10.

The apparent retention rate in 2001 of full-time students from Year 10 to Year 12 was 1.8 percentage points higher than the 1996 rate. The increase is 2.1 percentage points over this period when part-time students are included.

Care should be taken in interpreting apparent retention rates since various factors affecting their calculation have not been taken into account. At the national level these include the effects of part-time study, students who repeat a year of education, migration, and changing characteristics of the school population, such as the growing number of full-fee paying overseas students.

**10.14 FULL-TIME STUDENTS TO TEACHING STAFF(a),  
By category of school**



(a) Full-time teaching staff plus full-time equivalent of part-time teaching staff.

Note: This graph should not be used as a measure of class size.

Source: *Schools, Australia* (4221.0).

**10.15 SECONDARY STUDENTS, Apparent retention rates from Year 10 to Year 12**

	Full-time males	Full-time females	Full-time students	All males	All females	All students
	%	%	%	%	%	%
1996	68.6	78.7	73.6	71.7	83.2	77.3
1997	69.3	79.9	74.5	72.4	84.6	78.4
1998	68.9	79.4	74.1	71.8	83.6	77.6
1999	68.9	79.9	74.4	71.9	84.5	78.1
2000	69.0	80.0	74.4	72.1	84.7	78.3
2001	70.8	80.1	75.4	73.9	84.9	79.4

Source: *Schools, Australia* (4221.0).

## Vocational Education and Training (VET)

### Institutions

Most VET in Australia is provided in government-administered colleges. In some states and territories these are referred to as TAFE colleges or institutes. To a lesser extent, VET may also be provided by Institutes of Technology, some higher education institutions, schools and agricultural colleges, adult and community education authorities, private providers of education (such as business colleges) and employers. VET institutions offer a wide range of programs, ranging from recreation and leisure, through basic employment and educational preparation, to trades training, and para-professional and professional levels.

In 2001 there were 87 TAFE and other government institutes with 1,322 provider locations delivering VET training. A further 985 community education providers and 5,645 other providers delivering VET were at least partly publicly funded.

### Staff

Table 10.16 shows the number of teachers working in VET institutions in 2000–01. Of all VET teachers, the majority (57%) were employed full-time. The majority of full-time VET teachers (68%) were male. In contrast, 74% of part-time VET teachers were female.

**10.16 VET TEACHING STAFF — 2000–01(a)**

	Full-time staff '000	Part-time staff '000	All teaching staff '000
Males	11.0	3.2	14.2
Females	5.1	9.1	14.1
<b>Persons</b>	<b>16.1</b>	<b>12.3</b>	<b>28.4</b>

(a) Average over the financial year.

Source: ABS data available on request, Labour Force Survey, May 2001.

### Students and courses

Table 10.17 shows participation in publicly funded VET programs. While there were more males than females in VET courses overall, from age 40 onwards more women than men undertook VET courses.

**10.17 VET(a) CLIENTS(b), Vocational and preparatory courses(c) — 2001**

	Males '000	Females '000	Persons(d) '000
Age group (years)			
Under 16	20.6	17.6	38.2
16	44.8	41.8	86.7
17	56.0	48.6	104.6
18	57.6	45.9	103.7
19	52.1	39.6	92.0
20–24	150.0	116.1	266.6
25–29	98.5	87.0	185.8
30–39	164.4	164.4	329.5
40–49	124.4	151.9	276.3
50–59	70.0	77.7	148.1
60–64	13.3	14.0	27.4
65 and over	13.6	15.4	29.1
Not stated	28.3	35.9	68.4
<b>Total clients</b>	<b>893.5</b>	<b>856.0</b>	<b>1 756.8</b>

(a) Includes all VET delivery by TAFE and other government providers, registered community providers, some VET delivered in schools, and publicly funded delivery by private providers. Fee-for-service VET delivery by private providers has been excluded. (b) A client is any individual participating in a specific enrolment or training contract with a specific organisation. (c) Courses leading to a vocational award. (d) Includes sex not stated.

Source: National Centre for Vocational Education Research, data available on request.

VET programs are classified according to 12 fields of study on the basis of similar emphasis or subject matter orientation. As the new classification for education is being phased in on different timeframes for different education sectors, field of study data for the various sectors may not be comparable for 2001. Table 10.18 shows the number of course enrolments in each field of study in 2001. Since clients may be enrolled in more than one VET course the number of course enrolments is greater than the total number of clients — there were 2.1 million course enrolments in 2001 compared with 1.8 million clients.

Excluding multi-field education, the fields of study of Business, administration and economics; Services, hospitality and transportation; and Engineering and surveying accounted for 53% of the remaining 1,815,000 VET enrolments in 2001.

Males made up a clear majority of enrolments in the fields of study of Architecture and building (91%), Engineering and surveying (88%) and Land and marine resources and animal husbandry (76%). Similarly, females were in the majority in Business, administration and economics (66%), Health, community services (66%) and Arts, humanities and social sciences (61%) (table 10.18).

**10.18 VET(a) COURSE ENROLMENTS, Vocational and preparatory courses(b) — 2001**

Field of study	Males '000	Females '000	Persons(c) '000
Land and marine resources, animal husbandry	90.6	28.8	119.6
Architecture, building	99.2	9.7	109.0
Arts, humanities and social sciences	60.4	94.6	155.5
Business, administration and economics	139.9	279.0	420.7
Education	26.4	37.7	64.2
Engineering and surveying	217.6	30.3	248.1
Health, community services	67.6	130.6	198.7
Law, legal studies	8.5	6.6	15.2
Science	104.5	87.2	192.3
Veterinary science, animal care	1.1	5.2	6.2
Services, hospitality and transportation	145.9	139.3	285.5
VET multi-field education	142.2	161.4	304.2
<b>Total enrolments(a)</b>	<b>1 041.1</b>	<b>1 010.5</b>	<b>2 119.2</b>

(a) Includes all VET delivery by TAFE and other government providers, registered community providers, some VET delivered in schools, and publicly funded delivery by private providers. Fee-for-service VET delivery by private providers has been excluded.

(b) Courses leading to a vocational award. (c) Includes sex not stated.

Source: National Centre for Vocational Education Research, data available on request.

**Apprenticeships and traineeships**

Some 39% of all apprentices and trainees in training at 31 December 2001 were in the broad occupational group Tradespersons and related workers. In this group, Construction and Automotive trades accounted for 23% and 18%, respectively, of the group total (table 10.19).

Some 86% of apprentices and trainees in the broad occupational group Trades and related workers were male. Within this group, however, over 91% of those in Hairdressing were females.

**10.19 APPRENTICES AND TRAINEES(a), In training — 31 December 2001**

Major occupation group	Males '000	Females '000	Persons '000	Total %
Managers and administrators	2.9	3.0	5.9	1.8
Professionals	2.6	2.4	5.0	1.5
Associate professionals	7.5	6.8	14.3	4.3
Tradespersons and related workers				
Mechanical and fabrication engineering	15.4	0.3	15.8	4.8
Automotive	22.2	0.3	22.5	6.8
Electrical and electronic	14.7	0.2	14.9	4.5
Construction	29.3	0.3	29.6	9.0
Food	14.3	4.9	19.2	5.8
Skilled agricultural and horticultural workers	4.6	0.6	5.2	1.6
Hairdressers	0.9	9.3	10.2	3.1
Tradespersons and related workers n.e.c.	0.1	—	0.1	—
Other	8.3	1.1	9.4	2.9
Total	109.7	17.2	126.9	38.5
Advanced clerical and service workers	0.6	2.4	3.0	0.9
Intermediate clerical, sales and service workers	16.4	42.5	58.9	17.9
Intermediate production and transport workers	35.3	4.0	39.3	11.9
Elementary clerical, sales and service workers	20.4	27.2	47.6	14.4
Labourers and related workers	20.9	7.9	28.8	8.7
<b>Total</b>	<b>216.3</b>	<b>113.3</b>	<b>329.6</b>	<b>100.0</b>

(a) Major groups are classified according to the Australian Standard Classification of Occupations (ASCO).

Source: National Centre for Vocational Education Research, data available on request.

## Work-related training

The Survey of Education, Training and Information Technology, which was conducted between April and August 2001, collected information from individuals aged 15–64 years. The survey focused on educational attainment, participation in education and training over the past 12 months, and use of information technology. This article explores the incidence and characteristics of work-related training, using information collected in the survey about work-related training courses which were completed over the 12-month period prior to the survey. Details were collected about a maximum of four training courses for each person. Some comparisons are made with data from the 1997 Survey of Education and Training.

Further explanatory material is available in *Education and Training Experience, Australia* (6278.0).

### Work-related training in context

Work-related training not only enhances individuals' skills, enabling them to remain competitive in the labour market, but also promotes labour market competitiveness in a global context. Workplace training is also a key element of society's increasing focus on a learning path for individuals which extends beyond schooling to other formal and

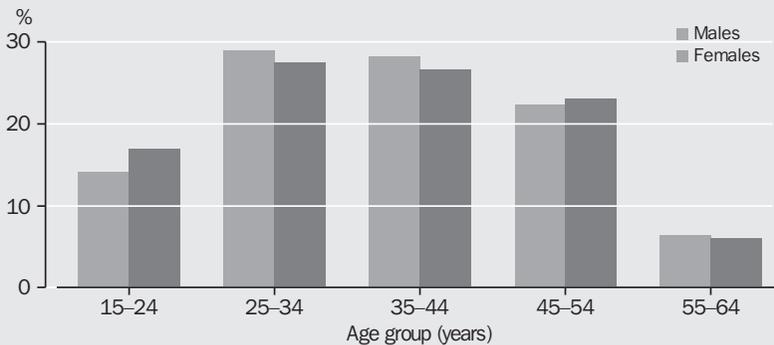
non-formal types of learning, and which continues throughout adult life. In 2001, 37% of the 12.9 million people aged 15–64 years had completed at least one work-related training course in the 12 months prior to the survey. In all, 4.8 million people completed 9.8 million courses.

This article focuses on the 8.3 million training courses which were completed by people who were wage or salary earners at the time of training. (A more detailed explanation of wage or salary earners is available in *Education and Training Experience, Australia* (6278.0).) These training courses, which involved over 143 million hours of training, represented 84% of all training courses completed. For ease of expression, the remainder of the article will refer to training course completions as those training courses completed by people who were wage or salary earners at the time of training.

### Age and sex of training participants

Some 85% of all training course completions were by people aged 25–64 years. Within this broad age range, relatively little training was completed by people aged 55–64 years (6% of training course completions) (graph 10.20). Half (50%) of completions were by females, an increase from 48% in 1997.

10.20 TRAINING COURSE COMPLETIONS(a) — 2001



(a) Individual age groups as a percentage of total course completions.

Source: ABS data available on request, Survey of Education and Training, 2001.

### Occupation of training participants

Some 30% of completed courses were undertaken by the broad occupation group Professionals, 19% by Intermediate clerical, sales and service workers, and 14% by Associate professionals. This pattern is similar to that in 1997, when the corresponding figures were 32%, 19% and 12% respectively. Only 3% of courses were undertaken by Advanced clerical and service workers, and 4% by Labourers and related workers, unchanged from 1997.

Over the period 1997 to 2001, the number of training course completions increased for each of the broad occupation groups, but most notably for those wage or salary earners who were employed as Elementary clerical, sales and service workers (33%) and Associate professionals (27%) (graph 10.21). In comparison, training course completions by Professionals and Advanced clerical and service workers both increased by 7%.

### Industry of trainees

In 2001, 15% of training course completions were by people employed in Health and community services and a further 14% by those employed in Education, little change from 1997 when the corresponding figures were 15% for both these industries. Between 1997 and 2001, training course completions increased most notably for people employed in Cultural and recreational services (54%), Construction (54%)

and Accommodation, cafes and restaurants (48%). However, over the same period, training course completions by those wage and salary earners in Wholesale trade fell by 16%, and there were small declines also in Agriculture, forestry and fishing (5%), Mining (3%) and Manufacturing (2%) (graph 10.22).

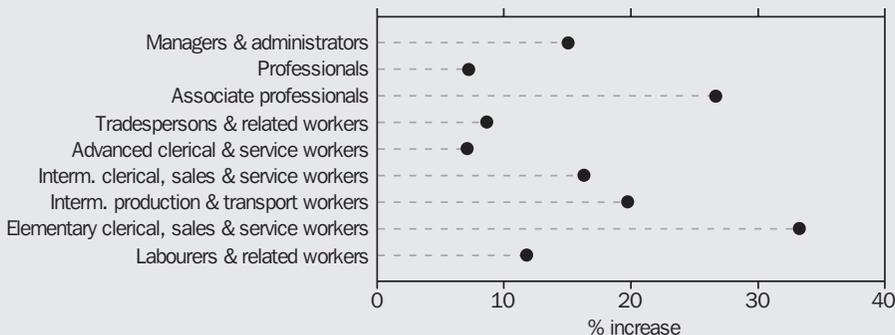
### Field of training

In 2001, 41% of all training course completions were in the Management and professional, and Technical and para-professional fields (compared to 43% in 1997). The incidence of Health and safety training courses increased from 12% (of all training courses completed in 1997) to 17% in 2001 (table 10.23), largely due to a 63% increase in the number of training courses completed in this field between 1997 and 2001.

### Duration of training courses

In 2001, 60% of training courses completed were less than 10 hours in length and 18% were between 10 and 19 hours (table 10.23). Only 9% of training courses were of 40 hours or more duration. Since 1997, there has been a 26% increase in the number of courses of less than 10 hours, while the number of those of duration 10 hours or more has remained constant. As a consequence, the average duration of work-related training courses completed by wage or salary earners fell from 20.6 hours in 1997 to 17.4 hours in 2001.

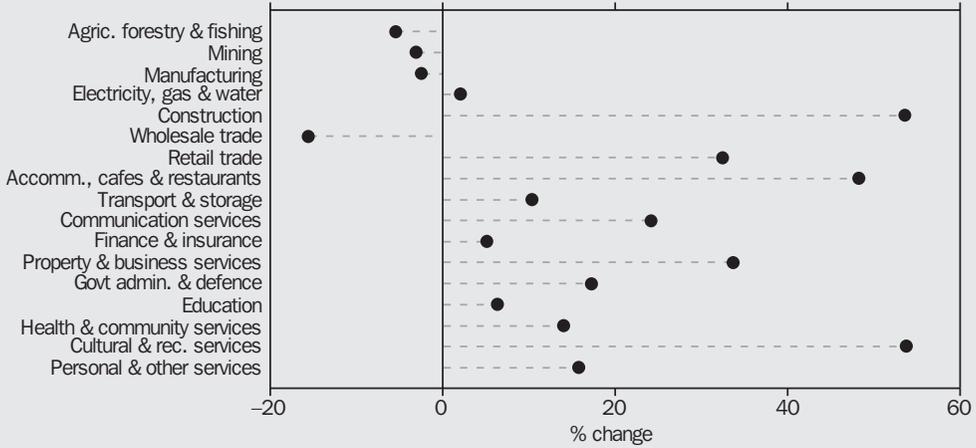
**10.21 TRAINING COURSE COMPLETIONS, By occupation of training participants(a)  
— 1997 to 2001**



(a) With main-period employers and excluding those training courses completed by wage or salary earners whose occupation was not determined.

Source: *Education and Training Experience, Australia* (6278.0).

**10.22 TRAINING COURSE COMPLETIONS, By industry of training participants(a)  
— 1997 to 2001**



(a) With main-period employers and excluding those training courses completed by wage or salary earners whose industry was not determined.

Source: *Education and Training Experience, Australia* (6278.0).

**10.23 TRAINING COURSE COMPLETIONS(a), Field and duration of training course**

	1997		2001	
	'000	%	'000	%
<b>Field of training course</b>				
Management and professional	2 110.4	29.3	2 393.3	29.0
Technical and para-professional	958.2	13.3	1 022.3	12.4
Trade and craft	406.8	5.6	502.3	6.1
Clerical and office	335.6	4.7	323.5	3.9
Sales and personal service	764.9	10.6	711.4	8.6
Transport, plant and machinery operation, and labouring and related fields	270.2	3.8	351.5	4.3
Induction	254.9	3.5	400.4	4.8
Supervision	158.4	2.2	203.2	2.5
Computing skills	611.1	8.5	833.7	10.1
Health and safety	859.7	11.9	1 401.4	17.0
Other(b)	475.6	6.6	118.5	1.4
<b>Time spent on training courses (hours)</b>				
1-9	3 959.6	55.0	4 991.0	60.4
10-19	1 488.4	20.7	1 481.2	17.9
20-29	693.1	9.6	726.3	8.8
30-39	337.4	4.7	337.1	4.1
40 or more	727.3	10.1	726.0	8.8
<b>Total</b>	<b>7 205.8</b>	<b>100.0</b>	<b>8 261.6</b>	<b>100.0</b>

(a) This table relates to the number of training courses completed, not the number of persons. Estimates relate to a maximum of four training courses per person. Therefore, a person may contribute more than once to a given category and/or to more than one category. (b) Includes English language, Literacy, Numeracy, and Music and arts.

Source: *Education and Training Experience, Australia* (6278.0).

**Method of training delivery**

In 2001, 82% of training course completions were delivered mainly by classroom instruction, lecture, seminar, workshop or conferences. The

predominance of this method of training delivery reflects the importance of the formalised nature of training for workers and a training environment that provides for

interactions between the participant and the trainer. By comparison, less people-interactive delivery methods of reading materials, audio or video cassette, and computer disk or CD-ROM each accounted for a further 4% of courses completed.

### Training costs and support

In 2001, 77% of training courses were completed solely in work time and a further 7% were partly completed in work time. Men more frequently completed training courses in work time than did women (82% and 72% respectively) (table 10.24).

Only 7% of training courses completed had some cost to the participant, much the same as in 1997 (8%). However, for those courses which did incur a cost, the average cost of \$272 was slightly higher than in 1997 (\$243). For men, the

average cost of training courses was \$374 while for women it was \$199. The corresponding figures for 1997 were \$317 and \$200.

Some 92% of all training course completions were supported by the employer in some way. That support was most frequently provided as in-house training courses. The proportion of training courses where the employer provided paid study leave more than doubled since 1997 — 13% of all training courses compared to 6% in 1997.

### Training course outcomes

For 89% of training course completions, participants considered that the skills gained would be transferable; that is, they could be used in a similar job with another employer. Also, some 8% of training course completions are believed to have helped the participant obtain a pay rise or promotion.

**10.24 TRAINING COURSE COMPLETIONS(a), Support for training**

	1997		2001	
	'000	%	'000	%
When course conducted				
In work time	5 385.4	74.7	6 378.4	77.2
Own time	1 307.2	18.1	1 302.7	15.8
In both work and own time	513.1	7.1	580.5	7.0
Whether costs incurred				
Yes	588.6	8.2	561.8	6.8
No	6 617.2	91.8	7 699.8	93.2
<b>All training courses</b>	<b>7 205.8</b>	<b>100.0</b>	<b>8 261.6</b>	<b>100.0</b>
Whether received financial support(b)				
Main-period employer provided paid study leave	430.0	6.0	1 032.2	12.5
Main-period employer paid fees	1 142.0	15.8	1 193.0	14.4
Main-period employer provided other financial support(c)	630.7	8.8	730.9	8.9
Other employer provided support	30.3	0.4	40.6	0.5
No employer support	751.9	10.4	641.4	7.8
In-house training course	5 055.7	70.2	6 033.3	73.0

(a) This table relates to the number of training courses completed not the number of persons. Estimates relate to a maximum of four training courses per person. Therefore, a person may contribute more than once to a given category and/or to more than one category. (b) Multiple response category. (c) Includes payment for training materials, accommodation, travel expense.

Source: ABS data available on request, *Survey of Education and Training, 1997 and 2001*.

### References

ABS (Australian Bureau of Statistics) 1998, *Education and Training Experience, 1997*, cat. no. 6278.0, ABS, Canberra.

ABS 2002, *Education and Training Experience, 2001*, cat. no. 6278.0, ABS, Canberra.

## Higher education

### Institutions

There were 42 higher education institutions which received operating grants from the Commonwealth Department of Education, Science and Training in 2001, as well as the Australian Film, Television and Radio School, the National Institute of Dramatic Art and the Australian Defence Force Academy. The private Melbourne College of Divinity reported data for the first time relating to postgraduate courses only. The private Bond University in Queensland also reported data for the first time for higher degree research courses only.

Apart from the Australian National University and the Australian Maritime College, which are established under Commonwealth legislation, Australian universities operate under state or territory legislation. However, they are autonomous bodies responsible for their own governance and make their own decisions on allocation of funding, staffing and academic courses.

### Staff

Table 10.25 shows that in 2001 there were almost equal proportions of male and female staff in higher education. This has changed somewhat over the last decade — in 1991, 54% of all higher education staff were male.

Higher education staff may be classified as academic or non-academic. In 2001, as in previous years, there were more non-academic than academic staff. The largest numbers of academics were at the lecturer and senior lecturer levels.

While there were more male than female academics in 2001, the proportions were closer than they had been a decade earlier. In 2001, 63% of academics were male, compared to 69% in 1991. Men outnumbered women at all academic levels except 'below lecturer'. Between 1991 and 2001, the proportion who were women increased substantially for all academic levels.

### Students and courses

Most higher education institutions provide both full-time and part-time courses and external or distance education courses. In addition, some institutions offer courses which associate full-time study with periods of employment.

Between 1991 and 2001 the total number of higher education students rose by 36%. Most higher education students undertake study on a full-time basis and the prevalence of this has increased slightly over the last decade. In 1991, 62% of all higher education students were enrolled in full-time study, but by 2001 the equivalent proportion was 68%. At the same time external enrolments have increased by 97% to 127,600 (table 10.26).

The basic undergraduate course at most institutions is a bachelor degree of three or four years duration. At some institutions, courses may also be offered at the diploma or advanced diploma level. Most institutions also offer postgraduate level study. One to two years of full-time postgraduate study are required for a master's degree and three to five years for a doctoral degree. Postgraduate diplomas and certificates are offered in some disciplines. In 2001, 75% of higher education students were enrolled in bachelor courses, with a further 21% enrolled in higher degree and other postgraduate courses (table 10.27).

**10.25 HIGHER EDUCATION STAFF**

Classification	1991			2001		
	Males %	Females %	Persons no.	Males %	Females %	Persons no.
Academic staff						
Above senior lecturer	90.2	9.8	5 210	82.8	17.2	7 049
Senior lecturer	82.2	17.8	7 128	69.5	30.5	8 372
Lecturer	61.4	38.6	12 014	54.4	45.6	11 600
Below lecturer	48.9	51.1	5 414	45.9	54.1	6 427
Total	69.2	30.8	29 766	62.5	37.5	33 448
Non-academic staff	42.9	57.1	41 361	38.5	61.5	44 780
<b>Total</b>	<b>53.9</b>	<b>46.1</b>	<b>71 127</b>	<b>48.8</b>	<b>51.2</b>	<b>78 228</b>

Source: Department of Education, Science and Training, 'Staff 2001: Selected Higher Education Statistics'.

**10.26 HIGHER EDUCATION STUDENTS, By type of enrolment**

	1991			2001		
	Males '000	Females '000	Persons '000	Males '000	Females '000	Persons '000
Internal						
Full-time	151.5	172.6	324.0	208.4	249.3	457.8
Part-time	70.4	75.3	145.7	64.7	76.4	141.1
External	27.8	37.0	64.8	53.5	74.1	127.6
<b>Total</b>	<b>249.7</b>	<b>284.8</b>	<b>534.5</b>	<b>326.6</b>	<b>399.8</b>	<b>726.4</b>

Source: Department of Education, Science and Training, 'Staff 2001: Selected Higher Education Statistics'.

**10.27 HIGHER EDUCATION STUDENTS, By level of course(a) — 2001**

Field of study	Postgraduate degree '000	Postgraduate diploma or equivalent '000	Bachelor degree '000	Diploma and advanced diploma '000	Other education '000	Total courses '000
Natural and physical sciences	8.1	1.0	51.5	0.3	0.6	61.5
Information technology	8.2	6.9	43.1	0.2	0.1	58.5
Engineering and related technologies	6.7	1.4	51.5	0.6	0.2	60.4
Architecture and building	1.4	0.8	13.6	0.1	—	15.7
Agriculture, environment and related studies	2.7	0.7	11.3	2.1	0.2	17.0
Health	11.3	6.7	66.8	0.7	0.1	85.6
Education	11.0	9.5	57.4	0.6	0.3	79.0
Management and commerce	34.4	11.7	135.2	2.4	1.0	184.6
Society and culture	20.3	7.3	136.2	4.1	1.7	169.5
Creative arts	3.9	1.6	38.6	0.5	0.6	45.1
Food, hospitality and personal services	—	—	0.1	—	—	0.1
Mixed field programmes	—	—	0.2	—	1.3	1.5
Non-award	—	—	—	—	—	10.2
<b>Total</b>	<b>107.8</b>	<b>47.5</b>	<b>543.1</b>	<b>11.6</b>	<b>6.2</b>	<b>726.4</b>

(a) The data take into account the coding of combined courses to two fields of study. As a consequence, counting both fields of study for combined courses means that the data in the total row may be less than the sum of the data aggregated down each column.

Source: Department of Education, Science and Training, 'Students 2001: Selected Higher Education Statistics'.

Higher education institutions offer a great variety of courses embracing such areas as Agriculture, Architecture, Commerce, Culture, Education, Engineering, Environment, Health, Hospitality, Information technology, Management, and the Natural and physical sciences. Fields of study with the largest numbers of award course students in 2001 were Management and commerce (25%); Society and culture (23%); Health (12%); and Education (11%).

Table 10.28 shows the number of higher education students by age group and sex. Over the last decade (1991–2001) the growth in higher education student numbers (36%) has been strongest among 25–29 year olds (57%) and 20–24 year olds (53%). The overall proportion of female students in higher education increased from 53% in 1991 to 55% in 2001.

The average annual starting salary of male bachelor degree graduates has risen by 36% between 1991 and 2001 to \$41,526. For females the rise was 33% to \$36,268 (table 10.29).

These starting salaries, as a percentage of average annual full-time adult ordinary time earnings, have declined in the years 1991–2001. For males they dropped from 99.4% to 91.4%. For females the respective percentages dropped from 104.6% to 94.6%.

The male postgraduate average annual starting salary rose by 58% between 1991 and 2001 to \$65,406. For females the rise was 48% to \$50,538. Postgraduate starting salaries, as a percentage of average annual full-time adult ordinary time earnings, show rises between 1991 and 2001. For males they increased from 134.6% to 144.0%. For females they increased from 131.0% to 131.9%.

## 10.28 HIGHER EDUCATION STUDENTS(a)

Age group (years)	1991 '000	1997 '000	1998 '000	1999 '000	2000 '000	2001 '000
19 and under						
Males	74.8	76.0	76.6	77.8	78.9	81.2
Females	96.6	102.4	104.8	107.7	110.4	113.4
Persons	171.4	178.4	181.4	185.5	189.3	194.5
20-24						
Males	80.3	101.0	103.0	105.2	107.1	113.0
Females	80.0	112.8	117.3	121.9	126.2	132.7
Persons	160.3	213.8	220.4	227.2	233.3	245.7
25-29						
Males	32.3	42.5	44.0	44.8	45.2	47.6
Females	30.7	44.4	46.7	48.1	49.0	51.2
Persons	63.0	86.9	90.7	92.9	94.1	98.7
30 and over						
Males	62.2	80.7	80.8	81.1	80.2	84.8
Females	77.6	99.1	98.6	99.6	98.6	102.7
Persons	139.8	179.8	179.4	180.7	178.8	187.4
Total						
Males	249.7	300.2	304.4	309.0	311.4	326.6
Females	284.8	358.7	367.5	377.3	384.1	399.8
Persons	534.5	658.8	671.9	686.3	695.5	726.4

(a) Includes students in enabling and non-award courses.

Source: Department of Education, Science and Training, 'Students 2001: Selected Higher Education Student Statistics'.

## 10.29 STARTING SALARIES FOR EMPLOYED HIGHER EDUCATION GRADUATES

	Bachelor graduates(a)		Postgraduates(a)		Average annual full-time adult ordinary time earnings(b)	
	Males	Females	Males	Females	Males	Females
	\$	\$	\$	\$	\$	\$
1991	30 604	27 223	41 435	34 083	30 784	26 025
1996	34 915	31 141	52 958	41 445	37 223	30 892
2001	41 526	36 268	65 406	50 538	45 412	38 327

(a) Self-employed graduates are included in 1991 and 1996 but excluded in 2001. (b) Of employees.

Source: Average Weekly Earnings, Australia (6302.0); Graduate Careers Council of Australia, Graduate Destinations Survey.

## Adult and community education (ACE)

ACE is the most decentralised of the education sectors. ACE refers to the provision of those general adult education programs and activities which fall outside, but complement, the formal programs and qualification pathways provided by the school, VET and higher education sectors.

ACE focuses on the provision of learning opportunities at a community level, rather than work-related training. The community education and VET sectors are the largest providers of adult recreational and leisure courses.

Courses range from general interest, recreational and leisure activities, personal development, social awareness and craft, through to vocational,

remedial and basic education. Community-based adult education is open to all, and its non-formal characteristics demonstrate the capacity of the community to develop alternatives to institutionalised education. In 2001, 36% of students enrolled in ACE courses were enrolled in Arts, humanities and social sciences courses, 21% in Health and community services courses, and 15% in VET multi-field education courses (table 10.30).

Recreation, leisure and personal enrichment enrolments are mainly with community-based providers (74% of students in 2001), the balance being almost entirely with government VET providers. There were 238,900 enrolments in these programs in 2001, 72% of which were by females.

**10.30 COURSE ENROLMENTS IN PERSONAL ENRICHMENT PROGRAMS — 2001**

	Males	Females	All
	'000	'000	enrolments(a) '000
Land and marine resources, animal husbandry	2.5	4.1	6.7
Architecture, building	3.2	5.6	8.8
Arts, humanities and social sciences	18.1	67.9	87.0
Business, administration and economics	4.1	6.9	11.1
Education	0.2	0.1	0.3
Engineering and surveying	2.6	4.2	6.9
Health, community services	9.8	39.7	50.0
Law, legal studies	0.2	0.4	0.6
Science	4.3	5.9	10.2
Veterinary science, animal care	—	0.1	0.2
Services, hospitality and transportation	5.9	15.1	21.1
VET multi-field education	14.1	21.8	36.1
<b>Total</b>	<b>65.0</b>	<b>171.7</b>	<b>238.9</b>

(a) Includes sex not stated.

Source: National Centre for Vocational Education Research, data available on request.

**Indigenous education and training****Indigenous school students**

In 2001 there were 78,943 Indigenous students attending primary schooling and 36,522 Indigenous students attending secondary schooling.

Most Indigenous students (88%) attended government schools in 2001. Of the remainder attending non-government schools, most were attending Catholic schools (68%) (table 10.31). The increase in ungraded students between primary and secondary education is mostly attributable to the classification of secondary-age students in Northern Territory remote Homeland Learning Centres as ungraded. This is due to the difficulty of classifying such students in terms of the normal secondary grade structure.

**10.31 FULL-TIME INDIGENOUS SCHOOL STUDENTS — August 2001**

Level/year of education	Government schools	Non-government schools			All schools
		Catholic	Other	Total	
<b>Primary</b>					
Pre-year 1(a)	6 056	474	126	600	6 656
Year 1	10 210	881	269	1 150	11 360
Year 2	9 943	833	260	1 093	11 036
Year 3	9 872	866	304	1 170	11 042
Year 4	9 792	819	260	1 079	10 871
Year 5	9 354	781	274	1 055	10 409
Year 6	9 195	781	290	1 071	10 266
Year 7 (Qld, SA, WA, NT)	5 241	441	205	646	5 887
Ungraded	1 039	160	217	377	1 416
<b>Total</b>	<b>70 702</b>	<b>6 036</b>	<b>2 205</b>	<b>8 241</b>	<b>78 943</b>
<b>Secondary</b>					
Year 7 (NSW, Vic., Tas., ACT)	3 306	243	79	322	3 628
Year 8	7 361	777	551	1 328	8 689
Year 9	6 584	762	468	1 230	7 814
Year 10	5 522	710	449	1 159	6 681
Year 11	3 579	478	282	760	4 339
Year 12	2 076	352	192	544	2 620
Ungraded	2 121	238	392	630	2 751
<b>Total</b>	<b>30 549</b>	<b>3 560</b>	<b>2 413</b>	<b>5 973</b>	<b>36 522</b>
<b>Total</b>	<b>101 251</b>	<b>9 596</b>	<b>4 618</b>	<b>14 214</b>	<b>115 465</b>

(a) Pre-year 1 does not include Qld and WA.

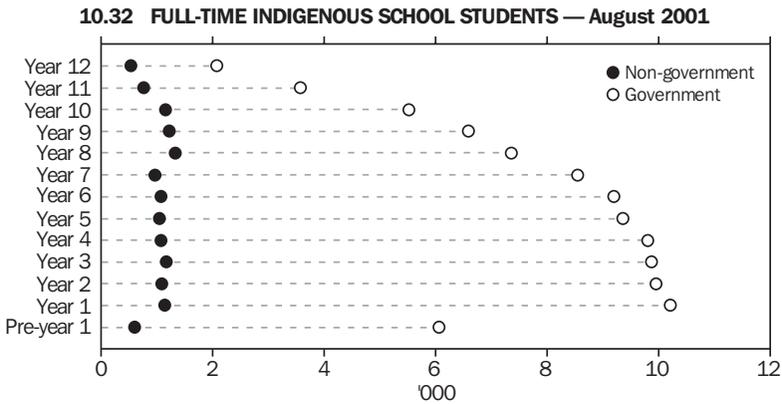
Source: Schools, Australia, 2001 (4221.0).

Graph 10.32 shows a decline in government school attendance from Year 1 onwards in 2001. The number of Indigenous students attending non-government schools remained relatively stable across the early grades, followed by a slight increase in Year 8 students, then a decline until Year 12.

Table 10.33 shows an increase in the number of Indigenous students between 1991 and 2001 from 72,249 to 115,465. Over this period, the

number of Indigenous students attending each level of education increased in every state and territory. New South Wales and Queensland experienced the largest increases in Indigenous school attendance, by 15,597 and 11,625 respectively.

In 1991 and 2001 there were more Indigenous males in primary schooling than females. In secondary schooling, there were more Indigenous males in 1991 and more Indigenous females in 2001.



Source: Schools, Australia, 2001 (4221.0).

**10.33 FULL-TIME INDIGENOUS SCHOOL STUDENTS(a), By level of education**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT(b)	Aust.
<b>PRIMARY</b>									
Males									
1991	6 080	897	7 102	1 542	4 426	621	4 341	152	25 161
2001	11 366	2 060	11 355	2 528	6 327	1 441	5 004	317	40 398
Females									
1991	5 670	871	6 585	1 488	4 335	611	4 261	132	23 953
2001	10 842	2 041	10 850	2 474	5 884	1 365	4 776	313	38 545
Students									
1991	11 750	1 768	13 687	3 030	8 761	1 232	8 602	284	49 114
2001	22 208	4 101	22 205	5 002	12 211	2 806	9 780	630	78 943
<b>SECONDARY</b>									
Males									
1991	3 339	613	3 413	582	1 864	412	1 298	81	11 602
2001	5 802	1 033	4 933	869	2 597	946	1 726	173	18 079
Females									
1991	3 224	593	3 422	651	1 884	416	1 272	71	11 533
2001	5 900	1 093	5 009	975	2 704	902	1 678	182	18 443
Students									
1991	6 563	1 206	6 835	1 233	3 748	828	2 570	152	23 135
2001	11 702	2 126	9 942	1 844	5 301	1 848	3 404	355	36 522
<b>TOTAL</b>									
Males									
1991	9 418	1 510	10 515	2 124	6 290	1 033	5 639	233	36 763
2001	17 168	3 093	16 288	3 397	8 924	2 387	6 730	490	58 477
Females									
1991	8 894	1 464	10 007	2 139	6 219	1 027	5 533	203	35 486
2001	16 742	3 134	15 859	3 449	8 588	2 267	6 454	495	56 988
Students									
1991	18 313	2 974	20 522	4 263	12 509	2 060	11 172	436	72 249
2001	33 910	6 227	32 147	6 846	17 512	4 654	13 184	985	115 465

(a) At August Schools Census date each year. (b) Includes one government primary school in Jervis Bay Territory with 38 students (14 males, 24 females).

Source: *Schools, Australia (4221.0)*.

## Indigenous VET students

In 2001, 53% of Indigenous VET clients were male. In all geographic regions, the number of male Indigenous clients outnumbered their female counterparts (table 10.34). Indigenous VET clients were not as strongly affiliated with urban locations when compared to all VET clients. Some 27% of Indigenous clients were located in capital cities compared with 55% of all clients, and a further 27% of Indigenous clients were located in remote areas compared with 4% of all clients.

Since clients may be enrolled in more than one VET course, the number of course enrolments is greater than the total number of clients. There were 78,100 Indigenous course enrolments in 2001 compared with 58,000 Indigenous clients.

There was an overall increase of 107% in Indigenous VET enrolments between 1995 and 2001 (table 10.35). While the largest increase in enrolments was in the field of Arts, humanities and social sciences (6,000 enrolments), the most rapid rate of growth over that period was in Law and legal studies where enrolments increased by more than 400%.

In 2001 there were more Indigenous enrolments (26%) in multi-field VET courses (including school courses offered in VET institutions) than in other courses. Arts, humanities and social sciences was the second most popular field of study, accounting for 12% of Indigenous enrolments.

**10.34 INDIGENOUS VET(a) CLIENTS(b), Vocational and preparatory courses(c) — 2001**

	Units	Geographic region of client address					Total
		Capital city	Other metropolitan	Rural	Remote	Other	
Indigenous clients							
Males	'000	8.3	1.7	11.7	8.5	0.5	30.7
Females	'000	7.1	1.7	10.5	7.4	0.5	27.2
Persons	'000	15.4	3.4	22.2	15.9	1.1	58.0
All Indigenous clients	%	26.6	5.9	38.2	27.4	1.9	100.0
All clients	%	55.2	7.3	31.2	3.9	2.4	100.0

(a) Includes all VET delivery by TAFE and other government providers, registered community providers, some VET delivered in schools, and publicly funded delivery by private providers. Fee-for-service VET delivery by private providers has been excluded.

(b) A client is any individual participating in a specific enrolment or training contract with a specific organisation. (c) Courses leading to a vocational award.

Source: National Centre for Vocational Education Research, data available on request.

**10.35 INDIGENOUS VET(a) COURSE ENROLMENTS, Vocational and preparatory courses(b)**

Field of study	1995	2001
	'000	'000
Land and marine resources, animal husbandry	2.5	6.7
Architecture, building	1.5	3.7
Arts, humanities and social sciences	3.4	9.4
Business, administration and economics	4.8	9.1
Education	2.2	4.5
Engineering and surveying	2.6	6.0
Health, community services	2.4	8.4
Law, legal studies	0.1	0.5
Science	0.9	3.1
Veterinary science, animal care	—	0.1
Services, hospitality and transportation	2.6	6.6
VET multi-field education	14.8	20.0
<b>Total</b>	<b>37.8</b>	<b>78.1</b>

(a) Includes all VET delivery by TAFE and other government providers, registered community providers, some VET delivered in schools, and publicly funded delivery by private providers. Enrolments in fee-for-service VET courses of private providers have been excluded. (b) Courses leading to a vocational award.

Source: National Centre for Vocational Education Research, data available on request.

**Indigenous higher education students**

In 2001, 7,342 Indigenous students were attending higher education. Females comprised 65% of Indigenous higher education students, compared to 55% of the total higher education student population.

Table 10.36 shows the distribution of Indigenous higher education students across states and territories in 2001. New South Wales, Queensland and Western Australia had the largest number of Indigenous students, with the Australian Capital Territory and Tasmania having the smallest number.

The proportion of Indigenous students who were females was the highest in Northern Territory, Western Australia and South Australia (70%, 67% and 65% respectively). The Australian Capital Territory had the least differential between the number of male and female Indigenous students attending higher education institutions (53% were females).

**10.36 INDIGENOUS HIGHER EDUCATION STUDENTS — 2001**

	Commencing Indigenous students			All Indigenous students		
	Males	Females	Persons	Males	Females	Persons
New South Wales	282	532	814	727	1 237	1 964
Victoria	142	233	375	293	477	770
Queensland	210	391	601	527	876	1 403
South Australia	88	107	195	159	294	453
Western Australia	238	514	752	442	899	1 341
Tasmania	61	54	115	103	131	234
Northern Territory	181	382	563	236	557	793
Australian Capital Territory	25	32	57	64	71	135
Multi-state(a)	20	74	94	53	196	249
<b>Total</b>	<b>1 247</b>	<b>2 319</b>	<b>3 566</b>	<b>2 604</b>	<b>4 738</b>	<b>7 342</b>

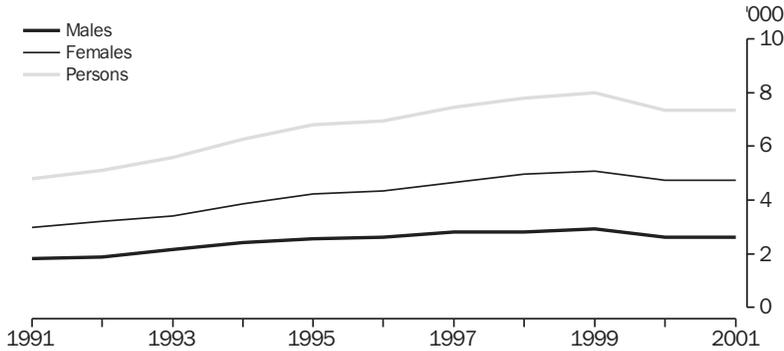
(a) Multi-state institutions have campuses in more than one state and/or territory.

Source: Department of Education, Science and Training, 'Students 2001: Selected Higher Education Statistics'.

Graph 10.37 illustrates the increase in Indigenous participation in higher education over the past decade. Between 1991 and 2001 the number of Indigenous students increased by 53% from 4,807 to 7,342. The greatest annual increase of Indigenous students was between 1993 and 1994 when the number of students increased by 686 or 12%.

Table 10.38 shows that in 2001 the fields of study with the largest numbers of Indigenous student enrolments were Society and culture (35%), Education (20%) and Health (14%).

10.37 ALL INDIGENOUS HIGHER EDUCATION STUDENTS



Source: Department of Education, Science and Training, 'Students 2001: Selected Higher Education Statistics'.

10.38 INDIGENOUS HIGHER EDUCATION STUDENTS, By broad field of study and level of course — 2001

Field of study	Postgraduate degree	Postgraduate diploma/graduate certificate	Bachelor degree	Associate degree/diploma and advanced diploma	Other award courses	Enabling courses	Total
Natural and physical sciences	18	9	196	1	26	—	250
Information technology	6	3	127	2	—	—	138
Engineering and related technologies	5	1	92	2	—	—	100
Architecture and building	5	2	44	—	—	—	51
Agriculture, environment and related studies	10	14	89	27	2	43	185
Health	52	74	663	213	2	3	1 007
Education	81	84	959	317	7	10	1 458
Management and commerce	65	41	483	64	7	—	660
Society and culture	169	39	1 759	436	18	178	2 599
Creative arts	27	11	340	72	—	44	494
Food, hospitality and personal services	—	—	—	—	—	—	—
Mixed field programmes	—	—	3	2	6	636	647
Non-award	—	—	—	—	—	—	14
<b>Total(a)</b>	<b>438</b>	<b>278</b>	<b>4 494</b>	<b>1 136</b>	<b>68</b>	<b>914</b>	<b>7 342</b>

(a) The data take into account the coding of combined courses to two fields of study. As a consequence, counting both fields of study for combined courses means that the data in the total row may be less than the sum of the data aggregated down each column.

Source: Department of Education, Science and Training, 'Students 2001: Selected Higher Education Statistics'.

## Full-fee paying overseas students

This article draws on two different sources of data about overseas students.

Data on overseas *visitor arrivals* are taken from the ABS Overseas Arrivals and Departures Collection. Overseas visitors are people arriving in Australia from other countries for temporary visits which are either long-term (12 months or greater) or short-term (less than 12 months).

Data on *overseas students* are sourced from the Australian Education International Overseas Student Statistics Collection. For Commonwealth higher education institutions, data are collected from higher education institutions. For other providers of higher education and for other educational sectors, data are gathered from a register of courses and institutions for overseas students and matched with data on student visa holders.

### Overseas students and educational sectors

For providers of higher education, overseas students are defined as students who are neither Australian nor New Zealand citizens and who are enrolled in a higher education course at some point over the year.

For sectors other than higher education, overseas students are defined as foreign visitors in Australia who have student visas and who attend an educational course on a full-fee paying basis (although they may not be paying these fees themselves) at any point over the year.

Citizens of New Zealand are excluded because they do not require student visas. Students on institutional exchange programs are also excluded because they neither pay fees nor have their fees subsidised. In this article, students studying offshore (that is, at campuses of Australian education institutions outside Australia or by distance education outside Australia) are excluded, unless otherwise stated.

Students are allocated to educational sectors based on the courses they study. Where an institution offers different types of courses, students are allocated to sectors based on the type of course predominantly undertaken at that institution.

School education refers to study at the primary or secondary level. Vocational education refers to study at the certificate and diploma level. Higher education refers to study at the bachelor degree or associate degree level or above.

English Language Intensive Courses for Overseas Students (ELICOS) refers to a range of different courses in the English language taught at higher education institutions, vocational education institutions, schools or private colleges.

### Factors in the growth of education exports

Over the past two decades, increasing numbers of overseas students have come to Australia. In 2000, overseas students generated \$3.7b in export earnings for the Australian economy. Exporting education has played a major role in forging links with other countries, especially in Asia, from which the majority of overseas students originate.

Moreover, by accepting increasing numbers of overseas students, Australia has become more widely recognised in the arena of international education, and is regarded as a safe, friendly study destination with high-quality courses.

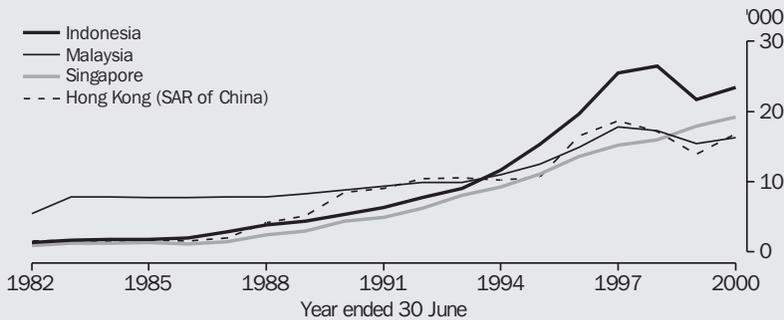
As well as the economic benefits, there are cultural and political advantages to welcoming overseas students. Agreements about educational exchange are an important element of Australia's foreign relations policies with countries such as China, India and Indonesia.

A diverse student population helps to foster cultural exchange and understanding among students. Some overseas students also add to our cultural diversity and skilled labour supply by becoming permanent residents after finishing their studies. This article examines some of the characteristics of overseas students and their role in Australian society.

### Trends in overseas student arrivals

In 1999–2000, 64,000 long-term visitor arrivals and 163,100 short-term visitor arrivals stated that education was their main purpose for travelling to Australia. This represents 48% of all long-term visitor arrivals and 4% of all short-term visitor arrivals.

**10.39 SELECTED COUNTRIES OF RESIDENCE OF VISITOR ARRIVALS(a) FOR EDUCATION**



(a) Both long-term and short-term.

Source: ABS data available on request, Overseas Arrivals and Departures Collection.

Long-term visitor arrivals for education have increased by more than eight times since 1981–82 (from 7,600), while short-term visitor arrivals for education have increased tenfold over the same period (from 16,300) (graph 10.39). Over the last two decades, there have been some changes to the ranking of the countries of residence of visitor arrivals for education.

While Malaysia, the United States of America, Hong Kong and Indonesia have frequently been present in the top five, Singapore and China have become more prominent in the 1990s (table 10.40).

Papua New Guinea and New Zealand declined in relative importance as source countries through the 1980s and 1990s, although the numbers of arrivals from these countries continued to increase. Since the early 1980s, the quality of Australian education has become better known and promoted more widely internationally.

As the economies of Asian countries grew, so did their need for a skilled, educated workforce. Australia absorbed many students who might otherwise have studied in the United States of America or the United Kingdom, because Asian students perceived it as being closer and cheaper.

Between 1997–98 and 1998–99, there was a decline in the number of arrivals for education from Indonesia, Hong Kong and Malaysia. This was associated with the Asian currency crisis in 1997–98, resulting in fewer people travelling to study because of the increased cost.

**10.40 MAJOR COUNTRIES OF RESIDENCE OF VISITOR ARRIVALS(a) FOR EDUCATION**

	Year ended 30 June			
	1982	1988	1994	2000
	'000	'000	'000	'000
Indonesia	1.3	3.8	11.6	23.4
Singapore	0.9	2.4	9.2	19.2
United States of America	1.4	3.4	6.9	18.0
Hong Kong (SAR of China)	1.6	4.2	10.2	16.9
Malaysia	5.5	7.9	11.0	16.2
China (excludes SARs and Taiwan)	0.2	6.4	2.5	14.0
New Zealand	2.4	3.8	4.5	6.2
Papua New Guinea	3.2	3.5	4.8	4.2
<b>Total(b)</b>	<b>23.9</b>	<b>54.9</b>	<b>110.5</b>	<b>227.1</b>

(a) Both long-term and short-term. (b) Also includes other countries not listed, and therefore components do not add to total.

Source: ABS data available on request, Overseas Arrivals and Departures Collection.

Countries less affected by the currency crisis (such as China and Singapore) did not experience the same declines in visitor arrivals, and arrivals from the United States of America rose markedly due to a large increase in short-term visitor arrivals.

Between 1998–99 and 1999–2000, visitor arrivals from Indonesia, Hong Kong (SAR of China) and Malaysia increased, and in 1999–2000 visitor arrivals for education from all countries were larger than ever before.

## Characteristics of overseas students

In 2000, there were 153,400 overseas students in Australia, according to Australian Education International. This figure differs from the estimate of overseas visitor arrivals for education because it counts the number of students in Australia during the year, rather than the number of arrivals into Australia. It also only counts those students with student visas or students in higher education who are not Australian or New Zealand citizens, while estimates of overseas visitor arrivals count every person who states that education is their main purpose for travelling.

Almost half of the 153,400 overseas students in Australia during 2000 were studying in the higher education sector (72,700 or 47%).

Higher education experienced the greatest growth in overseas student numbers, doubling between 1994 and 2000 (graph 10.41). The number of students in vocational education also increased over this period (from 19,500 to 30,800), while those in school education remained much the same (around 13,000).

ELICOS numbers generally increased between 1994 and 2000, although numbers have varied within this period, peaking in 1996, falling

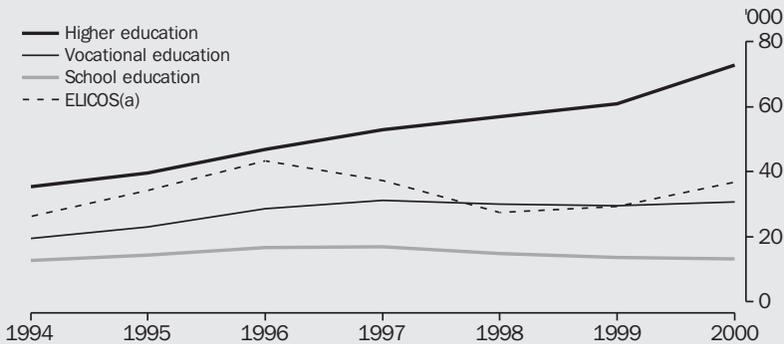
substantially in 1997 and 1998, then recovering somewhat in 1999 and 2000. These courses may have been more affected by the Asian currency crisis than others, because some students undertake them as part of work-related training. In addition, overseas visitors may combine plans to study short English courses with plans to holiday in Australia.

Reflecting the fact that most overseas students are studying in higher education, in 2000 they were most commonly aged 20–24 years (43%) (graph 10.42). There were also similar numbers of men and women from overseas countries studying in Australia. This contrasts with the situation in 1983, when most (67%) overseas students in higher education were men.

## Overseas students in schools

In 2000, close to 1,400 overseas students were attending primary school while 11,400 were attending secondary school. They comprised 8.3% of all overseas students. While the number of overseas students in schools has remained much the same since 1994 (from 12,600 to 12,800), in 2000 they represented a smaller proportion of overseas students. This is due to the steady increase of overseas students in higher education.

10.41 OVERSEAS STUDENTS, By educational sector



(a) English Language Intensive Courses for Overseas Students.

Source: Australian Education International, 'Overseas Student Statistics 2000'.

Table 10.43 shows the proportions of overseas students in schools by state/territory. The proportions studying in Victorian and Western Australian primary schools increased significantly between 1994 and 2000, while the proportion studying in Queensland schools showed a large fall. For secondary school students the state to gain most was Victoria, while the proportions studying in New South Wales and Western Australia fell.

### Overseas students in higher and vocational education

As noted earlier, in 2000 some 72,700 or 47% of overseas students were studying in the higher education sector. The majority (64%) of these were studying towards bachelor degrees.

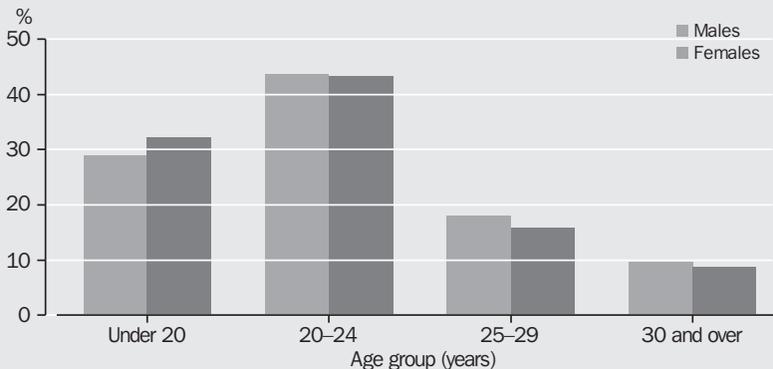
The increase in overseas student numbers in vocational education (from 19,500 in 1994 to 30,800 in 2000) could be attributed to the fact

that the VET sector expanded during the 1990s. Overseas students may have been attracted to its increasingly varied curriculum.

In 2000, the most common field of study for overseas students in both higher education and vocational education was Business, administration and economics (44% of higher education students and 58% of vocational education students) (graph 10.44).

These field of study choices for overseas students differed in some respects from those of Australian students. In 2000, Business, administration and economics was the most common field of study for Australian VET students. For Australian higher education students, Arts, humanities and social sciences was the most common field, with Business, administration and economics a close second.

10.42 OVERSEAS STUDENTS — 2000



Source: Australian Education International, 'Overseas Students Statistics 2000'.

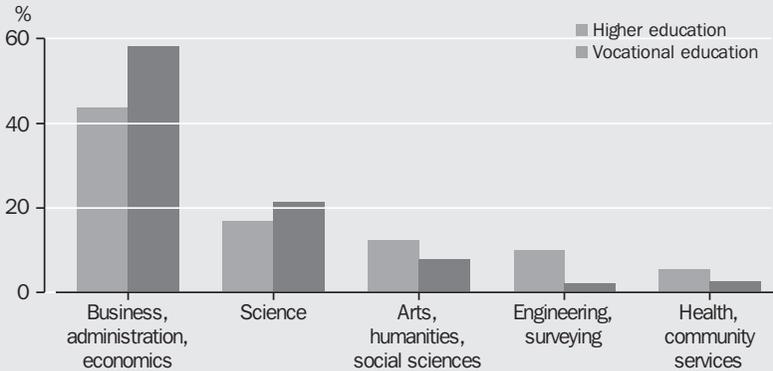
10.43 OVERSEAS STUDENTS IN SCHOOLS(a)

	Primary		Secondary	
	1994	2000	1994	2000
	%	%	%	%
New South Wales	21.7	19.3	32.2	20.2
Victoria	14.7	20.3	25.6	39.2
Queensland	44.4	30.1	17.6	17.2
South Australia	4.5	4.8	4.7	4.8
Western Australia	11.0	22.7	16.3	11.2
Tasmania	1.0	0.9	0.9	2.4
Northern Territory	1.2	0.7	0.4	1.4
Australian Capital Territory	1.5	1.2	2.3	3.7
Australia	100.0	100.0	100.0	100.0

(a) As these data refer only to those students who hold a student visa, they exclude overseas visitors' dependants attending school.

Source: Australian Education International, 1994 and 2000 Overseas Student Statistics Collection.

10.44 OVERSEAS STUDENTS ACROSS SELECTED FIELDS OF STUDY — 2000



Source: Australian Education International, 'Overseas Students Statistics 2000'.

### Overseas students in intensive English language courses

In addition to overseas students who come to Australia to study towards degrees, certificates and other long-term courses, some students come for shorter periods to undertake courses in the English language. Around 36,800 or 24% of overseas students were undertaking ELICOS in 2000. These courses can be undertaken at a variety of institutions.

While those undertaken at higher education and vocational education institutions may be part of a degree or diploma, those undertaken at private institutions can be as short as six weeks. In 2000, almost half (48%) of overseas students undertaking ELICOS were studying in private colleges, while 27% were studying at vocational education institutions and 22% at higher education institutions.

However, unlike students undertaking other courses, ELICOS students do not require a student visa, and these figures do not include overseas visitors who undertake English language courses while in Australia on a tourist or a working holiday visa. In 2000, it was estimated that 43% of overseas visitors studying ELICOS had other types of visas.

### Exporting education

Overseas students continue to be a major source of revenue for Australian educational institutions, with their expenditure on fees increasing from \$883m to \$1.8b between 1994 and 2000.

Overseas students also contribute to the Australian economy more generally. For example, in 2000 they spent \$1.9b on goods and services while in Australia (table 10.45). In recent years, the Australian education industry has built upon the success of exporting education by establishing campuses in countries other than Australia. In addition, it is possible for students to study Australian courses in other countries via distance education.

In 2000, around 34,900 or 19% of all overseas students enrolled in Australian institutions were studying offshore, most commonly in Malaysia, Singapore and Hong Kong (SAR of China). This number has increased fourfold since 1994.

10.45 EXPENDITURE BY OVERSEAS STUDENTS — 2000

Sector	Type of expenditure		Total \$m
	Fees \$m	Goods and services \$m	
Higher education	978	1 009	1 987
Vocational education	337	376	713
School education	130	148	278
ELICOS(a)	395	323	718
<b>Total</b>	<b>1 840</b>	<b>1 856</b>	<b>3 696</b>

(a) English Language Intensive Courses for Overseas Students.

Source: Australian Education International, 'Overseas Student Statistics 2000'.

## Participation in education and training

In May 2001, 2.6 million people aged 15–64 years had applied to enrol in a course of study (table 10.46). Of all applicants, 91% gained a place and were studying.

**10.46 PARTICIPATION IN EDUCATION, Persons aged 15–64 — May 2001**

	Males '000	Females '000	Persons '000
<b>Applied to enrol</b>	<b>1 230.5</b>	<b>1 322.4</b>	<b>2 552.9</b>
Studying	1 123.7	1 187.4	2 311.1
Gained placement but deferred study	71.5	91.1	162.6
Unable to gain placement	35.4	43.8	79.2

Source: ABS data available on request, Survey of Education and Work, 2001.

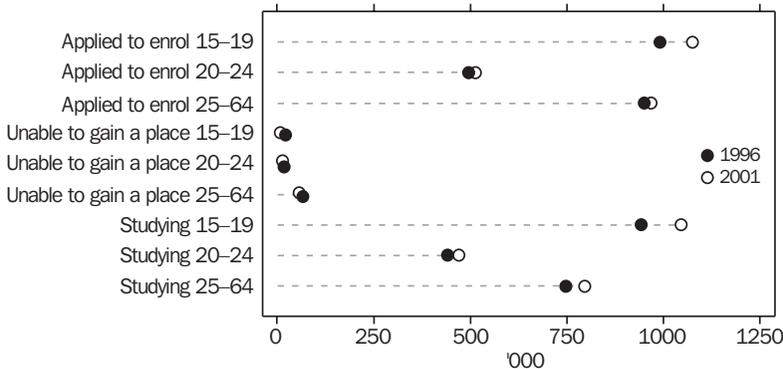
Between 1996 and 2001, the demand for education increased, as did the number of people being accepted into educational institutions. Although there was a rise in the number of

enrolment applications across all age groups, there was a slight decrease in the number of people unable to gain placement in courses (graph 10.47).

While participation in education may occur at any age, many young people continue in full-time education immediately after completing compulsory schooling, either in post-compulsory schooling or within other forms of education such as VET. Some young people also return to full-time study after a period of absence some time after completing compulsory schooling. In all, 77% of 15–19 year olds at May 2001 were in full-time education (including 51% still at school). At age 20–24 years, 23% were undertaking full-time study (including less than 1% still at school) and 12% were participating in part-time tertiary study (table 10.48).

Many people aged 25 years and over return to study, to upgrade their skills or to gain new skills, and often in conjunction with employment. The education participation rate at May 2001 for people in this age group was higher for those in part-time study (6%) than for those in full-time study (2%).

**10.47 PARTICIPATION IN EDUCATION, By age group**



Source: ABS data available on request, Survey of Education and Work, 1996 and 2001.

**10.48 EDUCATION PARTICIPATION RATES,  
Persons aged 15–64 — May 2001**

	Age group (years)		
	15–19	20–24	25–64
	%	%	%
Attending school	51.4	*0.3	*0.1
Attending tertiary(a)			
Full-time	18.5	22.5	1.8
Part-time	7.5	12.0	6.1
Total	26.0	34.5	7.9
Total attending	77.4	34.8	7.9
Not attending	22.6	65.2	92.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

(a) Education institutions offering post-school courses.

Source: ABS data available on request, Survey of Education and Work, 2001.

**Educational attendance and the labour force**

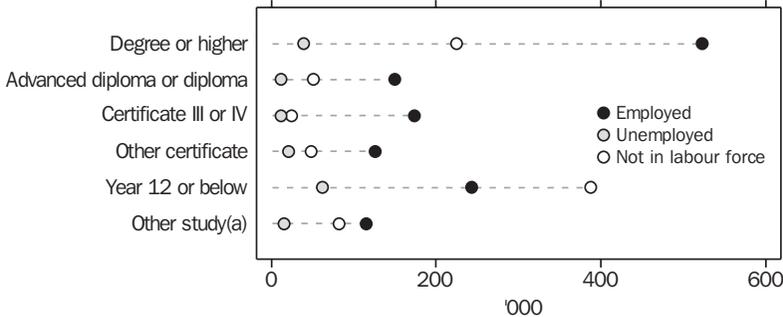
Graph 10.49 indicates the labour force status of all students aged 15–64 years at May 2001. Some 56% of student studying Year 12 or below were not in the labour force, while 35% were

employed. In contrast, 25% of other students were not in the labour force and 68% were employed.

Most people aged 15–19 years attending an educational institution to study at May 2001 were either not in the labour force at all (48%) or were employed part-time (36%). Some 37% of students aged 20–24 years were employed part-time, and another 29% were not in the labour force (table 10.50). Full-time employment was much higher among students aged 20–24 than among those aged 15–19 (27% compared to 8%). In both age groups, students who undertook part-time study were more frequently employed full-time than part-time.

The ‘full-time participation rate’ describes the proportion of the population, at specific ages, in full-time education or training, or in full-time work, or in both part-time education or training and part-time work. The full-time participation rate identifies the proportion of the population which has a low risk of marginal participation or non-participation in the labour market, and consequently determines the proportion that is at risk. At May 2001, the full-time participation rate for people aged 15–19 years was 86% and 77% for 20–24 year olds.

**10.49 PERSONS AGED 15–64 IN EDUCATION, By level of study — May 2001**



(a) Comprises persons in bridging courses, studying for statements of attainment, other study not leading to a qualification or unable to be determined.

Source: Education and Work, Australia, May 2001 (6227.0).

**10.50 PERSONS AGED 15–24, Whether enrolled in a course of study leading to a qualification and labour force status — May 2001**

			Enrolled		Total '000
	Full-time	Part-time	Total	Other(a)	
	'000	'000	'000	'000	
<b>15–19 YEARS</b>					
In the labour force					
Employed					
Full-time	6.6	76.5	83.2	136.0	219.2
Part-time	362.2	13.0	375.2	71.3	446.5
Total	368.8	89.5	458.3	207.3	665.6
Unemployed	80.6	6.1	86.6	58.0	144.6
Not in the labour force	490.9	*3.2	494.1	46.3	540.4
<b>Total</b>	<b>940.3</b>	<b>98.7</b>	<b>1 039.0</b>	<b>311.7</b>	<b>1 350.7</b>
<b>20–24 YEARS</b>					
In the labour force					
Employed					
Full-time	11.6	110.4	122.0	587.6	709.6
Part-time	144.7	27.2	171.9	113.4	285.3
Total	156.3	137.5	293.8	701.0	994.9
Unemployed	23.1	7.5	30.6	94.8	125.4
Not in the labour force	125.7	8.5	134.2	98.6	232.8
<b>Total</b>	<b>305.1</b>	<b>153.5</b>	<b>458.6</b>	<b>894.5</b>	<b>1 353.1</b>

(a) Includes those not enrolled and those enrolled in study not leading to a qualification.

Source: *Education and Work, Australia, May 2001* (6227.0).

## Educational attainment

Formal educational qualifications are the desired outcome of most study at educational institutions. When issued by an accredited authority they denote a particular level of knowledge, skills and perhaps competencies. This assists the graduates themselves when entering the labour market, employers in selecting appropriate personnel, and clients in assessing the quality of professional services. The classification of educational attainment to level assists in measuring the stocks of available skills in a community, enabling policy makers to monitor the volume of skill levels compared to skill shortages, and to influence the direction of future educational focus.

In May 2001, of the 12.8 million persons aged 15–64, 6.0 million people (47%) had at least one non-school qualification. These comprised 2.2 million whose level of highest non-school qualification was a bachelor degree or higher, 854,600 whose highest was an advanced diploma or diploma, 1.8 million whose highest was a

certificate III or IV, 873,600 whose highest was a certificate I or II and 192,100 whose highest was a certificate not further defined (table 10.51).

Graph 10.52 shows the proportion of males and females aged 15–64 and their level of highest non-school qualification at May 1991, 1996 and 2001. During this period the proportion of persons with a bachelor degree or higher has increased by 5.7 percentage points for males and by 9.7 percentage points for females. In 1991 there was a greater percentage of males (11%) with a bachelor degree or higher than females (7.3%), but by 2001 this pattern had been reversed, with 17% of females having a bachelor degree or higher compared to 16% of males.

By combining information about individuals' highest year of school completed and their level of highest non-school qualification it is possible to look at the population's overall level of highest educational attainment.

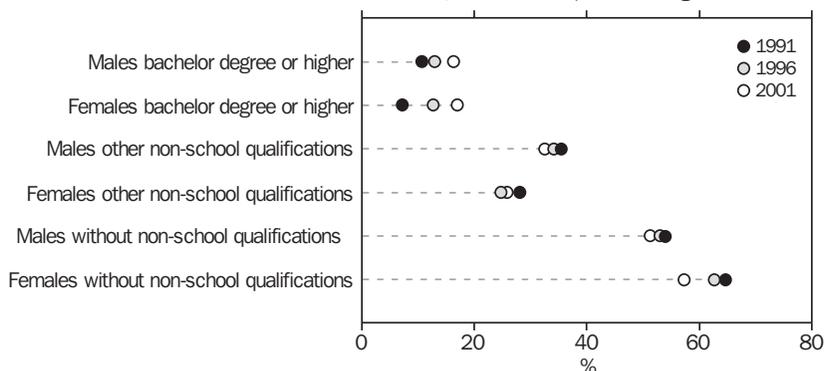
## 10.51 LEVEL OF HIGHEST NON-SCHOOL QUALIFICATION, Persons aged 15–64 — May 2001

	Highest year of school completed				Total(a) '000
	Year 12 '000	Year 11 '000	Year 10 '000	Year 9 or below '000	
Postgraduate degree	268.5	7.7	6.8	**0.8	283.9
Graduate diploma / Graduate certificate	262.8	15.9	18.1	*3.6	300.3
Bachelor degree	1 463.7	46.6	75.0	10.2	1 595.5
Advanced diploma / Diploma	588.9	89.4	145.7	30.6	854.6
Certificate III / IV	508.1	283.4	789.7	217.3	1 798.6
Certificate I / II	306.7	127.7	339.1	100.1	873.6
Certificate not further defined	89.6	34.1	54.6	13.4	192.1
Level not determined	62.4	18.0	48.8	13.6	142.7
Without a non-school qualification	2 113.5	938.8	2 158.1	1 489.3	6 747.1
<b>Total</b>	<b>5 664.1</b>	<b>1 561.6</b>	<b>3 636.0</b>	<b>1 878.9</b>	<b>12 788.3</b>

(a) Includes persons who never attended school. Boarding school pupils at May 2001 have not been allocated a highest year of school completed but are included in the total.

Source: *Education and Work, Australia, May 2001* (6227.0).

## 10.52 LEVEL OF HIGHEST NON-SCHOOL QUALIFICATION, Persons aged 15–64



Source: ABS data available on request, *Survey of Education and Work, 1991, 1996 and 2001*.

In the 25–44 age group there were approximately 1.3 million persons (22% of all 24–44 year olds) with a level of highest educational attainment of bachelor degree or above (table 10.53). This compares with 729,500 (17%) in the 45–64 age group. In the 25–44 age group 967,100 persons (17%) had a level of highest educational attainment of certificate III or IV, compared to 644,100 persons (15%) in the age group 45–64.

Just under 41% of 45–64 year olds reported their level of highest educational attainment as Year 10 or below, compared to only 25% of 25–44 year olds.

The most common main field of study (for highest educational attainment) was mixed field programmes with 7.7 million persons (60% of the 15–64 year old population) (table 10.54). This group for the most part comprises persons whose highest educational attainment was Year 12 or below.

Engineering and related technologies made up the next largest main field of study of highest educational attainment, with 1.2 million persons (9.2% of the population aged 15–64). This was followed by Management and commerce with 860,200 persons (6.7%), Society and culture with 653,100 persons (5.1%) and Health with 570,300 persons (4.5%) (table 10.54).

## 10.53 LEVEL OF HIGHEST EDUCATIONAL ATTAINMENT — May 2001

	Age group (years)				Total '000
	15–19 '000	20–24 '000	25–44 '000	45–64 '000	
Postgraduate degree	—	*4.7	148.7	130.5	283.9
Graduate diploma / Graduate certificate	**0.2	5.8	163.2	131.1	300.3
Bachelor degree	**0.8	180.0	946.8	467.9	1 595.5
Advanced diploma / Diploma	*5.1	87.3	446.1	316.1	854.6
Certificate III / IV	22.8	164.6	967.1	644.1	1 798.6
Certificate I / II	*3.4	6.7	42.5	69.2	121.8
Certificate not further defined	*1.3	**0.6	6.4	*5.5	13.7
Year 12	384.7	594.8	1 064.1	478.1	2 521.7
Year 11	277.7	101.4	471.8	246.2	1 097.1
Year 10 or below	630.8	197.8	1 413.1	1 769.4	4 011.1
Level not determined	4.8	9.3	73.5	55.1	142.7
<b>Total(a)</b>	<b>1 350.7</b>	<b>1 353.1</b>	<b>5 751.7</b>	<b>4 332.9</b>	<b>12 788.3</b>

(a) Includes boarding school pupils and persons who never attended school and have no educational qualifications.

Source: *Education and Work, Australia, May 2001* (6227.0).

## 10.54 MAIN FIELD OF HIGHEST EDUCATIONAL ATTAINMENT — May 2001

	Age group (years)				Total '000
	15–19 '000	20–24 '000	25–44 '000	45–64 '000	
Natural and physical sciences	—	23.4	114.5	72.5	210.4
Information technology	*3.1	23.3	96.7	21.1	144.2
Engineering and related technologies	5.8	79.0	634.5	458.3	1 177.7
Architecture and building	*1.5	26.7	209.8	152.0	390.0
Agriculture, environment and related studies	*2.2	17.5	68.5	35.8	124.1
Health	*1.1	34.8	312.8	221.6	570.3
Education	**0.7	28.2	208.8	202.3	440.0
Management and commerce	9.2	91.6	479.9	279.5	860.2
Society and culture	*3.9	63.9	367.4	217.9	653.1
Creative arts	3.0	26.5	117.7	62.4	209.6
Food, hospitality and personal services	7.2	40.3	166.3	81.0	294.7
Mixed field programmes(a)	1 312.3	894.1	2 950.0	2 494.6	7 651.0
Field not determined	**0.6	*3.1	16.5	14.2	34.3
<b>Total(b)</b>	<b>1 350.7</b>	<b>1 353.1</b>	<b>5 751.7</b>	<b>4 332.9</b>	<b>12 788.3</b>

(a) Includes persons whose highest level of educational attainment was Year 12 or below. (b) Includes persons who never attended school and have no educational qualifications.

Source: *Education and Work, Australia, May 2001* (6227.0).

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### Web sites

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Commonwealth Department of Education, Science and Training, <<http://www.dest.gov.au>>

Ministerial Council on Education, Employment, Training and Youth Affairs, <<http://www.curriculum.edu.au/mceetya>>

National Centre for Education and Training Statistics, <<http://www.abs.gov.au/ncets>>

National Centre for Vocational Education Research, <<http://www.ncver.edu.au>>

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## Introduction

The effects of criminal activity, as well as people's perceptions about the extent of such activity, are issues which impact directly or indirectly on the quality of people's lives. This chapter provides an overview of the Australian criminal justice system, including people's involvement with it either as offenders or as victims of crime. As well as data on the characteristics of crime victims and offenders, and outcomes from the justice process, the chapter also looks at the non-reporting of crime. The data presented are based on national crime and justice statistics produced by the ABS. These are sourced from surveys such as the Crime and Safety Survey and from administrative data, covering crimes recorded by police, the volume and flow of criminal work through the Higher Courts, and information on prisoners dealt with by correctional services agencies. Justice is primarily administered through state and territory governments, with differences in legislation, processes and operational structures. However, by taking account of these differences, comparable crime and justice statistics provide indicators of the level and nature of crime and the outcomes of criminal justice. The chapter draws on data sources other than the ABS.

## The criminal justice system

The criminal justice system consists of the state/territory and Commonwealth institutions, agencies, departments and personnel responsible for dealing with the justice aspects of crime, victims of crime, persons accused or convicted of committing a crime, and related issues and processes.

Each state and territory has laws and police, courts and corrections systems, while the federal criminal justice system deals with offences against Commonwealth laws. Criminal law is administered principally through the federal, state and territory police, the courts and state and territory corrective or penal services. There is no independent federal corrective service, and the relevant state or territory agencies provide corrective services for federal offenders.

The states and territories have independent legislative powers in relation to all matters that are not otherwise specifically vested in the Commonwealth of Australia, and it is the statute law and the common law of the states and territories that primarily govern the day-to-day lives of most Australians.

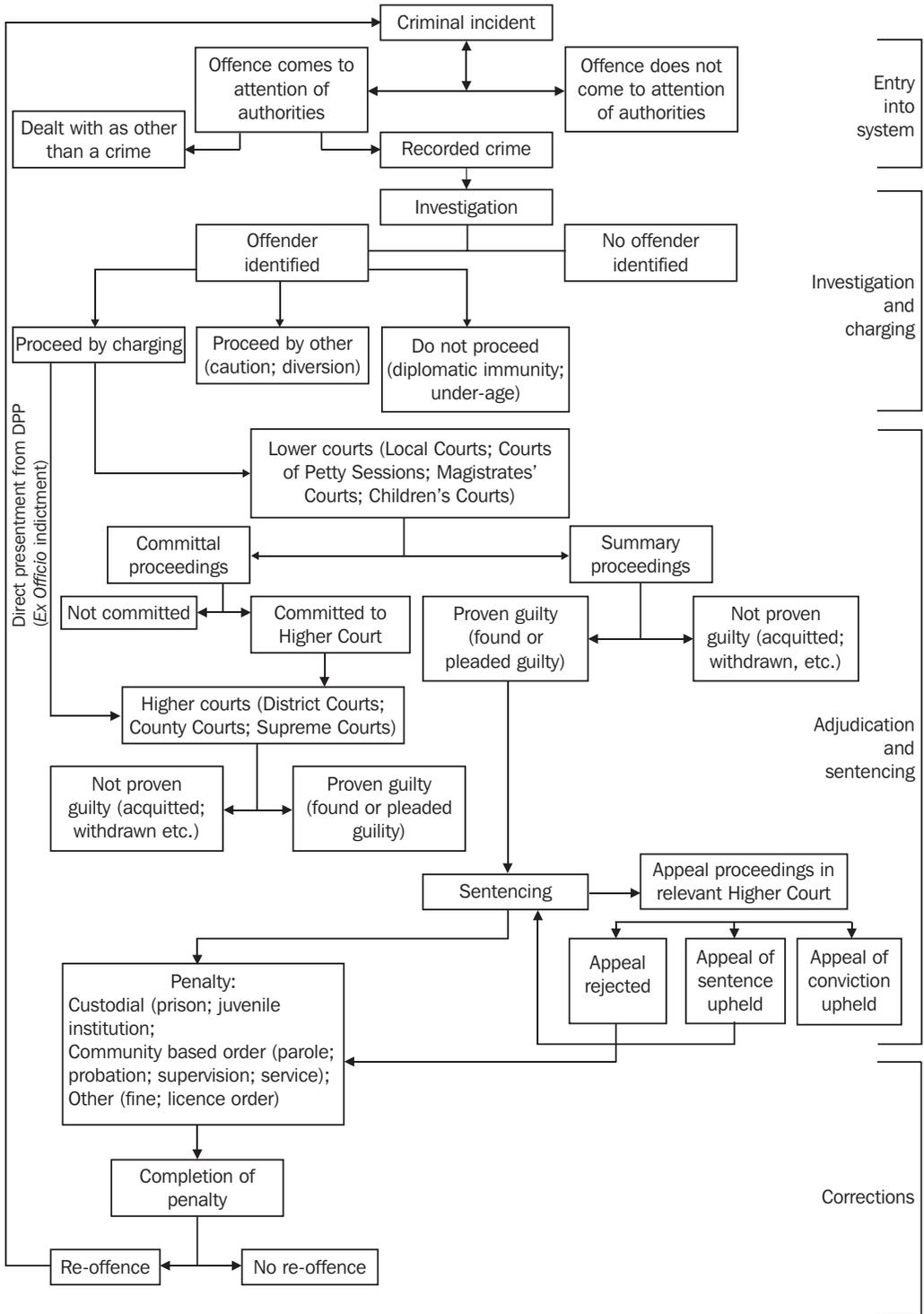
The eight states and territories have powers to enact their own criminal laws, while the Commonwealth has powers to enact laws, including sanctions for criminal offences, in relation to its responsibilities under the Constitution. Thus, in effect, there are nine different systems of criminal law in Australia. The existence of cooperative arrangements between the various states and territories and the Commonwealth, such as those relating to extradition or the creation of joint police services, helps address issues which have arisen out of the separate development of the various systems of criminal law.

The various agencies that comprise the criminal justice system act within a broader process in which criminal offenders interact with police, courts and corrective services. Diagram 11.1 illustrates the possible stages involved in the processing of cases and shows some of the links between these three elements of the judicial system.

The police, as well as agencies such as the Australian Customs Service (ACS), are responsible for the prevention, detection and investigation of crimes. Where alleged offenders are detected by police, they can be proceeded against either through the use of a non-court process (such as a caution, fine or diversionary conferencing) or charges may be laid before a criminal court. The court, including judicial officers, a jury (in the higher courts), the prosecution and the defence, determines the guilt or innocence of the defendant.

Following the hearing of the charges, in cases where a finding of guilt is made by the court, sentences may be imposed. These may include imprisonment, community service orders of various kinds, fines or bonds. A number of jurisdictions have also introduced penalties such as home detention or work outreach camps which are administered by correctional agencies. Fines and bonds are the most common penalties handed down by the courts.

11.1 FLOWS THROUGH THE CRIMINAL JUSTICE SYSTEM



## Expenditure on public order and safety

The Steering Committee for the Review of Commonwealth/State Service Provision, in its *Report on Government Services 2002*, estimated that approximately \$350 per person was spent by governments on justice in recurrent expenditure. This does not include spending by governments on items such as capital works (i.e. new police stations, prisons or court facilities). Of the total recurrent expenditure of nearly \$6.8b, \$4.4b was spent on police services, while expenditure on corrective services was \$1.5b (table 11.2).

Between 1996–97 and 2000–01, expenditure grew most in real terms for criminal court administration and corrective services (annual average growth rates of more than 6%).

## The police

Australia is served by police agencies in each state and the Northern Territory, with the Australian Federal Police (AFP) also being responsible for policing the Australian Capital Territory. Among its responsibilities the Australian Crime Commission (ACC) and the ACS also have responsibilities for the maintenance of law, order and safety.

While the principal duties of the police are the prevention and detection of crime, the protection of life and property, and the enforcement of law to maintain peace and good order, they may perform a variety of additional duties in the service of the state. These duties include the prosecution of summary offences, regulation of street traffic, and acting as clerks of petty

sessions, Crown land bailiffs, mining wardens and inspectors under fisheries and other relevant legislation.

With the exception of the AFP and the ACC, police in Australia are under the control of the relevant state government and the Northern Territory Government. However their members also perform certain functions on behalf of the Commonwealth Government, such as the registration of aliens, and they enforce various Commonwealth Acts and Regulations in conjunction with the AFP and other Commonwealth officers.

## Commonwealth policing agencies

### Australian Federal Police (AFP)

The AFP is a Commonwealth statutory authority established by the *Australian Federal Police Act 1979* (Cwlth). The AFP has its headquarters in Canberra. Its Criminal Investigations Program is conducted through six Regional Commands, its Headquarters Investigations Department and its numerous liaison officers in many countries.

The AFP is responsible for the prevention, detection and investigation of criminal offences such as drug offences, money laundering and organised crime, identifying the proceeds of crime, and investigation of fraud against Commonwealth revenue and expenditure such as social security and taxation fraud. In the Australian Capital Territory, the AFP provides a full range of general community policing services, including traffic control, special operations, search and rescue services and conventional crime investigations.

**11.2 GOVERNMENT EXPENDITURE ON JUSTICE(a)(b)(c)**

Justice sector	1996–97	1997–98	1998–99	1999–2000	2000–01	Growth(d)
	\$m	\$m	\$m	\$m	\$m	
Police services	3 839	3 879	4 240	4 408	4 383	3.4
Court administration — criminal(e)	355	381	409	406	456	6.5
Court administration — civil(f)(g)	440	441	479	502	476	2.0
Corrective services(h)	1 154	1 141	1 254	1 409	1 461	6.1
<b>Total justice system</b>	<b>5 789</b>	<b>5 843</b>	<b>6 382</b>	<b>6 725</b>	<b>6 776</b>	<b>4.0</b>

(a) In 2000–01 dollars. (b) Recurrent expenditure plus depreciation less revenue from own sources. (c) Payroll tax has not been included for WA and ACT as they are exempt. For all other jurisdictions, it has been included. (d) Average annual growth rate over the period 1996–97 to 2000–01. (e) Includes the cost of coroners' courts. (f) Excludes the cost of probate hearings. (g) Includes the cost of the Family Court and Federal Court of Australia. (h) Excludes WA community corrections expenditure during 1996–97. NT prison and community corrections did not deduct revenue from own sources in 1996–97.

Source: Steering Committee for the Review of Commonwealth/State Service Provision, 'Report on Government Services 2002'.

### National Crime Authority (NCA)

The NCA was established by the Commonwealth Government in July 1984 through the *National Crime Authority Act 1984* (Cwlth).

Complementary legislation was passed in each state and territory to underpin the work of the NCA in those jurisdictions. This ensured that the NCA's investigations were not limited by jurisdictional or territorial boundaries.

The decision to establish the NCA was taken in response to the findings of several Royal Commissions conducted in the late 1970s and early 1980s, which revealed the extent of organised criminal activity in Australia. The NCA's mission involved the counteracting of organised criminal activity and the reduction of such activity's impact on the Australian community.

### Australian Crime Commission (ACC)

On 5 April 2002 a summit of state and territory leaders was convened by the Prime Minister which looked at new approaches to strengthen the fight against nationally significant crime, including transnational crime and terrorism. On 9 August 2002 at a meeting of the Commonwealth, state and territory police ministers, agreement was reached on the functions, governance arrangements and resourcing of the ACC.

Planning is well advanced for the NCA, the Office of Strategic Crime Assessment and the Australian Bureau of Criminal Investigation to be replaced by the ACC. With headquarters in Canberra, the ACC will have the following functions: provide a

coordinated national criminal intelligence framework; set national intelligence priorities to avoid duplication; allow areas of new and emerging criminality to be identified and investigated; and provide for investigations to be intelligence driven.

The ACC will have in-house and taskforce access to all coercive and investigatory powers which have been available to the NCA. The first priority taskforce for the ACC will be illegal handgun trafficking, both into and within Australia.

### Number of sworn police officers

The number of sworn police officers in the various Australian police services is shown in table 11.3. The figures in the table are not directly comparable across the various jurisdictions, as those for NCA and AFP do not differentiate between full-time and part-time officers, whereas those for the states and territories are on a full-time equivalent basis. Between 1999–2000 and 2000–01, all states and the Northern Territory experienced increases in the number of sworn police officers, with the largest increase occurring in Queensland (5.7%). The Australian Capital Territory was the only jurisdiction with a fall in the number of sworn police officers (6.6%). The number of sworn police officers per 100,000 population was noticeably higher in the Northern Territory than elsewhere, at 475 per 100,000.

Further detail on the operations of each police agency may be found in the relevant annual reports.

**11.3 SWORN POLICE OFFICERS(a)**

Police officers	1999–2000		2000–01	
	no.	rate per 100,000	no.	rate per 100,000
National Crime Authority(b)	130	n.a.	128	n.a.
Australian Federal Police(c)(d)	1 344	n.a.	1 442	n.a.
New South Wales	13 172	203	13 614	207
Victoria	9 359	196	9 488	196
Queensland	7 319	205	7 734	213
South Australia	3 479	232	3 582	238
Western Australia	4 658	246	4 742	247
Tasmania	1 049	223	1 081	230
Northern Territory	905	462	948	475
Australian Capital Territory	632	202	590	187

(a) Based on full-time equivalents, except for the NCA, AFP and ACT figures which are based on actual number of sworn officers.

(b) Seconded officers from home force. Figures are based on actual number of sworn officers. As from 1 January 2003, the NCA has been incorporated into the newly formed ACC. (c) In 1999–2000 total figures exclude temporary staff; however these are included in 2000–01. Figures also include officers serving overseas and are based on actual number of sworn officers. (d) Excludes the AFP officers who were responsible for ACT policing and who are separately counted against the ACT.

Source: *National Crime Authority, Annual Report*; *Steering Committee for the Review of Commonwealth/State Service Provision, 'Report on Government Services 2002', Attachment 8A Table 8a15*; for all other state and territory figures, *Australian Federal Police Annual Report*.

## National crime statistics

National crime statistics provide comparable data across the states and territories for selected crimes recorded by state and territory police in Australia.

Two sources of national statistics provide a picture of crime in Australia: crimes recorded by police, and crime victimisation surveys. Crimes recorded by police relate to offences that have become known to and have been recorded by police. These offences may have been reported by a victim, witness or other person, or they may have been detected by police. These statistics do not provide a total picture of crime, as not all crimes come to the attention of police. In addition, care should be taken in interpreting police statistics, as fluctuations in recorded crime may be a reflection of changes in community attitudes to reporting crime, changes in police procedures or resources, or changes in crime recording systems, rather than a change in the incidence of criminal behaviour. Significant events occurring in particular years may also contribute to fluctuations in recorded crime.

A complementary picture of the nature and extent of crime comes from crime victimisation surveys. These household-based surveys collect information on crimes of which people know they have been victims, whether or not they reported the crimes to the police. Crime victimisation surveys are suitable for measuring crimes against individuals (or households) who are aware of and recall the incident and how it happened, and who are willing to relate what they know. Crime victimisation surveys allow crime information to be related to personal and household characteristics, and facilitate the study of patterns of victimisation over time and across crime categories.

Not all types of crime are suitable for measurement by household surveys. No reliable information can be obtained about crimes where there is no specific victim (e.g. trafficking in narcotics). Crimes of which the victim may not be aware cannot be measured effectively; some instances of fraud and many types of attempted crimes fall into this category. It may also be difficult to obtain reliable, comprehensive

information about some crimes, such as sexual offences and assault by other household members. Finally, no reliable data can be collected by household surveys on crimes against commercial establishments.

## Crime and safety

The Crime and Safety Survey is a household survey which has been conducted nationally in 1993, 1998 and 2002. The survey also provides data on selected household crimes and personal crimes against persons aged 15 years and over for the 12-month period prior to the survey, and the risk factors associated with crime victimisation. Similar surveys have been conducted annually since 1990 (except for 1993, 1998 and 2002) in New South Wales; in 1999 in Western Australia; in 2000 in South Australia; and in 1995 in all states and territories except Tasmania, Northern Territory and the Australian Capital Territory.

### Crimes affecting households and persons

Households and individuals in Australia experience a diverse range of crimes. The Crime and Safety Survey focuses on those categories of more serious crime that affect the largest number of people: household break-in, motor vehicle theft, assault (including sexual assault) and robbery.

In the 12 months prior to the 1998 Crime and Safety Survey, 5% of households had at least one break-in to their home, garage or shed and 3% found signs of at least one attempted break-in (table 11.4).

An estimated 0.5% of persons aged 15 years and over reported in the survey that they were victims of robbery and 4% of persons aged 15 years and over were victims of assault in the 12 months prior to the survey. An estimated 0.4% of females aged 18 years and over reported that they were victims of sexual assault in the same time period.

Compared with the previous survey (1993), there had been increases in the rates of break-in and attempted break-in. The reported incidence of motor vehicle theft was unchanged, while the incidence of sexual assault disclosed in the survey had fallen slightly.

**11.4 VICTIMS OF CRIME — 12 months prior to April 1998**

Type of crime	Victims '000	Victimisation prevalence rates	
		1993 %	1998 %
<b>Households</b>			
Break-in	(a)349.9	4.4	5.0
Attempted break-in	(a)226.4	3.1	3.2
Break-in/attempted break-in(b)	(a)534.1	6.8	7.6
Motor vehicle theft	(a)117.9	1.7	1.7
<b>Persons</b>			
Robbery	(c)79.1	. .	0.5
Assault	(c)618.3	. .	4.3
Sexual assault	(d)30.1	0.6	0.4

(a) Households. (b) Break-in/attempted break-in includes households that were victims of either a break-in or an attempted break-in, or both. Therefore the figures for break-in/attempted break-in are less than the sum of the break-in and attempted break-in figures. (c) Persons aged 15 years and over. (d) Females aged 18 years and over.

Source: *Crime and Safety, Australia, April 1998 (4509.0)*.

police vary depending on the type of offence, as shown in graph 11.5. People are much more likely to report crimes against property to the police (a requirement for any associated insurance claim) than crimes against the person (i.e. assault or sexual assault). The five-year period to 1998 saw little change in reporting of property crimes, but an increased willingness for victims of sexual assault to report their assault to the police.

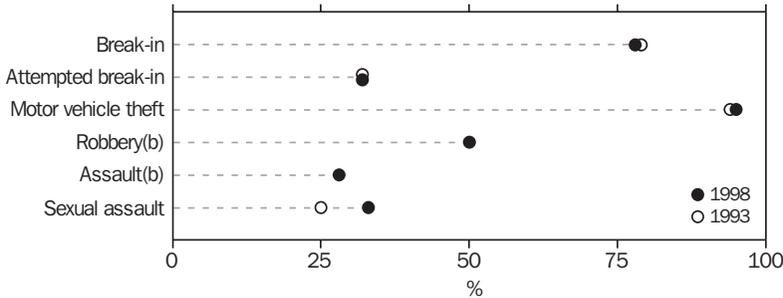
**Crimes recorded by police**

The number of victims of crimes recorded by police increased between 2000 and 2001 for almost all of the offences listed in table 11.6. The largest proportional increases were recorded for victims of blackmail/extortion (37%), attempted murder (17%) and armed robbery (17%). Falls were evident for three offences. Manslaughter showed the largest decrease (29%), with decreases also in driving causing death (6%) and murder (3%). On the basis of crime victimisation rates, between 2000 and 2001 there were increases for most offence types in the likelihood of someone becoming a victim of a crime.

**Reporting to police**

Crime is not always reported to the police, with many factors influencing whether or not a crime is reported. In particular, rates of reporting to the

**11.5 REPORTING RATE(a) TO POLICE FOR THE MOST RECENT INCIDENT — 12 months prior to April 1993 and 1998**



(a) Of household/person victims. (b) No 1993 rate has been provided as data are not comparable between 1998 and 1993 surveys.

Source: *Crime and Safety, Australia, April 1998 (4509.0)*.

**11.6 VICTIMS AND VICTIMISATION RATE, By selected offences recorded by police**

	1996	1997	1998	1999	2000	2001
	NUMBER					
<i>Homicide and related offences</i>	1 027	<i>n.a.</i>	995	970	1 020	1 047
Murder	312	321	285	343	315	306
Attempted murder	335	318	387	359	393	458
Manslaughter	38	39	47	43	48	34
Driving causing death(a)	342	<i>n.a.</i>	276	225	264	249
Assault	114 156	124 500	130 903	134 271	138 708	151 753
Sexual assault	14 542	14 353	14 336	14 104	15 759	16 744
Kidnapping/abduction	480	562	705	766	693	758
<i>Robbery</i>	16 372	21 305	23 801	22 606	23 336	26 565
Armed robbery	6 256	9 054	10 850	9 452	9 483	11 056
Unarmed robbery	10 116	12 251	12 951	13 154	13 853	15 509
Blackmail/extortion	268	360	272	255	257	352
<i>Unlawful entry with intent</i>	402 079	421 569	434 376	415 735	429 374	435 524
Property theft	313 902	332 525	339 512	322 983	(b) <i>n.a.</i>	325 180
Other	88 177	89 044	94 864	92 752	(b) <i>n.a.</i>	110 344
Motor vehicle theft(c)	122 914	130 138	131 587	129 552	138 912	139 943
Other theft	521 762	530 881	563 482	612 559	681 268	699 262
	RATE PER 100,000 POPULATION					
<i>Homicide and related offences</i>	5.6	<i>n.a.</i>	5.3	5.1	5.3	5.4
Murder	1.7	1.7	1.5	1.8	1.6	1.6
Attempted murder	1.8	1.7	2.1	1.9	2.1	2.4
Manslaughter	0.2	0.2	0.3	0.2	0.3	0.2
Driving causing death(a)	1.9	<i>n.a.</i>	1.5	1.2	1.4	1.3
Assault	623.5	672.2	699.0	709.2	724.2	782.9
Sexual assault	79.4	77.5	76.6	74.5	82.3	86.4
Kidnapping/abduction	2.6	3.0	3.8	4.0	3.6	3.9
<i>Robbery</i>	89.4	115.0	127.1	119.4	121.8	137.1
Armed robbery	34.2	48.9	57.9	49.9	49.5	57.0
Unarmed robbery	55.3	66.1	69.2	69.5	72.3	80.0
Blackmail/extortion	1.5	1.9	1.5	1.3	1.3	1.8
<i>Unlawful entry with intent</i>	2 196.2	2 276.2	2 319.5	2 195.7	2 241.7	2 246.9
Property theft	1 714.6	1 795.4	1 812.9	1 705.8	(b) <i>n.a.</i>	1 677.6
Other	481.6	480.8	506.6	489.9	(b) <i>n.a.</i>	569.3
Motor vehicle theft(c)	671.4	702.7	702.7	684.2	725.2	722.0
Other theft	2 850.0	2 866.4	3 008.9	3 235.2	3 556.8	3 607.5

(a) A change in the recording practices for driving causing death offences in NSW resulted in incomplete counts for this offence in 1997. (b) A change in the legislation related to unlawful entry with intent (UEWI) offences in SA resulted in an inability to provide UEWI disaggregated into property theft and other for 2000. (c) Counts for motor vehicle theft prior to 1997 are not directly comparable with those for other years as WA included the theft of caravans and trailers in addition to motor vehicle theft.

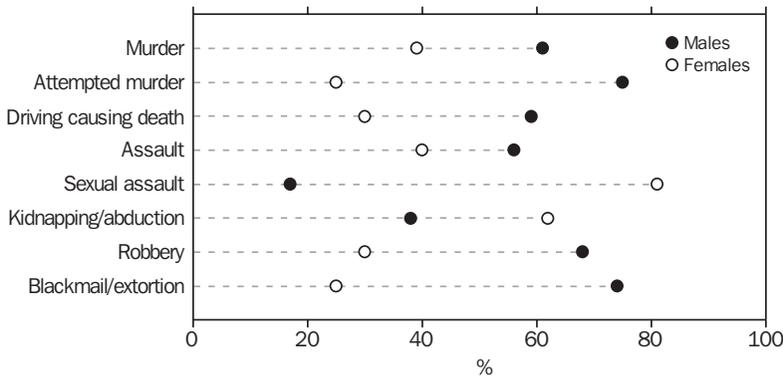
Source: *Recorded Crime, Australia, 2001 (4510.0)*.

## Personal crime

Based on reports to police, males were more likely than females to be victims of personal crime, with the exception of sexual assault and kidnapping/abduction (graph 11.7). The reported sexual assault victimisation rate for females (139 victims per 100,000) was more than four times the male victimisation rate (28.9 victims per 100,000).

As table 11.6 shows, assault is the most common category of offences recorded against the person. Police recorded 151,753 victims of assault during 2001, a 9% increase over the previous year and 33% higher than in 1996. The assault victimisation rate in 2001 was 782.9 victims per 100,000 persons, up from the 724.2 in 2000 and 623.5 per 100,000 persons in 1996. The 16,744 cases of sexual assault recorded in 2001 were 15% higher than in 1996, with the 2001 sexual assault victimisation rate of 86.4 victims per 100,000 persons 9% higher than the 1996 rate of 79.4 per 100,000 persons.

11.7 VICTIMS OF PERSONAL CRIME — 2001



Source: Recorded Crime, Australia, 2001 (4510.0).

In 2001 there were 306 victims of murder, which represented a rate of 1.6 victims per 100,000 persons. The annual recorded counts for murder victims in Australia have fluctuated over the period 1996 to 2001, partly due to some specific incidents: Tasmania in 1996 where 35 lives were taken in a single incident at Port Arthur; South Australia in 1999 where 12 bodies were discovered at Snowtown; Western Australia in 1999 where 9 victims resulted from 2 family murder/suicide incidents; and Queensland in 2000 where 15 victims of the fire at Childers were recorded. Despite this fluctuation in the number of murder victims, the rate has remained relatively stable over the last 6 years, ranging from 1.5 to 1.8 murder victims per 100,000 persons.

**Property crime**

Unlawful entry with intent (UEWI) and other theft are the most frequently occurring of the property offences. The UEWI victimisation rate increased

by 2% between 1996 and 2001 to be 2,247 victims per 100,000 persons in 2001. The victimisation rate for motor vehicle theft increased by 8% between 1996 and 2001. The 2001 rate for other theft was 3,607 victims per 100,000 persons, representing a 27% increase since 1996.

**Age and sex of victims**

Young people aged 15–24 years experienced the highest levels of recorded crime victimisation (table 11.8). Males experienced higher recorded assault rates across all age groups. For the offence category of assault, the rates for 15–24 year olds were approximately twice the average for all age groups. Robbery and sexual assault rates for the 15–19 year age group were more than three times the overall average. The robbery rate for 20–24 year olds was more than twice the national average.

## 11.8 VICTIMISATION RATES(a) OF SELECTED CRIMES(b) — 2001

Offence category	Age groups (years)						Total(c)
	0–14	15–19	20–24	25–34	35–44	45 and over	
MALES							
Murder	0.8	1.3	3.0	2.7	3.1	1.5	1.9
Attempted murder	1.0	3.7	9.8	7.0	4.4	1.5	3.5
Driving causing death	0.4	3.4	2.7	2.1	1.1	1.4	1.5
Assault	330.7	1 756.2	1 764.5	1 598.7	1 024.1	390.1	887.0
Sexual assault	80.8	51.9	27.5	18.9	11.1	2.1	28.9
Kidnapping/abduction	4.6	7.7	6.7	2.8	1.8	0.5	3.0
Robbery(d)	48.7	630.4	392.8	188.6	108.9	54.5	150.9
Blackmail/extortion(d)	0.2	4.7	3.1	3.3	2.6	2.2	2.4
FEMALES							
Murder	0.9	1.1	1.6	1.6	1.3	1.1	1.2
Attempted murder	0.6	1.2	2.2	2.1	1.8	0.6	1.2
Driving causing death	0.2	2.1	0.7	0.7	0.5	0.9	0.8
Assault	223.9	1 353.1	1 365.5	1 203.4	768.3	209.8	618.9
Sexual assault	270.2	498.0	203.3	128.7	65.4	16.3	139.0
Kidnapping/abduction	7.1	19.6	8.7	5.7	2.3	0.4	4.8
Robbery(d)	9.0	152.2	151.0	92.5	66.5	50.0	66.4
Blackmail/extortion(d)	n.p.	0.8	1.2	1.5	1.0	0.6	0.8
PERSONS							
Murder	0.9	1.2	2.3	2.2	2.2	1.3	1.6
Attempted murder	0.8	2.5	6.1	4.6	3.1	1.0	2.4
Driving causing death	0.3	2.8	1.9	1.4	0.8	1.1	1.3
Assault	279.2	1 564.8	1 579.7	1 409.5	900.8	298.2	782.9
Sexual assault	173.3	270.5	114.0	73.8	38.6	9.5	86.4
Kidnapping/abduction	5.9	13.5	7.7	4.3	2.0	0.5	3.9
Robbery(d)	29.5	399.5	277.1	141.8	88.3	52.5	111.3
Blackmail/extortion(d)	0.2	2.8	2.2	2.4	1.8	1.4	1.6

(a) Rate per 100,000 population. (b) As recorded by police forces in all jurisdictions. (c) Includes victims for whom age and/or sex was not specified. (d) For Robbery and Blackmail/extortion where the victim can be an organisation, figures shown only include person victims.

Source: *Recorded Crime, Australia, 2001 (4510.0)*.

## Weapons used against victims of crime

The use of a weapon during a crime not only impacts on the potential degree of emotional trauma experienced by the victim but also the potential severity of physical injury suffered. While firearms may result in more widespread and serious damage during an incident than other weapons, as demonstrated so graphically by the deaths of 35 people shot at Port Arthur in 1996, other weapons such as knives also produce violent consequences, sometimes including death.

Community concern about the perceived increase in attacks involving the use of weapons raises the question whether people are

increasingly being confronted by the use of a weapon during the commission of an offence, and what weapons are being used.

Data from the national *Recorded Crime Australia* data collection show that weapon use varies across the different offence types, and that there have been some changes over recent years.

The majority of victims did not have a weapon used against them, with the exception of murder and attempted murder victims. However, during the period 1995–2001, for most offences a person was increasingly likely to be a victim of a crime involving the use of a weapon.

Of the serious offences shown in tables 11.9 and 11.10 (see also graphs 11.11 and 11.12), there were more victims of assaults with a weapon than of any other offences. In recent years, more than 11% of assault victims were assaulted with a weapon, with less than 1% assaulted with a firearm. Between 1995 and 2001 there was a 61% increase in the assault victimisation rate involving a weapon, which equates to approximately 7,000 more victims in 2001 who had a weapon used against them than there were in 1995.

Robbery was the offence type with the next largest number of victims involving a weapon. While the proportion of people who were victims of an armed robbery fluctuated during

the period 1995–2001, the 2001 rate was 96% greater than in 1995. There has also been a marked shift in the relative proportions of the type of weapon used. In 1995, 10% of robbery victims had a firearm used against them, while a further 22% involved another weapon type. By 2001, approximately 6% of robbery victims had been subjected to the use of a firearm while 31% had other types of weapons used against them. Nearly 60% of robbery victims were not subjected to a weapon.

In contrast to assaults and robberies, the extent of weapon use during sexual assaults has remained relatively constant, and very low, with 2% or less of victims of this offence having been subjected to a weapon between 1995 and 2001.

### 11.9 VICTIMS OF RECORDED CRIME, By use of weapon in commission of offence

Offence and weapon type	Proportion of victims who had a weapon used against them						
	1995 %	1996 %	1997 %	1998 %	1999 %	2000 %	2001 %
<b>Murder</b>							
Firearm	17.8	31.7	23.4	18.9	18.1	19.0	16.0
Other weapon	42.6	41.3	49.5	49.1	44.0	40.0	42.8
Total weapon(a)	65.3	77.9	75.4	71.2	64.4	60.3	59.2
<b>Attempted murder</b>							
Firearm	26.7	31.0	28.3	19.4	31.5	30.5	28.8
Other weapon	47.7	47.2	58.8	64.3	47.9	52.2	51.5
Total weapon(a)	74.7	81.5	87.1	84.2	79.4	83.0	80.8
<b>Assault</b>							
Firearm	0.7	0.6	0.7	0.5	0.5	0.6	0.6
Other weapon	8.8	9.1	9.1	9.3	10.3	10.6	10.6
Total weapon(a)	9.9	10.2	10.2	10.2	11.3	11.5	11.4
<b>Sexual assault</b>							
Firearm	0.2	0.1	0.2	0.2	0.2	0.2	0.2
Other weapon	1.6	1.7	1.8	1.9	1.7	1.5	1.6
Total weapon(a)	1.9	1.9	2.1	2.1	2.0	1.7	1.9
<b>Kidnapping/abduction</b>							
Firearm	2.8	5.2	3.7	3.9	7.8	7.1	9.1
Other weapon	7.8	9.0	8.4	11.0	15.1	13.6	12.4
Total weapon(a)	11.1	14.6	12.3	15.1	23.5	20.9	21.6
<b>Robbery(b)</b>							
Firearm	10.0	9.7	10.3	8.0	6.4	5.7	6.3
Other weapon	21.6	24.6	28.3	33.3	31.8	32.4	31.1
Total weapon(a)	36.1	38.2	42.5	45.6	41.8	40.6	41.6

(a) Includes data where a weapon was used but was not able to be identified as to the exact type of weapon. (b) Refers to persons or organisations. All other offence types refer to persons only.

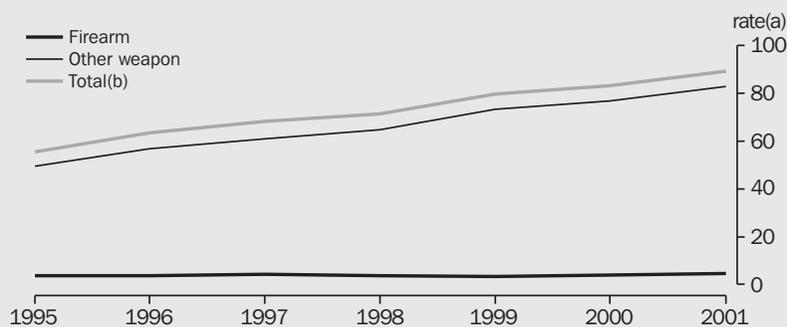
Source: *Recorded Crime, Australia, 2001* (4510.0).

**11.10 VICTIMS OF RECORDED CRIME, By use of weapon in commission of offence**

Offence and weapon type	Victims who had weapon used against them per 100,000 population						
	1995 rate per 100,000	1996 rate per 100,000	1997 rate per 100,000	1998 rate per 100,000	1999 rate per 100,000	2000 rate per 100,000	2001 rate per 100,000
<b>Murder</b>							
Firearm	0.3	0.5	0.4	0.3	0.3	0.3	0.3
Other weapon	0.8	0.7	0.9	0.7	0.8	0.7	0.7
<i>Total weapon(a)</i>	1.2	1.3	1.3	1.1	1.2	1.0	0.9
<b>Attempted murder</b>							
Firearm	0.4	0.6	0.5	0.4	0.6	0.6	0.7
Other weapon	0.8	0.9	1.0	1.3	0.9	1.1	1.2
<i>Total weapon(a)</i>	1.2	1.5	1.5	1.7	1.5	1.7	1.9
<b>Assault</b>							
Firearm	3.7	3.6	4.4	3.6	3.4	4.1	4.5
Other weapon	49.5	56.9	61.0	64.7	73.2	76.7	82.9
<i>Total weapon(a)</i>	55.4	63.6	68.3	71.4	79.8	83.1	89.3
<b>Sexual assault</b>							
Firearm	0.1	0.1	0.2	0.1	0.2	0.1	0.2
Other weapon	1.2	1.4	1.4	1.5	1.3	1.3	1.4
<i>Total weapon(a)</i>	1.4	1.5	1.6	1.7	1.5	1.4	1.6
<b>Kidnapping/abduction</b>							
Firearm	0.1	0.1	0.1	0.1	0.3	0.3	0.4
Other weapon	0.2	0.2	0.3	0.4	0.6	0.5	0.5
<i>Total weapon(a)</i>	0.3	0.4	0.4	0.5	1.0	0.8	0.9
<b>Robbery(b)</b>							
Firearm	8.1	8.7	11.8	10.2	7.6	6.9	8.7
Other weapon	17.4	22.0	32.5	42.3	37.9	39.4	42.6
<i>Total weapon(a)</i>	29.1	34.2	48.9	57.9	49.9	49.5	57.0

(a) Includes data where a weapon was used but was not able to be identified as to the exact type of weapon. (b) Refers to persons or organisations. All other offence types refer to persons only.

Source: *Recorded Crime, Australia, 2001* (4510.0).

**11.11 VICTIMS OF ASSAULT INVOLVING A WEAPON**

(a) Rate per 100,000 population. (b) Includes data where a weapon was used but was not further defined.

Source: *Recorded Crime, Australia, 2001* (4510.0).

While the majority of assault, robbery and sexual assault victims did not have a weapon used against them, this was not the case with murder and attempted murder. During the period 1995–2001, the proportion of murder victims who were attacked with a weapon peaked at 78% in 1996. Since that time, the proportion of murders involving a weapon fell to about 60% in 2000 and 2001, and the murder victimisation rate involving a weapon fell by 21% (graph 11.12). The overall decrease in weapon use largely reflects the decrease in the use of firearms: 16% of murder victims in 2001 were killed by a firearm, compared to 32% in 1996.

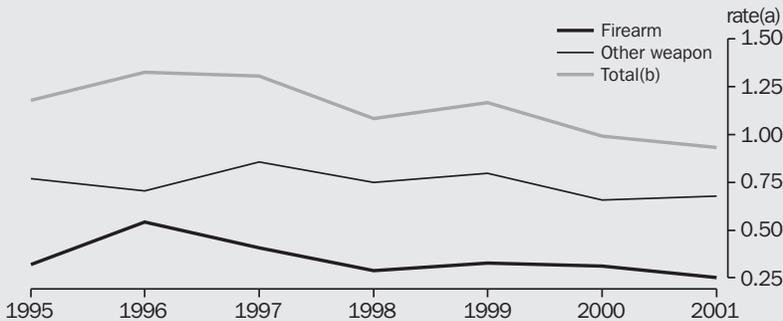
The decrease in weapon use for murders has not been evident for attempted murders, with the victimisation rate based on use of weapon 58% higher in 2001 than 1995. The proportion of kidnappings/abductions where a weapon was used increased markedly in 1999–2001 compared with previous years.

For the offence types which had the highest proportion of weapon use, there were 181 murders, 370 attempted murders and 164 kidnappings/abductions involving the use of a weapon in 2001.

A person was more likely to be a victim of a crime where a firearm was used in 2001 than in 1995, with the exception of murder. A firearm was the predominant weapon type for kidnappings/abductions in 2001, and a person was four times more likely to be a victim of a kidnapping/abduction involving a firearm in 2001 than in 1995. However, since 1995 there was a greater increase in the likelihood of being confronted by a weapon other than a firearm for attempted murder (54% increase), assault (67% increase) and robbery (145% increase).

A knife was the predominant weapon used against a victim across most of the other offence types, according to 2001 reported crime data (graph 11.13). For murder and attempted murder approximately one victim in three was attacked with a knife; and for robbery it was nearly one in four. Weapons such as clubs/bats/bars were the most likely type of weapon used in assaults. Syringes were recorded as having been used in only a small proportion of offences, while 4% of robbery victims had a syringe used against them.

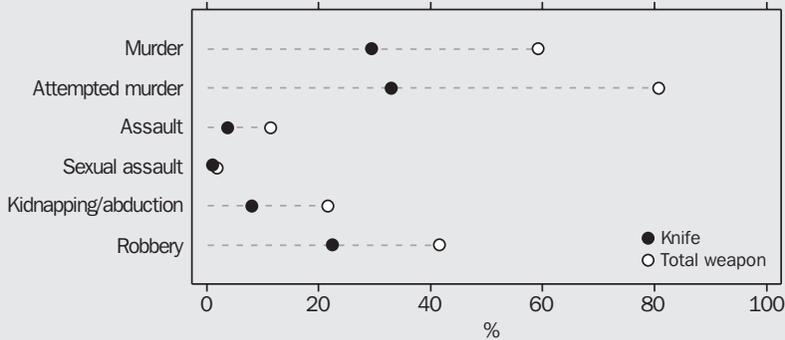
**11.12 VICTIMS OF MURDER INVOLVING A WEAPON**



(a) Rate per 100,000 population. (b) Includes data where a weapon was used but was not further defined.

Source: Recorded Crime, Australia, 2001 (4510.0).

11.13 VICTIMS(a), Weapon used in commission of offence — 2001



(a) The definition of a victim varies according to category of offence.

Source: *Recorded Crime, Australia, 2001 (4510.0)*.

## Drug offences

The traffic in and abuse of illicit drugs results in significant social and financial costs to individuals and the community. To minimise the harm associated with illicit drug activity there is close cooperation between the Commonwealth Government, the state and territory governments, the various police services and other law enforcement agencies. Included in these is the ACS which has, among other things, responsibility for the enforcement of laws controlling the import and export of illicit drugs. These agencies direct particular attention to monitoring the various types and forms of illicit drugs and identifying emerging patterns of use through the analysis of law enforcement data on illicit drug seizures and arrests.

As table 11.14 shows, in 2000–01 by far the largest category of drug arrests involved cannabis offences, with 54,017 offenders (69% of the national total). The next largest categories of

arrests involved amphetamine offences ('speed'), with 8,851 offenders (11% of the national total), and heroin offences (7,396 or 9%).

Victoria's arrest rate of 83.7 per 100,000 persons for heroin and other opioids was the highest for any of the states and territories and more than twice the national average of 38.2 per 100,000 persons.

While the number of cannabis arrests and infringement notices has been declining in the period 1996–97 through to 2000–01, there has been an upward trend in arrests associated with amphetamines. Heroin arrests peaked during 1998–99 (graph 11.15).

Information on the widespread problems arising from drug abuse in Australia, and on how these problems are being approached, is presented in the *Australian Illicit Drug Report* produced by the Australian Bureau of Criminal Intelligence.

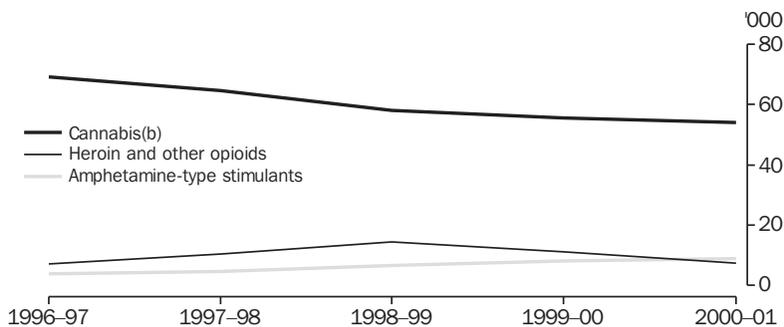
## 11.14 ALL DRUG ARRESTS(a) — 2000–01

Drug type	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
NUMBER									
Cannabis(b)	13 736	6 524	13 178	10 974	7 371	1 050	850	334	54 017
Cocaine	506	63	26	22	30	2	—	3	652
Heroin and other opioids	2 263	4 008	448	233	352	9	24	59	7 396
Amphetamine-type stimulants	2 841	1 263	1 992	711	1 758	70	160	56	8 851
Hallucinogens	55	1	67	25	44	1	5	1	199
Steroids	33	—	28	—	21	—	7	1	90
Other drugs(c)	1 936	2 384	1 343	491	515	93	35	4	6 801
<b>Total</b>	<b>21 370</b>	<b>14 243</b>	<b>17 082</b>	<b>12 456</b>	<b>10 091</b>	<b>1 225</b>	<b>1 081</b>	<b>458</b>	<b>78 006</b>
RATE PER 100,000 ADULT POPULATION									
Cannabis(b)	209.1	136.2	365.7	726.2	389.3	222.3	428.2	104.6	279.0
Cocaine	7.7	1.3	0.7	1.5	1.6	0.4	—	0.9	3.4
Heroin and other opioids	34.5	83.7	12.4	15.4	18.6	1.9	12.1	18.5	38.2
Amphetamine-type stimulants	43.2	26.4	55.3	47.0	92.8	14.8	80.6	17.5	45.7
Hallucinogens	0.8	—	1.9	1.7	2.3	0.2	2.5	0.3	1.0
Steroids	0.5	—	0.8	—	1.1	—	3.5	0.3	0.5
Other drugs(c)	29.5	49.8	37.3	32.5	27.2	19.7	17.6	1.3	35.1
<b>Total</b>	<b>325.3</b>	<b>297.3</b>	<b>474.1</b>	<b>824.3</b>	<b>532.9</b>	<b>259.4</b>	<b>544.6</b>	<b>143.4</b>	<b>402.9</b>

(a) The arrest data for each state and territory include AFP data. (b) The SA, NT and ACT figures include infringement notices. (c) 'Other drugs' includes phencyclidine (PCP or 'angel dust'), diazepam, lignocaine, benzocaine, dothiepin, flunitrazepam, other prescription drugs, and any drug not included in the other categories.

Source: Australian Bureau of Criminal Intelligence, 'Australian Illicit Drug Report, 2000–01'.

## 11.15 SELECTED DRUG ARRESTS(a)



(a) The arrest data for each state and territory include AFP. (b) The SA, NT and ACT figures include infringement notices.

Source: Australian Bureau of Criminal Intelligence, 'Australian Illicit Drug Report, 2000–01'.

## Outcomes of police investigations

Statistics about the outcomes of investigations describe the status of the processes of police investigations that are initiated following the reporting or detection of an offence. The status of investigations includes:

- investigations that were not finalised (i.e. were still continuing, were pending or suspended)
- investigations that were finalised without an offender being proceeded against because the reported offence was not verified, the complaint was withdrawn, or the alleged offender could not be proceeded against because of some statutory or procedural bar
- investigations that were finalised and an offender was proceeded against by initiating court action or some other form of formal proceeding (e.g. a diversionary conference or a caution).

In 2001 a higher proportion of offences against the person (homicide, assault, sexual assault and kidnapping/abduction) reached a finalised status within 30 days of initiation of the investigation than was the case for offences against property (UEWI and motor vehicle theft offences). Similarly, the proportion of offenders proceeded against was higher for offences against the person than for property offences (table 11.16).

## Courts

Many courts and court-related tribunals operate throughout Australia. The majority of courts handle matters that are criminal or civil in nature, while tribunals provide a less costly alternative for progressing some civil and administrative matters outside the formality of a court. A criminal matter generally arises where a charge has been laid either by police or some other prosecuting authority on the basis of a breach of criminal law. A civil matter occurs where there is a dispute between two or more individuals or organisations, where one party seeks legal remedy for an injury or loss from the other party who is alleged to be liable.

There are many other types of courts and tribunals in operation, commonly referred to as specialist courts and tribunals, that have been created because the courts were not the best way to address certain types of matters. Examples of these courts include the Coroners' Courts, Family Court, Federal Magistrates' Court, Drug Courts,

Workers' Compensation Commissions/Tribunals, Industrial Relations Commission, Small Claims Tribunals, Administrative Appeals Tribunal and Residential Tenancy Tribunal.

Courts and tribunals tend to be arranged in a hierarchy (diagram 11.17), with the majority of less serious matters being heard before magistrates and more serious matters being heard before judges. For criminal matters the seriousness is often determined by the nature of the alleged offence. In a civil context, seriousness is generally determined according to the amount being sought in compensation. A court's or tribunal's ability to deal with either a civil, criminal or other matter will depend on the legislation or jurisdiction applicable to that particular level of court.

The hierarchy of courts also applies to appeal matters. Where grounds for appeals exist, the appeal process is available in both criminal and civil matters. Appeals resulting from civil tribunal decisions may be referred to the Magistrates', District, Supreme or Commonwealth Courts, depending on the jurisdiction and the right of appeals. Criminal appeals resulting from the Magistrates' Court can be appealed at either the District, Supreme or Commonwealth Court level in the first instance. The High Court of Australia is the highest court of appeal for both criminal and civil cases.

The following section focuses on the criminal jurisdiction of higher courts.

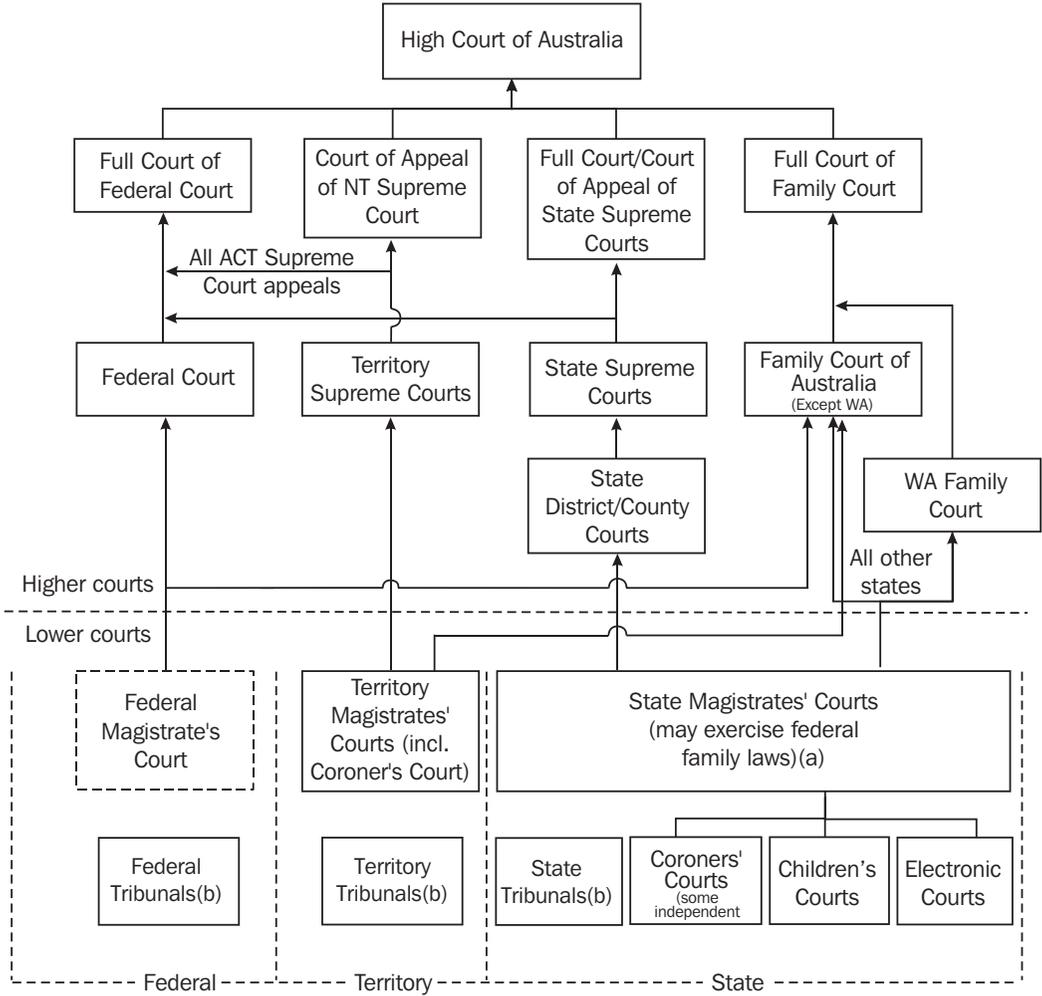
**11.16 VICTIMS OF RECORDED CRIME, By outcome of investigations at 30 days — 2001(a)**

Investigation status	Murder %	Attempted murder %	Assault %	Sexual assault %	Kidnapping/ abduction %	Robbery(b) %	UEWI(c) %	Motor vehicle theft %
Investigation not finalised	34.0	40.8	42.6	63.8	61.6	79.6	93.0	90.4
Investigation finalised								
No offender proceeded against	4.9	3.3	12.9	17.3	18.2	4.6	1.3	2.2
Offender proceeded against	61.1	55.9	44.4	18.9	20.2	15.8	5.7	7.4
Total	66.0	59.2	57.4	36.2	38.4	20.4	7.0	9.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) For selected offences recorded by police during 1 January to 31 December 2001. (b) Robbery includes both armed and unarmed robbery. (c) Unlawful entry with intent.

Source: *Recorded Crime, Australia, 2001 (4510.0)*.

11.17 HIERARCHY OF COURTS



—————> Arrows indicate the flow of cases on appeal.  
 - - - - - Indicates a separation between state/territory or court jurisdiction.

(a) Appeals from lower courts in NSW go directly to the Court of Appeal in the NSW Supreme Court. (b) Appeals from federal, state and territory tribunals may go to any higher court in their jurisdiction.

Source: Steering Committee for the Review of Commonwealth/State Service Provision, 'Report on Government Services 2002'.

## Criminal courts

A system of courts for the hearing of criminal matters exists in all Australian states and territories. Once charges are laid by police, the court will hear evidence by both prosecution and defence, and will make a decision as to whether or not the defendant is guilty. In cases where the defendant is found guilty, the court may also record a conviction and impose a penalty.

The courts in Australia are arranged hierarchically. The lowest level of criminal court is the Magistrates' Court or Court of Summary Jurisdiction. The majority of all criminal cases are heard in these courts. Cases heard in Magistrates' Courts do not involve a jury; the magistrate determines the guilt of the defendant. This is known as a summary proceeding. Relatively minor offences such as property damage or minor road traffic offences can be dealt with in this way. More serious offences are dealt with by the higher court levels. All states and territories have a Supreme Court which can deal with all criminal matters. The larger jurisdictions also have an intermediate level of court, known as the District or County Court, which deals with the majority of serious offences. The Supreme Courts and Intermediate Courts are collectively referred to as the Higher Courts.

All offences which are dealt with by the Higher Courts have an automatic entitlement to a trial before a judge and jury. In some jurisdictions, the defendant may elect to have the matter heard before a judge alone. Offences which must be heard before a judge and jury are known as indictable offences. These include offences such as murder, manslaughter and drug importation as well as serious sexual offences, robberies and assaults.

The defendant proven guilty in a criminal matter is entitled to appeal against the conviction or severity of penalty imposed. Under some

circumstances, the prosecution is also entitled to appeal against the leniency of the penalty. The states and territories differ in the ways in which they deal with appeals. Some appeals from Magistrates' Courts may be heard before the Intermediate Courts. In other jurisdictions, the Supreme Court may hear these appeals. In most jurisdictions, an appeal court or Court of Criminal Appeal may be constituted to hear appeals from the Supreme or Intermediate Courts. In Australia, the highest court of appeal from all jurisdictions is the High Court of Australia.

## National criminal courts statistics

As well as differences across the states and territories in terms of legislation, court procedures and the type of matters dealt with, there are also variations in data management practices and differences in the information that is collected as part of court processes. The net result of such differences has been a lack of readily available nationally comparable data on court activities and the characteristics of people whose matters are handled by the various courts. The aim of national criminal courts statistics collection undertaken by the ABS is to progressively redress this situation through the application of national data standards and counting rules.

## Higher criminal courts

Table 11.18 summarises the number of defendants with cases in the Higher Criminal Courts during 2000–01. There were 6,823 defendants pending at the start of 2000–01 and 10,711 defendants initiated during 2000–01, giving a total workload of 17,534 defendants who had criminal cases active at some time during 2000–01, excluding defendants in Queensland (for which there are only partial data — see footnote (b) in the table). There were 10,786 defendants finalised in the Higher Courts during 2000–01.

## 11.18 DEFENDANTS INITIATED, FINALISED AND PENDING — 2000-01(a)

Status	Units	NSW	Vic.	Qld(b)	SA	WA	Tas.	NT	ACT	Aust.(b)
SUPREME COURT										
Pending at start	no.	157	75	n.a.	48	93	246	200	188	n.a.
Initiated	no.	112	84	n.a.	32	204	442	365	168	n.a.
Finalised	no.	117	100	785	70	225	450	360	189	2 296
Proportion of active finalised	%	43.2	61.0	n.a.	63.1	68.2	65.4	63.7	53.1	n.a.
INTERMEDIATE COURT(c)										
Pending at start	no.	2 323	1 289	n.a.	489	1 715	..	..	..	n.a.
Initiated	no.	3 341	2 051	n.a.	1 010	2 902	..	..	..	n.a.
Finalised	no.	3 542	2 055	6 147	860	2 818	..	..	..	15 422
Proportion of active finalised	%	62.6	61.6	n.a.	58.6	61.5	..	..	..	n.a.
TOTAL HIGHER COURTS										
Pending at start	no.	2 480	1 364	n.a.	537	1 808	246	200	188	n.a.
Initiated	no.	3 453	2 135	n.a.	1 042	3 106	442	365	168	n.a.
Finalised	no.	3 659	2 155	6 932	930	3 043	450	360	189	17 718
Proportion of active finalised	%	61.7	61.6	n.a.	58.9	61.9	65.4	63.7	53.1	n.a.

(a) Data exclude defendants in appeal cases. (b) Pending and initiation data are currently not available for Qld. The Qld data for 'finalised' exclude bench warrants being issued. (c) There is no Intermediate Court in Tas., NT or ACT.

Source: *Higher Criminal Courts, Australia, 2000-01 (4513.0)*.

Table 11.19 indicates the methods by which defendants involved in criminal cases were finalised in the Higher Court system during 2000-01. A defendant is regarded as finalised when all the charges laid against them have been concluded in some manner. Of the 17,718 defendants finalised during 2000-01, 77% (13,722) either pleaded guilty or were declared guilty, 7% (1,284) were acquitted and another 13% (2,225) had their charges withdrawn by the prosecution.

The process involved in adjudicating criminal charges depends on how a defendant pleads to the charges laid against them. Defendants who initially plead guilty to all charges are not subject to a jury trial and go through a sentence hearing to determine the penalty. In contrast, defendants who plead not guilty to at least one charge are typically subject to a trial by jury which determines whether they are acquitted or found guilty.

Graph 11.20 indicates the proportion of defendants whose initial and final pleas were guilty. The proportions who initially pleaded

guilty varied noticeably across the states and territories, ranging from 5% in the Northern Territory to 55% in Western Australia. Changes in plea from not guilty to guilty also varied, with the changes proportionally highest in the Northern Territory (86%) and lowest in Western Australia (18%). However, there was less variation in the proportion of defendants who eventually pleaded guilty, ranging from 70% in South Australia to 90% in the Northern Territory.

Graph 11.21 shows the proportion of defendants by age group and sex during 2000-01. The majority (51%) of the 17,718 defendants who were finalised by the Higher Courts in 2000-01 were aged between 17 and 29 years. Males represented 87% of total finalised defendants. Of all defendants finalised during 2000-01, 44% were males aged 17 to 29 years.

Of the defendants proven guilty in the Higher Criminal Courts during 2000-01, excluding the Australian Capital Territory, approximately 55% received a sentence of imprisonment. The proportion was highest for those proven guilty of homicide or a related offence (89%) (graph 11.22).

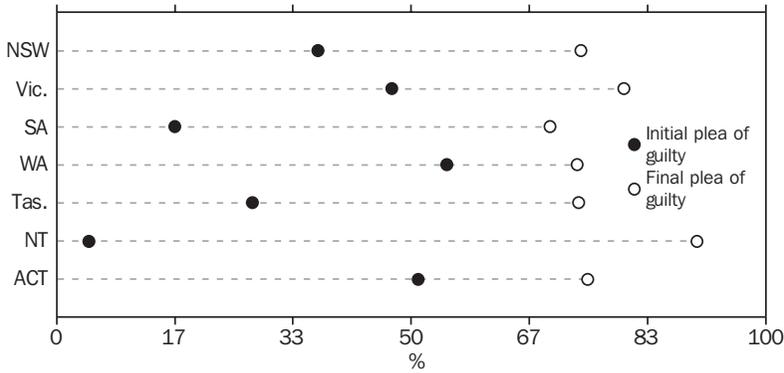
## 11.19 DEFENDANTS FINALISED, By method of finalisation — 2000–01(a)

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
SUPREME COURT									
Adjudicated									
Acquitted	23	19	13	12	7	32	16	16	138
Proven guilty									
Guilty verdict	45	30	42	24	48	63	16	23	291
Guilty plea(b)	43	44	623	20	156	264	299	116	1 565
Total	88	74	665	44	204	327	315	139	1 856
Total	111	93	678	56	211	359	331	155	1 994
Non-adjudicated									
Bench warrant issued	—	—	n.a.	2	5	6	11	—	(c)24
Withdrawn	6	7	107	11	6	73	17	29	256
Other finalisation	—	—	—	1	3	12	1	5	22
Total	6	7	(c)107	14	14	91	29	34	(c)302
<b>Total defendants finalised</b>	<b>117</b>	<b>100</b>	<b>(c)785</b>	<b>70</b>	<b>225</b>	<b>450</b>	<b>360</b>	<b>189</b>	<b>(c)2 296</b>
INTERMEDIATE COURT(d)									
Adjudicated									
Acquitted	379	150	301	57	259	..	..	..	1 146
Proven guilty									
Guilty verdict	318	211	287	85	348	..	..	..	1 249
Guilty plea(b)	2 351	1 620	4 377	456	1 813	..	..	..	10 617
Total	2 669	1 831	4 664	541	2 161	..	..	..	11 866
Total	3 048	1 981	4 965	598	2 420	..	..	..	13 012
Non-adjudicated									
Bench warrant issued	110	27	n.a.	64	175	..	..	..	(c)376
Withdrawn	349	46	1 181	187	206	..	..	..	1 969
Other finalisation	35	1	1	11	17	..	..	..	65
Total	494	74	(c)1 182	262	398	..	..	..	(c)2 410
<b>Total defendants finalised</b>	<b>3 542</b>	<b>2 055</b>	<b>(c)6 147</b>	<b>860</b>	<b>2 818</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>(c)15 422</b>
TOTAL HIGHER COURTS									
Adjudicated									
Acquitted	402	169	314	69	266	32	16	16	1 284
Proven guilty									
Guilty verdict	363	241	329	109	396	63	16	23	1 540
Guilty plea(b)	2 394	1 664	5 000	476	1 969	264	299	116	12 182
Total	2 757	1 905	5 329	585	2 365	327	315	139	13 722
Total	3 159	2 074	5 643	654	2 631	359	331	155	15 006
Non-adjudicated									
Bench warrant issued	110	27	n.a.	66	180	6	11	—	(c)400
Withdrawn	355	53	1 288	198	212	73	17	29	2 225
Other finalisation	35	1	1	12	20	12	1	5	87
Total	500	81	(c)1 289	276	412	91	29	34	(c)2 712
<b>Total defendants finalised</b>	<b>3 659</b>	<b>2 155</b>	<b>(c)6 932</b>	<b>930</b>	<b>3 043</b>	<b>450</b>	<b>360</b>	<b>189</b>	<b>(c)17 718</b>

(a) Data exclude defendants finalised in appeal cases. (b) Includes defendants who initially pleaded not guilty but changed this to a guilty plea during proceedings. (c) These totals exclude Qld defendants finalised by a bench warrant being issued. (d) There is no Intermediate Court in Tas., NT or ACT.

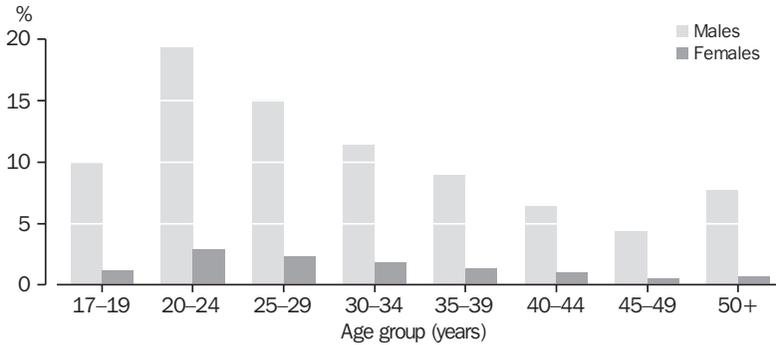
Source: Higher Criminal Courts, Australia, 2000–01 (4513.0).

11.20 ADJUDICATED DEFENDANTS, By plea — 2000-01



Source: Higher Criminal Courts, Australia, 2000-01 (4513.0).

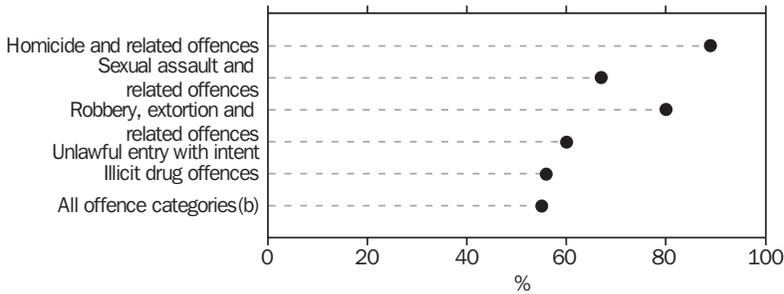
11.21 TOTAL HIGHER COURTS, Defendants(a) finalised — 2000-01



(a) Excludes defendants who are organisations.

Source: Higher Criminal Courts, Australia, 2000-01 (4513.0).

11.22 DEFENDANTS PROVEN GUILTY, Sentenced to imprisonment(a) — 2000-01



(a) The 2000-01 data on offence and penalty have been classified as 'experimental' due to data quality issues. Not all defendants could be assigned to a specific offence, and for a number of defendants a penalty outcome could not be determined. For more detail on the 'experimental' offence and penalty data, refer to the Explanatory Notes section of Higher Criminal Courts, Australia, 2000-01' (4513.0). (b) Includes other offence types not separately listed in the chart.

Source: Higher Criminal Courts, Australia, 2000-01 (4513.0).

For defendants who have been dealt with by the courts, duration figures are available that indicate the elapsed time taken to finalise all charges for a defendant from the date the defendant's case commenced. The total duration for a finalised defendant includes the time taken by the defence and prosecution to prepare their cases, the time taken to list the case and the actual time taken for any hearings.

Table 11.23 provides median duration statistics from initiation to finalisation for defendants in each state and territory. The median duration was shortest in Western Australia and Tasmania (15 weeks) and longest in the Australian Capital Territory (33 weeks). Duration is affected by issues such as the seriousness of the offence with which a defendant has been charged, the type of plea entered, as well as court practices in relation to pre-trial discussions and case listing. In terms of the type of offences considered, there are

differing Higher Criminal Court workloads across the states and territories. Defendants finalised in 2000–01 by the trial outcome of guilty verdict had the longest median duration time at 49 weeks.

For all states and territories for which data were available, the median duration for defendants who initially pleaded not guilty was more than double that of defendants who initially pleaded guilty.

### Total criminal cases

Table 11.24 shows the total number of criminal cases handled in the courts of Australia, including appeal and non-appeal cases. Of all the criminal cases filed in Australia during 2000–01, 99% were filed in the Magistrates' Courts, with Victoria and Queensland contributing 60% to the national total. A large proportion of cases in the Magistrates' Court in most states and territories are minor traffic matters.

**11.23 DEFENDANTS(a) IN HIGHER CRIMINAL COURTS, Median duration (weeks) to finalisation — 2000–01**

Method of finalisation	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
Acquitted	38.2	41.7	32.5	34.3	60.3	24.6	63.4	57.6	41.5
Guilty verdict	52.3	51.1	34.9	40.1	63.1	23.0	42.8	53.3	49.3
<i>Guilty plea</i>	19.1	18.1	18.6	19.8	10.1	10.5	16.0	16.9	16.7
Initial plea of not guilty(b)	31.1	31.7	n.a.	23.2	31.0	13.7	17.2	55.3	n.a.
Initial plea of guilty(b)	13.0	13.6	n.a.	11.4	8.0	6.4	5.0	12.6	n.a.
Other finalisation(c)	30.6	41.3	28.4	14.2	27.1	20.9	26.6	67.1	27.0
Total defendants finalised	24.4	23.0	21.7	21.3	14.6	14.6	18.1	33.1	21.3

(a) Data exclude defendants finalised in appeal cases. (b) Information on both initial and final pleas was not available in Qld. (c) Includes defendants who were withdrawn by the prosecution, remitted to the Magistrates' Court or finalised by another non-adjudicated method.

Source: *Higher Criminal Courts, Australia, 2000–01 (4513.0)*.

**11.24 CRIMINAL COURT CASES(a)(b) — 2000–01**

Court level	NSW '000	Vic. '000	Qld '000	SA '000	WA '000	Tas. '000	NT '000	ACT '000	Aust. '000
Supreme Court	1.0	0.7	1.4	0.3	0.5	0.5	0.4	0.2	4.9
District/County Court(c)	8.5	4.4	8.1	1.3	3.1	..	..	..	25.4
Magistrates' Court(d)(e)(f)	284.3	762.8	470.8	171.4	272.5	65.1	12.4	10.4	2 049.8
<b>Total</b>	<b>293.8</b>	<b>768.0</b>	<b>480.3</b>	<b>173.0</b>	<b>276.1</b>	<b>65.6</b>	<b>12.8</b>	<b>10.7</b>	<b>2 080.1</b>

(a) Cases are defined as one or more defendants with one or more criminal matters before the courts. (b) Data include appeal and non-appeal cases. (c) The NT, ACT and Tas. do not have District/County Courts. (d) Qld lodgment data for the Magistrates' Court have been extrapolated using available data for the period January to June 2001. (e) Tas. has estimated statewide totals for criminal magistrates' lodgments (both minor and primary). (f) Includes Childrens and Electronic Courts.

Source: *Steering Committee for the Review of Commonwealth/State Service Provision, 'Report on Government Services 2002'*.

## Corrective services

Corrective services agencies are responsible for administering the penalties handed down by the criminal courts which require some form of supervision or custody of the offender. This may include imprisonment on either a full-time or part-time basis, community service and other forms of supervised work, home detention or good behaviour bonds under supervision. Most persons for whom corrective services have responsibility have received a sentence from a criminal court, but some persons have been given orders pending judgement or sentencing (e.g. unsentenced prisoners).

All states and territories operate prisons and other types of corrective services. Separate provisions exist in each state and territory for dealing with juvenile offenders. The majority of convicted adult prisoners from the Australian Capital Territory serve their sentences in New South Wales prisons, but local provision is made for the custody of unsentenced prisoners and periodic detainees, and for community corrections (e.g. probation and parole). The Commonwealth Government does not operate any prisons or other corrective services, as federal offenders (persons convicted of offences under Commonwealth laws) are supervised by state or territory agencies for correctional purposes.

During 2000–01, 12 of the 96 prisons were privately operated facilities. These prisons operate in conjunction with state operated

prisons and are monitored by the corrective services authorities in a similar manner to state operated prisons.

Corrective services comprise prisons, periodic detention and community-based corrections. Community-based corrections include restricted movement, reparation (fine option and community service) and supervision (parole, bail and sentenced probation).

## Prisoners in Australia

The annual National Prisoner Census, conducted on the night of 30 June, counts all adult offenders who are held in custody in gazetted Australian prisons, including periodic detainees in New South Wales and the Australian Capital Territory. At any point in time, the majority of prisoners are serving long sentences for relatively serious offences, but the flow of offenders in and out of prisons consists primarily of persons serving short sentences for less serious offences.

The total prison population in Australia has increased by 50% from 15,021 in 1991 to 22,458 in 2001. There were 20,960 male prisoners on 30 June 2001, comprising 93% of the total prisoner population (table 11.25). The average age of prisoners in Australia was 33 years for males and 32 years for females. The majority of prisoners in Australia are young adult males, with 56% of all prisoners being males aged between 20 and 34 years (graph 11.26). New South Wales had the highest proportion of prisoners (39%) followed by Queensland with 20%.

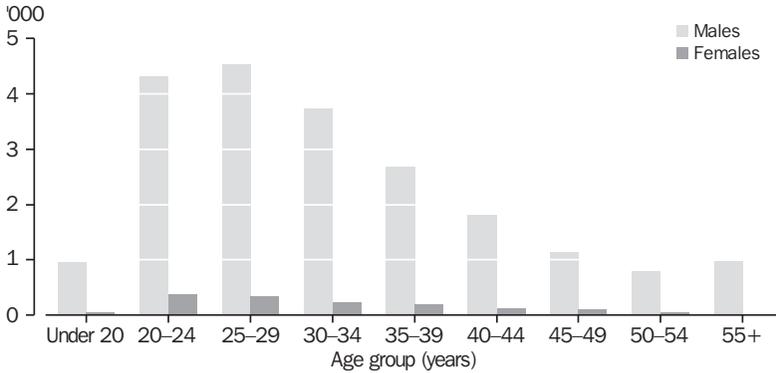
**11.25 PRISONERS, By jurisdiction — 30 June 2001**

	Males no.	Females no.	All prisoners no.	Males rate(a)	Females rate(a)	All prisoners rate(a)
New South Wales	8 226	620	8 846	330.9	24.3	175.6
Victoria	3 144	247	3 391	170.9	12.9	90.4
Queensland	4 227	290	4 517	308.5	20.8	163.4
South Australia	1 310	79	1 389	228.1	13.2	118.4
Western Australia	2 952	218	3 170	405.0	29.9	217.6
Tasmania	326	20	346	187.4	10.8	96.5
Northern Territory	698	19	717	934.5	28.9	510.5
ACT in ACT	77	5	82	64.5	4.1	34.0
ACT in NSW	117	12	129	98.0	9.9	53.5
<b>Australia(b)</b>	<b>20 960</b>	<b>1 498</b>	<b>22 458</b>	<b>284.5</b>	<b>19.8</b>	<b>150.5</b>

(a) Rate per 100,000 adult population. (b) The majority of full-time prisoners sentenced in the ACT are held in NSW prisons. The ACT in NSW figures are a subset of the NSW figures and are not separately counted in the Australian totals.

Source: *Prisoners in Australia, 2001* (4517.0).

**11.26 PRISONERS, By age and sex — 30 June 2001**



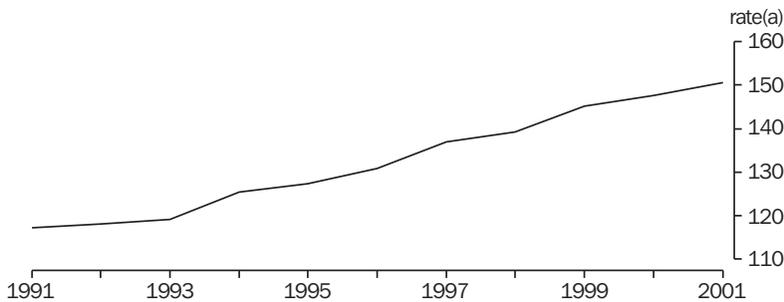
Source: *Prisoners in Australia, 2001 (4517.0)*.

Some of the factors which have influenced the size of the prison population over this period include: legislative changes affecting the length of time prisoners spend in prison; the abolition of sentence-reducing mechanism such as remission; significant court delays leading to an increase in unsentenced prisoners in some jurisdictions (the proportion of prisoners who were unsentenced increased from 13% in 1991 to 19% in 2001); an increase in Australia's population; and an increase in the amount of recorded crime. Graph 11.27

shows a time series of the rate of adult prisoners per 100,000 adult population. The rate has steadily increased since 1991.

Nationally, the imprisonment rate was 151 per 100,000 adult population at 30 June 2001. The imprisonment rates vary noticeably between jurisdictions, with the Northern Territory recording the highest imprisonment rate of 511 per 100,000 adult population (graph 11.28), substantially greater than the next highest rate of 218 prisoners per 100,000 adult population in Western Australia, and well above the national rate.

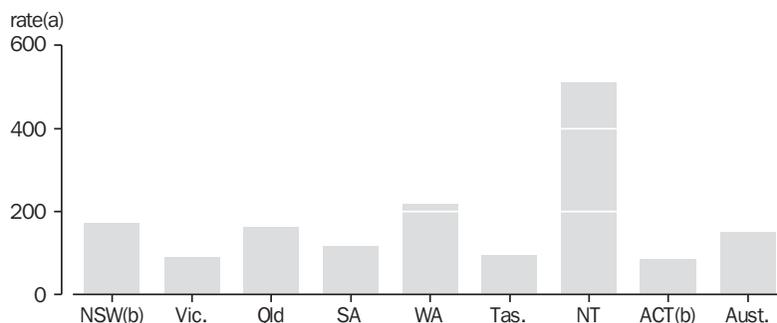
**11.27 IMPRISONMENT RATE(a)**



(a) The data are a snapshot of the prison population as at 30 June each year. The rate is per 100,000 adult population.

Source: 1991-93: *Australian Institute of Criminology*; 1994-2001: *Prisoners in Australia, 2001 (4517.0)*.

## 11.28 IMPRISONMENT RATE(a), By jurisdictions — 30 June 2001



(a) Rate per 100,000 adult population. (b) ACT prisoners who were held in NSW prisons have been excluded from the NSW rate, but included in the ACT rate.

Source: *Prisoners in Australia, 2001 (4517.0)*.

## Most serious offence

The most serious offence is defined as the offence for which prisoners have received the longest sentence. Nearly half (45%) of all sentenced prisoners were convicted of offences involving violence or the threat of violence,

including homicide (10%), sexual assault (10%), assault (11%) and robbery (14%) (table 11.29). Another 12% were in prison for unlawful entry with intent, while a further 10% were serving sentences for illicit drug offences.

### 11.29 SENTENCED PRISONERS, By most serious offence(a) — 30 June 2001

	NSW(b)	Vic.	Qld	SA	WA(c)	Tas.	NT	ACT in ACT	ACT in NSW(b)	Aust.(d)	Aust.(d)
	%	%	%	%	%	%	%	%	%	%	no.
Homicide	7.7	12.0	12.4	16.5	8.7	17.7	9.0	—	12.4	10.1	1 827
Assault	13.4	5.4	11.4	8.0	11.1	10.3	18.5	31.0	7.8	11.3	2 042
Sexual assault	8.5	11.4	10.9	8.0	15.1	12.1	7.3	—	13.2	10.4	1 884
Abduction, and related offences	—	0.7	0.4	0.4	0.5	—	—	3.4	—	0.3	51
Robbery	14.1	12.3	13.5	15.0	15.5	7.7	3.9	—	17.8	13.5	2 442
Blackmail and extortion	0.7	—	0.1	0.2	—	—	—	—	—	0.3	57
Unlawful entry with intent	11.9	13.6	9.4	15.2	13.2	11.0	7.7	3.4	16.3	11.9	2 148
Theft and related offences	7.9	11.3	8.7	7.1	5.1	8.8	5.6	13.8	6.2	8.2	1 471
Deception and related offences	3.8	2.8	2.6	6.9	2.1	0.7	0.5	6.9	0.8	3.2	574
Illicit drug offences	12.3	11.3	8.5	9.2	8.6	1.8	3.8	—	8.5	10.2	1 852
Road traffic and motor vehicle regulatory offences	3.3	2.3	4.0	1.9	9.1	12.9	15.3	24.1	1.6	4.6	834
Government security(c)	10.0	14.2	3.6	6.7	5.9	15.1	4.4	3.4	10.1	8.5	1 538
Other offences	6.4	2.7	14.5	4.9	5.1	1.9	24.0	14.0	5.3	7.5	1 403
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	<b>18 123</b>

(a) The most serious offence is the offence for which the prisoner has received the longest sentence. (b) A majority of full-time prisoners sentenced in the ACT are held in NSW prisons. (c) With the introduction of a new computer system in WA there is some concern about the quality of WA corrective services data. (d) The ACT in NSW figures are a subset of the NSW figures and are not separately counted in the Australian totals.

Source: *Prisoners in Australia, 2001 (4517.0)*.

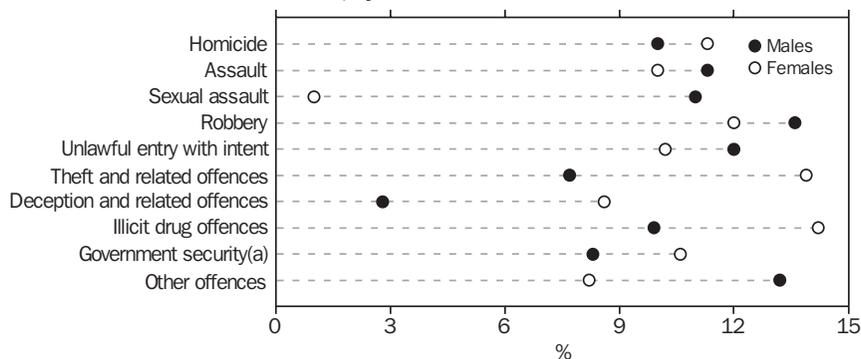
There were differences in the types of offences for which men and women were imprisoned. Graph 11.30 shows that the highest numbers of offences for males in prison at 30 June 2001 were robbery (14%), (UEWI) (12%), assault (11%) and sexual assault (11%). In the case of female prisoners, drug offences (14%), theft and related offences (14%), robbery (12%) and homicide (11%) were the most frequent reasons for imprisonment.

Aggregate length of sentence is a measure of the sentences imposed on an offender, sometimes taking multiple offences into account. It is not measured for prisoners who receive an

indeterminate type of sentence such as 'life', and periodic detainees' sentences are measured separately. At 30 June 2001 the average aggregate sentence of all prisoners sentenced to a specific term was 4.8 years. Male prisoners were serving an average aggregate sentence of 4.9 years, compared to an average of 3.3 years for female prisoners.

Prisoners serving sentences of at least one year but less than five years accounted for the highest proportion of prisoners in all states and the Northern Territory (table 11.31). Prisoners with indeterminate (including 'life') sentences made up 5% of all prisoners.

**11.30 SENTENCED PRISONERS, By selected most serious offence — 30 June 2001**



(a) Government security offences include offences such as treason; they also include offences against justice procedures, such as perjury and resisting police.

Source: *Prisoners in Australia, 2001, Companion Data (4517.0)*.

**11.31 SENTENCED PRISONERS, Aggregate length of sentence(a)(b) — 30 June 2001**

Length of sentence	NSW(c)	Vic.	Qld	SA	WA	Tas.	NT	ACT(c)	Aust.
	%	%	%	%	%	%	%	%	%
Less than 1 year	16.1	25.3	14.1	12.2	12.2	29.0	32.5	..	17.1
1 to under 5 years	35.8	41.2	36.7	36.8	43.4	39.3	45.6	..	38.3
5 to under 10 years	20.1	19.8	26.0	27.3	22.0	10.3	12.0	..	21.4
10 years and over	11.3	12.0	14.0	11.5	14.3	11.4	4.1	..	12.2
Indeterminate(d)	2.3	1.6	9.2	12.3	8.1	9.9	6.0	..	5.1

(a) Excludes periodic detainees, who comprised 5.9% of all sentenced prisoners nationally. (Periodic detention applies only in NSW and in the ACT.) (b) The aggregate sentence is the longest period that the offender may be detained under sentence in the current episode. Charges pending which are likely to extend the current episode are ignored. (c) Prisoners sentenced to full-time custody in the ACT are held in NSW prisons and are included in the NSW figures. (d) Indeterminate prisoners includes those sentenced to life imprisonment, those held at the Governor's pleasure and those subject to ministerial or administrative decisions.

Source: *Prisoners in Australia, 2001, Companion Data (4517.0)*.

**11.32 SENTENCED PRISONERS, By age and aggregate sentence length — 30 June 2001**

Length of sentence	Age group (years)					Total(a)
	Less than 20	20–29	30–39	40–49	50 and over	
Periodic detainees(b)	37	475	314	171	77	1 074
Under 1 year	187	1 545	960	316	87	3 098
1 to under 5 years	327	3 358	2 057	791	402	6 941
5 to under 10 years	38	1 454	1 200	663	523	3 879
10 years and over	8	531	768	511	385	2 203
Indeterminate(c)	2	177	327	251	171	928
<b>Total</b>	<b>599</b>	<b>7 540</b>	<b>5 626</b>	<b>2 703</b>	<b>1 645</b>	<b>18 123</b>

(a) Includes prisoners whose age was not stated. (b) Periodic detainees are required to be held in custody for two consecutive days in a one-week period. (c) Indeterminate prisoners includes those sentenced to life imprisonment, those held at the Governor's pleasure and those subject to ministerial or administrative decisions.

Source: *Prisoners in Australia, 2001 (4517.0)*.

Younger prisoners were more likely to be serving shorter sentences than older prisoners. While 1% of prisoners aged less than 20 years were serving a sentence of 10 years and over (excluding Indeterminate sentence lengths), this proportion progressively increased across the age groups to be 23% for prisoners aged 50 years and over (table 11.32).

**Indigenous prisoners**

At 30 June 2001 there were 4,445 Indigenous prisoners in Australia (20% of the Australian prisoner population) with a national rate of imprisonment for Indigenous persons of 1,829 per 100,000 adult Indigenous population (table 11.33). Western Australia recorded the highest imprisonment rate (3,036 Indigenous persons per 100,000 adult Indigenous population) followed by New South Wales (1,971). Nationally, the Indigenous rate of imprisonment was approximately 15 times that of the non-Indigenous population.

**11.33 INDIGENOUS IMPRISONMENT — 30 June 2001**

	no.	rate(a)	ratio(b)
NSW(c)	1 339	1 970.9	13.2
Vic.	150	1 060.3	12.3
Qld	1 146	1 724.4	13.8
SA	230	1 651.7	18.6
WA	1 072	3 036.1	20.6
Tas.	40	417.7	4.8
NT	456	1 356.5	5.6
ACT(d)	12	566.3	19.3
ACT in NSW(c)	8	377.5	7.5
<b>Australia</b>	<b>4 445</b>	<b>1 828.5</b>	<b>15.1</b>

(a) Rate of Indigenous prisoners per 100,000 adult Indigenous population. (b) Ratio of Indigenous to non-Indigenous rates of imprisonment. (c) A majority of full-time prisoners sentenced in the ACT are held in NSW prisons. The ACT in NSW figures are a subset of the NSW figures. (d) Refers to unsentenced prisoners in ACT prison custody.

Source: *Prisoners in Australia, 2001 (4517.0)*.

**Community-based corrections**

During the June quarter 2001 there were an average of 57,207 persons (based on the first day of the month figures) in community-based corrections, with sentenced probation being the most prevalent option for all states and territories (table 11.34).

**11.34 PERSONS IN COMMUNITY-BASED CORRECTIONS — June quarter 2001**

Type of penalty	Units	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
Community-based corrections(a)(b)	no.	18 323	6 497	17 724	5 863	5 054	949	1 431	1 365	<b>57 207</b>
Restricted movement	no.	184	..	239	176	80	..	40	..	<b>719</b>
Reparation										
Fine option	no.	122	1 131	6 054	1 523	550	61	261	..	<b>9 701</b>
Community service	no.	5 153	893	2 099	1 430	2 142	326	430	214	<b>12 687</b>
Supervision (compliance)	no.									
Parole	no.	3 616	1 009	1 521	948	1 166	110	179	149	<b>8 698</b>
Bail	no.	168	—	—	233	—	—	—	167	<b>569</b>
Sentenced probation	no.	11 264	3 630	7 811	2 432	3 053	552	611	836	<b>30 188</b>
Community-based corrections	rate(c)	371.4	173.8	644.5	509.8	355.1	269.9	1 045.4	579.5	<b>388.6</b>

(a) Average of the number on first day of each month in the June quarter 2001. (b) As a person may have more than one type of order, the sum of the components may be greater than the total. (c) Rate per 100,000 adult population.

Source: *Corrective Services Australia, June Quarter 2001 (4512.0)*.

## Deaths in custody

In 1991 the Royal Commission into Aboriginal Deaths in Custody, which investigated the deaths of 99 Indigenous persons in police or prison custody occurring between January 1980 and May 1989, presented its findings and recommendations. One of the outcomes was the establishment of a National Deaths in Custody Monitoring and Research Program at the Australian Institute of Criminology.

During 2000, 91 people died in all forms of custody in Australia, a 40% increase since 1990. Of the 91 deaths, 17 were of Indigenous persons, making up about one-fifth of all deaths. The largest number of deaths in custody recorded

since 1990 was in 1997 (105), while the largest number of Indigenous deaths was in 1995 (21). The majority of deaths (70%) occurred in prison custody, with the remainder while in police custody (27%) or juvenile detention (3%) (table 11.35).

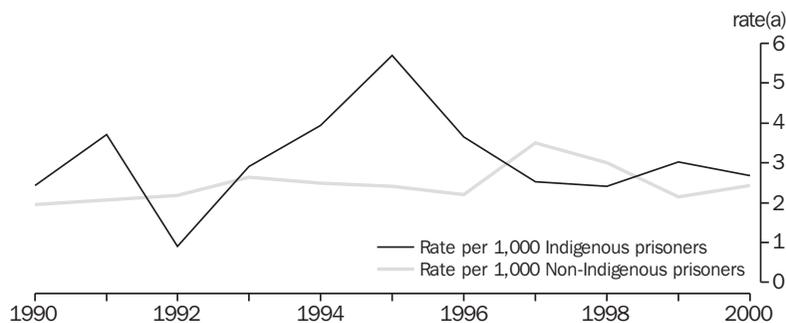
For the years 1990–2000, 18% of all deaths in prison custody were of Indigenous prisoners. During this period, the proportion of the prison population who were Indigenous rose from 14% to 20%. In 1995 the crude death rate of Indigenous prisoners was more than twice that of non-Indigenous prisoners (5.7 and 2.4 respectively). However, by 2000 the Indigenous death rate was 2.7, compared with 2.4 per 1,000 for non-Indigenous prisoners (graph 11.36).

**11.35 DEATHS IN CUSTODY**

	Police		Prison		Juvenile detention		Total		
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	
1990	5	26	5	28	—	1	10	55	65
1991	5	26	8	31	—	—	13	57	70
1992	7	24	2	34	—	—	9	58	67
1993	3	28	7	42	—	1	10	71	81
1994	3	24	11	42	—	1	14	67	81
1995	4	22	17	42	—	2	21	66	87
1996	6	23	12	40	—	1	18	64	82
1997	6	23	9	67	—	—	15	90	105
1998	6	19	9	60	1	—	16	79	95
1999	6	20	13	46	—	—	19	66	85
2000	5	20	11	53	1	1	17	74	91
Total	56	255	104	485	2	7	162	747	909

Source: Australian Institute of Criminology, 'Trends and Issues Paper No. 217', based on data from the National Deaths in Custody database.

**11.36 PRISON CUSTODY DEATH RATES(a)**



(a) Death rates are calculated using the Prisoner Census conducted on 30 June each year.

Source: Prisoners in Australia (4517.0); Australian Institute of Criminology, 'Trends and Issues Paper No. 217', based on data from the National Deaths in Custody database.

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Australian Institute of Criminology, <<http://www.aic.gov.au>>

National Crime Prevention, <<http://www.ncp.gov.au>>

NSW Bureau of Crime Statistics and Research, <<http://www.lawlink.nsw.gov.au/bocsar>>

NSW Police Service, <<http://www.police.nsw.gov.au>>

NT Police, <<http://www.nt.gov.au/pfes/police.shtml>>

Office of Crime Statistics at the SA Attorney General's Department, <<http://www.ocs.sa.gov.au>>

Productivity Commission, <<http://www.pc.gov.au>>

Qld Criminal Justice Commission, <<http://www.cjc.qld.gov.au>>

Qld Police Service, <<http://www.police.qld.gov.au>>

SA Police, <<http://www.sapolice.sa.gov.au>>

Tasmania Police, <<http://www.police.tas.gov.au>>

University of Melbourne, Criminology Department, <<http://www.criminology.unimelb.edu.au>>

University of Western Australia, Crime Research Centre, <<http://www.law.ecel.uwa.edu.au/crc>>

Victoria Police, <<http://www.police.vic.gov.au>>

WA Police, <<http://www.wapol.gov.au>>

Window on the Law at the Attorney General's Department, <<http://www.law.gov.au/wotl.html>>

**International sites**

Canadian Centre for Justice Statistics at Statistics Canada, <<http://www.statcan.ca>>

Dept of Justice Canada, <[http://canada.justice.gc.ca/index\\_en.html](http://canada.justice.gc.ca/index_en.html)>

Home Office, United Kingdom, <<http://www.homeoffice.gov.uk/rds>>

International Victimology, <<http://www.victimology.nl>>

NZ Ministry of Justice, <<http://www.govt.nz/justice>>

United Nations Crime and Justice Information Network, <<http://www.uncjin.org>>

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## Introduction

Cultural and recreational activities are essential to a shared sense of quality of life and to the social and physical wellbeing of individuals. They take many forms including involvement in creative and performing arts, music, literature, cultural heritage, libraries, radio, television, sports, gambling and amusements.

This chapter reviews a range of cultural and recreational activities which Australians undertake and provides a statistical summary (where available) for those activities. Data are drawn mainly from household surveys conducted by the ABS.

The chapter also provides information on the industries providing a range of culture and recreation services in Australia. These statistics have been obtained through industry surveys conducted by the ABS, and its compilations of administrative data, such as information about government funding of cultural activities. Government and non-government organisations have also supplied a range of industry data. For additional information about some of the industries providing culture and leisure services, see *Chapter 21, Service industries*.

## Cultural and natural heritage

Australia's heritage draws on its cultural and natural environments and the history of its people.

Cultural heritage includes historic places of significance, such as: old towns, and residential and commercial buildings; Indigenous ceremonial grounds and rock art galleries; shipwrecks and streetscapes; as well as paintings, objects, books, aircraft and natural history specimens. Increasingly what was formerly intangible, such as traditions, customs and habits, is being recorded and documented in photographs, films, tapes and digital records; these also add to Australia's cultural heritage.

Movable cultural heritage refers to items of cultural heritage which are capable of being transported. Australia is one of only a few countries that have developed and published a specific policy and strategy to care for their movable cultural heritage. Through the Heritage Collections Council, governments at all levels work collaboratively with the museums sector and non-government organisations to conserve,

promote, manage and provide access to Australia's collections of movable cultural heritage.

Natural heritage refers to the importance of ecosystems, biological diversity and geodiversity to the existence of life, and to their scientific, social, aesthetic and life-support value to present and future generations of people. It includes places of scientific or aesthetic importance, and geological features and landscapes. Extensive areas of coastline, forests, wetlands and deserts are included in national parks, nature reserves and wilderness areas. Many smaller sites are important habitats for native flora and fauna, enabling the conservation of threatened species. Many natural places are significant to Indigenous communities for cultural reasons.

Conservation of heritage places involves identifying them, surveying their values, and classifying and managing them. These functions are shared between all levels of government and their statutory authorities, with assistance from academic and professional bodies, individuals, community conservation organisations such as the national trusts, and conservation councils in each state and territory.

The Commonwealth Government maintains the Australian Heritage Places Inventory database on the Internet, providing the community with a one-stop shop for information on Commonwealth, state and territory heritage places throughout Australia. It also undertakes heritage activities on its own account. Examples of this include the nomination of sites for World Heritage listing, the protection of Aboriginal and Torres Strait Islander heritage and the development of the Register of the National Estate — Australia's national heritage list. In December 2000, the Commonwealth Government introduced legislation to change the role of the Commonwealth in national heritage protection. Passage of the legislation was delayed by the 2001 Federal election, and amended legislation is expected to be reintroduced in 2002. The legislation creates a new heritage list of places that are significant to the nation as a whole and retains the Register of the National Estate.

## National Estate

The term 'the National Estate' was coined by William Clough Ellis, a British architect, in the 1940s. It was introduced into Australia in 1973 when the Federal Government set up a Commission of Inquiry into the National Estate,

headed by Hon. Mr Justice RM Hope. The inquiry aimed to 'preserve and enhance the quality of the National Estate'. Following the recommendations of this inquiry, the Australian Heritage Commission Act was passed in 1975 with the support of all political parties.

'The National Estate' is defined in the legislation as:

...those places, being components of the natural environment of Australia, or the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the present community.

Both publicly and privately owned places form part of the National Estate. It encompasses places which are important to local communities, as well as those which are of regional or state significance. The National Estate also includes places which have national or international significance. Broad stretches of coastline, desert, forest and national parks, as well as isolated geological monuments and small areas which might provide habitats for endangered plant or animal species are part of the National Estate. It can cover whole villages and suburbs, streetscapes, single mansions, cattlemen's huts,

railway yards and other reminders of the historical development of Australia's society and economy. Places of significance to Aboriginal or Torres Strait Islander peoples, such as rock engravings, rock art galleries, fish traps, carved trees, meeting places and ceremonial sites are also part of Australia's National Estate, as are reminders of early European settlement, such as mission stations.

The Australian Heritage Commission has a statutory obligation to identify the National Estate. It has established the Register of the National Estate to place on public record Indigenous, historic and natural places to assist in their management and conservation, and, in particular, their protection from potentially adverse Commonwealth actions.

During 2001-02, the number of places in the Register of the National Estate increased by 96 to 12,941. This compares with an increase of 227 in 2000-01. Details by state or territory and type, and comparisons with the previous year, are shown in table 12.1.

More comprehensive statistics on the types of places on the Register of the National Estate can be found in the annual reports of the Australian Heritage Commission.

### 12.1 PLACES ON THE REGISTER OF THE NATIONAL ESTATE

	Indigenous places		Historic places		Natural places		Total	
	2000-01	2001-02	2000-01	2001-02	2000-01	2001-02	2000-01	2001-02
New South Wales	218	221	3 055	3 084	474	478	3 747	3 783
Victoria	106	111	2 387	2 412	245	247	2 738	2 770
Queensland	154	155	737	737	319	320	1 210	1 212
Western Australia	74	74	962	964	267	265	1 303	1 303
South Australia	148	150	1 202	1 204	389	389	1 739	1 743
Tasmania	65	65	1 186	1 201	252	253	1 503	1 519
Northern Territory	105	105	144	144	62	62	311	311
Australian Capital Territory(a)	27	28	178	183	31	30	236	241
External territories	—	—	38	39	20	20	58	59
<b>Total</b>	<b>897</b>	<b>909</b>	<b>9 889</b>	<b>9 968</b>	<b>2 059</b>	<b>2 064</b>	<b>12 845</b>	<b>12 941</b>

(a) Includes Jervis Bay.

Source: Australian Heritage Commission.

## National parks

National parks and other protected areas are areas of land and/or sea especially dedicated to the protection of biodiversity and other natural and cultural resources. They are established under Commonwealth or state/territory laws or other legal means. All governments participate in the development of a comprehensive, adequate and representative national reserve system as part of Australia's obligation under the United Nations Biodiversity Convention established in 1993. Most national parks and other protected areas in Australia are declared and managed by state and territory governments, although Indigenous protected areas and protected areas managed by conservation or other groups have commenced recently. The Commonwealth Government declares and manages parks and reserves on land owned or leased by the Commonwealth, in Commonwealth waters and on Aboriginal land leased to the Commonwealth.

Although there are nearly 50 different designations in Australia for protection, all protected areas are classified into one or more of the IUCN (World Conservation Union) six protected area management categories, with the most common being 'national park' and 'nature reserve'. The types of areas managed include: strictly protected areas managed mainly for science with very limited public access; areas where recreation is encouraged, but where

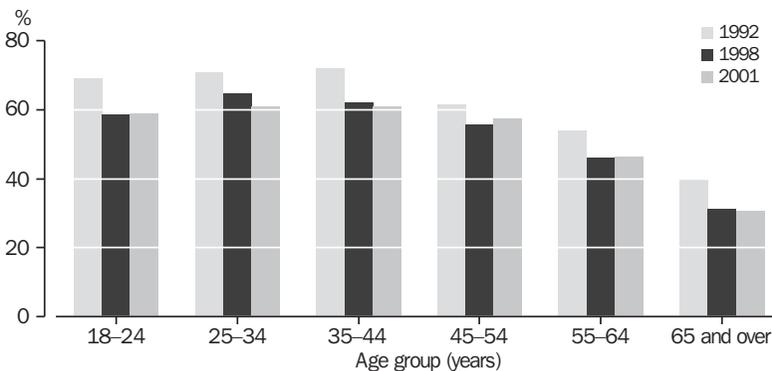
resource development adverse to conservation of the environment is not; and multiple use areas where ecologically sustainable resource utilisation, recreation and nature conservation can coexist.

## Visits to World Heritage areas, national and state parks

The ABS Environmental Attitudes and Practices Survey is a household survey collecting data on several environmental topics, including visits to World Heritage areas, and national and state parks. The most recent survey found that people between the ages of 25 and 44 years were the most likely to have made a visit to these areas and parks in the 12 months prior to March 2001. During that period 61% of people aged from 25–34 years, and from 35–44 years, visited one of these areas, compared with an attendance rate of 54% for all adults. However, as shown in graph 12.2, outings to these areas and parks have tended to decline from 1992 to 2001 within each age group.

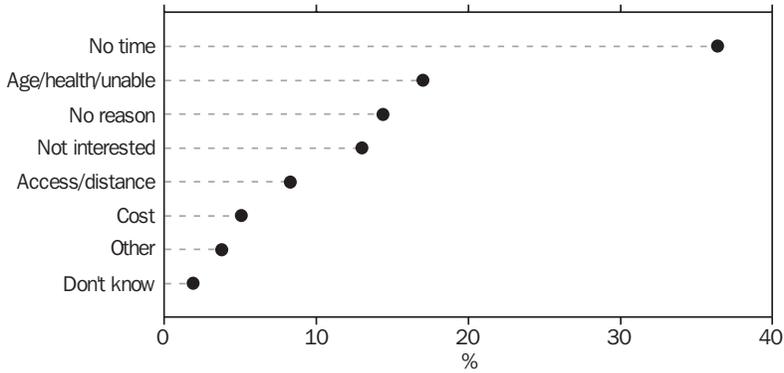
For those who had not visited a World Heritage area, national or state park in the 12 months prior to March 2001, lack of time (36%) was given as the main reason which prevented them from doing so (graph 12.3). Inability to visit because of age or health was the next most common reason for not visiting these areas (17%).

**12.2 VISITS TO WORLD HERITAGE AREAS, NATIONAL AND STATE PARKS**



Source: *Environmental Issues: People's Views and Practices, March 2001 (4602.0)*.

12.3 MAIN REASON FOR NOT VISITING A WORLD HERITAGE AREA OR PARK — 2001



Source: *Environmental Issues: People's Views and Practices, March 2001 (4602.0)*.

**Museums and commercial art galleries**

At its Annual General Meeting during the National Conference in March 2002, Museums Australia — the peak industry association and professional body representing museums in Australia — adopted the following definition of ‘museums’:

A museum helps people understand the world by using objects and ideas to interpret the past and present and explore the future. A museum preserves and researches collections, and makes objects and information accessible in actual and virtual environments. Museums are established in the public interest, and operate as not-for-profit organisations.

Museums Australia recognises that museums of science, history and art may be designated by many other names (including gallery and Keeping Place). In addition, the following may qualify as museums for the purposes of this definition:

- (a) natural, archaeological and ethnographic monuments and sites, and historical monuments and sites of a museum nature that acquire, conserve and communicate material evidence of people and their environment;
- (b) institutions holding collections, and displaying specimens, of plants and animals, such as botanical and zoological gardens, herbaria, aquaria and vivaria;
- (c) science centres;
- (d) cultural centres and other entities that facilitate the preservation, continuation and management of tangible or intangible heritage resources (e.g. living heritage and digital creative activity); and
- (e) other institutions that the Council of Museums Australia considers have some or all of the characteristics of a museum.

The main Commonwealth museums are the National Museum of Australia, the National Gallery of Australia, the Australian National Maritime Museum, the Australian War Memorial, the National Science and Technology Centre (Questacon), and the National Portrait Gallery.

Australian Museums and Galleries On Line (AMOL, formerly known as Australian Museums On Line), is a web site providing access to a database of information on over 1,500 national, state, territory, regional and local museums across Australia. Information about items held by museums is accessible through a range of search options, such as region, collection type and collection strength. AMOL is an initiative of the Heritage Collections Council, which coordinates national approaches to caring for, and promoting access to, Australia’s heritage collections.

Museums Australia has a membership base comprising those who work and contribute to Australia’s museums. The association’s primary role is to advocate for the industry and provide a range of professional services to its members. The services are offered at a national, state, territory and interest group level, and include professional development and training opportunities, newsletters, publications, advocacy and representation.

**Museum attendance**

The 1999 Survey of Attendance at Selected Cultural and Sporting Events and Venues indicated that 21.2% of the Australian population aged 15 and over (3.2 million people) had visited an art museum at least once in the previous 12 months (table 12.4). This is similar to the attendance rate of 22.3% (3.1 million people)

determined when the survey was run in 1995. The attendance rate at museums other than art museums was 19.9% (3.0 million people) in 1999, compared with 27.8% (3.9 million people) in 1995. This large fall in attendance can be partly explained by the temporary closure of some large museums in the more recent survey period.

#### 12.4 ATTENDANCE(a) AT MUSEUMS — 1999

Attendance rate(b)	Art museums	Other museums
	%	%
Sex		
Males	17.9	18.8
Females	24.4	21.1
Persons	21.2	19.9
Age group (years)		
15–17	25.4	25.8
18–24	19.3	17.9
25–34	20.5	20.6
35–44	21.6	24.8
45–54	25.4	21.0
55–64	22.2	18.6
65 and over	16.2	12.4
Birthplace		
Australia	21.6	20.6
Main English-speaking countries	25.5	23.7
Other countries	16.5	14.4

(a) Attendance at least once in the 12 months prior to interview in April 1999. (b) The number of people who attended, expressed as a percentage of the number of people in that population group.

Source: *Attendance at Selected Cultural Venues, Australia, April 1999 (4114.0)*.

### Museums industry

The ABS conducted a survey of museums in respect of the 1999–2000 financial year. Museums were defined for the purpose of the survey as organisations operating enclosed areas storing artefacts, artworks and museum objects, and which were open to the general public.

At the end of June 2000, there were 2,049 museum establishments comprising 249 art museums/galleries, 411 historic properties and 1,389 other museums (e.g. social history, natural history and science museums) (table 12.5). The majority of these establishments (58.0%) were operated on a volunteer basis. Museums with employees also rely on the services of volunteers. The 861 museum establishments with employees, at the end of June 2000, had a total of 6,956 employees or working proprietors and 15,393 volunteers.

The 78 museums with 100 or more employees averaged 121,300 admissions each (or 34.4% of total museum admissions) in 1999–2000. This compares with an average of 34,800 admissions for museums with 20–99 employees, 29,100 admissions for museums with 5–19 employees and 7,100 admissions for museums with 1–4 employees. Museums which were operated solely by volunteers had an average of 4,200 admissions in 1999–2000.

At the end of June 2000, there were 61.6 million artefacts, artworks and museum objects located in museums, of which 16.1% were on display. The majority (59.3%) of these artefacts, artworks and museum objects were in the 78 large museums with employment of 100 or more. These large museums displayed only 1.6% of their artefacts, artworks and museum objects. More information from this survey is shown in *Chapter 21, Service industries*.

#### 12.5 MUSEUMS — 1999–2000

	Units	Art museums/galleries	Historic properties	Other museums	Total
Museum/galleries establishments at end June 2000	no.	249	411	1 389	2 049
Artefacts/artworks/museum objects at end of June 2000	'000	1 157.5	*2 740.0	57 737.8	61 635.3
Admissions during the year ended 30 June 2000	'000	6 527.6	*7 260.0	13 744.2	27 531.8
Employment at end June 2000	no.	1 741	1 010	4 205	6 956
Volunteers for the month of June 2000	no.	4 177	5 929	19 857	29 963
Income	\$m	197.2	64.4	454.8	716.4
Expenses	\$m	164.4	57.4	420.7	642.5

Source: *Museums, Australia, 1999–2000 (8560.0)*.

## Commercial art galleries

The ABS conducted a survey of commercial art gallery businesses (including Aboriginal and Torres Strait Islander art centres) in respect of 1999–2000. Commercial art galleries were defined as businesses whose primary activity was the display and sale of artworks. Auction houses and businesses where artists sold artwork directly to the consumer were not included.

At the end of June 2000, there were 514 commercial art gallery businesses operating in Australia, comprising 31 which self-identified their main activity as being Aboriginal and Torres Strait Islander art centres, and 483 other commercial art galleries. These 514 businesses operated from 573 locations (table 12.6).

The average wages and salaries per employee for all commercial art gallery businesses was \$22,600 in 1999–2000. The larger businesses (10 or more persons employed) had average wages and salaries per employee of \$16,400, compared with \$27,700 for the smaller businesses (0–2 persons employed). At the end of June 2000, there were 1,409 persons employed by commercial art gallery businesses, comprising 435 working proprietors and partners, 389 permanent full-time employees, 337 permanent part-time employees and 249 casual employees.

### 12.6 COMMERCIAL ART GALLERIES — 1999–2000

	Units	Value
Businesses at end June	no.	514
Locations/outlets	no.	573
Employment at end June		
Males	no.	552
Females	no.	857
Total	no.	1 409
Income		
Commission income from the sale of artworks	\$m	43.4
Income from the sale of artworks owned by the business	\$m	72.7
Other income	\$m	15.6
Total	\$m	131.8
Other expenses		
Wages and salaries	\$m	22.0
Other	\$m	55.7
Total	\$m	77.7
Operating profit before tax	\$m	*8.8

Source: *Commercial Art Galleries, Australia, 1999–2000* (8651.0).

## Botanic gardens, zoological parks and aquaria

### Botanic gardens and herbaria

Botanic gardens are scientific and cultural institutions established to collect, study, exchange and display plants for research and for the education and enjoyment of the public. Some botanic gardens have an associated herbarium that is, a scientific collection of dried preserved plant specimens used for the accurate classification and identification of plants and plant material. Many recently established gardens operate under the auspices of local government or community groups and have a native plant and conservation focus.

There are major botanic gardens in each capital city, and these are managed by the respective state or territory government, with the exceptions of Brisbane (which is managed by the City Council) and Canberra (which is managed by the Commonwealth Government). The Commonwealth also manages the Booderee Botanic Gardens at Jervis Bay on behalf of the traditional Aboriginal owners of the land, the Wreck Bay Aboriginal Community Council, under arrangements in place since December 1995.

The Council of Heads of Australian Botanic Gardens, with its secretariat located at the Australian National Botanic Gardens in Canberra, coordinates the liaison between the various botanic gardens in Australia and represents these gardens in national and international matters.

The Council of Heads of Australian Herbaria, with a rotating secretariat, coordinates the liaison between the various herbaria. This body is also responsible for 'Australia's Virtual Herbarium', a web site which links the databases of all the eight major herbaria to provide plant information and locational data on the Internet.

The Australian National Botanic Gardens occupies a 90-hectare (ha) site on the lower slopes of Black Mountain in Canberra. It contains the national collection and one of Australia's most comprehensive displays of living native plants. Officially opened in 1970, it was proclaimed a Commonwealth Reserve in 1991 and is managed within the framework of the *Environment Protection and Biodiversity Act 1999* (Cwlth). The Australian National Botanic Gardens maintains about 100,000 plants constituting about 7,000 species. It receives about 330,000 visitors each year, with peaks in October for the spring flowering and January for the holiday tourist

season. It is on the Register of the National Estate in recognition of its importance as a research- and teaching-based botanic garden established to display and interpret Australian flora. The Australian National Herbarium, containing the dried specimens of the living plants in the Gardens, is managed jointly with CSIRO (Commonwealth Scientific and Industrial Research Organisation) Plant Industry as part of the Centre for Plant Biodiversity Research. It currently houses about 1.4 million herbarium specimens.

### Attendance at botanic gardens

The 1999 Survey of Attendance at Selected Cultural and Sporting Events and Venues showed that 36.1% of the Australian population aged 15 and over (almost 5.4 million people) attended a botanic garden at least once in the 12 months prior to interview in April 1999 (table 12.7). In 1995 the attendance rate was 38.5% (5.4 million people).

#### 12.7 ATTENDANCE(a) AT BOTANIC GARDENS — 1999

Attendance rate(b)	%
Sex	
Males	33.1
Females	39.0
Persons	36.1
Age group (years)	
15–17	31.0
18–24	35.1
25–34	40.4
35–44	39.5
45–54	39.1
55–64	33.8
65 and over	27.4
Birthplace	
Australia	35.6
Main English-speaking countries	41.4
Other countries	34.8

(a) Attendance at least once in the 12 months prior to interview in April 1999. (b) The number of people who attended, expressed as a percentage of the number of people in that population group.

Source: *Attendance at Selected Cultural Venues, Australia, April 1999 (4114.0)*.

The Botanic Gardens Census estimated that during 1999–2000 there were 11.8 million visits to botanic gardens. (This estimate includes visits by Australian adults, children, and people from outside Australia, as well as multiple visits by individuals.) The six largest botanic gardens

(i.e. those employing 50 or more persons) accounted for 61.9% of these visits at an average of 332,000 visits per location.

### Botanic gardens industry

The ABS Botanic Gardens Census in respect of 1999–2000 found that there were 72 employing organisations operating botanic gardens at the end of June 2000. The operations of these organisations covered 3,664 ha, comprising 3,050 ha of botanic gardens and 614 ha of arboreta. Further information about botanic gardens, including comparisons with data from the 1996–97 Census, is included in *Chapter 21, Service industries*.

### Zoological parks and aquaria

Zoological parks and aquaria (i.e. animal, fauna, bird life and reptile parks, aquaria, aviaries, butterfly houses and dolphinariums) are primarily engaged in the breeding, preservation, study and display of native and/or exotic fauna in captivity, enclosures or natural environments, to be accessible to the general public.

The first zoo in Australia, the Melbourne Zoo, was founded in 1857. There are now zoos and wildlife sanctuaries throughout Australia. As well as the four traditional zoos in Sydney, Melbourne, Adelaide and Perth, there are numerous wildlife parks and sanctuaries, some of which are associated with urban zoos and others which are privately owned. Some of the better known zoological parks and sanctuaries are Taronga Park (Sydney), Healesville Sanctuary (60 km from Melbourne), the Western Plains Zoo (Dubbo), Victoria's Open Range Zoo at Werribee (a Melbourne suburb), The Territory Wildlife Park (Darwin), Monarto Zoological Park (70 km from Adelaide), Lone Pine Koala Sanctuary (Brisbane) and Currumbin Sanctuary (Gold Coast). The best known aquarium in Australia is Sea World at Surfers Paradise, Queensland.

The Australasian Regional Association of Zoological Parks and Aquaria (ARAZPA) was formally established in 1990 at Auckland Zoo, New Zealand, and was incorporated in Australia in 1991. The Australian regional office is located in New South Wales. ARAZPA is administered by a board of management, with committees addressing the region's species management program, ethics, budget and policy review, and animal husbandry. There are currently 47 full institutional members, which are zoological parks and aquaria, along with a large number of individual memberships. A key purpose of the association is to promote and maintain

professional standards of operation in the zoological industry and to maximise its collective resources for the conservation of biodiversity.

### Attendance at animal or marine parks

The 1999 Survey of Attendance at Selected Cultural and Sporting Events and Venues shows that 33.9% of the Australian population aged 15 and over (5.0 million people) visited an animal or marine park during the 12 months prior to interview in April 1999 (table 12.8). Of these, 61.4% (3.1 million people, or 20.8% of the Australian population aged 15 and over) visited a zoo at least once during the year. In 1995 the attendance rate at animal and marine parks was 35.3% (also 5.0 million people).

#### 12.8 ATTENDANCE(a) AT ANIMAL AND MARINE PARKS — 1999

Attendance rate(b)	%
Sex	
Males	31.3
Females	36.3
Persons	33.9
Age group (years)	
15–17	35.0
18–24	36.0
25–34	44.8
35–44	43.5
45–54	30.1
55–64	25.2
65 and over	16.4
Birthplace	
Australia	33.9
Main English-speaking countries	39.7
Other countries	29.8

(a) Attendance at least once in the 12 months prior to interview in April 1999. (b) The number of people who attended, expressed as a percentage of the number of people in that population group.

Source: *Attendance at Selected Cultural Venues, Australia, April 1999 (4114.0)*.

### Zoological gardens and aquaria industry

An ABS survey of the zoological gardens and aquaria industry, in respect of 1996–97, showed that there were almost 8 million paid admissions to zoological gardens and aquaria during that year. Admissions income of \$69.2m accounted for 48.6% of total income. At the end of June 1997, there were 65 businesses in this industry, comprising 53 zoological gardens and 12 aquaria. These businesses operated from 69 separate locations covering an area of 3,631 ha.

There were 1,946 persons employed in the zoological gardens and aquaria industry at the end of June 1997. Full-time employees accounted for 65.2% (1,268) of total employment. A further 1,591 persons worked for zoological gardens and aquaria on a volunteer basis during June 1997. The majority of these volunteers (75.0%) worked as guides and information officers.

## Libraries and archives

### Libraries

The main activities of libraries are the acquisition, collection, organisation, conservation and loan of library materials such as books, magazines, manuscripts, musical scores, maps and prints.

The National Library of Australia is Australia's largest library. It was established as a separate entity in 1960 by the *National Library Act 1960* (Cwlth). This library, which was formerly known as the Commonwealth National Library, grew out of the Commonwealth Parliamentary Library which was established in 1901. The National Library builds and maintains a national collection of Australian library materials and provides an effective gateway to national and international sources of information. It acquires Australian printed material (monographs, serials, maps, music, photographs and pictures), using the legal deposit provisions of the *Copyright Act 1968* (Cwlth), and other formats and materials, through purchase or voluntary deposit. In recent years the National Library's web site has become a primary means of information service delivery for both on-site and off-site users.

### Public Lending Right (PLR)

PLR is a cultural program of the Commonwealth Government which is administered by the Department of Communications, Information Technology and the Arts. It makes payments to eligible Australian book creators and publishers on the basis that income is lost from the availability of their books for loan in public lending libraries. It also supports the enrichment of Australian culture by encouraging the growth and development of Australian writing and publishing. Australia is one of 15 countries operating a PLR program.

Some 8,500 book creators and their publishers received PLR payments in 2001–02, totalling almost \$5.9m. The PLR rates of payment under the current PLR scheme are \$1.30 per copy of each eligible book for creators and 32.5 cents per copy of each eligible book for publishers.

A complement of the PLR is the Educational Lending Right (ELR) program. This came into effect under the Commonwealth Government's Book Industry Assistance Plan, which was funded from 2000–01 to 2003–04. An annual survey of the book stock of a representative sample of educational libraries (including school, Technical and Further Education (TAFE) and university libraries) is used to determine payments. In 2001–02, some 6,890 book creators and publishers received ELR payments totalling \$8.37m.

### Library attendance

The 1999 Survey of Attendance at Selected Cultural and Sporting Events and Venues provides data on persons aged 15 years and over who attended a national, state or local government library at least once in the 12 months prior to interview in April 1999. Table 12.9 shows that 38.1% of the Australian population aged 15 and over (almost 5.7 million people) attended one of these libraries at least once during the 12 months. In 1995 the attendance rate was 38.4% (5.4 million people).

**12.9 ATTENDANCE(a) AT LIBRARIES(b) — 1999**

Attendance rate(c)	%
Sex	
Males	30.4
Females	45.6
Persons	38.1
Age group (years)	
15–17	60.5
18–24	38.1
25–34	36.6
35–44	43.7
45–54	35.1
55–64	30.6
65 and over	33.5
Birthplace	
Australia	38.3
Main English-speaking countries	47.2
Other countries	31.1

(a) Attendance at least once in the 12 months prior to interview in April 1999. (b) National, state or local government library only. (c) The number of people who attended, expressed as a percentage of the number of people in that population group.

Source: *Attendance at Selected Cultural Venues, Australia, April 1999 (4114.0)*.

### Archives

The primary function of archives is the permanent preservation of records which are unique because of their administrative, financial, legal, research, cultural or other information value. The records are generally no longer required for the conduct of current activities by government agencies, non-government organisations or individuals. While much archival work is an adjunct to other activity, a growing number of archival bodies employ specialist staff to serve the legal, administrative and research needs of individuals and organisations and are funded by governments and private sources.

The National Archives of Australia (NAA) is the Commonwealth organisation which promotes reliable record keeping and maintains a visible, accessible and known archival collection, in the interests of accountable government and for the benefit of the community. There are NAA offices and reading rooms in all states and territories. The national headquarters in Canberra also houses the Treasures Gallery, the Exhibitions Gallery and the Federation Gallery. Constructed as part of the Centenary of Federation in 2001, the Federation Gallery houses Australia's original 'birth certificates' including the Constitution and Queen Victoria's Royal Commission of Assent. The National Archives administers the legislative framework for Commonwealth records management (including arrangements for the disposal of records), maintains information systems, provides appropriate custody and preservation arrangements (including archival storage) and makes records available under the relevant legislation. Records covered by the *Archives Act 1983* (Cwlth) occur in all formats including files, index cards, architectural models, photographs, films, video tapes and electronic media. The National Archives curates touring exhibitions, produces publications based on its collections, and presents education and events programs. The database 'RecordSearch' and many of the record keeping publications and reference guides are now online. The National Archives also maintains the 'Documenting a Democracy' web site which presents the founding documents of democratic governments in Australia.

In addition, each state and territory government maintains its own archives and provides for public access to records, and archives have been established by some churches, business corporations, universities and city councils. The Australian War Memorial collects private material concerning Australians at war, and it is also custodian of certain official Commonwealth

records relating to war or warlike operations. ScreenSound Australia collects cultural material relevant to the film and sound media. Other corporate and private records continue to be collected by some state archives offices, libraries and universities.

The National Archives maintains a web site entitled 'Archives of Australia', which provides information about archives in Australia and operates as a portal to the web sites of other Australian archival institutions.

### Libraries and archives industry

An ABS survey of libraries and archives in respect of 1999–2000 showed that there were 505 local government library organisations with 1,510 library locations, eight national and state library organisations with 26 locations, and eight national and state archive organisations with 27 locations. The libraries held 54.3 million books and other library materials at the end of June 2000, of which 36.4 million were available as lending stock. The total income of the industry in 1999–2000 was \$792m, with government funding accounting for 91% (\$725m) of the total. For additional information on the libraries industry, see *Chapter 21, Service industries*.

## Literature and print media

### Reading habits, book buying and borrowing

Books Alive is a four-year campaign funded by the Department of Communications, Information Technology and the Arts and coordinated by the Australia Council. The aim of the campaign is to promote the intrinsic value of books, reading and literacy (particularly for children), and the books of Australian writers. To inform the development of the campaign, a national telephone survey of about 1,500 people aged 18 years and over was conducted in June 2001 to obtain information about patterns of reading, buying and borrowing books for pleasure.

The incidence of Australians aged 18 years and over who had read books for pleasure in the week before interview (72%) was lower than for newspapers (91%), but ahead of magazines (63%) and reading for work or study (44%).

Those who had read books for pleasure in the previous week were asked about the source of each book read. The origins of all the books read were as follows:

- 29% were bought new
- 20% were borrowed from a library
- 19% had been in the house for a long time (origins unknown)
- 13% were borrowed from a friend
- 10% were received as a gift
- 5% were bought second-hand
- 2% were borrowed from someone in the house
- 2% were from other sources.

In summary, 44% of books were purchased (new, second-hand or as a gift) and 35% were borrowed. Most borrowing was from libraries, but informal networks also played a significant role.

### Book publishing

During 2000–01 there were 228 businesses which were either predominantly engaged in book publishing, or generated income of \$2m or more from this activity. Table 12.10 shows that these organisations generated \$1,361.2m in income, of which \$1,260.6m was from the sale of books. Of the total book sales, \$747.7m (59.3%) was attributed to Australian titles.

**12.10 BOOK PUBLISHERS — 2000–01**

	Units	Value
Organisations at end June 2001	no.	228
Income		
<i>Sales of all books</i>	\$m	1 260.6
Sales of Australian titles	\$m	747.7
Sales of imported titles	\$m	512.9
Sales of other goods	\$m	29.6
Other income	\$m	71.1
<i>Total</i>	\$m	1 361.2
Average income per business	\$m	6.0
Expenses		
Wages and salaries paid	\$m	223.7
Royalties and fees paid	\$m	85.0
Other expenses	\$m	1 013.0
<i>Total</i>	\$m	1 321.7
Average expenses per business	\$m	5.8
Ratio of royalties and fees paid to sales of Australian titles	%	11.4
Export sales of books	\$m	162.2
Internet sales of books	\$m	1.1
Operating profit before tax	\$m	62.7
Profit margin	%	4.6
Industry value added	\$m	382.0

Source: *Book Publishers, Australia, 2000–01* (1363.0).

## Performing arts

The performing arts include music performances, acting, dance performances, opera and musicals, circuses and puppet shows.

### Attendance at the performing arts

Attendance at the performing arts is a significant aspect of the cultural life of many Australians. Table 12.11 shows that in the 12 months prior to April 1999, 25.4% of the Australian population aged 15 and over (almost 3.8 million people) attended at least one popular music concert; 16.5% (almost 2.5 million people) attended at least one theatre performance; and 16.3% (over 2.4 million people) attended at least one opera or musical. Attendance rates at most of the performing arts were similar to those recorded in a survey conducted in 1995. The largest

difference was the fall in the attendance at operas or musicals, from an attendance rate of 19.3% (2.7 million people) in 1995.

### Performing arts industries

There were 1,437 employing businesses mainly engaged in the performing arts industries at the end of June 2000. Of these, 705 mainly provided live theatrical or musical presentations (i.e. music and theatre productions); 125 operated venues for performing arts such as concert halls and entertainment centres; and 606 provided services to the arts industry such as festival management, casting agency operation, costume design and set designing. They employed 16,429 persons at the end of June 2000. During 1999–2000 they accrued total income of \$1,633.8m, of which \$470.0m was from government funding and \$460.5m from box office income.

For additional information about the performing arts industry, see *Chapter 21, Service industries*.

**12.11 ATTENDANCE(a) AT THE PERFORMING ARTS — 1999**

Attendance rate(b)	Popular music concert %	Classical music concert %	Dance performance %	Opera or musical %	Theatre %	Other performing arts %
<b>Sex</b>						
Males	25.1	7.1	6.8	11.9	13.5	15.9
Females	25.6	10.4	11.2	20.5	19.4	19.5
Persons	25.4	8.8	9.0	16.3	16.5	17.8
<b>Age group (years)</b>						
15–17	37.3	5.0	12.7	15.8	25.1	16.4
18–24	42.4	6.4	7.5	14.4	14.7	18.1
25–34	32.8	7.3	9.4	17.0	17.5	22.1
35–44	25.9	8.7	10.7	15.5	16.8	23.4
45–54	22.7	11.6	10.7	20.1	19.6	16.1
55–64	16.2	11.5	8.1	17.9	16.2	13.5
65 and over	7.2	8.9	5.1	12.9	10.3	10.4
<b>Birthplace</b>						
Australia	28.2	8.2	8.8	17.1	17.4	18.4
Main English-speaking countries	24.1	12.3	10.1	19.0	19.5	18.7
Other countries	13.5	9.1	9.1	11.0	10.9	14.3

(a) Attendance at least once in the 12 months prior to interview in April 1999. (b) The number of people who attended, expressed as a percentage of the number of people in that population group.

Source: *Attendance at Selected Cultural Venues, Australia, April 1999 (4114.0)*.

## Symphony Australia Orchestral Network

The Symphony Australia Orchestral Network comprises Australia's six major professional symphony orchestras — Adelaide Symphony Orchestra, Melbourne Symphony Orchestra, Queensland Orchestra, Sydney Symphony Orchestra, Tasmanian Symphony Orchestra and West Australian Symphony Orchestra — as well as the national service organisation, Symphony Australia. The network was established as a division of the Australian Broadcasting Corporation (ABC) over a number of years from 1932. The orchestras and the national service organisation now operate as subsidiary companies of the ABC. The orchestras present live concerts in Australia's major performing arts venues and in free open-air concerts. They also present broadcasts on ABC radio and television, make recordings for international record labels, accompany opera and ballet performances, undertake international tours, and give performances in regional and country areas throughout Australia. In 2000–01, the six orchestras presented approximately 800 concerts to audiences totalling more than

1.1 million people (table 12.12) and reached much larger audiences through their recording and broadcast activities.

## Musica Viva

Musica Viva, Australia's national promoter and organiser of chamber music concerts, began as a performing ensemble named Sydney Musica Viva in December 1945, as an initiative of violist, conductor and inventor Richard Goldner. It is now a non-profit company with headquarters in Sydney; it has a board with members throughout Australia, a state committee structure and branch offices in capital cities. During 2001, 2,537 concerts or other performances were presented by Musica Viva across Australia and overseas, with audiences exceeding 443,000 Australians and 34,000 overseas patrons (table 12.13). *Ménage* concerts, designed for people aged between 18 and 35 years and presented in unusual, intimate venues, were presented in Adelaide, Perth, Melbourne and Sydney to audiences totalling 1,069. *CountryWide*, a regional touring program, reached audiences of 22,921, while the live music education program ('Musica Viva in Schools') reached 367,189 students across Australia and in Singapore.

### 12.12 SYMPHONY ORCHESTRAS

Type of performance	1999–2000		2000–01	
	Concerts	Total attendances	Concerts	Total attendances
Paid orchestral concerts	530	744 409	527	651 324
School concerts	203	103 919	214	76 046
Free concerts	49	261 024	39	263 537
<b>Total</b>	<b>782</b>	<b>1 109 352</b>	<b>780</b>	<b>990 907</b>

Source: Symphony Australia web site.

### 12.13 MUSICA VIVA AUDIENCES(a)

Location	1998	1999	2000	2001
New South Wales	291 292	274 495	263 162	276 931
Victoria	42 853	34 183	48 096	47 159
Queensland	15 303	22 144	27 608	25 837
South Australia	23 089	16 073	19 624	24 582
Western Australia	43 015	44 474	43 999	41 110
Tasmania	9 599	8 024	11 408	10 201
Northern Territory	4 703	7 171	8 336	7 895
Australian Capital Territory	12 911	12 947	9 102	9 366
<i>Australia</i>	<i>442 765</i>	<i>419 511</i>	<i>431 335</i>	<i>443 101</i>
Overseas	50 000	34 350	37 500	34 770
<b>Total</b>	<b>492 765</b>	<b>453 861</b>	<b>468 835</b>	<b>477 851</b>

(a) Includes audiences at regional touring concerts, education concerts, subscription concerts and special events.

Source: Musica Viva Australia.

## Opera Australia

In 1997 the Australian Opera and the Victorian State Opera merged to become Opera Australia. More reliant on box office receipts than many of the world's arts companies, 65% of Opera Australia's revenue comes directly from ticket sales.

With a repertoire spanning the history of opera, almost 250 performances are staged each year (table 12.14), making the company the third busiest opera company in the world after the Vienna State Opera and the Metropolitan Opera, New York. To support this schedule, the company engages a full-time opera chorus and two resident orchestras — The Australian Opera and Ballet Orchestra, based in Sydney, and Orchestra Victoria in Melbourne.

**12.14 OPERA AUSTRALIA, Key indicators**

	1998	1999	2000	2001
Employees	1 175	1 118	1 389	1 254
Performances	237	237	196	225
Attendances	268 866	290 770	254 212	268 012

Source: *Opera Australia*.

## The Australian Ballet

The Australian Ballet, formed in 1962, is a full-time ensemble company that presents over 180 performances annually both in Australia and abroad. The company has received international

acclaim for its presentations of great ballet classics, as well as modern repertoire created by Australian and international choreographers.

In 2001 the Australian Ballet gave 211 performances, up from 203 in 2000. It employed 150 persons, consisting of 69 dancers and 81 other staff (table 12.15).

## Film and video

### Film and video production

Australia has a well-developed audiovisual production industry composed, for the most part, of small specialised companies. They produce programs ranging from feature films to sports coverage, documentaries and television commercials. A relatively small number of Australian companies engage exclusively in film and television drama production. The majority specialise in the production of commissioned programs such as commercials and corporate communications.

The major market for Australian audiovisual products is the domestic television broadcast industry. However, export markets are also important for feature films and television dramas, some high-budget documentaries and some commercials.

**12.15 THE AUSTRALIAN BALLET**

	1996	1997	1998	1999	2000	2001
PERFORMANCES						
Theatres in Australia						
New South Wales	81	81	94	80	81	94
Victoria	60	62	63	48	61	68
Queensland	10	10	7	6	10	6
South Australia	7	6	8	6	8	13
Western Australia	—	6	—	—	6	—
Australian Capital Territory	6	8	7	—	6	6
Other venues in Australia						
Sydney Olympic Arts Festival	..	..	..	..	16	..
Regional (The Dancers Company)	28	10	18	23	14	16
Open-air	1	1	1	1	1	1
Overseas	14	—	—	20	—	7
<b>Total</b>	<b>207</b>	<b>184</b>	<b>198</b>	<b>184</b>	<b>203</b>	<b>211</b>
EMPLOYMENT(a)						
Dancers	62	62	62	62	61	69
Other staff(b)	82	82	82	82	78	81
<b>Total</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>144</b>	<b>139</b>	<b>150</b>

(a) Average for the year. (b) Includes artistic, music, production, marketing and administration staff.

Source: *The Australian Ballet, 'Annual Reports'*.

**12.16 FILM AND VIDEO PRODUCTION, Number and value of titles(a)**

Type of film	1996-97		1997-98		1998-99		1999-2000		2000-01	
	no.	\$m	no.	\$m	no.	\$m	no.	\$m	no.	\$m
Features	36	198	41	246	45	292	34	412	34	368
Adult TV drama										
Mini-series	6	69	3	12	4	62	3	23	4	41
Series and serials	20	158	20	165	20	234	20	228	24	220
Telemovies	12	26	12	41	16	59	24	76	21	144
Children's TV drama	12	72	16	109	8	52	12	86	13	88

(a) Includes production budgets of Australian, co-produced and foreign features and TV dramas shot in Australia, and in-house production by television stations.

Source: Australian Film Commission.

The film and video production industry comprises businesses mainly engaged in the production of motion pictures on film or video tape for theatre or television projection. Services such as casting, film editing and titling are also included.

A survey of the film and video production industry was conducted by the ABS in respect of 1999-2000. At the end of June 2000, there were 1,975 businesses in the film and video production industry, employing 15,195 persons. In 1999-2000 these businesses generated \$472.2m from the production of television programs, \$233.1m from the provision of production services to other businesses, \$262.6m from the provision of post-production/laboratory services to other businesses and \$505.9m in other income.

The Commonwealth Government provides assistance and encouragement, through measures such as the investment program of the Australian Film Finance Corporation, the development program of the Australian Film Commission and the Australian content regulations of the Australian Broadcasting Authority (ABA), for the production of high-cost feature films, television dramas and documentaries. Table 12.16 shows the number and value of Australian titles produced in Australia and overseas, as well as foreign titles shot in Australia, from 1996-97 to 2000-01.

During 1999-2000, businesses in the television services industry, film and video production industry, and film and video distribution industry incurred total film and video production costs of \$1,791.7m. Of these costs, \$1,315.4m was spent on productions specifically for television, \$243.0m on commercials and advertisements and \$233.4m on productions other than for television. These businesses completed, or were working on, 5,410 productions other than for television, of

which 4,727 were corporate, marketing or training videos and 51 were feature films. For additional information about the film and video production industry, see *Chapter 21, Service industries*.

### Film and video distribution

The film and video distribution industry comprises businesses mainly engaged in leasing or wholesaling motion pictures on film or video tape to organisations for exhibition or sale. Agents mainly engaged in leasing and wholesaling films and videos to organisations are also included.

At 30 June 2000, there were 58 businesses in the industry, which employed 1,426 people. In 1999-2000 these businesses generated \$1,141.8m in total income and had an operating profit before tax of \$103.6m. The main sources of income were the sale, rental or lease of prerecorded video tapes, disks, films and interactive software (\$841.1m), and the provision of channels to pay television broadcasters (\$169.2m). For additional information about the film and video distribution industry, see *Chapter 21, Service industries*.

### Motion picture exhibition

The motion picture exhibition industry comprises businesses mainly engaged in screening motion pictures on film or video tape. It also includes businesses mainly engaged in drive-in theatre operation, cinema operation and film or video festival operation.

The ABS conducted a survey on the motion picture exhibition industry in respect of 1999-2000. At the end of June 2000, there were 173 businesses in the industry, employing 9,282 people. The motion picture exhibition

industry had an operating profit before tax of \$113.3m for 1999–2000, which represented a profit margin of 11.4%.

At the end of June 2000, there were 326 cinema sites and 17 drive-in sites in Australia. For 1999–2000, there were 79 million paid admissions to cinemas.

For additional information about motion picture exhibition, see *Chapter 21, Service industries*.

## Cinema attendance

The 1999 Survey of Attendance at Selected Cultural and Sporting Events and Venues found that 67.0% of the Australian population aged 15 and over (almost 10 million persons) attended a cinema, drive-in or other public screening of a film at least once in the 12 months prior to interview in April 1999 (table 12.17). Attendance at cinemas was significantly higher than in 1995, when the attendance rate was 62.1% (8.7 million persons).

**12.17 ATTENDANCE(a) AT CINEMAS — 1999**

Attendance rate(b)	%
Sex	
Males	64.2
Females	69.6
Persons	67.0
Age group (years)	
15–17	90.9
18–24	88.3
25–34	78.6
35–44	72.5
45–54	63.8
55–64	50.3
65 and over	35.6
Birthplace	
Australia	69.7
Main English-speaking countries	69.1
Other countries	53.5

(a) Attendance at least once in the 12 months prior to interview in April 1999. (b) The number of people who attended, expressed as a percentage of the number of people in that population group.

Source: *Attendance at Selected Cultural Venues, Australia, April 1999 (41.14.0)*.

## Radio and television broadcasting

Broadcasting services in Australia are regulated primarily through the *Broadcasting Services Act 1992* (Cwlth). The Act identifies and defines categories of broadcasting services, establishes

regulatory arrangements for broadcasting services, and establishes the ABA as the independent regulator for radio and television in Australia.

The Act defines six categories of broadcasting services covering both radio and television:

- national broadcasting services — the ABC and the Special Broadcasting Service (SBS) are largely regulated through separate legislation
- community broadcasting services — non-profit free-to-air services provided for community purposes
- commercial broadcasting services — free-to-air radio and television services operated for profit and funded predominantly by advertising revenue
- subscription broadcasting services — services with general appeal to the public and funded predominantly by customer subscriptions
- subscription narrowcasting services — services with limited appeal to the public (either because of content or availability) and funded predominantly by customer subscriptions
- open narrowcasting services — services providing programs targeted to special interests groups (e.g. foreign language), or of limited appeal because of content or availability, and not funded by subscriptions.

## Australian Broadcasting Corporation (ABC)

The ABC has been in existence since 1932 as Australia's only national, non-commercial broadcaster. At 30 June 2001, the ABC's services included:

- a national analog television service
- a digital television service with analog simulcast in Sydney, Melbourne, Brisbane, Perth and Adelaide
- a digital multichannel service in Sydney, Melbourne, Brisbane, Perth and Adelaide
- local television services in each state and territory
- ABC Asia Pacific, an international television service broadcasting via satellite to Asia and the Pacific
- four national radio networks
- Radio Australia, an international radio service broadcasting by shortwave and digital satellite to Asia and the Pacific

- nine metropolitan radio stations in capital cities and Newcastle
- 48 regional radio stations throughout Australia.

### Special Broadcasting Service (SBS)

SBS was established by the Commonwealth Government in 1978. Its principal function is to provide multilingual and multicultural radio and television services that inform, educate and entertain all Australians and, in doing so, reflect Australia's multicultural society.

Both SBS Radio and SBS Television broadcast nationally. The radio service has its origins in 1975 when ethnic radio stations 2EA in Sydney and 3EA in Melbourne began limited broadcasts. By 1996 SBS Radio had expanded to its current five signal service broadcasting in 68 languages. It operates a national signal heard in all capital cities and major regional centres, and separate AM and FM signals in Sydney and Melbourne. It broadcasts in more languages than any other radio network in the world.

SBS Television began in 1980. More than half of the programs broadcast are in languages other than English, but they are made accessible to all Australians through subtitling. SBS Television broadcasts in more than 60 languages — more than any other television network in the world — and has access to over 400 national and international program sources.

### Australian Broadcasting Authority (ABA)

The ABA, established in October 1992 under the *Broadcasting Services Act 1992* (Cwlth), is the regulator for radio and television broadcasting, digital broadcasting and Internet content in Australia. As well as planning the availability of segments of the broadcasting services bands (VHF/UHF television, FM and AM radio), the Authority has the power to allocate, renew, suspend and cancel licences and collect any fees payable for those licences.

Under the *Television Broadcasting Services (Digital Conversion) Act 1998* (Cwlth), the ABA was empowered to regulate for the introduction of digital broadcasting services in Australia from 1 January 2001.

In terms of broadcasting content, the ABA is empowered to:

- conduct research into community attitudes on programming matters

- develop program standards relating to broadcasting in Australia
- assist broadcasting service providers (licensees) develop codes of practice
- monitor compliance with licence conditions and codes of practice
- investigate complaints about services.

The ABA administers a regulatory scheme for Internet content which applies to Internet content hosts and Internet service providers. It also has a role in administering aspects of the *Interactive Gambling Act 2001* (Cwlth), including investigation of complaints about interactive gambling content and registration of industry codes of practice (and/or determination of industry standards) relating to certain interactive gambling matters.

### Television services industry

At the end of June 2000, in addition to the two public television broadcasters, there were 41 private sector television broadcasters, comprising 34 commercial free-to-air television broadcasting businesses (operating 48 television stations) and seven pay television broadcasting businesses (operating seven television stations). In 1999–2000 the private sector broadcasters earned a total income of \$4,181.9m, employed 10,668 persons and had a net worth of \$2,810.1m. Commercial free-to-air television broadcasters recorded an operating profit before tax of \$803.5m, while pay television broadcasters reported a loss of \$675.8m. For additional information about the television services industry, see *Chapter 21, Service industries*.

### Support for the arts

#### Cultural Ministers Council (CMC)

The CMC was established in 1984 to provide a forum for the exchange of views on issues affecting cultural activities in Australia and New Zealand. It comprises Australian Commonwealth, state and territory government ministers responsible for arts and cultural heritage, as well as the corresponding New Zealand government minister. The relevant minister from Papua New Guinea participates with observer status.

One of the CMC's core activities is the commissioning of studies and investigations through the appointment of working or advisory groups and/or consultants. In November 1985, the CMC established the Statistical Advisory

Group, now known as the Statistics Working Group. This group liaises with the ABS on cultural statistics, monitors the need for the development, collection and dissemination of culture and leisure statistics, commissions studies, and provides advice to the CMC on statistical matters.

## Australia Council

The Australia Council is the Commonwealth Government's arts funding and advisory body. It was formed as an interim council in 1973 and was given statutory authority by the *Australia Council Act 1975* (Cwlth). The Australia Council supports Australian artists and arts organisations in order to allow them to pursue artistic excellence, to create and present their work, to take advantage of opportunities to improve and develop their skills, and to tour and promote their work to wider audiences. It directly supports young, emerging, developing and established artists through a range of grant programs. These programs cover: Aboriginal and Torres Strait Islander arts; community and cultural development; dance; literature; major performing arts; music; new media arts; theatre; and visual arts/crafts. During 2000–01, some 4,369 grant applications were made to the Australia Council, of which 1,721 were successful. These grants totalled \$78m in 2000–01.

## Training in the arts

Training in the arts in Australia involves a broad range of organisations. Formal training is available through courses in TAFE institutions, universities and private institutions. A number of on-the-job training programs are also available in the arts, and many organisations offer in-house training programs for their staff. The last decade has seen the development in some states of multi-disciplinary tertiary institutions providing training in the arts.

A number of national specialised education institutions have been established to provide training in cultural fields. For example, the Australian Film, Television and Radio School is the national training centre for the film and broadcasting industries. The National Institute of Dramatic Art is the national training school for people who wish to enter the profession of theatre, film or television as actors, directors, designers, stage managers, theatre crafts technicians, production managers or teachers of voice and movement. The Australian Ballet School provides full-time training to the highest standard for young Australian dancers seeking a career in the classical dance profession. The

Australian National Academy of Music offers master classes and short-term programs which bring distinguished national and international performers and music educators into contact with students.

CREATE Australia is the national Industry Training Advisory Board for cultural industries. Its primary task is to help cultural industries develop and run high quality, relevant vocational education and training programs. CREATE Australia supports cultural industries by:

- developing quality training programs for industry — including competency standards, training packages, curriculum and assessment
- encouraging innovation in training development and delivery, and giving advice to industry about training
- encouraging partnerships between industry and training providers
- giving advice to government on policy and training priorities based on industry consultation.

Products developed and produced by CREATE Australia include: the national entertainment industry training package; the national library and information services industry training package; the national museums industry training package; resource materials to support the implementation of these training packages; language, literacy and numeracy resources to support training in the entertainment industry; and the community cultural development training directory.

In June 2001 CREATE Australia launched two new national industry training packages, one for film, television, radio and multimedia, and one for music. CREATE is currently developing a national industry training package for visual arts, craft and design. Scoping studies to investigate training needs for the writing, publishing and journalism sectors and the performing arts sectors are in progress.

## Festivals

Festivals have become a major part of Australian life and they offer a unique and valuable contribution to our culture. Community festivals throughout regional Australia are increasing both in number and popularity. They range in size from small community celebrations to major cultural events, and they feature a variety of

themes as diverse as flower arranging, heritage, food and wine, multicultural events, music and the arts.

An ABS survey on performing arts industries in Australia, in respect of 1999–2000, indicated that there were 152 performing arts festivals of more than two days duration. These comprised 72 music festivals and 71 multifaceted performing arts festivals, with the remaining 9 festivals focused on drama, comedy or dance. It is estimated that there were about 26,600 performing arts performances at these festivals, with total attendances estimated at 9.9 million.

Total income of these festivals was \$103m. The three main sources of income were ticket sales of \$42m (41% of total income), government funding of \$27m (26% of total income) and fundraising income of \$22m (22% of total income).

The ABS Work in Selected Culture and Leisure Activities Survey indicated that in the 12 months to April 2001, 193,900 people were involved in organising a festival of any type or duration. Of the people involved in festival organising, 50.3% were women and 49.7% were men; however, of the 317,500 people involved in fete organising, 73.6% were women and 26.4% were men. Some payment was received by 24.5% of people involved in organising festivals and 3.9% of people organising fetes.

## Employment and participation in cultural activities

### Employment in cultural occupations

The five-yearly Census of Population and Housing provides information on the number and characteristics of people whose main job in the week prior to the census was in a cultural occupation. People who had unpaid involvement in cultural activities, or who worked part-time in cultural activities but who had another job that they regarded as their main job in the week prior to the census, would not be recorded in the census as being cultural employees. Table 12.18 shows the number and sex of people who were recorded as having a main job in selected cultural occupations in the 2001 Census of Population and Housing.

**12.18 PERSONS IN SELECTED CULTURAL OCCUPATIONS — 2001**

	Males	Females	Persons
Graphic designer	11 545	9 599	<b>21 144</b>
Architect	9 012	2 297	<b>11 309</b>
Librarian	1 748	8 565	<b>10 313</b>
Music teacher (private)	2 569	5 876	<b>8 445</b>
Library assistant	1 174	7 224	<b>8 398</b>
Photographer	4 453	2 392	<b>6 845</b>
Instrumental musician	5 070	1 555	<b>6 625</b>
Architectural associate	5 223	1 188	<b>6 411</b>
Media producer	3 686	2 554	<b>6 240</b>
Library technician	642	5 499	<b>6 141</b>
Print journalist	2 933	2 589	<b>5 522</b>

Source: ABS data available on request, 2001 Census of Population and Housing.

## Involvement in culture and leisure activities

The most recent data about the involvement of persons aged 15 years and over in selected culture and leisure activities were collected in April 2001 as part of the ABS Work in Selected Culture and Leisure Activities Survey. During the 12 months prior to interview in April 2001, an estimated 2.5 million persons (16.8% of the Australian population aged 15 years and over) were involved in some form of paid or unpaid work relating to the culture and leisure activities covered in the survey. These figures exclude involvement solely for the respondent's own use or that of their family.

As table 12.19 shows, the Australian Capital Territory had the highest rate of involvement in this type of work, at 28.8% of residents aged 15 years and over. This was significantly higher than the Australian rate of 16.8%.

More persons had paid involvement in writing (214,800), design (210,700) and visual art activities (175,800) than in any other culture or leisure activity in the survey. Of those involved in writing, 40.0% received payment; for design, 60.2% received payment; while for visual art activities, 34.9% received payment. The activity with the highest percentage of people with paid involvement was television, with 64.6% of the 83,600 people involved receiving some payment.

## 12.19 PERSONS INVOLVED IN CULTURE AND LEISURE ACTIVITIES — 2001

	Some paid involvement(a)	Unpaid involvement only	Total persons involved	Persons with no involvement	Total persons	Participation rate
	'000	'000	'000	'000	'000	%
New South Wales	291.2	465.6	756.8	4 311.5	5 068.4	14.9
Victoria	222.2	416.6	638.8	3 141.7	3 780.5	16.9
Queensland	163.1	334.8	497.9	2 272.8	2 770.7	18.0
South Australia	74.7	140.9	215.6	965.6	1 181.2	18.3
Western Australia	91.3	157.1	248.4	1 220.8	1 469.2	16.9
Tasmania	20.1	45.8	65.9	297.8	363.7	18.1
Northern Territory(b)	8.8	11.4	20.2	90.7	110.9	18.2
Australian Capital Territory	28.5	39.3	67.8	167.9	235.7	28.8
<b>Australia</b>	<b>900.0</b>	<b>1 611.5</b>	<b>2 511.5</b>	<b>12 468.7</b>	<b>14 980.2</b>	<b>16.8</b>

(a) Includes persons who only received payment in kind. Of the 900,000 people who received some payment, 53,700 (6.0%) only received payment in kind. (b) Refers to mainly urban areas only.

Source: *Work In Selected Culture and Leisure Activities, Australia, April 2001 (6281.0)*.

## How Australians spend their free time

Generally, Australians fit their leisure activities into their free time, that is, the time left over after personal, family, educational and employment responsibilities. The 1997 Time Use Survey showed that Australians aged 15 years or more spent on average about 5 hours (316 minutes) or 22% of their time per day on free time activity as their main activity (table 12.20). People frequently undertake more than one activity at the same time (e.g. housework and listening to the radio). If simultaneous activities are included, Australians spent just over nine hours (552 minutes) on free time activities. Time spent using audio and audiovisual media (e.g. listening to the radio and watching television) showed the largest increase when comparing all activities (including simultaneous activities) with main activities. As a main activity, an average of just over two hours (131 minutes) was spent on using audio and audiovisual media. However, when simultaneous activities were included, time spent on this activity nearly doubled to over four hours (257 minutes).

## 12.20 AVERAGE TIME SPENT ON FREE TIME ACTIVITIES(a) — 1997

	Main activity minutes per day	All activities minutes per day
Social and community interaction		
Socialising	11	12
Visiting entertainment and cultural venues	5	5
Religious activities and ritual ceremonies(b)	5	5
Other	24	24
<b>Total</b>	<b>45</b>	<b>47</b>
Recreation and leisure		
Sport and outdoor activity	27	28
Games, hobbies, arts and crafts	16	20
Reading	25	37
Audio and audiovisual media	131	257
Talking (including phone)	35	115
Other	35	48
<b>Total</b>	<b>271</b>	<b>505</b>
<b>Total</b>	<b>316</b>	<b>552</b>

(a) Free time is the amount of time left over after necessary time, committed time and contracted time have been taken out of a person's day. Necessary time includes time spent on activities such as sleeping, eating and personal care. Committed time includes time spent on activities such as housework, care of children and shopping. Contracted time includes time spent on paid work and regular education.

(b) For more information on Australia's religious composition, see 'Chapter 5, Population'.

Source: *Time Use on Culture/Leisure Activities, 1997 (4173.0)*.

## Funding for culture

### Government funding

In Australia, all three levels of government provide funding for cultural activities, facilities and services.

Total government funding for cultural activities was \$4,447.4m in 2000–01 (table 12.21). Of this, the Commonwealth Government contributed \$1,639.7m (37%), state and territory governments contributed \$1,935.2m (44%) and local governments provided \$872.4m (20%).

The majority of the funding supported Heritage activities (\$2,743.7m or 62% of total funding). In particular, Nature parks and reserves (\$978.5m), Libraries and archives (\$838.8m) and Other museums (which consist largely of museums other than art museums) (\$613.1m) collectively accounted for 55% of the total government funding. Arts activities received the remaining \$1,703.7m (38%) of government funding. These funds were mainly for Broadcasting and film (\$902.3m) which accounted for 20% of total government funding for culture.

### Business funding

The ABS conducted a Business Generosity Survey in respect of 2000–01. During that period, businesses gave \$1,446.6m to organisations or individuals, of which the arts and culture activities (namely the performing arts; the creative arts; museum, art gallery and library activities; and zoological or botanical parks and gardens operation) received \$69.6m (5%). This comprised \$40.4m of sponsorship, \$22.8m of donations and \$6.3m of business to community projects. Sport and recreation activities received 43% of the total given by businesses to organisations or individuals. For additional information see the section *Funding for sport and recreation*. Other activities covered by the survey were community service and welfare, health, education and training, and environmental activities.

### Children's participation in cultural and leisure activities

A survey of children's activities in the 12 months to April 2000 found that 29% of children aged 5–14 years (777,700 children) were involved in at least one of four selected organised cultural activities outside of school hours. Girls were twice as likely as boys (40% compared with 20%) to participate in at least one of these activities (table 12.22).

12.21 CULTURAL FUNDING — 2000–01

	Level of government			Total \$m
	Commonwealth \$m	State/territory \$m	Local \$m	
<b>Heritage</b>				
Art museums	42.4	94.4	54.1	190.9
Other museums	306.9	255.2	51.0	613.1
Nature parks and reserves	63.6	891.3	23.6	978.5
Zoological parks, aquaria and botanic gardens	5.7	101.4	15.4	122.5
Libraries and archives	83.0	297.0	458.7	838.8
<b>Total</b>	<b>501.5</b>	<b>1 639.3</b>	<b>602.8</b>	<b>2 743.7</b>
<b>Arts</b>				
Literature and print media	22.0	4.3	2.6	28.9
Performing arts	95.9	76.2	28.6	200.8
Performing arts venues	5.5	93.5	48.8	147.8
Public halls and civic centres	—	1.1	132.5	133.6
Visual arts and crafts	15.7	10.8	2.8	29.2
Broadcasting and film	853.0	47.1	2.2	902.3
Community cultural activities	53.3	21.3	17.8	92.4
Administration of culture	31.2	31.3	25.6	88.0
Other arts n.e.c.	61.6	10.3	8.7	80.7
<b>Total</b>	<b>1 138.2</b>	<b>295.9</b>	<b>269.6</b>	<b>1 703.7</b>
<b>Total</b>	<b>1 639.7</b>	<b>1 935.2</b>	<b>872.4</b>	<b>4 447.4</b>

Source: *Cultural Funding by Government, Australia, 2000–01* (4183.0).

## 12.22 CHILDREN INVOLVED IN CULTURAL ACTIVITIES(a), Participation rate — 2000

	Age (years)										All children %
	5 %	6 %	7 %	8 %	9 %	10 %	11 %	12 %	13 %	14 %	
<b>Males</b>											
Playing a musical instrument	*4.0	9.8	11.0	16.5	17.0	20.4	20.2	20.8	19.7	18.1	<b>15.8</b>
Singing	**1.1	**0.6	*2.1	*3.2	*3.8	*4.1	*3.0	*4.4	*3.6	*2.8	<b>2.9</b>
Dancing	**1.2	*2.2	*2.1	**0.8	*1.5	*1.6	**0.5	*2.8	*2.7	*1.7	<b>1.7</b>
Drama	**0.1	*1.3	*3.6	*3.5	*2.8	*4.7	*2.4	*4.3	*4.2	*4.8	<b>*3.2</b>
All	6.2	12.6	15.2	20.5	20.5	25.2	23.5	24.6	24.4	24.0	<b>19.7</b>
<b>Females</b>											
Playing a musical instrument	5.4	8.2	15.6	23.7	24.1	27.3	29.4	23.0	23.7	20.0	<b>20.2</b>
Singing	**1.1	*3.5	*4.1	7.5	7.7	10.3	7.7	8.8	7.6	7.7	<b>6.7</b>
Dancing	23.3	25.0	22.0	21.0	21.4	19.5	20.4	15.2	15.7	11.6	<b>19.5</b>
Drama	**0.7	*2.6	*5.1	5.8	5.7	7.8	7.2	10.5	8.4	7.0	<b>6.1</b>
All	27.9	32.8	37.1	41.8	44.8	45.0	48.0	42.1	41.5	34.6	<b>39.7</b>
<b>Persons</b>											
Playing a musical instrument	4.7	9.1	13.2	20.1	20.5	23.7	24.5	22.0	21.7	19.0	<b>17.9</b>
Singing	*1.1	*1.9	3.0	5.3	5.8	7.0	5.2	6.7	5.6	5.1	<b>4.7</b>
Dancing	12.1	12.9	11.7	10.8	11.3	10.1	9.9	9.3	9.1	6.5	<b>10.4</b>
Drama	**0.4	*1.9	4.3	4.6	4.2	6.2	4.7	7.5	6.3	5.8	<b>4.6</b>
All	16.9	22.0	25.8	31.1	32.5	34.6	35.1	33.8	32.8	29.1	<b>29.4</b>

(a) Outside of school hours during the 12 months prior to interview in April 2000.

Source: *Children's Participation in Cultural and Leisure Activities, Australia, April 2000 (4901.0)*.

During the year, 10% of girls were involved in more than one of the selected organised cultural activities outside of school hours, compared with 3% of boys. The rate of children's participation in at least one of the organised cultural activities ranged from 22% in the Northern Territory to 34% in the Australian Capital Territory.

Playing a musical instrument was the most popular of the selected cultural activities (18%), followed by dancing (10%), singing (5%) and drama (5%). The activity with the highest ratio of girls to boys was dancing, with 11 times more girls participating than boys.

Participation in dancing was highest for children aged 6 years (13%) and lowest for children aged 14 years (7%). Participation in the other three activities peaked between 10 and 12 years of age. During the 12-month period, 93% of those children who were involved in dancing had dancing lessons. Some 75% had lessons in playing a musical instrument, 69% participated in drama lessons and 57% in singing lessons.

In the two school weeks prior to interview in April 2000, 44% of children (34% of boys and 55% of girls) undertook art and craft activities. This compares with 97% of children who watched television or videos and 69% who played electronic or computer games.

Further details about children's participation in organised sports and other leisure activities are outlined in the section *Children's participation in sports and leisure activities*.

## Sport and recreation

Australia is recognised internationally as a nation that is very much involved in sport. Sport and recreation form an integral part of Australian culture and there are believed to be many benefits associated with participating in sport and physical activity, including enjoyment, social interaction, health, personal achievement, national pride and community involvement. In many ways sport unites and personifies the nation. Interestingly, Australians competed internationally as 'Australia' in sport before Australia was federated as a nation.

## Sport and recreation administration

Governments invest in sport and recreation because it returns both tangible and intangible benefits to the nation. Federal, state, territory and local governments all play an important role in the development of Australian sport and recreation. The provision of quality facilities, whether they be state of the art stadiums or community cycling paths, encourages physical activity and, importantly, good health.

## Sport and Recreation Ministers' Council (SRMC)

The SRMC provides the major mechanism for liaison between the Commonwealth Government and state and territory governments on matters concerned with sport and recreation in Australia and, more recently, in New Zealand and Papua New Guinea. The SRMC is a forum for consultation and cooperation between the respective governments, with its membership comprising ministers with prime responsibility for sport and recreation.

The Standing Committee on Recreation and Sport (SCORS) — comprising representatives of the relevant ministers' departments and the Australian Sports Commission — provides advice and administrative support to the SRMC.

The Recreation and Sport Industry Statistics Group is a sub-committee of SCORS. Its role is to improve the range, definition and quality of statistics for the sport and recreation industry. It comprises representatives from Commonwealth, state and territory departments responsible for sport and recreation, the ABS, the Australian Sports Commission and Sport Industry Australia.

## National Sporting Organisations

Sports in Australia are managed and coordinated by National Sporting Organisations (NSOs). Each organisation manages the participation and development of a specific sport in Australia. They are able to offer guidance and further contacts for those seeking information on their sport. There are 129 such organisations in Australia.

## Australian Sports Commission (ASC)

The ASC is the Commonwealth government agency responsible for the funding and development of sport in Australia. The ASC's national leadership role is achieved through two operational areas: the Australian Institute of Sport (AIS) and the Sport Development Group (SDG).

Through the AIS and the Active Australia program, the ASC supports a wide range of initiatives designed to develop sporting excellence and increase participation in organised sport by all Australians. The ASC works in partnership with NSOs to establish specific sport development programs at all levels.

The AIS is the elite sport development arm of the ASC. Its core business is to provide a world class training environment to support AIS athletes and

coaches. The AIS has four operational areas: Planning and Evaluation; Coach and Athlete Services; Technical Direction; and Business Development. In 2002, these areas supported 35 programs in 26 sports for the 700 athletes on scholarship. For more information about the AIS, refer to the article *Australian Institute of Sport* in *Year Book Australia 2002*.

The SDG provides a full range of advisory and support services to assist NSOs and their affiliated organisations and clubs, with the aim of increasing the number of people participating in sport across Australia, especially in rural and regional Australia. In addition the SDG administers the ASC's Sports Excellence and Sport Development grant programs. These programs provide essential funding to NSOs to support the operation of their organisation, as well as high performance and sport development activities.

## Australian Sports Drug Agency (ASDA)

The ASDA is the custodian of Australia's athlete anti-doping program and it plays a leading role, within Australian and international sports communities, in delivering drug testing and education services. ASDA also provides policy advice to sporting organisations and the Commonwealth Government regarding 'drugs in sport' issues. ASDA is an independent statutory authority and was established in 1990.

## Australia Sport International (ASI)

ASI was established by the Australian Government to connect international businesses to Australian suppliers of sport- and recreation-related goods and services. ASI helps organisations in the Australian sports and recreation industry to enhance their export performance by providing access to a range of services designed to support their international marketing efforts.

## Sport Industry Australia

The peak body for the sport and recreation industry in Australia is Sport Industry Australia. Established in 1976 as the Confederation of Australian Sport, it sees its role as maximising the contribution that sport and recreation make to the health and wellbeing of individual Australians, their community and the Australian economy. It aims to build and strengthen the network between what it refers to as the not-for-profit sport and recreation sector, sport businesses and governments.

### **Australian Olympic Committee (AOC)**

The AOC is recognised by the International Olympic Committee as the National Olympic Committee in Australia responsible for the protection and development of the Olympic Movement in this country, as well as the promotion of its goals and principles. The AOC is committed to: the development of Australia's athletes; organising and funding Australia's Olympic teams; and encouraging the development of high performance sport through athlete support and funding initiatives.

### **Australian Paralympic Committee (APC)**

The APC administers funding provided by the ASC for athletes with disabilities to undertake high-level training and compete in the Paralympic Games and other major international sporting events. The APC is also responsible for the selection, assembly and management of Australian teams participating in international events for athletes with disabilities.

### **Australian Commonwealth Games Association (ACGA)**

The ACGA is responsible for assisting the growth of the Commonwealth Games movement in Australia and the development of the athletes and sports which are the foundation of the Games. The ACGA also assists other nations, especially the emerging nations, with development programs and projects.

The ACGA provided support for the Commonwealth Games held in Manchester in 2002, and will be closely involved with the management of the Commonwealth Games in Melbourne in 2006.

### **Melbourne 2006 Commonwealth Games Pty Ltd**

Melbourne 2006 Commonwealth Games Pty Ltd is the organising committee for the 2006 Melbourne Commonwealth Games. The Committee's board members were nominated by the state government of Victoria, ACGA and the Commonwealth Games Federation.

### **Sport and Recreation Training Australia (SRTA)**

SRTA is a national Industry Training Advisory Board for sport and recreation industries.

The primary roles of SRTA are to advise government on, and assist industry with, vocational education and training matters for the sport and recreation industries.

Some of the key activities undertaken by SRTA include:

- industry consultation, research and analysis relating to vocational education and training matters
- information dissemination and marketing to industry stakeholders
- development and maintenance of national training packages
- management of, and participation in, nationally based vocational education and training projects (e.g. workplace assessment, case studies, and support materials)
- participation in industry and government committees, forums, networks, and consultation and planning processes.

SRTA has developed training packages for various sectors of the sport and recreation industry, including outdoor recreation, sport, fitness and community recreation. The former two packages were re-released in 2002. The latter two packages are currently under review.

### **Australian Council for Health, Physical Education and Recreation (ACHPER)**

ACHPER is a national professional association representing people who work in the areas of health education, physical education, recreation, sport, dance, community fitness or movement sciences.

ACHPER is a membership-based non-profit organisation, governed by a volunteer board comprising professionals from educational and community sectors. ACHPER advocates and lobbies on behalf of its members, undertakes research and provides an advisory consultancy service, conducts teacher professional development programs, and conducts leadership training programs for community fitness instructors.

## Funding for sport and recreation

### Government funding for recreation and sport

Total expenditure by the three levels of government (Commonwealth, state and territory, and local) on recreational facilities and services in 1998–99 was \$4,775m. Funds are sometimes transferred between levels of government before being spent on recreational facilities and services. The following expenditures by components of government sum to more than the total expenditure by all levels of government, because transfers have been included in the component figures, but not double-counted in the total figure. Most expenditure was sourced from general government (e.g. government departments), at \$3,447m, compared with \$1,915m by public non-financial corporations. Of general government expenditure, Commonwealth government expenditure was \$236m, states and territories spent \$1,767m and local governments \$1,515m. Of all public expenditure on recreational facilities and services, current expenditure was much larger than capital expenditure (\$3,890m compared with \$885m).

The Commonwealth Government, through the ASC, supports the development of sport in Australia. In 2001, the Government announced funding to sport of almost \$550m to be spent over four years. Of this, over \$400m is aimed at elite athlete development, \$82m is directed at participation program initiatives, and remaining funding is directed to other sport initiatives, including initiatives to detect and combat the use of drugs by sports participants. In 2002, the Government announced an additional investment of \$65.4m to upgrade and expand facilities at the AIS in Canberra.

### Business funding

According to the ABS Business Generosity Survey, during 2000–01 businesses gave \$1,447m to organisations and individuals, of which sport and recreation activities (which included the operation of sporting events, clubs and teams; indoor or outdoor recreational facility operations; social, leisure and hobby club activities; and recreational parks and gardens operations) received \$628m (43%). This comprised \$480m of sponsorship, \$109m of donations and \$39m of business to community projects related to sport and recreation. Activities associated with sport and recreation attracted the most sponsorship

funding compared with the other activities surveyed, namely community service and welfare, arts and culture, health, education and training, and environmental activities.

## Sport, recreation and gambling industries

The ABS conducted a series of surveys of the sport, recreation and gambling industries in respect of 2000–01.

At the end of June 2001, there were 7,147 employing organisations involved in the provision of sport and physical recreation activities. This total comprised: 1,034 horse and dog racing organisations; 667 health and fitness centres; 864 other sports and physical recreation venues; 756 sports and physical recreation administrative organisations; 1,937 sports and physical recreation clubs, teams and sports professionals; 1,259 other sports services; and 630 government organisations. These organisations had a total income of \$8,466m and expenses of \$8,608m in 2000–01. At the end of June 2001 the organisations employed 98,267 people and were assisted by 178,837 volunteers during the month of June. For additional information on sport and physical recreation industries, see the article *Sports industries* in *Chapter 21, Service industries*.

At the end of June 2001, there were 1,092 businesses operating in the gambling services industries in Australia. Of these, 10 were lottery operators, 13 were casinos, and the remaining 1,069 provided other gambling services such as bookmaking and totalisator services. The gambling services industries employed 32,591 persons, which was 7% less than at the end of June 1998, and received \$9,543m in income, which was 21% higher than in 1997–98. The major source of income (90%) was the net takings from gambling (i.e. the revenue earned by businesses from gambling services, net of payouts to players or bettors). Total expenses for the gambling services industries were \$8,179m, of which 37% were gambling or gaming taxes and levies.

There were 2,911 organisations (operating at 3,121 premises in Australia) in the hospitality clubs industry at the end of June 2001. These organisations employed 64,990 persons, which was marginally higher than three years earlier, and received a total income of \$6,297m, which was 10% higher than in 1997–98. Of these organisations, 1,952 (67%) had gambling facilities.

These organisations received 96% (\$6,036m) of the industry's total income, of which 64% (\$3,835m) was income from gambling. Gambling income had increased by 24% since 1997–98.

There were 4,003 businesses operating pubs, taverns and bars in 4,627 premises at the end of June 2001. Gambling services were provided by 2,566 (64%) of these businesses. The major source of income for pubs, taverns and bars was the sale of liquor and other beverages (\$5,682m). This was 63% of the total income of \$9,007m. Gambling was the second major source of income (\$2,121m, or 24% of total income). Total income of pubs, taverns and bars had increased by 13% since 1997–98. Income from sales of liquor and other beverages had increased marginally since 1997–98, while income from gambling increased by 64%. Most of the gambling income (78%, \$1,659m) was net takings from poker or gaming machines, 19% (\$396m) was commission or venue share from poker or gaming machines, and 3% (\$53m) was commissions from TAB.

In all, the ABS surveys indicated that there were 6,012 businesses (across a range of industries) providing gambling facilities in Australia at the end of June 2001, and that net takings from gambling in 2000–01 were \$13.8b; this represented an increase of 26% since 1997–98. Almost two-thirds (63%, or \$8,752m) of the total net takings from gambling came from poker and gaming machines. Net takings from poker and gaming machines increased by 39% over takings in 1997–98, and the number of poker or gaming machines in use at the end of June 2001 (185,512) increased by 19.5% from the number in use three years earlier. Most of these machines were located in hospitality clubs (60%), pubs, taverns and bars (30%) and casinos (6%).

The sections *Hospitality industries* and *Gambling services* in *Chapter 21, Service industries* contain some additional information for these industries.

## Amusement and leisure industries

In respect of the 2000–01 financial year, the ABS conducted surveys of major amusement and theme parks, and amusement centres.

Major amusement and theme parks were defined as parks which:

- were operated on a commercial basis
- were permanently based at a fixed site
- had multiple rides and attractions
- had over 50,000 attendees for the year.

At the end of June 2001, there were 30 amusement and theme parks within the scope of the survey operating in Australia, and these employed 4,150 persons. During 2000–01, there were 8.9 million visits to these amusement and theme parks. Total income for businesses operating these parks was \$287m. The seven parks in Queensland earned 71% of this total income and had 59% of the total employment; and the 12 parks in New South Wales earned 24% of the total income and had 36% of the total employment. Additional information on amusement and theme parks may be found in the *Amusement and leisure* section in *Chapter 21, Service industries*.

Amusement centres include indoor play centres, amusement machine centres, mini golf centres, go-kart venues and similar operations. At the end of June 2001, there were 288 businesses operating amusement centres. These operations were carried out at 384 locations, 236 in capital cities and suburbs, and 148 in other areas. Of the 384 locations, 138 were amusement machine centres.

Amusement centres employed 2,793 people at the end of June 2001 and earned a total income of \$137m in 2000–01 (table 12.23). New South Wales and Victoria each had 28% of the total amusement centre locations in Australia. The centres located in New South Wales accounted for 25% of the industry employment and 27% of the industry income, while those in Victoria accounted for 42% of the industry employment and 40% of the industry income (New South Wales and Victoria's shares of the Australian population are 34% and 25% respectively). A greater proportion of the larger units in this industry were based in Victoria, and those with activities in both states had more significant operations in Victoria.

Additional information on amusement centres may be found in the *Amusement and leisure* section of *Chapter 21, Service industries*.

## 12.23 AMUSEMENT CENTRES — 2000–01

	Businesses at end June(a)	Locations at end June		Employment at end June		Wages and salaries		Total income	
		no.	%	no.	%	\$m	%	\$m	%
New South Wales	79	107	27.8	697	25.0	9.7	26.8	37.6	27.5
Victoria	88	109	28.3	1 162	41.6	16.0	44.1	54.9	40.1
Queensland	47	63	16.4	367	13.1	4.7	12.8	21.5	15.7
Western Australia	30	35	9.1	168	6.0	1.8	5.0	8.0	5.8
South Australia	36	45	11.7	295	10.6	3.0	8.4	10.2	7.5
Tasmania	10	14	3.6	35	1.3	0.5	1.4	1.8	1.3
Northern Territory	3	3	0.8	7	0.3	—	0.1	0.2	0.2
Australian Capital Territory	9	9	2.3	63	2.3	0.5	1.4	2.7	2.0
<b>Australia</b>	<b>288</b>	<b>384</b>	<b>100.0</b>	<b>2 793</b>	<b>100.0</b>	<b>36.2</b>	<b>100.0</b>	<b>136.9</b>	<b>100.0</b>

(a) Multi-state businesses are counted in each state in which they operate. Hence the counts of businesses for states and territories do not sum to the total for Australia.

Source: *Selected Amusement and Leisure Industries, Australia, 2000–01* (8688.0).

## Involvement and participation in sports and physical activities

### Involvement in organised sports and physical activities

In the 12 months to April 2001, an estimated 4.1 million persons (27.1% of all people aged 15 years and over) were involved in sport and physical activity that was organised by a club, association or other organisation. This involvement includes players or participants and those involved in non-playing roles that support, arrange and/or run organised sport and physical activity. A total of 3.5 million persons (23.5%) were players or participants in at least one organised sport or physical activity, and over 1.4 million persons (9.5%) were involved as coaches, referees, administrators, scorers or in other non-playing roles.

Of the 4.1 million persons involved in organised sport and physical activity, 0.9 million (21.6% of those involved) were both a player and involved in at least one non-playing role. Of the 1.4 million persons with non-playing involvement, 33.8% participated in more than one non-playing role. In all, these 1.4 million persons had 2.1 million involvements in non-playing roles in the 12 months prior to interview (table 12.24).

### Participation in sports and physical activities

Table 12.25 shows the results of an ABS survey on the sports and physical activities (both organised and non-organised) in which Australians participated in 1999–2000.

The survey found that 54.7% of the population (7,541,700 people) aged 18 years and over participated as a player or participant (rather than in a support role) in one or more sports or physical activities.

Participation rates were highest for the 18–24 year age group (73.5%), and declined steadily with age. The rate for persons aged 65 years and over was 33.8%.

Males had a higher participation rate than females in every age group. Overall, males had a participation rate of 58.5% compared with 50.9% for females.

### Popular sports and physical activities

In 1999–2000, participation by adults in activities organised by clubs or associations was highest in aerobics/fitness, golf, lawn bowls, tennis and netball. However, when non-organised participation is included, the activities which attracted the most participants were walking (about 2.6 million people), swimming (1.9 million), aerobics/fitness (1.4 million), golf (1.3 million) and tennis (1.0 million).

For men, the most popular activities were golf and walking; for women, walking and swimming had the most participants (table 12.26).

**12.24 INVOLVEMENT IN ORGANISED SPORTS AND PHYSICAL ACTIVITIES(a) — 2001**

Type of involvement	Some paid involvement(b) '000	Unpaid involvement only '000	Total involvements '000	Participation rate(c) %
Playing	88.1	3 428.3	3 516.4	23.5
Non-playing roles				
Coach, instructor or teacher	105.8	452.6	558.4	3.7
Referee or umpire	69.5	270.5	340.0	2.3
Committee member or administrator	24.3	570.7	595.0	4.0
Scorer or timekeeper	*14.6	439.1	453.7	3.0
Medical support	*11.9	78.2	90.1	0.6
Other involvement	*7.3	79.8	87.1	0.6
<i>Total</i>	233.5	1 890.9	2 124.3	..
<b>Total</b>	<b>321.6</b>	<b>5 319.2</b>	<b>5 640.8</b>	<b>..</b>

(a) Relates to persons aged 15 years and over who were involved in sport or physical activity organised by a club, association or other organisation in the 12 months prior to interview in April 2001. (b) Includes those who were paid for all or some of their involvement. Payment includes payment in dollars and/or goods and services. (c) Refers to the number of persons involved in organised sport and physical activity, expressed as a percentage of the civilian population aged 15 years and over.

Source: *Involvement in Organised Sport and Physical Activity, Australia, April 2001* (6285.0).

**12.25 PARTICIPATION IN SPORTS AND PHYSICAL ACTIVITIES(a) — 1999–2000**

Age group (years)	Males		Females		Persons	
	Number '000	Participation rate %	Number '000	Participation rate %	Number '000	Participation rate %
18–24	745.8	79.7	605.4	67.0	1 351.2	73.5
25–34	960.2	68.9	910.5	64.2	1 870.7	66.6
35–44	833.5	58.5	837.8	57.7	1 671.3	58.1
45–54	657.7	51.9	565.7	45.0	1 223.4	48.5
55–64	409.1	48.8	312.3	37.6	721.5	43.2
65 and over	372.6	39.4	330.9	29.2	703.5	33.8
<b>Total persons</b>	<b>3 979.0</b>	<b>58.5</b>	<b>3 562.7</b>	<b>50.9</b>	<b>7 541.7</b>	<b>54.7</b>

(a) Relates to persons aged 18 years and over who participated in sport or physical activity during the 12 months prior to interview during 1999–2000.

Source: *Participation in Sport and Physical Activities, Australia, 1999–2000* (4177.0).

The most popular sports or physical activities varied with age. In the 18–24 year age group, swimming had the most participants (350,900), followed by aerobics/fitness (345,300) and walking (231,600). For people aged 45 years and over, walking (1,170,200) had the most participants, followed by golf (575,700) and swimming (485,300).

**State and territory differences**

Differences in levels of participation in sport and physical activities in different parts of the country are in part affected by the age profiles of those populations, but other factors such as climate and life-style preferences of individuals may also be important, as well as the existence of facilities, including cycle and walking paths. These differences can be observed between the states and territories. In 1999–2000 adults in the Australian Capital Territory recorded the highest participation rate (65.3% of persons aged 18 and over). South Australia, on the other hand, recorded the lowest participation rate (50.1%) (table 12.27).

### 12.26 ADULT PARTICIPATION IN SELECTED SPORTS AND PHYSICAL ACTIVITIES(a) — 1999–2000

	Number '000	Participation rate %
<b>MALES</b>		
Golf	1 059.2	15.6
Walking	934.0	13.7
Swimming	885.3	13.0
Fishing	579.5	8.5
Aerobic/fitness	511.8	7.5
Tennis	508.1	7.5
Cycling	446.4	6.6
Running	425.9	6.3
Surf sports	247.2	3.6
Lawn bowls	243.5	3.6
<b>FEMALES</b>		
Walking	1 664.7	23.8
Swimming	1 026.3	14.7
Aerobics/fitness	933.1	13.3
Tennis	512.4	7.3
Netball	319.5	4.6
Golf	265.6	3.8
Cycling	232.6	3.3
Running	229.1	3.3
Tenpin bowling	164.8	2.4
Martial arts	150.4	2.1

(a) Persons aged 18 years and over.

Source: *Participation in Sport and Physical Activities, Australia, 1999–2000 (4177.0)*.

### 12.27 PARTICIPATION IN SPORT(a) — 1999–2000

	Males %	Females %	Persons %
New South Wales	57.2	48.3	<b>52.7</b>
Victoria	59.8	49.8	<b>54.7</b>
Queensland	57.6	51.5	<b>54.5</b>
South Australia	54.4	45.9	<b>50.1</b>
Western Australia	64.3	64.6	<b>64.5</b>
Tasmania	53.3	49.5	<b>51.3</b>
Northern Territory(b)	56.5	54.7	<b>55.7</b>
Australian Capital Territory	68.9	61.9	<b>65.3</b>
Australia	58.5	50.9	<b>54.7</b>

(a) Persons aged 18 years and over. (b) Figures for NT refer to mainly urban areas only.

Source: *Participation in Sport and Physical Activities, Australia, 1999–2000 (4177.0)*.

## Masters sport

Many people who were involved in sport when young are keen to continue or renew their active involvement by competing with and against their age peers rather than retiring from sport once

they reach a certain age or feel that they are less competitive in open competition than they used to be.

A large number of sports offer Masters (or Veterans) sport where the competitions are arranged in age groups to allow participants to compete and enjoy their sport against people of similar age. A number of multi-sport festivals for the mature-aged competitors, known as Masters Games, are conducted in various locations.

The flagship event of Masters Sport is the Australian Masters Games. The 8th Australian Masters Games, the most recent, were held in Newcastle in 2001 and attracted 11,225 participants. The next Games, the 9th Australian Masters Games, will be conducted in Canberra in October and November 2003.

## Attendance at sporting events

Attending sports events (such as club matches and international competitions) is a popular pastime of many Australians. During the 12 months prior to interview in April 1999, about 7 million people, or 47% of all people aged 15 years and over, attended a sporting event (excluding junior and school sport). The attendance rate was virtually unchanged from the rate recorded in a similar survey in 1995. Men (55%) were more likely to have attended than women (40%). For both men and women, attendance rates were highest for the 15–24 year age group (69% and 58% respectively) and steadily declined with age. Among men aged 65 years and over, the attendance rate was 28%, while for women in this age group it was 17%.

During the 12 months prior to interview in April 1999, the most popular spectator sport was Australian Rules football — 2.5 million people attended this sport on at least one occasion during the year (table 12.28). Horse racing (1.8 million), motor sports (1.6 million) and Rugby League (1.5 million) were also among the most popular spectator sports.

The total attendance rate in 1999 was 43.1%, virtually unchanged from the attendance rate in 1995 (43.2%). However, there had been a significant increase in attendance at Australian Rules football (from 13.3%, or 1.9 million people in 1995).

**12.28 ATTENDANCE(a) AT SELECTED SPORTING EVENTS — 1999**

	Persons	Attendance rate(b)
	'000	%
Australian Rules football	2 509.2	16.8
Horse racing	1 756.4	11.8
Motor sports	1 574.3	10.6
Rugby League	1 501.1	10.1
Cricket	942.5	6.3
Soccer	621.2	4.2
Harness racing	534.8	3.6
Basketball	526.0	3.5
Rugby Union	446.2	3.0
Tennis	444.0	3.0
Dog racing	276.4	1.9
Netball	248.7	1.7

(a) Attendance at a sporting event, match or competition as a spectator by persons aged 15 years and over in the 12 months prior to interview in April 1999. (b) The number of people who attended, expressed as a percentage of the civilian population aged 15 years and over.

Source: *Sports Attendance, Australia, April 1999 (4174.0)*.

## Children's participation in sports and leisure activities

### Children's participation in organised sport

A survey of children's activities in the 12 months to April 2000 found that 1.6 million children aged 5–14 years (50%) participated outside of school hours in sport that had been organised by a school, club or association.

For both boys and girls, participation in organised sport peaked at the age of 11 years. However, across all ages boys were more likely to participate than girls (the total participation rate was 66% for boys and 52% for girls) (table 12.29). There was also a higher percentage of boys participating in more than one sport (32% of boys compared with 20% of girls).

Of those who played organised sport outside of school hours, boys played more often: 52% of the boys played an average of once a week or more over the year ending April 2000, compared with 45% of girls. Older children played organised sport more frequently, with 57% of those 12–14 year old children who had participated doing so an average of once a week or more over the year, compared with 36% of their 5–8 year old counterparts.

Of children in all the states and territories, those in the Northern Territory had the highest participation rate (66%) in organised sport outside of school hours, while those in Queensland had the lowest participation rate (56%). Children living in the six state capital cities had a lower participation rate in organised sport outside of school hours than those living elsewhere in Australia (57% compared with 62%).

**12.29 CHILDREN'S PARTICIPATION IN ORGANISED SPORT(a) — 2000**

Age (years)	Number			Participation rate		
	Males	Females	Persons	Males	Females	Persons
	'000	'000	'000	%	%	%
5	46.0	37.9	83.8	35.1	29.5	32.3
6	79.5	42.8	122.2	58.9	36.2	48.3
7	90.1	62.2	152.3	65.8	48.6	57.5
8	101.5	78.9	180.4	72.2	57.2	64.8
9	99.4	80.1	179.5	72.0	59.6	65.9
10	106.8	77.2	184.0	74.1	59.2	67.0
11	108.7	77.3	186.0	76.3	60.7	69.0
12	88.9	82.1	171.0	71.8	60.6	66.0
13	90.9	72.1	163.1	69.1	56.6	63.0
14	83.5	62.5	145.9	63.8	51.8	58.0
<b>Total</b>	<b>895.2</b>	<b>673.0</b>	<b>1 568.2</b>	<b>66.1</b>	<b>52.3</b>	<b>59.4</b>

(a) Outside of school hours during the 12 months prior to interview in April 2000.

Source: *Children's Participation in Cultural and Leisure Activities, Australia, April 2000 (4901.0)*.

### Children's sports with the most participants

The sports that attracted most boys were outdoor soccer (with a participation rate for boys of 20%), swimming (13%), Australian Rules football (13%) and outdoor cricket (10%). For girls, the most popular sports were netball (18%), swimming (16%), tennis (8%) and basketball (6%) (table 12.30).

About an equal percentage of girls and boys participated in athletics (including track and field) and hockey (50% of those involved in athletics and 51% of hockey players were girls). However, for some sports, there is a clear difference between the sexes in preferences or opportunities. Most (97%) netball players were girls while boys made up 98% of Australian Rules footballers, 97% of Rugby League players and 95% of outdoor cricket players.

### Children's participation in leisure activities

In the two school weeks prior to interview in April 2000, skateboarding and rollerblading were undertaken outside of school hours by 31% of children aged 5–14 years. During the same period 64% of children rode a bike outside of school hours. These activities were significantly more popular among boys than girls (36% of boys and 26% of girls skateboarded or rollerbladed; 71% of boys and 56% of girls rode a bike). Of the less active leisure activities considered, 97% of both boys and girls watched TV or videos, and 79% of boys and 58% of girls played electronic or computer games in the two-week period.

For further information about children's involvement in organised cultural activities, such as dancing and singing, and in art and craft activities during their leisure time, see the section *Children's participation in cultural and leisure activities*.

#### 12.30 PARTICIPATION IN THE MOST POPULAR SPORTS(a) — 2000

	Number			Participation rate		
	Males '000	Females '000	Persons '000	Males %	Females %	Persons %
Swimming	177.0	203.1	380.1	13.1	15.8	14.4
Soccer (outdoor)	265.0	37.3	302.3	19.6	2.9	11.4
Netball	*6.4	234.9	241.4	*0.5	18.2	9.1
Tennis	124.8	99.1	223.8	9.2	7.7	8.5
Basketball	119.6	80.7	200.3	8.8	6.3	7.6
Australian Rules football	170.3	*4.1	174.4	12.6	*0.3	6.6
Cricket (outdoor)	133.6	7.3	140.9	9.9	0.6	5.3
Martial arts	72.7	31.9	104.6	5.4	2.5	4.0
Athletics and track and field	52.2	51.9	104.1	3.9	4.0	3.9
Rugby League	92.5	*2.5	95.1	6.8	*0.2	3.6

(a) Children aged 5–14 years who participated in organised sport outside of school hours during the 12 months prior to interview in April 2000.

Source: *Children's Participation in Cultural and Leisure Activities, Australia, April 2000* (4901.0).

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## Introduction

This chapter starts by sketching the evolution of Australian industry from the time of settlement. It then presents an overview of the current structure and performance of the main industrial components of the Australian economy, and their relative contributions to overall economic activity, particularly in terms of production and employment. Statistics are presented at a broad industry level, generally equating to the Division level of the Australian and New Zealand Standard Industrial Classification (ANZSIC).

While the statistics presented in this chapter provide the basis for comparisons across industries, care should be taken when making comparisons with data in the industry-specific chapters. Differences in the frequency, scope, statistical units and methodologies of the various ABS collections used to compile the statistics will affect the degree to which comparisons can be made.

Table 13.1 shows each industry's contribution to production and employment in the economy. Tables 13.2–13.5 provide more detailed indicators of economic activity by industry over the short and longer term. Each of these tables includes data covering all businesses in the economy. Table 13.6 provides the latest in a selected series of performance indicators for each industry, but its scope excludes non-employed businesses and entities in the general government sector. Tables 13.7 and 13.8 relate to number of businesses and employment by size of business.

The chapter concludes with a brief introduction to the chapters on economic issues on Australia's industries, on certain cross-cutting issues, and on the macroeconomic perspectives.

## The evolution of Australian industry

Australia's economic development has been one of contrast and change. In the early years of settlement, between 1788 and 1820, there was little scope for industrial or commercial enterprises. The government, as both main producer and main consumer, established workshops to produce the basic necessities of life — flour, salt, bread, candles, leather and leather articles, blacksmith's products, tools and domestic items.

Between 1820 and 1850, the pastoral industry led Australia's economic development, and by 1850 it was supplying well over 50% of the British market for imported wool. The growth in the wool industry brought great advances in the rest of the economy, with local manufacturing industries being established in response to new market opportunities. Gold surpassed wool as Australia's major export earner throughout the 1850s and 1860s, resulting in a rapid expansion of banking and commerce. Increased public works activity during the 1870s played an important role in encouraging expansion in manufacturing.

From 1901 to 1930 manufacturing expanded further, with impetus from Federation and the elimination of customs barriers between states, and from the First World War. With the onset of the Second World War, the Australian manufacturing sector was sufficiently developed and diversified to respond to the demand for war materials and equipment. Key industries expanded and new ones developed rapidly to produce munitions, ships, aircraft, new kinds of equipment and machinery, chemicals, textiles and so on. After the war, all sectors of the economy experienced growth. The onset of the oil price rises in 1973–74 led the world into recession, and 'stagflation' (inflation coupled with slower growth in gross domestic product (GDP)) affected all sectors of the economy. The modest employment growth between 1968 and 1979 was dominated by the service industries.

The 1980s and 1990s saw a decline in the relative contribution to GDP from goods-producing industries and a rise in the contribution from service industries. The falling contribution from goods-producing industries is largely the result of a decline in manufacturing's share of GDP. The mining, manufacturing, and electricity, gas and water supply industries experienced declining employment, along with outsourcing of some activities, particularly support services.

With the beginning of a new century, the Australian taxation system underwent major changes with the introduction of the Goods and Services Tax (GST), and other taxation reform. At the end of 2000–01, Australia's GDP had increased steadily to be \$641b, with GDP per capita of \$33,281.

## Output and employment by industry

Two measures of the importance of an industry are its contributions to GDP and to employment; these are illustrated in table 13.1.

The table shows that, in 2000–01, Manufacturing remained the most significant industry in terms of its contribution to GDP. Property and business services was the only other industry to contribute over 10% of GDP. Retail trade, with 14.8% of total employment, was the largest employing industry, followed by Manufacturing (12.3%).

## Profits, wages and output

Table 13.2 presents broadly the profits of businesses (referred to as gross operating surplus (GOS) and gross mixed income (GMI)) and the wages income of employees (referred to as compensation of employees) for 2000–01, the change over 1999–2000, and the average annual rate of growth over the years from 1992–93.

GOS refers to the income from production of corporate enterprises, while GMI denotes the income from production of unincorporated enterprises.

The table shows that profits rose in 2000–01 in all industries except Construction (down 9.0%), Wholesale trade (down 5.7%), Retail trade (down 3.9%) and Transport and storage (down 2.4%). The average for profits across all industries increased 4.3% in 2000–01 over 1999–2000. From 1992–93 to 2000–01 profits grew by an average of 5.1% per year.

The strongest increases in profits in 2000–01 were recorded for Finance and insurance (17.4%), Accommodation, cafes and restaurants (14.4%), and Mining (14.2%). In the period from 1992–93 to 2000–01, there was an average annual increase in profits for every industry. Over this period, Accommodation, cafes and restaurants showed an average annual increase of 11.3%, while profits for Personal and other services increased on average by 9.9%.

**13.1 INDUSTRY GROSS VALUE ADDED AND EMPLOYMENT(a) — 2000–01**

Industry	Industry gross value added at current prices		Employment(b)	
	\$m	Contribution to GDP % (c)	'000	Contribution to total employment % (c)
Agriculture, forestry and fishing	21 647	3.2	429	4.7
Mining	31 598	4.7	78	0.9
Manufacturing	78 266	11.7	1 119	12.3
Electricity, gas and water supply	16 339	2.4	68	0.7
Construction	33 543	5.0	668	7.3
Wholesale trade	31 378	4.7	431	4.7
Retail trade	33 915	5.1	1 348	14.8
Accommodation, cafes and restaurants	16 331	2.4	465	5.1
Transport and storage	32 484	4.8	424	4.6
Communication services	19 710	2.9	189	2.1
Finance and insurance	43 950	6.6	354	3.9
Property and business services	74 779	11.2	1 066	11.7
Government administration and defence	24 054	3.6	373	4.1
Education	29 287	4.4	629	6.9
Health and community services	37 466	5.6	910	10.0
Cultural and recreational services	11 542	1.7	225	2.5
Personal and other services	14 490	2.2	359	3.9
Ownership of dwellings	61 117	9.1	..	..
Taxes less subsidies on products	58 171	8.7	..	..
Statistical discrepancy	-38	..	..	..
<b>Total</b>	<b>670 029</b>	<b>100.0</b>	<b>9 134</b>	<b>100.0</b>

(a) Estimates relate to May 2001 and are entirely sourced from the Labour Force Survey. (b) Defence forces are not included in the estimates of employment. (c) Percentage contributions may not sum to 100% due to rounding.

Source: Australian System of National Accounts, 2000–01 (5204.0); Labour Force, Australia, May 2002 (6203.0).

## 13.2 PROFITS AND WAGES(a)

Industry	Profits (GOS and GMI(b))			Wages (compensation of employees(c))		
	2000–01 \$m	Change from 1999–2000 %	Average annual rate of growth 1992–93 to 2000–01	2000–01 \$m	Change from 1999–2000 %	Average annual rate of growth 1992–93 to 2000–01
			%			%
Agriculture, forestry and fishing	15 364	5.7	4.0	5 634	10.4	8.5
Mining	24 909	14.2	6.6	6 115	5.6	3.3
Manufacturing	30 798	1.5	4.9	44 382	8.7	4.7
Electricity, gas and water supply	12 441	4.5	4.1	3 478	7.7	-3.0
Construction	16 589	-9.0	4.7	16 125	-4.4	5.3
Wholesale trade	8 389	-5.7	2.4	20 323	-4.9	3.9
Retail trade	6 801	-3.9	0.1	25 277	5.5	6.6
Accommodation, cafes and restaurants	5 158	14.4	11.3	10 744	12.6	8.9
Transport and storage	11 980	-2.4	2.5	18 923	8.3	5.3
Communication services	10 552	2.2	7.8	8 380	12.5	4.7
Finance and insurance	18 490	17.4	5.1	21 555	10.9	7.6
Property and business services	23 140	3.8	4.8	49 549	14.1	11.0
Government administration and defence	3 839	8.5	4.4	20 097	-1.6	3.9
Education	3 354	9.2	6.0	25 551	7.9	4.7
Health and community services	6 451	9.8	5.0	30 487	9.2	5.5
Cultural and recreational services	5 462	8.2	6.6	5 576	3.4	7.7
Personal and other services	3 596	0.7	9.9	10 442	0.3	4.9
Ownership of dwellings	57 328	4.7	6.0	..	..	..
<b>All industries</b>	<b>264 641</b>	<b>4.3</b>	<b>5.1</b>	<b>322 638</b>	<b>6.7</b>	<b>5.9</b>

(a) At current prices. (b) GOS (gross operating surplus). GMI (gross mixed income). (c) This was formerly known as wages, salaries and supplements.

Source: Australian System of National Accounts, 2000–01 (5204.0).

The table also shows the growth in wages. Movements in wages correlate with employment in the industry and average wages per person employed. The Property and business services industry showed the largest increase (14.1%) in 2000–01. Accommodation, cafes and restaurants (up 12.6%) and the Communication services industries (up 12.5%) also showed significant wages growth in 2000–01.

The largest average annual rate of growth over the period from 1992–93 to 2000–01 was recorded in the Property and business services industry (up 11.0%), with the Accommodation, cafes and restaurants (up 8.9%) and the Agriculture, forestry and fishing industries (up 8.5%) also showing significant annual growth.

Wages in the Electricity, gas and water supply industry rose by 7.7% in 2000–01, but recorded an average annual decrease of 3.0% over the years from 1992–93 to 2000–01. Some industries showed a decrease in wages over 2000–01. These included Wholesale trade (down 4.9%), Construction (down 4.4%) and Government

administration and defence (down 1.6%). However over the eight years to 2000–01 these three industries showed an average annual increase in wages.

Table 13.3 shows the growth in each industry's gross value added in terms of chain volume measures, in 2000–01 and over the longer term as an annual average over the years from 1992–93 to 2000–01. While estimates in current price terms, shown in tables 13.1 and 13.2, reflect both price and volume changes, chain volume estimates reflect only volume changes, as the direct effect of price changes has been eliminated from the estimates. For more information on chain volume measures see the section *Chain volume or 'real' GDP in Chapter 29, National accounts*.

The three industries showing the largest growth in gross value added in 2000–01 were Culture and recreation (11.2%), Communication services (10.3%) and Property and business services (9.3%). The Construction industry showed the largest decrease in gross value added over 2000–01 (down 17.6%).

## 13.3 INDUSTRY GROSS VALUE ADDED, Chain volume measures(a)

Industry	2000-01	Change from	Average annual rate of
	\$m	1999-2000	growth 1992-93 to
		%	2000-01
			%
Agriculture, forestry and fishing	19 376	-4.1	2.6
Mining	29 738	5.8	4.7
Manufacturing	74 240	0.5	2.7
Electricity, gas and water supply	15 988	3.1	2.3
Construction	29 534	-17.6	2.3
Wholesale trade	32 332	-0.9	5.7
Retail trade	32 901	0.8	3.9
Accommodation, cafes and restaurants	14 679	1.7	4.8
Transport and storage	31 432	0.9	4.0
Communication services	20 362	10.3	10.4
Finance and insurance	40 417	4.6	4.6
Property and business services	73 829	9.3	6.2
Government administration and defence	24 829	3.2	2.4
Education	27 540	1.6	1.7
Health and community services	35 191	2.7	3.5
Cultural and recreational services	12 105	11.2	4.0
Personal and other services	15 415	7.2	5.1
Ownership of dwellings	60 478	4.1	4.0
Taxes less subsidies on products	50 765	-1.2	4.3
Statistical discrepancy (production-based)	220	..	..
<b>All industries (GDP)</b>	<b>641 370</b>	<b>1.9</b>	<b>4.0</b>

(a) Reference year for chain volume measures is 1999-2000.

Source: Australian System of National Accounts, 2000-01 (5204.0).

The largest annual average increase in gross value added over the years from 1992-93 to 2000-01 was recorded in the Communication services industry (10.4% per year).

## Changes in hours worked by industry

Table 13.4 shows that, over the period 1992-93 to 2000-01, hours worked for all industries combined increased on average by 2.1% per year. The most substantial average annual increase was recorded in the Property and business services industry (up 7.4%); the most substantial average annual fall was in the Electricity, gas and water supply industry (down 3.1%).

The Property and business services industry showed the largest increase in hours worked over 2000-01 (up 9.6%). Hours worked fell across a number of industries, with the largest decreases during 2000-01 being in Wholesale trade (down 4.9%), Agriculture, forestry and fishing (down 3.8%) and Construction (down 3.5%).

The reductions in hours worked should be considered in the context of the corresponding increases in labour productivity achieved by some

industries. Most notably Electricity, gas and water supply, with an average annual decrease in hours worked since 1992-93 of 3.1% per year, shows an average annual increase in labour productivity of 5.6% over this period. This issue is discussed in greater depth in the next section, *Changes in labour productivity*.

It is interesting to compare the growth in hours worked with the growth in wages over the same period. In Manufacturing, hours worked hardly changed over the period 1992-93 to 2000-01, while wages for this industry grew at an average annual rate of 4.7%. For the Agriculture, forestry and fishing industry there was a similar trend, with hours worked showing minimal change over the period 1992-93 to 2000-01, while wages increased at an average annual rate of 8.5%. Across all industries, the average annual change in wages was 5.9% per year, compared with an average growth in hours worked of 2.1% per year.

In evaluating changes in hours worked, it is important to recognise that industry restructuring, outsourcing of some functions and contract employment have impacted more substantially on some industries than others. More detail on employment changes over time is included in *Chapter 6, Labour*.

## 13.4 INDEXES(a) OF HOURS WORKED

Industry	2000–01	Change from	Average annual rate of
	Index number	1999–2000	growth 1992–93 to
		%	2000–01
			%
Agriculture, forestry and fishing	96.2	-3.8	0.1
Mining	98.4	-1.6	-0.9
Manufacturing	99.2	-0.8	0.1
Electricity, gas and water supply	105.2	5.2	-3.1
Construction	96.5	-3.5	3.4
Wholesale trade	95.1	-4.9	0.5
Retail trade	99.9	-0.1	1.8
Accommodation, cafes and restaurants	108.4	8.4	4.6
Transport and storage	103.9	3.9	2.3
Communication services	105.2	5.2	5.3
Finance and insurance	102.6	2.6	1.2
Property and business services	109.6	9.6	7.4
Government administration and defence	102.7	2.7	-0.7
Education	103.4	3.4	1.8
Health and community services	106.4	6.4	3.0
Cultural and recreational services	100.5	0.5	4.1
Personal and other services	97.9	-2.1	2.4
<b>All industries</b>	<b>101.8</b>	<b>1.8</b>	<b>2.1</b>

(a) Reference year 1999–2000 = 100.0.

Source: Australian System of National Accounts, 2000–01 (5204.0).

## Changes in labour productivity

Changes in the number of hours worked can provide an indicator of the level of economic activity of an industry. A developing or buoyant industry will generally show an increase in the number of hours worked over time. However, rapid growth in labour productivity within an industry may be associated with a decline in hours worked. A general indication of such effects is provided in table 13.5, which shows the changes in labour productivity (measured here as chain volume gross product per hour worked) experienced by each industry between 1999–2000 and 2000–01, as well as the average rate of change over the period from 1992–93 to 2000–01.

For some industries, principally those dominated by the public sector, the growth in the volume of output is derived using indicators of labour input because of a lack of suitable output indicators. Therefore, for these industries there are no meaningful measures of labour productivity growth. The remaining industries, and indexes of their labour productivity, are shown in the table.

The average increase in labour productivity across all industries in the market sector (including Health and community services) between 1999–2000 and 2000–01 was almost negligible, while over the period from 1992–93 to 2000–01 the average annual increase was 1.8%. The

Mining (up 5.7%) and Electricity, gas and water industries (up 5.6%) showed the largest annual increases over the period 1992–93 to 2000–01.

Gross product per hour worked increased most markedly during 2000–01 in the Cultural and recreational services industry (up 10.6%) and the Mining industry (up 7.6%).

Labour productivity in the Electricity, gas and water supply industry increased on average by 5.6% per year over the period from 1992–93 to 2000–01; this industry's average increase in gross value added over the same period was 2.3%, hours worked fell by an annual average of 3.1%, and wages fell by an average of 3.0% per year over this period. The Mining industry experienced growth in labour productivity of 5.7% per year over the period from 1992–93 to 2000–01; this industry's average increase in gross value added over the same period was 4.7%, hours worked fell by an annual average of 0.9%, while wages increased at an average rate of 3.3% per year over this period.

As indicated in the table, in 2000–01 Construction showed the largest decrease in labour productivity of 14.6%, while over the period from 1992–93 to 2000–01 labour productivity fell at an annual rate of 1.0%. Labour productivity in 2000–01 decreased because the growth in the

chain volume estimates of gross value added (down 17.6%) was less than the growth in hours worked (down 3.5%).

In contrast, labour productivity in the Wholesale trade industry increased by an average of 5.2% per year over the period 1992–93 to 2000–01, because gross value added grew at a faster rate (5.7% per year) than hours worked (0.5% per year).

These measures of labour productivity should be treated with care. Changes in the composition of labour, which are not captured in the hours worked measure, can affect output, which can also be affected by changes in inputs other than labour (e.g. capital). Finally, the extent to which the capacity of inputs is used can affect output per hour worked; for example, there will be an apparent increase in productivity when an input that was previously not fully used becomes fully used.

## Industry performance

The relative performance of industries, like the relative performance of businesses, can be analysed using a combination of quantitative estimates (of the kind shown in earlier tables) and performance ratios. Various ratios commonly used in financial analysis are included in table 13.6. These show, for example, that in 2000–01:

- industries which converted the highest proportion of their sales into profit (as represented by the profit margin) were

Finance and insurance, Communication services, Mining, and Electricity, gas and water supply

- businesses in Communication services, Retail trade and Mining reported, on average, the highest return on assets
- the industries with the highest returns on net worth were Communication services, Retail trade, Wholesale trade and Construction
- the greatest ability to service debt charges from profits (as represented by the interest coverage ratio) were recorded for Communication services, Private community services, Construction and Wholesale trade.

The derivations of the performance ratios shown in table 13.6 are as follows:

*Profit margin* — operating profit before tax as a percentage of sales of goods and services plus interest income plus other operating income.

*Return on assets* — operating profit before tax as a percentage of total assets.

*Return on net worth* — operating profit before tax as a percentage of net worth.

*Interest coverage* — the number of times that businesses can meet their interest expenses from their earnings before interest and tax.

*Investment rate* — the proportion of industry value added used for capital investment.

### 13.5 INDEXES OF GROSS PRODUCT(a) PER HOUR WORKED

Industry	2000–01	Change from	Average annual rate of
	Index number	1999–2000	growth 1992–93 to
		%	2000–01
			%
Agriculture, forestry and fishing	99.7	-0.3	2.5
Mining	107.6	7.6	5.7
Manufacturing	101.3	1.3	2.6
Electricity, gas and water supply	98.0	-2.0	5.6
Construction	85.4	-14.6	-1.0
Wholesale trade	104.2	4.2	5.2
Retail trade	100.9	0.9	2.0
Accommodation, cafes and restaurants	93.8	-6.2	0.3
Transport and storage	97.1	-2.9	1.7
Communication services	104.8	4.8	4.8
Finance and insurance	102.0	2.0	3.3
Health and community services	96.5	-3.5	0.4
Cultural and recreational services	110.6	10.6	-0.1
<b>All industries</b>	<b>100.1</b>	<b>0.1</b>	<b>1.8</b>

(a) Reference year for chain volume measures is 1999–2000 = 100.0.

Source: Australian System of National Accounts, 2000–01 (5204.0).

## 13.6 INDUSTRY PERFORMANCE RATIOS(a) — 2000–01

	Profit margin	Return on assets	Return on net worth	Interest coverage	Investment rate
	%	%	%	times	%
Agriculture, forestry and fishing(b)	n.a.	n.a.	n.a.	n.a.	n.a.
Mining	19.6	10.2	22.3	5.9	42.2
Manufacturing	6.3	6.8	17.2	4.6	14.7
Electricity, gas and water supply	13.8	3.9	7.9	2.5	34.8
Construction	4.6	8.3	23.6	6.3	8.9
Wholesale trade	4.2	9.5	27.8	6.3	10.4
Retail trade	2.9	10.9	30.5	2.2	9.8
Accommodation, cafes and restaurants	4.1	4.8	10.2	2.5	28.6
Transport and storage	5.1	4.4	12.8	2.6	19.8
Communication services	22.3	14.8	37.2	10.4	60.1
Finance and insurance	28.6	2.5	12.5	1.9	..
Property and business services	8.3	5.1	10.0	2.0	14.0
Private community services	9.0	10.0	18.1	8.1	11.2
Cultural and recreational services	7.0	5.6	10.0	5.5	25.0
Personal and other services	8.4	7.7	11.9	5.7	16.5
<b>All industries(b)</b>	<b>9.3</b>	<b>4.3</b>	<b>14.8</b>	<b>2.5</b>	<b>(c)20.2</b>

(a) The underlying data include private employing and public trading businesses, but exclude non-employing businesses and entities in the general government sector. (b) The Economy Activity Survey for 2000–01 excluded data from the Agriculture, forestry and fishing industry. (c) Investment rate for All industries excludes the Finance and insurance industries.

Source: *Business Operations and Industry Performance, Australia, Preliminary, 2000–01 (8142.0)*.

## Number of businesses and employment by size of business

This section outlines the growth in the number of Australian businesses, and in their employment, by employment size group, in 2000–01 and over the 10-year period from 1990–91 to 2000–01. The analysis and tables cover businesses other than government enterprises and those classified to the Agriculture, forestry and fishing industries.

Table 13.7 shows details of the change in the number of businesses by employment size group, while table 13.8 shows the change in employment across the different employment size categories.

The tables show that in 2000–01 there were 1,164,100 non-agricultural private sector businesses operating in Australia, employing around 6.9 million people. Over the period from 1990–91 to 2000–01, the total number of businesses increased by an average of 3.3% per year, while the total number of persons working grew at 2.2% per year. By comparison, during the 12-month period 1999–2000 to 2000–01 the number of businesses grew by 4.5%, while the number of persons working increased by 2.5%.

Over the period 1990–91 to 2000–01 the average annual rate of growth in numbers of businesses varied across the different size categories, ranging from 1% for businesses with 200 or more employees to 4.3% per year for businesses with 1–4 employees. Over the 12-month period to 2000–01 the number of businesses with 100–199 employees fell by 8.6%, with all other size categories showing increases. The most significant growth in businesses during 2000–01 occurred for those with 20–99 employees (up 8.2%) and non-employing businesses (up 7.4%).

Change in the number of persons employed across the different size categories generally reflected the change in numbers of businesses, with those having 1–4 employees recording the strongest average annual growth (up 3.5%) over the period from 1990–91 to 2000–01. Those businesses with 100–199 employees showed a decrease in employment numbers during 2000–01 (down 9.2%) while still showing an average annual increase in employment over the 10 years to 2000–01 of 1.4% per year. Working proprietors and partners in employing businesses showed an annual decrease in numbers over the same period (down 1.2%). During 2000–01 the number of working proprietors and partners decreased by 4.4%, while in contrast, the number of own account workers increased by 3.7%.

## 13.7 BUSINESSES(a), By employment category of business

	2000–01	Change from 1999–2000		Average annual rate of growth 1990–91 to 2000–01
	'000		%	%
Non-employing businesses	582.1		7.4	2.7
1–4 employees	370.1		1.2	4.3
5–19 employees	169.8		1.6	3.3
20–99 employees	35.9		8.2	3.0
100–199 employees	3.4		–8.6	1.4
200 or more employees	2.8		3.5	1.0
<b>Total</b>	<b>1 164.1</b>		<b>4.5</b>	<b>3.3</b>

(a) Excludes public trading and general government entities, and businesses in the Agriculture, fishing and forestry industries.

Source: *Small Business in Australia, 2001 (1321.0)*.

## 13.8 PERSONS EMPLOYED(a), By employment category of business

	2000–01	Change from 1999–2000		Average annual rate of growth 1990–91 to 2000–01
	'000		%	%
Persons working in their own businesses				
Own account workers	713.2		3.7	2.3
Working proprietors and partners in employing businesses	276.5		–4.4	–1.2
Employees				
Employees in businesses employing 1–4 persons	775.1		2.0	3.5
Employees in businesses employing 5–19 persons	1 494.3		3.5	3.1
Employees in businesses employing 20–99 persons	1 376.5		6.9	2.6
Employees in businesses employing 100–199 persons	465.2		–9.2	1.4
Employees in businesses employing 200 or more persons	1 801.1		2.7	1.5
<i>Total</i>	5 912.2		2.7	2.4
<b>Total persons working</b>	<b>6 901.9</b>		<b>2.5</b>	<b>2.2</b>

(a) Excludes persons employed by public trading and general government entities, and by businesses in the Agriculture, fishing and forestry industries.

Source: *Small Business in Australia, 2001 (1321.0)*.

## The chapters on economic issues — a guide

*Chapters 14 to 30* address economic issues — Australia's industries, some cross-cutting issues, and the macroeconomic perspectives.

### Industries

*Chapters 15 to 24, 26 and 27* provide a detailed discussion of individual industries, their structure, performance and activities.

*Chapter 15, Energy* presents information on the energy sector — its resources, the supply and use of energy products, conservation initiatives and environmental issues. The export of energy products earned Australia \$25,503m in 2001–02, representing 21% of the value of all exports in that year. In comparison, \$9,030m was spent on energy imports, mainly crude oil and petroleum products. The chapter concludes with an article

*Renewable energy in 2003*. The chapter should be read in conjunction with *Chapter 14, Environment*, given the close links between the production and consumption of energy products and their environmental impacts.

*Chapter 16, Agriculture* presents a detailed picture of Australia's agriculture industry, including aspects such as land use, commodity production, livestock numbers and employment. Australian agriculture is a vital industry occupying a significant place in global rural trade, with wool, beef, wheat, cotton and sugar being particularly important. Australia is also an important source of dairy produce, fruit, rice and flowers. The chapter includes an article *Environmental impacts of agriculture*, and concludes with an article *The wool industry — looking back and forward*.

The main features of two important primary industries in Australia, forestry and commercial fishing, are presented in *Chapter 17, Forestry and fishing*. The chapter includes four articles, namely *Forest conservation, Sustainable forest management, Fishing and the environment*, and *Aquaculture and the environment*.

The mining industry is profiled in *Chapter 18, Mining*. Australia continues to rank as one of the world's leading mineral resource nations, and minerals exports are the nation's largest export earner. The chapter includes two articles, *A Decade of Australian exploration expenditure — 1991–92 to 2000–01*, and *Mining and the environment*.

The manufacturing industry is discussed in *Chapter 19, Manufacturing*. This chapter presents a range of data about manufacturing as a whole and its constituent industries. It is an important sector in the Australian economy, contributing about 13% of Australia's GDP and its employment. However, the sector's share of Australian GDP has fallen over the past 20 years. The chapter includes an article on *Manufacturing and the environment*.

*Chapter 20, Construction* provides an analysis of the construction industry and its activities. The construction industry engages in three broad areas of activity: residential building (houses, flats, etc.), non-residential building (offices, shops, hotels, etc.), and engineering construction (roads, bridges, water and sewerage, etc.). A number of other parts of the Australian economy are also closely linked to the construction industry, including parts of the manufacturing, wholesale and retail trade, and finance industries, in supplying components, fittings and furnishings, and in financing construction. The chapter contains three articles, namely *The WasteWise Construction Program, Attitudes of residential builders to energy issues and usage*, and *The use of forest products*. It concludes with an article *Construction and the environment*.

A profile of Australia's service industries is included in *Chapter 21, Service industries*. These industries are the most significant and fastest growing component of the Australian economy. This chapter presents them in overview, and provides a range of statistical information for a selection of the service industries, with a particular focus on those surveyed in the ABS rotating program of service industries collections. The chapter includes an article *Sports industries*.

*Chapter 22, Tourism* presents statistics on Australia's tourism activities, both domestic and international. In an economic context, the effects of tourism are to generate economic activity and to transfer such activity between different parts of the economy. Tourism-related activity is now recognised as a major contributor to total economic activity. In particular, international tourism has experienced substantial growth in the past decade or so. The chapter concludes with an article *Sustainable tourism in the Great Barrier Reef Marine Park*.

The transport industry and transport activities are discussed in *Chapter 23, Transport*. Transport has great economic and social impact, generating substantial employment and contributing significantly to GDP, with numerous support industries ranging from automotive manufacturers to travel agencies. There are also social costs of transport — such as road accidents, traffic congestion, fuel emissions, aircraft noise pollution and shipping oil spills. The chapter concludes with an article *Environmental impacts of Australia's transport system*.

*Chapter 24, Communications and information technology* covers the communication services industries, which encompass telecommunication services, and postal and courier services. Communication services overall has been one of the fastest growing industries in Australia. The chapter also canvasses the use of information technology by businesses, farms and households.

*Chapter 26, Financial system* provides an analysis of Australia's financial system and its main institutions, markets and activities.

*Chapter 27, Government finance* presents statistics on financial operations and financial position of the Australian public sector, comprising general government entities, public financial and public non-financial corporations. The chapter includes an article *Recent tax reforms*.

## Cross-cutting issues

Two chapters discuss cross-cutting issues affecting the Australian economy.

*Chapter 14, Environment* discusses a range of contemporary environmental issues affecting Australia. These include environmental attitudes and behaviour in Australian households; Australia's biodiversity; extent and clearing of native vegetation; invasive species; coastal and marine environment; and atmosphere and

climate change. As 2003 is the International Year of Freshwater, the chapter concludes with an article *Australia's rivers*.

As indicated earlier, the chapter should be read in conjunction with *Chapter 15, Energy*.

*Chapter 25, Science and innovation* presents information on investment (in terms of human resources and expenditure) in research and development by broad sector, and on the incidence and impacts of innovation in Australian industry.

### **The macroeconomic perspectives**

The remaining three chapters focus on various macroeconomic perspectives on the Australian economy.

*Chapter 28, Prices* discusses a range of price indexes providing summary measures of the movements in various categories of prices. Price indexes are used extensively to analyse and monitor price behaviour, and to adjust government payments such as pensions. The chapter provides an outline of the major consumer and producer price indexes, their history, and their underlying concepts and methodology. It also outlines the ABS producer price indexes in a stage of production framework, and output price indexes for selected services.

*Chapter 29, National accounts* provides a systematic summary of national economic activity, as embodied in Australia's system of national accounts. The system includes national income, expenditure and product accounts, financial accounts, the national balance sheet and input-output tables. At their summary level, the national income, expenditure and product accounts reflect key economic flows: production, the distribution of incomes, consumption, saving and investment. At their more detailed level, they are designed to present a statistical picture of the structure of the economy and the detailed processes that make up domestic production and its distribution. The chapter includes a national balance sheet for Australia at current prices and in real/volume terms. It includes an article *Beyond GDP: Towards wider measures of wellbeing*, and concludes with an article *Accounting for the environment in National Accounts*.

*Chapter 30, International accounts and trade* presents statistics on Australia's exports and imports of goods, international trade in services, international investment transactions, and the levels of Australia's foreign financial assets and liabilities. These statistics are used by economic analysts and policy advisers to monitor, evaluate and forecast developments in Australia's external trade and external sector accounts, to analyse patterns of trade and to assess types of transactions and financial claims and liabilities between Australian residents and non-residents.

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## Introduction

Australia's environment is unique. It is one of 17 megadiverse countries with an exceptional total number of species, and a high degree of endemic species found nowhere else. The marine area is one of the largest in the world and home to the world's most diverse mangrove and seagrass ecosystems and one of the largest areas of coral reef.

The environment has a range of ecological, economic and social values, many of which cannot be readily measured. While Australia's growing economy and its increasing use of energy and other resources have brought prosperity and wellbeing to many Australians, our economic activities and consumption patterns also have environmental consequences. The way we manage our natural resources and the waste products that we generate can impact on the many values we place upon the environment.

This chapter begins by presenting information on people's views and behaviour in relation to the environment. It notes a decline in concern for the environment during the last decade. Registration of environmental concerns and donations to environmental causes are explored. Data are presented on water sources and people's view of drinking water quality. The discussion of household waste management includes data on recycling and use of environmentally friendly products.

The section *Australia's biodiversity* presents data on the biological diversity of Australia's species and ecosystems. It covers legislation to protect threatened species and presents data on threatened species and communities and terrestrial protected areas. This is closely linked with the section *Extent and clearing of native vegetation*. The section *Invasive species* addresses the number of native species threatened by invasive pest animals and the current and potential distribution of weeds. An article *Environmental impacts of agriculture* in *Chapter 16, Agriculture* has information on land degradation and related issues, including salinity.

The section *Coastal and marine environment* presents information on the uniqueness of this part of Australia's environment and the threats posed by human activity. The section then focuses on two particular ecosystems: estuaries and coral reefs. Data are also presented on marine protected areas.

The final section, *Atmosphere and climate change*, presents trends in temperatures and other climatic conditions over the last century, followed by recently compiled data on greenhouse gas emissions. This section has close links with *Chapter 15, Energy*, as some of the environmental issues are consequences of energy production and consumption. An article *Climate change* follows *Chapter 1, Geography and climate*.

As 2003 is the International Year of Freshwater, this chapter is followed by an article *Australia's rivers*, addressing issues of inland water quality.

## Environmental views and behaviour

### Concerns about environmental problems

The attitudes of Australians influence decision-making on environmental issues. Australians appear to have become less concerned about environmental problems during the last decade. In 1992, three out of four Australians (75%) stated that they were concerned about the environment, but this level of concern fell to 62% in 2001. The decline in the level of concern is most pronounced among young Australians (aged 18–24), only 57% of whom expressed concern about the environment in 2001 compared to 79% in 1992. People in the 45–54 age group contained the largest proportion expressing concern about environmental problems (69% in 2001), while older people (65 years and over) contained the smallest proportion (51% in 2001) (graph 14.1).

**Registration of environmental concerns**

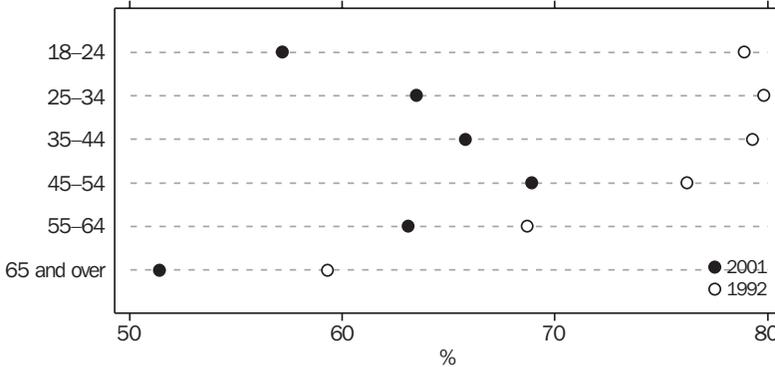
Of those who stated concern about environmental problems, less than one in 10 (8%) registered their environmental concern by writing letters, telephoning, participating in a demonstration, signing a petition or making some other form of official expression. Of those who registered concern, 37% signed a petition, 33% wrote letters and 27% used the telephone. The least favoured method of registration was participation in a demonstration (6%) (graph 14.2).

Of those registering environmental concerns, younger people (aged 18–24) were the most likely to sign a petition (60%) or participate in a

demonstration (10%) to register their concern, and were more than twice as likely to pursue these options than those aged 55 and over. People aged 45 and over were most likely to register their concern by writing letters.

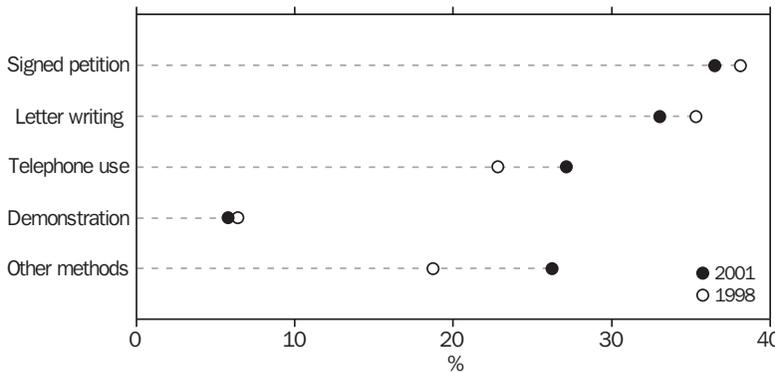
Only 7% of Australians stated that they belonged to an environmental group. Younger people reported the highest membership in environmental groups (9%). Of those who were members of an environmental group, the majority (62%) belonged to non-specific environmental groups. Membership was highest for landcare or catchment management groups (36%), more than three times that of marine conservation groups (11%).

**14.1 CONCERN ABOUT ENVIRONMENTAL PROBLEMS, By age group (years)**



Source: *Environmental Issues: People's Views and Practices (4602.0)*.

**14.2 METHOD OF REGISTRATION OF ENVIRONMENTAL CONCERN**



Source: *Environmental Issues: People's Views and Practices (4602.0)*.

### Donation of time or money to environmental protection

As concern about environmental issues has declined among Australians, so has the time and money donated by households to environmental protection. In 1992, more than 28% of Australians stated that they donated time or money to environmental protection, compared with only 20% in 2001. While people aged 35–44 ranked highest in terms of contribution at 23%, the same group registered the highest decline in contribution (13%) from 1992 (graph 14.3).

Time was the main factor limiting involvement in environmental actions. Nearly half (49%) of Australians claimed that they had 'no time' for such involvement. 'Age, health or inability' was the next most likely reason (10%), particularly for people aged 65 and over (46%). Only 5% of respondents stated 'no money' as the main reason for non-involvement.

### Comparison of environmental views and practices across states and territories

Environmental views and practices differ across states and territories. People in the Australian Capital Territory reported the highest level of concern about environmental problems (71%), followed closely by South Australia and Western Australia (70% and 69% respectively). New South Wales and Tasmania reported the lowest levels of environmental concern in 2001 (59% and 60% respectively). Since 1992, Tasmania has

consistently reported lower levels of environmental concern than other states and territories.

Registration of environmental concerns by Australians fell across all states and territories (except South Australia) between 1992 and 2001. Western Australians were the most likely to register their environmental concerns (12%) and people in the Australian Capital Territory were least likely to do so (7%) in 2001.

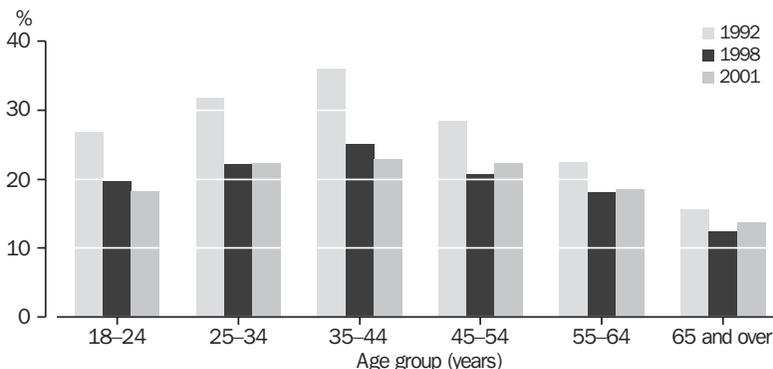
People in South Australia and Western Australian were the most likely to contribute time or money towards environmental protection; in both states, one in four provided such support in 2001.

### Water supply, quality and conservation

Water is essential for all living organisms. Australia is considered one of the driest inhabited continents (Smith 1998). Relative to other continents, Australia is also characterised as having variable climatic conditions and high levels of evapotranspiration. These factors result in a low proportion of rainfall converted to streamflow (Pigram 1986), making freshwater a valuable resource. All Australians are affected by the provision and availability of good quality water.

Given that 2003 is the International Year of Freshwater, consideration of the availability and quality of water is particularly relevant in this edition of Year Book Australia (see the article at the end of this chapter).

**14.3 DONATION OF TIME OR MONEY TO ENVIRONMENTAL PROTECTION**



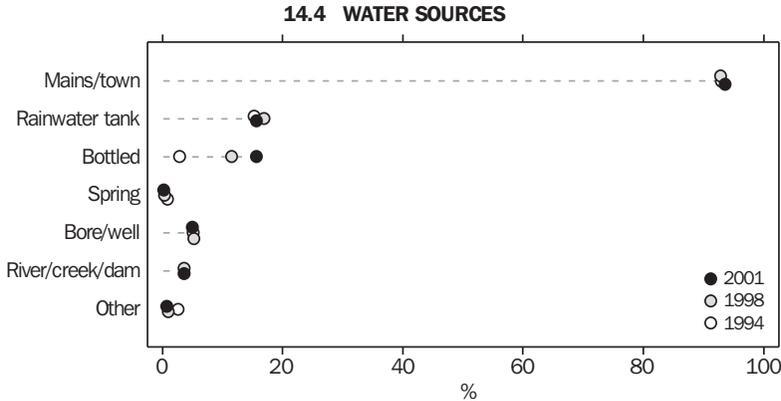
Source: *Environmental Issues: People's Views and Practices* (4602.0).

**Water supply**

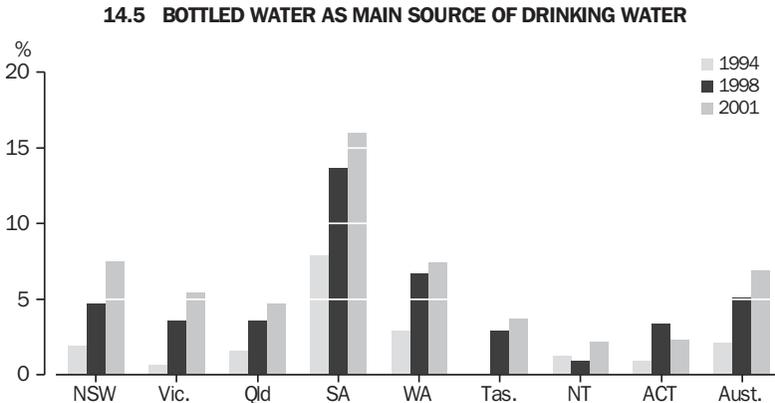
Mains or town water is the most common source of domestic water supply in Australia. Over nine in 10 (94%) Australian households received their domestic water supply from this source in 2001 (graph 14.4). Mains water was fully established in the Australian Capital Territory (100%).

Tasmanians were the least likely to have mains water supply; in Tasmania 87% of the households were connected to it. Rainwater tanks and bottled water were the next most important sources of water (both 16%) after mains water supply. South Australians were the most likely to depend on these sources of water (on rainwater by 52%, and on bottled water by 27%); both shares were more than twice the national average dependency on those sources of water.

Bottled water has become an increasingly important source of drinking water across Australia since 1994 (7% dependency in 2001, compared with 2% in 1994). Except for the Australian Capital Territory, all states and territories showed a rising trend in the consumption of bottled water. Since 1994, South Australia consistently ranked highest for use of bottled water as a source of water (from 9% in 1994 to 24% in 2001). South Australians were the most likely to rely on bottled water as their main source of drinking water (16%), which was more than twice the national average. People in New South Wales (8%) and Western Australia (7%) reported the next highest degree of dependency (graph 14.5).



Source: Environmental Issues: People's Views and Practices (4602.0).



Source: Environmental Issues: People's Views and Practices (4602.0).

## Water quality

Water quality can be affected by a number of factors including bacterial contamination and physical or chemical changes such as turbidity, colour and acidity. Treating water with chlorine can affect its taste. The national water quality guidelines, the *Australian Drinking Water Guidelines 1996*, are endorsed by the National Health and Medical Research Council and the Agriculture and Resource Management Council of Australia and New Zealand. These guidelines are not mandatory standards, but represent a framework for identifying acceptable water quality through community consultation (WSAA 2001).

In 2001, over a quarter (27%) of Australians were not satisfied with the quality of tap-water for drinking (graph 14.6). South Australians were the most dissatisfied (42%), to the extent that 10% of people indicated they did not drink any tap-water at all. This was four times the national average. Dissatisfaction with the quality of tap-water for drinking has declined in most states and territories, the exceptions being South Australia and Tasmania. People in the Northern Territory were the most satisfied with the quality of tap-water for drinking (90%).

Several problems affected the quality of mains tap-water for drinking. Half of those who expressed dissatisfaction with quality of drinking water (52%) nominated taste as the reason for their dissatisfaction (graph 14.7). About a third stated chlorine as a problem (32%). Other

common complaints included: dirty water (16%); odour (16%); colour (15%) and microbial or algae contamination (14%). Since 1998, the proportion of Australians concerned about the different problems associated with water quality declined, except in relation to chlorine, which registered a small increase in concern (30% in 1998; 32% in 2001).

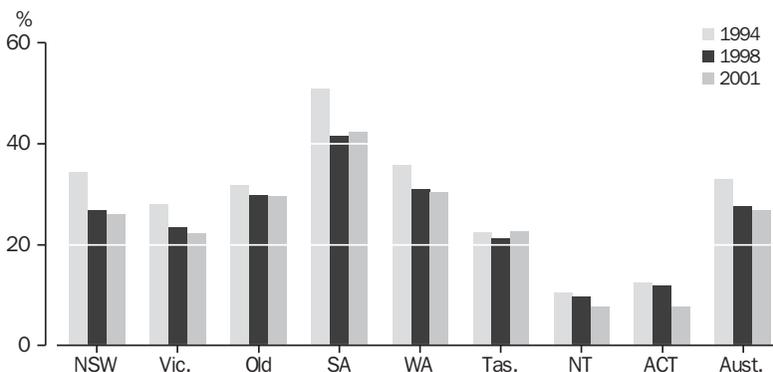
South Australian households registered the highest levels of dissatisfaction with taste (65%), followed by Western Australian households (58%). Northern Territorians were the most likely to complain that the tap-water was salty (5%). About 4% of South Australians also mentioned this problem. This corresponds with research by the Commonwealth Scientific and Industrial Research Organisation which found that salt concentrations in several Adelaide Hills catchments periodically exceeds Australian drinking water guidelines (Newton et al. 2001).

## Water conservation

Australian households used 1.8 million megalitres of water in 1996–97, making households the second largest user of water after the agriculture sector (ABS 2000b). Therefore, water conservation methods at home can make a significant contribution to reducing the total amount of water consumed.

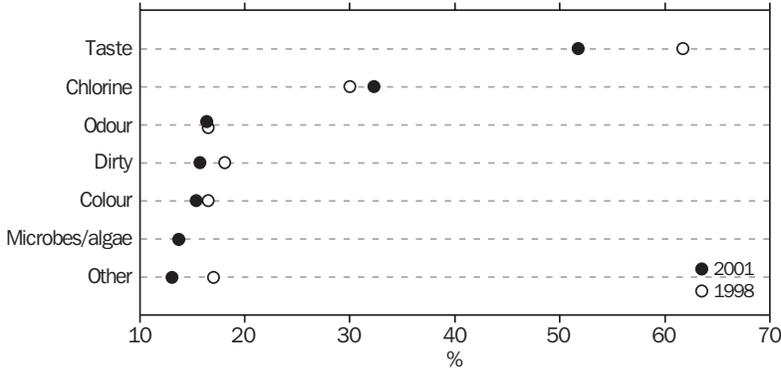
Household water conservation can be achieved through both the use of devices such as dual flush toilets and reduced flow shower heads and behavioural practices like having shorter showers.

14.6 DISSATISFACTION WITH TAP-WATER QUALITY FOR DRINKING



Source: *Environmental Issues: People's Views and Practices (4602.0)*.

14.7 QUALITY PROBLEMS WITH MAINS TAP-WATER FOR DRINKING



Source: Environmental Issues: People's Views and Practices (4602.0).

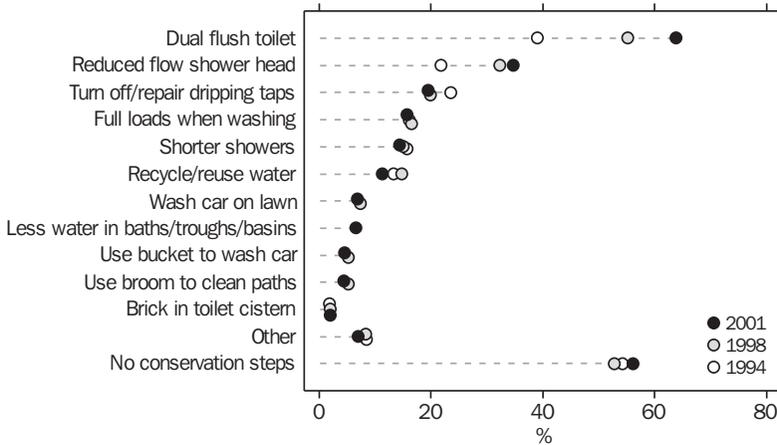
In relation to water conserving devices, 64% of households had a dual flush toilet (up from 55% in 1998), and 35% of households had a reduced flow shower head (up from 32% in 1998) (graph 14.8). Just over a quarter of Australian households (27%) did not have either of these items.

Turning off or repairing dripping taps was still the most common behavioural practice reported by Australian households in 2001 (20%). The second most common practice was having full loads of washing (16%), followed by having shorter showers (14%). The overall commitment to saving water in the household by behaviour modification slipped slightly over the years, with

56% of households reporting that they did not adopt any behavioural practice to conserve water in 2001. This compares with 53% in 1998 and 54% in 1994.

Victorian households were the most likely to practise water conservation, with just over half (51%) of households reporting taking some steps. This is a significant increase on 1994 figures, when 40% of Victorians took specific water conservation steps. In contrast, several states including New South Wales, Queensland and Western Australia, and the Australian Capital Territory, showed a significant decline in households taking water conservation steps.

14.8 WATER CONSERVATION METHODS, Devices and behavioural practices



Source: Environmental Issues: People's Views and Practices (4602.0).

Just over half (58%) of Australian households with a garden reported that they regularly conserve water in the garden, with a further 3% reporting that they sometimes use water-saving measures. Home gardeners in Western Australia were the most committed (68%) and those in New South Wales were the least likely to do so (50%).

The main method used by Australian home gardeners was to water either early in the morning or late in the evening when it was cooler (graph 14.9). The next two most common practices were to water less frequently but for longer periods (20%), and to use recycled water (18%). Around one in 10 households with a garden reported that they did not bother to water the garden at all but only relied on rainfall.

Over two-thirds (69%) of Australian households with a garden used mulch in 2001. Nearly three-quarters of those using mulch in the garden did it to conserve water (74%), while over a third mulched to reduce weeds (36%). Around 58% of households with gardens planted native trees or shrubs, with the highest proportion occurring in the Australian Capital Territory (66%). However, only around 18% of households planted natives for their water-conserving attributes.

**Household waste management**

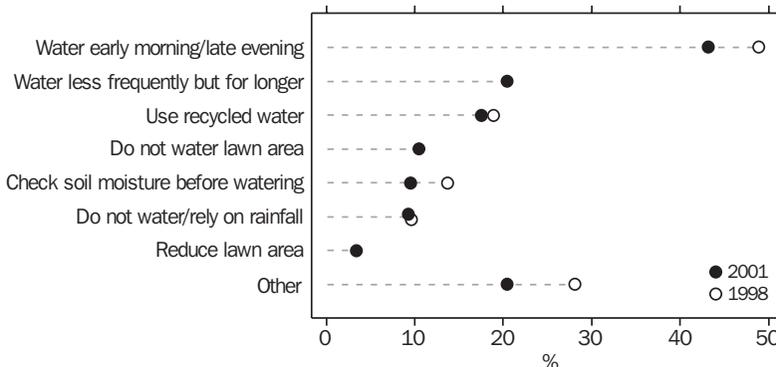
Australia is among the top 10 solid waste generators within the Organisation for Economic Co-operation and Development (OECD) (OECD 1999). The primary pressure from waste generation is the need for disposal, and the consequent environmental impacts. The main form of waste disposal in Australia is landfill, which accounts for over 95% of solid waste disposal in some states and territories

(Newton et al. 2001). The impacts of landfill disposal include: use of land that could otherwise be used for another purpose; potential leachates from toxic wastes; release of methane from the decomposition of organic wastes; and greenhouse gas emissions through the transportation of wastes to landfills, which are mostly on the fringes of cities (Newton et al. 2001).

Wastes are generally categorised as either urban solid wastes or hazardous wastes. Urban solid wastes are further classified into three types: municipal (domestic and council); commercial and industrial; and construction and demolition. Approximately 40% of all solid wastes are municipal, much of it from domestic households. The rate of household waste disposal in Australia is among the highest 10 in the OECD. Based on 1996–97 data, the per capita disposal of domestic waste in Australia was approximately 400 kilograms per year (OECD 1999). Waste from households typically includes garden wastes, paper, glass, plastic and food wastes.

The guiding principles for current waste management strategies are represented by the waste minimisation hierarchy. This strategy is aimed at providing options to avoid generating waste in the first place, and extracting the maximum benefits from the waste. The hierarchy begins with reducing waste, following by reusing and recycling, then recovery of heat energy such as methane, and finally treatment and disposal. This strategy embraces a life-cycle approach whereby reusable and recyclable waste may be used as an alternative to traditional resource inputs. Therefore, not only is waste reduced but some of the pressures on natural resources are alleviated.

**14.9 WATER CONSERVATION METHODS IN THE GARDEN**



Source: *Environmental Issues: People's Views and Practices* (4602.0).

**Reducing**

Reducing waste means preventing waste generation in the first place. Householders can avoid generating waste by bulk buying, using refillable containers, composting food scraps, choosing products with minimal packaging, buying products that are built to last, and refusing disposable carry bags. Other methods of reducing waste are to use durable, long-lasting goods instead of disposable ones, in order to reduce the input of virgin materials by consuming less.

**Reusing**

Reusing involves using something more than once, either in its original form, or for a different purpose. Examples include using refillable containers, donating old clothes to other family members or charities, and buying secondhand or antique furniture. Reuse for a different purpose includes using paper, cardboard and packaging for children’s art and craft activities, and reusing glass and plastic containers.

**Recycling**

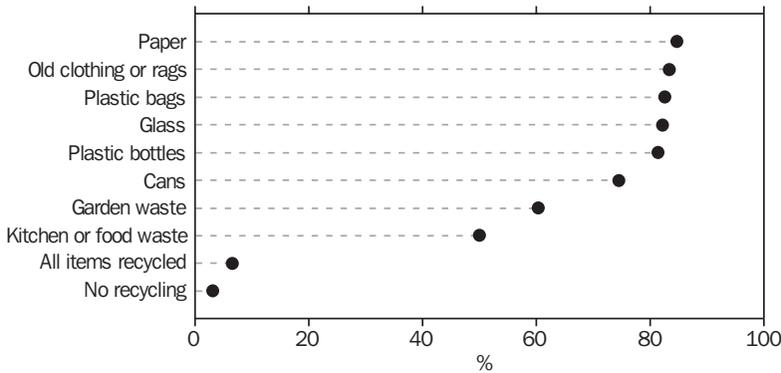
Recycling infers processing of products or materials into similar products or using them as secondary raw materials for producing new products. Usually less energy is consumed, less

virgin material is used (avoiding further environmental damage), and landfill space is saved.

Household recycling increased in Australia during the 1990s: in 1992 around 85% of people recycled at least one item of their household waste; by 2000 the vast majority of Australians (97%) practised at least some recycling, with 7% doing so for all recyclable items. Paper, old clothing, plastic bags and glass were the items most commonly recycled (graph 14.10). The preferred method for household recycling of paper (by 87% of households), glass (by 88%), cans and plastic bottles (both by 89%) was a collection service from the dwelling. For plastic bags, reuse was the most popular option. Around two-thirds of Australian households composted or mulched their kitchen or food waste (67%) and garden waste (71%). Old clothes or rags were usually (73%) taken to a central collection point such as a charity depot.

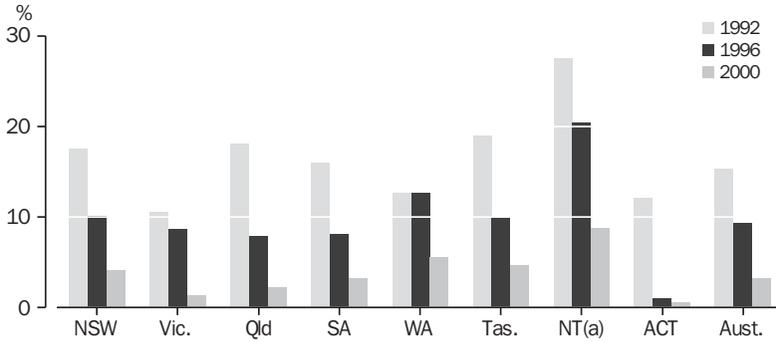
As more Australians have become involved in recycling, the proportion of households not participating declined from 15% in 1992 to only 3% in 2000 (graph 14.11). Lack of recyclable materials was the main reason for households not recycling, and these households were most likely to be composed of people living alone.

**14.10 HOUSEHOLDS INVOLVED IN RECYCLING, Items recycled — 2000**



Source: *Environmental Issues: People's Views and Practices, 2000 (4602.0)*.

14.11 HOUSEHOLDS NOT RECYCLING ANY WASTE



(a) NT data refer mainly to urban areas.

Source: *Environmental Issues: People's Views and Practices (4602.0)*.

Use of environmentally friendly products (EFPs)

EFPs are important for reducing waste produced within households as they generally take less natural resources to produce and generate less waste than their counterparts. In 2001, the most widely used EFPs in Australian households was refillable containers, followed by recycled paper (table 14.12). More than half of all Australian households claimed they do not eat organically grown fruit and vegetables (56%) and nearly one in two households did not use unbleached paper (45%) or phosphate-free cleaning products (43%).

Cost was the single most important factor which prevented households from using EFPs (graph 14.13). Over a third of households (37%) which did not use them believed that these

products were more expensive to buy. About 4% were not convinced of the environmental benefits.

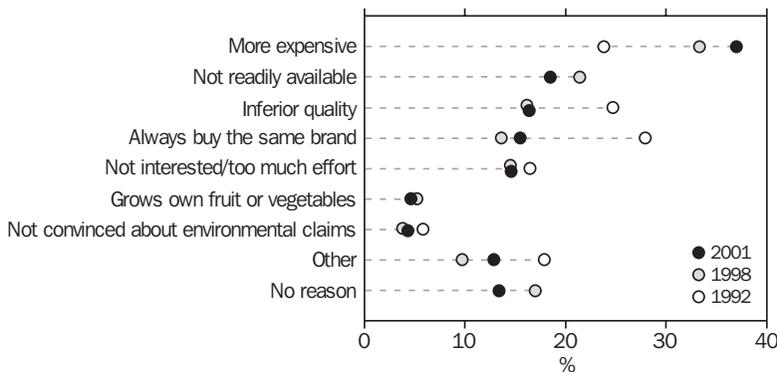
14.12 USE OF EFPs(a)

	1992	1998	2001
	%	%	%
Refillable containers	63.3	72.4	64.5
Phosphate-free cleaning products	37.7	42.5	39.5
Unbleached paper	63.4	52.2	51.3
Recycled paper	67.9	71.1	69.8
Organically grown fruit and vegetables	(b)	39.8	41.8

(a) For 1998 and 2001, includes households which sometimes use EFPs. (b) Respondents were not asked about organically grown fruit and vegetables in 1992.

Source: *Environmental Issues: People's Views and Practices (4602.0)*.

14.13 REASONS EFPs NOT USED



Source: *Environmental Issues: People's Views and Practices (4602.0)*.

## Australia's biodiversity

Biological diversity, or 'biodiversity', is the variety of all life forms — the different plants, animals and micro-organisms, the genes they contain and the ecosystems of which they form a part.

Biodiversity is constantly changing; it is increased by genetic change and evolutionary processes and reduced by processes such as habitat degradation, population decline, invasion and extinction. Biodiversity covers terrestrial, marine and other aquatic environments and is considered at three interrelated and interdependent levels:

- ecosystem diversity: the variety of habitats, biotic communities and ecological processes
- species diversity: the variety of species on the Earth
- genetic diversity: the variety of genetic information in all of the individual organisms that inhabit the Earth. Genetic diversity occurs within and between the populations of organisms that comprise individual species as well as among species (Commonwealth of Australia 1996).

### Species biodiversity

Australia is identified as one of 17 megadiverse countries. These countries have an exceptional total number of species, and a high degree of endemic species found exclusively in that country. As a consequence of Australia's size, relative age and isolation, its flora and fauna have evolved to become a globally significant centre of endemism, with over 80% of our mammals, flowering plants, reptiles, frogs, fungi, molluscs and insects known only to occur in Australia (Williams et al. 2001).

Estimates of the total number of species in Australia vary considerably, from about 500,000 to in excess of 10 million (Horwitz, Recher & Majer 1999). Table 14.14 presents the most recent estimates of the number of species currently known in Australia and the percentage of endemic species for each taxa. Only a few groups of species are thought to be entirely known,

reflecting the limited state of our knowledge of Australia's biodiversity, particularly with respect to invertebrates and micro-organisms.

Many terrestrial and marine regions within Australia are globally significant centres of biodiversity (Williams et al. 2001). The south-west Western Australia region supports the eighth highest number of endemic vascular plant species in any one region (about 2,830 species), and contains over one-third of Australia's plant species. The Great Barrier Reef contains about 2,000 reef fish and 500 coral species, the highest concentration of the world's fish and coral species. The rainforests in the Wet Tropics of northern Queensland are also internationally identified as major centres of biodiversity.

### Ecosystem biodiversity

Ecosystems are a dynamic complex of plant, animal and micro-organism communities which, together with the non-living environment, interact to maintain a functional unit (Commonwealth of Australia 1996). Ecosystems contribute to the maintenance of water cycles, photosynthesis, gene flow, soil production and protection, storage and cycling of nutrients, regulation of climate and carbon sequestration. Ecosystem diversity is defined by the variety of these processes, habitats and biotic communities, and is generally considered in terms of distinct vegetation types, or marine and freshwater habitats. On the basis of vegetation alone, Australia has a wide range of ecosystem types ranging from rainforests, eucalypt forests and woodlands, acacia and mallee to heath, mangroves and grasslands (see the section *Extent and clearing of native vegetation*).

For the purposes of analysing Australian ecosystems at the continental scale, the Interim Biogeographic Regionalisation of Australia (IBRA) (Thackway & Cresswell 1995) and the Interim Marine and Coastal Regionalisation for Australia (IMCRA) (IMCRA Technical Group 1998) have been developed. In Australia, IBRA and IMCRA have identified 85 terrestrial bioregions and 60 marine bioregions representing the major environmental units in Australia. These provide a framework for conservation planning and sustainable resource management within a bioregional context.

## 14.14 ESTIMATED NUMBER OF DESCRIBED SPECIES IN AUSTRALIA — 2000

Taxonomic group	Species described(a) no.	Estimated total species(a)(b) no.	Percentage described(b) %	Endemic %
<b>Flora</b>				
Fungi				
Fungi (other than lichens)	12 500	250 000	5	90
Lichens	2 877	5 000	60	(c)
Plants				
Vascular plants (flowering plants, cycads, conifers and ferns)	15 638	20 000–25 000	70	85
Algae	5 000	10 000–12 000	45	(c)
Mosses and allies (Bryophytes)	1 500	2 500	60	(c)
<i>Total</i>	25 000	290 000	9	(c)
<b>Fauna</b>				
Invertebrates				
Sponges (Porifera)	1 416	3 500	40	(c)
Corals, anemonies, jellyfish (Cnidaria)	1 270	1 760	70	(c)
Flatworms, parasites (Platyhelminthes)	1 506	10 800	14	(c)
Thorny-headed worms (Acanthocephala)	57	160	35	(c)
Roundworms, threadworms (Nematoda)	2 060	30 000	7	(c)
Squid, octopus, mussels, clams, snails (Mollusca)	9 336	12 250	75	90
Ringed worms, earthworms (Annelida)	2 125	4 230	50	(c)
Velvet worms (Onychophora)	56	56	100	(c)
Crayfish, crabs, prawns etc. (Crustacea)	6 426	9 500	70	(c)
Spiders, mites etc. (Arachnida)	5 666	27 960	20	(c)
Insects (Insecta)	58 532	83 860	70	90
Starfish, echinoderms etc. (Echinodermata)	1 206	1 400	85	(c)
Other invertebrates	2 929	7 230	35	(c)
Vertebrates				
Sea squirts, doliolids, salps (Tunicata)	536	735	70	(c)
Lancelets (Cephalochordata)	8	8	100	(c)
Lampreys, hagfishes (Agnatha)	5	10	50	(c)
Fish (Pisces)	4 150	5 250	80	90
Frogs (Amphibia)	176	176	100	93
Snakes, lizards (Reptilia)	633	633	100	89
Birds (Aves)	825	825	100	45
Mammals (Mammalia)	369	369	100	83
<i>Total</i>	99 287	200 000	50	(c)

(a) Data on species numbers, collected by the Australian Biological Resources Study Environment Australia. (b) Estimates are approximations. (c) Unknown.

Source: Williams et al. 2001.

## Conservation of biodiversity

The loss of biodiversity is considered one of the most serious environmental problems in Australia. The clearance of native vegetation is a significant threat to terrestrial biodiversity (see the section *Extent and clearing of native vegetation*). Other key threats to biodiversity include invasive species (i.e. pests and weeds; see the section *Invasive species*), dryland salinity, pollution, nutrient loading and sedimentation of waterways and coastal areas, altered hydrological and fire regimes, and climate change. These processes pose a major threat to sustainable management of our ecosystems and the environment, as well as to the social and economic values of biodiversity.

The Commonwealth administers biodiversity conservation through the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act 1999). This Act provides for: identification and listing of threatened species and threatened ecological communities; development of recovery plans for listed species and ecological communities; recognition of key threatening processes; and where appropriate, reducing these processes through threat abatement plans. In August 2002, 116 flora and fauna species were listed as extinct, and 1,488 species and 27 ecological communities were listed as threatened under the EPBC Act (table 14.15). At that time, 140 recovery plans had been adopted covering 183 of these listed species.

As a signatory to the International Convention on Biological Diversity, Australia is required to establish a system of protected areas. These areas are dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources. The EPBC Act (1999) is the principal Commonwealth legislation for establishing and managing protected areas, which are developed according to the *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia 1996). The strategy calls for a Commonwealth, state and territory cooperative program to ensure that Australia's terrestrial and marine protected area systems are comprehensive, adequate and representative.

In 2000, there were 5,251 protected areas in Australia, occupying 61.4 million hectares and accounting for 7.8% of the total land area. Of the six international (World Conservation Union) management categories, national parks (39%) and nature reserves (31%) comprise the largest proportion of Australia's total protected area (table 14.16). At present, the conservation reserve system does not represent all ecosystems equally, with about 40% of IBRA regions having less than 5% of their land represented in protected areas. Arid and semi-arid environments, native grasslands and wetlands are particularly poorly represented. Given the small proportion of many landscapes in protected areas, conservation outside formal reserves is an important mechanism for biodiversity conservation and requires the involvement of farmers, businesses, conservation groups, resource users, Indigenous peoples and the wider community.

**14.15 THREATENED SPECIES AND COMMUNITIES(a) — 2000–02**

	Extinct	Critically endangered	Endangered	Vulnerable	Conservation dependent
Ecological communities	—	—	27	—	—
Fauna					
Fish	—	2	14	17	—
Amphibians	4	—	15	12	—
Invertebrates	—	2	2	6	—
Reptiles	—	—	12	38	—
Birds	23	5	34	62	—
Mammals	27	1	33	51	1
Flora					
Plants	62	35	489	657	—
Fungi	—	—	—	—	—
<b>Total</b>	<b>116</b>	<b>45</b>	<b>599</b>	<b>843</b>	<b>1</b>

(a) As listed under the 'Environment Protection and Biodiversity Conservation Act 1999' (Cwlth).

Source: EA 2002b.

### 14.16 TERRESTRIAL PROTECTED AREAS, By (IUCN) World Conservation Union management category — 2000

IUCN category	Primary management intent	no.	ha
Category IA	Nature reserve: managed mainly for science	1 981	19 119 788
Category IB	Wilderness area: wilderness protection	49	3 918 965
Category II	National park: ecosystem conservation and recreation	598	23 909 090
Category II/IB	National park/wilderness area	5	1 295 335
Category III	Natural monument: conservation of specific natural features	660	271 713
Category IV	Habitat/species management area: conservation through management intervention	1 397	325 304
Category V	Protected landscape/seascape: landscape/seascape conservation and recreation	151	861 095
Category VI	Managed resource protected areas: sustainable use of natural ecosystems	376	11 720 773
None specified	..	3	29
To be announced	..	31	16 519
<b>Total</b>	..	<b>5 251</b>	<b>61 438 611</b>

Source: EA 2000.

## Extent and clearing of native vegetation

Native vegetation is a key element contributing to Australia's biodiversity. Across Australia, 23 major native vegetation groups have been identified across Australia, which collectively comprise 'tens of thousands of plant species, thousands of vegetation communities and assemblages, and provide habitat to myriads of microorganisms and animal species' (NLWRA 2002b). In general, the extent and distribution of native vegetation across Australia is determined by climatic variation and the physical landscape (i.e. landform, geology and soils). Rainforests and eucalyptus forests are limited to the higher rainfall areas across the tropical north, around eastern and south-western coastal regions, and across Tasmania. Australia's arid interior is dominated by grasslands and forblands. Regions between these climatic extremes are occupied primarily by woodlands, shrublands and Acacia forests.

Australia's landscape is dominated by a few plant genera ranging across a broad variety of structural vegetation types. Table 14.17 details the estimated pre-European and current extent of Australia's major native vegetation groups. At present, hummock grasslands cover 23% of Australia, existing primarily in the arid interior. Eucalypt woodlands (17%) and Acacia forests, woodlands and shrublands (17%) occupy the next largest proportion of Australia's landmass. Smaller areas of the continent are inhabited by shrubs and forblands (10%), tussock grasslands (7%), eucalypt forests (4%) and mallee

woodlands and shrublands (3%). The remaining native vegetation types together comprise less than 4% of Australia's land area (NLWRA 2002b).

## Clearing of native vegetation

Since European settlement, large tracts of Australia's native vegetation have been cleared to facilitate human settlement and the expansion of agriculture. Extensive broadscale clearing continues to take place. Clearance of vegetation reduces the natural range of ecosystems as well as the diversity of habitats and ecological processes occurring within them. Consequently, native vegetation clearance has been identified as one of the most threatening processes for biodiversity loss and species extinction in Australia (SoE 2001a). Broadscale vegetation clearance has other important implications for the state of the environment through its effect on dryland salinity, carbon cycling and changes in hydrological cycles.

According to the *Australian Native Vegetation Assessment 2001*, approximately 982,000 square kilometres, or 13% of Australia's native vegetation, has been cleared or substantially modified since European settlement (table 14.18). Clearing has been concentrated in the higher rainfall areas and where there are more fertile soils, generally excluding the arid interior and the tropical far north. In the intensively used areas of Australia (primarily the agricultural and urban zones), about 33% of native vegetation has been cleared (NLWRA 2002b).

## 14.17 AREA OF PRE-EUROPEAN AND PRESENT NATIVE VEGETATION — 2001

Major vegetation group	Pre-European	Present	Proportion remaining
	km <sup>2</sup>	km <sup>2</sup>	%
Rainforest and vine thickets	43 493	30 231	70
Eucalypt tall open forests	44 817	30 129	67
Eucalypt open forests	340 968	240 484	71
Eucalypt low open forests	15 066	12 922	86
Eucalypt woodlands	1 012 047	693 449	69
Acacia forests and woodlands	657 582	560 649	85
Callitris forests and woodlands	30 963	27 724	90
Casuarina forests and woodlands	73 356	60 848	83
Melaleuca forests and woodlands	93 501	90 513	97
Other forests and woodlands	125 328	119 384	95
Eucalypt open woodlands	513 943	384 310	75
Tropical eucalypt woodland/grasslands	256 434	254 228	99
Acacia open woodlands	117 993	114 755	97
Mallee woodlands and shrublands	383 399	250 420	65
Low closed forests and closed shrublands	15 864	8 749	55
Acacia shrublands	670 737	654 279	98
Other shrublands	115 824	98 947	85
Heath	47 158	25 861	55
Tussock grasslands	589 212	528 998	90
Hummock grasslands	1 756 962	1 756 104	100
Other grasslands, herblands, sedgeland and rushlands	100 504	98 523	98
Chenopod shrubs, samphire shrubs and forblands	563 389	552 394	98
Mangroves, tidal mudflats, samphires and bare areas, etc.	112 063	106 999	96

Source: NLWRA 2002b.

## 14.18 EXTENT OF NATIVE VEGETATION CLEARANCE SINCE EUROPEAN SETTLEMENT — 2001

	Cleared or modified	
	km <sup>2</sup>	%
NSW	234 527	30
Vic.	142 633	60
Qld	304 043	18
SA	99 473	11
WA	183 887	7
Tas.	10 695	16
NT	6 055	—
ACT	738	31
<b>Aust.</b>	<b>982 051</b>	<b>13</b>

Source: NLWRA 2002b.

The extent of clearing of major vegetation groups since European settlement is shown in table 14.17. The most affected groups include: 'eucalypt woodlands' and 'eucalypt open woodlands', where 31% and 25% of pre-European extent has been cleared, accounting for 32% and 13% respectively of all clearing; and 'inland acacia forests and woodlands', and 'mallee woodlands and shrublands', where approximately 15% and 35% of pre-European extent has been cleared, accounting for 10% and 14% respectively of all clearing. The extensive clearing of low closed forests, rainforest and heath communities is

particularly important given that they were already highly restricted in their natural, pre-European distribution.

## 14.19 ESTIMATED ANNUAL CLEARANCE OF WOODY VEGETATION

	Area cleared in 1999(a)	Area cleared in 2000(b)
	ha	ha
NSW	30 000	100 000
Vic.	2 450	2 500
Qld	425 000	425 000
SA	3 396	1 600
WA	3 738	6 000
Tas.	940	17 000
NT	3 320	12 700
ACT	—	—
<b>Aust.</b>	<b>468 844</b>	<b>564 800</b>

(a) 1999 data from AGO 2001b. (b) 2000 estimates from ACF 2001.

Source: Cited in Hamblin 2001.

Recent estimates of annual native vegetation clearing rates in Australia vary markedly and are highly uncertain (table 14.19). Nonetheless, they are indicative of a relatively high rate of clearance. The extent of land clearance in the intensively used regions of Australia (38% of the continent) from 1990 to 1995 was estimated at 1.2 million

hectares (Barson, Randall & Boardas 2000). The most recent estimates of annual native vegetation clearing in Australia include 468,844 hectares for 1999 (AGO 2001b) and 564,000 for 2000 (ACF 2001). The latter figure is exceeded by only four other countries: Brazil, Indonesia, the Democratic Republic of Congo and Bolivia (ACF 2001, cited in Hamblin 2001). Most of Australia's recent vegetation clearance has been conducted in Queensland.

### Greenhouse gas emissions from land clearing

Land clearing makes a significant contribution to Australia's greenhouse gas emissions and consequently has important implications for global climate change, global warming and associated policy mechanisms. Where vegetation is cleared for a different land use, the cleared vegetation is usually burned, leading to emissions of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases into the atmosphere. CO<sub>2</sub> is also released from the soil and from decay of unburned aboveground biomass. Although significant quantities of CO<sub>2</sub> are sequestered from the atmosphere during vegetation regrowth, land clearing is a net emitter of CO<sub>2</sub> in Australia (AGO 2001b).

Australia provides greenhouse gas emission estimates to the United Nations Framework Convention on Climate Change (UNFCCC), including land use change, which is defined as the deliberate removal of forest cover by humans and replacement of it with pasture, crops, urban development or other land uses. Emissions from the clearing of other vegetation types (such as grasslands and shrublands) are excluded from the analysis of land use change emissions, unless it was reclearing (AGO 2002a).

The National Carbon Accounting System (NCAS) assists in monitoring land use change and its impact on Australia's emissions. According to NCAS, emissions from land use change were estimated to be 61 megatonnes (Mt) CO<sub>2</sub> in 2000, contributing 11% of Australia's total emissions in that year (AGO 2002b). However, all estimates of emissions from land clearing are subject currently to high degrees of uncertainty and are likely to change in the future.

### Invasive species

An invasive species is 'a species occurring as a result of human activities beyond its accepted normal distribution and which threatens valued

environmental, agricultural and personal resources by the damage it causes' (EA 2002a). Invasive species include feral animals, marine pests, weeds, non-native insects and other invertebrates, and diseases and parasites. Invasive species can be native or exotic. They may reduce farm and forestry productivity, threaten native species and contribute to land degradation. Invasive species are acknowledged by the World Conservation Union (IUCN) as the second most significant cause of biodiversity loss in the world, behind habitat loss and fragmentation.

### Invasive animals (pests)

Many invasive animals have been deliberately brought to Australia for transport, food, sport and recreation, pets and pest control (Bomford & Hart 2002). Other animals, such as black rats and house mice, have been accidentally imported. Some species were legally released into the wild (e.g. rabbits and foxes), while others escaped domestication (e.g. feral goats and pigs) or were released illegally (e.g. Indian mynahs). At least 80 exotic vertebrate animal species have successfully established wild populations on mainland Australia and over 30 of these species are deemed to be pests (table 14.20). Furthermore, several native species may be considered pests, such as the laughing kookaburra, kangaroos and the crown-of-thorns starfish (Clarke et al. 2000).

**14.20 EXOTIC VERTEBRATE ANIMAL SPECIES THAT HAVE ESTABLISHED WILD POPULATIONS — 2001**

	No. of invasive species	Invasive species classified as pests
Mammals	25	European rabbit; feral goat, cat and pig; European red fox; house mouse; dingo/feral dog
Birds	(a)20	European starling; Indian myna
Reptiles	4	—
Amphibians	1	Cane toad
Freshwater fish	23	European carp; Mosquito fish; Mozambique tilapia

(a) A further seven invasive bird species are established on offshore islands.

Source: Bomford and Hart 2002.

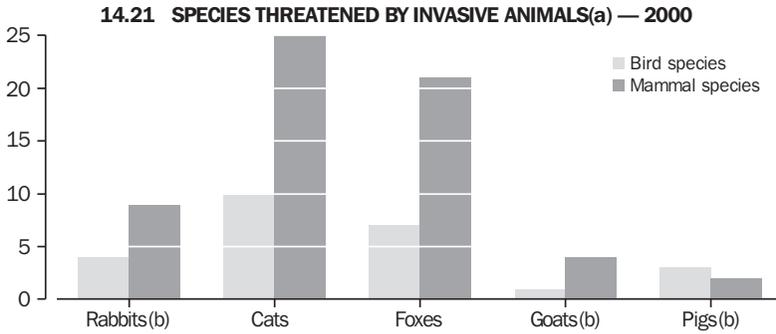
Australia's pest animals have direct impacts on Australia's livestock industries through predation and competition for pasture. Short-term agricultural costs attributed to the main exotic vertebrate pests in Australia have been estimated to total at least \$420m per year (Bomford & Hart 2002). A further \$60m per year is spent on

controlling these vertebrate pests, while the costs of combating associated long-term land degradation are likely to be large. These estimates do not include environmental costs such as threats to the survival of native species.

Pest animals may damage vegetation and soils, foul water or compete with native animals for habitat and food. Along with the processes associated with their presence, several invasive species are listed as key threatening processes under the EPBC Act 1999. Listed threatening processes threaten or may threaten the survival, abundance or evolutionary development of a native species or an ecological community. Competition and land degradation by feral goats and rabbits; predation by feral cats and the

European red fox; and predation, habitat degradation, competition and disease transmission by feral pigs are each recognised as key threatening processes (EA 2002b).

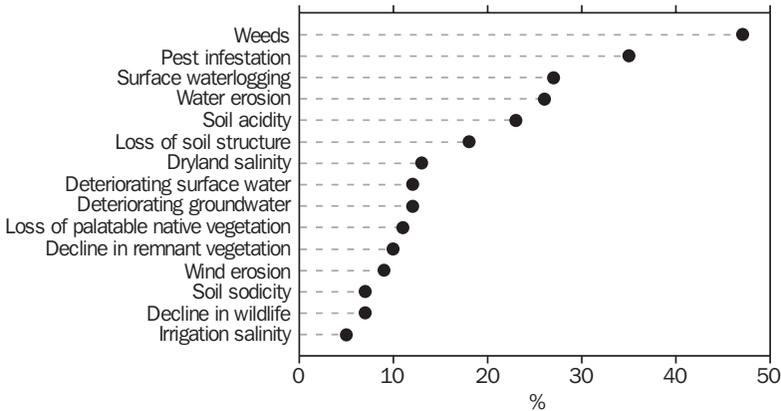
The number of bird and mammal species threatened by processes associated with these invasive animals is shown in graph 14.21. These invasive species also threaten a range of plants, amphibians and reptiles. Threat abatement plans have been prepared under the National Feral Animal Control Program and the EPBC Act 1999 for the European fox, cat, rabbit and goat (EA 2002b). These plans focus on strategic approaches to reducing, to an acceptable level, the effects of processes that threaten the long-term survival of native species and ecological communities.



(a) Number of threatened species under confirmed or perceived threat from the relevant key threatening process listed under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth). (b) Threat includes associated threats such as land degradation.

Source: EA 2002b.

**14.22 LAND DEGRADATION PROBLEMS REPORTED BY FARMERS — 1997**



Source: Mues, Chapman and Van Holst 1998.

## Invasive plants (weeds)

A weed is any invasive plant, native or introduced, that is deemed to be a problem or has the potential to be a problem on any area of land or water. Weeds reduce the productive capacity of agricultural systems (agricultural weeds) and pose a significant threat to natural ecosystems (environmental weeds). Surveys of landholders in Australia show that weeds are the most common land problem faced by farmers (graph 14.22), and the majority of farmers believe their weed problems are getting worse (Jones et al. 2000). In 1987, weeds were estimated to cost the Australian economy \$3.3b annually, through lost agricultural production and control costs (Combellack 1987). Environmental weeds are considered one of the most serious threats to biodiversity and nature conservation in Australia (Williams et al. 2001).

There are over 3,000 weed species in Australia today (National Weeds Strategy Fact Sheet), of which over 370 species have been declared noxious (Lazarides, Cowley & Hohnan 1997). Management of these weeds is coordinated through the National Weeds Strategy, which aims to integrate the efforts stakeholders, including governments, industry, land managers and the general public, to reduce the detrimental impact of weeds on the sustainability of Australia's productive capacity and natural ecosystems.

To help focus national efforts addressing the weed problem, a list of 'Weeds of National Significance' (WONS) has been compiled (Thorpe & Lynch 2000). A final 'Top 20' weed species (table 14.23) were selected from an original list of 71 nominated weed species on the basis of their invasiveness and impact characteristics; their potential and current area of spread; and their primary industry, environmental and socioeconomic impacts. Of these top 20 WONS, six were classified as primarily a threat to the environment, another five as primarily a threat to agricultural systems and nine weeds have both environmental and agricultural effects.

## Coastal and marine environment

Australia's marine area is one of the largest in the world, extending over about 16 million square kilometres (including an Exclusive Economic Zone of some 11 square kilometres of ocean beyond the territorial sea), from Antarctica to near-equatorial latitudes — more than double Australia's land area. The length of the coastline of Australia's mainland and islands is about 61,700 km. Australia's marine and coastal regions host a broad variety of habitats ranging from estuaries and mangroves, dunes and beaches, rocky and coral reefs, seagrasses, gulfs and bays, seamounts, and a huge area of continental shelf.

### 14.23 WEEDS OF NATIONAL SIGNIFICANCE, Current and potential distribution — 1999

Common name	Origin of weed	Current distribution	Potential distribution
		'000 km <sup>2</sup>	'000 km <sup>2</sup>
Alligator weed	Argentina	30	500
Athel pine	North Africa, Arabia, Iran and India	80	3 646
Bitou bush/boneseed	South Africa	231	1 258
Blackberry	Europe	691	1 425
Bridal creeper	South Africa	385	1 244
Cabomba	United States of America	35	181
Chilean needle grass	South America	14	242
Gorse	Europe	233	870
Hymenachne	Central America	73	415
Lantana	Central America	389	1 052
Mesquite	Central America	410	5 110
Mimosa	Tropical America	73	434
Parkinsonia	Central America	950	5 302
Parthenium	Caribbean	427	2 007
Pond apple	North, Central and South America and West Africa	27	181
Prickly acacia	Africa	173	2 249
Rubber vine	Madagascar	592	2 850
Salvinia	Brazil	383	1 376
Serrated tussock	South America	171	538
Willows	Europe, United States of America and Asia	63	135

Source: Agricultural and Resource Management Council of Australia and New Zealand, *Australia and New Zealand Environment and Conservation Council and Forestry Ministers 1999*; Thorpe and Lynch 2000.

Australian coastal and marine habitats are home to a wealth of fauna and flora species, most of which are only found in Australia. For example, Australia has:

- the world's highest levels of biodiversity for a number of types of marine invertebrates
- the highest mangrove species diversity
- the world's largest areas and highest species diversity of tropical and temperate seagrasses
- one of the largest areas of coral reefs (SoE 2001b).

There are two distinct marine biogeographic regions in Australia: the temperate south, and the tropical north, which overlap on the western and eastern coastlines. In the south, which has been geographically and climatically isolated for around 40 million years, about 80–90% of species of most marine groups are endemic (found only in a particular area), or restricted to this area. In the north, which is connected by currents to the Indian and Pacific Ocean tropics, only around 10% of most groups are endemic (Zann 1995).

Land use and other human activities impact on the coastline and marine environment in a number of ways. Pressures can arise from local land-based pollution, poor drainage and effluent management, or can emanate from land disturbance in catchments many hundreds of kilometres away. Activities related to fisheries and aquaculture, the shipping and port industries, and marine tourism and recreation, are all potentially threatening to the health of Australia's coastal and marine environments.

A significant factor causing pressure on some parts of Australia's coastline is high population density in coastal regions, particularly along the east and south-east coasts and along the west coast south of Perth. As at 30 June 1996, 83% of the population lived within 50 km of the coast. All states except the Northern Territory and South Australia are experiencing higher rates of population growth and urban development within 3 km of the coast compared to the rest of Australia (Newton et al. 2001). The coastal strip is an ecologically sensitive zone, and urban sprawl, and pollution of rivers, lakes and seas, were described by the Resource Assessment Commission as the two most important problems faced by the coastal zone (RAC 1993).

This section focuses on two significant marine ecosystems — estuaries and coral reefs. It discusses the significance of these habitats and the processes which threaten them. This is

followed by a discussion of marine protected areas in Australia. Further information on the Great Barrier Reef Marine Park can be found in the article *Sustainable tourism in the Great Barrier Reef Marine Park*, which follows *Chapter 22, Tourism*.

## Estuaries

Estuaries are semi-enclosed coastal water bodies occurring where inland meet inshore marine waters. These waterways are typically marine or brackish, but occasionally are dominated by freshwater. Estuaries are highly productive and diverse habitats that constitute an important part of Australia's coastal environment. They support fisheries, aquaculture and recreational activities, and are the preferred sites for many settlements, and for industry and ports. Australia has over 1,000 estuaries along its coastline. Of these, 783 are regarded as major estuaries: 415 in the tropics, 170 in the subtropics, and 198 in temperate areas (Zann 1995). The long arid coastlines in the south-west and west have few estuaries.

Australia's estuaries occur over a wide range of geological and climatic conditions and consequently display a great variety of forms. Different types of estuaries are defined by the relative influence of the natural processes that shape them. As part of the National Land and Water Resources Audit (NLWRA), Australia's estuaries were classified based on whether they are dominantly affected by river flows, tidal or wave action. According to the NLWRA, 17% of estuaries are wave-dominated estuaries; 11% are tide-dominated estuaries; 10% are wave-dominated deltas; 9% are tide-dominated deltas; 5% are strand plains, coastal lakes and lagoons; and 35% are tidal creeks and flats. Tide-dominated systems are mainly located in northern tropical Australia. Wave-dominated systems are mainly located in southern temperate regions. Their management needs and ecological processes vary (NLWRA 2002a).

Australia's estuaries face a number of pressures from urban and industrial development in coastal areas, and from disturbance through land use and vegetation clearance in catchments. For example, estuaries are often used for dumping, sand or water extraction, construction of marinas, ports and canal estates, and are susceptible to changes in natural flows caused by the construction of dams and weirs. Such pressures threaten the condition of estuaries by causing excess nutrient

concentrations, sedimentation, loss of habitat, weed and pest infestation, and the accumulation of pollutants.

Of the 972 estuaries assessed by NLWRA, 9% were in extensively modified condition, 19% were in modified condition, 22% were in largely unmodified condition and 50% were in near-pristine condition (table 14.24). Most of Australia's near-pristine estuaries are located

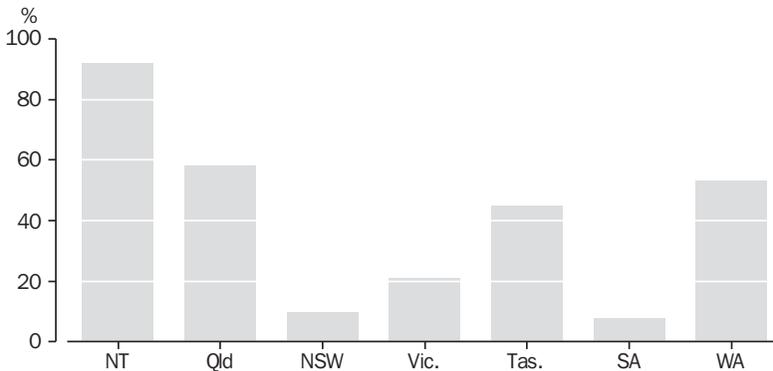
away from population centres. The majority of estuaries in the Northern Territory are in near-pristine condition, primarily as a result of low population pressure and minimal catchment and estuarine shoreline development (graph 14.25). Conversely, most of the estuaries in New South Wales are under intense urban development pressure, with approximately 80% of the state's population living near an estuary (NLWRA 2002a).

**14.24 CONDITION OF ESTUARIES, By process type — 2002**

Class	Near-pristine	Largely unmodified	Modified	Extensively modified	Total
<b>Wave</b>					
Wave-dominated estuary	28	41	62	25	156
Strandplain	36	13	10	1	60
Other	40	30	22	17	109
<b>Tide</b>					
Tide-dominated estuary	57	25	9	4	95
Tidal flat/creek	210	43	16	15	284
Other	40	17	23	9	89
<b>River</b>					
Wave-dominated delta	28	24	30	12	94
Tide-dominated delta	36	16	11	9	72
Other	9	1	3	—	13
<b>Total</b>	<b>484</b>	<b>210</b>	<b>186</b>	<b>92</b>	<b>972</b>

Source: NLWRA 2002a.

**14.25 NEAR-PRISTINE ESTUARIES — 2002**



Source: NLWRA 2002a.

## Coral reefs

Coral reefs are accumulations of dead corals and other organisms with a limestone skeleton, cemented together by some algal species and by physical processes. The reef builds slowly towards the surface of the water, at the rate of a few millimetres per year. Once the reef reaches sea level, the reef grows horizontally. Reefs build as a result of the growth of corals and other living creatures. The accumulation of sand and rubble formed when organisms are broken down by waves and animals, such as worms and sponges that bore into the coral, also add to reef growth (CRC Reef 2002).

Coral reefs are exceptionally diverse marine systems that thrive in relatively low nutrient tropical waters and can only grow in waters where temperatures rarely fall below 18°C. They are among the most productive and complex ecosystems in the world. The Great Barrier Reef is the largest coral reef in the world, consisting of about 3,000 individual reefs covering an area of 345,950 square kilometres. Australia's coral reef systems include:

- Houtman–Abrolhos Islands reef system, offshore from Perth, which comprises the most southerly reefs in the Indian Ocean
- Ningaloo Reef off the Western Australian coast, stretching 230 km
- North West Shelf reefs, for example, Ashmore Reef off Western Australia, Scott (a pinnacle) and Seringapatam Reefs and Rowley Shoals (a marine park), Australia's only 'shelf-edge atolls'
- Cocos (Keeling) atoll, Australia's only true atoll
- Torres Strait reefs
- Great Barrier Reef system in Queensland, of some 2,300 km in length
- Coral Sea reefs, for example, the Coringa–Herald Reserve system, and the Lihou Reef which is the largest reef system in the Coral Sea
- high-latitude coral reefs, for example, Flinders Reef off Brisbane, the Solitary Islands off the New South Wales coast, and the Elizabeth and Middleton Reefs on the Lord Howe Rise (SoE 2001b).

Australian coral reefs face a variety of pressures. These pressures include: run-off of sediment and nutrients at a number of coastal locations, which

is steadily increasing through human activities (primarily from the effects of agriculture and land use practices, as well as increasing industrial and urban development); increased recreational and commercial fishing; increasing pressure from tourism developments; threats from invasive and pest species such as the crown of thorns starfish; and coral bleaching possibly due to global warming (SoE 2001b). The article *Sustainable tourism in the Great Barrier Reef Marine Park* following *Chapter 22, Tourism* addresses management of the impacts on the Park from tourism.

A global assessment of reefs found that about 25% of the world's reefs have effectively been lost. The largest single cause has been a massive coral bleaching event in 1998, which destroyed about 16% of the world's coral reefs in nine months (Wilkinson 2000). It is likely that half of these reefs will never recover. The impacts of the bleaching event were equally as damaging on pristine, remote reefs as on reefs already stressed by human causes. Coral bleaching occurs when the sea surface temperature goes over a certain level, usually just over 30°C. The symbiotic algae (which provide coral polyps with nutrients) in the coral tissues are then expelled, allowing the white calcium carbonate skeleton to show through the clear animal tissue cover. If the temperature remains high for more than two weeks, the coral dies. In 1998, 3% of reefs were destroyed by coral bleaching in Australia. It is estimated that a further 1% of Australia's coral reefs have been destroyed by other causes, such as sediment and nutrient run-off from the land, increased recreational and commercial fishing, and the mining of sand and rocks (SoE 2001b).

During March–April 2002, the Great Barrier Reef Marine Park Authority and the Cooperative Research Centre for the Great Barrier Reef World Heritage Area conducted aerial surveys to determine the area of bleaching on the Reef (GBRMPA 2002). The surveys studied 641 reefs, representing 22% of all reefs in the Marine Park. They found that bleaching was extremely widespread, extending over 1,450 km, including reefs from near the coast to the outer reefs. About 21% of these reefs showed a high level of bleaching (30% or greater of the reef affected), 36% were moderately bleached (1–30% of reef affected) and 43% had low to negligible levels of bleaching (less than 1% of the reef affected) (table 14.26).

In the Great Barrier Reef, during 2002 the worst affected reefs were those closest to the mainland. Nearly 50% of reefs near the coast (inshore reefs) were bleached to high or very high levels, with only 30% relatively unaffected (table 14.26). Many of the outer reefs (offshore reefs) were also affected, with over 50% of reefs bleached to some extent. Among the bleached reefs, however, the intensity of bleaching was highly variable (GRMPA 2002).

#### 14.26 GREAT BARRIER REEF, Affected by coral bleaching

	1998	2002
	%	%
<b>Inshore reefs</b>		
Low level bleaching	13	30
Moderate level bleaching	33	23
High level bleaching	54	47
<b>Offshore reefs</b>		
Low level bleaching	72	49
Moderate level bleaching	23	43
High level bleaching	5	8
<b>All reefs</b>		
Low level bleaching	n.a.	43
Moderate level bleaching	n.a.	36
High level bleaching	n.a.	21

Source: GBRMPA 2002.

### Marine protected areas

A key response to pressures on marine and coastal environments is the establishment of a National Representative System of Marine Protected Areas. This conservation reserve system formally addresses the management and protection of marine areas while allowing a range of sustainable uses. The preservation of the ecological viability of marine and estuarine systems and the protection of marine biodiversity are integral to the aims of Marine Protected Areas. These areas can be declared under Commonwealth, state or territory legislation in seas within each jurisdiction's waters. In November 2000, there were 190 marine protected areas covering about 60 million hectares (SoE 2001b).

Marine protected areas range from nature reserves to marine parks, and can include reefs, seagrass beds, shipwrecks, archaeological sites, mangroves, underwater areas on the coast and seabeds in deep water. The Commonwealth Government has under its jurisdiction 13 marine protected areas, including the Great Barrier Reef Marine Park (table 14.27). With almost 34 million hectares protected, the Great Barrier Reef Marine Park is the world's largest marine protected area and, given its status as a World Heritage area, it is subject to a special management program administered by the Great Barrier Reef Marine Park Authority.

#### 14.27 COMMONWEALTH MARINE PROTECTED AREAS — 2000

Name of Commonwealth reserve	Area protected ha	Date proclaimed
<b>Marine national nature reserve</b>		
Coringa-Herald	885 600	16 August 1982
Lihou Reef	844 000	16 August 1982
Ashmore Reef	58 300	16 August 1983
Elizabeth and Middleton Reef	188 000	23 December 1987
Mermaid Reef	53 984	10 April 1991
<b>Marine reserve</b>		
Tasmanian Seamounts	37 000	19 May 1999
Solitary Islands (Commonwealth waters)	12 962	3 March 1993
Cartier Island	16 700	21 June 2000
<b>Marine park</b>		
Great Australian Bight (Commonwealth waters)	1 976 900	22 April 1998
Ningaloo (Commonwealth waters)	232 600	20 May 1987
Macquarie Island (Commonwealth waters)	16 200 000	27 October 1999
Lord Howe Island (Commonwealth waters)	300 500	21 June 2000
Great Barrier Reef(a)	34 480 000	1 July 1975

(a) The Great Barrier Reef is managed by the Great Barrier Reef Marine Park Authority.

Source: EA 2000.

## Atmosphere and climate change

### Climate change in Australia

The Earth's climate has gone through many cycles that have caused significant fluctuations in the composition of the Earth's atmosphere. These fluctuations may result in changes to rainfall, evaporation and moisture balance and cyclonic activity (Hengeveld 1991). This section discusses issues relating to the atmosphere such as temperature changes, rainfall and cyclonic activity and greenhouse gas emissions, including CO<sub>2</sub> as well as other atmospheric pollutants.

One of the key factors indicating environmental change is temperature. Australia's annual average temperatures have increased since 1910 (graph 14.28). In general, minimum temperatures have increased the most, particularly in the eastern half of Australia where they have increased by approximately one degree Celsius (BoM 2000).

Australia's continental average temperature has increased by 0.7°C since 1910, with most of this increase occurring after 1950 (CSIRO 2001a). Although average temperatures have generally increased since early last century, the amount of warming has not been uniform throughout the continent, nor has it been the same for minimum and maximum temperatures. The largest increase in minimum temperatures has been in the north-east quadrant of Australia, while the largest increase in maximum temperatures has been in

the north-west (BoM 2002b). Most of Australia has experienced a warming trend in annual mean temperatures over the past few decades (BoM 2002c). Environmental impacts that may result from increasing temperatures include changed rainfall patterns, effects on vegetation distribution, and the ability of areas to support land uses such as agriculture and global phenomena such as rising sea levels.

Climate change is not limited to increasing temperatures. Australia's annual mean rainfall has increased slightly over the last century. Most of this increase has been in the north-west and south-east (BoM 2002a). In 2001, preliminary data indicated that the total average rainfall across Australia was 553 mm. This amount was higher than the long-term average of 457 mm, but less than the highest level of 784 mm recorded in 1974 (BoM 2002a). The implications of these changes may include more intensive and frequent flooding, which may result in greater property damage and higher rates of erosion.

Changes have also occurred with the most destructive atmospheric activity — tropical cyclones. Trends in tropical cyclone activity in the Australian region (south of equator; 105–160° E) show that the total number of cyclones has decreased in recent decades. However, the number of stronger cyclones (minimum central pressure less than 970 hPa) appears to have increased slightly. Tropical cyclone numbers in the Australian region are influenced by the El Niño–Southern Oscillation phenomenon, and the decrease in total cyclone numbers may be associated with an increased frequency of El Niño events (BoM 2002d).

14.28 ANNUAL MEAN TEMPERATURE TREND(a)



(a) Trend expressed as the departure from 1960–91 mean, as calculated January 2000.

Source: BoM 2000.

## Greenhouse gas emissions

There is widespread national and international concern that it is human activities which have contributed to changes in atmospheric activity (Watson 1999). CO<sub>2</sub> and other 'greenhouse gases' are released into the atmosphere from the use of fossil fuels, and stored carbon has also been released through the clearing of vegetation. It is thought that increasing the concentration of greenhouse gases increases the atmosphere's ability to absorb heat energy (UNEP & UNFCCC 1999). This has been termed the 'greenhouse effect' or 'enhanced greenhouse effect'. Projections indicate that annual average temperatures in Australia could be 0.4–2.0 degrees higher by 2030 and 1.0–6.0 degrees higher by 2070 (CSIRO 2002a). These estimates are based on world emissions scenarios produced by the Intergovernmental Panel on Climate Change (IPCC).

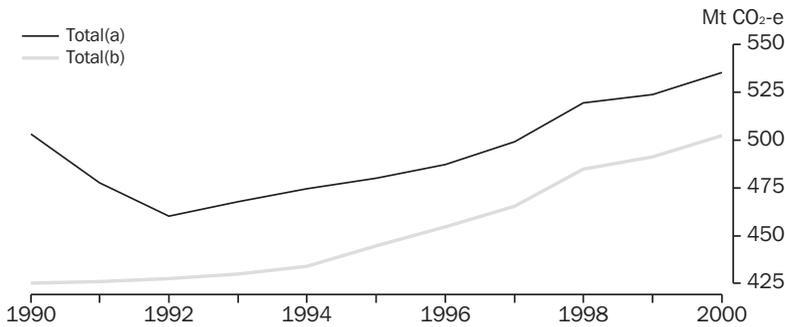
However, these scenarios have recently been challenged by Ian Castles, a former Australian Statistician. As reported in *The Australian* (20 August 2002), Castles wrote to the IPCC

chairman that 'the economic projections used in the IPCC's emissions scenarios are technically unsound'. Castles found what he considered to be significant errors in the IPCC's Special Report on Emissions Scenarios, and he believes the IPCC's projections of emissions and therefore of temperatures are based on unrealistic assumptions and as a result have overestimated the level and impact of future economic activity.

According to the National Greenhouse Gas Inventory, Australia's total net emissions of greenhouse gases increased by 32 Mt of carbon dioxide equivalent (CO<sub>2</sub>-e) (6.3%) between 1990 and 2000. The decline of emissions during the early 1990s is due to land use changes (graph 14.29) (AGO 2002b).

As amounts of greenhouse gas emissions continue to increase, they are being reflected in the findings from atmospheric measuring stations. In the past 25 years, a steady increase in the level of CO<sub>2</sub> has been recorded at the Cape Grim Baseline Air Pollution Station in Tasmania (graph 14.30).

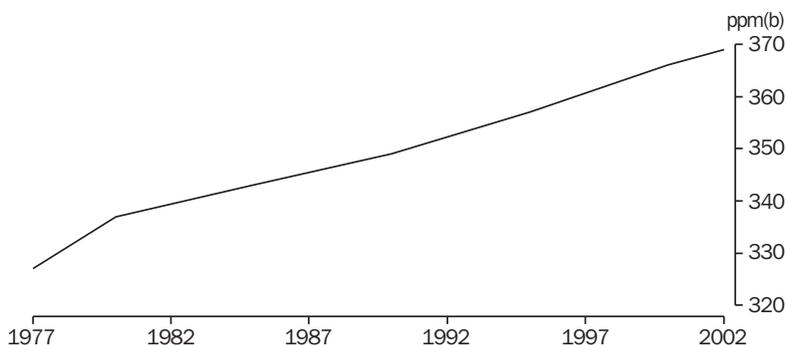
14.29 GREENHOUSE GAS EMISSIONS



(a) Total (with net CO<sub>2</sub>-e emissions/removals). (b) Total (without CO<sub>2</sub>-e from land use and forestry change).

Source: AGO 2002b.

## 14.30 CARBON DIOXIDE MEASUREMENTS(a)



(a) Recorded at Cape Grim Baseline Air Pollution Station, Tasmania. (b) Parts per million.

Source: CSIRO 2002b.

While total CO<sub>2</sub>-e emissions increased by 6.3% between 1990 and 2000, the emissions of individual greenhouse gases that make up this total varied significantly. Emissions of CO<sub>2</sub> increased by 25.5%, methane emissions by 1.0% and those of nitrous oxide by 30.8% (table 14.31). Perfluorocarbons (PFC) and sulphur hexafluoride were the only greenhouse gases to record a decrease in emissions over the period (76.2% lower in 2000 than in 1990). As a result of these changes, CO<sub>2</sub> increased its share of total emissions from about 64% to 68%.

The UNFCCC established the first international treaty dealing with climate change and laid the basis for global action to 'protect the climate system for present and future generations' (UNEP & UNFCCC 1999). Governments recognised the

need for legally binding commitments to greenhouse gas emission limitations and reductions, which were subsequently reflected in policy terms in the Kyoto Protocol. Developed countries are committed to reducing their greenhouse gas emissions by at least 5% from 1990 levels by 2008 to 2012. In recognition of the fact that all developed countries have different economic circumstances and differing capacities to make emissions reductions, each developed country has a specific, differentiated target (AGO 2002b). Australia negotiated to restrict its emissions increases to 8% above 1990 levels by this time. Australia's 8% target includes a one-off benefit of land clearing, where reduced emissions compensate for large increases in transport and power generation.

## 14.31 GREENHOUSE GAS EMISSIONS, By gas (UNFCCC accounting)

Greenhouse gases	1990	2000	Change Mt	Change in emissions
	Mt CO <sub>2</sub> -e	Mt CO <sub>2</sub> -e		%
Carbon dioxide	356.0	379.9	23.9	6.7
Methane	118.9	121.1	2.2	1.8
Nitrous oxide	23.3	31.9	8.7	37.6
Perfluorocarbons and sulphur hexafluoride	4.1	1.0	-3.1	-75.6
Carbon dioxide equivalent(a)	1.2	1.5	0.3	25.2
<b>Total</b>	<b>503.3</b>	<b>535.3</b>	<b>32.0</b>	<b>(b)6.3</b>

(a) Includes confidential carbon dioxide and nitrous oxide data from ammonia production and nitric acid. (b) According to the 108% Kyoto target accounting provisions, the change in emissions between 1990 and 2000 is 5%.

Source: AGO 2002b.

The Kyoto Protocol is an international treaty under which developed countries (those listed in Annex B of the Protocol) have agreed to limit net greenhouse gas emissions. Many countries, including Australia, have signed (but not ratified) the Protocol. Other countries that have not ratified include New Zealand, and the United States of America (UNFCCC 2002). To enter into force the Protocol must be ratified by at least 55 countries that account for at least 55% of the total CO<sub>2</sub> emissions of developed countries in 1990. All European Union member states have either ratified, accepted or assented to the Protocol. Japan has accepted and most Pacific island states have ratified the Protocol. In September 2002, Canada, Mexico, Russia, India and China used the Earth Summit in Johannesburg to support or indicate their intention to ratify the Protocol. By August 2002, 21 of the 37 Annex I countries had ratified, accepted or assented to the Protocol. Annex I countries (including Australia, New Zealand, Japan, United States of America and the European Union) must report greenhouse gas emissions more often and in more detail.

Sources that need to be counted in the 1990 baseline are all emissions from energy, industrial processes, solvent and other product use, and changes in agriculture, waste and for some countries, including Australia, land use changes (emissions from land clearing) are also included. Approximately one-third of Australia's greenhouse gas emissions arise from the land-based sectors. The Protocol allows countries with a net source of emissions from land use change and forestry in 1990, such as Australia, to include emissions from land use change in the baseline used for calculating their assigned amounts. This mechanism was included in the Kyoto Protocol in recognition that land clearing contributes a substantial proportion of Australia's

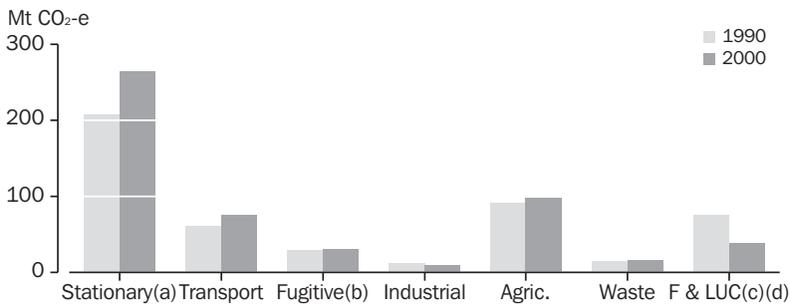
total emissions. The trigger mechanism will allow Australia to obtain credit for efforts made to reduce emissions from land clearing.

In February 2002, the Minister for the Environment and Heritage, Dr David Kemp, announced the establishment of the Australian/US Climate Action Partnership. The Partnership would focus on such issues as emissions measurement and accounting, climate change science, stationary energy technology, engagement with business to create economically efficient climate change solutions, agriculture and land management, and collaboration with developing countries to build capacity to deal with climate change (Kemp 2002).

### **Greenhouse gas emissions and the Australian economy**

The Australian economy is highly dependent on energy consumption. The combustion of fossil fuels is the major contributor to Australia's greenhouse gas emissions (around 64% of net emissions from stationary and transport energy combustion in 2000) (AGO 2002b). Fossil fuels provide around 90% of Australia's energy needs, a higher proportion than for most other countries or regions. The stationary energy sector (emissions from fuel combustion in energy industries such as the electricity industry) is the biggest contributor of greenhouse gases (graph 14.32), accounting for 49.3% of net emissions in 2000, with electricity generation accounting for the majority of this sector's contributions (264 Mt of CO<sub>2</sub> equivalents). Energy use and resulting greenhouse gas emissions from the stationary energy and transport sectors are described in further detail in *Chapter 15, Energy*.

The industrial processes sector (emissions resulting from production processes) recorded a decrease in emissions in this period, from 12 Mt of CO<sub>2</sub>-e in 1990 to 10.3 Mt in 2000 (almost entirely a result of reduction in PFC emissions from aluminium production).

14.32 GREENHOUSE GAS EMISSIONS (CO<sub>2</sub>-e), By sector

(a) Stationary energy. (b) Fugitive emissions from the production and distribution of coal and gas. (c) Estimated emissions from land clearing. These assessments should be treated as indicative only due to high uncertainties in emissions estimates. (d) Forestry and land use change.

Source: AGO 2002b.

Vegetation plays an important role in reducing the level of greenhouse gases in the atmosphere, as trees and other plants absorb CO<sub>2</sub> from the air and store it as carbon. Under ideal conditions, one million hectares of new forest could absorb about 25 Mt of CO<sub>2</sub> a year, which would lower Australia's present CO<sub>2</sub> production by about 9% (CSIRO 2001b). The forestry sector (including commercial forestry) is an emitter (source) and an absorber (sink) for CO<sub>2</sub>. Emissions from the forestry sector are affected by both timber harvest and forest regrowth rates. In 2000, carbon removals through the growth of forests were 23.7 Mt with forest and grassland conversion causing 64.7 Mt of emissions. Land use change and forestry provided a total of 7.1% of total net national emissions (AGO 2002b).

Current best estimates of land clearing model the emissions from burning cleared vegetation, decay of slash and below ground decay of roots, and loss of soil carbon. These estimates are highly uncertain and likely to change in the future (see the section *Extent and clearing of native vegetation*).

### National Pollutant Inventory (NPI)

For about a decade, the Australian public has been more concerned about air pollution than about any other environmental problem. Poor air quality may lead to a number of negative impacts: it can cause health problems, damage infrastructure, reduce crop yields and harm flora and fauna. Overall, air quality in Australia is relatively good and has generally improved during the 1990s (ABS 2002b).

The NPI is an Internet database designed to provide the community, industry and government with information on the types and amounts of certain substances being emitted to the environment. The NPI is not exhaustive in its reporting of emissions, in that only emissions over a threshold from certain industries are counted. However, it does provide some quantitative measure of the amount of substances entering the environment. For example, 690 Mt of carbon monoxide, 690 Mt of nitrous oxides and 1.3 gigatonnes of sulphur dioxide were reported as released into the atmosphere for 2000–01 (table 14.33). The database also provides information about the substances listed on the NPI. It explains what the substances are derived from, what they are used for, and the risks to human health and the environment associated with them. As reporting procedures improve, this will provide for more comprehensive coverage of pollutants, allowing industry, the community and local governments to meet the interests and needs of Australians.

### 14.33 SELECTED POLLUTANTS REPORTED ON THE NPI(a) — 2000–01

Pollutant	Mt
Carbon monoxide	690
Arsenic and compounds	0.17
Benzene	1.7
Cyanide (inorganic) compounds	4.2
Hydrogen sulfide	0.057
Lead and compounds	0.5
Oxides of nitrogen	690
Sulphur dioxide	1 300

(a) Not all industries report to the NPI.

Source: NPI 2002.

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National Pollutant Inventory, <<http://www.npi.gov.au>>

# Australia's rivers

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*This article was contributed by John Whittington and Peter Liston of the Cooperative Research Centre for Freshwater Ecology.*

By world standards Australia is a dry continent with few freshwater resources. Australian rivers are characterised by relatively low and variable flows.

In much of the intensive land use zone of Australia, catchment land use has significantly modified the physical and chemical nature of the rivers. These now carry higher than natural levels of sediment and nutrient. In some regions, the biological condition of the rivers, wetlands and groundwater dependent ecosystems has been severely impacted by the extraction of large volumes of water for agricultural, urban and industrial use.

It is widely recognised that the condition of many of Australia's rivers has declined below a level that the broader community considers satisfactory. The states, with Federal Government support, are acting to improve catchment management and reduce the ecological pressures associated with high levels of abstraction.

## **Variability — a characteristic of Australia's rivers**

Rainfall is distributed unevenly, both geographically and seasonally, across Australia. In vast areas the average annual rainfall is less than 200 mm/year, while in parts of north eastern Queensland and western Tasmania rainfall exceeds 3,000 mm/year. Most of this rainfall, even in the wetter catchments, does not run off into the river systems. On average, only 12% (less than 3% in the drier areas and up to 24% in the wetter areas) of rainfall enters the rivers; the remaining rainfall is accounted for by evaporation, used by vegetation or stored in lakes, wetlands and groundwater aquifers. Almost 50% of Australia's average annual run-off enters the Gulf of Carpentaria, a region of relatively limited water resource development, and the Timor Sea (NLWRA 2001b).

Driven by a changeable climate, variable river flow is a characteristic of Australian rivers. Flow variability can be described by the coefficient of variation of annual flows (CVR), calculated as the standard deviation divided by the mean. Australia and South Africa have CVR well in excess of the world average (Finlayson & McMahon 1988). While this relationship is true for all catchment sizes, it is particularly so for Australia's large (greater than 100,000 km<sup>2</sup>) inland catchments, which have a CVR of 1.12, nearly four times the world average of 0.33. As well as more variable flow, extreme floods occur more often in Australia and South Africa than in the rest of the world (Finlayson & McMahon 1988).

Highly variable flows have important implications for river management as the flora and fauna of Australia's rivers have evolved with this variability. River regulation by dams reduces the numbers and extent of floods and dry periods, and reduces water quality. These changes affect the way the river functions physically and chemically, in turn impacting on the plants and animals living there.

The high run-off variability and extreme flood pattern influence the size and type of Australia's major dams. The level of demand and reliability expected by Australian water users, combined with the high levels of evaporation in Australia, has led to Australia's relatively high storage volumes. Australia's large dam storage capacity of 79,000 GL (in 447 large dams) is four times annual surface water diversions of 19,100 GL (NLWRA 2001b).

## **Pressures on the rivers**

The consumption of Australia's freshwater resources from lakes, rivers and underground aquifers has increased dramatically in the last two decades. Between 1983–84 and 1996–97 national water consumption increased from 14,600 GL to

23,300 GL (NLWRA 2001b). Of the water diverted in 1996–97, approximately 75% was used for irrigated agriculture (17,356 GL), 5% (1,238 GL) for other rural purposes such as stock and domestic uses, with the remaining 20% (4,673 GL) for urban and industrial purposes (NLWRA 2001b).

Irrigated agriculture is by far the biggest consumer of Australia's freshwater resources. In return, major economic and social benefits accrue to Australia from irrigated agriculture. Without irrigation, a significant proportion of Australia's agricultural industries would either not exist or would be greatly diminished. Towns and industries that rely on these enterprises would contract or disappear. Total annual profits from irrigated agriculture averaged over the five years to 1996–97 were \$3.84b, accounting for over 50% of the total profits from Australian agriculture (NLWRA 2002b).

Across Australia, catchment land use and diverting water are considered the most serious threats to the ecological condition of Australia's rivers, wetlands and groundwater dependent ecosystems. Determining a sustainable level of diversions (sustainable yield) to support either rural, urban or industrial use is complex. It inevitably requires a trade-off between environmental, cultural, social and economic values. Each state and territory government has developed its own methods for estimating sustainable yield. The relative weighting given to various social, environmental and economic values reflects local knowledge and values. As would be expected, the weightings given to these values are often highly contentious.

Based on state assessments of sustainable yield the Audit (NLWRA 2001b) determined that 34 (10.5%) of Australia's 325 surface water basins are overused, with a further 50 (15.4%) highly developed. On the other hand, 60% of Australia's river basins have less than 30% of the nominated sustainable flow regime diverted (NLWRA 2001b). Almost all of the basins with a high volume of unused sustainable yield are in the northern parts of Australia. Undoubtedly, these regions will be heavily targeted for water resource development in the future, and long-term planning for this needs to be undertaken so as to avoid the mistakes made in many of the southern water basins.

Land use in the catchment, combined with how well this use is managed, is a major driver of river condition. Approximately 60% of the Australian continent is used for agriculture, predominantly cropping and grazing (NLWRA 2002b). In the non-urban regions, most of the elevated nutrient and sediment loads to rivers are a consequence of using land for agricultural production. High fertiliser application rates, and other agricultural practices, have resulted in some landscapes leaking more nutrients into the waterways than they did before the adoption of European agricultural production systems. Attention to management of on-farm nutrient balances should reduce the leakage of nutrients into Australian rivers (NLWRA 2001a).

Widespread clearing, particularly of the riparian vegetation and in areas vulnerable to soil erosion, results in higher than natural sediment loads to many rivers. Increased sediment loads smother important habitat for aquatic biota, for example, deep holes in rivers that provide important refuges for many native fish and other biota are frequently filled in. Increased sediment loads also increase turbidity, resulting in reduced aquatic plant growth and increased costs of water treatment. The Audit estimates that a 5% increase in turbidity of Australian streams will increase water treatment costs by \$715m over the next 20 years (NLWRA 2002b).

### **River condition depends on catchment condition**

Use of Australia's land and water resources places pressures on the river systems. The Audit describes the impact of these pressures on the condition of Australia's rivers (NLWRA 2002a).

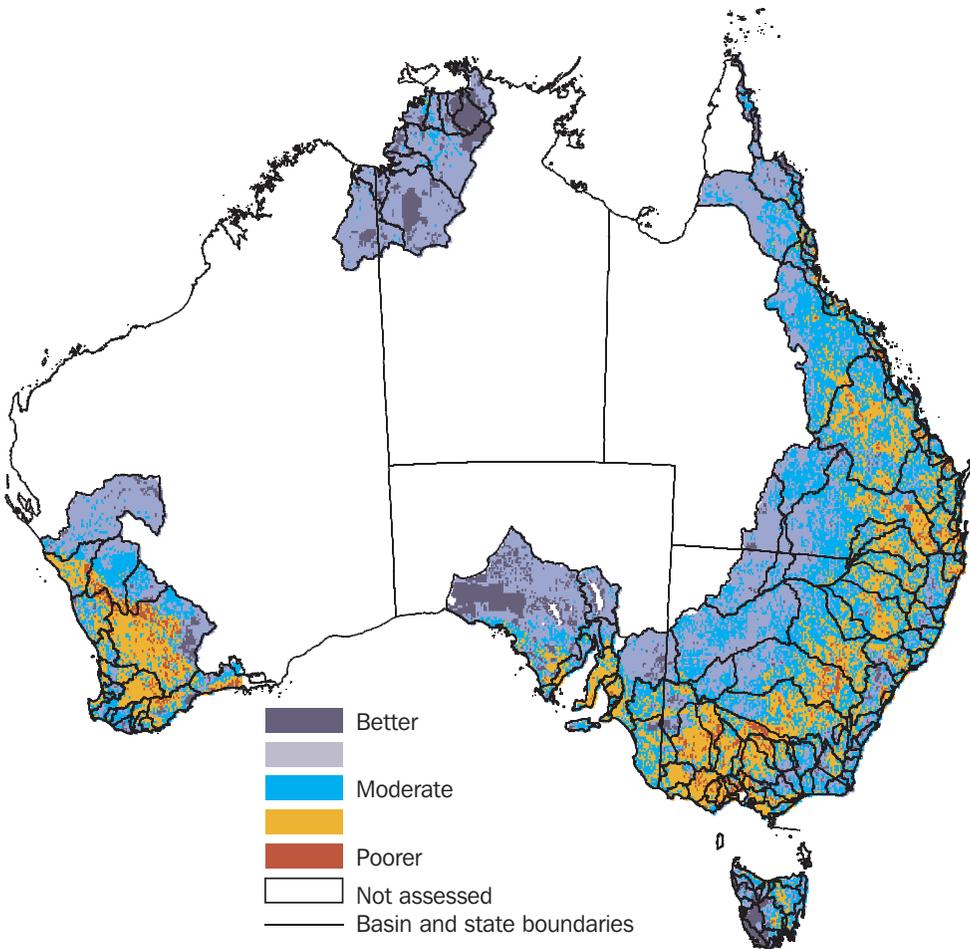
The Audit reports catchment condition across Australia using an index composed of 14 sub-indices that describe attributes of the catchments, land, water and biota. The differences in the condition between catchments were described by a few indicators: vegetation cover, native vegetation fragmentation, sediment and nutrient inputs to rivers, catchment hydrology (particularly the effects of dams), and land use intensity (NLWRA 2002a). The catchments in the poorest condition were in areas with intensive land use. These

catchments are generally in cleared, agronomically marginal rainfall areas that have soils of relatively poor fertility and structure (map S14.1) (NLWRA 2002a). Until the condition of these catchments is significantly improved, we should expect that river condition in these catchments will continue to decline.

The Audit (NLWRA 2002a) describes river condition using an environmental index that combines the effects of catchment disturbance,

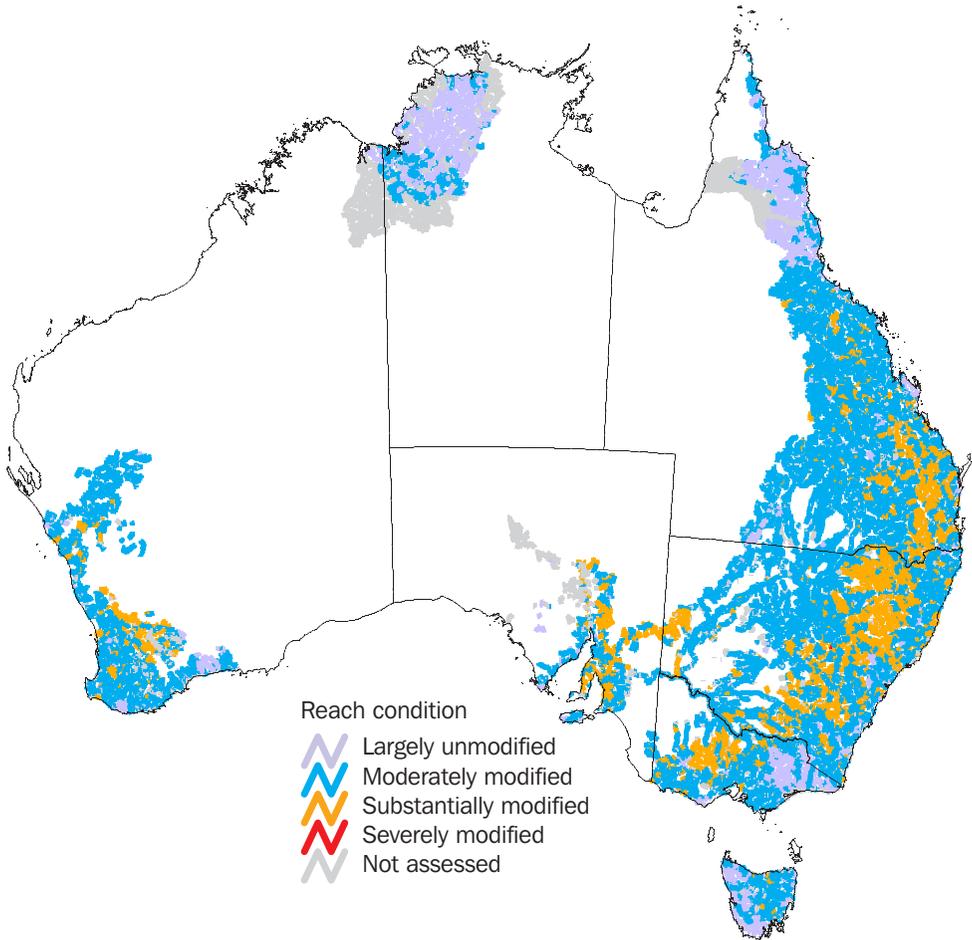
habitat condition, hydrological disturbance, and nutrient and suspended sediment loads. The environmental index shows that within the intensive land use zone of Australia, which represents approximately 40% (3 million square kilometres) of the continent, over 85% of the rivers have been degraded to some extent by human activity (map S14.2). The percentage of river significantly modified, ranges from 97% of river length in New South Wales rivers to 34% in Northern Territory (NLWRA 2002a).

**S14.1 CATCHMENT CONDITION FOR 5 KM x 5 KM CELLS**



Source: National Land and Water Resources Audit Assessment of Catchment Condition 2002 Database.

## S14.2 CONDITION OF RIVER REACHES BASED ON THE ENVIRONMENT INDEX



Source: National Land and Water Resources Audit Assessment of Catchment Condition 2002 Database.

The Audit reports a relatively high correlation between catchment condition and river condition as described by the Environment Index (NLWRA 2002a). While these indices are not entirely independent, the strong correlation underscores the need to consider broad catchment management as part of any river management program.

### The rivers are carrying more nutrient and sediment

Australia's history of agricultural practices has resulted in an accelerated leakage of nutrient and sediment from Australian landscapes. The Audit (NLWRA 2002a) reports that nutrient and suspended sediment loads to be significantly higher than natural levels for 92% of river length (map S14.3). Total phosphorus (TP) loads in rivers averaged 2.8 times higher than estimates for pre-European settlement levels and total

nitrogen (TN) loads are 2.1 times higher (NLWRA 2001a). Exceeding national guidelines for nutrient concentrations is a major concern in 61% of river basins (NLWRA 2001b).

The dominant sources of TP and TN to the rivers vary depending on the local climate, geography, geology and land use. In Queensland and New South Wales, hill-slope erosion dominates, while in coastal Victoria, South Australia, Western Australia and Tasmania, river bank erosion and dissolved phosphorus run-off dominates. TN loads come predominantly from hill-slope erosion in Queensland and coastal New South Wales, and as dissolved run-off in coastal Victoria, South Australia, Tasmania and much of Western Australia (NLWRA 2001a). Most nutrient and sediment entering the waterways are deposited on floodplains. Of the TP entering the waterways, 60% is deposited on floodplains, 13% in reservoirs and 27% reaches the coast. Of the total TN entering the river systems, 41% is deposited on floodplains, 9% stored in reservoirs, and 39% reaches the coast. The remaining 11% is converted to nitrogen gas and lost to the atmosphere.

Accumulation of sand and gravels is a major stressor in many Australian streams. Extensive delivery of sediment to the rivers occurs downstream from areas of hill-slope erosion (50 million tonnes per year), gully erosion (44 million tonnes per year) and streambank erosion (33 million tonnes per year) (NLWRA 2001a). Most of the sediment supplied to rivers is deposited in channels, floodplains and reservoirs, with about 20% entering the ocean (NLWRA 2001a).

About 30,000 km of river length have experienced sediment accumulation of greater than 0.3 metres since European settlement. The Murray–Darling Basin is one of the worst affected basins, with 20% of river length accumulating more than 0.3 metres of sediment. Land management that targets erosion control could provide a significant benefit to managing supply sediment loads and nutrient loads to many rivers.

### **The rivers have less water**

Assessing the impact of human activities on the flow regime of Australia's rivers is complicated by the relative lack of suitable hydrological information. The Audit found adequate

information on which to determine natural flows for only 30% of the total river length in Australia's intensive land use zone (NLWRA 2002a).

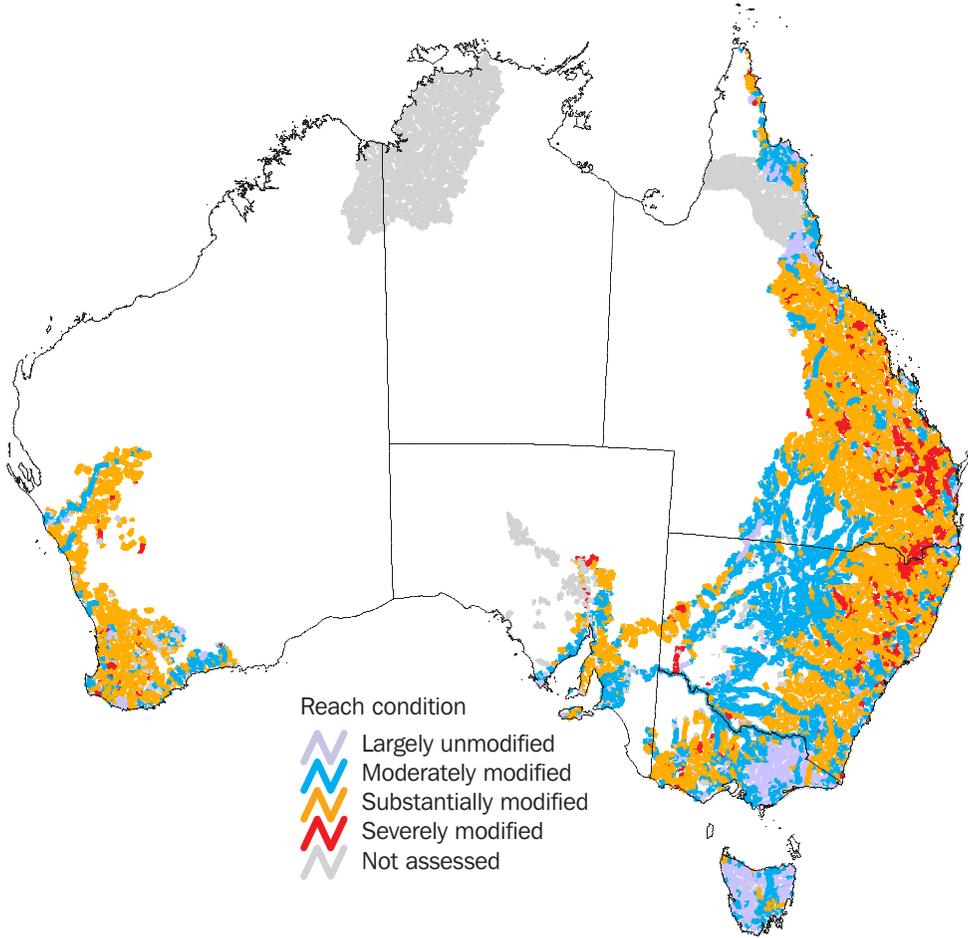
Rivers below major dams, termed regulated rivers, generally flow for longer periods than natural, and the seasonal variability in flows is reduced (NLWRA 2002a). There are fewer small floods and dry periods and there is frequently a reversal of seasonal flows, such that water is retained in the dams during the wetter periods and rivers run high during the dry periods to supply irrigation water.

Less is known about the level of hydrological disturbance in rivers which do not have major dams above them. Flow is frequently reduced by abstraction, particularly during the low flow periods, but estimates of this are generally crude and are usually made on an annual or seasonal basis (NLWRA 2002a). Large-scale harvesting of floodwaters occurs in some river systems, where private floodplain storages can capture a significant proportion of flow. For example, there is significant floodplain harvesting on the Balonne floodplain. Total water storage on the Balonne floodplain is estimated to be 1,160 GL, which is equivalent to the current mean annual flow in the Balonne River (Whittington et al. 2002).

### **Aquatic animals reflect river and catchment use**

Across the world there has been a trend toward using assessments of the condition of biotic communities to assess river condition. It is argued that the plants and animals dependent on a river will integrate the effects of environmental degradation and of pollution and are therefore the fundamental indicators of river condition (Norris & Thoms 1999). While there are many biological indicators that could be used, there are very limited data for most of them. The most comprehensive data set for aquatic biota is the information from the National River Health Program (NRHP). This program assessed river health using aquatic macroinvertebrate communities at approximately 6,000 sites across Australia, and provides the most comprehensive assessment of biotic river health available across Australia.

**S14.3 CONDITION OF RIVER REACHES BASED ON THE NUTRIENT AND SUSPENDED SEDIMENT LOAD INDEX**



Source: National Land and Water Resources Audit Assessment of Catchment Condition 2002 Database.

Based on data from the NRHP, the majority of rivers (69%) across Australia were found to be in good condition (NLWRA 2002a). The remaining 31% were suffering for some degree of impairment, ranging from mild impairment where some of the animals normally occurring in a river were missing, to major damage where most animals were missing. The rivers with biota in good condition tended to be in national parks, mountainous regions or remote regions. Rivers showing impact tended to be close to major cities

or in highly developed agricultural areas. Also impacted were rivers in mountainous regions affected by river regulation.

The environmental factors most significantly impacting on river biological condition were poor water quality, damaged habitat, changed hydrological condition or a combination of these factors. Regions such as the Murray–Darling Basin, with considerable river regulation associated with intensive agricultural development, tended to have

poor biological condition brought on by environmental degradation across multiple factors (NLWRA 2002a).

Biological data do not always give the same picture on river condition as do environmental data. In part this is attributable to the limits of one group of the biota to reflect the full range of environmental changes that can occur. Fish or algae may be better indicators for some environmental impacts. However, in many instances, a more important reason for the mismatch between biological and environmental assessments is the timelag between environmental damage occurring and its biological consequences. It may be months or years before the full impact of a change in river flows or in salinity is realised by the biota. In these circumstances the degraded environmental condition can act as an early warning of the biological damage that will occur unless restoration measures are undertaken.

### Protection of freshwater ecosystems

Australia has a poor record of managing aquatic habitats. Responsibility for land and water management lies with the states and territories, though the Federal Government has been a substantial source of funding for water resource development and more recently, rehabilitation. Within most states there has been considerable activity to provide adequate flows for the environment. This has been largely driven by the Water Reform Agenda of the Council of Australian Governments, which states that the environment be recognised as a legitimate user of water, and that each jurisdiction formally determine allocations for the environment. However, despite considerable activity, progress has been slow. As at June 2000, only 43 (13%) of Australia's 325 river basins have formal allocations of flow to the environment (NLWRA 2001b).

Conservation of Australia's ecosystems has historically focused on protection of terrestrial ecosystems. Within the 7.8% of Australia's total land area that is within formally protected areas, some native terrestrial ecosystems are well protected and others are not (NLWRA 2001c). Recent efforts to increase the comprehensiveness of protected ecosystems have prioritised bioregions that have relatively low levels of protection using the Interim Biogeographic Regionalisation for Australia (IBRA) framework. While the IBRA bioregions are an accepted landscape framework for conserving terrestrial

biodiversity (Cresswell & Thomas 1997), they are unlikely to be an appropriate framework for conserving aquatic biodiversity. If aquatic ecosystems fall within existing reserve systems, such as parts of the Australian Alps and south-west Tasmania, they can be adequately protected. However, this is not usually the case, and therefore frameworks that explicitly address the diversity of aquatic ecosystems need to be developed. Such a framework has been proposed by Davies (2001), which provides for the establishment of a freshwater and estuarine reserve system based on the principles of comprehensiveness, adequacy and representativeness, (CAR reserve system) in a similar way to that described for forest reserves (JANIS 1997). This is currently being implemented in Tasmania.

Like rivers, wetlands are not adequately protected. It is estimated that since European settlement approximately 50% of Australia's wetlands have been converted to other uses. In some regions the rate of loss has been even higher (Commonwealth of Australia 1997). Of those remaining, many are threatened by water abstraction, weeds and grazing. The Federal Government has published a Directory of Important Wetlands in Australia (Environment Australia 2001). The directory describes 851 wetlands (totalling 57,829,522 ha) of national importance, but protection of these is highly variable. Of these wetlands, 57 wetlands, with a total surface area of 5,310,179 ha, are designated to the List of Wetlands of International Importance of the Ramsar Convention, referred to as Ramsar wetlands. Once listed as a Ramsar wetland, the Federal Government must ensure that the wetland is managed such that its ecological character is maintained. However, the protected status of many of Australia's Ramsar wetlands is compromised because protection does not extend to the source of the wetland's water. For example, as a result of water abstraction upstream, median annual flows to the Ramsar listed Narran Lakes in northern New South Wales have been reduced to approximately 24% of natural, and the interval between significant flooding events has been reduced from 2 years to 6.5 years (Whittington et al. 2002). It is argued that without significant alterations to water management upstream of Narran Lakes, the

current level of diversion will result in a significant reduction in the health of the Narran Lakes system (Whittington et al. 2002).

There is growing recognition of the value of the few relatively unimpacted rivers in Australia (Cullen 2002). However, efforts to protect these

aquatic systems are limited (Cullen 2002). Morton et al. (2002) have called for the establishment of a system of heritage rivers to protect the remaining relatively undamaged rivers. Cullen (2002) argues that the extraction of water is the major threatening process in these rivers and must be controlled.

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## Introduction

Energy is a vital input to all sectors of the economy. As well as supplying the power on which industry and households depend, the production and supply of energy provide employment and investment opportunities, and energy is a major source of export earnings, all of which contribute substantially to the welfare and standard of living of Australians.

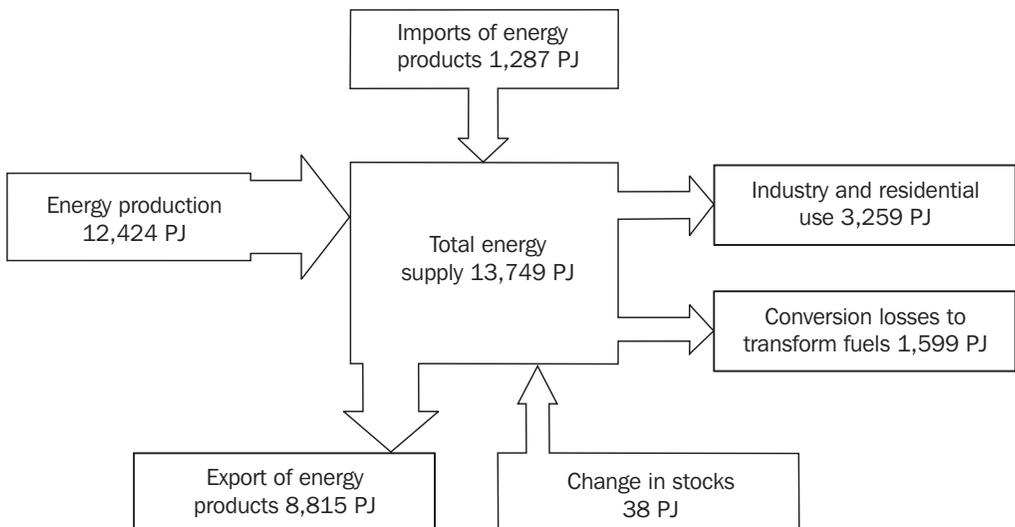
Australia has an abundance of fossil fuel and mineral energy resources, and our trends of energy production and use are a reflection of this abundance. In addition to being one of the world's largest exporters of coal, Australia's per capita energy consumption is one of the highest in the world, with a heavy reliance on fossil fuels. This reliance is also a major source of human-generated greenhouse gases. There is widespread national and international concern that these have caused temperatures to increase worldwide. *Chapter 14, Environment* looked at atmosphere and climate change in a broad context, and provided an analysis of Australia's production of greenhouse gases from all sources (including sinks). Of these sources, the combustion of fossil fuels is responsible for about three-quarters of man-made emissions of carbon dioxide (the main greenhouse gas). These emissions associated with energy production and use are addressed in this chapter in the section *Greenhouse gas emissions*.

The fuels produced in Australia are either consumed here, stockpiled for future consumption or export, or exported to other countries. In some cases, consumption takes place in Australia to produce another kind of fuel for consumption or export. In the case of electricity generation from fossil fuels (mainly coal), a large amount of energy is lost in this conversion process. Some fuels are imported into Australia, mainly crude oil. Diagram 15.1 illustrates the quantities of energy used for each of these purposes in 1998–99.

Over two-thirds of energy production in Australia is exported, and the mix of fuels in production and consumption are distinctly different. Black coal and uranium are expected to continue to dominate the pattern of both energy production and trade. Final consumption of energy by industry and households (excluding conversion losses) amounted to 3,259 petajoules (PJ) in 1998–99, about a quarter of the energy produced in Australia in that year.

The following sections describe Australia's energy resources, the production of these resources, and Australia's trade in energy products. Then follows an analysis of Australian energy consumption, together with a section comparing various aspects of Australia's consumption with that in a number of other Organisation for Economic Co-operation and Development (OECD) countries. The final section, *Energy and the environment*, includes an analysis of the impact, on those emissions, of household consumption and the production of goods and services for export.

15.1 ENERGY MODEL — 1998–99



Source: ABARE, electronic datasets.

## Energy resources

Australia has large identified resources of fossil fuels and uranium. It is ranked in the top six countries in the world for economic demonstrated resources (EDR) of black and brown coal, and has the world's largest EDR of uranium. Australia also has significant reserves of natural gas and crude oil.

Australia has substantial resources of high quality black coal. Most of these resources are located in New South Wales and Queensland. Small but

locally important coal resources occur in Western Australia, South Australia and Tasmania (map 15.2). Brown coal occurs mainly in Victoria with other known resources in Western Australia, South Australia and Tasmania (AGSO 2000a).

In 2001, Australia accounted for 6% of the world's recoverable EDR of black coal and ranked sixth after the United States of America (27%), Russia (19%), China (12%), India (9%) and South Africa (7%). Australia has about 20% of the world's recoverable brown coal EDR, second behind Germany (22%) (AGSO 2000a).

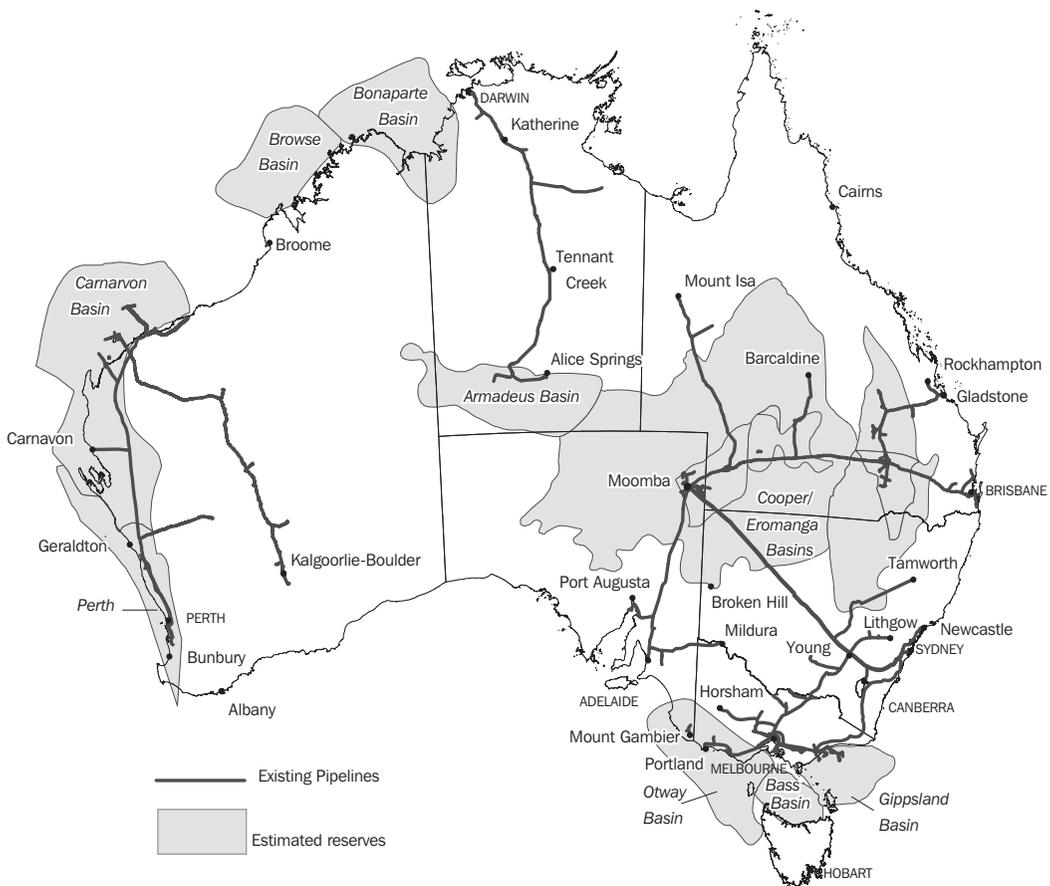
### 15.2 COAL RESOURCES — 2000



Map 15.3 shows the extent of access to gas resources in Australia. Known natural gas reserves in Australia are less extensive than coal reserves, although it is expected that natural gas will increase its share of the domestic energy market in the short- to medium-term. The total length of

Australia's transmission pipeline system has increased from 7,670 km a decade ago to over 15,600 km in 2001 (ANZMEC 2001). Since 1960, remaining gas reserves have increased more than eight times, mainly due to discoveries of major gas resources on the North West Shelf.

15.3 GAS RESOURCES — 2000



Source: The Australian Gas Association.

EDRs of non-renewable energy assets were estimated at 1.9 million PJ in 2001 (table 15.4). Black coal accounted for 59%, followed by brown coal (19%) and uranium (16%). Australia has the world's largest resources of uranium in the low cost (EDR) category, with 29% of the world's total EDR (recoverable at <US\$80/kg U). Other countries with significant EDR of uranium include: Kazakhstan (19%), Canada (14%), South Africa (10%), Brazil (7%), Namibia (6%), the Russian Federation (6%) and the United States of America (5%).

Changes in EDRs can be due to various factors, one of which is production activity. Others include discoveries and reclassification of resources due to reassessments (such as with black and brown coal in 1999, when some resources previously considered economic were reclassified as subeconomic).

#### 15.4 ECONOMIC DEMONSTRATED RESOURCES(a)

Fuel	1991	2001	Change %
	'000 PJ	'000 PJ	
Black coal	1 387.8	1 152.8	-16.9
Brown coal	404.5	365.7	-9.6
Crude oil	9.5	8.4	-11.6
Condensate	4.4	10.4	136.4
LPG	3.4	6.9	102.9
Natural gas	26.9	86.5	221.6
Uranium	222.8	307.4	38.0
<b>Total energy assets</b>	<b>2 059.3</b>	<b>1 938.1</b>	<b>-5.9</b>

(a) Non-renewable resources only.

Source: Australian National Accounts: National Balance Sheet (5241.0.40.001).

Table 15.5 shows the net present value (NPV) of demonstrated energy assets within Australia. The NPV is the expected value of the resource based on current market value, with some modifications based on depletion and economic forces. At mid 2001 total subsoil assets had an NPV of just under \$173b, of which 70% was attributed to the NPV of energy assets (over \$121b). The two most significant energy assets were black coal and natural gas which accounted for 33% and 28%, respectively. The increase in the value of energy resources between mid 1991 and mid 2001 was primarily due to increases in the NPV of black coal and natural gas over this period.

#### 15.5 NET PRESENT VALUE OF ENERGY AND SUBSOIL ASSETS

Fuel	30 June 1991	30 June 2001	Change %
	\$m	\$m	
Black coal	5 408	40 566	650.1
Brown coal	168	633	276.8
Crude oil	12 888	22 888	77.6
Condensate	2 395	14 139	490.4
LPG	1 713	5 725	234.2
Natural gas	14 036	33 555	139.1
Uranium	2 531	3 701	46.2
<b>Total energy assets</b>	<b>39 139</b>	<b>121 207</b>	<b>209.6</b>
Total subsoil assets	56 388	172 873	206.6

Source: Australian National Accounts: National Balance Sheet (5241.0.40.001).

### Energy production

The production of primary fuels in Australia grew significantly between 1990–91 and 1998–99, with an overall increase of about 34% (table 15.6). Significant increases in production occurred in uranium, black coal and, to a lesser extent, natural gas. Black coal continues to dominate the pattern of energy production (as it has done for at least the last 20 years), accounting for nearly half of total energy production in 1998–99. Uranium accounted for 24% of total production, followed by natural gas at 11%, and then crude oil at 8%.

Over two-thirds of energy production in Australia is exported (mainly black coal and uranium — see *Chapter 30, International accounts and trade*), and these two products are expected to continue to dominate the pattern of both energy production and trade. Domestically, most coal production is used to generate electricity. Other uses include coke-making for the iron and steel industry, and as a source of heat in the manufacture of cement.

Australia's total production of uranium reached a record high in 1999, 22% higher than for 1998. This was due to a significant increase in uranium production from the Ranger and Olympic Dam mines (AGSO 2000a).

Production depletes crude oil resources at about 3.7% a year, condensate at 1.7% a year and natural gas at 0.9% a year. In the longer term, increases in the real price of oil and advances in technology are likely to lead to exploration which could discover large amounts of petroleum not presently classified as resources (AGSO 2000b).

## 15.6 PRODUCTION OF PRIMARY FUELS

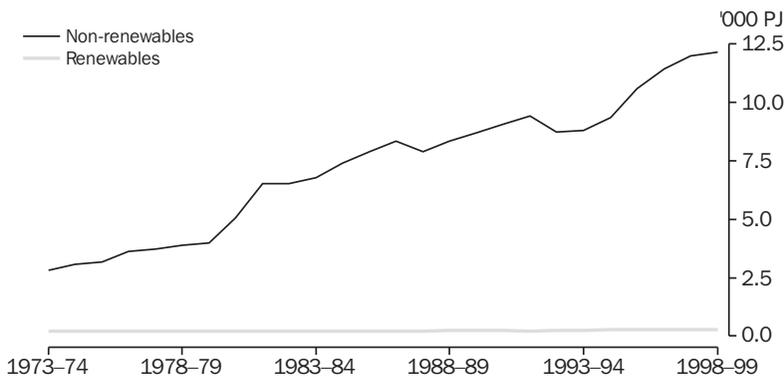
Fuel	1990–91	1994–95	1998–99	Change since 1990–91
	PJ	PJ	PJ	%
Black coal	4 396.0	5 173.2	6 051.1	37.7
Brown coal	484.1	492.0	647.3	33.7
Crude oil and LNG	1 182.3	1 154.0	1 032.2	-12.7
LPG	94.0	95.6	103.5	10.1
Natural gas	840.4	1 174.9	1 306.1	55.4
Uranium	2 062.8	1 236.6	3 001.4	45.5
Wood	100.1	108.9	108.3	8.2
Bagasse	78.2	91.4	109.6	40.2
Hydro-electricity	58.0	58.5	60.5	4.3
Solar	2.4	3.4	3.8	58.3
<b>Total</b>	<b>9 298.3</b>	<b>9 588.5</b>	<b>12 423.8</b>	<b>33.6</b>

Source: ABARE, electronic datasets.

Graph 15.7 shows the production of non-renewable and renewable energy sources between 1973 and 1998. Over this period, the production of non-renewable fuels has shown an upward trend. In contrast, production of renewable energy sources (wood, bagasse, hydro-electricity and solar) has remained relatively stable, therefore reducing their share of total production over the period.

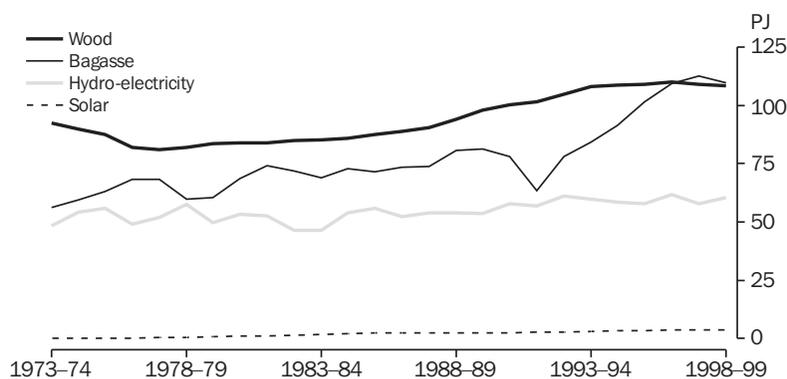
Although production of renewable fuels increased by 18% between 1990–91 and 1998–99, their share of total energy production fell from 2.6% to 2.3% over this period. The production of renewable fuels between 1973 and 1998 is shown by type of fuel in graph 15.8. (It should be noted that there is a limit to the possible increase in bagasse's share of renewable energy, which is related to the production of sugar cane.)

15.7 PRODUCTION OF PRIMARY FUELS



Source: ABARE, electronic datasets.

## 15.8 PRODUCTION OF RENEWABLE FUELS



Source: ABARE, electronic datasets.

## Australia's international trade in energy products

In 2001–02, 10,509 PJ of total energy production in Australia were exported (table 15.9). The largest contributors were black coal (51% of total energy exports) and uranium (33%). Crude oil and natural gas contributed 8% and 4%, respectively. Total energy exports (primary plus secondary) increased by 65% between 1993–94

and 2001–02. Among primary exports, uranium increased sharply (by 84%) and exports of black coal increased by 53% over this period.

Imports of energy products are relatively small by comparison (1,286 PJ in 2001–02) and are dominated by crude oil. Imports of this product increased by over a third between 1993–94 and 2001–02. Graph 15.10 shows the sharp contrast between exports of energy products from and imports of these products into Australia over more than 25 years.

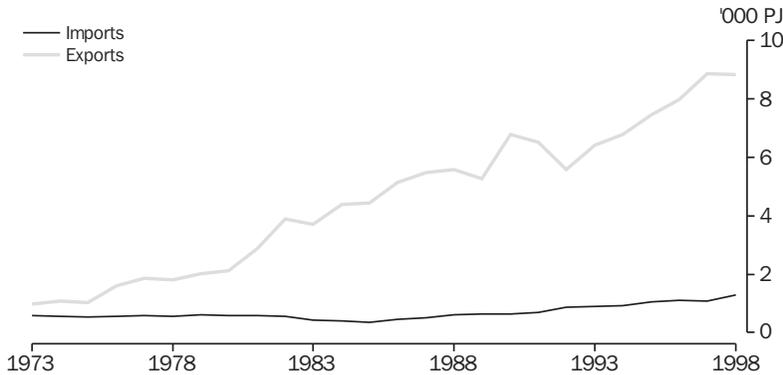
## 15.9 ENERGY PRODUCTS, Volume of exports and imports

Fuel	Exports			Imports		
	1993–94 PJ	1997–98 PJ	2001–02 PJ	1993–94 PJ	1997–98 PJ	2001–02 PJ
<b>Primary energy products</b>						
Black coal	3 484.5	4 390.5	5 339.5	4.9	3.0	1.1
Crude oil and ORF(a)	352.9	547.0	892.1	781.3	967.0	1 057.1
LPG	38.7	83.6	94.8	4.1	13.0	14.9
Natural gas(b)	327.8	415.8	(c)435.9	—	—	—
Uranium	1 877.2	3 015.1	3 462.0	—	—	—
<b>Total</b>	<b>6 081.1</b>	<b>8 452.0</b>	<b>10 224.3</b>	<b>790.3</b>	<b>983.0</b>	<b>1 073.1</b>
<b>Secondary energy products</b>						
Automotive gasoline	30.5	52.0	42.6	4.0	12.1	49.4
Aviation gasoline	54.6	83.5	44.2	3.9	2.4	0.2
Aviation turbine fuel	58.1	90.8	89.8	2.6	1.4	8.3
Kerosene	2.0	1.2	0.6	—	—	(d)
Gas oil or fuel oil	59.2	39.8	60.3	38.0	32.2	22.3
Other petroleum products(e)	53.3	69.7	45.0	29.8	31.3	24.9
Coke	14.3	4.8	2.2	2.6	2.3	1.3
<b>Total</b>	<b>271.9</b>	<b>341.9</b>	<b>284.6</b>	<b>80.9</b>	<b>81.7</b>	<b>106.4</b>
<b>Total</b>	<b>6 353.0</b>	<b>8 793.9</b>	<b>10 508.9</b>	<b>952.1</b>	<b>1 146.4</b>	<b>1 285.9</b>

(a) Other refinery feedstock. (b) ABARE estimate. (c) 2000–01 value. (d) From 30 January 1998 kerosene is included in Gas and fuel oils. (e) Also includes lubes and greases, bitumen and other bituminous products, solvents, waste oils and diesel.

Source: ABS data on request, International Trade Special Data Service; ABARE 2001.

## 15.10 EXPORTS AND IMPORTS OF ENERGY PRODUCTS



Source: ABARE, electronic datasets.

Table 15.11 shows that the large volumes of exported energy products contributed significantly to Australia's export earnings. The export of energy products contributed about 21% towards Australia's total export earnings in 2001–02, up from 18% in 1993–94. Black coal accounts for by far the largest share of the total value of energy exports (52.2%), followed by crude oil (25.2%) and liquid natural gas (10.3%). Uranium contributes only 1.4% of the total value of energy exports. Imports of energy products (mainly crude oil) made up only 7.5% of the total value of imports in 2001–02. It is important to emphasise that although the quantity of energy exports (by energy yield) has increased by 65% from 1993–94 to 2001–02, the value of energy exports increased by 126%, a key factor of which

is the decline of the Australian dollar relative to the US dollar, decreasing by 28% in value from US\$0.73 in 1993–94 to US\$0.52 by 2001–02.

## Energy use

Total energy consumption in 1998–99 was 4,858 PJ, of which about two-thirds was delivered to end use consumers and one-third lost in conversion, transmission and distribution. Graph 15.12 shows Australian energy consumption over the 25 years, 1977–78 to 1998–99. Growth rates in total energy consumption over recent years (after a slowdown in the early 1990s) have been above the long-term average for the 25-year period. Annual fluctuations are, to a significant extent, attributable to changes in Australia's rate of economic growth.

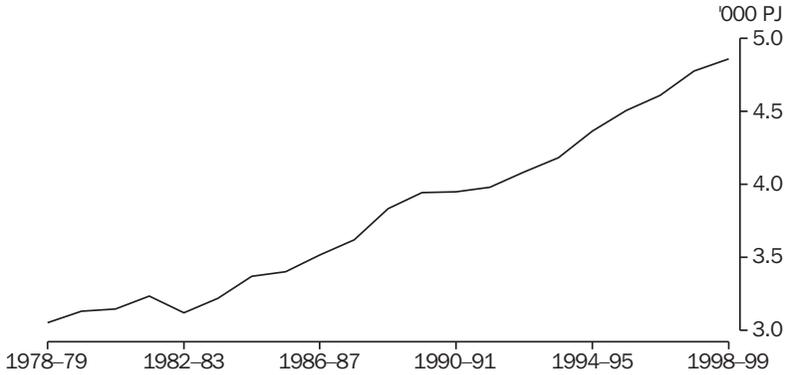
15.11 ENERGY PRODUCTS, Value of exports and imports

Fuel	Exports			Imports		
	1993–94 \$m	1997–98 \$m	2001–02 \$m	1993–94 \$m	1997–98 \$m	2001–02 \$m
Black coal(a)	7 161	9 531	13 323	—	—	—
Crude oil and ORF(b)	1 424	2 251	6 422	2 803	3 697	7 454
LPG	138	367	720	19	68	117
LNG	1 047	1 599	2 636	—	—	—
Uranium	193	288	361	—	—	—
Automotive gasoline	172	304	405	750	93	450
Diesel fuel(c)	210	270	315	153	149	413
Other refinery products	964	1 079	1 321	392	431	596
<b>Total</b>	<b>11 309</b>	<b>15 689</b>	<b>25 503</b>	<b>4 117</b>	<b>4 437</b>	<b>9 030</b>
Total trade in goods and services	64 548	87 768	121 176	64 470	90 684	119 681

(a) Coking plus steaming. (b) Other refinery feedstock. (c) Includes automotive diesel oil and industrial and marine diesel fuel.

Source: International Merchandise Trade, Australia (5422.0); ABARE, electronic datasets.

15.12 ENERGY CONSUMPTION

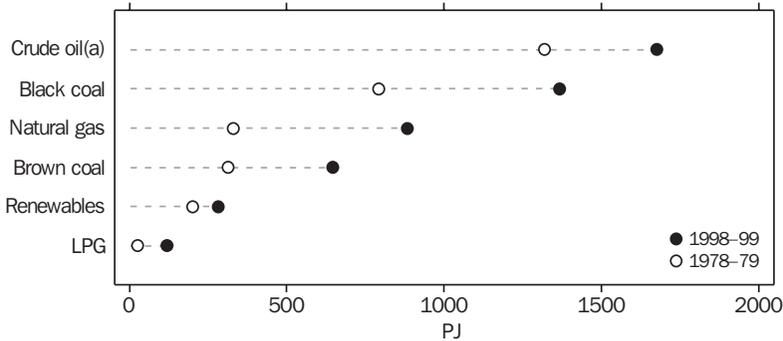


Source: ABARE, electronic datasets.

Natural gas has been the fastest growing primary energy over the 20 years 1978-79 to 1998-99 (graph 15.13). The growth rate for coal (black and brown) has also been above the overall trend, due primarily to the strong growth in electricity generation over the period (graph 15.14). The

consumption of crude oil has also grown significantly, reflecting the heavy use of petroleum products in the transport sector. The annual growth in consumption of renewable energy sources has declined over the years (ANZMEC 2001).

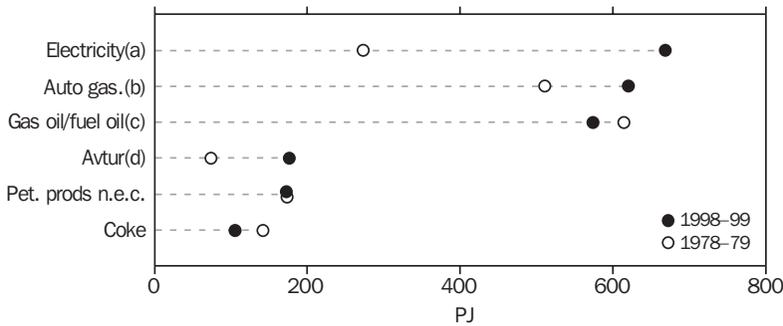
15.13 PRIMARY ENERGY PRODUCTS USED



(a) Refinery feedstock.

Source: ABARE, electronic datasets.

15.14 SECONDARY ENERGY PRODUCTS USED



(a) Excludes hydro-electricity. (b) Automotive gasoline. (c) Includes: heating oil; automotive diesel oil; fuel oil; and industrial diesel fuel. (d) Aviation turbine fuel.

Source: ABARE, electronic datasets.

### Direct energy use by sector

In 1998–99, 78% of total energy consumption was accounted for by three major sectors: electricity generation; transport; and manufacturing (table 15.15). Electricity generation is the largest energy consuming sector. The strong growth in energy consumption in that sector is attributed to increased electrification in all end use sectors; rapid growth in a number of industries in which electricity is the prime fuel source, such as the commercial and non-ferrous metal sectors; and technological innovation encouraging the use of new electrical appliances in all sectors (ANZMEC 2001).

The transport sector accounted for 25% of total energy consumption in 1998–99, and is the second largest energy user. Within the transport sector, road transport accounted for about 78% of

energy consumed, of which two-thirds is attributed to passenger vehicles and the remainder to light commercial vehicles, trucks, and buses. Air transport grew rapidly in the late 1980s and much of the 1990s, resulting from the rapid growth of tourism and increased use of air travel in response to the improved competitiveness of air fares compared with other transport modes.

Strong growth in the mining sector reflects the rise in energy consumption in oil and gas mining, and in particular the development of a liquid natural gas industry in the late 1980s; the expanding demand for natural gas and for increased production of crude oil, condensate and liquid petroleum gas; and strong energy demand in other mining activities.

15.15 ENERGY CONSUMPTION(a), By sector

	1990–91	1994–95	1998–99	Change since
	PJ	PJ	PJ	1990–91 %
Agriculture	57.7	64.4	70.1	21.5
Mining	164.6	213.1	264.5	60.7
Manufacturing	1 073.9	1 132.4	1 177.0	9.6
Electricity generation	1 065.0	1 162.6	1 398.3	31.3
Construction	37.2	44.3	50.3	35.2
Transport(b)	1 003.0	1 139.3	1 231.2	22.8
Commercial(c)	156.8	179.2	210.5	34.2
Residential(d)	327.8	359.5	386.0	17.8
Other(e)	64.1	70.6	70.3	9.7
<b>Total</b>	<b>3 949.9</b>	<b>4 365.3</b>	<b>4 858.3</b>	<b>23.0</b>

(a) Fuels consumed less derived fuels produced. (b) Includes all transport use, including household motor vehicle use. (c) Includes wholesale and retail trade, communications, finance and insurance, property and business services, government administration and defence, education, health and community services, cultural and recreational services, and personal and other services, along with water, sewerage and drainage. (d) Transport use by households is included in transport. (e) Includes lubricants and greases, bitumen and solvents, as well as energy consumption in the gas production and distribution industries.

Source: ABARE, electronic datasets.

The strong growth in the commercial sector is attributed to the relatively fast growth of the sector. The effect on consumption of increased energy efficiency of individual appliances, applications and processes is being offset by the increased use of electrical equipment (ANZMEC 2001).

**Australian energy consumption allocated to final use**

While the previous section showed the direct use of energy by industries and households, this section looks at the amount of energy used, both directly and indirectly, by the final users of the goods and services. These final users may not necessarily use energy directly, but they are considered to be using energy indirectly through their consumption of products (goods and services) that contain embedded energy (i.e. the energy used in production).

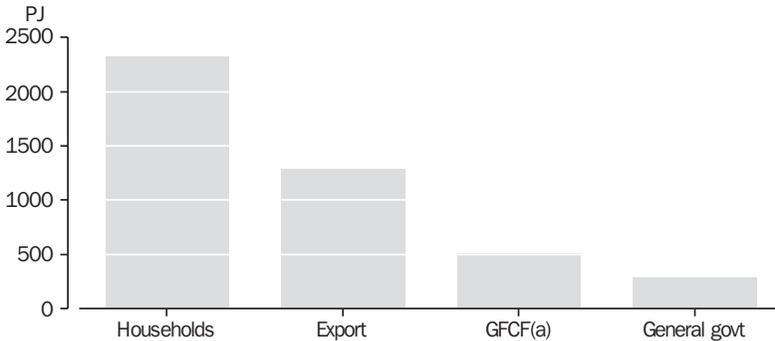
In 1994–95, over half of Australian energy consumption allocated to final use (53%) was by households, either directly or indirectly through the consumption of products (graph 15.16). Goods and services produced for export made up a further 29%; gross capital formation was responsible for 11% (e.g. energy embodied in buildings, road, rail, and pipeline infrastructure); and the remaining 7% was attributed to government final consumption (mainly government administration and the provision of services such as education, health and community services).

**Households as direct and indirect consumers of energy**

In 1994–95, the use of petroleum products — mainly motor vehicle fuels — was the biggest contributor to household consumption of energy (25% of total household consumption of energy), followed by household electricity use (21%), and various other sources of direct energy consumption by households (11%). Approximately two-thirds of household electricity use is attributed to conversion losses in the production of this electricity (mainly from coal). Indirect consumption of energy through the consumption of (non-energy) goods and services made up about 43% of total household energy use. The largest of these indirect sources was household consumption of wholesale and retail goods and services and of repairs (9%). Main products contributing to final household consumption of energy are shown in graph 15.17.

Relative to its gross domestic product (GDP) Australia has a very high level of motorisation, and a high level of total personal travel. Other than the North Americans, only Italians are more motorised than Australians (OECD/IEA 2001). Per capita road transport use in Australia increased 10% from 1990–91 to 1998–99 (see table 15.21). Table 15.18 shows that the number of persons driving to work or study in Australia increased by 9% between 1996 and 2000. Some 76% of adults aged 18 years and above drove to work or study in 2000.

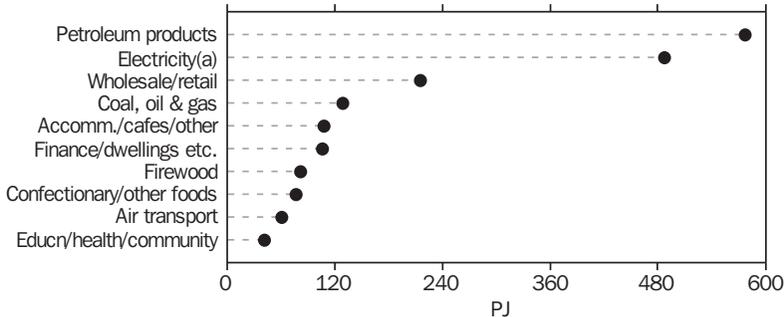
**15.16 ENERGY CONSUMPTION, By final use — 1994–95**



(a) Gross fixed capital formation.

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992–93 to 1997–98 (4604.0)*.

**15.17 DIRECT AND INDIRECT HOUSEHOLD CONSUMPTION OF ENERGY,  
By product type — 1994–95**



(a) Includes conversion loss from primary fuel to derived product.

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992–93 to 1997–98 (4604.0)*.

**15.18 TYPE OF TRANSPORT TAKEN TO WORK/STUDY, Number of persons travelling**

	1996 '000	2000 '000	Change %
Train	654.5	623.6	-4.7
Bus	545.7	359.7	-34.1
Tram/light rail	(a)	50.1	..
Ferry/boat	(a)	15.7	..
Taxi	(a)	9.1	..
Car/truck/van as driver	5 991.9	6 539.8	9.1
Car/truck/van as passenger	552.8	457.9	-17.2
Motorbike or motor scooter	99.4	66.0	-33.6
Bicycle	215.2	98.4	-54.3
Walk	487.4	378.7	-22.3
Other	153.1	24.2	..
<b>Total</b>	<b>8 700.0</b>	<b>8 623.1</b>	<b>11.7</b>

(a) Included in Other.

Source: *Environmental Issues: People's Views and Practices (4602.0)*.

Household electricity use was the other major contributor to energy consumption attributed to households. The 1970s and 1980s saw significant increase in the level of indoor comfort and amenities in Australian homes for space comfort, water heating and electric appliances. Natural gas and electricity are the key sources of space heating (table 15.19). In 1999 natural gas was the main heating source for 41% of residences that

had space heating (up from 38% in 1994); electricity provided 35% and wood most of the remainder. Over the period, electricity lost share to gas. As comfort standards have increased, whole house heating rather than 'spot' heating increased and pipeline gas became more widely available (OECD/IEA 2001). Electricity is the major source of energy for both water (about 60% in 1999) and cooking (about 59%).

## 15.19 PRINCIPAL FUEL TYPES USED IN DWELLINGS, Number of dwellings by purpose

Fuel type	Room heating			Water heating			Cooking(a)
	1994 '000	1999 '000	Change %	1994 '000	1999 '000	Change %	1999 '000
Electricity	1 906.4	1 997.3	4.8	3 999.3	4 253.8	6.4	4 181.1
Gas	2 044.3	2 349.6	14.9	2 153.8	2 526.7	17.3	2 887.0
Wood	1 130.4	1 118.3	-1.1	(b)	73.9	..	51.4
Solar	3.8	*0.8	-78.9	317.1	344.7	8.7	—
Oil	200.0	156.3	-21.9	(b)	2.2	..	0.9
Coal/coke	(b)	*2.7	..	(b)	—	..	—
Other	90.6	44.5	..	141.9	12.4	..	14.8
Don't know	(b)	*7.5	..	(b)	36.9	..	—
None	1 039.1	1 458.1	40.3	—	—	..	—
<b>Total</b>	<b>6 414.5</b>	<b>7 135.2</b>	<b>11.2</b>	<b>6 612.1</b>	<b>7 250.6</b>	<b>11.2</b>	<b>7 135.2</b>

(a) Not collected in 1994. (b) Included in Other.

Source: *Environmental Issues: People's Views and Practices* (4602.0).

### Energy consumed in the production of exports

Of the 29% of total energy consumed in the production of goods and services for export, a third is attributed to basic non-ferrous metals and metal products. Basic non-ferrous metals and products include products from alumina production, aluminium smelting and aluminium product manufacturing. These activities consume large amounts of electricity in their production. Energy consumed in the production of export products in 1994–95 is shown in graph 15.20.

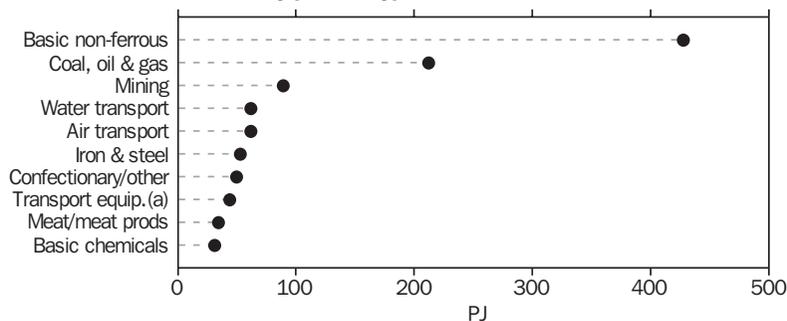
### Indicators of energy use in Australia

Between 1990–91 and 1998–99 Australia's total energy consumption increased by 23%. Over the same period, population increased by just under 10%, and GDP by over 34% (in chain volume

terms). Aggregate energy intensity (energy consumed per unit of output) of the economy declined by around 9% from 1990–91 to 1998–99. Despite the high growth in electricity generation, total energy consumption grew at a slower rate than GDP, particularly over the more recent years shown (table 15.21).

An indicator of aggregate energy intensity, such as the ratio of energy use to GDP, does not account for the effects of changes in the structure of energy use over time. Aggregate energy intensity is a very basic indicator and does not provide an adequate picture of the underlying trends in energy intensity within the economy. The next section *International comparisons of energy performance* provides more detail on the composition of this aggregate indicator.

15.20 ENERGY CONSUMED IN THE PRODUCTION OF EXPORTS,  
By product type — 1994–95



(a) Includes other machinery.

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992–93 to 1997–98* (4604.0).

## 15.21 SELECTED ENERGY INDICATORS

	Energy consumption	Electricity generation	Energy use by road transport	Population	GDP(a)	Per capita energy use	Per capita electricity generation	Energy use/GDP(a)	Road transport use per capita
	PJ	PJ	PJ	'000	\$m	GJ/capita	GJ/capita	GJ/\$m	GJ/capita
1990–91	3 949.9	1 065.0	796.6	17 284.0	439 783	228.5	61.6	8 981.5	46.1
1991–92	3 982.7	1 092.9	809.7	17 494.7	441 458	227.7	62.5	9 021.7	46.3
1992–93	4 081.8	1 096.5	829.1	17 667.1	457 735	231.0	62.1	8 917.4	46.9
1993–94	4 181.9	1 109.6	853.5	17 854.7	476 556	234.2	62.1	8 775.3	47.8
1994–95	4 365.3	1 162.6	878.0	18 071.8	498 113	241.6	64.3	8 763.7	48.6
1995–96	4 505.5	1 211.8	904.3	18 310.7	520 669	246.1	66.2	8 653.3	49.4
1996–97	4 611.0	1 244.1	921.3	18 524.2	540 379	248.9	67.2	8 532.9	49.7
1997–98	4 777.6	1 347.3	936.4	18 730.4	565 881	255.1	71.9	8 442.8	50.0
1998–99	4 858.3	1 398.3	960.7	18 937.2	591 546	256.5	73.8	8 212.9	50.7

(a) Chain volume measure. Reference year is 1997–98.

Source: Australian Demographic Statistics (3101.0); Australian System of National Accounts (5204.0); ABARE, electronic datasets.

## International comparisons of energy performance

This section outlines the main concepts underlying measures of energy performance, and the difficulties they present for measurement. It provides some international comparisons of energy performance and discusses Australia's performance against various indicators relative to that of other OECD countries.

Given that countries exhibit a range of climate, industrial structures, geographical features and economic development, changes in the aggregate energy intensity ratio (energy consumed per unit of output) are an inadequate basis for measuring and comparing energy efficiency among countries. Using only the ratio of energy use to GDP as an energy performance indicator for international or cross-country comparison would be misleading. However, aggregate energy intensity can be broken down to identify the factors which have contributed to the net aggregate effect. These factors may be due to the level of economic activity (the production effect); the sectoral composition of the economy (the structural effect); and energy intensities of activity within the various energy-using sectors (the real intensity effect).

Overall, Australia's ratio of energy use to GDP and its energy use per capita are higher than the OECD average (table 15.22). Although the ratio of energy use to GDP for Australia declined between 1990 and 2000, this was less of a decline than that experienced in most other OECD countries. This is partly due to a natural evolution of the Australian economy towards more energy use, particularly in the transport, commercial, and residential sectors. In addition, structural changes in the economy towards certain energy-intensive

manufacturing industries contributed to increased energy use. Energy savings offset some of this growth, but the overall impact was a growth in energy use (OECD/IEA 2001).

Between 1990 and 2000 the end use of energy by Australian industry (manufacturing and mining) increased by a higher percentage than in all but four of the OECD countries included in table 15.23; in two countries (Germany and the United States of America) it fell. Australian manufacturing production involves a high share of energy intensive raw materials. Particularly important is the production of ferrous and non-ferrous metals. Energy use for non-ferrous metals (alumina refining and aluminium smelting) has increased dramatically as Australia has captured an increased share of the global market. Expansion of these industries has pushed up manufacturing energy use. Australia is one of the few countries listed where structural changes have had an upward effect on energy use over the past two decades.

Passenger transport rose strongly all through the 1970s and 1980s, driven by increased car ownership and air travel. In the early 1970s Australia had a relatively low level of per capita motorisation by United States of America or Canadian standards. However, Australia experienced a higher rate of growth in ownership, relative to GDP, than most other countries, and significantly closed the gap with the United States of America. Factors that combined to give Australia high energy use for transport include: high volume of passenger transport; above-average fuel intensity of cars; and high car ownership (OECD/IEA 2001).

## 15.22 ENERGY INDICATORS FOR SELECTED OECD COUNTRIES — 2000

	Energy production	Change 1990 to 2000		TPES(a)	Change 1990 to 2000	TPES(a)/GDP(b)		Change 1990 to 2000	TPES(a)/Pop'n		Change 1990 to 2000
	Mtoe(c)	%	Mtoe(c)		%	toe/\$USm	%	toe/capita	%		
<b>Australia</b>	<b>232.55</b>	<b>47.5</b>	<b>110.17</b>	<b>25.1</b>	<b>232.8</b>	<b>-11.4</b>	<b>5.8</b>	<b>13.3</b>			
Canada	374.86	37.0	250.97	19.1	306.8	-8.7	8.2	8.8			
Denmark	27.87	170.6	19.46	6.6	141.8	-14.6	3.6	2.6			
Finland	15.13	29.1	33.15	16.5	268.8	-7.1	6.4	10.9			
France	131.38	18.7	257.13	16.3	189.6	-4.5	4.3	10.5			
Germany	134.32	-27.6	339.64	-4.3	177.8	-19.3	4.1	-8.3			
Italy	26.86	9.1	171.57	10.9	135.5	-3.3	3.0	12.4			
Netherlands	57.24	-4.6	75.80	14.1	192.6	-14.3	4.8	8.1			
New Zealand	15.38	25.4	18.63	33.0	261.1	1.0	4.9	17.8			
Norway	224.99	87.4	25.62	19.1	216.9	-14.3	5.7	12.9			
United Kingdom	272.69	31.1	232.64	9.8	184.1	-12.6	3.9	5.7			
United States of America	1 675.77	1.6	2 299.67	19.8	255.9	-13.4	8.3	7.8			
<b>OECD total</b>	<b>3 826.49</b>	<b>12.2</b>	<b>5 316.93</b>	<b>30.3</b>	<b>215.9</b>	<b>-8.9</b>	<b>4.7</b>	<b>8.8</b>			

(a) Total primary energy supply (TPES) is made up of production plus imports less exports less international marine bunkers, net of stock changes. (b) Gross domestic product (GDP) in purchasing price parity terms, expressed in 1995 \$US. (c) Million tonnes of oil equivalent.

Source: OECD/IEA 2002.

## 15.23 ENERGY END USE BY SECTOR, Selected OECD countries — 2000

	Industry(a)			Transport			Other(b)		
	1990	2000	Change	1990	2000	Change	1990	2000	Change
	Mtoe(c)	Mtoe(c)	%	Mtoe(c)	Mtoe(c)	%	Mtoe(c)	Mtoe(c)	%
<b>Australia</b>	<b>21.8</b>	<b>24.5</b>	<b>12.6</b>	<b>22.7</b>	<b>28.1</b>	<b>23.9</b>	<b>12.1</b>	<b>15.7</b>	<b>29.3</b>
Canada	58.4	70.8	21.2	41.2	53.5	29.9	54.5	62.0	13.8
Denmark	2.8	2.9	3.6	4.6	4.9	6.5	6.5	6.9	5.8
Finland	9.9	11.6	16.9	4.4	4.5	3.2	7.5	8.1	8.1
France	45.7	46.4	1.6	41.5	52.8	27.2	52.5	64.9	23.6
Germany	88.7	75.8	-14.5	60.0	67.2	11.9	96.8	96.7	-0.1
Italy	42.9	42.9	—	34.3	42.4	23.6	38.2	42.7	11.7
Netherlands	20.5	20.6	0.5	10.6	14.2	34.3	19.5	22.7	16.4
New Zealand	4.0	5.9	47.1	3.6	5.0	40.4	2.3	2.6	11.6
Norway	7.2	8.2	14.4	4.1	4.6	11.4	5.9	6.7	13.8
United Kingdom	40.9	41.3	0.9	46.5	52.7	13.4	56.2	63.7	13.4
United States of America	416.0	359.5	-13.6	484.4	610.3	26.0	406.6	473.1	16.3

(a) Manufacturing and mining. (b) Includes agriculture, commerce, public services, residential and non-specified other sectors. (c) Million tonnes of oil equivalent.

Source: OECD/IEA 2002.

The 1970s and 1980s saw an expansion of the area of built space in the commercial sector in Australia that closely followed the rise in commercial sector gross product. Electricity intensity in this sector rose, indicative of greater electrification (e.g. increased electricity use for air conditioning, lighting and computing). This trend appears to be slowing, however, even with the rising commercial sector gross product. Significant growth in residential energy use over

the past two decades can be attributed to rapid development of equipment ownership in Australia. Canada, the United States of America and Nordic countries, by contrast, showed little growth in residential energy use for equipment because consumption was already so well developed in the early 1970s.

Table 15.24 shows that Australia has a far greater dependence on coal for the production of electricity than the other OECD countries shown.

## 15.24 FUEL SHARES IN ELECTRICITY GENERATION, Selected OECD countries — 2000

	Coal %	Petroleum %	Natural gas %	Fossil fuels %	Nuclear %	Hydro- electricity %	Geothermal, solar %	Combust. renew. and waste %
<b>Australia</b>	<b>77.2</b>	<b>1.3</b>	<b>12.6</b>	<b>91.1</b>	—	<b>8.1</b>	—	<b>0.8</b>
Canada	19.5	2.5	5.5	27.5	12.0	59.2	—	1.2
Denmark	46.0	12.2	24.3	82.5	—	0.1	12.3	5.1
France	5.8	1.4	2.1	9.3	77.5	12.5	0.1	0.6
Germany	52.7	0.8	9.3	62.8	29.9	3.8	1.7	1.8
Italy	11.3	31.8	37.5	80.7	—	16.4	2.2	0.7
Netherlands	28.4	3.5	57.7	89.6	4.4	0.2	1.2	4.7
New Zealand	2.6	—	23.8	26.4	—	63.1	8.9	1.5
Norway	0.1	—	0.1	0.3	—	99.5	—	0.2
United Kingdom	33.4	1.5	39.4	74.3	22.9	1.4	0.3	1.2
United States of America	52.7	3.1	15.7	71.6	20.0	6.2	0.5	1.7
OECD	38.8	6.2	15.8	60.8	23.3	13.7	0.7	1.5

Source: OECD/IEA 2002.

## Energy and the environment

### Greenhouse gas emissions

As mentioned in *Chapter 14, Environment*, fossil fuel combustion is the major contributor to Australia's greenhouse gas emissions. Table 15.25 shows that the electricity supply industry accounts for nearly half of total energy-related emissions, and that emissions in this industry grew by 25% between 1992–93 and 1997–98. Direct emissions by households contributed around 13% in 1997–98, with most of these emissions due to motor vehicle use. Other significant direct emitters of greenhouse gases included manufacturing of iron and steel; mining; manufacturing of basic non-ferrous metals and products; air and space transport; and road transport (excluding household motor vehicle

use). Combined emissions from this group of industries accounted for nearly 20% of energy-related emissions in 1997–98.

While table 15.25 presents the direct generation of greenhouse gases by the energy-using industry group or sector, graph 15.26 shows that, in 1996–97, the bulk of Australia's energy-related greenhouse gases were emitted in the production and consumption of goods and services for the purpose of household final consumption (about 56%). A further 25% of energy-related emissions were generated in the production of goods and services for export. Other final use categories (general government final consumption, and gross fixed capital formation) were responsible for the remaining emissions.

## 15.25 PRODUCTION OF ENERGY-RELATED GREENHOUSE GASES(a), By industry

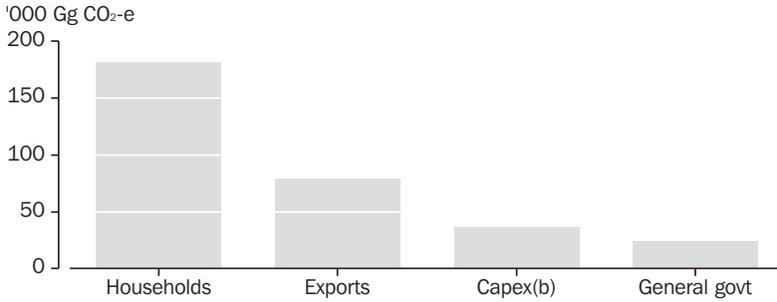
	1992–93 Gg CO <sub>2</sub> -e(b)	1993–94 Gg CO <sub>2</sub> -e(b)	1994–95 Gg CO <sub>2</sub> -e(b)	1995–96 Gg CO <sub>2</sub> -e(b)	1996–97 Gg CO <sub>2</sub> -e(b)	1997–98 Gg CO <sub>2</sub> -e(b)	Change 1992–93 to 1997–98 %
Agriculture; hunting and trapping; forestry and fishing	6 053	6 252	6 518	6 737	6 988	7 188	18.8
Mining	10 986	11 237	12 295	13 271	14 596	15 136	37.8
Manufacturing	52 431	52 934	55 665	56 603	55 437	57 166	9.0
Electricity and gas	135 987	137 164	142 412	148 256	153 611	169 562	24.7
Construction	4 293	4 419	4 582	4 809	4 819	4 958	15.5
Transport	25 443	26 332	29 111	30 708	31 415	30 939	21.6
Services	7 781	7 997	8 325	8 610	8 823	9 063	16.5
Household production	42 194	42 990	44 051	44 361	45 286	45 587	8.0
<b>Total</b>	<b>285 168</b>	<b>289 325</b>	<b>302 959</b>	<b>313 355</b>	<b>320 975</b>	<b>339 597</b>	<b>19.1</b>

(a) Excludes fugitive emissions. (b) Gigagrams of carbon dioxide equivalents (CO<sub>2</sub>-e).

Note: Due to varying classification systems, definitional differences, and various states of revision of data sources, figures will not necessarily reconcile with other data sources. Statistics of greenhouse gas emissions are also available for 1999 from AGO 2000.

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992–93 to 1997–98 (4604.0)*.

**15.26 GREENHOUSE GAS EMISSIONS(a), By final use — 1996–97**



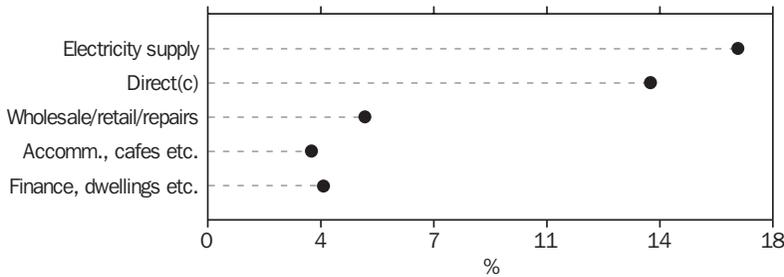
(a) Energy-related emissions produced either directly or indirectly, by category of final use.  
 (b) Gross fixed capital formation.

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992–93 to 1997–98 (4604.0)*.

Graphs 15.27–15.29 show the contributions that the production or consumption of various goods and services make towards Australia’s greenhouse gas emissions. The consumption of electricity by households indirectly produced the greatest amount of energy-related greenhouse gas emissions (17%). This was followed by direct emissions by households (14%), most of which is due to the consumption of motor vehicle fuels (graph 15.27). The most significant contributor to energy-related greenhouse gas emissions

resulting from production of goods and services for export is basic non-ferrous metals and products (6% of total energy-related greenhouse gases) (graph 15.28). A significant proportion of emissions is also attributed to buildings and other construction, such as roads, irrigation systems, oil refineries, and water and gas supply systems, that contain high levels of embodied energy (about 7% of total greenhouse gas emissions) (graph 15.29).

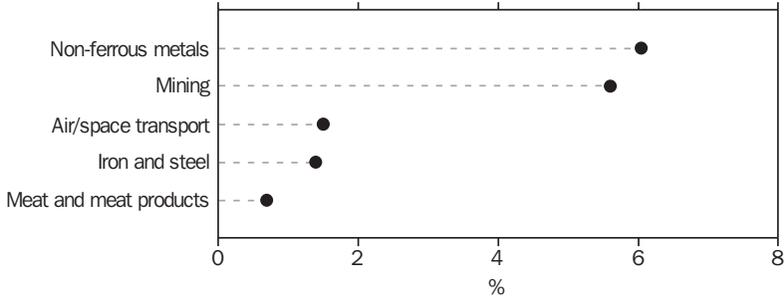
**15.27 GREENHOUSE GASES(a) INDUCED(b) BY HOUSEHOLDS, Contributions by product consumed — 1996–97**



(a) Energy-related greenhouse gases only. (b) Produced either directly or indirectly through the consumption of products. (c) Direct production by households, mainly through motor vehicle use.

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992–93 to 1997–98 (4604.0)*.

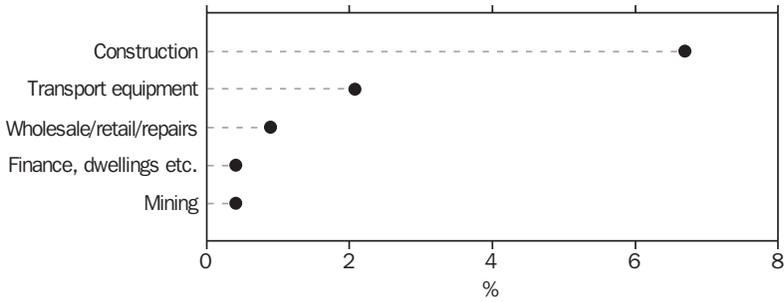
**15.28 GREENHOUSE GASES(a) INDUCED(b) BY EXPORTS,  
Contributions by producing industry — 1996-97**



(a) Energy-related greenhouse gases only. (b) Produced indirectly through the production of goods and services for export.

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992-93 to 1997-98 (4604.0)*.

**15.29 EMISSIONS(a) INDUCED BY OTHER FINAL USES(b),  
Contributions by final use — 1996-97**



(a) Energy-related greenhouse gases only. (b) Produced indirectly by government final consumption of products or gross capital formation.

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992-93 to 1997-98 (4604.0)*.

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*Environmental Issues: People's Views and Practices* (4602.0)

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2000b, *Oil and Gas Resources of Australia 1999*, Canberra

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OECD/IEA (Organisation for Economic Co-operation and Development/International Energy Agency):

2001, *Energy Use in Australia in an International Perspective: Comparison of Trends through the mid 1990s*, Paris

2002, *Energy Balances of OECD Countries 1999–2000*, Paris

### Other sources

The following organisations also produce energy and greenhouse gas statistics:

Australian Greenhouse Office

Australian Institute of Petroleum

Commonwealth Department of Industry, Tourism and Resources

Electricity Supply Association of Australia

Joint Coal Board

LANDINFO, Sinclair Knight Merz

The Australian Gas Association

State government departments and instrumentalities are also important sources of energy data, particularly at the regional level. A number of private corporations and other entities operating within the energy field also publish or make available a significant amount of information.

**Web sites**

Australian Greenhouse Office, <<http://www.greenhouse.gov.au>>

Australian Institute of Petroleum, <<http://www.aip.com.au>>

Australian Renewable Energy site (Australian Greenhouse Office), <<http://renewable.greenhouse.gov.au>>

Commonwealth Department of Industry, Tourism and Resources, <<http://www.industry.gov.au>>

Electricity Supply Association of Australia, <<http://www.esaa.com.au>>

Energy Australia, <<http://www.energy.com.au>>

Geoscience Australia, <<http://www.agso.gov.au>>

International Energy Agency, <<http://www.iea.org>>

Joint Coal Board, <<http://www.jcb.org.au>>

Organisation for Economic Co-operation and Development, <<http://www.oecd.org>>

Sustainable Energy Development Authority (NSW), <<http://www.seda.nsw.gov.au>>

# Renewable energy in 2003

## Introduction

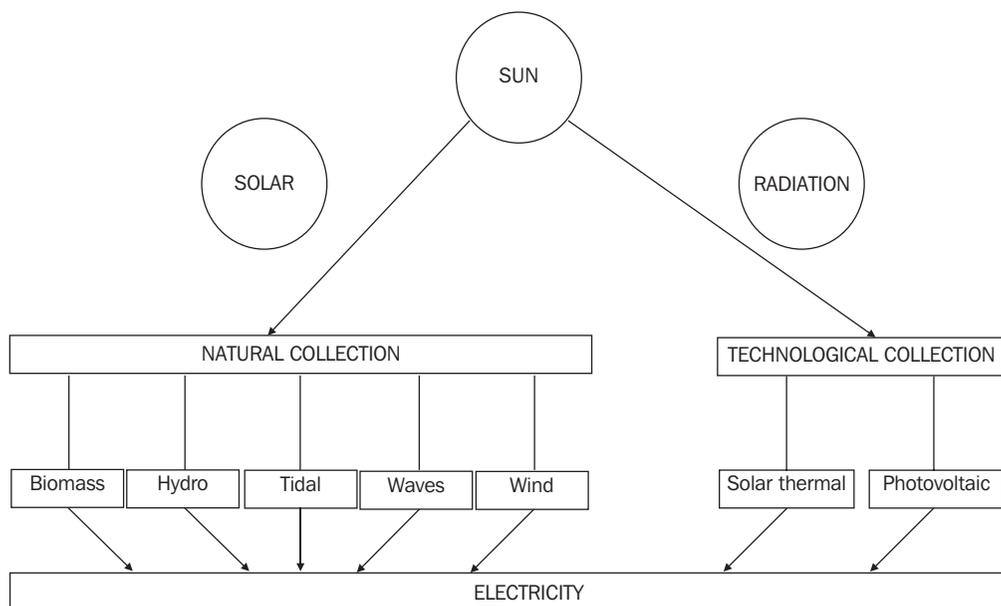
Renewable energy is energy derived from a renewable or replenishable resource. Sources include sunlight or solar energy, and others such as wind, wave, tidal, biomass and hydro energy. Diagram S15.1 shows the sun as the origin of these renewable energy resources and their potential to be converted to electricity. Geothermal resources are derived from such a large energy source that the rate of depletion is negligible, and are therefore also regarded as renewable.

Two main reasons for renewable energy's rapid growth are the depletion of fossil and other non-renewable fuels, and concerns about the effects of greenhouse gas emissions. As well as being perpetually available, renewable energy

sources are low polluting and produce very little or no net greenhouse gas emissions when operating. In Australia, government, industry and community support are driving renewable energy growth, particularly for electricity generation and transport use.

Although depletion of fossil fuels is far from being an issue for Australia, there are many environmental benefits to be gained from renewable energy development. However, there are potential negative as well as positive environmental impacts, specific to each renewable energy source. Careful planning and use of appropriate existing or new technologies may overcome many of the potential problems and so maximise the potential benefits.

**S15.1 SOLAR ENERGY CONVERSION PATHS**



Source: Bioenergy Australia, 'Conference notes, December 2000'.

## Renewable energy's role in sustainable energy development and greenhouse gas emissions reduction

Renewable energy, energy efficiency and use of cleaner fossil fuel technologies are key tools in a strategy for sustainable energy use and greenhouse gas emissions reduction. Energy use in Australia continues to rise due to economic development, an increasing number of energy intensive industries, population growth and rising standards of living that increase demand for energy and for energy intensive products. About 94% of domestic energy use comes from fossil fuels and the rest from renewable energy (ABARE 2001).

The structure of the Australian economy, and its heavy reliance on fossil fuels for its energy, translates to high emissions of carbon dioxide, the main greenhouse gas contributing to global warming. The energy sector accounted for 362.6 million tonnes (Mt) or 79.6% of total net national greenhouse gas emissions in 1999, an increase of 1.0% from 1998 and 21.7% from 1990. This compares with the total net national emissions increase of 17.4% (excluding land clearing) from 1990. Emissions associated with land clearing have decreased significantly since 1990. As a result, once emissions associated with land clearing are included in Australia's national greenhouse gas inventory, the overall growth in emissions since 1990 is expected to be significantly less than 17%. The Kyoto Protocol target for Australia restricts emissions to a maximum of 8% by the budget period 2008–12 (AGO 2001).

Within the energy sector, electricity generation and transport are the biggest energy consumers and contributed 37.5% and 16.1% respectively to total net national greenhouse emissions in 1999. This points to a need to increase renewable energy for electricity generation and transport as an effective means for Australia to constrain the growth in its greenhouse emissions.

The relatively low cost of fossil fuels has been a constraint on investment in renewable energy, and correspondingly there is currently a price premium attached to the use of renewable energy. Table S15.2 shows estimates of unit costs of electricity generation in 1998–99 by fuel type and gives an indication of this price premium (ABARE 2001). However there is mounting support for renewable energy from governments, industries and households.

**S15.2 UNIT COSTS OF ELECTRICITY GENERATION — 1998–99**

Fuel type	Cost of existing power plants	Cost of new power plants
	\$ per '000 kWh	\$ per '000 kWh
Black and brown coal, natural gas	32.66–36.04	30.11–32.70
Hydro-electricity	43.13	41.76
Wind energy	56.62	50.83
Biomass (including biogas)	108.53–122.88	46.87–60.32

Source: ABARE 2001.

## Support for renewable energy

### Commonwealth Government

A range of Commonwealth government initiatives and funding of \$381m are in place to boost the uptake of renewable energy. These are part of the measures announced in the 1997 *Climate Change Statement* (\$60m over five years) and the 1999 *Measures for a Better Environment* (\$321m over four years). The majority of the funding was for power generation using renewable energy especially for remote areas, but there were small measures to assist the development of transport fuels from renewable sources. Additionally, in early 2002, the Australian Government announced a \$50m bio-fuels initiative to enable renewable fuels such as ethanol to provide 2% of the country's transport fuel.

Among these government initiatives, the most significant market driver is the Mandatory Renewable Energy Target (MRET). The MRET places a legal requirement on electricity wholesalers and large energy users to purchase an additional quantity of electricity generated from renewable sources. In order to improve planning certainty, the requirement is for an additional 9,500 gigawatt hours (GWh) of renewable generation by 2010. The measure is phased in via a number of interim targets over the period 2001–2010, and the final 9,500 GWh target must be maintained between 2011 and 2020 (<<http://www.orer.gov.au>>). The measure applies nationally. All wholesale electricity buyers and retailers on grids of over 100 megawatt (MW) capacity in all states and territories must contribute to the measure.

In order to discharge their renewable energy liability, liable parties (electricity retailers or large energy users) must surrender an assigned number of Renewable Energy Certificates (RECs) to the Office of the Renewable Energy Regulator (ORER). The requirement to purchase renewable electricity is determined by the ORER and allocated in proportion to the overall electricity purchases of liable parties.

RECs are generated by the production of renewable energy. Each megawatt hour (MWh) of electricity generated from an eligible renewable energy source creates one REC. The ORER issues the RECs to renewable generators — one REC for each MWh generated. New renewable generators obtain RECs for their entire output, whereas existing generators (mostly large hydro) receive RECs for generation above a base line set on 1997 production. Renewable generators can then sell their RECs to liable parties in order to discharge this liability. The purchasers' liability under the MRET for any year is met when they surrender the required number of certificates to the regulator.

There is no option available to 'sign up', as the target is mandatory and a legal obligation on the part of liable parties is legislated. A penalty of \$40/MWh is payable for each REC not purchased, effectively setting a price cap on compliance and capping the cost of the subsidy to electricity consumers.

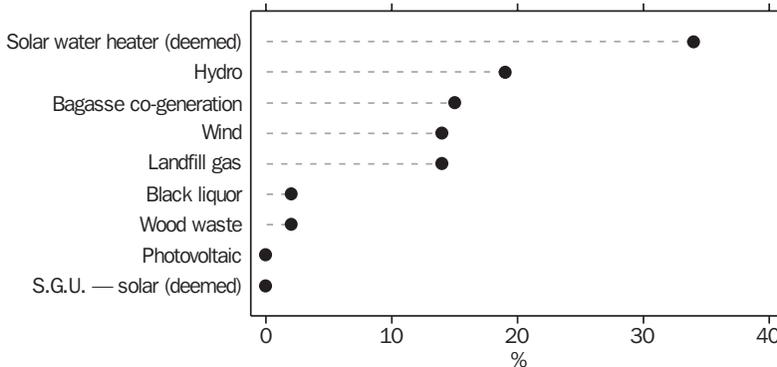
RECs are traded on the Green Electricity market developed by the Australian electricity industry. Over 600,000 RECs were created in 2001,

providing more than enough certificates to cover MRET's first year target of 300,000 RECs and a head start for 2002's larger target of 1.1 million RECs. Contributions to the 2001 target of 300,000 RECs from different renewable sources are shown in graph S15.3. This shows that wind and landfill gas, which were previously used in negligible amounts, could experience strong growth under the MRET scheme.

**State, territory and local governments**

Through participation in Commonwealth government programs and their own initiatives, state, territory and local governments are actively promoting renewable energy and assisting industries in the commercialisation and use of sustainable energy technologies. For example, New South Wales imposes mandatory reduction targets on its privatised electricity industry through the *Electricity Supply Act 1995* (NSW), and in mid 2002 the Victorian Government announced the Victorian Greenhouse Strategy, promising 59 actions to combat greenhouse gas emissions. Many initiatives involve providing information, guidelines and other practical help. As an example, the development of wind energy in New South Wales is aided by a Wind Monitoring Network set up by the New South Wales Sustainable Energy Development Authority (SEDA). This network incorporates twenty-five 40-metre monitoring towers across the state. A New South Wales wind atlas of the state's wind resource, based on data from these towers and other sources, is also available to the public.

**S15.3 CONTRIBUTIONS TO 2001 REC TARGET, By energy source**



Source: OECD/IEA 2002.

## Industry and R&D

The Renewable Energy Industry Action Agenda, launched in June 2000, was established by the Department of Industry, Tourism and Resources to build a partnership between industry and government to fast-track the growth of the industry. It aims to achieve annual sales of \$4b of renewable energy technologies by 2010 (DISR 2000). Industry has identified many action points including the need to deliver products and services that provide cost effective and reliable 'energy solutions' to customers. A technology roadmap for the renewable energy industry has been developed to encourage greater collaboration between industry and the research community. Standards, training and accreditation initiatives are being developed to support improvement to product and service quality and reliability. There is general recognition that renewable energy has enormous growth potential and that export opportunities are the key to achieving economies of scale, which are important in lowering the cost of renewable energy.

## Households

Households can directly contribute to the increased use of renewable energy for electricity generation through the Green Power program administered by SEDA. This is a national accreditation program that sets stringent environmental and reporting standards for renewable energy products offered by electricity suppliers across Australia. More than 55,000 households (and about 2,500 businesses or local councils) are customers of Green Power. By asking energy suppliers to provide them with electricity generated from renewable sources, these customers voluntarily pay a higher price for their electricity to support the use of renewable energy. An average home that has subscribed to 100% Green Power (including off-peak) is estimated to save eight tonnes of carbon dioxide annually, equivalent to taking just over two cars off the road. SEDA's National Green Power Audit showed that the total green energy sales increased by 50% from the previous year to reach 455 GWh in 2000–01. Over the four-year life of the Green Power program, demand for genuine renewable energy has increased tenfold from 40 GWh in 1997.

## Renewable energy growth

The growing support for sustainable energy, including renewables, has yielded measurable results. Electricity generation increased by 4%

from 1997–98 to 1998–99 while electricity emissions increased by 1.9%, an indication that a greater proportion of lower emission fuels, or cleaner fuel technologies, were used during 1998–99 to produce electricity. By contrast, in the previous year electricity generation increased by 6% and emissions increased by more than 10%.

In 1999, Australian Bureau of Agricultural and Resources Economics estimated that the 6% of total primary energy that came from renewable energy was largely from biomass in the form of bagasse (39%) which was used to generate electricity and steam, wood (39%) which was used primarily for home heating, hydro-electricity (21%) and solar (1%). Renewable energy contributed 11% to electricity generation, most of which was generated from large-scale hydro-electric schemes (ABARE 1999).

## Environmental considerations in developing renewable energy

Australia is well endowed with renewable energy and is an international leader in a number of technologies, such as R&D for photovoltaic modules and fuel cells, solar thermal and remote area power systems. Momentum for renewable energy development in Australia is gaining rapidly due to the urgent need to stabilise greenhouse gas emissions. Large potential economic and social benefits are also expected to flow from renewable energy development. Among the economic benefits, particularly to rural and remote areas, are: cost-effective clean energy; renewable energy industry and market creation; R&D development; and export potential. Renewable energy facilities can be built near customers to reduce energy losses in electricity transmission, a particular advantage in transmission lines feeding rural areas. Availability of low-cost, clean and reliable energy, improved land, air and water quality, and job creation have positive impacts on people's health and wellbeing.

There are other environmental effects, negative as well as positive, specific to each type of renewable energy resource/technology. They include effects on air, water and soil quality; impact on biodiversity, flora and fauna; and noise and visual impact. Careful assessment of these impacts and the

adoption of environmentally sound technologies and practices are an essential part of planning for renewable energy projects and their implementation. The remainder of this article discusses these environmental effects as they relate to different renewable energy resources, and presents case studies.

## Hydropower

Hydropower is produced by the movement of freshwater from rivers and lakes. The most common form of hydropower plant uses a dam on a river to store water in a reservoir. Enormous quantities of water are involved and a large hydro-electric power system requires a very large dam, or a series of dams. In Australia hydropower is currently the largest source of renewable energy for electricity generation (over 8% of total supply) and is expected to retain this position, although its share is projected to drop to about 6% by 2019–2020 (ABARE 2001). Most of this hydropower is from the two largest plants, the Snowy Mountains scheme and the Tasmanian Hydro-Electric installation.

Although it is a renewable energy source, hydropower does carry a greenhouse gas penalty due to the production of methane, which arises from the rotting of underwater vegetation. The extent to which methane is produced in a hydro-electric dam depends on a variety of factors, including the original vegetation on the dam site, water temperature, and the area of the dam. Shallow warm tropical dams are more likely to be major emitters of methane than deep cold dams located in temperate regions. Recent studies from the Australian Coal Association Research Program on power generation in Brazil led the Commonwealth Scientific and Industrial Research Organisation to assign a greenhouse gas production value of 0.19 tonnes of carbon dioxide equivalent (CO<sub>2</sub>-e) to each MWh of hydro-produced electricity. This is about one-third of the value assigned for electricity produced using natural gas and one-fifth the amount allocated to power stations burning black coal.

Fish injury and mortality from passage through turbines and detrimental effects on the quality of downstream water (hydro can cause low dissolved oxygen levels in the water which is harmful to riparian habitats) are also potential negative environmental effects of hydropower. Mitigating techniques are available, for example, upstream fish passage can be aided using fish

ladders or elevators, and maintaining minimum flows of water downstream helps the survival of riparian habitats. An important determinant of environmental impacts is the size of hydropower plants, which ranges from micro to large.

Large-scale hydro is associated with significant negative environmental impacts, including detrimental effects on river flows and water supplies. The flooding of large areas of land often leads to the displacement of local residents and negative impacts on local fauna and flora. The 500 MW Tully Millstream project was shelved due to the potential inundation of a World Heritage rainforest.

Smaller hydro systems do not experience these problems, or experience them to a much lesser extent. In particular, micro hydro systems (less than 100 kilowatts (kW)) are preferable from an environmental point of view. Seasonal river flow patterns downstream are not affected and there is no flooding of valleys upstream. These systems operate by diverting part of the river flow through a penstock (or pipe) and a turbine, which drives a generator to produce electricity. The water then flows back into the river. Micro hydro systems are mostly 'run of the river' systems which allow the river flow to continue. They provide an attractive alternative or supplement to diesel systems in rural and remote areas.

## Case studies

**Mini hydro case study** (*Australian Energy News*, December 2000)

The construction of a very cost effective mini hydro generator on the 11,000 megalitre Toonumbar Dam near Lismore in the north of New South Wales resulted from a 1998 study commissioned by SEDA which identified the potential to develop or upgrade hydro-electric plants on 32 dams in New South Wales. Toonumbar is an irrigation dam, and the generator runs only when water is released or when the dam is overflowing. It has a capacity to produce 400 MWh of hydro-electricity a year. The proximity to regional and rural electricity loads is a great advantage and transmission losses are minimised when power does not need to be transported over long distances.

**Small hydro case study** (*EcoGeneration Magazine*, December 2000/January 2001)

The hydro is constructed on an existing dam, the Pindari Dam near Ashford, Inverell in northern New South Wales. The dam is primarily used for irrigation purposes and has a storage capacity of 312,000 . The irrigation releases provide the means of generating electricity. The project is a small hydro (defined as having a size of 1 MW to 10 MW) construction with two horizontal Francis turbines rated at 2.8 MW each. The plant's long-term average energy output is estimated at about 16,300 MWh per annum, enough to supply approximately 4,000 households. The power is exported to the national grid via an 8 km 66 kilovolt transmission line. The project is expected to save 14,600 tonnes of CO<sub>2</sub>-e per year during its 80-year lifetime.

## Biomass

Biomass is derived from plant and animal material, and can be used in a variety of ways to supply energy (heat, electricity, liquid and gas fuels, charcoal) and various chemicals and other products. Sources of biomass fall into five main groups: wood and forest; agricultural residues; energy crops and short rotation forests; municipal and industrial wastes; and peat. A considerable biomass resource exists in Australia including woody weeds, field crop residues, bagasse from large sugar mills, cotton and rice residues, residues from large forest and plantation operations (eucalypts and radiata pine), waste from sawmills and the pulp and paper industry, and landfill gas.

The potential of biomass to supply energy and reduce greenhouse gas emissions is large. On a world scale the International Energy Agency estimates that biomass energy sources have the potential to meet 40% of all present energy consumption. It has been estimated that, if biomass was to contribute 1,000 MW of Australia's electricity generating capacity, net carbon dioxide emissions would fall by about 7.4 Mt a year.

There are many environmental benefits as well as negative impacts from the use of biomass. Relative to other renewable energy sources, the much wider range of environmental effects associated with biomass reflects the large variety of biomass sources, conversion processes and products.

Additional environmental benefits offered by biomass are many, the major one being in solving waste disposal problems. By far the greatest source of feedstocks for biomass-to-energy schemes is by-products of existing agricultural, industrial and urban processes. Recycling, combined with advanced waste-to-energy combustion or gasification, reduces the need for landfill disposal. A follow-on benefit can be reduced problems with waste leaching into groundwater. Decaying of waste in landfills produces methane, the emission of which has higher global warming potential than carbon dioxide. It has been estimated that one tonne of methane from ruminant enteric fermentation has 21 times the global warming potential of one tonne of carbon dioxide over a 100-year period. Similarly, nitrous oxide released from animal wastes is 310 times as potent as carbon dioxide.

Processing of biomass can lead to improvement to the local environment (odour control, air and water quality). Treating waste in an anaerobic digester, rather than allowing it to decay naturally, improves local air quality. The biogas piped off is a valuable energy source, and the waste is substantially sterilised. Digestion of animal manure kills pathogens; the residue can then be spread safely as an agricultural fertiliser. Sewerage effluent treatment prior to discharge to waterways or oceans improves water quality. Unlike coal and oil, biomass contains no sulphur, or negligible quantities; sulphur is the main cause of acid rain.

Biomass can play a significant role in land care. Trees planted for energy can assist with the reduction of soil salinity and acidity, and the mitigation of soil erosion, the use of wastewater, the sequestration of atmospheric carbon and enhanced biodiversity. The ash left after combustion of most biomass contains negligible amounts of toxic metals, and so can be used as a soil conditioner.

Biofuels can be used for transport fuels. Other renewable energy sources could potentially be used to produce hydrogen or electricity for use in motor vehicles, although these applications are far from being economic or available for general use yet.

On the other hand, there are many more issues to be considered in the assessment of biomass projects than those for other sources of renewable energy. This is in part due to the variety of biomass material available as well as issues associated with its use. If biomass resources are to be maintained on a sustainable basis, it will be important to ensure that the rate of harvesting of these resources does not exceed the rate at which they are grown. It will also be necessary to ensure that the use of biomass resources does not adversely impact on biodiversity.

Sawdust and wood waste make sawmills a very attractive site for biomass-to-energy investment. Not only are large sites producing thousands of tonnes of material a year that would otherwise produce methane and carbon dioxide as it decomposed or burned, but the sawmills are also substantial users of electricity and in some cases process heat as well. These conditions make biomass-to-energy investments at large sawmills a likely part of any energy sector response to greenhouse gas reduction.

However, using waste for energy purposes could reduce the desirable incentives to minimise and recycle waste materials, if it is cheaper to burn it. Stack emissions from municipal solid waste-to-energy plants, and also possibly from wood-fired biomass plants, could contain toxic substances such as dioxins which would need to be controlled.

Other issues centre around the life-cycle costs and benefits of the energy material: how was it produced and manufactured — what is the ecological footprint of the demand created by the bio-energy companies? Does the material have a higher beneficial use than simply a one-off energy exercise? Could it be better used to replace other virgin materials? Also, transport of large quantities of biomass to the power plants would result in increased traffic congestion, noise, dust, road damage and fuel use.

Other concerns surround the growing of 'energy crops'. Planting large areas with fast growing trees could reduce both water run-off and percolation into the groundwater, impacting on downstream users. Biodiversity could be further threatened and agri-chemical use could be increased. Soil nutrient levels could be depleted by continually removing large quantities of biomass material such as crop residues from the land. There is concern among some sections of the community that genetically engineered trees and crops could

be developed specifically for use for bio-energy supplies. The use of land for energy cropping could reduce the area of land otherwise available for food and fibre production, resulting in land scarcity.

### Case studies

#### **Cronulla Sewerage Treatment Biogas Project** (*EcoGeneration Magazine*, June/July 2001)

This Sydney water cogeneration project forms part of an upgrade of the Cronulla Sewerage Treatment Plant. Sewerage wastewater, when treated anaerobically (oxygen excluded), produces methane that in this project is collected and used to generate renewable power. Otherwise the methane would either be flared or vented to the atmosphere with adverse environmental impacts. Methane has 21 times the greenhouse gas impact of carbon dioxide.

The power produced by the generation project displaces purchases of high value electricity from the grid. The unit produces about 2,470 MWh of power per year — approximately 10% of the power requirements of the Cronulla Treatment Plant. The heat produced by the engine exhaust and jacket is recovered and used to heat the sewerage sludge in the anaerobic digestion process, which assists the processing of the sludge and the production of the methane for the generation unit. The biogas cogeneration plant is designed to use 100% of the gas produced by the digesters and can be operated 24 hours a day, 7 days a week.

Producing power 'on site' increases the reliability of supply to the plant. The plant reduces greenhouse gas emissions arising from the processing of Cronulla's sewerage by 17,000 tonnes of carbon dioxide each year.

#### **Construction of Anaerobic Digester at Camellia, New South Wales** (*Bioenergy Australia Newsletter*, April 2002)

EarthPower Technologies Sydney, in association with Babcock and Brown and contractor McConnell Dowell Constructors (Aust) Pty Ltd, is constructing a state-of-the-art anaerobic digester at Camellia in Sydney's western suburbs.

The \$30m facility will process food wastes and food processing wastes to produce 7 MW equivalent of methane gas and high nutrient organic fertilisers. It will have the capacity to process 82,000 tonnes per year of delivered waste (about 20,000 dry tonnes of digestible solids), representing about 10% of available organic waste in Sydney. Preliminary design work is also being carried out to include a 3.2 MW cogeneration unit, which will satisfy the requirements of the plant and export excess electricity into the grid.

The patented German BTA pre-treatment process already used in Europe and North America has been combined innovatively with Australian technology. The plant is scheduled for completion in October 2002 and should be in operation by the end of the year.

### Wind energy

Wind energy is the fastest developing renewable energy source in Australia. This trend follows the growth in wind farms in other parts of the world. Europe is the leader in wind energy — since 1993 the market for wind turbines has grown by more than 40% per year. A wind turbine was first used to generate electricity in Denmark in 1891, while Australia's first commercial wind farm, at Ten Mile Lagoon near Esperance in Western Australia, has been operating for only about 20 years. Until recently, the share of wind energy in Australia's total energy consumption was very small, with just 72 MW installed by the end of 2001. The Australian Wind Energy Association (AusWEA) expects installed wind generation capacity to triple by 2002, with 500 MW of wind projects currently at various stages of planning and development. There is keen interest in developing wind farms in most states, and wind energy's share in electricity generation is set to increase markedly, with annual growth estimated to be about 25% from 1998–99 to 2019–20. This compares to a 2.3% annual growth rate for total energy consumption (ABARE 2001).

There are abundant wind energy resources worldwide, estimated to be about 53,000 terrawatt hours (TWh) or more than four times the world's entire electricity consumption of 14,396 TWh in 1998 (world electricity production is predicted to be 27,325 TWh by 2020). This was reported in *Wind Force 10*, a plan prepared by an international alliance to achieve 10% of the world's electricity from wind power by 2020. Greenpeace and AusWEA are members of this alliance, and have launched an initiative to build

an Australian wind-power manufacturing industry and install 5,000 MW of wind energy capacity in Australia by 2010 — a 50-fold increase in capacity in 10 years. This target is equivalent to approximately 15,000 GWh of electricity each year, meeting the needs of 2.5 million average Australian homes (Blue Wind Energy 2002).

Why is there such impetus to grow wind energy capacity? Australia has among the best wind resources in the world and wind energy has become the cheapest renewable energy technology. Its current cost is only two to three cents more per kWh than the national electricity market pool prices, and this premium is reducing. Wind energy integrates well into the electricity grid, it is a proven technology and involves a short construction period. High quality modern wind generators are reliable, having an availability factor of 98%, and run during most hours of the year. This availability factor is beyond that of other electricity generating technologies.

Proponents of wind energy claim that it has many environmental advantages over other renewable sources. It is estimated by AusWEA that achieving the 5,000 MW target would cut Australia's total greenhouse gas emissions by more than 15 Mt or 3.3% of the nation's total 1999 emissions. Wind energy is an advancing technology and yields the most power per installed MW of capacity. It uses land resources sparingly, with generators and access roads occupying less than 1% of the area in a typical wind farm. In this respect a wind generator, using 36 square metres or 0.0036 hectares to produce 1.2 and 1.8 MWh per year, compares favourably to solar cells requiring almost 400 times the area to produce the same amount of electricity. However, the relative land requirements of wind farms and solar installations depend on site-specific factors. While wind farms can be integrated with some land uses (e.g. grazing) as part of a multiple land use approach, they are not compatible with other land use options (e.g. farm forestry). Conversely, in some situations solar cells can be installed on buildings with no net requirement for land.

As well as producing zero pollutants (no waste products), wind energy generators have among the lowest energy 'payback periods'. The energy produced by a wind

generator throughout its 25-year lifetime (in an average location) is 80 times larger than the amount of energy used to operate, dismantle and recycle it. In other words, on average, it takes only two to three months for a wind generator to recover all the energy required to build and dispose of it.

Other potential benefits of wind energy include enhancement of a clean and green image of the region and the potential for enrichment of habitat and re-establishment of indigenous vegetation. A better understanding of agriculturally impoverished flora and fauna species can be acquired through the process of assessing environmental impacts of wind farm proposals.

As with other energy sources, there are some adverse environmental impacts associated with the use of wind energy. While it is technically possible to have wind turbines on every hill, it would not be socially acceptable. Wind generators obviously have to be highly visible since they must be located in windy, open terrain to be effective. The loss of visual amenity is a critical issue in community acceptance of the high growth plans being proposed by wind energy developers, particularly in areas of great natural beauty such as those in coastal Victoria. Other issues are the impact on rare and endangered species such as the migratory orange-bellied parrots that are protected by Federal legislation, neighbours affected by noise and change in land values, radiation and interference with TV reception. One of the most critical issues is the lack of a coordinated approach on where future wind farms are going to be located.

Objections to some of these impacts are easier to overcome than others. Modern design and materials have greatly reduced the noise created by the turning blades, so that there is now less noise than the disturbance created by vehicle traffic along a highway. While older turbines with metal blades caused television interference in areas near the turbines, such interference from modern turbines is unlikely because many components formerly made of metal are now made from composites.

The impact on populations of birds and bats has been alleviated to a certain extent by developments in the turbines themselves — the bigger the turbine the better from the point of view of both birds and bats. Modern turbines are large, generally ranging from 660 kW to 1.5 MW, and

turn quite slowly, making them far more visible and easy to avoid. The evolution of towers from a steel grid construction to a smooth steel tower has eliminated nesting opportunities for birds directly beneath the rotors, further reducing incidents of bird-strike. However it has been acknowledged that there has been a general lack of information on the migratory habits of Australian bird populations, and more work in this area is needed for the development of wind projects.

It is more difficult to overcome objections concerning land use and visual impact because most of these are subjective. Helping people understand the overall environmental good of wind generated electricity could counteract these concerns; so could a perception that better design, careful choice of turbines, and careful visualisation studies before siting could improve the visual impact of wind farms. There is now substantial experience in minimising the ecological impact of construction work in areas such as coastlines and mountains, or in offshore locations. Furthermore, it is possible to restore the surrounding landscape to its original state after construction, and to reuse, or completely remove, the foundations of wind generators at the end of their useful life.

### Case studies

**Codrington wind farm, Victoria**  
(*EcoGeneration Magazine*,  
August/September 2001)

Codrington is the first fully private investment (project cost was \$30m) in a wind farm in Australia. It was Australia's second largest wind farm at the end of 2001 with a combined capacity of 18.2 MW from 14 turbines. The turbines are mounted on tubular towers 50 metres high. Power is produced at a wind speed of between 10.8 and 90 km/h, and is generated at 690 volts and stepped up to 66,000 volts with a transformer for connection to the electricity grid. The turbines are connected through underground cables before being connected to the local grid. Power generated will be purchased by the electricity retailer Origin Energy for use in its Ecosaver Green Power Product, with any surplus going towards meeting Origin Energy's liability under the MRET.

The site, located on the coast near Port Fairy in south-west Victoria, is owned by two farmers who lease access to Pacific Hydro. The turbines take up less than 1% of the area of the farm, which continues to be used for sheep and cattle grazing, and farm activities are unaffected.

Prior to construction, the project went through a comprehensive consultation process which examined local environmental impacts including birds, flora and fauna, Aboriginal cultural issues and local visual and noise studies, as well as its socioeconomic impacts.

The Codrington wind farm produces enough energy to supply more than 14,000 homes, and it is deemed to have the potential to abate the equivalent of up to 88,000 tonnes of carbon dioxide per year.

**Windy Hill wind farm, Ravenshoe, on the Atherton Tableland in Far North Queensland** (<<http://www.stanwell.com/wind/windfarms/WindyHill>>, last viewed on 21 May 2002)

As a wind farm, Windy Hill is ideally located, with good exposure to prevailing winds and close vicinity to electricity transmission and major load centres. It consists of 20 turbines with a combined capacity of 12 MW, enough to power 3,500 homes. Each turbine is placed on a tubular tower which stands about 46 metres tall. The turbine blades are each 22 metres long and rotate at about 30 revolutions per minute.

The wind farm is built on privately owned farmland used predominantly for dairy and beef farming. Operating the wind farm has minimal impact on the farming activity.

An educational centre, the Power by Nature Centre, to provide detailed information on wind farms and other renewable energy technologies has been opened at Windy Hill. There are displays incorporating state of the art technology to allow visitors to see and interpret wind farm generation and activity as it happens.

The developer Stanwell Corporation Limited began investigating the site through a wind monitoring program in December 1998, and undertook additional studies and consultation on issues such as aesthetics, compatibility with telecommunication systems, noise and impact on wildlife.

Local firms and expertise have been used where possible during the construction and approximately 15% of the total cost of around \$20m were spent on local fabrication and construction. Of the 17 contracting firms, 9 were based in Cairns or the Atherton Tablelands area. Long-term employment was made possible because local people will maintain the turbines.

By replacing non-renewable energy sources such as coal, Windy Hill prevents at least 25,000 tonnes of greenhouse gas emissions per year.

### **Solar thermal and photovoltaic**

Solar energy is Australia's largest energy source: the average amount of solar energy that falls on Australia is about 15,000 times the nation's energy use. In all parts of Australia, except southern Victoria and Tasmania, solar resources are good to very good. Sunlight can be used to generate electricity, provide hot water, and to heat, cool and light buildings.

The much higher cost of solar power installation relative to energy output, compared to other renewable as well as non-renewable energy sources, has been a major limiting factor in its uptake in Australia. A 1.5 kW solar power system has an area of about 11 square metres and generates around 1,800 kWh of electricity. Such a system typically costs around \$20,000. Technological breakthroughs are, however, helping to bring this price down.

By its nature, solar energy is an intermittent and diffuse source. It is not available on cloudy days or at night, and it is not concentrated. Sunlight therefore has to be collected and/or converted for use. A range of commercially proven solar energy technologies is available:

- Solar power systems convert sunlight into electricity, either directly via the photovoltaic effect, or indirectly by first converting the solar energy to heat or chemical energy. The simplest photovoltaic cells power watches and calculators and the like, while more complex systems can light houses and provide power to the electricity grid.

- Concentrating solar power technologies use reflective materials such as mirrors to concentrate the sun's energy. This concentrated energy is then converted into electricity.
- Solar hot water heaters use the sun to heat either water or a heat-transfer fluid in collectors. A typical system will reduce the need for conventional water heating by about two-thirds. High-temperature solar water heaters can provide energy-efficient hot water for large commercial and industrial facilities.

In Australia, solar power has traditionally been used in remote areas where electricity grid is not available. Such systems store electricity in batteries for use when the sun is not shining and are called stand-alone power systems. Telecommunication, for example, railway signalling systems, is a major market. Other industrial markets are also important, including navigational aids, cathodic protection, water pumping, street lighting, and remote refuelling (aviation) installations. Industry accounts for well over half the market. However solar power is now appearing more in urban areas, especially where government rebate (Australian Greenhouse Office's Photovoltaics Rebate Program launched in January 2000) and other assistance help to reduce the cost of installing solar energy systems to consumers.

Solar power systems give off no noise or pollution, making them ideal renewable energy suppliers. Their disadvantages, other than the high cost relative to energy output, lie in their relatively large structures and the reflective materials used by some technologies. These have implications for land use, aesthetics, and visual and other disturbance to the local community and to animals. Because of the advanced technologies and the materials involved, solar systems have relatively high payback period, in terms of the energy they produce and the energy required to produce and to operate them. It would seem that technological development would be the most important determinant in solar energy's uptake and in reducing its negative impacts.

### Solar water heaters in Australia

In 1999, about 5% of Australian households used solar water heaters, with the majority of these systems (92%) using an electric booster. The highest proportion of hot water systems using solar energy occurred in the Northern Territory (44%) and Western Australia (20%)

(ABS 1999). The average amount of hot water that can be gained from solar heating for home use ranges from 50% in southern states to more than 90% in northern Australia. However, energy (and money) saved by a properly sized system is roughly the same across Australia. The initial temperature of the water to be heated is lower in southern states, making energy supplied from the sun more 'valuable' in the heating process.

There are substantial environmental benefits with solar hot water systems. By replacing fossil fuel energy from burning coal or gas with solar energy, solar hot water systems can reduce the amount of greenhouse gas generated. As an example, if one were to replace an electric hot water system with a gas-boosted solar unit, one could reduce the amount of greenhouse gases produced by water heating by over 75%. The annual saving in greenhouse gas emissions would be around two tonnes, which is equivalent to driving a small car from Sydney to Perth and back again. Solar hot water systems may not always be the most environmentally friendly option for heating water, depending on the location and boosting method used. An electric-boosted solar water heater can produce more greenhouse gas emissions than a high-efficiency gas-only water heater in cooler climates where a solar system is more reliant on boosting. This means that replacing a gas water heater with an electric boosted solar water heater may create a detrimental effect on the environment (AGO 2002).

### Case study

**Solar power system on Lord Howe Island and Singleton solar farm** (SEDA through the Australian Institute of Energy web site <<http://www.aie.it>>)

The SEDA owns a solar power system on Lord Howe Island. This 8 kW system is mounted on the airport roof and provides residents of this World Heritage-listed island with clean electricity. The islanders therefore avoid the high cost of generating electricity from diesel, as well as associated air and noise pollution. The Lord Howe Island solar power system is attractive and without adverse environmental impacts, and contributes significantly to the Island's power supplies.

The Singleton solar farm was commissioned in 1998 with the support of a grant from SEDA. Each year the 400 kW capacity farm produces 550,000 kWh of electricity used to supply public demand for Green Power. The clean solar power produced by the farm will eliminate the need to produce 550 tonnes of carbon dioxide each year from the traditional means of electricity production. The Singleton solar farm has been warmly welcomed by the community, as much for the interest it creates as for the environmental benefits it will bring for many years to come.

### Wave power, tidal energy and geothermal energy

Wave power is sourced from winds blowing on oceans, tidal energy by the gravitational pull of the moon on the ocean, and geothermal energy is heat from the earth. These renewable energy resources are clean and sustainable, and all are abundant in Australia. However they are at early stages of research and development, and it may be many years before they become commercially viable.

#### Case study

##### Wave power system on the breakwater at Port Kembla

(<<http://www.energetech.com.au>>)

Australian wave power developer Energetech's wave power system is powered by an oscillating water column driving air back and forth through a turbine mounted on a shoreline structure such as breakwaters. The first 300 kW Energetech system is under construction on the breakwater at Port Kembla. Wave power has enormous potential, with studies suggesting that many billions of dollars could be invested in this form of electricity generation over the next two decades. Energetech's shore-mounted system driving the

novel Denniss Turbine is well regarded by international observers as having the best potential for economic wave energy development (*Australian Energy News*, March 2002).

### The future of renewable energy

Australian governments are strongly supporting the surge in renewable energy development. While renewable energy's share of total energy consumption will remain small relative to non-renewable sources for a long time to come, its capacity is expanding enormously from a small base.

Continuing government funding and support in providing information and practical assistance will facilitate the renewable energy growth. The recent release of the Wind Energy Handbook and guidelines for preparation of an environment impact statement for wind farms are signs of increasing inter-governmental support, beginning at the planning phase for these projects. Businesses are increasingly aware of the economic potentials of renewable energies and are actively building industry capacities and exploring export opportunities. Households are contributing by indicating their preference for 'green electricity' through participating in the Green Power program and installing solar power in their dwellings.

Each renewable energy source has unique characteristics, making them suited to a wide range of purposes, sites and situations. In general they are all better for the environment than non-renewable energy sources, and technological advances will continue to assist in reducing the negative impacts.

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## Introduction

Interacting factors such as the opening up of new land, the development of transport facilities and profitable markets, and technical and scientific achievements, have shaped the evolution of Australian agriculture.

Until the late 1950s, agricultural products accounted for more than 80% of the value of Australia's exports. Since then, that proportion has declined markedly as the Australian economy has become increasingly diverse. The quantity and value of production have expanded in the mining, manufacturing and, in recent years, the service industries. This decline in importance has not been due to a decline in agricultural activity, as agricultural output has increased over this period. The direct contribution of agriculture to gross domestic product has remained steady at around 3% throughout the last decade. Australian agriculture is a vital sector occupying a significant place in global rural trade, with wool, beef, wheat, cotton and sugar being particularly important. Australia is also an important source of dairy produce, fruit, rice and flowers.

The major source of statistics on land use, commodity production and livestock numbers in this chapter is the ABS Agricultural Census, conducted each year until 1996–97. Since 1997–98 these data have been collected in the Agricultural Commodity Survey, a large sample survey conducted Australia-wide. The Agricultural Commodity Survey is conducted in place of the census in four years out of five. The last census was conducted in 2001, coinciding with the Census of Population and Housing.

## The agricultural environment

Australia is a relatively flat continent, with mean elevation just exceeding 200 metres. The dominant feature of the continent is the Great Dividing Range which spans the length of the eastern seaboard. There are very few naturally good soils for agriculture. Most are infertile and shallow, with deficiencies in phosphorus or nitrogen. To offset these deficiencies, superphosphate and nitrogenous fertilisers are widely used, particularly on pasture and cereal crops. Fragile soil structure and a susceptibility to waterlogging are other common features of Australian soils, while large areas are naturally affected by salt or acidity. These soil

characteristics restrict particular agricultural activities or rule out agricultural activity altogether.

With the exception of Antarctica, Australia is the world's driest continent. The wet northern summer is suited to beef cattle grazing inland and the growing of sugar and tropical fruits in coastal areas. The drier summer conditions of southern Australia favour wheat and other dryland cereal farming, sheep grazing and dairy cattle (in the higher rainfall areas) as well as beef cattle. Within regions there is also a high degree of rainfall variability from year to year, which is most pronounced in the arid and semi-arid regions. Rainfall variability often results in lengthy periods without rain. The seasonality and variability of rainfall in Australia require that water be stored, and 70% of stored water use (including groundwater) is accounted for by the agricultural sector. Storage ensures that there are adequate supplies all year round for those agricultural activities requiring a continuous supply. Irrigation has opened up areas of Australia to agricultural activities which otherwise would not have been suitable.

Evaporation is another important element of Australia's environment affecting agricultural production. Hot summers are accompanied by an abundance of sunlight. This combination of climatic variables leads to high rates of evaporation. Areas that have been cleared for crop and pasture production tend to coincide with five–nine months of effective rainfall (where rainfall exceeds evaporation) per year. In areas of effective rainfall of more than nine months, generally only higher value crops or tropical crops and fruits are grown, while in areas with effective rainfall of less than five months, cropping is usually restricted to areas that are irrigated.

Since European settlement the vegetation of Australia has altered significantly. In particular, large areas of Australia's forest and woodland vegetation systems have been cleared, predominantly for agricultural activity. The areas that have been altered most are those which have been opened up to cultivation or intensive grazing. Other areas, particularly in the semi-arid regions where extensive grazing of native grasses occurs, now show signs of returning to timber and scrub.

For more detail see the article *Environmental impacts of agriculture* in this chapter, and *Chapter 1, Geography and climate*.

## Land used for agriculture

In spite of Australia's harsh environment, agriculture is the most extensive form of land use. At 30 June 2000, the estimated total area of establishments with agricultural activity in Australia was 455.5 million hectares (ha), representing about 59% of the total land area (tables 16.1 and 16.2). The rest of the Australian land area consists of unoccupied land (mainly desert in western and central Australia), Aboriginal land reserves (mainly located in the Northern Territory), forests, mining leases, national parks and urban areas.

Livestock grazing accounts for the largest area of land use in Australian agriculture. This activity has led to the replacement of large areas of native vegetation by introduced pastures and grasses in the higher rainfall and irrigated areas.

At 30 June 2000, 5% of Australia's agricultural land was under crops, with a further 5% under sown pastures and grasses. This maintains the trend which has seen about 10% of Australia's agricultural land under cultivation each year since the 1980s. Until that time, the area of land

cropped or sown to pastures and grasses had been expanding rapidly. This expansion was facilitated by factors including increased use of fertilisers, improved water supply and reduction in the rabbit population due to myxomatosis.

## Irrigation

The high variability in river flow and annual rainfall, which are features of the Australian environment, means that successful ongoing production of crops and pastures is dependent on irrigation.

Vegetables, fruit (including grapes) and sugar cane are the most intensively irrigated crops, with 78%, 70% and 47% respectively of their total growing areas sown being irrigated. However the total area of land irrigated, about 2.4 million ha in 2000 (table 16.3), represents less than 1% of the total land used for agriculture.

Most irrigated land is located within the confines of the Murray–Darling Basin, which covers parts of New South Wales, Victoria, Queensland and South Australia.

### 16.1 AGRICULTURAL LAND USE

	Area of				Total
	Crops(a)	Sown pastures and grasses	Balance(b)	Area of establishments with agricultural activity		Proportion of Australian land area(c)
	mill. ha	mill. ha	mill. ha	mill. ha	%
1995	17.0	(d)	410.2	463.3	60.2
1996	19.4	17.1	428.7	465.2	60.5
1997	21.1	19.0	422.0	462.2	60.1
1998	21.5	22.8	419.5	463.8	60.3
1999	23.3	22.5	407.9	453.7	59.0
2000	23.8	23.8	407.9	455.5	59.2

(a) Pastures and grasses harvested for hay and seed are included in 'Sown pastures and grasses'. (b) Includes areas of arid or rugged land held under grazing licences but not always used for grazing, and also variable amounts of fallow land. (c) About 769,203,000 ha. (d) Collected in the NT only.

Source: *Agriculture, Australia (7113.0)*.

### 16.2 AREA OF ESTABLISHMENTS WITH AGRICULTURAL ACTIVITY

	NSW	Vic.	Qld	SA	WA	Tas.	NT	Aust.(a)
	mill. ha	mill. ha	mill. ha	mill. ha	mill. ha	mill. ha	mill. ha	mill. ha
1995	60.3	12.7	149.7	56.1	114.0	1.9	68.6	463.3
1996	61.0	12.8	149.7	56.9	114.5	1.9	68.3	465.2
1997	60.9	12.7	149.6	56.2	112.5	1.9	68.3	462.2
1998	60.3	12.7	148.2	57.5	115.8	1.9	67.3	463.8
1999	59.3	12.8	140.3	59.4	113.1	1.9	66.9	453.7
2000	62.1	13.3	145.4	59.9	105.6	1.8	67.5	455.5

(a) Including ACT.

Source: *Agriculture, Australia (7113.0)*.

## 16.3 AREA OF CROPS AND PASTURES IRRIGATED — 1999–2000

	NSW '000 ha	Vic. '000 ha	Qld '000 ha	SA '000 ha	WA '000 ha	Tas. '000 ha	NT '000 ha	ACT '000 ha	Aust. '000 ha
Pastures (native or sown)	265.2	504.9	53.9	57.9	10.5	28.2	4.1	—	924.7
Cereals									
Rice	127.2	(a)	(a)	(a)	—	(a)	—	—	127.2
Other cereals	164.8	(a)	(a)	(a)	2.2	(a)	—	—	167.0
Total	293.9	23.6	53.9	4.4	2.2	1.7	—	—	379.7
Cotton	267.5	(a)	148.8	(a)	*1.0	(a)	(a)	(a)	417.0
Sugar cane cut for crushing	—	(a)	200.2	(a)	1.7	(a)	(a)	(a)	201.9
Vegetables for human consumption	13.9	21.4	27.7	11.0	7.9	17.2	—	—	99.2
Fruit (including nuts)	23.1	23.0	22.7	17.4	6.0	3.0	1.5	—	96.6
Grapevines	25.4	31.0	1.8	49.6	5.1	—	—	—	113.6
All other crops	35.9	8.8	17.6	8.1	1.3	11.9	—	—	83.7
<b>Total</b>	<b>944.1</b>	<b>625.8</b>	<b>547.8</b>	<b>159.1</b>	<b>39.2</b>	<b>62.1</b>	<b>6.0</b>	<b>—</b>	<b>2 384.3</b>

(a) Data not separately collected.

Source: *Agriculture, Australia, 1999–2000* (7113.0).

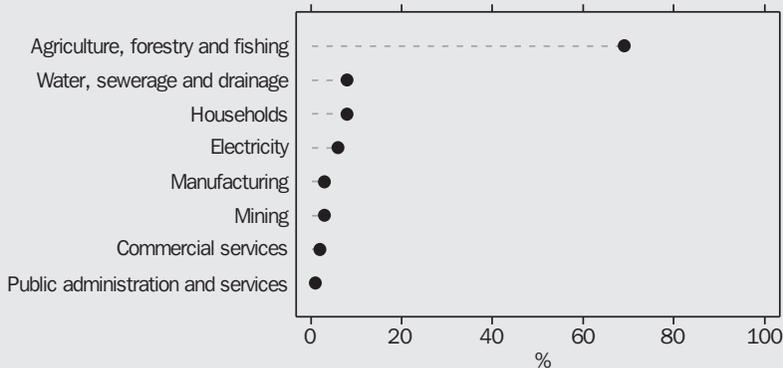
## Environmental impacts of agriculture

This article looks at the impact of agricultural activities on the Australian environment. In particular it examines land and water use, salinity and the adoption of various land management practices.

Land and water are essential for agricultural production. Since European settlement of Australia around 100 million hectares (ha) of

forest and woodland have been cleared, mostly for agricultural production (NFI 1998), and land continues to be cleared for agriculture. Today around 456 million ha, or 59% of land in Australia, are used for agriculture, making it the dominant form of land use. Agriculture is also the largest consumer of water in Australia; in 1996–97 it accounted for 15,502 gigalitres or 70% of total water use (graph 16.4).

### 16.4 WATER USE — 1996–97



Source: ABS 2000.

The combined impacts of land and water use for agricultural production have been substantial. For example:

- The removal of native vegetation and the introduction of exotic species have contributed to the extinction and decline of many species of Australian wildlife (Hamblin 2001).
- The construction of dams and diversion of water from rivers have greatly altered water flows, reducing the amount of water flowing down rivers, and have changed the times of peak flows (ABS 2001b).
- There has been a deterioration of soil and water quality in many areas.

Tables 16.5 and 16.6 show the area affected by three types of land degradation, as well as their estimated annual cost to agricultural production. Water quality is discussed in an article following *Chapter 14, Environment*, and hence it will not be considered here.

Salinity, sodicity and acidity are all naturally occurring conditions of Australian soils, but these have been exacerbated by agricultural activities. Sodicity is a condition in which the sodium levels of the soil increase to the extent that they affect the physical properties of the soil. Sodic soils are prone to waterlogging. Acidity is a condition in which the concentration of hydrogen ions increases in the soil, which can cause the death of many plant species. Salinity is the build-up of salts in the soil, which also can kill plants.

In recent years salinity has gained prominence as a national environmental issue (see for example, MDBC 1999; Commonwealth of Australia 2000; NLWRA 2001). Early results from the 2001 ABS Agricultural Census show that around 26,000 farmers have salinity and/or are managing salinity on their properties. Table 16.7 shows that the proportion of farms reporting managing for salinity is greater than those reporting salinity, which is an indication that farmers are taking action to prevent or reduce the impact of salinity on agricultural land.

#### 16.5 EXTENT OF SALINITY, SODICITY AND ACIDITY — 2000

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha
Saline soils	89	287	62	472	2 169	26	—	—	<b>3 206</b>
Sodic soils	24 713	8 008	42 191	7 635	14 615	504	11 533	1	<b>109 219</b>
Acidic soils	4 095	2 754	6 192	20	4 602	677	2 973	4	<b>21 317</b>

Source: NLWRA 2002.

#### 16.6 ANNUAL COST(a) TO AGRICULTURE OF SALINITY, SODICITY AND ACIDITY — 2000

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Saline soils	6.3	18.5	10.2	39.1	111.0	1.9	—	—	187.0
Sodic soils	280.3	342.5	180.3	126.4	89.7	12.3	3.0	—	1 034.6
Acidic soils	378.7	471.1	232.5	2.9	226.1	214.8	58.2	0.2	1 584.5
<b>Combined cost(b)</b>	<b>624.1</b>	<b>757.4</b>	<b>392.9</b>	<b>162.0</b>	<b>341.6</b>	<b>220.3</b>	<b>61.1</b>	<b>0.2</b>	<b>2 559.5</b>

(a) For a description of method used to derive see NLWRA 2002. (b) Salinity, sodicity and acidity constraints often coincide, so the aggregate affect is less than sum of each constraint.

Source: NLWRA 2002.

### 16.7 FARMERS REPORTING SALINITY OR SALINITY MANAGEMENT — 2000–01

	Salinity	Salinity management
	%	%
New South Wales	6	16
Victoria	11	20
Queensland	3	8
South Australia	13	21
Western Australia	37	37
Tasmania	5	8
Northern Territory	3	6
Australian Capital Territory	3	10
<b>Australia</b>	<b>10</b>	<b>17</b>

Source: ABS data available on request, preliminary data from the 2000–01 Agricultural Census.

Various activities have been used by farmers to manage or prevent salinity. The type of management adopted depends on the nature of the farm: cattle farmers adopt practices different from those used by orchardists. Three commonly promoted salinity management actions are the planting of lucerne, salt-tolerant pastures and trees. Others include pumping groundwater (to lower water tables) and digging drains, especially where the salinity is severe or high value crops (e.g. grapes) are involved.

The impacts of salinity extend beyond the agriculture sector. Roads, houses and water supply infrastructure can all be degraded by it. Over four states (New South Wales, Victoria, South Australia and Western Australia) the road, buildings and/or water supply infrastructure of 68 towns are at risk of damage from salinity. Biodiversity is also at risk through the loss and degradation of native vegetation. Across Australia around 630,000 ha of native vegetation and 80 wetlands, including wetlands of international importance, are at risk (NLWRA 2001).

One factor contributing to salinity is the rise in water tables due to increased amounts of water entering underground water bodies from

irrigated land. This ultimately results in increased salt loads entering river systems. Reduced river flows, brought about by the construction of dams, weirs and water diversions, compound the problem as the flow is insufficient to dilute saline groundwater inflows (ABS 1996).

In recent years the area irrigated has increased substantially. Between 1990 and 2000 the area of irrigated land increased by more than half a million ha or 30%. The growth in irrigated area was greatest in Queensland, where an additional 236,000 ha (or 76%) were irrigated in 2000, compared to the area irrigated in 1990 (table 16.8).

Irrigation can also cause a decline in soil structure and water quality, while the method of irrigation used influences the efficiency of water use and impact on the environment (Smith 1998). Impacts on water quality result from the high levels of fertiliser use in conjunction with some irrigation methods. Continued awareness of the need for greater efficiency and technological advancements can be expected to improve land management practices and reduce the decline in the health of land and water assets. For example, there has been a growth in the use of irrigation methods that are more efficient in terms of water delivery. In 2000 around 30% of irrigators reported using spray, micro spray or drip irrigation methods compared to 23% in 1990 (table 16.9).

A number of factors affect the choice of irrigation methods used by farmers. These include cost, available technology, soil type, type of crop, climate and topography. In 1999–2000, furrow or flood irrigation methods were used for nearly 70% of all irrigated land. Flood irrigation, used on the majority of pastures and cereal crops, is popular probably because it is cheaper than the other methods available (Vic SoE 1991). If not managed correctly, furrow and flood irrigation can be highly inefficient and have detrimental effects on the water table and surrounding water bodies. However, for some crops, like rice, it is essential.

### 16.8 IRRIGATED AREA

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	'000 ha								
1990	820	526	312	99	29	44	—	—	<b>1 832</b>
2000	944	626	548	159	39	62	6	—	<b>2 384</b>

Source: ABS 1991; ABS 2001a.

## 16.9 IRRIGATION METHODS

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	%	%	%	%	%	%	%	%	%
1990									
Spray method (excluding micro spray)	13	8	43	51	26	77	(a)	(a)	20
Drip or micro spray	1	2	4	13	18	3	(a)	(a)	3
Furrow or flood	84	90	46	33	48	11	(a)	(a)	74
Other	2	—	7	3	8	8	(a)	(a)	3
Irrigation methods reported(b)	100	100	100	100	100	100	(a)	(a)	100
2000									
Spray method (excluding micro spray)	11	12	37	44	23	86	26	58	22
Drip or micro spray	3	5	8	33	38	6	68	42	8
Furrow or flood	85	82	54	21	35	8	—	—	70
Other	*1	*—	1	1	4	—	5	—	1
Irrigation methods reported(b)	100	100	100	100	100	100	100	100	100

(a) Not collected. (b) Percentages may not add to 100 due to rounding individual values.

Source: ABS 1991; ABS 2001a.

## 16.10 USE OF STUBBLE MANAGEMENT PRACTICES — 2000–01

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
	'000	'000	'000	'000	'000	'000	'000	'000
	ha	ha	ha	ha	ha	ha	ha	ha
Most stubble removed by baling or heavy grazing	315	168	167	337	804	7	1	—
Stubble left intact (no cultivation)	862	257	592	545	2 756	3	—	—
Stubble ploughed into soil	1 600	487	740	511	357	13	—	—
Stubble removed by cool burn	745	248	60	263	393	4	—	—
Stubble removed by hot burn	841	466	23	389	469	3	—	—
Stubble mulched	378	290	279	467	105	2	—	—
All other methods	152	70	85	147	216	1	—	—
<b>Total area treated</b>	<b>4 893</b>	<b>1 987</b>	<b>1 948</b>	<b>2 659</b>	<b>5 099</b>	<b>33</b>	—	—

Source: *Agricultural Commodities, Australia, 2000–01* (7121.0); ABS data available on request, preliminary data from the 2000–01 *Agricultural Census*.

In 1999–2000, the spray method was used on approximately 22% of irrigated land. Spray irrigation has a higher installation cost and can be used for the application of slightly more saline water (generally from groundwater sources). The spray method produces less waterlogging than the flooding method, but is ineffective in high winds and can sometimes wash fertilisers from crops. Drip irrigation, also known as micro or trickle irrigation, is used on a smaller scale than other methods, and accounted for approximately 8% of irrigated land in 1999–2000. It is used on high value crops like grapes, citrus and tomatoes. Although the drip method is highly efficient, as evaporation losses are substantially reduced, it has higher installation and maintenance costs. Other technological innovations, such as laser levelling, have improved water efficiency (Smith 1998).

Many other land management practices can have environmental benefits. The planting of trees and fencing of native vegetation are

two obvious examples (see ABS 2001a; *Chapter 14, Environment*). These protect land and water quality as well as creating habitat for native animals and plants. Less obvious practices also help to make a difference. For example, stubble management methods can influence rates of soil erosion and the amount of organic matter retained in the soil (stubble is what remains of plants after crops have been harvested). In 2000–01 around 5 million ha of stubble were left intact (table 16.10). This stubble would have protected the soil from erosion by wind and rain.

The increasing use of more efficient irrigation methods, the implementation of salinity management activities and adoption of other land use practices are an indication that farmers are more aware of the environmental impact of their activities than in the past. Much of the impact on the environment is the result of historical land management decisions, and has taken decades to manifest. The impact of

agriculture on the environment can be reduced and there are a number of community groups and government programs dedicated to

achieving this. However, it is likely that the damage already done will take decades to abate and repair.

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## Characteristics of Australian farms

In 1999–2000 there were 146,371 establishments undertaking agricultural activity with an estimated value of agricultural operations greater than \$5,000. For the majority of these establishments (144,560) their primary activity was agriculture. While the remainder were undertaking some form of agricultural activity, their main activity was not in agriculture. The majority of agricultural establishments were engaged in either beef cattle farming (35,236), mixed grain/sheep/beef farming (18,232), grain growing (16,463), sheep farming (14,302) or dairy cattle farming (13,820).

Table 16.11 provides information on the numbers and types of establishments undertaking agricultural activity at 30 June 2000.

## Employment in agriculture

The number of people employed in agriculture decreased in 2001 to 402,000 persons. The majority of persons employed in agriculture were male (67%). Around 79% of women employed in agriculture were married, compared with 69% of men.

Table 16.12 shows the average employment in agriculture and services to agriculture for each of the years 1996–2001.

## 16.11 ESTABLISHMENTS UNDERTAKING AGRICULTURAL ACTIVITY — At 30 June 2000

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
<b>Agriculture</b>									
Plant nurseries	974	395	754	131	163	56	16	6	2 496
Cut flower and flower seed growing	295	260	206	131	177	59	6	—	1 134
Vegetable growing	986	1 099	1 455	573	584	602	13	2	5 313
Grape growing	1 175	2 233	*143	2 406	474	85	3	3	6 522
Apple and pear growing	233	374	117	118	246	140	—	1	1 229
Stone fruit growing	465	250	104	252	165	*20	—	—	1 257
Kiwi fruit growing	1	**	*3	—	**	—	—	—	*20
Fruit growing n.e.c.	2 001	498	2 267	571	309	57	90	—	5 794
Grain growing	4 206	3 181	2 112	3 653	3 282	24	3	1	16 463
Grain-sheep/beef cattle farming	7 205	3 380	1 730	2 757	3 113	46	—	1	18 232
Sheep-beef cattle farming	4 036	2 471	804	939	618	363	—	22	9 253
Sheep farming	5 457	4 521	576	1 567	1 438	719	—	24	14 302
Beef cattle farming	10 806	8 528	11 458	990	2 131	1 088	211	24	35 236
Dairy cattle farming	1 943	8 133	1 842	770	386	743	1	2	13 820
Poultry farming (meat)	351	197	145	78	64	10	1	—	845
Poultry farming (eggs)	131	108	128	47	73	13	5	2	508
Pig farming	328	193	340	147	111	24	1	—	1 145
Horse farming	770	452	499	109	126	59	2	4	2 021
Deer farming	*56	*75	**	*29	**	*16	—	—	196
Livestock farming n.e.c.	415	*262	*202	*118	107	*54	1	—	1 158
Sugar cane growing	489	—	4 534	—	*5	—	—	—	5 029
Cotton growing	490	—	484	—	1	—	—	—	974
Crop and plant growing n.e.c.	248	369	455	326	61	146	8	1	1 614
<b>Total</b>	<b>43 063</b>	<b>36 988</b>	<b>30 367</b>	<b>15 712</b>	<b>13 653</b>	<b>4 324</b>	<b>361</b>	<b>93</b>	<b>144 560</b>
<b>Other industries</b>	<b>591</b>	<b>316</b>	<b>331</b>	<b>193</b>	<b>265</b>	<b>106</b>	<b>6</b>	<b>3</b>	<b>1 811</b>
<b>Total</b>	<b>43 654</b>	<b>37 304</b>	<b>30 698</b>	<b>15 905</b>	<b>13 917</b>	<b>4 430</b>	<b>367</b>	<b>96</b>	<b>146 371</b>

Source: *Agricultural Commodities, Australia, 1999–2000 (7121.0)*.

## 16.12 EMPLOYED PERSONS(a) IN AGRICULTURE AND RELATED SERVICES TO AGRICULTURE, Annual averages

	Married males '000	All males '000	Married females '000	All females '000	Persons '000
1996	184.2	269.5	98.7	120.9	390.5
1997	191.1	278.2	102.8	126.2	404.4
1998	181.7	268.0	97.0	124.5	392.5
1999	186.1	278.7	101.6	129.1	407.7
2000	190.0	279.7	100.4	129.5	409.2
2001	185.3	269.7	103.8	132.0	401.7

(a) The estimates of employed persons include persons who worked without pay for at least one hour per week in a family business or on a farm (i.e. unpaid family helpers). Persons who worked in another industry and in agriculture are classified to the industry of predominant activity.

Source: ABS data available on request, *Labour Force Survey*.

## Gross value of agricultural commodities produced

The contribution of agriculture to the Australian economy can be measured in a number of ways. The most direct measurement available is the gross value of agricultural production for the year ending 30 June. In 1999–2000, the gross value of agricultural production in current prices was \$30.2b.

Table 16.13 shows the gross value of agricultural commodities produced for the years 1994–95 to 1999–2000. The values shown are the values of recorded production at the wholesale prices realised in the principal marketplace. Also shown are chain volume indexes of the value of production, which provide an indication of the change in value after the direct effects of price change are eliminated. Chain volume measures are discussed in the section *Chain volume or 'real' GDP* in *Chapter 29, National accounts*.

**16.13 AGRICULTURAL COMMODITIES PRODUCED, Gross value and chain volume index(a)**

	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
GROSS VALUE OF COMMODITIES PRODUCED (CURRENT PRICES) (\$m)						
Crops						
Barley for grain	622.2	1 276.4	1 308.0	1 032.0	835.5	864.8
Oats for grain	165.8	289.4	226.6	223.3	156.6	118.4
Wheat for grain	2 127.2	4 304.7	4 877.9	3 801.5	4 011.0	4 831.2
Other cereal grains	580.2	733.0	764.9	702.1	810.9	750.4
Sugar cane cut for crushing	1 207.7	1 168.7	1 186.4	1 247.7	1 044.1	881.9
Fruit and nuts	1 426.4	1 498.8	1 667.8	1 586.8	1 763.0	1 761.1
Grapes	511.0	714.4	721.4	998.2	1 200.1	1 118.2
Vegetables	1 491.6	1 616.1	1 662.3	1 812.3	1 864.4	1 861.9
All other crops(b)	2 999.6	3 729.0	3 580.5	3 904.3	4 540.7	4 735.1
<i>Total</i>	<i>11 131.7</i>	<i>15 330.5</i>	<i>15 995.8</i>	<i>15 308.2</i>	<i>16 226.3</i>	<i>16 923.0</i>
Livestock slaughterings and other disposals						
Cattle and calves	4 213.5	3 575.9	3 597.0	4 138.2	4 476.6	5 050.9
Sheep and lambs	836.8	1 035.7	1 042.6	1 066.2	1 053.5	1 053.9
Pigs(c)	630.6	597.8	764.8	709.8	689.7	791.7
Poultry(c)	902.0	948.1	932.0	1 053.6	1 018.5	1 031.0
<i>Total(d)</i>	<i>6 618.8</i>	<i>6 192.7</i>	<i>6 376.3</i>	<i>6 991.9</i>	<i>7 255.8</i>	<i>7 946.9</i>
Livestock products						
Wool	3 319.3	2 559.7	2 621.2	2 753.9	2 141.0	2 149.2
Milk(e)	2 419.1	2 848.3	2 808.9	2 817.0	2 899.6	2 845.2
Eggs(e)	230.6	256.9	274.9	347.5	337.1	321.4
<i>Total(e)(f)</i>	<i>5 995.0</i>	<i>5 707.3</i>	<i>5 758.7</i>	<i>5 957.8</i>	<i>5 411.8</i>	<i>5 353.7</i>
<b>Total value(g)</b>	<b>23 754.8</b>	<b>27 242.0</b>	<b>28 130.8</b>	<b>28 258.0</b>	<b>28 893.9</b>	<b>30 223.6</b>
CHAIN VOLUME INDEX OF GROSS VALUE OF COMMODITIES PRODUCED (Index number)						
Crops						
Barley for grain	57.9	115.7	133.1	127.8	119.0	100.0
Oats for grain	82.6	167.7	147.9	145.8	160.8	100.0
Wheat for grain	37.3	68.6	95.3	76.1	89.2	100.0
Other cereal grain	63.2	81.4	93.0	81.7	103.5	100.0
Legumes for grain	59.6	102.5	102.8	93.1	100.4	100.0
Oilseeds	15.8	25.8	33.0	36.4	75.7	100.0
Sugar cane cut for crushing	85.1	86.2	93.2	98.5	92.6	100.0
Cotton	51.1	59.0	92.6	100.0	96.7	100.0
Nursery production	88.8	96.7	81.8	72.2	94.2	100.0
Fruit and nuts	84.3	84.6	91.1	87.9	86.0	100.0
Grapes	65.5	92.6	80.1	79.1	97.4	100.0
Vegetables	80.3	89.0	88.6	91.6	96.3	100.0
All other crops(b)	68.8	102.0	76.7	86.3	97.5	100.0
<i>Total</i>	<i>56.9</i>	<i>77.8</i>	<i>89.6</i>	<i>84.1</i>	<i>93.6</i>	<i>100.0</i>
Livestock slaughterings and other disposals						
Cattle and calves	85.3	86.4	92.9	96.8	99.5	100.0
Sheep and lambs	89.3	87.9	88.3	91.5	92.8	100.0
Pigs(c)	96.0	97.0	95.2	94.4	99.5	100.0
Poultry(c)	76.7	80.1	82.8	91.7	95.5	100.0
<i>Total(d)</i>	<i>85.7</i>	<i>86.8</i>	<i>90.7</i>	<i>94.9</i>	<i>97.8</i>	<i>100.0</i>
Livestock products						
Wool	104.6	98.7	104.6	98.4	98.1	100.0
Milk(e)	75.7	80.4	83.2	87.0	93.8	100.0
Eggs(e)	97.2	95.6	97.3	98.8	103.9	100.0
<i>Total(e)(f)</i>	<i>89.5</i>	<i>89.0</i>	<i>93.1</i>	<i>92.7</i>	<i>96.0</i>	<i>100.0</i>
<b>Total(g)</b>	<b>69.9</b>	<b>82.0</b>	<b>90.6</b>	<b>88.3</b>	<b>95.1</b>	<b>100.0</b>

(a) Chain volume indexes are compiled by linking together (compounding) movements in volumes, calculated using the average prices of the previous financial year, and applying the compounded movements to the current price estimates of the reference year, which for these estimates is 1999-2000. (b) Includes pastures and grasses. Excludes crops for green feed or silage. (c) Excludes pigs and poultry in Tas. and NT, prior to 1997-98. (d) Excludes pigs and poultry in NT, prior to 1997-98. (e) Includes honey and beeswax. (f) Excludes NT prior to 1997-98. (g) Includes pigs and poultry slaughterings in Tas. and NT, and livestock products in NT.

Source: *Agriculture, Australia (7113.0)*; ABS data available upon request, Australian National Accounts.

## Financial statistics of farm businesses

Estimates of selected financial aggregates of farm businesses are shown in tables and graphs 16.14–16.20. The estimates have been derived from the Agricultural Finance Survey, conducted annually from 1986–87 to 1999–2000.

### Turnover

Turnover is the sum of gross proceeds from the sales of crops, livestock, livestock products and other miscellaneous revenue, and is a good guide to the level of farm business activity. The average

turnover per farm business increased by 2% to \$275,000 during 1999–2000 and was due to an increase in total turnover, since the estimated number of farm businesses had increased for the first time in several years (table 16.16).

In 1999–2000, 24,000 or 23% of Australian farm businesses had a turnover of \$300,000 or more, and contributed 66% of the total turnover of all Australian farms. Their average turnover was \$779,000 and the average cash operating surplus (a measure of profitability) was \$153,000. The farm business profit margin (the ratio of cash operating surplus to turnover) for these businesses was 20%.

#### 16.14 FARM BUSINESSES, Selected financial aggregates

	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
	\$m	\$m	\$m	\$m	\$m	\$m
Sales from crops	9 804.2	13 159.6	13 581.2	13 493.1	13 564.3	13 110.8
Sales from livestock	6 279.1	6 339.7	5 964.7	5 922.0	6 373.4	7 300.9
Sales from livestock products	5 596.3	4 975.1	5 403.3	5 556.5	4 986.5	5 143.7
Turnover	23 516.3	26 724.9	27 122.3	27 300.1	27 606.6	28 525.5
Purchases and selected expenses	13 517.0	14 948.6	15 692.3	15 472.4	15 908.7	16 642.2
Value added(a)	9 768.1	11 185.3	10 797.4	12 034.4	12 181.4	12 817.1
Adjusted value added(b)	8 234.3	9 552.5	9 103.2	10 145.0	10 191.0	10 731.2
Gross operating surplus(a)	6 006.0	7 176.6	6 588.3	7 608.1	7 359.1	7 961.5
Interest paid	1 508.9	1 666.7	1 719.9	1 595.1	1 645.3	1 866.3
Cash operating surplus(c)	4 835.7	6 429.3	5 906.3	6 091.7	5 529.1	5 587.2
Net capital expenditure	2 090.8	2 307.9	2 480.7	2 624.7	2 573.1	2 197.1
Gross indebtedness	18 267.7	19 592.7	20 464.2	21 630.8	24 295.4	26 195.4

(a) Includes an estimate for the increase (or decrease) in the value of livestock. (b) The estimate of value added less the estimates of rates and taxes, insurance payments and other expenses. (c) Excludes an estimate for the increase (or decrease) in the value of livestock.

Source: *Agriculture, Australia* (7113.0).

#### 16.15 FARM BUSINESSES, Selected financial aggregates — 1999–2000

	NSW(a)	Vic.	Qld	SA	WA	Tas.	Aust.(b)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Sales from crops	4 041.1	2 149.8	3 270.5	1 432.4	1 960.8	191.7	13 110.8
Sales from livestock	2 171.9	1 131.0	2 449.6	595.0	627.8	180.6	7 300.9
Sales from livestock products	1 441.4	1 975.7	517.0	386.3	619.9	201.7	5 143.7
Turnover	8 460.6	5 929.7	6 899.8	2 765.2	3 557.4	675.1	28 525.5
Purchases and selected expenses	5 014.0	3 278.5	3 967.3	1 579.4	2 305.9	372.1	16 642.2
Value added(c)	3 848.9	2 791.0	3 110.4	1 330.4	1 308.6	333.3	12 817.1
Adjusted value added(d)	3 171.0	2 389.8	2 677.0	1 098.0	1 029.5	287.2	10 731.2
Gross operating surplus(c)	2 383.7	1 737.0	1 953.7	847.6	785.8	203.4	7 961.5
Interest paid	553.0	336.4	431.1	225.0	274.1	39.3	1 866.3
Cash operating surplus(e)	1 548.3	1 309.1	1 509.1	512.6	505.5	140.1	5 587.2
Net capital expenditure	582.7	396.5	539.9	255.6	353.2	52.0	2 197.1
Gross indebtedness	7 499.7	4 341.8	6 422.9	3 093.2	4 029.0	610.0	26 195.4

(a) Includes ACT. (b) Includes NT. (c) Includes an estimate for the increase (or decrease) in the value of livestock. (d) The estimate of value added less the estimates of rates and taxes, insurance payments and other expenses. (e) Excludes an estimate for the increase (or decrease) in the value of livestock.

Source: *Agriculture, Australia, 1999–2000* (7113.0).

At the other end of the scale, 19,000 farms (18%) had a turnover of less than \$50,000. These farm businesses contributed only 2% of the total turnover, at an average of \$33,000. These farms had an estimated average cash operating surplus of only \$26 per farm, which equated to a farm business profit margin of 0.1%.

In 1999–2000 the overall farm business profit margin was 20%, which was the same as for 1998–99 (graph 16.17).

## Gross Indebtedness

Australian farm businesses owed a total of \$26.2b at 30 June 2000 (table 16.18), an 8% increase on the total owing at end June 1999. The aggregate debt has risen steadily from \$11.5b in 1986–87 when the current series of agricultural finance surveys began. There was, however, a wide range of debt levels among individual farm businesses, with a third of all farm businesses having a debt of less than \$22,000 (with 20% reporting no debt), a third owing between \$22,000 and \$200,000 and a third owing more than \$200,000. Overall, the median debt per farm business was \$87,000 at 30 June 2000. The total interest bill for Australian farm businesses, at \$1.9b, was 13% higher than in 1998–99.

**16.16 FARM BUSINESSES, By size of turnover**

	Number of farm businesses				Total turnover			
	1996–97	1997–98	1998–99	1999–2000	1996–97	1997–98	1998–99	1999–2000
	'000	'000	'000	'000	\$m	\$m	\$m	\$m
Less than \$50,000	20.4	22.5	20.0	19.2	618.6	620.9	607.2	625.1
\$50,000–\$99,999	21.4	20.2	18.7	18.7	1 609.0	1 562.6	1 440.5	1 488.4
\$100,000–\$149,999	13.8	13.3	15.0	16.1	1 787.3	1 666.2	1 887.2	1 944.4
\$150,000–\$199,999	12.0	11.6	11.2	11.7	2 170.9	2 064.9	1 993.9	2 138.9
\$200,000–\$249,999	9.7	6.7	8.0	8.3	2 184.8	1 514.8	1 830.6	1 886.5
\$250,000–\$299,999	6.0	5.0	5.3	5.5	1 699.8	1 398.2	1 470.9	1 528.5
\$300,000 and over	22.9	25.0	24.2	24.3	17 051.9	18 472.5	18 376.4	18 913.8
<b>Total</b>	<b>106.1</b>	<b>104.3</b>	<b>102.5</b>	<b>103.8</b>	<b>27 122.3</b>	<b>27 300.1</b>	<b>27 606.6</b>	<b>28 525.5</b>

Source: *Agriculture, Australia* (7113.0).

**16.17 FARM BUSINESSES, Profit margins(a)**



(a) Profit margin is derived before allowing for any drawings taken by directors of unincorporated businesses.

Source: *Agriculture, Australia* (7113.0).

Graph 16.19 shows that the average debt to asset ratio for agricultural businesses has continued its slow downward trend of recent years.

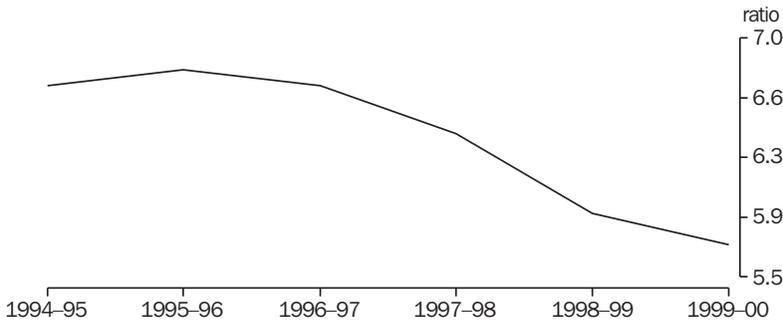
Graph 16.20 shows a decrease in the average interest coverage of agricultural businesses, from 4.4 times in 1998–99 to 4.0 times in 1999–2000. This reflects the impact of a greater increase in interest paid compared to cash operating surplus.

**16.18 FARM BUSINESSES, Aggregate and mean gross indebtedness**

30 June	Aggregate	Average per farm business
	\$m	\$
1995	18 267.7	170 266
1996	19 592.7	180 723
1997	20 464.2	192 815
1998	21 630.8	207 456
1999	24 295.4	237 012
2000	26 195.4	252 327

Source: Agriculture, Australia (7113.0).

**16.19 FARM BUSINESSES, Average debt to asset ratio(a)**



(a) The debt to asset ratio is the total value of assets at 30 June divided by gross indebtedness at 30 June.

Source: Agriculture, Australia (7113.0).

**16.20 FARM BUSINESSES, Average interest coverage(a)**



(a) The interest coverage is the total of cash operating surplus and interest paid divided by interest paid at 30 June.

Source: Agriculture, Australia (7113.0).

## Crops

Table 16.21 shows the area of crops in the states and territories of Australia since 1880–81, and table 16.22 is a summary of the area, production and gross value of the principal crops in Australia over recent years.

### Cereal grains

In Australia, cereals are divided into autumn–winter–spring growing (winter cereals) and spring–summer–autumn growing (summer cereals). Winter cereals such as wheat, oats, barley and rye are usually grown in rotation with some form of pasture such as subterranean clover, medics or lucerne. In recent years, alternative winter crops such as canola, field peas and lupins have been introduced to crop rotation in areas where they had not previously been grown. Rice, maize and sorghum are summer cereals, the latter being grown in association with winter cereals in some areas. In northern Australia there are two rice growing seasons.

### Wheat

Wheat is Australia's largest crop. It is produced in all states but primarily on the mainland in a narrow crescent known as the wheat belt. Inland of the Great Dividing Range, the wheat belt stretches in a curve from central Queensland through New South Wales, Victoria and southern South Australia. In Western Australia, the wheat belt continues around the south-west of the state and some way north, along the western side of the continent (see map 16.23).

Final estimates for the 1999–2000 season show that wheat production increased by 15% over the 1998–99 season to a record 24.8 million tonnes (table 16.24). New South Wales recorded the biggest increase in production, up by 31% to 8.6 million tonnes, followed by Victoria which was up by 81% to 2.6 million tonnes. Western Australia remained the biggest producer of wheat with a record state harvest of 9.0 million tonnes.

**16.21 AREA OF CROPS**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha
1880–81	245	627	46	846	26	57	—	—	<b>1 846</b>
1890–91	345	822	91	847	28	64	—	—	<b>2 197</b>
1900–01	990	1 260	185	959	81	91	—	—	<b>3 567</b>
1910–11	1 370	1 599	270	1 112	346	116	—	—	<b>4 813</b>
1920–21	1 807	1 817	316	1 308	730	120	—	1	<b>6 099</b>
1930–31	2 756	2 718	463	2 196	1 939	108	1	2	<b>10 184</b>
1940–41	2 580	1 808	702	1 722	1 630	103	—	2	<b>8 546</b>
1949–50	2 295	1 881	832	1 518	1 780	114	—	4	<b>8 424</b>
1959–60	2 888	1 949	1 184	1 780	2 628	130	1	3	<b>10 564</b>
1969–70	4 999	2 212	2 208	2 290	3 912	98	6	2	<b>15 728</b>
1979–80	5 243	2 243	2 334	2 771	5 281	79	2	1	<b>17 954</b>
1990–91	4 073	2 063	2 872	2 933	5 359	75	6	—	<b>17 382</b>
1991–92	3 846	2 039	2 302	2 920	5 216	76	5	—	<b>16 404</b>
1992–93	3 906	2 258	2 316	3 073	5 668	73	4	1	<b>17 297</b>
1993–94	4 209	2 317	2 394	2 940	6 100	78	5	—	<b>18 043</b>
1994–95	3 432	2 296	2 056	2 991	6 182	77	4	—	<b>17 040</b>
1995–96	4 757	2 439	2 495	3 219	6 419	75	4	—	<b>19 409</b>
1996–97	5 589	2 552	2 685	3 279	6 950	73	5	—	<b>21 133</b>
1997–98	5 648	2 565	2 682	3 290	7 328	78	4	—	<b>21 595</b>
1998–99	6 173	2 749	3 014	3 648	7 597	76	7	—	<b>23 264</b>
1999–2000	6 114	3 081	3 130	3 670	7 691	77	6	—	<b>23 769</b>

Source: *Agriculture, Australia (7113.0)*.

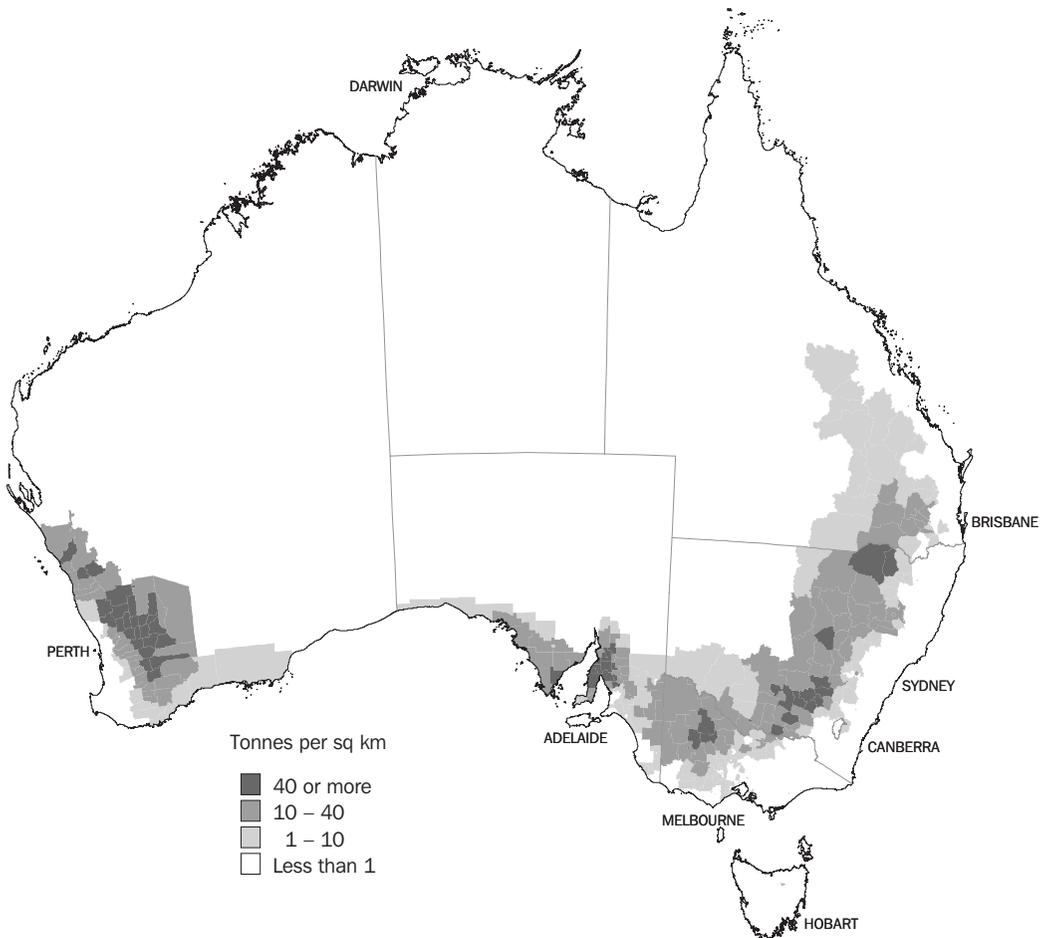
## 16.22 SELECTED CROPS, Area, production and gross value

	Area(a)			Production			Gross value		
	1997-98 '000 ha	1998-99 '000 ha	1999-2000 '000 ha	1997-98 '000 tonnes	1998-99 '000 tonnes	1999-2000 '000 tonnes	1997-98 \$m	1998-99 \$m	1999-2000 \$m
<b>Cereals for grain</b>									
Barley	3 521	3 167	2 596	6 482	5 987	5 032	1 032	835	865
Grain sorghum	507	587	622	1 081	1 891	2 116	183	282	260
Maize	57	64	82	272	338	406	55	60	62
Oats	937	909	584	1 634	1 798	1 118	223	157	118
Rice	147	148	131	1 324	1 362	1 084	341	360	289
Wheat	10 441	11 543	12 168	19 227	21 465	24 757	3 802	4 011	4 831
<b>Lupins for grain</b>	1 425	1 406	1 347	1 561	1 696	1 968	306	242	286
<b>Crops cut for hay</b>									
Cereal crops for hay	401	425	357	1 567	1 827	1 429	194	196	146
Non-cereal crops for hay	59	45	47	170	126	159	20	14	25
<b>Other crops</b>									
Sugar cane cut for crushing	415	402	428	39 531	38 534	38 165	1 248	1 044	882
Tobacco	3	3	3	8	7	8	46	40	49
Cotton lint(b)	381	446	435	564	634	698	1 228	1 353	1 416
Peanuts (in shell)	19	21	20	32	47	40	22	31	27
Soybean	32	55	56	54	107	104	22	44	36
Canola	698	1 247	1 911	855	1 690	2 460	330	643	760
Sunflower	90	195	162	84	220	170	34	81	64
<b>Orchard fruit</b>									
Oranges	n.a.	n.a.	n.a.	500	446	510	258	296	276
Apples	n.a.	n.a.	n.a.	309	334	320	273	321	274
Pears (excluding Nashi)	n.a.	n.a.	n.a.	153	157	156	108	112	72
Peaches	n.a.	n.a.	n.a.	65	66	86	53	65	74
<b>Other fruit</b>									
Bananas	10	11	12	223	225	257	230	266	284
Pineapples	3	3	3	123	131	139	37	39	44
Grapes	78	95	111	1 112	1 266	1 311	998	1 200	1 118
<b>Vegetables</b>									
Carrots	7	7	7	267	257	283	151	167	154
Potatoes	43	41	37	1 372	1 327	1 200	493	438	382
Tomatoes	8	9	8	380	394	414	167	192	190
<b>All crops (excluding pastures and grasses)</b>	<b>21 595</b>	<b>23 264</b>	<b>23 769</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>14 695</b>	<b>15 520</b>	<b>16 316</b>

(a) Area is productive area. (b) Value of cotton includes value of cotton seed.

Source: Agriculture, Australia (7113.0); ABS data available on request, Agricultural Census, Agricultural Commodities Survey, Value of Agricultural Commodities Produced.

## 16.23 WHEAT FOR GRAIN, Production — 1996–97(a)



(a) This map has been generated using small area Agricultural Census data for 1996–97.

Source: AgStats on Floppy Disk (7117.0).

## 16.24 WHEAT FOR GRAIN

	NSW	Vic.	Qld	SA	WA	Tas.	Aust.
AREA ('000 ha)							
1994–95	1 424	822	401	1 395	3 848	1	<b>7 891</b>
1995–96	2 328	853	627	1 519	3 892	1	<b>9 221</b>
1996–97	3 192	963	980	1 535	4 264	2	<b>10 936</b>
1997–98	2 936	857	1 001	1 438	4 205	3	<b>10 441</b>
1998–99	3 174	949	1 139	1 762	4 515	4	<b>11 543</b>
1999–2000	3 425	1 235	1 096	1 850	4 556	6	<b>12 168</b>
PRODUCTION ('000 tonnes)							
1994–95	875	934	225	1 487	5 438	3	<b>8 961</b>
1995–96	4 508	1 921	519	2 724	6 827	4	<b>16 504</b>
1996–97	8 363	2 262	1 980	2 795	7 516	8	<b>22 925</b>
1997–98	5 906	1 503	1 392	2 689	7 725	12	<b>19 227</b>
1998–99	6 563	1 462	1 941	3 310	8 170	18	<b>21 465</b>
1999–2000	8 602	2 642	1 904	2 586	9 004	20	<b>24 757</b>

Source: Agricultural Commodities, Australia (7121.0).

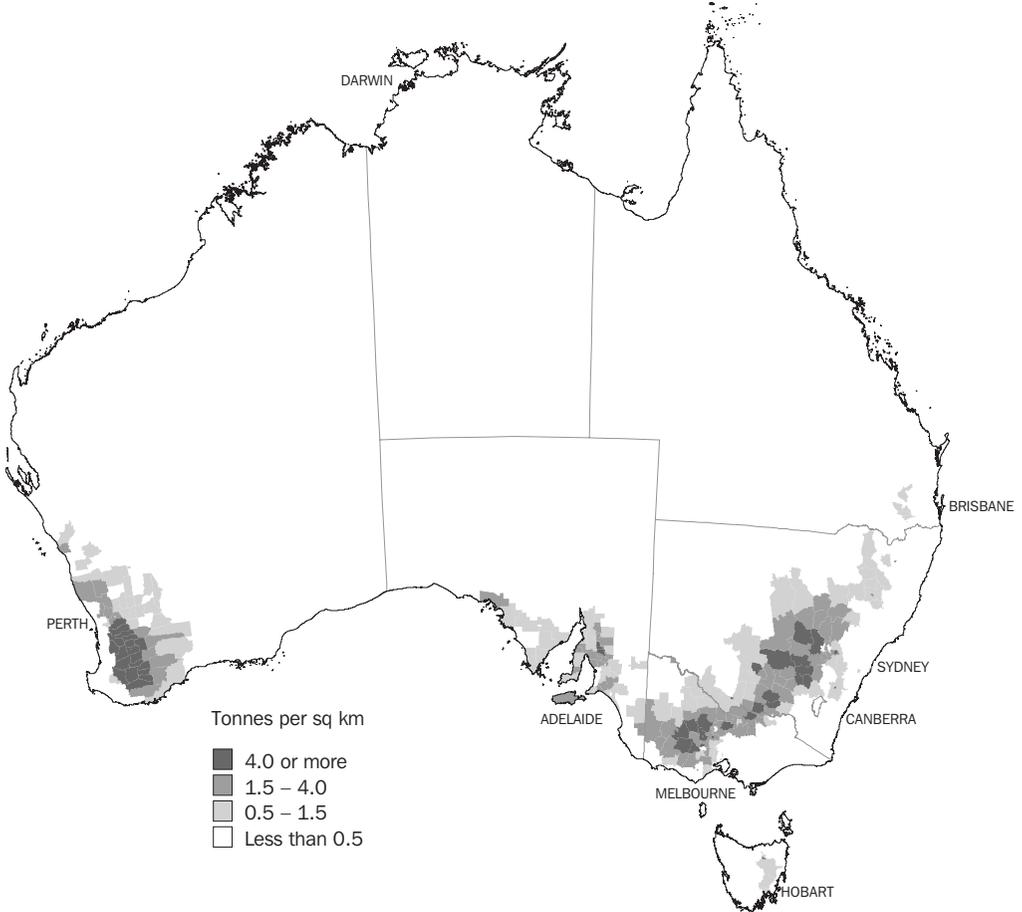
**Oats**

Oats are traditionally grown in moist, temperate regions. However, improved varieties and management practices have enabled oats to be grown over a wider range of soil and climatic conditions. They have a high feed value and produce a greater bulk of growth than other winter cereals; they need less cultivation and respond well to superphosphate and nitrogen. Oats have two main uses: as a grain crop, and as a fodder crop (following sowing, fallow or rough sowing into stubble or clover pastures). Fodder crops can either be grazed and then harvested for grain after removal of livestock, or else mown and baled or cut for chaff.

Map 16.25 shows the production of oats for grain in Australia in 1996–97.

Production of oats fell by 38% to 1.1 million tonnes in 1999–2000, with falls recorded in all states. The largest falls in production were recorded in New South Wales (down by 58% to 284,000 tonnes) and Victoria (down by 35% to 296,000 tonnes), leaving Western Australia as the main producing state with a harvest of 439,000 tonnes (table 16.26).

**16.25 OATS FOR GRAIN, Production — 1996–97(a)**



(a) This map has been generated using small area Agricultural Census data for 1996–97.

Source: AgStats on Floppy Disk (7117.0).

**16.26 OATS FOR GRAIN**

	NSW	Vic.	Qld	SA	WA	Tas.	Aust.
AREA ('000 ha)							
1994–95	375	148	14	95	256	8	<b>897</b>
1995–96	505	187	14	120	300	10	<b>1 136</b>
1996–97	393	175	39	121	316	8	<b>1 052</b>
1997–98	325	172	16	111	305	8	<b>937</b>
1998–99	354	188	18	112	228	8	<b>909</b>
1999–2000	160	138	10	70	199	6	<b>584</b>
PRODUCTION ('000 tonnes)							
1994–95	197	201	3	87	425	11	<b>924</b>
1995–96	711	392	7	162	585	18	<b>1 875</b>
1996–97	607	304	26	156	546	14	<b>1 653</b>
1997–98	488	369	13	153	596	15	<b>1 634</b>
1998–99	669	458	15	178	463	14	<b>1 798</b>
1999–2000	284	296	12	78	439	10	<b>1 118</b>

Source: *Agricultural Commodities, Australia (7121.0)*.

**Barley**

This cereal contains two main groups of varieties, 2-row and 6-row. The former is generally, but not exclusively, preferred for malting purposes.

Barley is grown principally as a grain crop, although in some areas it is used as a fodder crop for grazing, with grain being subsequently harvested if conditions are suitable. It is often grown as a rotation crop with wheat, oats and pasture. When sown for fodder, sowing may take place either early or late in the season, as barley has a short growing period. It may therefore provide grazing or fodder supplies when other sources are not available. Barley grain may be crushed to meal for stock or sold for malting. Map 16.27 shows the production of barley for grain in Australia in 1996–97.

Barley production fell by 16% to 5.0 million tonnes in 1999–2000 (table 16.28). Falls in barley production were recorded in all states except Victoria, where production increased by 37% to 1.2 million tonnes after a poor season in 1998–99.

**Grain sorghum**

The sorghums are summer growing crops which are used in a number of ways: grain sorghum for grain; sweet or fodder sorghum, Sudan grass and, more recently, Columbus grass for silage, green feed and grazing; and broom millet for brooms and brushware. However, the grain is used primarily as stockfeed and is an important source for supplementing other coarse grains for this purpose.

Grain sorghum has been grown extensively only in the last two decades, with Queensland producing around 62% of the harvest (table 16.29). Grain sorghum is the third biggest cereal crop (in terms of production) in Australia despite it only being grown in significant quantities in Queensland and New South Wales.

**Maize**

Maize is a summer cereal demanding specific soil and climatic conditions. Maize for grain is almost entirely confined to the south-east regions and the Atherton Tablelands of Queensland, and the north coast, northern slopes and tablelands, and the Murrumbidgee Irrigation Area in New South Wales. Small amounts are grown for green feed and silage in association with the dairy industry.

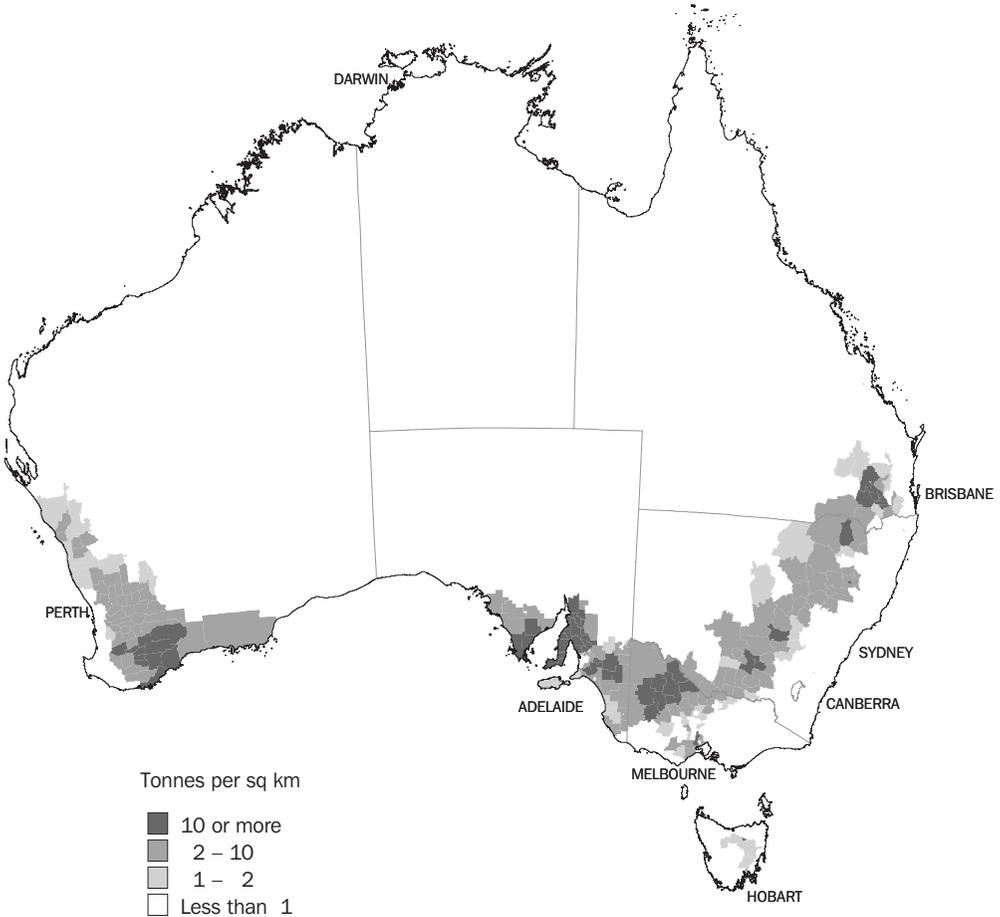
In 1999–2000, maize for grain production increased by 20% to 406,000 tonnes (table 16.30).

**Rice**

Nearly all of Australia's rice is grown in New South Wales, with production centered in the Murrumbidgee and Murray Irrigation areas. It was first grown commercially in 1924–25 in the Murrumbidgee Irrigation Area, which remains the largest individual producing region to this day.

Rice production fell in 1999–2000 by 20% to 1.1 million tonnes (table 16.31).

16.27 BARLEY FOR GRAIN, Production — 1996–97(a)



(a) This map has been generated using small area Agricultural Census data for 1996-97.

Source: AgStats on Floppy Disk (7117.0).

16.28 BARLEY FOR GRAIN

	NSW	Vic.	Qld	SA	WA	Tas.	Aust.
AREA ('000 ha)							
1994-95	410	492	93	882	579	14	2 470
1995-96	593	628	168	964	745	14	3 111
1996-97	668	585	180	1 009	909	15	3 366
1997-98	701	618	135	1 017	1 036	13	3 521
1998-99	638	568	163	975	811	11	3 167
1999-2000	476	585	130	845	550	9	2 596
PRODUCTION ('000 tonnes)							
1994-95	291	448	73	1 159	915	27	2 913
1995-96	1 074	1 342	195	1 851	1 323	38	5 823
1996-97	1 483	1 189	429	1 923	1 635	35	6 696
1997-98	1 365	928	205	2 027	1 926	31	6 482
1998-99	1 247	870	320	2 051	1 469	30	5 987
1999-2000	1 040	1 189	254	1 409	1 117	22	5 032

Source: Agricultural Commodities, Australia (7121.0).

**16.29 GRAIN SORGHUM**

	NSW	Vic.	Qld	SA	WA	Tas.	Aust.(a)
AREA ('000 ha)							
1994-95	161	6	519	(b)	—	(b)	<b>687</b>
1995-96	171	2	597	(b)	—	(b)	<b>770</b>
1996-97	117	1	424	—	1	(b)	<b>544</b>
1997-98	123	3	379	—	1	(b)	<b>507</b>
1998-99	216	**	367	—	*2	(b)	<b>587</b>
1999-2000	200	*1	419	(b)	*2	(b)	<b>622</b>
PRODUCTION ('000 tonnes)							
1994-95	347	8	916	(b)	2	(b)	<b>1 273</b>
1995-96	472	4	1 116	(b)	—	(b)	<b>1 592</b>
1996-97	417	3	1 003	—	2	(b)	<b>1 425</b>
1997-98	382	6	691	—	2	(b)	<b>1 081</b>
1998-99	822	**	1 059	—	*6	(b)	<b>1 891</b>
1999-2000	804	**	1 308	(b)	*2	(b)	<b>2 116</b>

(a) Includes NT. (b) Not collected.

Source: *Agricultural Commodities, Australia (7121.0)*.**16.30 MAIZE FOR GRAIN**

	NSW	Vic.	Qld	SA	WA	Tas.	Aust.(a)
AREA ('000 ha)							
1994-95	21	1	27	(b)	2	(b)	<b>50</b>
1995-96	24	1	31	(b)	—	(b)	<b>56</b>
1996-97	31	1	34	—	1	—	<b>67</b>
1997-98	22	1	34	—	—	—	<b>57</b>
1998-99	27	1	37	**	*—	—	<b>64</b>
1999-2000	22	1	59	(b)	*—	(b)	<b>82</b>
PRODUCTION ('000 tonnes)							
1994-95	145	5	80	(b)	11	(b)	<b>242</b>
1995-96	190	7	114	(b)	1	(b)	<b>311</b>
1996-97	256	7	130	—	5	—	<b>398</b>
1997-98	161	10	97	—	3	—	<b>272</b>
1998-99	186	3	145	**	*4	—	<b>338</b>
1999-2000	178	4	224	(b)	*—	(b)	<b>406</b>

(a) Includes NT. (b) Not collected.

Source: *Agricultural Commodities, Australia (7121.0)*.**16.31 RICE FOR GRAIN**

	NSW	Vic.	Qld	SA	WA	Tas.	Aust.(a)
AREA ('000 ha)							
1994-95	119	(b)	(b)	(b)	(b)	(b)	<b>119</b>
1995-96	136	(b)	(b)	(b)	(b)	(b)	<b>137</b>
1996-97	151	1	(b)	(b)	(b)	(b)	<b>152</b>
1997-98	146	1	(b)	(b)	(b)	(b)	<b>147</b>
1998-99	148	1	(b)	(b)	(b)	(b)	<b>148</b>
1999-2000	131	(b)	(b)	(b)	**	(b)	<b>131</b>
PRODUCTION ('000 tonnes)							
1994-95	1 016	(b)	(b)	(b)	(b)	(b)	<b>1 016</b>
1995-96	965	(b)	(b)	(b)	(b)	(b)	<b>966</b>
1996-97	1 248	6	(b)	(b)	(b)	(b)	<b>1 255</b>
1997-98	1 320	4	(b)	(b)	(b)	(b)	<b>1 324</b>
1998-99	1 357	5	(b)	(b)	(b)	(b)	<b>1 362</b>
1999-2000	1 084	(b)	(b)	(b)	**	(b)	<b>1 084</b>

(a) Includes NT. (b) Not collected.

Source: *Agricultural Commodities, Australia (7121.0)*.

## Vegetables and fruit

### Vegetables

In 1999–2000 the area sown to vegetables was 127,400 ha, which was a slight decrease from the previous year. Potatoes were by far the largest vegetable crop in terms of area and production, accounting for nearly a third of the total area of vegetables planted (tables 16.32 and 16.33).

The area sown to vegetables reached a peak of over 200,000 ha in 1945. It then fell to around 100,000 ha from the mid 1970s to the mid 1980s, but increased towards the end of the 1990s, reaching 131,000 ha in 1995–96 (table 16.32).

### Fruit (excluding grapes)

A wide variety of fruit is grown in Australia, ranging from pineapples, mangoes and pawpaws in the tropics to pome, stone and berry fruits in temperate regions. Table 16.34 shows the number of trees for the main types of orchard fruit, and the area under cultivation for bananas and pineapples.

The most significant crops in terms of gross value of production are bananas, oranges and apples. In 1999–2000 the value of the banana crop increased by 7%, while the value of the orange crop decreased by 7% and the value of the apple crop decreased by 15% (table 16.35). While bananas, oranges and apples remain the principal fruit crops in Australia, some other fruit types have experienced considerable growth in recent years, for example mandarins and strawberries.

**16.32 SELECTED VEGETABLES, Area**

	French and runner beans	Carrots	Onions	Green peas	Lettuces	Potatoes(a)	Pumpkins	Tomatoes	All vegetables
	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha
1994–95	6.1	6.9	5.2	9.8	4.0	37.6	5.4	8.7	<b>129.1</b>
1995–96	7.1	7.6	5.5	8.2	4.7	41.8	6.6	8.6	<b>131.4</b>
1996–97	7.9	7.0	4.8	9.3	4.7	41.1	6.3	8.8	<b>129.7</b>
1997–98	6.6	7.2	5.6	7.0	5.7	42.6	5.9	8.0	<b>130.6</b>
1998–99	5.9	6.5	5.4	6.2	6.2	41.3	7.5	8.5	<b>130.2</b>
1999–2000	6.6	7.0	5.3	5.5	5.2	36.8	9.0	8.3	<b>127.4</b>

(a) Excludes potatoes for seed.

Source: *Agricultural Commodities, Australia (7121.0)*.

**16.33 SELECTED VEGETABLES, Production**

	French and runner beans	Carrots	Onions	Green peas (pod weight)	Lettuces	Potatoes(a)	Pumpkins	Tomatoes
	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes
1994–95	29.4	238.5	200.4	97.9	92.5	1 122.4	76.7	340.0
1995–96	32.0	249.9	244.5	80.8	107.2	1 308.1	96.5	370.9
1996–97	37.6	257.4	196.5	94.2	110.8	1 286.1	87.1	393.1
1997–98	35.6	266.5	218.9	76.0	129.1	1 371.6	84.8	380.1
1998–99	30.4	256.6	224.0	65.7	131.1	1 326.8	87.6	394.4
1999–2000	34.5	283.3	247.1	66.9	151.9	1 199.6	108.8	413.6

(a) Excludes potatoes for seed.

Source: *Agricultural Commodities, Australia (7121.0)*; ABS data available on request, *Agricultural Census, Agricultural Commodities Survey*.

**16.34 SELECTED FRUIT, Number of trees(a) and area**

	Orchard fruit					Area of tropical fruit(b)			All area of fruit and nuts (excluding grapes)
	Apples '000 trees	Apricots '000 trees	Oranges '000 trees	Peaches '000 trees	Pears(c) '000 trees	Plums and prunes '000 trees	Bananas(b) ha	Pineapples(b) ha		ha
1994–95	5 101	642	6 297	1 245	1 317	905	8 281	3 209	<b>128 258</b>
1995–96	5 302	634	6 477	1 296	1 384	902	8 893	2 824	<b>133 461</b>
1996–97	5 656	629	6 736	1 475	1 416	931	9 589	2 668	<b>137 086</b>
1997–98	5 845	569	6 667	1 498	1 381	1 015	10 478	2 762	<b>144 082</b>
1998–99	5 969	565	6 400	1 509	1 401	1 024	11 405	2 821	<b>145 265</b>
1999–2000	6 115	520	6 945	1 972	1 401	1 420	11 730	2 817	<b>154 049</b>

(a) Number of trees six years and over. (b) Bearing area. (c) Excludes Nashi.

Source: *Agricultural Commodities, Australia (7121.0)*; ABS data available on request, *Agricultural Census, Agricultural Commodities Survey*.

**16.35 SELECTED FRUIT, Quantity and value of production**

	Apples	Apricots	Oranges	Peaches	Pears(a)	Plums and prunes	Bananas	Pineapples
QUANTITY OF PRODUCTION ('000 tonnes)								
1994–95	316.6	29.8	517.2	58.7	151.7	21.3	208.1	138.5
1995–96	280.0	21.6	442.1	60.4	156.0	21.4	220.0	127.9
1996–97	353.1	25.9	522.6	72.1	167.6	25.2	199.6	123.0
1997–98	308.9	19.9	499.8	64.8	152.9	26.4	223.0	123.0
1998–99	334.4	21.5	445.8	66.0	156.7	22.7	225.2	131.4
1999–2000	319.7	19.9	510.0	86.0	156.4	24.2	256.9	139.3
GROSS VALUE OF PRODUCTION (\$m)								
1994–95	269.8	28.8	214.8	50.0	73.4	31.9	254.7	43.3
1995–96	305.3	30.7	219.5	50.3	90.7	33.4	224.9	36.4
1996–97	378.4	39.1	256.3	60.1	106.2	38.6	216.6	39.3
1997–98	272.7	31.0	257.9	53.4	107.8	44.1	230.3	37.3
1998–99	321.1	27.9	296.2	65.5	112.4	42.4	266.3	39.4
1999–2000	273.7	31.8	276.4	74.3	72.1	43.4	283.8	43.7

(a) Excludes Nashi.

Source: *Agricultural Commodities, Australia (7121.0)*; *Agriculture, Australia (7113.0)*.

**Grapes**

Grapes are a temperate crop requiring predominantly winter rainfall and warm to hot summer conditions for ripening. Freedom from late spring frosts is essential to prevent the loss of the developing fruit. Grapes are grown for winemaking, drying and, to a lesser extent, for table use. Some of the better known grape producing areas are the Adelaide Hills, Barossa Valley, Clare Valley, Riverland, McLaren Vale and Coonawarra in South Australia; Sunraysia and the

Yarra Valley in Victoria; the Hunter and Riverina in New South Wales; the Swan Valley and Margaret River in Western Australia; and the Tamar Valley and Coal River Valley in Tasmania.

The gross value of grape production for 2000–01 increased by 31% from the previous year, to \$1.5b. Table 16.36 and 16.37 shows the area of vines and the grapes produced by grape variety.

**16.36 VITICULTURE, Area, production and value**

	Area(a)		Production of grapes for		Total production(b)	
	Bearing	Total	Winemaking	Drying	Quantity	Gross value
	'000 ha	'000 ha	'000 tonnes fresh weight	'000 tonnes fresh weight	'000 tonnes fresh weight	\$m
1995–96(c)	65	81	782	248	1 087	714.4
1996–97	72	90	743	136	943	721.4
1997–98	78	99	871	177	1 112	998.2
1998–99	95	123	1 076	119	1 266	1 200.1
1999–2000	111	140	1 111	133	1 311	1 118.2
2000–01	131	148	1 391	90	1 546	1 460.4

(a) At harvest. (b) Includes grapes used for table and other purposes. (c) Excludes NT and ACT.

Source: *Agriculture, Australia (7113.0)*; *Australian Wine and Grape Industry (1329.0)*.

**16.37 VITICULTURE, Area and production — 2000–01(a)**

Variety	Area of vines at harvest			Production of grapes used for			
	Bearing	Not yet bearing	All vines	Winemaking tonnes fresh weight	Drying tonnes fresh weight	Other tonnes fresh weight	Total tonnes fresh weight
	ha	ha	ha				
<b>Red grapes</b>							
Cabernet Sauvignon	24 992	3 611	28 603	249 253	15	186	<b>249 454</b>
Currant (including Carina)	778	50	828	1 619	9 765	259	<b>11 642</b>
Grenache	2 139	288	2 427	22 563	44	172	<b>22 778</b>
Mataro	948	181	1 128	11 624	9	69	<b>11 703</b>
Pinot Noir	3 219	919	4 138	29 509	27	13	<b>29 549</b>
Shiraz	29 295	4 381	33 676	311 048	30	41	<b>311 119</b>
Other red grapes	16 372	3 751	20 123	147 169	1 028	23 962	<b>172 159</b>
<b>Total</b>	<b>77 743</b>	<b>13 180</b>	<b>90 923</b>	<b>772 785</b>	<b>10 918</b>	<b>24 701</b>	<b>808 404</b>
<b>White grapes</b>							
Chardonnay	17 266	1 167	18 433	245 223	49	324	<b>245 595</b>
Doradillo	249	2	251	4 903	5	29	<b>4 937</b>
Muscat Gordo Blanco	2 495	80	2 576	48 970	2 598	197	<b>51 764</b>
Palomino and Pedro Ximenes	213	2	215	2 555	—	30	<b>2 585</b>
Riesling	3 129	429	3 558	26 980	—	—	<b>26 980</b>
Semillon	6 528	275	6 803	88 427	302	95	<b>88 824</b>
Sultana	10 298	867	11 165	73 812	72 784	20 944	<b>167 540</b>
Waltham Cross	327	19	346	1 109	1 684	958	<b>3 751</b>
Other white grapes	12 343	1 645	13 988	126 311	1 903	17 409	<b>145 622</b>
<b>Total</b>	<b>52 848</b>	<b>4 487</b>	<b>57 335</b>	<b>618 290</b>	<b>79 323</b>	<b>39 985</b>	<b>737 598</b>
<b>Total grapes</b>	<b>130 591</b>	<b>17 667</b>	<b>148 258</b>	<b>1 391 074</b>	<b>90 241</b>	<b>64 686</b>	<b>1 546 002</b>

(a) Excludes NT and ACT, where varietal data are not collected.

Source: *Australian Wine and Grape Industry, 2001 (1329.0)*.

**Selected other crops****Oilseeds**

The oilseeds industry is a relatively young industry by Australian agricultural standards. The specialist oilseed crops grown in Australia include sunflower, soybeans, canola, safflower and linseed. Sunflower and soybeans are summer crops while the others are winter crops. In Australia, oilseeds are crushed for their oil, which is used for edible and industrial purposes, and for protein meals for livestock feeds.

The 1990s saw the emergence of canola as the main oilseed crop, with production increasing from around 70,000 tonnes in 1990–91 to 2.5 million tonnes in 1999–2000 (see table 16.22). Canola production accounted for nearly 90% of the total Australian oilseed crop of 2.8 million tonnes in 1999–2000 (table 16.38). Before the emergence of canola, the main specialist oilseed crop was sunflower seed. Peanuts and cotton are also major sources of oil, but as a by-product to their main output.

**16.38 OILSEEDS**

	NSW	Vic.	Qld	SA	WA	Tas.	Aust.
AREA ('000 ha)							
1994–95(a)	217	95	92	33	104	—	<b>540</b>
1995–96(a)	227	105	57	35	99	—	<b>522</b>
1996–97(b)	247	115	112	42	107	—	<b>622</b>
1997–98(b)	310	125	89	67	248	—	<b>839</b>
1998–99(b)	496	222	145	136	537	1	<b>1 538</b>
1999–2000(b)	613	319	143	216	879	*1	<b>2 172</b>
PRODUCTION ('000 tonnes)							
1994–95(a)	147	69	64	30	108	—	<b>417</b>
1995–96(a)	339	143	46	51	117	—	<b>697</b>
1996–97(b)	432	147	120	57	108	—	<b>864</b>
1997–98(b)	419	142	82	92	270	—	<b>1 005</b>
1998–99(b)	793	268	166	196	615	1	<b>2 039</b>
1999–2000(b)	968	438	151	249	963	*2	<b>2 770</b>

(a) Excludes linseed. (b) Excludes peanuts and cotton seed.

Source: *Agricultural Commodities, Australia (7121.0)*.

**Cotton**

Cotton is grown mainly in New South Wales and Queensland, primarily for its fibre (lint). When the cotton is mature, seed cotton is taken to a gin where it is separated (ginned) into cotton lint and cotton seed. The lint is used for yarn while the cotton seed is further processed at an oil mill, where the short fibres (linters) remaining on the cotton seed after ginning are removed. These fibres are too short to make into cloth, but are used for wadding, upholstery and paper. The seeds are then separated into kernels and hulls.

The hulls are used for stock feed and as fertiliser, while the kernels are crushed to extract oil. The oilcake residue (crushed kernels) is ground into meal, which is a protein roughage, and is used as a stock feed.

The quantity and value of seed cotton production have risen significantly over the past five years (table 16.39). The gross value of seed cotton in 1999–2000 was \$1.4b, a 5% increase over the previous year.

**16.39 COTTON**

	Seed cotton(a)			
	Area '000 ha	Quantity '000 tonnes	Gross value \$m	Cotton lint '000 tonnes
1994–95	245	796	851	317
1995–96	315	923	1 003	381
1996–97	378	1 485	1 156	560
1997–98	381	1 519	1 228	564
1998–99	446	1 547	1 353	634
1999–2000	435	1 950	1 416	698

(a) Before ginning.

Source: *Agriculture, Australia (7113.0)*; ABS data available on request, *Agricultural Census, Agricultural Commodities Survey*.

## Sugar

Sugar cane is grown commercially in Australia along the east coast over a distance of some 2,100 km in a number of areas from Maclean in northern New South Wales to Mossman in Queensland. More recently, it has also been grown in Western Australia.

About 93% of production occurs in Queensland (table 16.40), with 75% of the crop grown north of the Tropic of Capricorn in areas where rainfall is reliable and the warm, moist and sunny conditions are ideal for growing sugar cane.

## Crops and pastures cut for hay or silage

To counter Australia's seasonal conditions and unreliable rainfall, many farmers use hay and silage as methods of fodder conservation to supplement pasture and natural sources of stockfeed.

Considerable areas of Australia are devoted to fodder crops and pastures, which are either used for grazing (as green feed) or harvested and conserved as hay or silage (table 16.41).

**16.40 SUGAR CANE CUT FOR CRUSHING, Area, production and yield**

	New South Wales			Queensland			Western Australia		
	Area harvested	Production	Yield	Area harvested	Production	Yield	Area harvested	Production	Yield
	'000 ha	'000 tonnes	tonnes/ha	'000 ha	'000 tonnes	tonnes/ha	'000 ha	'000 tonnes	tonnes/ha
1994-95	16	1 825	111.2	347	31 146	89.8	(a)	(a)	(a)
1995-96	18	1 923	107.8	359	33 898	94.6	1	69	69.0
1996-97	18	2 231	124.0	371	36 232	97.6	1	170	164.7
1997-98	19	2 416	127.0	394	36 790	93.4	3	326	126.7
1998-99	20	2 555	126.0	379	35 587	93.9	3	392	135.5
1999-2000	20	2 493	123.8	405	35 316	87.2	3	355	123.2

(a) Data not collected.

Source: *Agricultural Commodities, Australia (7121.0)*.

**16.41 CROPS AND PASTURES CUT FOR HAY OR SILAGE**

	Hay		Silage made
	Area	Production	Production
	'000 ha	'000 tonnes	'000 tonnes
1996-97	1 284	4 687	1 686
1997-98	1 427	5 295	2 129
1998-99	1 568	6 245	2 770
1999-2000	1 373	5 331	2 981

Source: *Agricultural Commodities, Australia (7121.0)*.

## Livestock

Cattle, sheep and pigs are the main livestock grown in Australia and have been present since the earliest days of white settlement. Table 16.42 provides an insight into the change in livestock numbers from 1861.

**16.42 LIVESTOCK(a)**

	Cattle	Sheep and lambs	Pigs
	'000	'000	'000
1861	3 958	20 135	351
1871	4 276	41 594	543
1881	7 527	62 184	816
1891	10 300	97 881	891
1901	8 640	70 603	950
1911	11 745	98 066	1 026
1921	13 500	81 796	674
1931	11 721	110 568	1 072
1941	13 256	122 694	1 797
1951	15 229	115 596	1 134
1961	17 332	152 579	1 615
1971	24 373	177 792	2 590
1981	25 168	134 407	2 430
1991	(b)23 662	163 238	2 531
1992	(b)23 880	148 203	2 570
1993	(b)24 062	138 099	2 646
1994	(b)25 758	132 569	2 775
1995	(b)25 731	120 862	2 653
1996	(b)26 377	121 116	2 526
1997	(b)26 695	120 228	2 555
1998	(b)26 851	117 491	2 768
1999	(b)26 578	115 456	2 626
2000	(b)27 588	118 552	2 511

(a) Prior to 1943, livestock numbers were recorded at different times of the year in different states. In 2000, the collection period was changed from 31 March to 30 June to better align with other ABS surveys. (b) Excludes house cows.

Source: *Agricultural Commodities, Australia (7121.0)*.

## Cattle

Cattle farming occurs in all states and territories. While dairy cattle are restricted mainly to southern and coastal districts, beef cattle are concentrated in Queensland and New South Wales. Table 16.43 shows the number of cattle by age, sex and purpose.

Cattle numbers in Australia increased slowly during the 1960s and 1970s, despite seasonal changes and heavy slaughtering, to a peak of 33.4 million in 1976. Beef cattle production is often combined with cropping, dairying and sheep. In the northern half of Australia, cattle properties and herd sizes are very large, pastures are generally unimproved, fodder crops are rare and beef is usually the only product. The industry is more intensive in the south, with higher stocking rates per hectare, because the more favourable environment allows the development of improved pastures (see map 16.44).

Drought conditions in the early 1980s led to a decline in the beef herd until 1984. For the next five years the size of the herd remained relatively stable. Between 1989 and 1998 cattle numbers increased gradually, despite unfavourable weather conditions continuing in many parts of Australia. After a slight decline in 1999, cattle numbers increased to 27.6 million in 2000.

Table 16.45 shows the number of cattle by state and territory.

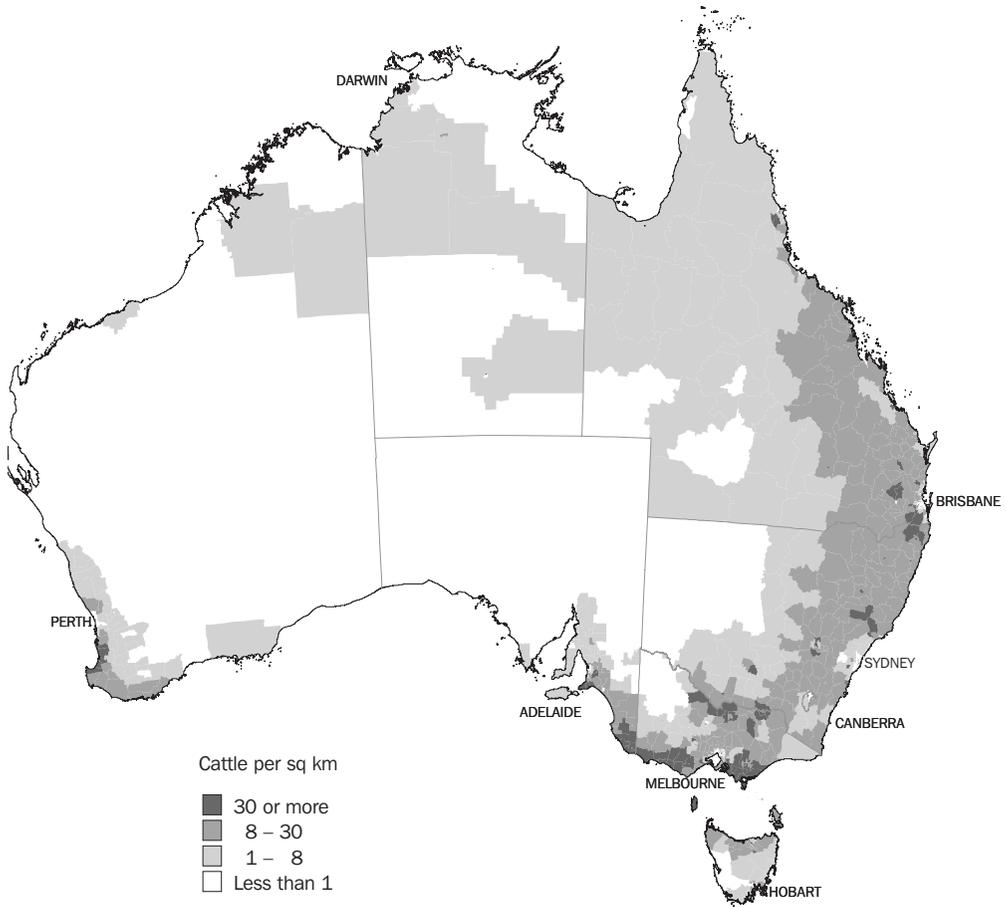
**16.43 CATTLE(a), By purpose**

	1995	1996	1997	1998	1999	2000
	'000	'000	'000	'000	'000	'000
Milk cattle						
Cows (in milk and dry)	1 821	1 884	1 977	2 060	2 155	2 171
Other milk cattle	919	923	982	1 015	1 065	969
Total	2 740	2 808	2 958	3 076	3 220	3 140
Meat cattle						
Bulls used or intended for service	555	553	551	547	528	518
Cows and heifers (1 year old and over)	11 213	11 667	11 879	11 783	11 621	12 282
Calves under 1 year old	5 806	5 768	6 029	6 026	5 740	5 872
Other cattle (1 year old and over)	5 418	5 581	5 278	5 420	5 469	5 774
Total	22 991	23 569	23 736	23 776	23 358	24 448
<b>Total cattle</b>	<b>25 731</b>	<b>26 377</b>	<b>26 695</b>	<b>26 851</b>	<b>26 578</b>	<b>27 588</b>

(a) Excludes house cows.

Source: *Agricultural Commodities, Australia (7121.0)*.

16.44 CATTLE FOR ALL PURPOSES, Excluding house cows — 31 March 1997(a)



(a) This map has been generated using small area Agricultural Census data for 1996–97.

Source: AgStats on Floppy Disk (7117.0).

16.45 CATTLE(a), By state/territory

	NSW	Vic.	Qld	SA	WA	Tas.	NT	Aust.(b)
	'000	'000	'000	'000	'000	'000	'000	'000
1995	6 236	4 280	9 947	1 216	1 899	693	1 421	<b>25 731</b>
1996	6 390	4 396	10 214	1 219	1 924	718	1 503	<b>26 377</b>
1997	6 511	4 411	10 415	1 181	1 909	725	1 530	<b>26 695</b>
1998	6 351	4 142	10 867	1 214	1 973	728	1 567	<b>26 851</b>
1999	6 291	4 125	10 748	1 183	1 931	724	1 567	<b>26 578</b>
2000	5 970	4 264	11 808	1 184	2 165	617	1 571	<b>27 588</b>

(a) Excludes house cows. (b) Includes ACT.

Source: Agricultural Commodities, Australia (7121.0).

## Dairying

Dairying is a major Australian agricultural industry. The estimate of gross value of dairy production at farm gate prices in 2000–01 was \$3.1b (table 16.46). This represented 9% of the gross value of agricultural production in Australia and placed dairy production third behind beef and wheat. Table 16.43 shows that the number of milk cattle in 2000, at 3.1 million, was 2% less than in 1999.

The entry of the United Kingdom, Australia's then largest market, into the European Union in 1973 forced the Australian dairy industry to develop new export trade links and become more internationally competitive.

### Dairy production

Most dairy production occurs in high rainfall coastal fringe areas where climate and natural resources allow production to be based on year-round pasture grazing. This enables efficient, low-cost milk production. With the exception of several inland river schemes, pasture growth generally depends on natural rainfall. Feedlot-based dairying is expanding, although it remains uncommon in Australia. However, the use of supplementary feed, such as grains, has become more common throughout the industry in recent years.

While Australian milk production had risen steadily up until 1999–2000, less favourable seasonal conditions and farm exits associated with deregulation of the milk industry saw production decrease by 3% to 10.5 billion litres in 2000–01 (table 16.46).

### Domestic dairy market

Average annual per capita milk consumption by Australians has stabilised at around 100 litres since the mid 1980s. However, there have been substantial changes in the types of fresh milk consumed, with fat-reduced and modified milks taking an increasing share of overall market milk sales. In 1998–99, Australians consumed 10.7 kg of cheese per person, the same as in 1997–98. Per capita milk consumption showed a slight decrease from 103.0 litres in 1997–98 to 102.4 litres in 1998–99 (see table 16.59).

### Sheep

Sheep numbers reached a peak of 180 million in Australia in 1970. In general, numbers have fallen since then. Poor market prospects for wool after 1990 had a marked impact on the flock size with sheep numbers falling rapidly until 1995, after which there was a gradual decline until 1999 (tables 16.47 and 16.48). Preliminary data show that at 30 June 2001 Australia had approximately 111 million sheep and lambs.

Map 16.49 shows the distribution of sheep and lambs in Australia at 31 March 1997.

**16.46 WHOLE MILK INTAKE BY FACTORIES(a), Production, use and gross value**

	Market milk sales by factories mill. litres	Milk used in the manufacture of dairy products mill. litres	Total intake mill. litres	Gross value \$m
1995–96	1 840	6 876	8 716	2 848
1996–97	1 853	7 187	9 040	2 809
1997–98	1 848	7 591	9 439	2 817
1998–99	1 859	8 319	10 178	2 900
1999–2000	1 842	9 005	10 847	2 845
2000–01	1 920	8 625	10 545	3 058

(a) Excludes NT.

Source: *Agricultural Commodities, Australia (7121.0)*; *Agriculture, Australia (7113.0)*; *Australian Dairy Corporation*.

**16.47 SHEEP AND LAMBS, By state**

	NSW mill.	Vic. mill.	Qld mill.	SA mill.	WA mill.	Tas. mill.	Aust.(a) mill.
1995	40.5	21.4	11.6	13.2	30.2	3.9	<b>120.9</b>
1996	41.1	22.0	10.7	13.6	29.8	3.9	<b>121.1</b>
1997	42.4	22.3	10.5	13.1	27.8	4.0	<b>120.2</b>
1998	40.8	21.1	11.0	13.1	27.5	3.9	<b>117.5</b>
1999	40.6	21.0	10.6	13.1	26.4	3.8	<b>115.5</b>
2000	43.4	22.7	9.2	13.8	26.1	3.3	<b>118.6</b>

(a) Includes ACT.

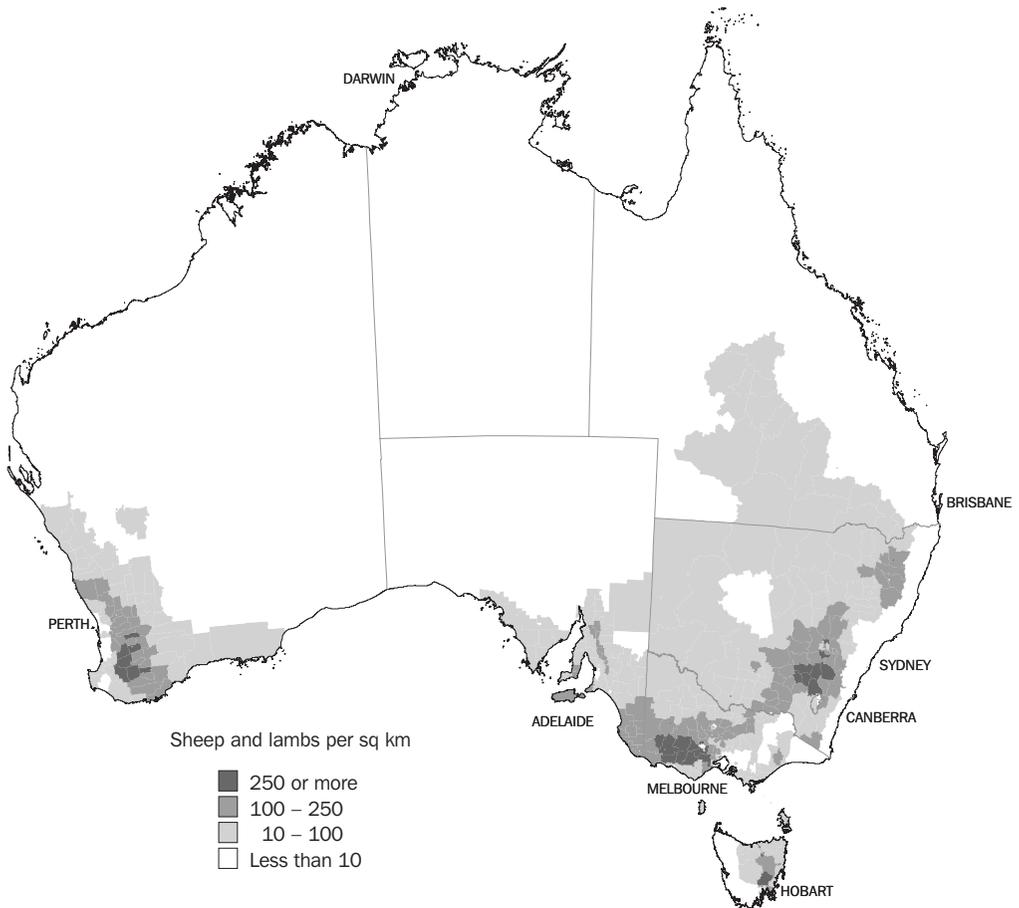
Source: *Agricultural Commodities, Australia (7121.0)*.

**16.48 SHEEP AND LAMBS**

	1995 mill.	1996 mill.	1997 mill.	1998 mill.	1999 mill.	2000 mill.
Sheep	94.0	91.7	89.8	87.5	86.0	87.9
Lambs (under 1 year old)	26.8	29.4	30.5	30.0	29.5	30.7
<b>Total</b>	<b>120.9</b>	<b>121.1</b>	<b>120.2</b>	<b>117.5</b>	<b>115.5</b>	<b>118.6</b>

Source: *Agricultural Commodities, Australia (7121.0)*.

**16.49 SHEEP AND LAMBS, Distribution — 31 March 1997(a)**



(a) This map has been generated using small area Agricultural Census data for 1996–97.

Source: *AgStats on Floppy Disk (7117.0)*.

## Pigs

Pig farming is a highly intensive industry. The majority of pigs are grown in specially designed sheds which provide a controlled environment conducive to the efficient production of large numbers of animals. The number of pigs decreased by 4% to 2.5 million in 1999–2000, while the number of establishments classified to pig farming fell slightly to 3,400. Recent changes in the Australian pig industry have seen many smaller producers leave the industry and existing producers increase their size of operations in an attempt to remain viable.

As table 16.50 shows, New South Wales is the largest producer of pigs, followed by Queensland and Victoria.

## Poultry

Poultry farming is a highly intensive industry, with the majority of poultry raised in large sheds which provide the birds with a stable environment protected from the elements. The poultry farming industry consists of two streams, meat production and egg production, both being major users of feed grains. Although the industry has grown over recent years, there was a decline in 2000 with poultry numbers falling by 7% to 87.0 million birds (table 16.51).

### 16.50 PIGS

	NSW	Vic.	Qld	SA	WA	Tas.	Aust.(a)
	'000	'000	'000	'000	'000	'000	'000
1995	791	439	644	423	316	38	<b>2 653</b>
1996	710	458	603	412	314	26	<b>2 526</b>
1997	729	485	600	417	297	24	<b>2 555</b>
1998	849	518	648	424	303	24	<b>2 768</b>
1999	778	521	621	406	277	22	<b>2 626</b>
2000	710	523	544	438	276	18	<b>2 511</b>

(a) Includes NT and ACT.

Source: *Agricultural Commodities, Australia (7121.0)*.

### 16.51 POULTRY

	Chickens(a)			Other poultry(b)			Total all poultry '000
	Chickens for egg production '000	Meat chickens (broilers)(c) '000	Total chickens '000	Ducks '000	Turkeys '000	Other poultry '000	
1995(d)	11 148	54 445	65 593	(e)	(e)	2 088	<b>67 682</b>
1996	13 413	62 331	75 744	411	1 222	1 040	<b>78 417</b>
1997	14 059	67 373	81 432	390	1 211	909	<b>83 942</b>
1998	14 036	75 504	89 540	456	1 268	673	<b>91 937</b>
1999	13 912	77 863	91 775	370	1 331	448	<b>93 924</b>
2000	12 016	72 912	84 928	517	1 360	224	<b>87 029</b>

(a) Includes breeding stock. (b) Excludes turkeys in SA. (c) Excludes meat strain chickens in Tas. (d) Excludes other poultry in SA.

(e) Not collected.

Source: *Livestock Products, Australia (7215.0)*; ABS data available on request, *Poultry and Game Birds Slaughtered Collection*.

## Meat production and slaughtering

Tables 16.52 and 16.53 show details of slaughtering and meat production from abattoirs, and from commercial poultry and other slaughtering establishments. They include estimates of animals slaughtered on farms and by country butchers. The data relate only to slaughtering for human consumption and do not include animals condemned or those killed for boiling down.

Production of beef for 2000–01 increased slightly to 2.1 million tonnes. Production of beef has reached record levels in recent years, with a comparatively weak Australian dollar and lower world supply leading to strong export demand and higher market prices.

Changing patterns in consumer demand and in sheep and lamb supply have seen production of lamb meat exceed production of mutton for the last two years. In 2000–01 lamb production increased by 6% to 367,000 tonnes, while mutton production increased by 5% to 348,000 tonnes.

Significant changes have taken place in the pig meat producing industry in recent years. Capital investment and corporate takeovers have seen the emergence of a few large companies producing a significant proportion of all pig meat sold in Australia. These moves, on top of the trend to more intensive and efficient production techniques, have seen pig meat production rise steadily since the mid 1970s when production dipped to a low of 174,000 tonnes. In 2000–01 pig meat production was 365,000 tonnes, more than double its low point in 1976.

### 16.52 PRODUCTION OF MEAT(a)

	Carcass weight					Dressed weight(b)(c)		
	Beef '000 tonnes	Veal '000 tonnes	Mutton '000 tonnes	Lamb '000 tonnes	Pig meat '000 tonnes	Total red meat '000 tonnes	Chicken meat '000 tonnes	Total poultry(d) '000 tonnes
1995–96	1 711	34	310	265	347	2 666	481	516
1996–97	1 772	38	296	270	336	2 712	488	524
1997–98	1 911	44	333	284	358	2 930	544	587
1998–99	1 973	38	316	312	370	3 009	564	607
1999–2000	1 952	36	333	347	363	3 031	598	638
2000–01	2 086	33	348	367	365	3 200	619	657

(a) Excludes offal. (b) Excludes Tas., NT and ACT. (c) Dressed weight of whole birds, pieces and giblets. (d) Includes other fowls, turkeys, ducks and drakes.

Source: *Livestock Products, Australia (7215.0)*; ABS data available on request, *Poultry and Game Birds Slaughtered Collection*.

### 16.53 LIVESTOCK AND POULTRY SLAUGHTERED FOR HUMAN CONSUMPTION

	Cattle	Calves	Sheep	Lambs	Pigs	Chickens(a)(b)	Other fowls(c) and turkeys(b)	Ducks and drakes(b)
	mill. head	mill. head	mill. head					
1995–96	6.9	1.0	14.6	14.2	5.0	336.4	9.6	2.6
1996–97	7.3	1.1	14.3	14.6	4.8	340.9	10.0	3.1
1997–98	8.1	1.3	16.3	15.0	5.1	364.2	10.7	2.9
1998–99	7.9	1.2	15.1	16.1	5.2	375.0	10.2	3.5
1999–2000	7.5	1.1	15.9	17.6	5.0	394.0	9.5	4.1
2000–01	7.9	1.0	16.6	18.6	5.0	398.9	8.4	4.0

(a) Comprises broilers, fryers and roasters. (b) Excludes Tas., NT and ACT. (c) Comprises hens, roosters, etc.

Source: *Livestock Products, Australia (7215.0)*; ABS data available on request, *Poultry and Game Birds Slaughtered Collection*.

Table 16.54 shows the gross value of livestock slaughterings over recent years. The value of slaughterings and other disposals dropped sharply in 1995–96, primarily due to a drop in the value of cattle and calves slaughtered. The value has increased in each of the last five years, with 2000–01 showing a 20% increase over 1999–2000.

The biggest customers for Australian beef in recent years have been Japan, the United States of America and the Republic of Korea. In 2000–01 the United States of America was the main customer for Australian beef with 406,000 tonnes purchased, up 25% from the previous year's shipment. Japan was Australia's second biggest customer with 348,000 tonnes purchased, up 3% from the previous year. The Republic of Korea was the third largest importer of Australian beef, purchasing 68,000 tonnes.

Table 16.55 shows the volume of exports of fresh, chilled or frozen meat. Beef was Australia's major meat export. Bone-out beef was the major meat commodity exported, and increased by 15% to 940,300 tonnes in 2000–01. Exports of bone-in lamb also increased significantly, up by 20% to 103,700 tonnes in 2000–01.

Table 16.56 shows the number, gross weight, gross value and unit value of live sheep and cattle exports. The number of live sheep exported in 2000–01 increased by 22% to 5.9 million head. Increased unit value, combined with increased numbers, raised the total export value of live sheep by 43% to \$257.7m. The number of live cattle exported in 2000–01 remained steady at 846,000, with the average unit value increasing by 11% to \$569.66 under the influence of a strengthening Australian dollar.

#### 16.54 GROSS VALUE OF LIVESTOCK SLAUGHTERINGS AND OTHER DISPOSALS(a)

	Cattle and calves	Sheep and lambs	Pigs	Poultry	Total(b)
	\$m	\$m	\$m	\$m	
1995–96	3 575.9	1 035.7	(c)597.8	(c)948.1	<b>6 192.7</b>
1996–97	3 597.0	1 042.6	(c)764.8	(c)932.0	<b>6 376.3</b>
1997–98	4 138.2	1 066.2	709.8	1 053.6	<b>6 991.9</b>
1998–99	4 476.6	1 053.5	689.7	1 018.5	<b>7 255.8</b>
1999–2000	5 048.7	1 053.5	791.7	1 030.8	<b>7 944.2</b>
2000–01	6 216.7	1 419.2	821.8	1 059.8	<b>9 540.4</b>

(a) Includes adjustment for net exports of live animals. (b) Includes value of other livestock. (c) Excludes Tas. and NT.

Source: *Agriculture Australia (7113.0); Value of Principal Agricultural Commodities Produced, Australia, Preliminary (7501.0)*.

#### 16.55 EXPORTS OF FRESH, CHILLED OR FROZEN MEAT(a)

	Beef(b)(c)		Veal(b)		Mutton(b)		Lamb(b)		Pork '000 tonnes
	Bone-in	Bone-out	Bone-in	Bone-out	Bone-in	Bone-out	Bone-in	Bone-out	
	'000 tonnes								
1995–96	50.7	702.6	1.7	5.3	81.0	64.3	46.3	7.8	5.7
1996–97	48.6	692.1	1.2	3.8	92.7	50.8	53.5	8.4	6.7
1997–98	46.9	795.9	1.8	5.5	107.8	59.1	62.2	8.8	12.3
1998–99	61.0	836.6	1.6	6.1	114.7	51.4	71.6	9.3	16.5
1999–2000	45.5	818.7	1.6	7.4	120.9	55.5	86.6	11.1	39.2
2000–01	42.0	940.3	2.1	6.4	127.8	63.8	103.7	12.3	43.9

(a) Excludes offal. (b) Factors can be applied to beef, veal, mutton and lamb bone-out figures to derive bone-in carcass weight estimates which, when added to bone-in figures, show total exports in carcass weight. The factor for beef and veal is 1.5 and that for mutton and lamb is 2.0 (Australian Meat and Livestock Corporation). (c) Includes buffalo meat.

Source: *Livestock Products, Australia (7215.0)*.

## 16.56 LIVE SHEEP AND CATTLE EXPORTS(a)

	Live sheep exports				Live cattle exports			
	Number	Gross weight	Gross value	Unit value(b)	Number	Gross weight	Gross value	Unit value(b)
	'000	'000 tonnes	\$'000	\$	'000	'000 tonnes	\$'000	\$
1995–96	5 879.9	296.9	226 913	38.59	615.9	219.0	343 699	558.07
1996–97	5 237.2	269.8	189 944	36.27	863.8	313.9	427 721	495.19
1997–98	4 961.1	256.0	193 266	38.96	694.0	255.4	334 058	481.34
1998–99	4 958.7	254.9	181 671	36.64	713.0	264.7	342 667	480.57
1999–2000	4 858.6	243.3	180 345	37.12	845.7	317.1	432 645	511.60
2000–01	5 936.0	283.6	257 661	43.41	845.8	314.3	481 827	569.66

(a) Excludes live sheep and cattle for breeding. (b) Obtained by dividing the gross value by the number of sheep, or cattle.

Source: *Livestock Products, Australia* (7215.0).

## The wool industry

### Wool production

Shorn wool (greasy wool) contains an appreciable amount of grease, dirt, vegetable matter and other material. The exact quantities of these impurities in the fleece vary with climatic and pastoral conditions, seasonal fluctuations and the breed and condition of the sheep. It is, however, the clean wool fibre that is ultimately consumed by the textile industry, and the term 'clean yield' is used to express the net wool fibre content present in greasy wool.

The gross value of wool produced in 2000–01 increased to \$2.5b (table 16.57), but was still less than half the value recorded in 1988–89 (\$5.9b), the peak year in the wool boom of the 1980s.

### Wool receivals

The total amounts of taxable wool received by brokers and purchased by dealers in recent years are shown in table 16.58. They exclude wool received by brokers on which tax had already been paid by other dealers (private buyers) or brokers.

The article at the end of this chapter *The wool industry — looking back and forward* outlines the history and prospects of the wool industry.

### Apparent consumption of foodstuffs

Estimates of the consumption of foodstuffs in Australia are compiled by taking the production of a commodity, adding to it any imports, deducting from it any exports, and taking account of changes in the levels of stocks. Because consumption of foodstuffs is measured, in general, at producer level, no allowance is made for consumer wastage, which results in overstating consumption to some extent.

## 16.57 SHEARING, WOOL PRODUCTION AND VALUE

	Wool production					
	Sheep and lambs shorn	Average fleece weight	Total wool			Gross value(b)
			Shorn wool	Other wool(a)	Quantity	
mill.	kg	'000 tonnes	'000 tonnes	'000 tonnes	\$m	
1994–95	155.3	4.37	679.4	50.1	729.5	3 319.3
1995–96	146.7	4.40	646.1	43.6	689.7	2 559.7
1996–97	156.4	4.37	685.0	46.1	731.1	2 621.2
1997–98	155.5	4.12	640.7	48.9	689.6	2 753.9
1998–99	147.9	4.32	638.8	48.8	687.6	2 141.0
1999–2000	142.7	4.50	642.3	52.5	694.8	2 149.2
2000–01	136.8	4.30	589.8	54.9	644.7	2 530.9

(a) Comprises dead and fellmongered wool, and wool exported on skins. (b) Gross value for shorn wool is based on the average price realised for greasy wool sold at auction; for skin wools the gross value is based on prices recorded by fellmongers and skin exporters.

Source: *Agriculture, Australia* (7113.0); *Livestock Products, Australia* (7215.0); ABARE, 'Australian Commodities, March Quarter 2000'.

## 16.58 TAXABLE WOOL RECEIVALS

	Receivals			Brokers as proportion of total receivals %
	Brokers	Dealers	Brokers and dealers	
	'000 tonnes	'000 tonnes	'000 tonnes	
1994–95	567.0	112.5	679.4	83.5
1995–96	552.9	93.1	646.1	85.6
1996–97	565.2	119.9	685.0	82.5
1997–98	524.0	116.7	640.7	81.8
1998–99	526.9	111.8	638.8	82.5
1999–2000	517.5	124.8	642.3	80.6
2000–01	487.2	102.6	589.8	82.6

Source: *Livestock Products, Australia (7215.0)*.

The estimates of consumption per capita have been obtained by using the mean resident population for the period.

Table 16.59 shows the changes in trends in the consumption of various foodstuffs since 1938–39.

## 16.59 APPARENT PER CAPITA CONSUMPTION OF FOODSTUFFS

Commodity	Units	Average three years ended								
		1938– 39	1948– 49	1958– 59	1968– 69	1978– 79	1988– 89	1996– 97	1997– 98	1998– 99
Meat (carcass equivalent weight)										
Beef	kg	n.a.	n.a.	n.a.	n.a.	n.a.	38.3	37.8	36.2	34.9
Veal	kg	n.a.	n.a.	n.a.	n.a.	n.a.	1.7	1.8	1.9	1.5
Beef and veal	kg	63.6	49.5	56.2	40.0	64.8	40.0	39.6	38.1	36.4
Lamb	kg	6.8	11.4	13.3	20.5	14.4	14.9	11.1	11.0	11.8
Mutton	kg	27.2	20.5	23.1	18.8	3.6	7.3	6.0	5.7	4.5
Pig meat	kg	3.9	3.2	4.6	6.7	13.3	17.5	17.6	18.5	19.0
Total meat	kg	101.5	84.6	97.2	85.9	96.1	79.8	74.2	73.3	71.6
Offal and meat n.e.i.	kg	3.8	4.0	5.2	5.1	5.9	3.1	0.9	n.a.	n.a.
All meat and meat products	kg	118.5	103.0	112.4	98.8	102.0	82.8	75.1	n.a.	n.a.
Canned meat (canned weight)	kg	1.0	1.2	1.9	2.2	1.6	n.a.	n.a.	n.a.	n.a.
Bacon and ham (cured carcass weight)	kg	4.6	5.3	3.2	3.6	6.0	6.9	8.5	8.7	8.7
Poultry (dressed weight)(a)	kg	n.a.	n.a.	n.a.	8.3	17.1	24.1	27.8	29.6	30.8
Milk and milk products										
Market milk (fluid whole litres)	L	106.4	138.7	128.7	128.2	100.5	101.7	104.2	103.0	102.4
Cheese (natural equivalent weight)	kg	2.0	2.5	2.6	3.5	5.3	8.8	10.6	10.7	10.7
Oils and fats										
Butter	kg	14.9	11.2	12.3	9.8	5.1	3.2	2.8	2.8	2.9
Margarine	kg	2.2	2.8	n.a.	4.9	8.5	9.0	6.6	6.7	6.4
Table	kg	0.4	0.4	n.a.	1.5	5.4	6.8	4.7	4.4	4.5
Other	kg	1.8	2.4	2.2	3.4	3.1	2.2	1.9	2.3	1.9
Beverages										
Tea	kg	3.1	2.9	2.7	2.3	1.7	1.2	0.8	0.8	0.9
Coffee	kg	0.3	0.5	0.6	1.2	1.6	2.0	2.0	2.3	2.4
Aerated and carbonated waters	L	n.a.	n.a.	n.a.	47.3	67.4	87.4	114.4	109.0	113.0
Beer	L	53.2	76.8	99.7	113.5	133.2	113.1	95.5	94.5	93.2
Wine	L	2.7	5.9	5.0	8.2	14.7	20.2	19.0	19.7	19.8
Spirits (litres alcohol)	L	0.5	0.8	0.7	0.9	1.2	1.2	1.2	1.3	1.2

(a) Excludes Tas., NT and ACT.

Source: *Apparent Consumption of Foodstuffs, Australia (4306.0)*; *Australian Dairy Corporation*.

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# The wool industry — looking back and forward

## Introduction

It is widely accepted that Australia produces the world's best quality woollen fibre: Australian merino wool. The reasons behind Australia's high quality wool can be attributed to many factors, but are predominantly the experience and expertise of Australian farmers in selecting superior animals for breeding purposes, and in using the harsh Australian climate to produce clean, fine wool of high strength.

Sheep have been part of the Australian scene almost since the first fleet arrived at Botany Bay in 1788. In 1800, the colony's number of livestock was recorded as 203 horses, 1,044 cattle, 6,124 sheep and 4,017 pigs. However, it was not until the 1820s, when Australia imported around 5,000 merino sheep from Saxony, France and England, that the foundations of the Australian wool industry were laid.

Preliminary ABS data show that at 30 June 2001 Australia had approximately 111 million sheep and lambs and accounted for around 9% of world sheep numbers. However, this modest contribution to world sheep numbers understates Australia's dominance in the world's top quality woollen fibre market; Australia produces over 50% of the world's merino wool. In terms of total wool production (i.e. shorn wool plus dead and fellmongered wool and wool exported on skins), Australia produced approximately 645,000 tonnes of greasy wool in the 12 months ending 30 June 2001, or around 27% of the world's yearly output of greasy wool. Historically Australia has exported over 90% of its wool clip.

Of the 146,000 establishments with agricultural activity (establishments with an estimated value of agricultural operations of \$5,000 or more) operating in Australia at 30 June 2000, approximately 53,000 produced wool (table S16.1), from an average flock size of 2,200 sheep. According to Australian Bureau of Agricultural and Resource Economics (ABARE), specialist wool producers number around 14,000 and account for 34% of Australian wool production. Total wool production in 2000–01 was valued at \$2.5b or around 7% of total agricultural output.

**S16.1 WOOL INDUSTRY, Establishments and wool produced**

	Establishments with sheep(a)	Wool produced(b)
	no.	tonnes
1998	54 717	689 601
1999	52 934	688 719
2000	53 150	694 526
NSW	19 027	240 664
Vic.	13 442	134 309
Qld	2 234	55 951
SA	8 242	83 954
WA	8 225	159 778
Tas.	1 925	19 595
NT	(c)	—
ACT	55	275

(a) As at 31 March for years 1998 and 1999. As at 30 June for year 2000. (b) Year ended 30 June. (c) Data not collected.

Source: *Agriculture, Australia (7113.0)*.

New South Wales is the main wool producing state, with over 36% of the national flock. The next most important state is Western Australia, which currently accounts for about 22% of the flock. Victoria accounts for about 19%, followed by South Australia with 12%.

Almost all wool produced in Australia is sold through the public auction system, conducted on behalf of growers by wool brokers and held at one of the five major wool selling locations situated around Australia. All wool is tested prior to auction by sending a sample of the wool to the Australian Wool Testing Authority, which provides details of the micron, strength, percentage of vegetable matter and other characteristics of the wool. This enables buyers to objectively assess each wool lot offered for sale by the broker prior to the auction to ensure that the wool purchased will meet the buyers' specific requirements. A small but growing proportion of wool is sold outside the auction system, either through brokers or directly by producers.

## Sheep breeds

The main sheep breed in Australia is the Australian Merino, accounting for around 75% of all sheep. Another 12% are first cross ewes (predominantly Merino x Border Leicester) which are used for producing high quality prime lambs (lambs for meat) by mating the ewes with short wool British meat breed rams. A further 9% are merino-derived dual purpose breeds and Comebacks, developed in high rainfall areas for the production of wool but combined with a more acceptable meat carcass than pure merinos. The balance of the flock are British breed sheep: long wool breeds used to breed prime lamb mothers (mainly Border Leicesters, but also Romney Marsh and Cheviots), and short wool breeds used for producing prime lambs (Poll Dorset, Dorset Horn, Suffolk, Southdown and South Suffolk).

## Development of the Australian Merino

The Australian Merino is recognised worldwide for its ability to produce pure white wool which is soft and fine but strong. No other breed can match the fineness and softness of the fleece produced by the Australian Merino. A number of strains have been developed within the Australian Merino breed, notably the Peppin strain (developed in the 1860s by the Peppin brothers in the Riverina district of New South Wales) and the South Australian strain (developed along similar lines to those used by the Peppin brothers, but with an emphasis on larger body size and stronger wool).

The Peppin brothers initially chose the best 200 of 6,000 ewes on their property to commence their breeding program. These were crossed with a Rambouillet ram from the United States of America, which produced outstanding progeny with high yielding medium fine wool. Merino rams from Germany, Vermonts from United States of America and Lincolns from England were also used by the Peppin brothers in developing their strain of sheep. Similar exercises were repeated around Australia, but were fine tuned to match local environmental conditions. For example, high rainfall areas better suited the use of Lincoln and merino sheep, while in South Australia the English longwool sheep were used to produce larger, more robust sheep able to withstand hot arid pastoral conditions.

There are four main types of merino in Australia. These are the superfine merino (18 micron fibre diameter or less), the fine wool merino (19 micron fibre diameter), the medium wool merino (20–22 micron fibre diameter) and the strong wool merino (23–25 micron fibre diameter). Climatic, geographic and management factors determine the distribution of these types throughout Australia. In general, finer woolled sheep grow best in the cooler areas, where feed is consistently scarce and sheep can be managed intensively. Stronger woolled sheep, on the other hand, grow better in the harsh hot low rainfall areas, where properties are large and the level of management is less intensive.

New South Wales has a range of excellent sheep growing areas, from the cooler southern and northern tablelands areas suited to superfine sheep, to the more temperate inland pastoral areas suited to medium woolled sheep, through to the semi-arid and remote western pastoral areas suited to strong woolled sheep. Western Australia tends to produce wool of medium micron grade, as most of its production is contained in the more temperate pastoral areas of the south-west of the state, while comparatively harsher conditions in the South Australian and Queensland sheep-growing regions tend towards the production of stronger woolled sheep. Like New South Wales, Victoria produces a wide range of wool types, while Tasmanian production tends toward the finer end of the scale.

Development of the merino is ongoing, and merino wool is progressively becoming finer, due to selective breeding of those sheep with high quality fine wool. According to data released by Australian Wool Exchange Ltd, the proportion of wool offered for auction measuring less than 19 micron has increased from 10.5% in 1993–94 to 19.6% in 2000–01.

## Historical overview

By 1820 the number of sheep in Australia had reached approximately 120,000 and consisted mainly of meat sheep from the Cape of Good Hope, India, England and Ireland, and their resultant crosses. At this stage only around 30 merino sheep had been imported into Australia. However, the importation of around 5,000 merino sheep in

the 1820s and their eventual crossing with the local sheep flock laid the foundations for the Australian wool industry.

During the next 30 years the pastoral industry expanded into newly opened lands in and around Sydney and beyond the Blue Mountains in New South Wales, as well as districts further afield such as Port Phillip and Portland Bay in present day Victoria. Imports of sheep continued to grow as the demand for sheep meat and wool increased in Australia and Great Britain.

By 1840 imports of sheep into the Colony of New South Wales reached 20,000, and in 1848 exports of sheep had reached almost 90,000. In the same year, 5,657 tonnes of wool, valued at £683,623, were exported to Great Britain from New South Wales, which at that time included the areas of Queensland and Victoria. By the end of 1850 sheep numbers across Australia had reached 16 million, or around 39 sheep per head of population, compared to around 6 sheep per head of population today.

Sheep numbers grew a further 25% during the 1850s, reaching 20.1 million in 1860. In 1852 the Colony of Victoria boasted 6.5 million sheep and was exporting 9,112 tonnes of wool with an estimated value of £1,062,787. By the latter half of the 19th century the wool industry had taken on a life of its own. Sheep numbers increased rapidly, from 20.1 million in 1860 to over 106 million in 1892 (graph S16.2). Over the same period wool production increased nearly tenfold,

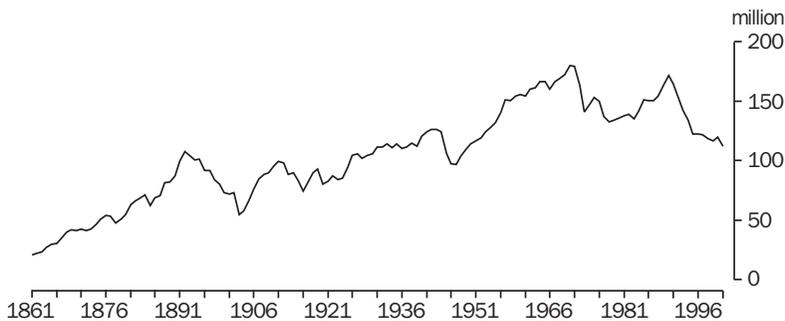
from 26,753 tonnes to 289,380 tonnes, as fleece weights increased with the development of improved strains of sheep.

Economic and climatic problems, culminating in the depression of the 1890s and the prolonged drought of 1895–1904, seriously affected wool production towards the end of the 19th century. Sheep numbers fell from 106 million in 1892 to 54 million in 1903 — a 49% fall. Droughts continued to affect the pastoral industry in the early part of the 20th century and caused significant periodic drops in sheep numbers.

Wool producers were given some respite when, during the First World War, all Australian wool was purchased by the British Government at 55% above pre-war values. However, it took about two decades for sheep numbers to be restored to the levels of 1892, when in 1926 sheep numbers rose above 100 million once again.

By the mid 1920s the United Kingdom was purchasing about 50% of Australia's total wool exports, up considerably on the pre-war figure of 30%, with wool exports accounting for three-quarters of all pastoral export income (which included live cattle and sheep, meat, wool and hides). By the late 1920s Australia's 103 million head of sheep produced 440,000 tonnes of wool and accounted for 17% of the world's sheep numbers. During this time Australia produced just on half of the world's merino wool.

**S16.2 SHEEP AND LAMBS(a)**



(a) Data for 2001 are preliminary.

Source: *Agriculture, Australia (7113.0) — recent data; ABS data on request, Agricultural Commodity Collections — historical data.*

In the 1930s exports of wool comprised approximately 30% of the total value of Australia's exports of merchandise trade, earning £46.9m in 1937–38. By the outbreak of the Second World War the demand for wool by Britain had increased substantially. The Australian and British governments entered into a number of contracts to purchase Australian produce including wool, mutton and lamb at agreed prices. In 1939 the governments of the United Kingdom and Australia arranged for Britain 'to acquire the Australian wool clip for the duration of the War and one full wool season after the cessation of hostilities', surplus to requirements of Australian manufacturers (*Year Book of Australia 1940*, p. 962).

In fact, during the war years net exports of wool (exports minus imports) fell from 386,000 tonnes in 1938–39 to 262,000 tonnes in 1944–45, a drop of 32% in seven years. However, net exports reached pre-war levels the following year, when the Australian war effort cut back its use of wool.

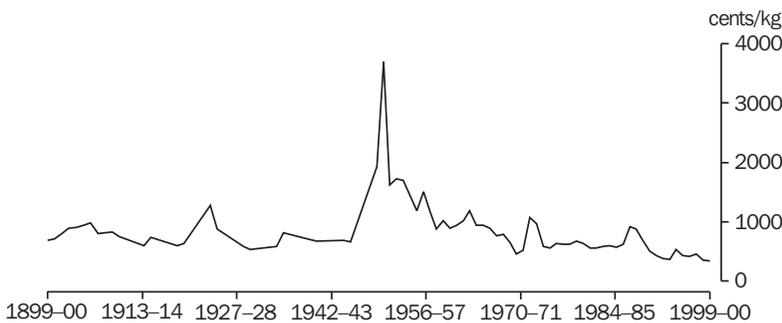
At the end of the Second World War the stock of Australian, New Zealand and South African wool in the ownership of the United Kingdom Government was 10.4 million bales. At a meeting of officials from each country held in London in April–May of 1945, the four governments formed a joint organisation, called U.K. Dominion Wool Disposals Limited, to market and sell the stockpile, together with future clips, in an orderly fashion to ensure the stability of wool prices. By

the end of 1951 all of the stockpile had been sold, as well as the wool bought in by the organisation at the floor price. On 22 January 1952, the joint organisation was voluntarily liquidated. Distributions to Australian wool growers of the profits arising from the transactions of the joint organisation in Australian wool were £23.6m in November 1949, £23.6m in March 1952 and £15.1m in March 1953.

Prosperity in the wool industry peaked in 1950–51 when the average greasy wool price reached 144.2 pence per pound, (equivalent to around \$37 per kilogram in today's prices, compared to around \$3.20 per kilogram being achieved in mid 2002 (graph S16.3)). This was nine times greater than the 1945–46 United Kingdom contract price, and almost 14 times greater than the average for the 10 seasons ending in 1938–39 (10.39 pence per pound). This short-lived but extreme increase in price was due to the American demand for wool which was generated by the Korean War.

During this period Australia was said to be 'riding on the sheep's back'. In 1950–51 the gross value of wool production had increased to 56% of the total value of production of all agricultural industries, compared with 17% in 1945–46. The increase in the price of wool during this period led to a sharp increase in sheep numbers, from 96 million in 1946 to 113 million in 1950.

**S16.3 AVERAGE UNIT VALUE OF GREASY WOOL(a)**



(a) At 2001 prices.

Source: *Agriculture, Australia (7113.0)* — recent data; ABS data on request, *Value of Agricultural Commodities Produced* — historical data.

## The industry after the golden period

The period of high prices did not last, and returns for wool quickly fell away. In 1951–52 returns were half those received for the previous year. While small rises sometimes occurred over the next 20 years, wool prices generally continued to fall until 1970–71, when the price fell to \$0.60 per kilogram (equivalent to \$4.32 in 2001 prices).

By 1970–71 wool production contributed only 15% to total gross value of agricultural production. Over most of the 20 year period up to 1970, wool producers made reasonable profits compared with other agricultural industries, and the number of sheep and quantity of wool produced continued to increase. However, there were underlying concerns within the industry about the general decline of wool prices, and these resulted in a number of attempts to stabilise prices over the period. In 1970 when wool prices bottomed, a record 180 million sheep were producing approximately 890,000 tonnes of wool.

A Wool Deficiency Payments Scheme operated for two years from 1971, after which the Australian Wool Corporation (AWC) established a minimum reserve price scheme, which operated between 1974 and 1991. The aim of the scheme was to stabilise future large movements in wool prices by purchasing wool which did not achieve the agreed floor price and then selling wool later in times of buoyant demand. However in the early 1990s a combination of sharp falls in demand and high reserve prices (set during a period of high demand in the late 1980s), resulted in the scheme being suspended in February 1991, when the size of the AWC stockpile had reached 4.7 million bales. The Government, with the agreement of the industry, decided that the scheme could no longer be maintained.

The Australian Wool Realisation Commission was initially responsible for the disposal of the wool stockpile. In December 1993 the disposal of the stockpile became the responsibility of Wool International (WI), a statutory corporation of the Commonwealth Government. WI was required to sell the stockpile in accordance with a statutory imposed disposal schedule, with the last bale of stockpile wool to be sold by 30 December 2000.

At 30 June 1998 the stockpile had been reduced to 1.2 million bales. By October 1998 equity in the wool stockpile had reached a level significantly

higher than the level of debt in the wool stockpile, and therefore, ongoing government involvement in stockpile management was no longer justified. As a result the Government announced a freeze on sales of wool from the stockpile in mid October 1998 and announced its intention to privatise WI by 1 July 1999. On this date WI became WoolStock Australia Limited, a public company limited by shares allocated to previous holders of unit equity in WI. WoolStock Australia took over the assets and liabilities from WI and was fully accountable to its shareholders for the efficient management and sale of the stockpile.

On 9 August 2001, WoolStock Australia was able to report that the last bales from the stockpile had been sold. This meant that future sales of wool would again operate under free market principles and that artificially set prices would no longer have an impact on the price of wool received by Australian growers.

It was during the 1990s that the Australian wool industry came to fully realise that wool is merely one of a number of fibres which apparel makers can choose to use in their garments, and that demand for wool depends significantly on the relative prices of substitute fibres, particularly the high quality but cheap synthetic fibres being produced today.

Over the last decade, world consumption of wool has declined by 10% from an average annual consumption of 1.76 million tonnes in the 1980s to 1.59 million tonnes in the 1990s. This decline occurred while total consumption of apparel fibres, including synthetics and cotton, was rising. In 1998, total world fibre consumption was around 46 million tonnes, with synthetics comprising 49% of this figure, cotton 42%, cellulose 5% and wool only 3%. During the 1990s most of the growth in total apparel fibre consumption was in synthetic fibres and cotton, which grew by 6% and 2% a year respectively.

Wool is a more expensive fibre to both produce and process than cotton or polyester, with production and processing (up to the yarn stage) estimated to be around three times more expensive. In addition, the price of wool fluctuates with changes in both supply and demand.

Nevertheless, most organisations in the textile industry still view wool as one of the most important apparel fibres and one which will always have a future in the textile industry.

## Financial overview

In 1971–72, the year after wool prices bottomed, the estimated turnover of the specialist wool producing industry was \$480m. This had risen to \$4.3b in 1989–90, but by 1999–2000 it had fallen to \$1.7b, a decrease of 60% in 10 years. By comparison, turnovers for the beef industry and grain industry in 1999–2000 were \$3.2b and \$4.2b respectively. On average in 1999–2000, the turnover of specialist wool growing businesses was \$153,400, while specialist beef businesses and grain growing businesses had turnovers of \$233,000 and \$315,000 respectively, with the average turnover of all farm businesses estimated at \$275,000.

Farm profitability in the wool industry has always been cyclical and dependent on fluctuating wool prices, export markets and weather conditions. Cash operating surplus (the cash surplus before the deduction of depreciation and income tax and before operators of unincorporated businesses have drawn a wage) for the specialist wool producing industry was \$315m in 1999–2000, with the average specialist wool growing business achieving a surplus of \$28,100, a decrease of 39% from the average of \$46,000 in 1989–90, and almost double the value achieved in 1998–99 (graph S16.4). Average cash operating surplus for specialist beef businesses and grain growing businesses in 1999–2000 was substantially higher than achieved by specialist wool businesses, at \$54,200 and \$55,500 respectively.

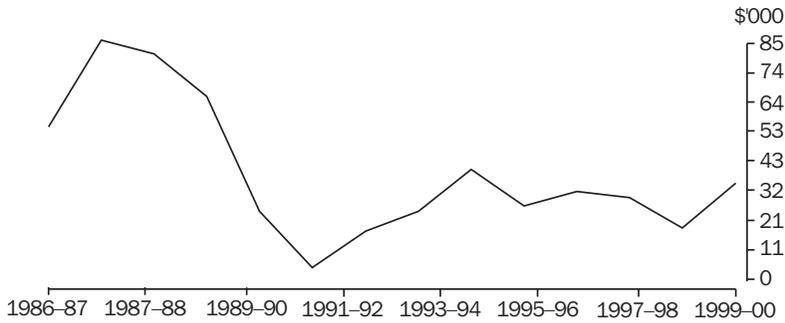
Net worth (assets less gross indebtedness) of the specialist wool producing industry in 1999–2000 was estimated at \$11.1b, compared with \$17.0b in the grain industry and \$21.3b in the beef cattle industry. Return on net worth for wool producers climbed from 1.5% in 1998–99 to 2.8% in 1999–2000, compared with 4.6% for all Australian farm businesses in 1999–2000. The rate of return

on farm business assets for wool producers was 2.4% in 1999–2000 compared with 3.2% for beef producers and 3.5% for grain growers. When looking at return on farm operating cost (cash operating surplus divided by operating costs) the specialist wool producing industry managed to generate 21.5%, that is, for every \$100 a wool producer expended on operating costs, \$21.50 of cash operating surplus was generated, compared with 20.7% for the grain industries and 28.2% for beef producers.

## Major wool markets

In the decade to 1999–2000, Australian greasy wool production fell by 35%, from over 1.0 million tonnes in 1989–90 to 694,000 tonnes in 1999–2000. In the 12 months to June 2001, wool production decreased a further 7% to 645,000 tonnes. On the other hand, total exports of wool (which include raw, semi-processed and wool on skins) have fluctuated around an average of 815,000 tonnes per year (expressed in a greasy wool equivalent) over the 10 years from 1990–91, with the figure for 1999–2000 being approximately 800,000 tonnes. The value of wool exports fluctuated around \$3.5b over most of the 1990s before dropping sharply from \$4.0b in 1997–98 to \$2.6b in 1998–99 and then back up to \$3.9b in 2000–01.

Wool markets in the early to mid 1990s saw an excess of production, steadily declining world prices and strong competition between natural and synthetic fibres. However, in more recent times the consumption of wool has exceeded production, due to a decrease in the size of the sheep flock, and healthy demand as a result of a comparatively low Australian dollar. Australia's wool exports increased by 20% in value terms to \$3.0b in the 12 months to 30 June 2000, as a result of significant rises in prices during 2000. In the 12 months to 30 June 2001, the value of exports increased a further 31% to \$3.9b.

**S16.4 AVERAGE CASH OPERATING SURPLUS FOR WOOL BUSINESSES(a)**

(a) At 2001 prices.

Source: *Agriculture, Australia (7113.0)* — recent data; ABS data on request, *Agricultural Finance Survey* — historical data.

Over the last two decades trade between Australia and China has increased substantially, with China becoming Australia's single largest wool market (graph S16.5). Today China purchases just over a third of Australia's exports of raw and semi-processed wool, importing \$1,360m of Australian wool in 2001. The European Union also accounts for about a third of Australia's wool exports by value, importing approximately 30%, with Italy by far the predominant purchaser of Australian wool in the EU. The Republic of Korea, France and Germany are the next most significant purchasers of wool, together accounting for approximately 15% of Australia's wool exports. While there has been growth in wool exports to China and other South East Asian countries over the last decade, the contribution of wool exports to Australia's total merchandise exports fell significantly, from 5.8% in 1991 to 3.0% in 2001.

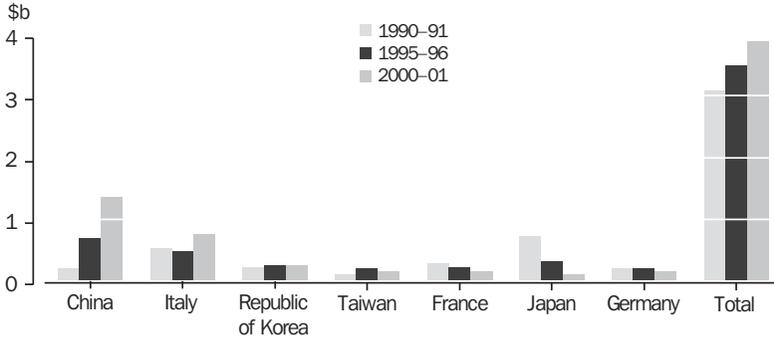
## Outlook for the industry

At mid 2002, the fortunes of the industry are uncertain. Following an improvement in wool prices over most of 2000-01, predominantly as a result of large price rises for the finer micron wools, confidence in the industry is returning. Wool producers are responding to these market signals by breeding finer micron wools than ever

before. Recent reductions in the supply of wool, in particular the depletion of the wool stockpile, are causing a turnaround in the price of wool to profitable levels. In the 12 months to June 2002, the relative price of broad micron wools has increased dramatically, and is now in some cases equal to that paid for fine wool. With these price fluctuations come producer frustration, as many wool growers invested heavily in producing finer wool, only to see the relative price of fine wool drop. The increase in the value of the Australian dollar since February 2002 reduced wool prices over subsequent months, a trend which is expected to last some time.

Latest predictions available from ABARE suggest that wool prices will trend downward over 2002-03, due mainly to weakening world markets and a strong Australian dollar. It is expected that China will play a significant role in the profitability of the wool industry in the medium-term future. However there are many in the wool industry who believe that the low supply of wool available will counteract these influences and may in fact cause an upturn in wool prices.

S16.5 WOOL EXPORTS(a), By destination



(a) Recorded trade basis.

Source: ABARE, 'Australian Commodity Statistics'.

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## Introduction

This chapter outlines the main features of two important primary industries in Australia, forestry and commercial fishing.

The forests and wood products industries, based on native and plantation forests, had a turnover in 1999–2000 of \$13.6b and employment of over 86,600 people. While the value of exports and imports of forest products is substantial (about \$1.8b and \$3.8b respectively in 2000–01), Australia is a net importer of forest products.

Australia's fisheries resources are diverse. Over 3,000 species of marine and freshwater fish, and at least an equal number of crustacean and mollusc species, occur in and around Australia. Less than 600 of these are commercially fished. However, almost all the major known fish, crustacean and mollusc resources are fully fished. Aquaculture, or 'fish farming', is an alternative to harvesting the naturally occurring fish stocks and has considerable potential as a way to ensure the sustainability of harvesting yields.

The gross value of Australian fisheries production was about \$2.5b in 2000–01, of which aquaculture accounted for 30%, its share up by one percentage point on the previous year. Exports and imports of fisheries products were valued at \$2.2b and \$1.2b respectively in 2000–01, making Australia a net exporter of these products.

## Forestry

Australia's native and plantation forests are an important natural resource providing a wide range of products and benefits to the community.

Forests are a reservoir of biological diversity and functioning ecosystems. They provide protection for soils and water resources, and are increasingly being recognised for their potential as carbon sinks. They are the foundation for a broad range of cultural and spiritual experiences for diverse groups of people and a major tourist attraction for Australians and overseas visitors, providing for a vast array of recreational and educational activities. Our forests and plantations also provide the basis for Australia's forest industries. Employment and wealth flow directly from the wood products derived from the forests, such as sawn timber, fibreboard, plywood and paper, and support a variety of other forest products and

services, such as honey, wildflowers, natural oils, gums, resins, medicines, firewood and craft wood.

The Commonwealth Government and the state and territory governments share a vision of ecologically sustainable management of the forest estate that integrates environmental, commercial and community values and uses. These values are embodied in regional forest agreements negotiated in New South Wales, Victoria, Western Australia and Tasmania.

## Forest estate

### Native forest

A forest is defined by Australia's National Forest Inventory as an area incorporating all living and non-living components, dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding two metres, and with an existing or potential crown cover of over-storey strata about equal to or greater than 20%. This definition includes Australia's diverse native forests, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands.

Based on this definition, the total area of native forest as at 30 June 2001 is estimated at 164.4 million hectares (ha), which is about 21% of Australia's land area (table 17.1). Of this area, 124.4 million ha (76%) were on public land and 37.3 million ha (23%) were on private land (Bureau of Rural Sciences 2001a). Of the publicly owned forests, 11.9 million ha (9%) were managed by state forest authorities for multiple uses including wood production, recreation and informal reserves, 17.7 million ha (14%) were on other Crown land, 74.5 million ha (60%) were on leasehold tenure and 20.5 million ha (16%) were in Nature Conservation Reserves (for further information on forests in Nature Conservation Reserves, see the article *Forest conservation*). Taking forested leasehold land together with private freehold forest, some 111.8 million ha, or 68% of Australia's forests, were under private management. (Differences between these figures and previously published estimates of forested areas are largely due to recent improvements in forest mapping, which have generated more accurate figures. This is particularly the case in South Australia.)

## 17.1 NATIVE FOREST AREAS — 30 June 2001

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha
<b>DOMINANT CANOPY SPECIES</b>									
Eucalypt									
Tall	3 946	2 396	1 073	1	171	1 116	—	29	8 732
Medium	18 288	3 483	28 790	625	20 815	1 266	22 117	84	95 468
Low	186	435	1 789	1 206	3 431	62	6 724	8	13 841
Mallee	3 102	1 045	127	6 110	4 973	—	—	—	15 357
Total	25 523	7 358	31 778	7 942	29 390	2 444	28 841	121	133 397
Acacia	12	63	7 127	1 826	3 986	73	3 513	(b)—	16 600
Melaleuca	44	90	2 094	1	155	1	1 708	—	4 092
Rainforest	467	16	2 926	—	7	598	318	—	4 332
Casuarina	67	4	140	728	40	1	—	(b)—	980
Mangrove	3	3	154	20	173	—	445	—	798
Callitris	261	50	387	248	—	1	—	—	946
Other	363	132	1 622	23	1 048	19	55	(b)—	3 262
<b>Total(a)</b>	<b>26 742</b>	<b>7 716</b>	<b>46 227</b>	<b>10 789</b>	<b>34 799</b>	<b>3 137</b>	<b>34 879</b>	<b>121</b>	<b>164 411</b>
<b>TENURE</b>									
Public									
Multiple use forest(c)	1 797	3 308	3 884	5	1 612	1 212	—	2	11 820
Nature Conservation Reserve(d)	4 899	3 006	3 225	3 933	4 364	926	46	108	20 507
Other Crown land(e)	1 801	175	1 682	373	13 206	98	332	—	17 667
Leasehold(f)	9 144	43	28 199	5 227	14 025	—	17 804	11	74 453
Total	17 640	6 532	36 991	9 538	33 207	2 237	18 182	121	124 448
Private	6 985	1 183	9 182	852	1 502	900	16 694	—	37 298
Unresolved tenure	2 117	1	54	399	90	(b)—	3	—	2 664
<b>Total(a)</b>	<b>26 742</b>	<b>7 716</b>	<b>46 227</b>	<b>10 789</b>	<b>34 799</b>	<b>3 137</b>	<b>34 879</b>	<b>121</b>	<b>164 411</b>

(a) NSW figures by forest type yet to be finalised, but total area for NSW is correct. (b) Area less than 1,000 ha. (c) Publicly owned land managed for multiple use including wood production. (d) Public land on which wood production is excluded (National Parks, etc.). (e) Reserved areas of educational, scientific and other public institutional land, including easements, defence land, and other minor tenure classifications. (f) Crown land where the right to harvest or clear land must be approved by state/territory governments. Often known as pastoral leases.

Source: Bureau of Rural Sciences, 'National Forest Inventory 2001'.

## Plantations

The combined resource of standing planted forests in Australia was 1.6 million ha planted to December 2001 (table 17.2). Of this total, industrial plantations comprised approximately 1.5 million ha, with the remainder covered by a range of joint ownership arrangements. Softwood plantations, which are dominated by the exotic species *Pinus radiata*, represented 62% (980,000 ha). Hardwood plantations, which are almost all native eucalyptus species, mainly the *Eucalyptus globulus* variety, represented 37% (588,000 ha). The proportion of the estate

accounted for by hardwood plantations is continuing to increase, up from 15% in 1994 and 29% in 1999.

A diverse range of ownership arrangements exists in the Australian plantation industry, including a variety of joint venture and annuity schemes between public and private parties. Of the standing plantation estate as at December 2001, 44% was on public land and 56% was on private land. While the area of plantations in public ownership has lessened over time, the proportion in private ownership has increased. Just over half of the resource planted since 1990 involved private ownership of land and trees, while only a quarter of the resource planted during this period involved public ownership.

## 17.2 PLANTATION AREAS — December 2001

Species type	NSW '000 ha	Vic. '000 ha	Qld '000 ha	SA '000 ha	WA '000 ha	Tas. '000 ha	NT '000 ha	ACT '000 ha	Aust. '000 ha
Hardwood	54	129	20	28	235	120	2	—	588
Softwood	270	216	181	115	103	75	5	15	980
Unknown	1	—	—	—	—	—	—	—	1
<b>Total</b>	<b>324</b>	<b>345</b>	<b>201</b>	<b>143</b>	<b>337</b>	<b>195</b>	<b>8</b>	<b>15</b>	<b>1 568</b>

Source: Bureau of Rural Sciences, 'National Plantation Inventory 2002'.

### Farm forestry

Farm forestry generally refers to the incorporation of commercial tree growing into farming systems. This may take the form of smaller scale plantations on farms, timber belts, wind breaks, alleys and wide-spaced plantings, and may also include management of native forest for commercial returns on farms.

Farm forestry is increasingly becoming adopted as part of farm management planning and integrated into existing land uses, not only to supply wood but also to provide a range of benefits such as environmental protection and increased agricultural production.

To date, plantation farm forestry has mostly occurred in higher rainfall regions (greater than 600 mm) where good growth rates can be achieved and there is an existing timber processing industry. Many farmers have also entered into farm forestry by leasing their land or

forming joint venture agreements with large-scale forest management companies. Fostering farm forestry uptake, and revegetation in general, in lower rainfall regions, will become an increasing priority in government programs designed to improve land management and ameliorate environmental degradation, especially salinity and water quality.

The baseline area for plantations owned outright by individuals having total estates less than 1,000 ha (i.e. the small-grower sector) was just on 67,000 ha in 2000, or nearly 5% of Australia's total plantation estate (Bureau of Rural Sciences 2001b). In contrast to the wider plantation estate, which mainly comprised softwoods, the farm forest resource comprised over 60% hardwoods.

The management of private native forests is recognised as an important component of farm forestry, as 23% of Australia's total native forest area is in private ownership and a further 45% is on privately managed leasehold land.

### Forest conservation

A number of threatening processes directly or indirectly jeopardise the health and vitality of forest ecosystems. These include: clearing for cropping and grazing; mining; timber harvesting; the impact of invasive species; altered fire regimes; and climate change. Impacts vary enormously in their spatial extent and the time taken for their consequences to become apparent. The processes presenting the greatest immediate threats are clearing and fragmentation of habitats, although the impacts of harvesting are particularly pertinent in forests from which timber is produced.

In recognition of the potentially adverse impacts of these threatening processes on Australia's forests, the Commonwealth Government and the state and territory governments have endeavoured to protect Australia's forest ecosystems through forest conservation. The general aim of forest conservation is to ensure that forest ecosystems and the natural processes that sustain them remain intact for their own sake and for the benefit and enjoyment of future generations (NFI 1998). This implies preservation of the suite of economic, ecological, social and cultural values of forest ecosystems. Forest conservation is an important component of ecologically sustainable forest management (see the article *Sustainable forest management*).

Across Australia, approximately 26.8 million ha of native forest are protected and conserved in reserves, representing 16% of our remaining native forest estate (table 17.3). This compares favourably with a global average of 8% reserved (AFFA 2001). Australia's protected forest estate is subject to a number of types of tenure and intentions regarding management. About 12% of the native forest estate is in Nature Conservation Reserves (20.5 million ha — see table 17.1), formally gazetted under state or territory and/or Commonwealth legislation (i.e. National Parks and Flora Reserves). The remaining conserved area occurs under tenures which are not principally managed for conservation but may afford some protection to many conservation values.

Australia's National Forest Policy Statement advocated the development of a comprehensive, adequate and representative (CAR) system of reserves for Australia's forests. The national CAR reserve system aims to safeguard biodiversity, old-growth, wilderness and other natural and cultural values of the forests. The 'comprehensive' dimension of the system aims to secure diversity across forest communities; the 'adequate' requirement ensures that the reserved areas are of sufficient size to maintain the viability and integrity of native forest populations, species and communities; and the 'representative' principle seeks to ensure that the diversity within a native forest community is preserved across its range (AFFA 2001).

Establishing a CAR reserve system is one of the key objectives of the Regional Forest Agreement (RFA) process. The RFA process adopted the nationally agreed 'JANIS criteria' to identify the areas of the forest that needed protection under the CAR reserve system. These criteria specify: the reservation of a proportion of the past extent of forest ecosystems and current rare or depleted ecosystems; the protection of old-growth and forested wilderness; and the protection of adequate high-quality habitat for forest species, particularly those considered endangered. Development of these CAR reserves is confined largely to RFA regions with forests intensively managed for timber production. The CAR reserve system is not applicable to the entire forest estate.

The RFA process added 2.9 million ha to the existing forest reserves estate, giving RFA regions a total of 10.4 million ha of forest in conservation reserves (table 17.4). This

increased the reserved forest area in RFA regions by about 39%. More than 8.5 million ha are within formal dedicated conservation reserves. The RFAs increased old-growth forest protection across the 10 RFA regions by approximately 42%, from 2.4 million ha to 3.4 million ha. As a consequence, about 68% of existing old-growth forests in RFA regions have been reserved.

### 17.3 PROTECTED NATIVE FOREST(a) — 2001

	Area of protected forest	Proportion of total native forest
	'000 ha	%
NSW	5 720	21
Vic.	5 189	67
Qld	3 665	8
WA	4 364	13
SA	3 960	37
Tas.	1 261	40
NT	2 500	7
ACT	108	89
<b>Aust.</b>	<b>26 766</b>	<b>16</b>

(a) Includes areas under conservation management that have not been formally gazetted under state or territory and/or Commonwealth legislation. Private forests informally managed for conservation are not included in the protected forest areas.

Source: Bureau of Rural Sciences 2001.

### 17.4 TOTAL RFA(a) REGIONS IN RESERVES(b) — March 2001

RFA/state	Pre-RFA(a) area	Post-RFA(a) area	Increase in reserves
	'000 ha	'000 ha	%
South-west			
WA/WA	932.6	1 047.2	12.3
East			
Gippsland/Vic.	573.6	581.1	1.3
Central			
Highlands/Vic.	177.6	293.9	65.5
North East/Vic.	394.8	591.5	49.8
Gippsland/Vic.	501.8	780.5	55.5
West/Vic.	466.4	629.3	34.9
Eden/NSW	160.4	266.1	65.9
Upper North			
East/NSW	243.7	705.0	189.2
Lower North			
East/NSW	747.0	1 367.0	83.0
Southern/NSW	1 003.1	1 401.0	39.7
Tasmania/Tas.	2 304.6	2 746.7	19.2
<b>Total</b>	<b>7 505.7</b>	<b>10 409.4</b>	<b>38.7</b>

(a) Regional Forest Agreement. (b) These figures have been agreed between Commonwealth agencies only. Some figures have not been agreed to by states and territories.

Source: AFFA 2002a.

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## Wood and paper products

Australia's wood and paper products industries are important components of Australia's primary and secondary industry sectors. They are particularly important in providing economic development and employment in many regions of rural Australia. The industries include hardwood and softwood sawmilling, plywood and panels manufacturing, woodchip production and export, and the pulp and paper industries. In 1999–2000, the value of turnover in the wood and paper products industries was \$13.6b, of which wood processing establishments (log sawmilling, timber dressing and other wood product manufacturing) contributed \$7.9b (table 17.5).

Estimates for 2000–01 show that total roundwood removed from forests fell by 4% from the 1999–2000 level, to 23.1 million cubic metres. The removal of broadleaved wood (primarily from native forests) increased marginally in 2000–01 to 11.7 million cubic metres, while 9% less coniferous wood (mainly from plantations) was removed.

In 2000–01 the value of exports of forest products totalled \$1,812m, of which 41% were woodchips and 29% paper and paperboard products. In that year the value of imports of forest products was \$3,834m, of which 54% were paper and paperboard products and 11% sawnwood. This indicates a trade deficit in forest products of \$2,022m in 2000–01. Australia produces 85% of its sawn timber needs, of which native forests provide about 33%, with the balance coming from softwood plantations. Imported sawn timber is mostly *Radiata* pine from New Zealand and Douglas fir from North America.

The hardwood and softwood sawmilling industries comprise mills of various sizes which process wood into sawn timber and other products such as veneers, mouldings and floorings. The hardwood mills are generally small scale and scattered. The softwood mills are generally larger and more highly integrated with

other wood processing facilities. Australia's production of sawn timber fell by 12% in 2000–01 to 3,523,000 cubic metres (table 17.6), of which 67% was softwood.

Other value-added timber products include plywood, wood-based panels and reconstituted wood products. Australian wood-based panels include particleboard, medium density fibreboard, and hardboard made from softwood or hardwood pulp logs, sawmill residues or thinnings.

Pulp and paper mills use roundwood thinnings, low quality logs, harvesting residues and sawmill waste, recycled paper and paperboard to produce a broad range of pulp and paper products. Around half of domestically consumed paper is imported. The majority of paper products produced domestically are packaging and industrial papers, newsprint, printing and writing papers, and tissue paper. Each requires different inputs and technologies. Recycled paper now contributes about half the fibre used in the production of paper and paperboard.

Woodchips are mainly used in the production of paper and paper products, and the woodchip export industry uses sawmill residues and timber which is unsuitable for sawmilling and not required by the Australian pulp, paper and reconstituted wood products industries. Before the advent of the woodchip export industry, much of this material was left in the forest after logging. Considerable quantities of sawmill waste material, which would otherwise be burnt, are also chipped for local pulpwood-using industries and for export. Up until 1990–91, at least 95% of woodchips exported from Australia had been eucalypt, but since then greater quantities of softwood woodchips have become available from pine plantations. In 2000–01, some 23% of the total value of woodchips exported was from softwood woodchips.

See also the article *The use of forest products in Chapter 20, Construction*.

## 17.5 FOREST AND FOREST PRODUCT INDUSTRIES, Summary of operations — 1999–2000

Industry	Employment at 30 June(a) '000	Wages and salaries(b) \$m	Turnover \$m
Forestry and logging	10.8	335.0	1 474.2
Wood and paper product manufacturing(c)			
Log sawmilling and timber dressing			
Log sawmilling	6.4	170.3	886.4
Wood chipping	0.8	38.8	513.2
Timber resawing and dressing	6.2	210.7	1 289.6
Total	13.5	419.9	2 689.2
Other wood product manufacturing			
Plywood and veneer manufacturing	1.5	53.1	272.1
Fabricated wood manufacturing	3.4	137.7	966.9
Wooden structural component manufacturing	22.2	654.2	3 244.7
Wood product manufacturing n.e.c.	6.2	145.0	682.1
Total	33.3	990.0	5 165.8
Paper and paper product manufacturing			
Pulp, paper and paperboard manufacturing	4.3	269.7	2 276.8
Solid paperboard container manufacturing	2.6	120.1	568.9
Corrugated paperboard container manufacturing	4.9	273.1	1 571.1
Paper bag and sack manufacturing	1.4	59.5	322.4
Paper product manufacturing n.e.c.	3.6	141.7	1 040.9
Total	16.9	864.1	5 780.2
Total	63.6	2 274.1	13 635.1
<b>Total forest and wood and paper products</b>	<b>74.4</b>	<b>2 609.1</b>	<b>15 109.3</b>

(a) Includes working proprietors. (b) Excludes the drawings of working proprietors. (c) Part of manufacturing industry.

Source: *Manufacturing Industry, Australia, 1999–2000 (8221.0)*; ABS data available on request, *Economic Activity Survey*.

## 17.6 PRODUCTION OF WOOD AND SELECTED WOOD PRODUCTS

Commodity	Units	1997–98	1998–99	1999–2000	2000–01
Sawn Australian grown timber					
Coniferous	'000 m <sup>3</sup>	2 327	2 338	2 637	2 351
Broadleaved	'000 m <sup>3</sup>	1 322	1 267	1 346	1 172
Total	'000 m <sup>3</sup>	3 649	3 606	3 983	3 523
Hardwood woodchips(a)	'000 t	5 665	4 856	6 164	6 402
Railway sleepers	'000 m <sup>3</sup>	62	67	40	n.a.
Plywood	'000 m <sup>3</sup>	170	169	192	157
Unlaminated particle board(a)	'000 m <sup>3</sup>	882	902	978	904
Medium density fibreboard	'000 m <sup>3</sup>	501	495	621	712
Wood pulp(a)	'000 t	958	871	861	895
Paper and paperboard					
Newsprint(a)	'000 t	444	405	464	419
Printing and writing	'000 t	424	497	535	593
Household and sanitary	'000 t	191	187	232	221
Packaging and industrial	'000 t	1 483	1 475	1 605	1 603

(a) Excludes production of small establishments with fewer than four persons employed, and establishments engaged in non-manufacturing activities but which may carry on, in a minor way, some manufacturing.

Source: *Manufacturing Survey, Australia (8221.0)*; Australian Bureau of Agricultural and Resource Economics data available on request.

## Management of forests

Land and forest management is the constitutional responsibility of state and territory governments. Each state has a forest authority responsible for the management and control of publicly owned forests, in accordance with the relevant Forestry Acts and Regulations.

The Department of Agriculture, Fisheries and Forestry - Australia (AFFA) and the Department of the Environment and Heritage (E&H) are the two key agencies with responsibilities relating to forests at the national level. Close liaison is maintained between them on relevant issues. AFFA's main responsibilities are the development of a national approach to forest management; providing advice to government on forest matters; administration of export licensing responsibilities in relation to unprocessed timber; liaison with state, national and international organisations concerned with forestry; and management of policy and program initiatives.

E&H has responsibilities for environmental matters relating to forests, and provides policy advice to the Government on conservation and environmental matters pertaining to Australia's forests, including biological diversity and climate change. The Australian Heritage Commission and Environment Australia within the Environment and Heritage portfolio have assessment, management and monitoring roles in respect of the national estate, endangered species and environmental impacts in Australia's forests.

AFFA and E&H, in close cooperation with the Australian states and territories, and other bodies, were extensively involved in the development of the National Forest Policy Statement and continue to actively participate in ongoing development of Australia's National Forest Inventory.

## Commonwealth government initiatives

### **National Forest Policy Statement (NFPS)**

The NFPS was signed by the Commonwealth and all mainland state and territory governments at the Council of Australian Governments meeting in Perth in December 1992. Tasmania became a signatory in 1995. The Statement provides a policy framework for the management of Australia's public and private forests, and outlines a vision for the ecologically sustainable management of Australia's forests. The vision has 11 broad national goals: conservation; wood production and industry development; integrated and coordinated decision making and

management; private native forests; plantations; water supply and catchment management; tourism and other economic and social opportunities; employment, labour force education and training; public awareness, education and involvement; research and development; and international responsibilities.

### **Plantation initiatives under the NFPS**

Under the NFPS, Australia is committed to expanding its plantation estate to provide additional resources for the forestry sector. The Commonwealth Government has supported the expansion of Australia's plantation resource base for many years. *Plantations for Australia: the 2020 Vision* was released in October 1997. Vision 2020 is a partnership between the Commonwealth Government, the state governments and the forest industry. This initiative, which aims to treble Australia's forest plantations estate by the year 2020, will enhance growth in Australia's forest industry and the contribution made by plantations to the Australian economy, rural communities and regional development.

### **Farm forestry**

Under the Natural Heritage Trust, the Commonwealth funds a number of farm forestry-related activities which can make a significant contribution to improving land use, leading to better soil health, water quality and vegetation condition. As well as achieving better environmental outcomes, farm forestry can become a profitable adjunct to traditional agricultural industries and provide the basis for regional wood processing initiatives.

### **Regional Forest Agreements (RFA)**

The Commonwealth signed 10 RFAs with four state governments between 1997 and 2001. The 20-year agreements in New South Wales, Victoria, Tasmania and Western Australia cover regions where commercial timber production is a major forest use. They seek to provide a balance of the full suite of environmental, social, economic and heritage values that forests can provide for current and future generations.

The agreements set out to establish a world-class forest conservation reserve system of nearly 10.4 million ha that is comprehensive, adequate and representative. The RFAs also provide certainty for forest industries and for continuous improvement in ecologically sustainable

management of the entire forest estate. More than 8.5 million ha are within formal dedicated conservation reserves.

The RFAs provide for the Commonwealth Government and the state governments to report against milestones each year and to conduct a major performance review every five years. The reviews, which began in Tasmania in 2002, are being undertaken with reference to the 'Montreal Process Indicators', nationally and internationally agreed criteria and indicators for measuring the sustainability of forest management, and other relevant criteria and indicators. See also the articles *Forest conservation* and *Sustainable forest management*.

### **Forestry Industry Structural Adjustment Program (FISAP)**

FISAP was established in 1996–97 to assist businesses and workers involved in native forest industries to adjust to changes associated with RFAs. Under shared funding arrangements with the states, the Commonwealth has allocated \$60m to New South Wales, \$19m to Victoria and \$15m to Western Australia. With RFAs now in place in those states, the focus of FISAP funding is primarily on leveraging private sector investment and employment generation in the native hardwood industry. Following the withdrawal of the Queensland Government from the RFAs process, \$5m of FISAP funds were allocated to Queensland to support investment by businesses involved in the native timber industry.

### **National Forest Inventory (NFI)**

Australia's NFI collects and communicates information on Australia's forests. It is a partnership between the Commonwealth Government and all state and territory governments, and is based in Canberra at the Bureau of Rural Sciences, a scientific research bureau of AFFA. The NFI databases contain information on native and plantation forests and a wide range of forest characteristics, including extent, type, age and tenure.

A State of the Forests Report (SOFR) produced by the NFI was released in late 1998. This comprehensive publication includes a description of the public, private, native and plantation forest estate, including use and management, and examination of the social attitudes framing public opinion on forest issues. Preparation is underway for the next SOFR, to be produced in 2003.

Information from the NFI is used to meet Australia's national and international forest-related reporting requirements.

### **National Plantation Inventory (NPI)**

The NPI is a component of the NFI, established in 1993 to provide up-to-date quantitative reporting of Australia's plantation resource. The NPI reports annually on plantation areas, new plantings, ownership and planting locations at a national and state level. Each year the NPI produces an update report, the *NPI Tabular Report*. The latest of these was launched in June 2002. The Tabular Report provides an annual snapshot of the plantation environment. Every five years the NPI produces a comprehensive report that also includes regional level plantations data and wood availability estimates. The latest report, *Plantations of Australia 2001*, also incorporated the findings of the National Farm Forest Inventory (NFFI). The NFFI, a project funded by the Farm Forestry Program, facilitated farm forest data collection by establishing a consistent framework and standards for data collection across Australia.

### **Forest and Wood Products Research and Development Corporation**

The Forest and Wood Products Research and Development Corporation was established in 1994 as a key initiative under the National Forest Policy Statement, to assist the forest industries to improve their international competitiveness and to realise their growth potential. Industry and the Commonwealth jointly fund the Corporation.

### **Commonwealth Scientific and Industrial Research Organisation (CSIRO)**

Research for the forestry, wood and paper industries addresses industrial and environmental forestry including the sustainable management of eucalypt and softwood plantations, tree breeding and genetics, wood properties and quality, forest assessment, and wood and fibre processing and products.

Most of the work for the sector is conducted by the CSIRO Forestry and Forest Products Division with other contributions from the CSIRO Divisions of Entomology, Land and Water, Plant Industry and Sustainable Ecosystems. Close links with other CSIRO divisions facilitate coordinated action on broad community and economic issues including landscape degradation, conservation of biodiversity, water quality, renewable energy, greenhouse gas emissions and carbon

sequestration, and new product options such as novel composites and environmentally benign preservation methods.

CSIRO also contributes to the forestry and forest products industries through its active participation in five Cooperative Research Centres: Sustainable Production Forestry, Greenhouse Accounting, Functional Communication Surfaces, Plant-based Management of Dryland Salinity, and Innovative Wood Manufacturing.

CSIRO research has delivered significant benefits to Australia's forestry, wood and paper industries. Recent examples include the SilviScan technology for rapid, low-cost assessment of wood properties, guidelines for effluent irrigation of forest plantations, the domestication and improvement of Australian native tree species by the Australian Tree Seed Centre, contributions to national policy and program development including the RFAs, and support to industry for the growing, management and processing of young eucalypts.

## Sustainable forest management

Sustainable forest management (SFM) is a primary objective for those agencies concerned with the management of Australia's forest resources. The Ecologically Sustainable Development Working Groups (ESDWG 1991) defined SFM as 'optimising the tangible and intangible social and economic benefits which forests can provide to the community, with the goals of maintaining the functional basis of forested land, biodiversity and the options available for future generations'. To achieve SFM, the challenge for forest managers is to strike a reasonable balance between the economic, ecological, social and cultural values of forests for current and future generations.

Australia is promoting its SFM interests in a number of international forums and mechanisms. They include the United Nations Forum on Forests, the International Tropical Timber Organisation and the Montreal Process. Australia's initiatives, including the publication of a summary of internationally agreed forest actions, are regarded as providing practical solutions for advancing SFM. Another key activity is the development of an Australian Forestry Standard as an objective benchmark for forest management. The standard will enable Australia to compete in the international marketplace.

### The Montreal Process: monitoring sustainable forest management

The Montreal Process, established in 1994, is being used as a tool to assist in the monitoring and reporting of Australia's progress toward SFM. The Montreal Process was established with the specific purpose of developing and implementing internationally agreed criteria and indicators for sustainable management of the world's temperate and boreal forests. The Montreal Process includes 12 countries on five continents, including Australia, which account for 90% of the world's temperate and boreal forests, and 45% of the world trade in forest products. Participation in the Montreal Process is voluntary and not intended to be legally binding.

The group has developed a comprehensive set of seven criteria (categories of forest values that are desirable to maintain) and 67 indicators (measurable aspects of these criteria) to characterise the state of a nation's forests and assess progress towards the goals of SFM. The seven criteria include vital ecosystem functions and attributes, socioeconomic benefits, and the laws and regulations that constitute the forest policy framework (AFFA 2002). The criteria are as follows:

1. Conservation of Biological Diversity
2. Maintenance of Productive Capacity of Forest Ecosystems
3. Maintenance of Ecosystem Health and Vitality
4. Conservation and Maintenance of Soil and Water Resources

5. Maintenance of Forest Contribution to Global Carbon Cycles
6. Maintenance and Enhancement of Long-term Multiple Socioeconomic Benefits to Meet the Needs of Societies
7. Legal, Institutional and Economic Framework for Forest Conservation and Sustainable Management.

The indicators have been modified to specifically address Australian conditions. They are divided into three broad groups for implementation at a regional level within Australia:

*Category A* — already implemented or to be implemented in the short term

*Category B* — require some development

*Category C* — require longer term research and development.

Australia's Montreal Process Implementation Group began drafting a progress report on implementing criteria and indicators of SFM in 2000–01, using a framework based on Montreal Process criteria and indicators. Joint projects with the states and territories have also improved the Commonwealth's SFM reporting capacity. This work will lead to the preparation of Australia's country report to the Montreal Process, and Australia's second *State of the Forests Report*, both of which will be published in 2003.

## References

- AFFA (Department of Agriculture, Fisheries and Forestry - Australia) 2002, *Sustainable Forest Management: Criteria and indicators for sustainable management of Australia's forests*, Montreal Process Implementation Group.
- ESDWG (Ecologically Sustainable Development Working Groups) 1991, *Final Report — Forest Use, 1991*.

## Fishing

### Production, processing, and exports and imports of fisheries products

#### Value of fisheries production

Australia's major commercially accessed species are prawns, rock lobster, abalone, tuna, other finfish, scallops, and edible and pearl oysters. Australian fishing operators concentrate their efforts on estuarine, coastal, pelagic (surface) species and demersal (bottom living) species that occur on the continental shelf.

Table 17.7 shows the quantity and table 17.8 the gross value of the production of the Australian commercial fishing industry. Australian fisheries production covers total production from both Commonwealth and state managed fisheries and from aquaculture. Gross value of production is the value placed on recorded production at the wholesale price realised in the principal markets. In general, the principal markets are the metropolitan markets in each state. However, in cases where commodities are consumed locally or where they become raw material for a secondary industry, these points are treated as the principal markets.

The gross value of Australian fisheries production (including aquaculture) rose by 4% (\$103m) in 2000–01, to \$2.5b (table 17.9) following a 13% increase the previous year. Contributing to this latest rise were a 29% increase in the value of tuna production and a 24% increase in the value of the rock lobster catch (table 17.10). As well, the values of the prawn and crab catches each rose by 10%. In quantity terms, there was a 1% increase over the year in Australian fisheries production to 230,000 tonnes, with an 11% increase in prawn production the most significant contributor (table 17.11).

Commonwealth fisheries accounted for 19% of the total value of Australian fisheries production in 2000–01 (table 17.8). Commonwealth fisheries are those managed for the Commonwealth Government by the Australian Fisheries Management Authority. State governments manage inland fisheries and aquaculture, in addition to those salt water fisheries not managed by the Commonwealth. The distribution of the management of fisheries between the Commonwealth and the states is determined following consultations held under the Offshore Constitutional Settlement Agreement.

## 17.7 FISHERIES PRODUCTION(a) — 2000–01

	NSW tonnes	Vic. tonnes	Qld tonnes	SA tonnes	WA tonnes	Tas. tonnes	NT tonnes	Cwth(b) tonnes	Aust. tonnes
<b>Fish</b>									
Tuna	28	—	—	9 051	17	—	12	(c)12 159	(d)16 105
Other	11 106	4 494	14 661	12 130	14 905	13 445	4 678	(e)44 661	120 080
<b>Total</b>	<b>11 134</b>	<b>4 494</b>	<b>14 661</b>	<b>21 181</b>	<b>14 922</b>	<b>13 445</b>	<b>4 691</b>	<b>56 820</b>	<b>136 186</b>
<b>Crustaceans</b>									
Prawns	2 600	172	9 441	2 988	2 976	—	—	(f)11 375	29 552
Rock lobster	105	587	512	2 563	11 348	1 519	—	276	16 910
Other	596	154	4 257	765	1 264	102	1 208	303	8 649
<b>Total</b>	<b>3 300</b>	<b>913</b>	<b>14 211</b>	<b>6 316</b>	<b>15 588</b>	<b>1 621</b>	<b>1 208</b>	<b>11 954</b>	<b>55 112</b>
<b>Molluscs</b>									
Abalone	305	1 409	—	920	316	2 709	—	—	5 659
Scallops	—	810	4 905	—	3 166	47	1	31	8 960
Oysters(g)	5 141	—	91	2 202	—	5 200	—	—	12 634
Other	1 524	1 364	267	2 263	1 269	436	202	(h)3 305	10 630
<b>Total</b>	<b>6 970</b>	<b>3 583</b>	<b>5 263</b>	<b>5 385</b>	<b>4 751</b>	<b>8 393</b>	<b>202</b>	<b>3 336</b>	<b>37 883</b>
<b>Total quantity</b>	<b>21 405</b>	<b>(i)9 078</b>	<b>34 135</b>	<b>(i)33 362</b>	<b>(i)35 353</b>	<b>23 459</b>	<b>6 101</b>	<b>72 110</b>	<b>229 841</b>

(a) Includes estimates of aquaculture production (except NT); excludes hatchery and inland commercial fishery production.  
(b) Total includes all fisheries under federal jurisdiction. (c) Includes the Southern bluefin, Eastern tuna and billfish, Southern and Western tuna fisheries. (d) Total has been adjusted down so as not to double count some Southern bluefin tuna caught in the Commonwealth Southern Bluefin Tuna Fishery which was used as input to farms in SA. (e) Includes the fish component of Commonwealth fisheries, plus catch from Commonwealth fisheries that cannot be disaggregated due to confidentiality reasons. (f) Includes the Northern prawn, Torres Strait, South East and other fisheries. (g) Excludes pearl oyster production. (h) Includes squid, octopus and cuttlefish from the South East and Great Australian Bight fisheries, and pearl oyster from the Torres Strait Fishery. (i) Includes production not elsewhere specified due to confidentiality.

Source: Australian Bureau of Agricultural and Resource Economics, 'Australian Fisheries Statistics, 2001'.

## 17.8 GROSS VALUE OF FISHERIES PRODUCTION(a) — 2000–01

	NSW \$'000	Vic. \$'000	Qld \$'000	SA \$'000	WA \$'000	Tas. \$'000	NT \$'000	Cwth(b) \$'000	Aust. \$'000
<b>Fish</b>									
Tuna	108	—	—	263 793	97	—	46	(c)123 931	(d)328 616
Other	35 808	21 467	92 144	24 723	34 480	98 971	21 108	(e)148 071	476 772
<b>Total</b>	<b>35 916</b>	<b>21 467</b>	<b>92 144</b>	<b>288 516</b>	<b>34 577</b>	<b>98 971</b>	<b>21 154</b>	<b>272 002</b>	<b>805 388</b>
<b>Crustaceans</b>									
Prawns	34 869	2 259	146 304	52 682	46 512	—	—	(f)190 390	473 016
Rock lobster	4 489	21 451	7 056	82 726	299 629	58 011	—	7 168	480 531
Other	5 144	1 261	27 405	4 606	10 513	2 640	11 152	3 055	65 775
<b>Total</b>	<b>44 502</b>	<b>24 971</b>	<b>180 765</b>	<b>140 014</b>	<b>356 654</b>	<b>60 650</b>	<b>11 152</b>	<b>200 614</b>	<b>1 019 322</b>
<b>Molluscs</b>									
Abalone	15 200	70 387	—	42 688	15 612	129 463	—	—	273 350
Scallops	3	1 619	26 600	—	15 896	79	3	32	44 232
Oysters	31 603	—	442	11 011	171 048	14 430	—	—	228 534
Other	6 150	3 506	1 823	5 326	15 884	3 124	1 962	(g)6 910	44 685
<b>Total</b>	<b>52 955</b>	<b>75 512</b>	<b>28 865</b>	<b>59 025</b>	<b>218 440</b>	<b>147 096</b>	<b>1 965</b>	<b>6 942</b>	<b>590 800</b>
<b>Total value</b>	<b>133 373</b>	<b>(h)127 114</b>	<b>301 775</b>	<b>(h)491 877</b>	<b>(h)610 050</b>	<b>306 718</b>	<b>(i)89 270</b>	<b>479 558</b>	<b>2 480 375</b>

(a) Includes estimates of the value of aquaculture production, but excludes the value of hatchery and inland commercial fishery production. (b) Total includes all fisheries under federal jurisdiction. (c) Includes the Southern bluefin, Eastern tuna and billfish, Southern and Western tuna fisheries. (d) Total has been adjusted down so as not to double count some Southern bluefin tuna caught in the Commonwealth Southern Bluefin Tuna Fishery which was used as input to farms in SA. (e) Includes the fish component of Commonwealth fisheries, plus catch from Commonwealth fisheries that cannot be disaggregated due to confidentiality reasons. (f) Includes the Northern prawn, Torres Strait, South East and other fisheries. (g) Includes squid, octopus and cuttlefish from the South East and Great Australian Bight fisheries, and pearl oyster from the Torres Strait Fishery. (h) Includes value of production not elsewhere specified due to confidentiality. (i) NT aquaculture has been aggregated for reasons of confidentiality.

Source: Australian Bureau of Agricultural and Resource Economics, 'Australian Fisheries Statistics, 2001'.

**17.9 GROSS VALUE OF FISHERIES PRODUCTION(a)**

	\$m
1981-82	344
1982-83	423
1983-84	449
1984-85	522
1985-86	635
1986-87	702
1987-88	828
1988-89	1 022
1989-90	1 092
1990-91	1 223
1991-92	1 376
1992-93	1 493
1993-94	1 679
1994-95	1 813
1995-96	1 690
1996-97	1 776
1997-98	1 883
1998-99	2 106
1999-2000	2 377
2000-01	2 480

(a) Includes estimates of the value of aquaculture production, but excludes the value of hatchery and inland commercial fishery production.

Source: Australian Bureau of Agricultural and Resource Economics 'Australian Fisheries Statistics, 2001'.

**17.10 GROSS VALUE OF SELECTED FISHERY PRODUCTS(a)**

	1998-99	1999-2000	2000-01
	\$m	\$m	\$m
Prawns	443	431	473
Rock lobster	412	552	481
Tuna	220	255	329
Other finfish	439	469	477
Abalone	173	221	273
Scallops	40	46	44
Oysters	45	53	57
Pearls(b)	183	190	172
Other n.e.i.(c)	151	160	174
<b>Total</b>	<b>2 106</b>	<b>2 377</b>	<b>2 480</b>

(a) Includes estimates of the value of aquaculture production, but excludes the value of hatchery and inland commercial fishery production. (b) Excludes NT. (c) Includes pearl oysters and aquaculture for NT.

Source: Australian Bureau of Agricultural and Resource Economics 'Australian Fisheries Statistics, 2001'.

**17.11 FISHERIES PRODUCTION(a)**

	1998-99	1999-2000	2000-01
	tonnes	tonnes	tonnes
<b>Fish</b>			
Tuna	16 738	16 201	16 105
Other	127 423	118 499	120 080
<i>Total</i>	<i>144 162</i>	<i>134 699</i>	<i>136 186</i>
<b>Crustaceans</b>			
Prawns	31 235	26 721	29 552
Rock lobster	19 035	20 428	16 910
Other	6 557	7 722	8 649
<i>Total</i>	<i>56 827</i>	<i>54 872</i>	<i>55 112</i>
<b>Molluscs</b>			
Abalone	5 641	5 569	5 659
Scallops	11 575	12 236	8 960
Oysters	10 731	12 046	12 634
Other	9 230	8 353	10 630
<i>Total</i>	<i>37 178</i>	<i>38 204</i>	<i>37 883</i>
<b>Total</b>	<b>238 930</b>	<b>228 209</b>	<b>229 841</b>

(a) Includes estimates of aquaculture production (except in NT); excludes production of pearl oysters in Qld and WA, and hatchery and inland commercial fishery production.

Source: Australian Bureau of Agricultural and Resource Economics, 'Australian Fisheries Statistics, 2001'.

Aquaculture, or 'fish farming', is an alternative to harvesting the naturally occurring fish stocks, and has considerable potential as a means of ensuring sustainability of harvesting yields. For more information, see the article *Aquaculture and the environment*.

In 2000-01, the value of Australian aquaculture production increased by \$59.0m (9%) (table 17.12). This increase was mainly due to a \$61.8m (31%) rise in the value of tuna production and a \$10.5m (12%) increase in the value of salmon.

**17.12 GROSS VALUE OF AQUACULTURE PRODUCTION(a)**

	1998–99	1999–2000	2000–01
	\$m	\$m	\$m
<b>Fish</b>			
Salmon	71.5	84.8	95.3
Tuna	166.7	202.0	263.8
Trout	10.9	12.9	12.8
Other(b)	12.5	15.0	14.9
<i>Total</i>	261.6	314.7	386.9
<b>Crustaceans</b>			
Prawn	42.2	51.9	49.5
Yabbies	2.4	3.7	3.4
Other(c)	2.1	2.1	2.5
<i>Total</i>	46.7	57.7	55.4
<b>Molluscs</b>			
Pearl oysters	182.6	190.5	171.5
Edible oysters	45.2	53.3	57.5
Other(d)	7.6	8.8	10.3
<i>Total</i>	235.4	252.6	239.3
<b>Total(e)(f)</b>	<b>606.1</b>	<b>687.2</b>	<b>746.2</b>

(a) Excludes aquarium fish, hatcheries production, crocodiles, microalgae and aquarium worms. (b) Includes eels, aquarium fish and other native fish. (c) Includes marron and redclaw. (d) Includes mussels, scallops, giant clams and abalone. (e) Includes NT aquaculture production which has been aggregated due to confidentiality reasons. (f) Includes production of species in SA unable to be assigned to a specific category.

Source: Australian Bureau of Agricultural and Resource Economics, 'Australian Fisheries Statistics, 2001'.

Table 17.13 shows the volume of Australian aquaculture production for the three years 1998–99 to 2000–01, with the latest year showing a 9% increase in total. In 2000–01, production of edible oysters (12,634 tonnes, a 5% increase on the previous year) accounted for the largest share of aquaculture production. Tuna and salmon production in 2000–01 increased by 16% and 12% to 9,051 tonnes and 12,223 tonnes respectively.

**Processing of fish, crustaceans and molluscs**

In Australia very little processing of fish products is undertaken which adds value to the product. Processing establishments vary in size, scope of operations and sophistication of technologies employed. The majority of establishments undertake only the most basic cleaning, filleting, chilling, freezing and packaging processes, but some have the capacity for significant product transformation. Much of the value that is added to the catch is due to correct handling and quick delivery by air to local or overseas markets.

**17.13 AQUACULTURE PRODUCTION(a)**

	1998–99	1999–2000	2000–01
	tonnes	tonnes	tonnes
<b>Fish</b>			
Salmon	9 195	10 907	12 223
Trout	1 646	1 960	1 950
Tuna	6 365	7 780	9 051
Other(b)	1 135	1 327	1 384
<i>Total</i>	18 341	21 974	24 607
<b>Crustaceans</b>			
Prawn	2 319	2 955	2 819
Yabbies	246	292	276
Other(c)	127	126	147
<i>Total</i>	2 692	3 373	3 242
<b>Molluscs</b>			
Edible oysters	10 731	12 046	12 634
Other(d)	1 949	2 065	2 551
<i>Total</i>	12 680	14 111	15 184
<b>Total(e)</b>	<b>34 143</b>	<b>39 830</b>	<b>43 602</b>

(a) Excludes NT. (b) Includes eels, aquarium fish and other native fish. (c) Includes marron and redclaw. (d) Includes mussels, scallops, giant clams and abalone. (e) Includes production of species in SA unable to be assigned to a specific category.

Source: Australian Bureau of Agricultural and Resource Economics, 'Australian Fisheries Statistics, 2001'.

**Exports and imports**

Exports of fisheries products come under Commonwealth jurisdiction, while domestic market activity is the responsibility of the states and territories.

A significant proportion of Australian fisheries production (edible and non-edible) is exported. In 2000–01, the value of exports (including live fish) rose by 9% to \$2.2b (table 17.14). Although the value of rock lobster exports fell by 8% to \$533m, this product remained Australia's highest earning fisheries export in 2000–01, accounting for 25% of the total value of fisheries products exported. Prawns, whole tuna and abalone were the next largest fish export earners worth \$291m, \$264m and \$249m respectively. (For some fisheries categories, the value of exports exceeds the value of production because exports are valued on a free on board (f.o.b.) basis which includes the value of packaging and distribution services to the point of export.)

Japan continued to be the major destination for Australian exports of fisheries products, accounting for 34% of the total value in 2000–01. Exports to Hong Kong (SAR of China) increased by 37% over the previous year, and now make up 25% of the total value. Slight fluctuations saw the

United States of America and Taiwan swap places in the rankings of destinations for Australia's fisheries exports.

Western Australia continued to be the Australian state which earned the most from the export of seafood (i.e. edible fisheries products) with sales of \$478m (28% of the total value) contributing, in value terms, 70% of Australian rock lobster exports. South Australia, the next largest earner from the seafood trade, moved shipments worth \$452m, bringing in more than half this sum from fish exports (\$272m). Queensland prawn exports earned the state \$219m out of a total \$402m worth of seafood exported.

The total value of Australian imports of fisheries products increased by 6% in 2000–01, to an estimated \$1.2b (table 17.15), although Australia remained a net exporter of fisheries products. The major item of value imported in 2000–01 was canned fish at \$188.6m. Other significant fisheries imports, in dollar terms, were fresh, chilled or frozen fillets (\$185.5m), pearls (\$182.9m) and prawns (\$175.6m). The two countries bringing the most fisheries products into Australia were Thailand and New Zealand.

#### 17.14 DESTINATION OF EXPORTS OF FISHERIES PRODUCTS(a)

Country	1998–99		1999–2000		2000–01	
	\$m	%	\$m	%	\$m	%
Japan	463	30.6	681	34.2	746	34.4
Hong Kong (SAR of China)	260	17.2	391	19.7	536	24.7
United States of America	145	9.6	188	9.4	194	8.9
Taiwan	170	11.3	211	10.6	181	8.3
Singapore	43	2.8	60	3.0	61	2.8
China	104	6.9	42	2.1	51	2.4
New Zealand	14	0.9	16	0.8	32	1.5
Spain	23	1.5	19	1.0	31	1.4
Thailand	11	0.7	8	0.4	18	0.8
United Kingdom	7	0.5	13	0.7	16	0.7
Switzerland	31	2.1	26	1.3	14	0.6
France	14	0.9	21	1.1	13	0.6
Other	226	15.0	312	15.7	276	12.9
<b>Total</b>	<b>1 511</b>	<b>100.0</b>	<b>1 988</b>	<b>100.0</b>	<b>2 169</b>	<b>100.0</b>

(a) Includes non-edible products (for example, marine fats and oils, fishmeal, pearls and ornamental fish). Excludes sea products landed abroad directly from the high seas.

Source: ABS data available on request, International Trade Special Data Service.

## 17.15 SOURCE OF IMPORTS OF FISHERIES PRODUCTS(a)

Country	1998-99		1999-2000		2000-01	
	\$m	%	\$m	%	\$m	%
Thailand	237	26.9	241	22.0	244	21.2
New Zealand	143	16.2	156	14.3	164	14.2
United States of America	61	6.9	75	6.9	75	6.5
Vietnam	32	3.6	32	2.9	44	3.8
Indonesia	19	2.2	25	2.3	40	3.5
South Africa	33	3.7	34	3.1	37	3.2
Malaysia	25	2.8	32	2.9	36	3.1
India	15	1.7	15	1.4	35	3.1
Canada	27	3.1	24	2.2	26	2.3
Taiwan	22	2.5	21	1.9	26	2.3
Peru	10	1.1	16	1.5	26	2.3
Japan	26	3.0	34	3.1	23	2.0
China	13	1.5	14	1.3	22	1.9
Chile	21	2.4	23	2.1	21	1.8
Singapore	11	1.3	12	1.1	11	1.0
Hong Kong (SAR of China)	11	1.3	13	1.2	9	0.8
Other	175	19.8	325	29.8	311	27.0
<b>Total</b>	<b>880</b>	<b>100.0</b>	<b>1 091</b>	<b>100.0</b>	<b>1 152</b>	<b>100.0</b>

(a) Includes non-edible products (e.g. marine fats and oils, fishmeal, pearls and ornamental fish).

Source: ABS data available on request, International Trade Special Data Service.

## Fisheries resources

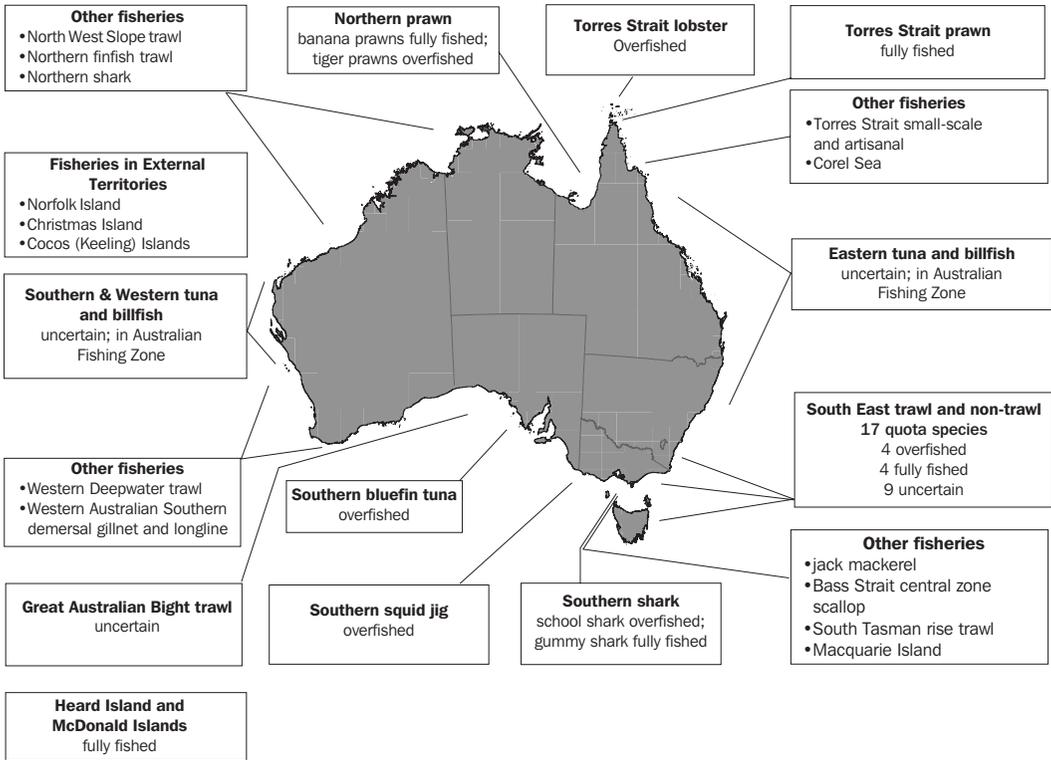
The Australian Fishing Zone (AFZ) covers an area 16% larger than the Australian land mass and is the third largest fishing zone in the world. Map 17.16 shows the status of Australia's Commonwealth managed or jointly managed fisheries resources. See also the article *Fishing and the environment*.

The 186,000 tonnes of produce harvested from the AFZ are insignificant by world standards, reflecting low productivity of the oceans rather than underuse of the resource. While some species are considered to be over-harvested,

some fish resources such as albacore and Southern whiting are not being used optimally. Over 3,000 species of marine and freshwater fish, and at least an equal number of crustacean and mollusc species, occur in and around Australia. Less than 600 of these are accessed commercially.

The level of fishing activity has increased over the last decade to the point where almost all the major known fish, crustacean and mollusc resources are fully used. Some major species such as Southern bluefin tuna, gemfish and shark have suffered serious biological depletion.

17.16 STATUS OF COMMONWEALTH MANAGED OR JOINTLY MANAGED FISHERIES RESOURCES



Source: Bureau of Rural Sciences.

## Fishing and the environment

A significant issue for fisheries in Australia is to ensure the ecological sustainability of wild fish stocks in the long term so that ecosystems that are fished remain diverse and healthy. Fishing also has impacts on the marine environment beyond the species it targets. This article focuses on the environmental impacts of various fishing activities on the marine environment, particularly the impact of commercial fisheries. Recreational fishing, which accounts for 13% by weight of total fish caught, and Indigenous fishing, are beyond the scope of the article.

### The Australian marine environment

Australia's marine area is one of the largest in the world, extending over about 16 million square kilometres. This is more than double the continent's land area. Australia's ocean domain

includes all ocean temperature zones (based on sea surface temperature), from tropical to polar. Australia's marine environment is very diverse in terms of the different physical features, species and ecosystems, and fisheries management and conservation vary from region to region (SoE 2001b). Of the 33 major animal groups, 28 are found in the sea and 13 are exclusively marine (DEST 1993). Australia has 5,250 known species of fish of which 4,150 have been described and 90% are endemic (only found in Australian waters). There are 9,500 species of crustaceans of which 6,426 have been described. Molluscs account for 12,250 species of which 90% are endemic with 9,336 of the molluscs described (SoE 2001a). Most of Australia's endemic marine species are found in the waters south of the

continent (Zann 1995a). *Chapter 14, Environment* contains more information on marine biodiversity.

### Status of Australian fisheries

A complete summary of the condition of all of Australia's fish stocks is not yet possible due to the different reporting approaches in the various Commonwealth, state and territory fisheries. One of the problems in attempting to assess the overall status of fisheries is that there is no national fisheries statistics database from which to assess trends (SoE 2001b).

Australia's commercial fishing fleet consists of approximately 10,000 vessels spread across the Commonwealth, state and territory fisheries. In the mid 1990s, approximately 200 different species of fish, 60 species of crustaceans and 30 species of molluscs were fished commercially (McLoughlin et al. 1993). By 2001, nearly 600 marine species were commercially fished.

A key finding in the 1996 State of the Environment report (SoE 1996) found that most Australian fisheries stocks were fully fished with little room for further development; management regimes were partly effective and improving; the effects of fishing on habitat and non-target species were largely unknown (SoE 2001b) (see map 17.16). Following are definitions of the classifications used.

*Underfished* — a fish stock that has the potential to sustain catches higher than those currently taken. The classification is not applied to stocks that are subject to limited catches while rebuilding from overfishing.

*Fully fished* — a fish stock from which current catches and fishing pressure are close to optimum. Categorising a species as 'fully fished' implies that increased fishing pressure or catches (allowing for annual variability) may lead to overfishing.

*Overfished* — a fish stock in which the amount of fishing is excessive or for which the catch depletes the biomass below a specified limit; or a stock that reflects the effects of previous excessive fishing. While both conditions are covered in Fishery Status Reports (BRS nd) by a classification of overfished, it is important to recognise the distinction between overfished stocks and overfishing. A management regime might curtail overfishing, but it can still be some

time (perhaps many years for some species) before a stock recovers; so a classification of overfished persists.

*Uncertain* — a fish stock that may be underfished, fully fished or overfished but for which, there is inadequate information to determine its status (ABARE 2002).

### Depletion of marine resources

Although fish are a renewable resource, fisheries production of a number of species has been declining since the late 1980s (Kearney 1995). Reasons for declines in some fisheries include overfishing, use of non-selective fishing gear, loss of habitat, pollution (see *Chapter 14, Environment*), natural disaster, and Australia's marine jurisdictional complexity which hinders management of a fish stock or population. Management of fisheries ecosystems, as opposed to the management of single species, is an important step towards better management of marine resources. The loss of a few key species has the potential to destroy whole ecosystems. For example, krill, 'the world's most abundant crustacean', has a key role in southern waters. Krill is the staple diet of many seals, whales, fish, squid, penguins and other seabirds, making it significant in the conservation of many species. If krill were to disappear, most of the creatures that feed on them would disappear (AAD 2000). There are very few examples in which fisheries management can claim clear success in achieving regulatory goals. The Western Australian Western Rock Lobster Fishery and the Tasmanian Abalone Fishery have managed to rebuild stocks over several years.

### Impacts on target species

Species that are particularly vulnerable to fishing activities are usually slow growing, low breeding (it produces a low number of eggs compared to other fish), long-lived marine species that aggregate for their spawning. For example, the 'overfished' Eastern gemfish, taken in the Commonwealth South East Trawl Fishery off southern New South Wales, was fished excessively in the 1970s and 1980s, and as a result it is still vulnerable. A zero catch limit was set from 1993 to 1996. The total allowable catch (TAC) for 1997 was set at 1,000 tonnes, but the catch was only 393 tonnes. Scientific advice was that the TAC for 1998 should be zero, but a total of 500 tonnes was allocated to cover bycatch (see *Impacts on non-target species* for

definition) and reduce discarding. The catch, however, was only 214 tonnes. The 1999 allocated catch for bycatch was 250 tonnes (actual catch 158 tonnes), and in 2000 the allocated catch for bycatch was reduced to 200 tonnes. Eastern gemfish remain vulnerable to targeted fishing as it congregates for its spawning run (SoE 2001b).

### Impacts on non-target species

In some fisheries, large numbers of other species (non-targeted species) are also taken. These are termed 'bycatch', which refers to the species that are taken incidentally in a fishery. Bycatch species are usually of lesser value and of greater quantity than the target species, and are sometimes discarded. Management of bycatch is of particular concern as little is known about the impacts of retained or discarded bycatch on marine ecosystems.

The components of fishing bycatch can be described as:

- the non-target species retained (byproduct)
- the non-target species discarded
- the other non-target species affected by fishing gear, but which do not reach the deck.

### Attempts to reduce bycatch

As a response to the significant issues and impacts of bycatch on the marine environment, the Commonwealth developed a National Bycatch Policy in 1999 and a Commonwealth Bycatch Policy in 2000. By the end of 2001, Bycatch Action Plans were developed for 14 of the 21 Commonwealth fisheries. Turtle exclusion devices (TEDs) and bycatch reduction devices (BRDs) allow escape and have been trialled in the Northern Prawn Fishery since 1993. They became compulsory in this fishery in 2000. Seal excluder devices are currently being trialled in the South East Trawl Fishery. These projects show that the use of TEDs and BRDs has resulted in a substantial decline in the catches of large animals such as turtles, stingrays and sharks. However, the use of BRDs in this fishery seems to have had little impact on the catch of the smaller, more abundant bycatch. The Commonwealth Government has provided just over \$1m from the Natural Heritage Trust to establish the SeaNet extension service. The project is focused on increasing the rate of adoption by the commercial fishing

sector of new fishing gear and practices to aid bycatch reduction and to implement environmental best practice (SoE 2001b).

### Trawling

Trawling is one of the most widely used commercial fishing methods in Australia. Demersal trawling makes contact with the sea floor and therefore it can have substantial impacts on seabed habitats and benthic (occurring at or near the bottom of a water body) ecosystems (Harris & Ward 1999). The extent of essentially indiscriminate impacts can be significant, including physical removal, disturbance of organisms and non-living components and increases in water turbidity. The nature of the catch in trawl fisheries other than the target species can include threatened species (e.g. turtles) and invertebrate (e.g. jellyfish) and large amounts of non-target species. Nearly 10,000 turtles are caught accidentally by trawl fishing each year in northern Australia, but an estimated 90% of these are released alive (SoE 2001b). Australia has about 30 of the world's 50 sea snakes, around half of which are endemic. They are quite fragile animals and it has been estimated that between 10% and 40% taken in trawls die once released (Zann 1995b).

Repeated trawling may prevent the recolonisation of benthic species, both sedentary and mobile. Seamounds (sites of highly valued marine biodiversity) have been trawled for orange roughy and some have been damaged by this activity. Trawl nets may dislodge attached species such as sponges and modify the habitat and food chains. Possible effects of trawling also include changes in food webs, such as increased populations of scavengers such as seabirds, fish and crabs. A 1996 study by the CSIRO and the Queensland Department of Primary Industries showed that each pass of the trawl along the sea bed removes about 5% to 25% of the seabed life. However, there is a cumulative effect; seven trawls over the same area of seabed removed about half the seabed life, and 13 trawls removed 70% to 90%. In the far northern Great Barrier Reef Marine Park, for every tonne of prawns harvested, about six to ten tonnes of other species are discarded (SoE 2001b). A study on the environmental effects of prawn trawling (Poiner et al. 1998) found that about one-third of bycatch species were crustaceans

and two-thirds fish. Zoning in the Great Barrier Reef Marine Park prohibits trawling on about 20% of the sea floor (Zann 1995a).

There are both Commonwealth and state fisheries laws under which fisheries are managed through general regulations or other statutory methods. There are various methods to manage each fishery such as size and catch limits and gear restrictions. The *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (the EPBC Act) came into force in July 2000. It requires an assessment and approval process for activities that are likely to have a significant impact on the Commonwealth marine environment, on nationally threatened species and ecological communities, and on internationally protected migratory species. The Act also requires that all Commonwealth managed fisheries have their own environmental impact strategically assessed. One of the most significant legislative changes is the removal of the general exemption of most marine fish from export control regulation under the *Wildlife Protection (Regulation of Exports and Imports) Act 1982* (Cwlth). The removal of the exemption makes the taking of marine native species consistent with the taking of terrestrial native species. This change comes into effect in December 2003. Before a fishery can become exempt from the Act, it must show that the fishery is ecologically sustainable in terms of its impact on: target species, non-target species and bycatch, and the ecosystem generally (including habitat) (SoE 2001b).

### Longline fishing

Longline fishing involves setting baited hooks along a line up to 100 km in length behind a boat. The line is deployed at various depths and is a particular threat to several non-target species, especially seabirds (EA 2000). The death rate of albatross averages 0.4 birds per 1,000 hooks deployed. The number of hooks set annually is high, between 50 and 100 million in the world's southern oceans alone (Robertson 2001). The interaction of sea birds that feed in open waters with longline fishing vessels can be fatal and considerable concern has been raised about the effect of longlining on populations of albatross and on some species of petrels. Species of albatross are particularly at risk, not only because of the number of birds caught, but also because of their breeding patterns. Albatross are now listed as vulnerable by the Commonwealth Government. The Government put in place a threat abatement plan in 1998

with the aim of reducing bycatch to one bird per 20,000 hooks set. This is a reduction of 90% over a five-year period through techniques such as setting baits at night when seabirds are less active (EA 2000).

### Ghost fishing

Ghost fishing refers to the lost, damaged or abandoned fishing nets and traps out at sea that continue to catch fish and other marine creatures. Worldwide, many thousands of marine mammals, turtles and seabirds die each year from swallowing plastic bags and other objects, or get trapped in discarded fishing gear. Fishing litter such as net fragments, ropes and bait straps may entangle marine animals, strangling or drowning them. In southern Australia, seals often get their necks entangled in lost or discarded fishing gear. It is estimated that at any one time around 500 seals in Tasmanian waters and 45 seals at Victoria's Seal Rocks have 'collars' of plastic litter (Zann 1995b). A study by the Bureau of Rural Sciences in 1989–91 of the composition of neck collars on entangled seals shows that trawl nets constitute the highest proportion followed by packaging bands.

### Illegal fishing

Illegal, unreported and unregulated fishing is a growing problem. Illegal fishers generally damage marine ecosystems in a number of ways. They typically remove unsustainable numbers of their target species from the marine environment and often capture large amounts of bycatch due to indiscriminate fishing methods. This contributes significantly to the decline in fish stocks and undermines their sustainable management within the AFZ and worldwide. Illegal fishers also often abandon fishing gear to avoid apprehension, endangering non-target species in the environment (SoE 2001b). Periodically, larger trawlers and longliners of various nationalities are apprehended fishing illegally in Australian waters.

For further information on protection of the marine environment see *Chapter 14, Environment*.

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## Fisheries legislation

The Commonwealth has jurisdiction over waters between three and two hundred nautical miles seaward of the territorial sea baseline of Australia and its external territories. This area, referred to as the AFZ, covers a total of 8.9 million square kilometres. Conversely, the states and the Northern Territory have jurisdiction over inland fisheries and marine waters up to three nautical miles seaward of the territorial sea baseline. To aid the management of Australian fisheries, arrangements known as

Offshore Constitutional Settlements have been entered into, which transfer jurisdiction from the Commonwealth to the state or territory.

### **Fisheries Management Act 1991 (Cwlth) and the AFZ**

The *Fisheries Management Act 1991* (Cwlth) is the main fisheries legislation, and applies to commercial fishing for swimming and sedentary species in the AFZ. The establishment of the AFZ in 1979 brought portions of oceanic tuna stocks, and demersal and pelagic fish stocks previously accessed by foreign fishing vessels, under Australian control.

Fishery management plans are central to the Act and contain all essential rules applying to the management of a fishery. A management plan normally operates through a system of statutory fishing rights, which allows long-term access to the fishery. The Act also provides for limited term fishing permits, which are primarily designed for the management of fish resources that are not yet under a management plan. Individual transferable quotas (ITQs) are commonly used to achieve a reduction in fishing levels. A particular fishery is assigned a total allowable catch, and the market for ITQs will determine the most efficient allocation of resources.

Australia has an international obligation, under the United Nations Convention on the Law of the Sea, to allow foreign nations access to surplus domestic fish stocks within the AFZ where such access does not conflict with Australian management and development objectives. To facilitate the process, the Act allows Australia to make bilateral agreements or joint venture arrangements with the government or commercial interests of other countries, under which foreign fishing licences will be granted.

### **Australian Fisheries Management Authority**

The *Fisheries Administration Act 1991* (Cwlth) establishes the Australian Fisheries Management Authority (AFMA) and specifies its functions. These include a duty to engage in appropriate consultation and to devise and implement management plans, adjustment programs and exploratory/feasibility fishing programs. AFMA is also to establish priorities for management-related research and arrange for such research to be undertaken.

### **Other legislation**

The *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) replaces the *Whale Protection Act 1980* (Cwlth) and the *Endangered Species Protection Act 1992* (Cwlth) in providing protection for all cetaceans (whales, dolphins and porpoises) in Commonwealth waters. The Australian states and territories have similar legislation. Australia supports a ban on whaling in international waters and is progressing this through the International Whaling Commission processes.

The *Fishing Levy Act 1991* (Cwlth), *Foreign Fishing Licences Levy Act 1991* (Cwlth) and *Fisheries Agreements (Payments) Act 1991* (Cwlth) enable the imposition of management levies and access fees payable by Australian and foreign fishermen, foreign governments and foreign commercial interests. The *Statutory Fishing Rights Charge Act 1991* (Cwlth) enables a charge to be levied on the grant of new fishing rights.

The *Primary Industries and Energy Research and Development Act 1989* (Cwlth) saw the establishment in July 1991 of the Fisheries Research and Development Corporation. This body investigates and evaluates the requirements for research and development in relation to the fishing industry; coordinates and funds such research and development activities; and facilitates the dissemination, adoption and commercialisation of results.

The *Torres Strait Fisheries Act 1984* (Cwlth) gives effect in Australian law to the fisheries elements of the Torres Strait Treaty. The Act applies in the area of Australian jurisdiction in the Torres Strait Protected Zone, and in areas outside but near that zone that have been proclaimed in respect of particular fisheries which Australia and Papua New Guinea have agreed to manage jointly under the treaty or which are referred to in the treaty.

## Aquaculture and the environment

Aquaculture, as defined by the Food and Agriculture Organisation (FAO 2001) is:

the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Farming implies some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, and so on. Farming also implies individual or corporate ownership of the stock being cultivated. For statistical purposes, aquatic organisms which are harvested by an individual or corporate body which has owned them throughout their rearing period contribute to aquaculture, while aquatic organisms which are exploitable by the public as a common property resource, with or without appropriate licences, are the harvest of fisheries.

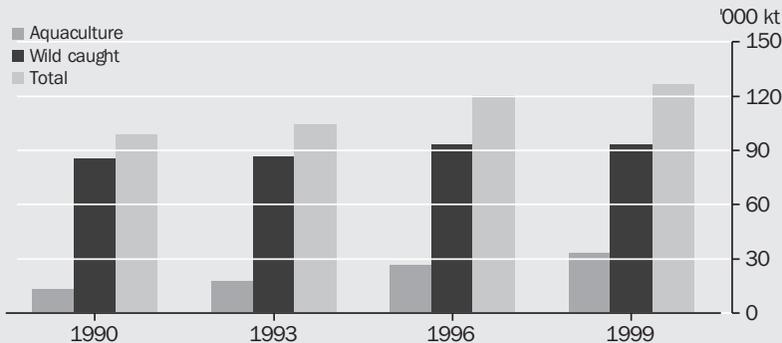
The two characteristics that therefore distinguish aquaculture from capture fisheries production are intervention in the rearing process and ownership of the stock being cultivated. This article addresses Australian aquaculture in a global and local context. It focuses on Australian systems of aquaculture production and associated environmental impacts. It also includes some positive outcomes and management practices.

### Global aquaculture production

Fish supplies from traditional marine and inland capture fisheries are unlikely to increase substantially in the future and aquaculture production will need to rise to help satisfy growing world demand for fisheries products (FAO 1997).

The world's aquaculture industries are expanding rapidly, including the Australian aquaculture industry. Global aquaculture production has more than doubled in weight and value in the past 10 years (New 1999). During the period between 1990 and 1999, global production of wild caught fisheries rose by 7.3 million tonnes (9%), and global aquaculture production rose by 20.2 million tonnes (155%) (graph 17.17). In 1999, aquaculture accounted for 33.3 million tonnes (26.4%) of total world production of finfish, crustaceans and molluscs. Nearly all (98%) of world aquaculture production was produced in 30 countries, with China alone accounting for 22.8 million tonnes (69%) of world production in that year (ABARE 2002).

17.17 WORLD FISHERIES PRODUCTION(a)



(a) Finfish, crustaceans and molluscs for selected years.

Source: FAO 2001.

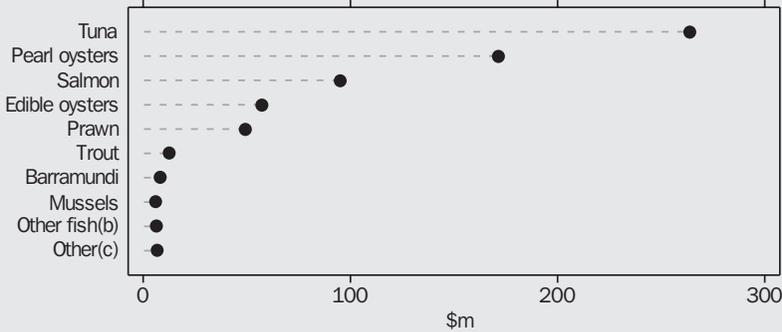
### Australian aquaculture production

The Australian aquaculture industry (see tables 17.12 and 17.13) occurs in diverse environmental areas including tropical, subtropical and temperate sectors. The production of juveniles of several species of finfish, molluscs and crustaceans has been undertaken for some years, initially for restocking wild populations and more recently as stock for grow-out operations providing mature fish to restaurants and export markets. The location of aquaculture is dependent on seasonal factors, the type of species being cultivated, the stage of aquatic organisms in their life-cycle and proximity to marine parks.

Point-source pollution from aquaculture is increasingly subject to regulation. For example, in the Great Barrier Reef region new regulations were established in 1999 to control the quality of aquaculture discharges (SoE 2001). It is likely that aquaculture in regional areas will experience strong growth due to the lack of suitable sites and high competition for coastal zones near metropolitan cities.

Over the past 30 years there has been a significant increase and diversification of aquaculture species farmed in Australia. Of the approximately 60 different species farmed, the major contributors are tuna, pearl oysters, salmon, edible oysters and prawns (FRDC 2000) (graphs 17.18 and 17.19).

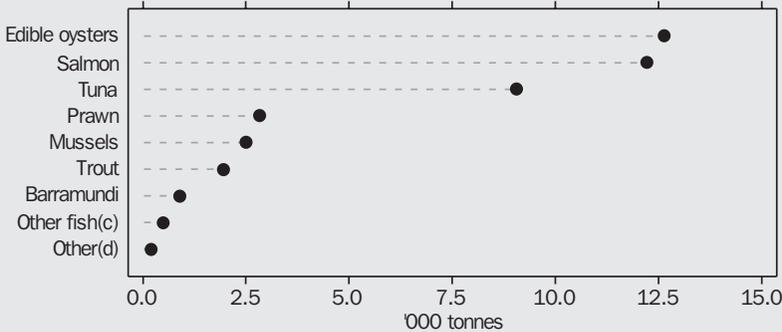
17.18 AQUACULTURE, Value of production(a) — 2000–01



(a) Excludes NT aquaculture, hatchery production, crocodiles, algae and aquarium worms. (b) Includes silver perch, eels, other native fish and aquarium fish. (c) Includes yabbies, marron, redclaw, scallops, giant clam and abalone.

Source: ABARE 2002.

17.19 AQUACULTURE, Volume of production(a)(b) — 2000–01



(a) Excludes NT aquaculture, hatchery production, crocodiles, microalgae and aquarium worms. (b) Quantity of pearl oysters are not available. (c) Includes silver perch, eels, other native fish and aquarium fish. (d) Includes yabbies, marron, redclaw, scallops, giant clam and abalone.

Source: ABARE 2002.

Australian aquaculture production rose by 146% in the decade to 2000–01, compared to a rise of 46% for the total gross value of fisheries production (graph 17.20; see also tables 17.12 and 17.13). In 2000–01, aquaculture accounted for 30% of the total gross value of fisheries production, to the value of \$746m, for 43,602 tonnes produced, compared with \$237m in 1990–91 (ABARE 2002). Prawn farming production rose from 15 tonnes in 1984 to 2,800 tonnes in 2000–01. Australian aquaculture is expected to continue to show strong growth for the next 10 years and, on current estimates, the value of production will be in excess of \$1b by the end of this period. The industry directly employs about 5,000 people (ABS 2002), provides regional development opportunities in rural Australia and contributes to export growth. Nevertheless, total production is low compared to that in other countries.

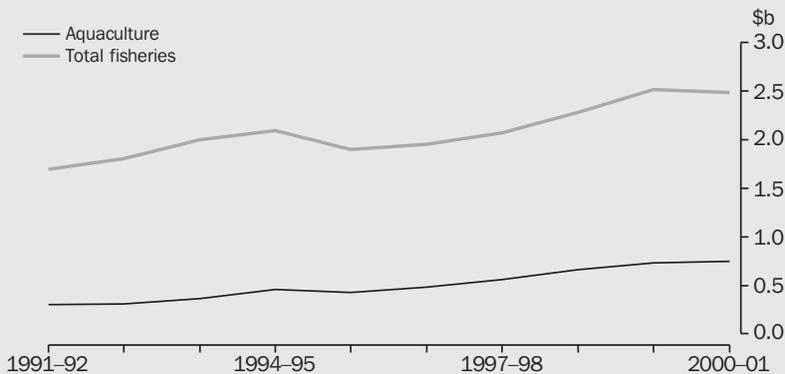
### Aquaculture systems

There are many types of aquaculture systems using a variety of management techniques. The main emphasis of the industry is on producing high value species in near-shore or land-based sites within the coastal zone; only about 10% of total production value is from freshwater species (Preston et al. 1997). Systems can be open or closed depending on the water flow. Open systems allow water to move through the cages such as in open seas or flowing rivers. In closed systems, the water flow is contained as in a lake or an aquarium. In some cases, more than one aquaculture system is used for the farming of a single species; for example, in the south-east of Tasmania, in the Huon Estuary,

juvenile Atlantic salmon are hatched in freshwater facilities and, after several months of growth, they are transferred to acclimatisation ponds where the salinity of the water is gradually increased. After about eight months the salmon are transferred to open sea cages, where they are grown to a marketable size (Brown, Van Landeghem & Schuele 1997). Trout are usually farmed in conjunction with Atlantic salmon, in ocean water cages and marketed as ocean trout. Freshwater trout are also produced on small farms, often for the tourist trade through the provision of 'catch your own trout' ponds and dams.

Fish farming is one type of aquaculture that involves intensive cage culture of fish in multiple use water bodies. This method represents a more demanding challenge to achieving environmentally sustainable production than any other form of aquaculture. This is a result of the high level of input of nutrients to the water body in the form of fish faecal waste and uneaten food (Gowan & Bradbury 1987). Tuna and salmon are the two main species farmed in open sea cages in Australia. For example, wild juvenile Southern bluefin tuna are caught, then towed in special purpose-built towing cages to offshore farms where they are placed in floating sea pontoons in the coastal waters off Port Lincoln, South Australia. Tuna are fed on wild pilchards, jack mackerel and squid (Holland & Brown 1999). Initial tuna aquaculture production in 1991 of 26 tonnes increased to 2,089 tonnes in 1997 (Allan 1999). By July 2001, 9,051 tonnes of tuna were produced by aquaculture in South Australia, to the value of \$263.8m (ABARE 2002).

17.20 AQUACULTURE AND FISHERIES, Value of production



Source: ABARE 2002.

Land-based aquaculture production systems in Australia include shallow ponds, freshwater dams and controlled environment indoor tanks in inland or coastal regions (Allan 1999); such systems tend to have lower operational costs than off-shore sites. For example, prawns are farmed in ponded areas along coastal waters and account for the highest proportion of pond aquaculture production in Australia. The majority of aquaculture prawn production in Australia is of black tiger prawns and kuruma prawns. Crustaceans such as yabby, redclaw and marron are farmed in dams and natural water bodies. Abalone are farmed in high technology on-shore tank facilities in which they spend their entire lives in a fully controlled environment (Brown, Van Landeghem & Schuele 1997).

### Environmental impacts

The environmental impacts of aquaculture vary according to the species cultivated, the management practices used and location of the production system (Preston et al. 1997). Aquaculture has the potential to alter coastal foreshores, estuaries, mangroves, salt marshes, and marine and other aquatic environments. The main environmental impacts of aquaculture are water pollution, pest species, the strain placed on wild fish populations for brood and feed purposes, and the culling of natural predators.

Water pollution from aquaculture is usually caused by faecal and urinary products, uneaten fish food, chemicals and antibiotics or vaccines used to control diseases. These may result in the significant organic pollution and increased turbidity of the water and the sea floor sediments in the vicinity of the cages, resulting in the temporary disappearance of animals and plants that live on or in the seabed. The contribution of effluent into waters already experiencing impacts can be significant (SoE 2001). Less than 30% of the protein in aquaculture feed is retained by the species farmed; the rest is either excreted or not eaten (CSIRO 1998). As an example of water pollution from aquaculture, the 110 hectares of prawn farms situated in the Logan River catchment in southern Queensland produce around 45 tonnes of nitrogen effluent. As a response, the Australian Prawn Farmers Association decided to implement national environmental practices which will ensure that prawn farming has no detrimental effect on water quality (SoE 2001). The regions of greatest concern are those

adjacent to unique and environmentally sensitive areas such as the Great Barrier Reef Marine Park (see the article *The Great Barrier Reef Marine Park* in *Chapter 22, Tourism*), and other marine parks (Preston et al. 1997). Tuna farming in feedlots can generate a significant amount of pollution (Parliament of South Australia 2000) and recent research suggests that pollution is causing the sudden appearance of strange micro-organisms capable of poisoning fish (SoE 2001).

Aquatic pest species (native or exotic) have the potential to adversely affect wild fish stocks and their environment when they escape from aquaculture production systems. Escaped fish can, for instance, cross breed with wild fish, and this may have effects on the genetic integrity and survival of fish stocks (Holland & Brown 1999). Escaped fish may also contribute to the transfer of disease or may be in direct competition for habitat with wild stocks. Farm fish escape into the wild because of human error, storm and predator damage to net cages and inadvertent release during transport. While much is still unknown about diseases and their impacts, they have the potential to cause significant damage to wild fish and other aquatic plants and animals. For example, the marine protozoan pathogen *Neoparamoeba pemaquidensis*, that occurs seasonally in Atlantic salmon in Tasmania, is now regarded as a major disease which costs the industry \$10m to \$15m annually (SoE 2001).

Where aquaculture operations depend on wild-caught juvenile fish for brood stocks, there can be an effect on the wild populations (SoE 2001). Threats to wild fish stocks may also arise due to a high demand for wild captured fisheries (e.g. pilchards and anchovies) for the sourcing of feedstock and fishmeal. Aquaculture often uses fishmeal to feed farmed species; an estimated 2 kg of fishmeal are required to produce 1 kg of farmed fish or prawns, which places pressure on the fish species used for fishmeal (WRI et al. 2000). The harvesting of larger fish, to meet the need for cost-effective food regimes, may also add further pressure to wild fish stocks due to the lack of alternative fish food (Preston et al. 1997).

Natural predators such as sea birds and sea mammals in the vicinity of aquaculture farms are susceptible to unnatural dangers like entanglement and illegal killing of protected species. For example, dolphins, whales and seals can become entangled in the predator

exclusion nets, such as those that surround the main nets of many tuna farm cages (SoE 2001). The South Australian Museum has been collecting records of dead and stranded dolphins around the South Australian coast for many years. In an initial study of the problem (Kemper & Gibbs 1997), at least 13% of all dolphin carcasses studied were believed to have died as a result of entanglement, including many in the tuna feedlots near Port Lincoln.

### Positive environmental outcomes

Aquaculture provides the basis for improved biological understanding of Australia's native marine and freshwater species and can be used to re-establish populations of endangered and threatened aquatic species (ABS 1997).

Aquaculture restocking programs are used to improve the catch in both commercial and recreational fisheries. Some species have intensive research and development programs in place, such as abalone, prawns, oysters and lobster. For example, some abalone that are produced in hatcheries are placed in specific coastal areas where depleted reefs are reseeded for future harvesting (Brown, Van Landeghem & Schuele 1997). The detailed research gathered on some marine species will help maintain healthy stocks in the wild and help preserve their genetic integrity. Scientific investigation and monitoring have an essential role in understanding and evaluating the boundaries of risk to help minimise negative environmental impacts.

### Management practices

In Australia, state and territory governments are responsible for the development of Australian aquaculture. A number of states have aquaculture and local development plans in place. In 1994, a National Strategy for Aquaculture was established and in 1997 a review of this was completed. It highlighted the need for improved management of natural resources such as land and water (Holland & Brown 1999). By May 2000, an Aquaculture Action Agenda program was designed to assist government and industry to develop strategies. The program aimed to maximise industry growth opportunities; increase export opportunities; improve innovation, research and development, and expand the skills base of people working in the area as many skills in aquaculture are still a limited expertise.

Regulatory or prescriptive instruments used to manage resource use are approaches where controls are implemented, compliance is monitored and non-compliance is penalised (ABARE 1993). Some of the mechanisms used to help manage aquaculture whereby operators access stocks by trading with other operators for harvest rights include:

- environmental impact assessments
- siting guidelines
- standards
- pricing mechanisms
- deposit refund schemes
- emissions trading
- monitoring schemes
- zoning
- bans
- restrictions
- buffer zones
- individual transferable quota schemes.

Many industry associations have developed codes of practice for their particular aquaculture operations, for example the Australian Prawn Farmers Association and the Australian Tuna Boat Owners' Association (Caton & McLoughlin 2000).

Management of other land-based activities becomes crucial to the maintenance of coastal water quality for aquaculture as these are generally conducted on a much larger scale. Increasingly, there is a need for planning authorities to engage in integrated catchment management, considering all activities that may affect a waterway rather than attempting to regulate aquaculture in isolation (SoE 2001). The viability of all aquaculture operations is directly dependent on the maintenance of a healthy and productive aquatic environment. It is in the interest of aquaculture operators to ensure minimal pollution and to prevent negative environmental impacts (Holland & Brown 1999). In some countries, the uncontrolled expansion of aquaculture has resulted in environmental degradation and pollution, raising doubts about the long-term sustainability of some aquaculture systems. A conservative approach to aquaculture management has prevented uncontrolled development in Australia (Preston et al. 1997).

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## Recreational fishing

It is estimated that over five million Australians take part in recreational fishing in Australia as a leisure activity. Some 120,000 people were identified as members of fishing clubs in 1996–97. Recreational fishing also supports about 90,000 Australian jobs. Two main industries are involved, the Australian fishing tackle and bait industry (with an annual turnover in excess of \$170m), and the recreational boating industry, (with an annual turnover of around \$500m of which 60% is related to fishing in one way or another). It is estimated that international tourists spend over \$200m on fishing in Australia each year. Current statistics on the quantity of seafood caught by recreational fishers are difficult to find. However a survey undertaken by the ABS in the early 1990s showed that recreational fishing accounted for around 23,000 tonnes of fish, 2,800 tonnes of crabs and approximately 1,400 tonnes of freshwater crayfish.

Recreational fishing is particularly important from a regional perspective, with significant flow-on benefits, such as providing employment opportunities in the tackle, boating, tourism, fishing charter and associated industries in many coastal and rural areas. Most of Australia's recreational fishing is undertaken along the coast and estuaries of New South Wales, Queensland and Victoria, reflecting both the excellent fishing areas and the geographic spread of Australia's population. However, freshwater recreational

fishing in inland areas of Australia plays an important role in regional economies, particularly those areas where rivers have been dammed to supply hydro-electricity or water for irrigation purposes. Australia also has some of the best trout streams in the world, thanks to the introduction of these species in most suitable streams during the 19th century.

Saltwater species are the main focus of recreational fishers, with tailor, bream, whiting and flathead being some of the more common and widespread species of saltwater fish caught. In addition to the introduced freshwater fish, Australia has a range of excellent tasting native inland fish such as barramundi, silver perch and golden perch.

Many fish are subject to daily bag limits, which restrict the number of fish legally able to be caught and retained in one day. In addition, some fishing areas are subject to seasonal closures, which are imposed by state fishing authorities to protect certain fish species during their breeding period. Many state fishing authorities have introduced a requirement for all fishers to purchase fishing licences for both freshwater and saltwater fishing. Income received through the licensing system will be used by state governments to undertake important research aimed at ensuring a healthy and sustainable fish population in Australia's recreational fishing areas.

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Bureau of Rural Sciences, <<http://www.affa.gov.au/outputs/ruralscience/html>>

Commonwealth Department of Agriculture, Fisheries and Forestry - Australia, <<http://www.affa.gov.au>>

Commonwealth Scientific and Industrial Research Organisation, Forestry and Forest Products,  
<<http://www.ffp.csiro.au>>

Environment Australia, <<http://www.ea.gov.au>>

FISHBASE, <<http://www.fishbase.org>>



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## Introduction

Mining broadly relates to the extraction of minerals occurring naturally as solids such as coal and ores, liquids such as crude petroleum, or gases such as natural gas. Activities carried out at or near mine sites as an integral part of mining operations, such as dressing or beneficiation of ores or other minerals, are included. Natural gas absorption and purifying plants are also included. However, the first stage processing of minerals and mineral extracts, while closely related to the mining industry, is included as part of the manufacturing industry.

Australia continues to rank as one of the world's leading nations with substantial identified resources of major minerals and fuel close to the surface. The mining industry, though contributing only around 5% of gross domestic product (GDP) and 1% of total employment, is the nation's largest export earner. In 2000–01, it accounted for 26% of the total value of exports, principally from the coal, and oil and gas extraction industries. Over the years, the industry has also become the world's leading producer of mining software and high-technology mining services. Many of the ports, roads, railways and towns in Australia were built by exploration, production and downstream activities in the mining industry.

The mining industry has the highest average weekly earnings (average gross earnings) when compared to other industries. In May 2002, the average weekly earnings for all employees in this industry were \$1,504, compared to the average of \$687 for all industries.

## Contribution to gross domestic product (GDP)

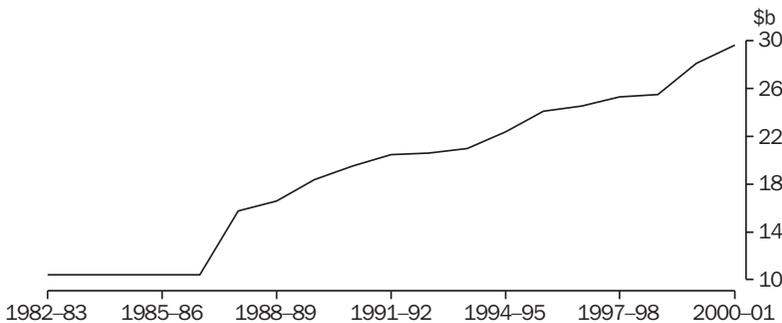
Graph 18.1 shows that the total volume of production (measured in terms of industry gross value added) of the mining industry in chain volume terms (measuring 'real' output unaffected by price change) increased dramatically in 1987–88. Since then, production has continued to rise at an average rate of about 5% per year.

Over the period 1994–95 to 2000–01, mining production increased by 32% (table 18.2). Despite this significant increase, the mining industry's contribution to GDP in percentage terms stayed much the same over the period, at about 5%. This was because the GDP for all industries excluding mining also increased over the period, by 27%.

Production in the mining industry other than services to mining has been consistently high and increasing steadily over the years. It accounts for most of the increases in the production for the mining industry as a whole. Between 1994–95 and 2000–01, the production of mining other than services to mining increased by 34%, although its contribution to the mining industry remained around 93–95%.

The contribution of services to mining, by its nature, has been small and very volatile. During the period 1994–95 to 2000–01, the production of services to mining varied from a low of \$1,325m in 1999–2000 to a high of \$1,856m in 1997–98.

**18.1 MINING PRODUCTION VOLUMES(a)**



(a) Production as measured by industry gross value added, chain volume measures based on 1999–2000 reference year.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

**18.2 MINING GROSS VALUE ADDED AND CONTRIBUTION TO GDP, Chain volume measures(a)(b)**

	Units	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
Gross value added								
Mining (excluding services to mining)	\$m	20 984	22 613	22 898	23 617	23 906	26 777	28 087
Services to mining	\$m	1 563	1 672	1 769	1 856	1 739	1 325	1 564
<i>Total</i>	\$m	22 400	24 123	24 519	25 329	25 462	28 102	29 651
Contribution to GDP(c)	%	4.8	5.0	4.9	4.8	4.6	4.9	5.0

(a) Reference year for these chain volume measures is 1999-2000. (b) Chain volume measures are not additive for most periods; the component measures do not sum to a total in the same way as the corresponding current price components do. (c) Strictly gross value added at basic prices, chain volume measures.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

## Mineral resources and geology

Australia has the largest economic demonstrated resources (EDR) of lead, mineral sands (ilmenite, rutile and zircon), nickel, tantalum, uranium and zinc. In addition, its EDR is in the top six worldwide for bauxite, black and brown coal, cobalt, copper, diamond (gem/near gem), gold, iron ore, manganese ore and rare earth oxides.

The diversity of Australian geology provides the basis for its wide range of economically important minerals and variety of deposit types. Its classified geological settings range from major Precambrian Shields composed of Archaean (older than 2.5 billion years) granite greenstone terrains, through to extensive Proterozoic (2.5-0.5 billion years) basins and metamorphic belts, to the younger Palaeozoic fold belts (0.5-0.25 billion years). Most significant mineral deposits discovered in the past two decades were hidden beneath cover and this is likely to be the pattern in the future, because prospective rocks in some 80% of the continent are concealed by a veneer of deeply weathered rocks or sedimentary strata. The weathering occurred particularly during the Mesozoic and Cainozoic periods (0.25 billion years to the present) and weathered rocks also host important mineral deposits.

The Archaean and Proterozoic basement rocks, underlying most of the western two-thirds of Australia, have been the source of much of the country's mineral wealth to date. Large deposits such as the gold and nickel mines of the Yilgarn (Kalgoorlie) region and iron ore deposits of the Pilbara region (both in Western Australia); base metal deposits at Broken Hill (New South Wales), Mount Isa (Queensland), McArthur River (Northern Territory); copper-uranium-gold deposit at Olympic Dam (South Australia); Argyle diamond deposit (Western Australia), and the uranium deposits of the Alligator Rivers area of the Northern Territory all occur in the Precambrian rocks. In eastern Australia, the major

deposits are of Palaeozoic age and include the base metal deposits at Elura, Cobar (New South Wales); Hellyer and Rosebery, the Mount Lyell copper-gold deposit, and the Renison tin deposit (Tasmania); and most other gold deposits. The large black coal deposits of New South Wales and Queensland are of upper Palaeozoic and Mesozoic age. Deposits formed in Tertiary times include the brown coal of Victoria; the oil shales of eastern Queensland; the bauxite of Weipa (Queensland), Gove (Northern Territory) and the Darling Ranges (Western Australia); the lateritic nickel deposits of Queensland and Western Australia; and the mineral sands deposits of the Murray Basin (Victoria and New South Wales) and Eneabba (Western Australia).

The presence of world class deposits in both the established and new mineral provinces confirms Australia's high mineral potential. Major discoveries since 1990 include the Century (zinc), Cannington (lead, zinc, silver) and Ernest Henry (copper-gold) deposits in the major Carpentaria-Mount Isa base metal province; the Cadia and Ridgeway (gold-copper) deposit in central western New South Wales; and the Bronzewing (gold), Wallaby (gold) and Silver Swan (nickel) deposits in the Eastern Goldfields of Western Australia. Exploration in the Murray Basin (New South Wales, Victoria, South Australia) is continuing to underline the world-class significance of this heavy mineral province. Heavy mineral production has commenced in this region from one deposit while resources are being delineated and feasibility studies are advanced at other deposits.

Australia's record of exploration successes continued with new resources being added to the national resource inventory. Exploration will continue to focus on the established mineral provinces such as the Yilgarn Craton (Western Australia), Mount Isa Inlier (Queensland), Laclan Fold Belt (New South Wales, Victoria),

Curnamona Craton (South Australia) and the Murray Basin. There is also likely to be increased interest in newer provinces such as the Tanami–Arunta (Northern Territory, Western Australia), Gawler Craton (South Australia), Kimberley (Western Australia), and Musgrave region (Western Australia, Northern Territory, South Australia) in the light of recent exploration successes. The traditionally targeted commodities (gold, nickel, copper, zinc, mineral sands and diamond) will be the focus of attention and the current high levels of interest in mineral sands are expected to continue for the short- to medium-term. Interest in tantalum and platinum group metals is buoyant and is likely to stay so in the short-term at least.

It is important to note that although the resources for many of Australia's mineral commodities have more than kept pace with production, the number of discoveries of large mineral deposits has been declining over the past decade. This is partly a reflection of the fact that mineral deposits are becoming harder to find because of the surficial cover. Future discoveries will depend increasingly upon the application of advanced and predictive geoscientific exploration concepts and upon the development of new exploration technologies designed to explore the extensive prospective areas under the shallow cover. The continuing global trend for mineral production to be consolidated and increasingly confined to large tonnage, high grade deposits means that there is an additional challenge for Australia to come up with discoveries of large world-class deposits, if it is to maintain its status as a major supplier of mineral commodities. Recent new prospects include copper gold mineralisation being delineated at Prominent Hill in the Gawler Craton, nickel and cobalt prospects in the Musgrave region, gold in the Tanami region, Yilgarn and the Pilbara region and diamonds in Kimberley. More exploration is required to determine the significance of these finds.

Australia's most important petroleum basins are off north-western Australia and under Bass Strait. These sedimentary basins, located around the margin of Australia, were formed as the super-continent of Gondwana broke apart in the Mesozoic age, mostly between 150 and 60 million years ago. Oil, condensate and gas are contained in sandstone reservoirs in these basins. Organic matter from both land plants and marine organisms was the source for these hydrocarbons.

Currently most of the production is from the Carnarvon Basin, offshore from Onslow and Dampier in Western Australia. Oil, condensate and gas are produced, including from the giant North West Shelf LNG project, which exports liquefied gas primarily to Japan. Further to the north, large reserves of gas and condensate have been identified in the Browse Basin, offshore from Derby in Western Australia. Oil is produced from the Timor Sea area and plans are well advanced for the production of gas and condensate from the Joint Petroleum Development Area with East Timor.

The Gippsland Basin, underlying eastern Bass Strait, has been in the past Australia's major hydrocarbon producing area, but is now in decline. However, recent discoveries of gas and condensate have been made in the offshore Otway Basin, beyond the western end of Bass Strait.

Some of Australia's onshore basins also contain hydrocarbons, and again sandstone reservoirs predominate. The main onshore petroleum accumulations are in sedimentary strata of middle Palaeozoic and Mesozoic age and include the Bowen/Surat Basin straddling Queensland and New South Wales, the Copper/Eromanga Basin of South Australia and Queensland, the Otway Basin of South Australia and Victoria, the Adavale Basin in Queensland and the Perth Basin.

## Mineral exploration

Exploration involves the search for new ore occurrences or undiscovered oil or gas, and/or appraisal intended to delineate or greatly extend the limits of known deposits of minerals or oil or gas reservoirs by geological, geophysical, geochemical, drilling or other methods. This includes construction of shafts and adits primarily for exploration purposes, but excludes activity of a developmental or production nature.

## Mineral exploration expenditure

Expenditure in Australia during the last five years on private mineral exploration other than for petroleum and water is summarised in table 18.3.

Mineral exploration expenditure in 2000–01 was \$683m, \$465m (41%) lower than in 1996–97, and \$7m (1%) higher than in 1999–2000. Western Australia and Queensland, with expenditure lower by \$268m (39%) and \$78m (48%) respectively, were the main contributors to the fall between 1996–97 and 2000–01. Western

Australia continued to account for the majority (60–62%) of the exploration expenditure over this period.

Most of the expenditure between 1996–97 and 2000–01 is related to the exploration for gold, as shown in table 18.4. In this period, gold exploration expenditure accounted for 54–63% of total mineral exploration expenditure. Its decline from \$728m to \$370m (down 49%) was the main contributing factor for the fall in mineral exploration expenditure. Expenditure in exploring other minerals except for mineral sands also fell.

### Petroleum exploration expenditure

Total private petroleum exploration expenditure was \$1,044m in 2000–01 (table 18.5), 22% higher than in 1996–97 and 44% higher than 1999–2000. This was mainly due to an increase of 44% in offshore exploration expenditure. In comparison, onshore exploration expenditure fell each year, and by 2000–01 it was 30% (\$75m) lower than in 1996–97. As a result, the percentage contribution of offshore exploration expenditure to total expenditure increased from 70% in 1996–97 to 83% in 2000–01.

#### 18.3 PRIVATE MINERAL EXPLORATION EXPENDITURE, By state/territory

	1996–97	1997–98	1998–99	1999–2000	2000–01
	\$m	\$m	\$m	\$m	\$m
New South Wales	94.1	88.2	65.6	56.1	57.2
Victoria	51.8	43.1	37.0	33.8	32.7
Queensland	160.7	133.2	93.8	82.6	83.1
South Australia	35.1	45.0	41.9	22.6	29.6
Western Australia	691.7	660.4	523.1	415.0	424.1
Tasmania	26.0	20.7	11.9	8.8	9.2
Northern Territory	88.9	75.9	64.5	57.5	47.5
<b>Australia</b>	<b>1 148.6</b>	<b>1 066.8</b>	<b>837.8</b>	<b>676.3</b>	<b>683.3</b>

Source: *Mineral and Petroleum Exploration, Australia (8412.0)*.

#### 18.4 PRIVATE MINERAL EXPLORATION EXPENDITURE, By mineral sought(a)

	1996–97	1997–98	1998–99	1999–2000	2000–01
	\$m	\$m	\$m	\$m	\$m
<i>Selected base metals</i>	206.8	227.1	176.9	156.8	165.4
Copper	n.p.	n.p.	n.a.	28.4	32.8
Silver, lead-zinc	n.p.	n.p.	n.a.	55.4	59.8
Nickel, cobalt	n.p.	n.p.	n.a.	73.0	72.8
Gold	728.3	648.4	486.1	374.8	370.2
Iron ore	25.8	30.0	41.5	29.7	23.4
Mineral sands	13.9	14.0	19.0	21.5	23.6
Uranium	13.0	22.2	15.4	11.7	8.4
Coal	70.5	64.8	39.9	35.4	41.3
Diamonds	59.3	42.8	40.9	29.8	31.8
Other(b)	30.9	17.5	18.0	16.7	19.3
<b>Australia</b>	<b>1 148.6</b>	<b>1 066.8</b>	<b>837.8</b>	<b>676.3</b>	<b>683.3</b>

(a) From July 2000, the value of exploration expenditure excludes Wholesale Sales Tax. (b) Includes tin, tungsten, scheelite, wolfram and construction materials.

Source: *Mineral and Petroleum Exploration, Australia (8412.0)*.

#### 18.5 PRIVATE PETROLEUM EXPLORATION EXPENDITURE

	1996–97	1997–98	1998–99	1999–2000	2000–01
	\$m	\$m	\$m	\$m	\$m
Onshore	251.9	232.2	182.3	110.1	176.9
Offshore	601.0	748.9	685.4	613.2	867.0
<b>Total</b>	<b>853.0</b>	<b>981.2</b>	<b>867.7</b>	<b>723.3</b>	<b>1 043.9</b>

Source: *Mineral and Petroleum Exploration, Australia (8412.0)*.

## A decade of Australian exploration expenditure — 1991–92 to 2000–01

### Introduction

This article discusses expenditure on mineral and petroleum exploration over the past 10 years and describes, in broad terms, some of the major influences on that expenditure. For geographic breakdowns, the analysis covers seven years only, as a breakdown for petroleum exploration data was not available before 1994–95.

All values, except those relating to ‘world exploration expenditure’, are presented in current prices. It has not been feasible to remove the effects of price changes from these data.

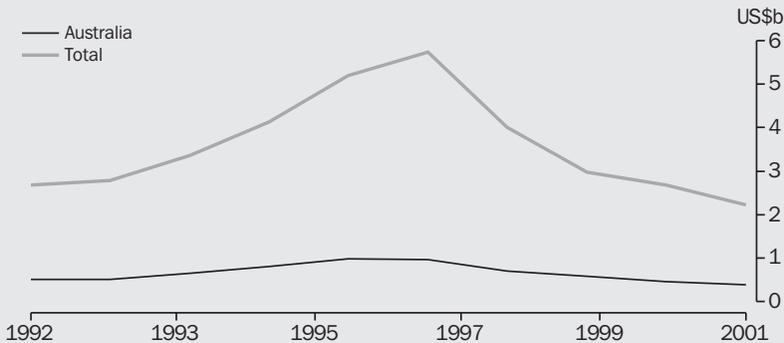
### Expenditure pattern over the past 10 years

Over the 10 years to June 2001, \$8.3b was spent on the search for minerals in Australia, while \$7.5b was spent on the search for petroleum in Australia and surrounding waters.

For the decade to December 2001, Australian non-ferrous mineral exploration expenditure remained relatively consistent as a proportion of global non-ferrous mineral exploration, averaging 18.3%. This relationship has been particularly steady in the past five years, with the average proportion being 17.7%. As shown in graph 18.6, both the global and the Australian levels in non-ferrous mineral exploration expenditure have declined steadily since 1997.

Graph 18.7 shows that Australian expenditure on mineral and petroleum exploration grew reasonably steadily from the early 1990s until 1997–98. It then declined, with mineral exploration being the major contributor to the total decline. By 2000–01, total exploration had fallen to levels similar to those of the early 1990s. Petroleum exploration expenditure fell in 1998–99 and 1999–2000, but rose markedly in 2000–01 to the highest level ever recorded in the series (which began in the mid 1970s).

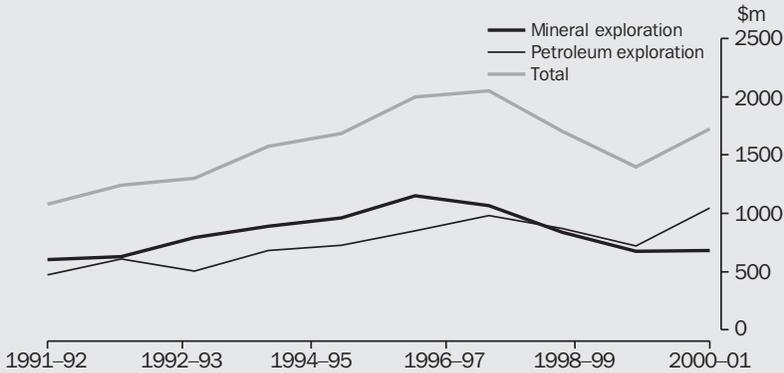
**18.6 WORLD NON-FERROUS MINERAL EXPLORATION EXPENDITURE(a)**



(a) Expenditure at constant prices with a reference year of 2001.

Source: ABARE, *Australian Commodities: Forecasts and Issues*, March 2002.

## 18.7 MINERAL AND PETROLEUM EXPLORATION



Source: *Mineral and Petroleum Exploration, Australia (8412.0)*.

The pattern of expenditure on exploration from the early 1990s to date does not appear to have been strongly influenced by the economic performance of the mining industry. The industry increased production throughout the 1990s, with some of the highest growth in production occurring in those years when exploration expenditure was declining.

### Influences on mineral exploration levels

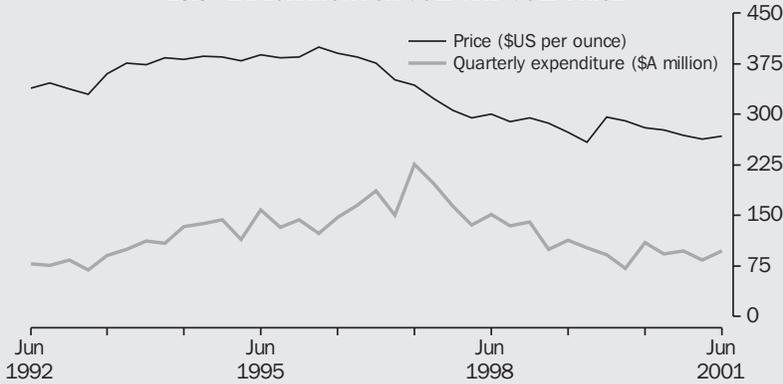
Intuitively, commodity prices would be a major consideration in corporate decisions concerning exploration activity. To test the strength of this link without the complexity which would accompany examination of data for a large number of commodities, the possible relationship between commodity prices and mineral exploration expenditure in Australia has been examined below in terms of exploration for gold. Over the past 10 years, gold exploration expenditure has been the major contributor to overall mineral exploration expenditure (contributing more than half) and movements in gold exploration expenditure

have often been the major factor driving changes in overall mineral exploration expenditure.

Graph 18.8 shows the broad relationship between expenditure on gold exploration and the price of gold in \$US (virtually all Australian gold contracts are expressed in \$US). The underlying data show that there was a fairly strong positive relationship between gold prices and gold exploration expenditure over most of the period, though this relationship should not be regarded as fixed.

Up to 1996, levels of exploration expenditure generally followed prices with a lag of around three months. During mid to late 1996 and in early 1997, there was a short period when the relationship became unstable. This period coincided with the beginning of the downward trend in gold prices which has continued up to the present. By late 1997, the positive correlation seemed to resume (again in a general way) but with a longer lag between price changes and expenditure changes (around six months). In recent years, gold exploration expenditure has followed prices downward and is now at levels barely above those of the early 1990s.

**18.8 EXPLORATION FOR GOLD AND GOLD PRICE**



Source: ABARE, 'Australian Mineral Statistics' (prices data).

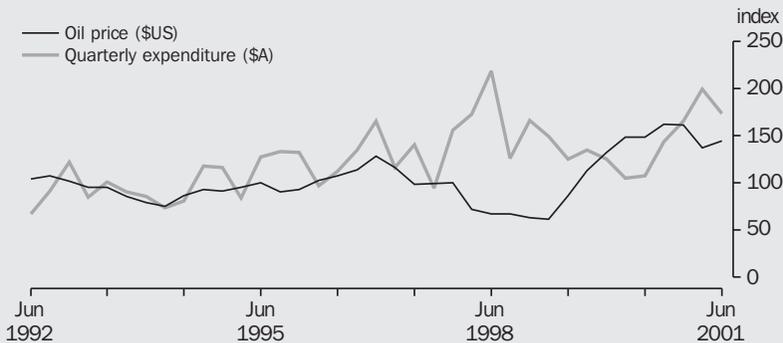
While the price of gold and trends in that price are clearly important factors in determining levels of exploration expenditure, there have also been several other influences in recent years. Prominent among these have been the availability and placement of venture capital (which is subject to a variety of influences including, in more recent years, central bank gold sales and the emergence of 'dot.com' investment opportunities, as well as general economic influences) and considerations related to taxation, native title, cultural heritage protection and environment protection. However, little information is available to help

determine the extent to which such influences have affected the level of expenditure on gold exploration.

**Influences on petroleum exploration levels**

In contrast to the situation with gold, there appears to be little (if any) correlation between the price of oil and the level of petroleum exploration expenditure (as illustrated by graph 18.9). Therefore, other factors must explain the levels of petroleum exploration expenditure in Australia.

**18.9 PETROLEUM EXPLORATION, Index numbers(a)**



(a) Base of index: 1992-93 = 100.

Source: ABARE, 'Australian Mineral Statistics' (prices data).

One likely explanation is that a substantial proportion of petroleum exploration expenditure is carried out by the major oil companies (or by others on their behalf), with exploration representing an early phase of their overall operations. In these circumstances, the main influences on exploration expenditure within Australia are likely to be the more complex commercial considerations of oil companies operating in a global context.

Investment decisions by the oil companies, along with decisions by the other businesses engaged in petroleum exploration, will most likely be influenced by broad conditions such as global and national economic trends, taxation systems, arrangements regarding the Joint Petroleum Development Area (formerly known as the Zone of Co-operation) in the Timor Sea, and the availability of venture capital and the opportunity costs associated with use of that capital. In addition, there will be more specific issues underlying exploration decisions, such as the issues associated with native title requirements, cultural heritage protection, environment protection, overseas prospects, and international political stability.

### Geographic aspects of exploration expenditure in recent years

Graph 18.10 shows the broad geographic distribution of exploration expenditure in Australia over recent years. In looking at state and territory shares, it should be noted that

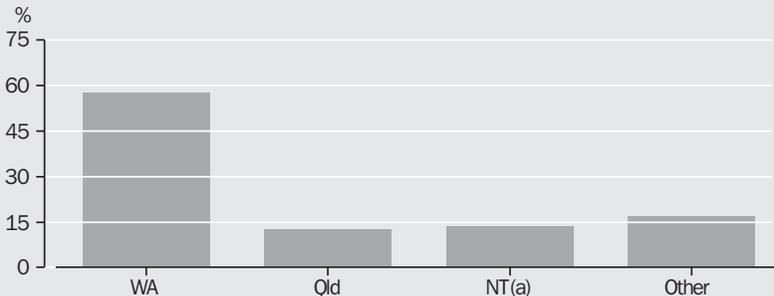
offshore petroleum exploration expenditure has been allocated to the state/territory which administers the region. Exploration expenditure for the Joint Petroleum Development Area has been allocated to the Northern Territory data.

State and territory distribution of exploration expenditure corresponds broadly to the level of production by the mining industry within the respective state or territory. This is particularly the case for Western Australia, which has by far the largest production by the mining industry as well as the largest exploration expenditure. Similarly, Queensland ranks second among the states for both production and exploration expenditure (although Northern Territory exploration expenditure is slightly larger when account is taken of the offshore areas).

Graph 18.11 narrows the focus to mineral exploration expenditure only. It illustrates that over the past seven years, mineral exploration expenditure in Western Australia was substantially larger than expenditure in any other state or territory, and in fact exceeded expenditure in all other states and territories combined.

Western Australian dominance of exploration expenditure was largely due to investment in the search for gold (\$2.6b having been spent over the seven-year period). For other minerals, Western Australia remains the state attracting the largest expenditure, but not to the same degree.

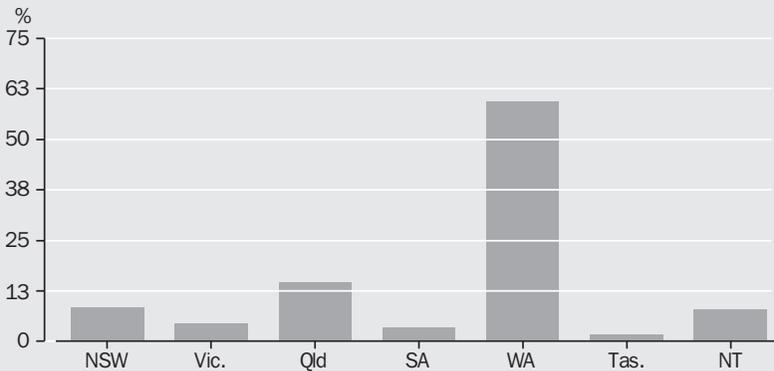
**18.10 EXPLORATION EXPENDITURE — 1994–95 to 2000–01**



(a) Petroleum exploration expenditure includes the Ashmore and Cartier Islands and the Joint Petroleum Development Area in the Timor Sea. Mineral exploration expenditure includes data for NT only.

Source: *Mineral and Petroleum Exploration, Australia* (8412.0).

**18.11 MINERAL EXPLORATION EXPENDITURE — 1994–95 to 2000–01**



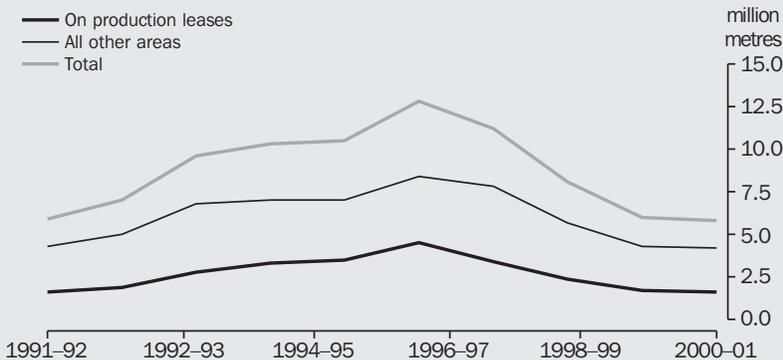
Source: Mineral and Petroleum Exploration, Australia (8412.0).

### Drilling operations in mineral exploration

During the 10 years to 2000–01, over 87 million metres (87,000 km) of drilling was undertaken in the search for minerals in Australia. Graph 18.12 shows a steady rise in drilling activity from the early 1990s, reaching a peak of 12.8 million metres in 1996–97. Over the period the proportion of drilling undertaken on production leases remained fairly stable, ranging from a low of 28% (several years) to a high of almost 35% (in 1996–97).

A variety of drilling methods are used in mineral exploration in Australia. In the period 1994–95 to 1999–2000 inclusive, \$825m was spent on diamond drilling, resulting in 8.1 million metres drilled. Corresponding data for other methods are reverse circulation drilling (\$781m spent and 22.2 million metres drilled), rotary air blast drilling (\$252m spent and 19.3 million metres drilled) and various other methods (\$223m spent and 9.5 million metres drilled).

**18.12 MINERAL EXPLORATION, Metres drilled**



Source: Mineral and Petroleum Exploration, Australia (8412.0).

## Summary of mining operations

The term 'mining industry' is used to refer to the group of industries engaged in mining for coal, oil and gas, and metallic minerals. It does not cover other mining activities such as sand and gravel quarrying, mining for clay and other construction materials or mining for gemstones.

Table 18.13 shows that in 1999–2000 mining industry turnover was \$37.1b, virtually unchanged from the previous year; value added at \$24.4b was 1% higher. Employment fell by 8% (3,823 persons) to 43,477 persons between June 1999 and June 2000.

The coal mining industry continued to be the largest contributor to total turnover, accounting for 31% in 1999–2000, down from 34% in 1998–99. The oil and gas extraction industry, through significant improvements in the price of oil during 1999–2000, accounted for 28% of turnover (23% in 1998–99). The other major contributors were the gold ore mining and iron ore mining industries, which accounted for 12% and 11% of turnover respectively in 1999–2000.

Turnover in the coal mining industry decreased by \$1.2b (10%) to \$11.3b in 1999–2000. While coal industry producers continued to generate productivity savings through ongoing structural reform, this could not fully compensate for falling prices. Although production increased during the

reference period, revenues fell. In the previous year, a falling Australian dollar had helped to offset depressed prices. However, the general stability in the currency over 1999–2000 provided no offset to falling prices in that year.

The oil and gas extraction industry recorded the largest increase in turnover in 1999–2000, rising \$1.8b (21%) to \$10.4b. An increase of almost \$1.9b in revenue from sales of goods and services, brought about by buoyed world prices for oil, was the major contributing factor. In addition production increased as several fields came fully back on line and production commenced from the Laminaria field.

The iron ore mining industry reported a decrease in turnover of \$570m (12%) to \$4.1b in 1999–2000. Production of iron ore increased during the year, but lower prices emanating from the February 1999 price negotiations with the Japanese in addition to the relative stability of the Australian dollar, meant that producers did not obtain the gains of the previous year.

The completion of the Olympic Dam (South Australia) expansion and the ramping up of production of Ernest Henry mine (Queensland) resulted in increased copper production. This was reflected in an increase in the value of turnover, rising \$165m (11%) to \$1.6b in 1999–2000.

**18.13 MINING, Summary of operations — 1999–2000**

Industry	Employment at 30 June(a)	Wages and salaries(b)	Turnover	Inventories		Purchases and selected expenses	Value added	Net capital expenditure
				Open	Close			
	no.	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Coal mining	17 154	1 661	11 323	830	933	5 006	6 420	525
Oil and gas extraction	4 642	434	10 427	345	359	1 234	9 206	2 208
Metal ore mining								
Iron ore mining	4 791	403	4 126	440	435	1 168	2 953	55
Bauxite mining	1 565	91	1 009	87	62	269	715	160
Copper ore mining	2 005	159	1 624	224	201	727	873	514
Gold ore mining	6 240	414	4 297	503	478	2 333	1 939	521
Mineral sand mining	1 775	95	1 083	207	195	385	686	205
Silver-lead-zinc ore mining	2 811	224	1 924	135	190	669	1 309	537
Other(c)	2 494	165	1 273	387	368	915	339	652
<b>Total</b>	<b>21 681</b>	<b>1 551</b>	<b>15 336</b>	<b>1 983</b>	<b>1 929</b>	<b>6 466</b>	<b>8 814</b>	<b>2 644</b>
<b>Total mining</b>	<b>43 477</b>	<b>3 647</b>	<b>37 086</b>	<b>3 158</b>	<b>3 221</b>	<b>12 706</b>	<b>24 440</b>	<b>5 377</b>
Total mining 1998–99	45 703	3 823	37 158	3 474	3 268	12 832	24 120	7 672

(a) Includes working proprietors. (b) Excludes amounts drawn by working proprietors. (c) Includes Australian and New Zealand Standard Industrial Classification (ANZSIC) Classes 1316 (Nickel ore mining) and 1319 (Metal ore mining n.e.c.).

Source: *Mining Operations, Australia, 1999–2000 (8415.0)*.

During 1999–2000 the gold industry experienced continued rationalisation, hedging by producers, Reserve Bank sales and a 20-year low in the price of gold. Rationalisation was marked by the entry of South African producers onto the Australian scene. In such uncertainties gold miners adopted various strategies to remain viable, ranging from staff cutting to more efficient mining techniques. There was a plethora of mine closures across the country while new developments were not as plentiful.

Table 18.14 shows that Western Australia continues to be the state with the largest mining industry. At \$10.9b, Western Australia contributes almost half of the national value added by the mining industry. Queensland is next largest. The state with the highest value added per person employed in the mining industry was Victoria (\$1,347,000), while Tasmania had the lowest (\$166,000).

## Mineral production

The total value of minerals produced in the coal mining, oil and gas extraction, and metal ore mining industries was \$34.3b in 1999–2000, an increase of \$117m (less than 1%) over 1998–99 (table 18.15).

The value of metallic minerals produced decreased by \$1b (7%) to \$14.2b. The performance of metallic mineral commodities throughout the reporting period was mixed. Several commodities, such as copper and nickel, experienced an increase in prices, while others such as lead, and in particular gold, remained relatively weak. The Australian dollar was lower in the second half of the reference period, which helped producers to sustain sales values for those commodities where prices had fallen. The value of copper concentrate production rose by \$106m (8%) to \$1.5b in 1999–2000, through the combined effects of improved prices and increased production. The value of gold production decreased by \$681m (15%) to \$3.9b, due to decreased production and a low market price for gold. The value of other metallic minerals rose by \$107m (7%).

The value of coal produced decreased by \$677m (6%) to \$9.9b in 1999–2000 despite an increase in the level of production. The value of crude oil increased globally in 1999–2000. This is reflected in the \$1.7b (39%) increase, to \$6.2b, in the value of production of crude oil. Production levels remained comparable with the previous year, although production from Bass Strait improved as output increased following repair work to the Longford refinery.

The metallic minerals group was the major contributor to the total value of production with 41%, followed by the oil and gas extraction industry with 30% and the coal industry with 29%.

**18.14 MINING, Summary of operations by state/territory — 1999–2000**

	Employment at 30 June(a)	Wages and salaries(b)	Turnover	Inventories		Purchases and selected expenses	Value added	Net capital expenditure
				Opening	Closing			
				\$m	\$m			
New South Wales	10 461	975	5 660	426	424	2 633	3 025	235
Victoria	2 412	161	3 642	68	53	377	3 250	439
Queensland	10 717	999	8 930	865	943	3 850	5 158	1 107
South Australia	1 564	111	1 265	89	104	332	948	530
Western Australia	15 835	1 204	15 735	1 412	1 440	4 816	10 946	2 198
Tasmania	1 103	81	514	67	69	333	183	34
Northern Territory	1 385	116	1 340	232	187	364	931	833
<b>Australia</b>	<b>43 477</b>	<b>3 647</b>	<b>37 086</b>	<b>3 158</b>	<b>3 221</b>	<b>12 706</b>	<b>24 440</b>	<b>5 377</b>

(a) Includes working proprietors. (b) Excludes amounts drawn by working proprietors.

Source: *Mining Operations, Australia, 1999–2000 (8415.0)*.

## 18.15 MINERAL PRODUCTION, Selected minerals

	Units	1995-96	1996-97(a)	1997-98	1998-99	1999-2000
<b>Metallic minerals</b>						
Bauxite	'000 t	50 724	46 874	50 418	58 005	53 141
Copper concentrate(b)	'000 t	(c)1 316	1 769	1 662	1 835	1 918
Gold bullion (dore)(d)	kg	291 965	296 398	333 673	311 038	286 359
Iron ore(e)	'000 t	137 267	162 480	168 104	160 564	165 966
Lead concentrate	'000 t	774	782	768	927	964
Mineral sands(f)	'000 t	2 491	3 044	3 198	3 195	3 589
Uranium oxide (U <sub>3</sub> O <sub>8</sub> )(g)	t	5 105	5 996	5 797	6 387	8 217
Zinc concentrate(h)	'000 t	1 295	2 070	1 921	2 143	2 303
Total value of metallic minerals	\$m	12 708	13 617	14 696	15 228	14 234
<b>Coal</b>						
Black coal	'000 t	194 492	206 169	226 818	226 870	253 846
Brown coal	'000 t	54 281	58 886	68 638	65 880	65 991
Total value of coal(i)	\$m	8 006	9 089	9 994	10 578	9 901
<b>Oil and gas</b>						
Crude oil(j)	ML	30 763	29 556	33 931	29 225	29 765
Natural gas	GL (k)	19 169	n.a.	(l)27 774	(l)27 691	(l)24 447
Ethane	GL	199	n.a.	n.a.	n.a.	n.a.
Propane	ML	2 092	2 142	2 421	1 509	1 643
Butane	ML	1 544	1 584	1 883	1 993	1 646
Liquefied natural gas	'000 t	7 346	n.a.	n.a.	n.a.	n.a.
Total value of oil and gas	\$m	8 070	8 823	9 523	8 377	10 164
<b>Total value of metallic minerals, coal, oil and gas</b>	<b>\$m</b>	<b>28 784</b>	<b>31 529</b>	<b>34 213</b>	<b>34 182</b>	<b>34 299</b>

(a) Break in series — data for 1996-97 and subsequent years derived solely from information supplied through the ABS mining collection. Data for prior years derived from information supplied by state mines departments or directly to the ABS, supplemented in some cases by data from other sources. (b) Includes copper precipitate. (c) Excludes SA. (d) Includes alluvial gold. (e) Includes iron ore pellets. (f) Includes ilmenite, beneficiated ilmenite, leucoxene, monazite, rutile, synthetic rutile and zircon. (g) Uranium figures supplied from ABARE, 'Australian Commodity Statistics, 2001'. (h) Includes zinc-lead concentrate and lead-zinc concentrate. (i) Excludes briquettes. (j) Includes condensate. (k) Includes field and plant usage. (l) Includes ethane and liquefied natural gas.

Source: *Mining Operations, Australia (8415.0)*; ABARE, 'Australian Commodity Statistics, 2001'.

## Major commodities

The information in this section has been largely drawn from the publication *Australia's Identified Mineral Resources, 2001* published by the former Australian Geological Survey Organisation, now Geoscience Australia.

### Summary

In 2000, Australia's EDR of bauxite, brown coal, copper, diamonds, magnesite, mineral sands (ilmenite, rutile and zircon), nickel, phosphate, tantalum, uranium and vanadium increased, while those of black coal, gold, iron ore, manganese ore and lithium decreased. EDR of zinc, lead and silver were maintained at levels similar to those reported in 1999. The reductions in EDR were due mainly to ongoing high levels of production; commodity prices were a subsidiary factor.

Australia, however, continues to rank as one of the world's leading mineral resource nations. It has the world's largest EDR of lead, mineral sands, nickel, tantalum, uranium and zinc. In addition, its EDR is in the top six worldwide for bauxite, black coal, brown coal, cobalt, copper, gold, iron ore, lithium, manganese ore, rare earth oxides and industrial diamond.

### Bauxite and alumina

Bauxite is a heterogeneous naturally occurring material from which alumina (Al<sub>2</sub>O<sub>3</sub>) and aluminium are produced. The principal minerals in bauxite are gibbsite (Al<sub>2</sub>O<sub>3</sub>·3H<sub>2</sub>O), boehmite (Al<sub>2</sub>O<sub>3</sub>·H<sub>2</sub>O) and diasporite (which has the same composition as boehmite but is denser and harder).

Australia is the world's largest producer of bauxite and alumina. In 1999, it was the third largest exporter of aluminium after the Russian Federation and Canada.

Data published by the Australian Bureau of Agricultural and Resource Economics (ABARE) show that in 2000–01 Australia produced 54.56 million tonnes (Mt) of bauxite, 16.10 Mt of alumina and 1.8 Mt of primary aluminium.

When exports of bauxite, alumina and aluminium are taken into account, the aluminium industry is Australia's second largest commodity exporter behind coal. The industry consists of five bauxite mines, six alumina refineries, six primary aluminium smelters, twelve extrusion mills and four rolled product mills (sheet, plate and foil).

In 2000–01, aluminium and alumina were among the major commodities exported. Exports of aluminium were 1.7 Mt, valued at \$4.9b, which represented 4% of total merchandise exports; exports of alumina were 12 Mt, valued at \$4.4b, representing 4% of total merchandise exports. Japan was the major market for aluminium, taking 39% of exports.

Bauxite mining employed 1,565 people nationally at the end of June 2000.

## Coal

Black coal is primarily used for electricity generation and the production of coke, which is integral to the production of iron and steel. Black coal is also used as a source of heat in the manufacture of cement and food processing. It occurs in all Australian states and the Northern Territory. Queensland and New South Wales have substantial resources of high quality black coal, which underpin a major export industry. Small but locally significant resources occur in Western Australia, South Australia and Tasmania.

In 2000, Australia produced 301.2 Mt of raw coal (293.7 Mt in 1999), which yielded 244.6 Mt of saleable coal (231.0 Mt in 1999). Black coal exports in 2000 were 100.8 Mt of coking coal and 85.5 Mt of steaming coal. Australia has 6% of the world's recoverable black coal EDR, and ranks sixth behind the United States of America (27%), Russia (19%), China (12%), India (9%) and South Africa (7%). Australia produced about 7% of the world's black coal in 2000, ranking it the fourth largest producer after China (30%), United States of America (26%) and India (8%).

The coal industry was the single largest employer in the mining sector at the end of June 2000, with 17,154 employees, or 40% of the total. This represented a drop of 2,550 (13%) over the level at end June 1999. Coal was Australia's biggest export earning commodity in 2000–01, accounting for \$10.8b or 9% of the total value of

merchandise exports. The main market for Australian coal was Japan, which purchased 93 Mt of Australian coal at a cost of \$5.0b (46% of total sales).

Australian brown coal deposits are Tertiary in age and range from about 15–50 million years old. The main deposits are in Victoria, which is the only state that mines brown coal mainly for the generation of electricity. Smaller deposits occur in South Australia, Western Australia and Tasmania. Another important use is for the production of briquettes used for industrial and domestic heating in Australia and overseas.

In 2000, Australian brown coal production was about 66 Mt, up slightly on 1999. The La Trobe Valley produces about 98.5% of Australia's brown coal. Australia has about 20% of the world's recoverable brown coal EDR, and ranks second behind Germany (22%). It produced 8% of the world's brown coal in 2000, placing it third after Germany (20%) and the United States of America (10%).

## Copper

Australia's major copper mining and smelting operations are at Olympic Dam (South Australia) and Mount Isa (Queensland). Other significant copper producing mines are at Northparkes, Cadia Hill (New South Wales), Ernest Henry, Osborne, Mt Gordon (Queensland), Golden Grove and Nifty (Western Australia).

Australia has the world's third largest EDR of copper (7%), after Chile (25%) and United States of America (13%). As a copper producer, Australia ranks fourth in the world, with 6% of world production. In 2000, Australia produced 829,000 tonnes of primary copper, 13% higher than 1999. This increase reflected the first full year of expanded production at the Olympic Dam mine.

A major expansion of the Olympic Dam copper/uranium/gold/silver mine in South Australia, completed in 1999 at a cost of \$1.94b, is now reflected in copper production of 200 kilotonnes per annum (ktpa) from the previous base of 85 ktpa. This was achieved despite disruptions in the copper solvent extraction plant following a fire in December 1999.

Exports of copper ores and concentrates totalled \$1,036m in 2000–01, while exports of copper metal and copper articles totalled \$1,708m. Copper mining employed 2,005 persons at the end of June 2000, representing 9.2% of total employees in the metal ore mining sector.

## Diamonds

Diamonds are composed of carbon, and are the hardest known substances. They occur naturally but are extremely rare compared to other minerals. Diamonds are formed deep in the earth and are carried to the surface or near surface by volcanic rocks in narrow cylinder-like bodies called 'pipes'. A large proportion of industrial diamonds are manufactured, and it is also possible to produce synthetic diamonds of gem quality. Uses for diamonds include jewellery, computer chip manufacture, drill bit facing, and stone cutting and polishing.

Diamond (gem/near gem, industrial) production in 2000 was 26.6 million carats (Mc), a decrease of 4.2 Mc on the previous year. Most of this fall resulted from lower mining grades at Argyle diamond mine. Waste rock stripping, associated with expansion of the open pit, is expected to limit production over the next few years.

Australia's diamond production is the largest in the world for natural industrial diamonds and second largest (after Botswana's) for gem/near gem diamonds. Production is mostly from the Argyle AK 1 pipe with lesser contribution from the nearby Argyle alluvials operation. Minor production was also recorded at Merlin (Northern Territory) and Copeton (New South Wales).

Australia's EDR of industrial diamond ranks third (15%), after the Republic of Congo (26%) and Botswana (22%). Detailed data are not available on world resources of gem/near gem diamonds, but Australia has one of the largest stocks for this category.

Exports of diamonds (unsorted) in 2000–01 totalled \$650m. This represents a 18% decrease from the 1999–2000 value. The two main destinations were the United Kingdom and Belgium–Luxembourg.

## Gold

Gold has a range of uses, but the two principal applications are as an investment instrument and in the manufacture of jewellery. Secondary uses, in terms of the amount of gold consumed, are in electronic and dental applications.

The low US dollar price for gold in 2001 continued to attract much attention internationally. Within Australia a further fall in exploration expenditure was cause for concern. Production remained high at just under

300 tonnes, but well below record levels. Australia maintained its world standing in terms of both production and resources.

Australia's gold resources occur, and are mined, in all states and the Northern Territory. Based on figures published by the United States Geological Survey (USGS), and modified to incorporate the Australian resources estimates for 2000, Australia has the third largest EDR after South Africa and the United States of America.

Preliminary data from ABARE indicate that Australia's gold production in 2000 fell by just under 2% to 296.4 tonnes. Western Australia continued to be the dominant producer with a 203.7 tonnes, 4% lower than in 1999, and accounting for 69% of Australian production compared to 71% in 1999. Queensland remained the second largest producer and increased its output by over 3 tonnes to 36.9 tonnes. Other production (in rounded amounts) was: Northern Territory 23 tonnes; New South Wales 19 tonnes; Tasmania 6.8 tonnes; Victoria 4.4 tonnes; and South Australia 2.3 tonnes.

In 2000–01 gold was Australia's third biggest export earning commodity after black coal and crude petroleum oils, accounting for 4% of total merchandise exports at a value of \$5.1b. The main markets were Singapore (\$1.7b), Republic of Korea (\$0.9b) and the United Kingdom (\$0.7b).

The gold mining industry employed 6,240 people at the end of June 2000, making it the second largest employer in the mining sector behind the coal industry.

## Iron ore

Iron ore is the source of primary iron for the world's steel industries. Almost all iron ore (98%) is used in steel making. It occurs in all states and the Northern Territory, with about 90% of identified resources in Western Australia. Over 80% of resources occur in the Pilbara region of that state.

ABARE reported that Australia's iron ore production in 2000 was 171.5 Mt (compared to 151.6 Mt in 1999).

Australia has some 10% of world EDR of iron ore and is ranked fourth after China (18%), Ukraine (16%) and Russia (15%). In terms of contained iron, Australia has about 12% of the world's EDR and is ranked third behind Ukraine (18%) and

Russia (16%). Australia produces around 15% of the world's iron ore, and is ranked third behind China (21%) and Brazil (19%).

Iron ore accounted for \$4.9b or 4% of total merchandise exports in 2000–01. Japan was Australia's largest market, taking 43% of exports in dollar terms. Iron ore mining employed 4,791 people at the end of June 2000.

## Manganese ore

Over 90% of world manganese production is used in the desulphurisation and strengthening of steel. In Australia, manganese ore is mined at Groote Eylandt (Northern Territory) and Woodie Woodie (Western Australia). Resources at these mines are the basis of an important export industry.

In 2000, Australia produced 1.6 Mt of manganese ore, with a manganese content of 0.8 Mt. ABARE reported that exports of ore and concentrates totalled 1.4 Mt. Australia has 7% of world EDR of manganese ore, placing it fourth behind South Africa (46%), Ukraine (24%) and China (11%). In terms of contained manganese, Australia has 9% of world EDR, placing it third after South Africa (53%) and Ukraine (19%). Australia is the fifth largest producer (9%) of ore behind China (25%), South Africa (16%), Ukraine (14%) and Gabon (10%).

EDR of manganese ore decreased by 4.8% to 127.8 Mt in 2000, mainly as a result of new resource data becoming available for both Groote Eylandt and Woodie Woodie.

## Mineral sands

The principal components of mineral sands are zircon ( $ZrSiO_4$ ) and the titanium minerals rutile ( $TiO_2$ ) and ilmenite ( $FeTiO_3$ ). Rutile and ilmenite are used mainly in the production of titanium dioxide pigment. A small portion, less than 4% of total titanium mineral production and typically rutile, is used in making titanium sponge metal. Zircon is an opacifier for glazes on ceramic tiles, and is used in refractories and the foundry industry.

In 2000, Australia produced 2.2 Mt of ilmenite, 237 kilotonnes (kt) of rutile and 352 kt of zircon. The bulk of Australia's rutile and zircon production is exported, compared to about 53% of ilmenite. The remaining ilmenite is upgraded to synthetic rutile, which contains 92–93% titanium dioxide ( $TiO_2$ ).

EDR of ilmenite continued its increasing trend in 2000, up from 180.9 Mt in 1999 to 196.0 Mt, an increase of 8.4%. A reassessment of resources in Queensland, which has the second largest EDR (28%), was the main reason for the increase. In Western Australia, which has the largest ilmenite EDR (68%), most of the increase was on the Northern Swan Coastal Plain and reflected successful infill drilling programs.

EDR of rutile (which includes leucocoxene in Western Australia) rose by nearly 11% from 19.8 Mt in 1999 to 21.9 Mt in 2000. Western Australia and New South Wales were the main beneficiaries, with most of the increase (80%) within the Murray Basin in New South Wales. Queensland and Western Australia together have just over 80% of Australia's EDR of rutile.

EDR of zircon rose by nearly 6% from 26.3 Mt in 1999 to 27.9 Mt in 2000. Most of the increase was in the Murray Basin in New South Wales.

According to data from Geoscience Australia and USGS, Australia has the world's largest EDR of ilmenite, rutile and zircon with 29%, 44% and 40% respectively. In 2000, world production of ilmenite increased by 2% to 7.2 Mt, rutile by 11% to 431 kt, while zircon decreased by 3% to 902 kt. Australia produced about 30%, 55% and 39% each of world production of ilmenite, rutile and zircon respectively, and is the leading producer of all three minerals as well as the largest exporter.

The mineral sand mining industry employed 1,775 people at the end of June 2000.

## Nickel

More than 80% of world nickel production is used in steel alloys. When alloyed with other elements, nickel imparts toughness, strength, resistance to corrosion, and various other electrical, magnetic and heat resistant properties. About 65% of the world nickel output is used in the manufacture of stainless steel. Stainless steels are widely used in the chemical industry, domestic products (sinks, cooking utensils and cutlery), motor vehicles and construction.

Total identified resources of nickel rose by over 10 Mt (30%) in 2000. Most of this occurred in Western Australia, with minor increase in New South Wales and Tasmania. EDR increased by nearly 90% from 11 Mt to a record 20 Mt, representing 45% of total identified resources. Most of this was in Western Australia and mainly reflected industry reassessments of resources at

existing deposits. Western Australia remains the largest holder of nickel resources with 94% of total EDR.

In 2000, some 799 kt of nickel concentrate (approximately 166 kt of contained nickel) was produced from Western Australia.

According to Geoscience Australia and USGS data, world EDR of nickel increased by 22.6% (47.5 Mt in 1999 to 58.2 Mt in 2000). Australia's share of EDR increased to 34.3%, up from 22.3% in 1999, making it the largest holder of EDR followed by Russia and Canada (both 11%) and Cuba (10%).

Australia produced about 14% of estimated world nickel output of 1.23 Mt. Russia was again the largest producer with 265 kt (22%), followed by Canada 194 kt (16%), Australia 166 kt and New Caledonia 129 kt (10%). Australian exports of nickel in 2000–01 totalled \$1.6b.

## Tantalum

Increased use of portable electronic devices such as mobile phones, computers and video cameras has maintained strong growth in demand for tantalum capacitors in recent years. Australia, through Sons of Gwalia's operations, is the world's largest producer of tantalum in the form of tantalum concentrates. The company's Greenbushes and Wodgina (Western Australia) deposits are the largest of their type commercially mined.

Despite increased production of tantalum pentoxide ( $Ta_2O_5$ ), EDR increased by 19% in 2000 to just over 29,345 tonnes tantalum. This was largely due to reassessment of resources in the Greenbushes deposit. Sons of Gwalia Limited reported that the resources at Greenbushes increased from 75.2 to 98.1 million pounds (Mlbs)  $Ta_2O_5$  (34.1 to 44.5 kt  $Ta_2O_5$ ), while those at Wodgina remained unchanged at 30.1 Mlbs  $Ta_2O_5$  (13.7 kt  $Ta_2O_5$ ).

In 2000, Sons of Gwalia produced 737,516 lbs (335 tonnes) of  $Ta_2O_5$  from the Greenbushes operation and a further 569,045 lbs (258 tonnes) from its Wodgina mine.

The increase in resources at Greenbushes and Wodgina consolidated Australia's position as the world's largest holder of tantalum resources. Based on world estimates published by the USGS and modified by Geoscience Australia to take account of recent discoveries, Australia has over 90% of the world's EDR of tantalum. Canada has the second largest resource base.

World production in 2000, based on USGS estimates modified to account for later Australian data, amounted to 628 tonnes tantalum. Production was dominated by Australia, with 485 tonnes in 2000 (about 77% of world output). According to USGS, minor producers of tantalum metal were Brazil (90 tonnes), Canada (50 tonnes) and Nigeria (3 tonnes).

Australia's exports of tantalum and niobium ores and concentrates in 2000–01 were 4,174 tonnes, an increase of 251 tonnes over 1999–2000. The total value of tantalum exports in 2000–01 was \$136m, an increase of 68% over 1999–2000.

## Uranium

At December 2000, Australia had 654,000 tonnes of uranium (U) in the Reasonably Assured Resources (RAR) category recoverable at less than US\$40 per kilogram of uranium (<US\$40/kg U). RAR recoverable at <US\$80/kg U were estimated to be 667,000 tonnes uranium. Australia's RAR recoverable at <US\$40/kg U (equates to EDR) are the largest of all those countries that have reported resources in this category. Because all countries have reported their resources in the <US\$80 category, the world ranking of the various countries is based on the <US\$80 figures. Australia has the world's largest resources of uranium in RAR recoverable at <US\$80/kg U, with 29% of world resources in this category.

In 2000, Australia's RAR recoverable at <US\$80/kg U increased by 96 kt U (17%) to 667 kt U. This was mainly due to reassessment of the ore reserves and mineral resources for the Olympic Dam deposit by Western Mining Corporation. The increases for Olympic Dam reflect the discovery of additional resources, and changes resulting from increases in long-term copper prices, lower exchange rates for the Australian dollar, and the recently completed expansion of the operations.

Approximately 95% of Australia's total uranium resources in RAR recoverable at <US\$80/kg U are within the following six deposits: Olympic Dam, South Australia, which is the world's largest uranium deposit; Ranger, Jabiluka, Koongarra in the Alligator Rivers Region, Northern Territory; and Kintyre and Yeelirrie, Western Australia. Uranium oxide was produced at the Ranger and Olympic Dam operations. Commercial operations commenced at the Beverley in situ leach operation in November. Australia's total production for 2000 was a record high of 8,937 tonnes of uranium oxide tonnes ( $U_3O_8$ ) (equivalent to 7,579 tonnes of uranium), of which Olympic Dam produced

4,500 tonnes  $U_3O_8$  and Ranger produced 4,437 tonnes  $U_3O_8$ . Nil production was reported from Beverley for the year. Australia's total production for 2000 was 27% higher than in 1999.

Total expenditure on uranium exploration in Australia for 2000 was \$7.59m, 21% lower than for 1999. Annual expenditure on uranium exploration in Australia has declined progressively since 1997. Respondents to the annual survey (conducted by Geoscience Australia) of uranium exploration, and mining companies, attribute this to: low market prices for uranium in recent years; uranium mining policies of state governments in Western Australia, Queensland, New South Wales, Victoria and Tasmania; and difficulties in accessing prospective areas because of native title issues.

Exports of uranium ores and concentrates in 2000–01 totalled 9,722 tonnes and earned \$497m. All exports of Australian uranium are subject to stringent safeguards which provide assurance that none of the material is diverted from peaceful uses.

## Zinc, lead, silver

Zinc is the 23rd most abundant element in the earth's crust. The construction and appliance manufacturing industries use large amounts of zinc, mainly as coatings on steel beams, sheet steel and vehicle panels in the automotive industry.

The widespread occurrence, relatively simple extraction, and combination of desirable properties have made lead useful to humans since at least 5000 BC. In deposits mined today, lead (in the form of galena,  $PbS$ ) is usually associated with zinc, silver and commonly copper, and is extracted as a co-product of these metals. More than half of the lead used today comes from recycling, rather than mining. The largest use is in batteries for vehicles and communications.

The relative scarcity, attractive appearance and malleability of silver has made it suitable for use in jewellery, ornaments and silverware since before Roman times. Its extensive use in coins throughout history has declined over the last 40 years. Silver is mined and produced mainly as a co-product of copper, lead, zinc, and to a lesser extent, gold. Today, photographic paper and film, followed by the electronics and jewellery/tableware industries are the most important users of silver.

Australia has the world's largest EDR of lead (23%), and zinc (18%). It has the fourth largest EDR of silver (11%) after Mexico, Canada and the United States of America. As a producer,

Australia ranks first in the world for lead, second for zinc (after China) and fourth for silver after Mexico, United States of America and Peru.

Australia's total identified resources of zinc (79.7 Mt) and lead (50 Mt) decreased by 2%, with silver staying steady at 85.4 kt in 2000. In the same period, EDR of zinc (32.8 Mt), lead (14.6 Mt) and silver (32 kt) remained unchanged as a result of production and reassessment of resources at major mines.

Mine production in 2000 for zinc, lead and silver was 1.42 Mt, 0.7 Mt and 2.06 kt, respectively. Production was mainly from mines at Cannington, Century, George Fisher, Hilton and Mount Isa in Queensland; McArthur River in the Northern Territory; Broken Hill and Elura in New South Wales; Rosebery in Tasmania; and Scuddles, Gossan Hill and the Lennard Shelf deposits in Western Australia. Australia's gold mines are significant contributors to silver production.

The silver-lead-zinc ore mining industry employed 2,811 people at the end of June 2000.

## Crude oil and condensate

Australian production of crude oil and condensate in 2000–01 was 38,705 million litres (ML), an increase of 3% over 1999–2000. Production of total crude oil and condensate from the North West Shelf accounted for 31% (or 11,936 ML) of total Australian crude oil and condensate production, and Gippsland accounted for 24% (or 9,328 ML). The North West Shelf was the major producer of condensate during 2000–01 with 73% (5,121 ML) of total Australian production sourced in that region.

In 2000–01 exports of crude petroleum oils totalled 22,501 ML, valued at \$7.6b; they were substantially up on 1999–2000 (19,173 ML, \$4.9b). The main markets were Singapore, Republic of Korea, Taiwan, Japan and United States of America.

## Liquefied petroleum gas (LPG)

LPG is a valuable co-product of oil and gas production and petroleum refining. The major constituents of LPG are propane and iso- and normal-butane, which are gaseous at normal temperatures and pressures, and are easily liquefied at moderate pressures or reduced temperatures. Operations involving LPG are expensive in relation to other liquid fuels because LPG has to be refrigerated or pressurised when transported and stored. LPG is an alternative transport fuel for high mileage vehicles in urban areas, as well as a petrochemical feedstock and domestic fuel.

Production of naturally occurring LPG in Australia in 2000–01 was 4,056 ML, an decrease of 7% over 1999–2000. The major contributors were the Gippsland Basin (1,725 ML or 43% of total production) and the North West Shelf (1,493 ML or 37% of total production).

In 2000–01 Australian exports of liquefied propane and butane totalled 1.5 Mt, a decrease of 3% from 1999–2000. Export earnings from liquefied propane and butane in 2000–01 were \$830m, up \$182m (28%) on the previous year.

## Liquefied natural gas (LNG)

During 2000–01, some 31,524 million cubic metres (Mm<sup>3</sup>) of LNG were produced for domestic consumption and export, an increase of 1% over 1999–2000. Production was dominated by the North West Shelf, which accounted for 16,042 Mm<sup>3</sup> of natural gas, or 51% of the total.

Export earnings from LNG increased by 37% to \$2.6b in 2000–01.

## Mining and the environment

### Introduction

The impact of the mining industry on the environment has been a public concern, with growing appreciation of the natural environment and increasing awareness of the possible harmful effects that the industry's activities can cause. The industry and government have responded with a number of initiatives and regulations to protect and manage the environmental effects of mining activities.

The extractive nature of mining operations creates a variety of impacts on the environment before, during and after mining operations. The extent and nature of impacts can range from minimal to significant depending on a range of factors associated with each mine. These factors include: the characteristic of the ore body; the type of technology and extraction methods used in mining and the on-site processing of minerals; and the sensitivity of the local environment. The environmental impacts of mining, although significant, are generally confined to local areas. Apart from direct physical impacts of extractive activities, contamination of air, land and water may also result. However, mining in isolation may not be the main land use that upsets ecological systems, as environmental effects are cumulative in nature and other past activities or events may have contributed to these effects.

This article briefly discusses the main environmental impacts of mineral mining, such as wastes, and the rate of resource use (where the supply of minerals depends on the rate of resource use, which is affected by the economic life of mineral deposits and the rate at which new reserves are discovered). The article also summarises environmental management

initiatives, such as the use of legislation, environmental impact assessments, environmental protection expenditure, rehabilitation and industry self-regulation.

### Impact of the mining industry on the environment

#### Mineral exploration

Mineral exploration can impact on the environment. Its effect depends on the scale of exploration and what equipment is used in the exploration phase. Initial exploration may involve the use of satellites and aerial photography, with the latter impacting through noise and proximity to wildlife areas when conducted at a low altitude. Activities at ground level often require the use of bore holes, excavation pits and transect lines. The use of support equipment also leaves an impact on the environment; exploration vehicles require access tracks, and even helipads, if left unrehabilitated, can have medium- to long-term effects.

#### Mining operation

Environmental impacts may also occur through mine establishment, ore extraction, mineral concentration and associated transport, provision of infrastructure (which may include whole townships) and downstream processing.

Inherent to mining and mineral processing operations is the generation of wastes. These are mostly in the form of waste rocks, including surface waste rocks, rocks between ore bodies or layers and other unwanted material. This form of waste contains low or nil concentrations of the material desired and is often relatively

toxic. Normally, waste rocks are stockpiled or dumped adjacent to or near the excavation area, to be used later as backfill during reclamation.

Mineral processing produces wastes in grain sizes of fine sand, silt and clay fractions. Referred to as mine tailings, this type of waste contains significant concentrations of minerals that are not amenable to recovery at the time of initial mining. Tailings are usually disposed of in specially lined tailings dams, which are normally capped and revegetated to prevent the release of environmentally harmful materials. Other wastes from mining may be in the form of water and air pollution. The majority of air emissions associated with the mining industry include dust, oxides of nitrogen, sulphur dioxide and carbon monoxide. Some of these come from mining vehicles and on-site plant machinery. Water quality may be affected by:

*Acid mine drainage* — when large quantities of excavated rock containing sulphide minerals interact with water and oxygen to create sulphuric acid.

*Heavy metal contamination and leaching* — heavy metals occur naturally in many ores, and are often released in the mineral extraction process. Metals (i.e. arsenic, cobalt, copper, cadmium, lead, silver and zinc) contained in an excavated or exposed rock may be leached out and carried downstream by flowing water.

*Processing chemical pollution* — spilling, leaking or leaching of chemical agents (i.e. cyanide, sulphuric acid) from the minesite into nearby water bodies.

*Erosion and sedimentation* — erosion of cleared land surface and dumped waste material resulting in sediment loadings into the adjacent water bodies, particularly during rainfall.

Environmental impacts resulting from mining are not limited to current mining operations. Mining residues and scars at old mining sites may also impact on local environments. The legacy of abandoned, unrehabilitated minesites has required comprehensive remediation efforts paid for with taxpayers funds. One example is the Upper South Alligator River (north of Katherine) which forms part of Stage III of the Kakadu National Park World Heritage area. As the numbers of visitors increased to the area, a hazard reduction works program was conducted during the early 1990s (Mudd 2000).

### Rate of mineral resource use

Minerals, oil and gas are finite and non-renewable resources; their consumption today poses a threat of scarcity to future generations. The mining industry has an obligation to operate within the concept of sustainable development. This is defined by the World Commission on Environment and Development report *Our Common Future* (The Brundtland Report) as ‘development which meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED 1987). For the mining industry to be sustainable, it would need to maintain a rate of resource use which is reasonable, that is, its consumption of resources does not go beyond a level which can ensure the availability of resources for the future of the industry and the people. This rate of resource use depends on a variety of factors including the rate of use of existing known resources, the rate at which new resources are discovered, and the rate of recycling of existing materials. If discoveries or recycling do not keep pace with the rate of use, depletion will result.

Geoscience Australia has estimated that Australian stocks of crude oil will be exhausted in eight years if the current rate of production is maintained and there is no discovery of new reserves (GA 2001a). However, with continuing advances in technology for exploration and mining activities, the rate of discovery of new reserves has kept pace with the rate of production, allowing for changes in the actual and potential stocks of minerals, oil and gas. Modern technology has been a contributing factor to the efficient recovery of minerals, and the consequent fall in the cost of finding additional reserves of base metals in particular (ABS 2001a). For example, declining costs (and rising commodity prices) mean that processing of areas such as tailings and slag heaps becomes economically viable. Resource scarcity is also lessened by recycling and/or substitution.

As the previous section outlined, in 2000 Australia’s economic demonstrated resources (EDR) of bauxite, brown coal, copper, diamond, magnesite, mineral sands, nickel, phosphate, tantalum, uranium and vanadium increased, while those of black coal, gold, iron ore, manganese ore and lithium decreased (GA 2001b). EDR of zinc, lead and silver were maintained at levels similar to those reported in 1999.

**18.16 MINING INDUSTRY ENERGY USE**

	Mining		All users(a)	
	Primary energy(b)	Secondary energy(c)	Primary energy(b)	Secondary energy(c)
	PJ	PJ	PJ	PJ
1992-93	121	112	9 727	2 203
1993-94	125	116	9 865	2 253
1994-95	138	122	10 410	2 319
1995-96	151	134	11 787	2 387
1996-97	156	143	12 676	2 435
1997-98	164	150	13 250	2 489

(a) Industries, households and exports. (b) Primary energy sources include solar, wind, wood, bagasse, coal, oil and gas, and uranium concentrates. (c) Secondary energy sources are those mainly derived from a primary energy source such as thermal electricity, which is derived mainly from coal, and refined petroleum products (e.g. automotive petrol) derived from crude oil.

Source: ABS 2001b.

**Use of energy and water by the mining industry**

The mining industry is not a major user of energy as compared to other industries like manufacturing and electricity. It used about equal proportions of both primary and secondary energy sources in the period 1992-93 to 1997-98 (table 18.16).

The mining industry's use of total energy was 314 petajoules (PJ) in 1997-98, as compared to 121 PJ in 1992-93.

The mining industry is not a high user of water. Between and 1993-94 and 1996-97, it accounted for 3% of total water consumed (table 18.17). Most of water consumed was sourced from the environment.

**18.17 NET WATER CONSUMPTION**

	Mining	All users(a)
	ML	ML
1993-94	591 194	18 575 443
1994-95	600 458	21 141 525
1995-96	590 527	19 875 227
1996-97	570 217	22 185 731

(a) Industries and households.

Source: ABS 2000.

**Environmental management**

In order to mitigate the adverse impacts from mining activities mentioned above, the mining industry and government undertake environmental management measures. These measures are aimed at the prevention, reduction or elimination of pollution or any degradation of the environment. They include waste management and protection of

biodiversity, landscape, air and climate (MCA 2002). Protection mechanisms are backed by environmental legislation from the states and, increasingly, the Commonwealth, which has been assuming more responsibilities and imposing standards on the states.

In Australia, the state and territory governments own and administer mineral and petroleum rights over land, and seaward to three nautical miles from the sea baseline. In these areas, although the Commonwealth Government has some responsibilities regarding the environmental protection, the states and territories are the main authorities for environmental management of most mines within their respective jurisdictions.

Environmental management involves the use of mechanisms in the development, operation and subsequent rehabilitation of mine sites. These mechanisms are supported by legislation. The mining industry has also introduced its own code for self regulation.

**Competing land use values**

There is little choice in where mining occurs as it depends on the location of the minerals. As a result, there is often competition relating to land use between mining and for example, urbanisation, agriculture and conservation. Mining operations are therefore required to comply with comprehensive measures to control their environmental impacts. One measure is the use of buffer zones where land around a mine site is used for other purposes such as grazing (such as the Bengalla Mine near Muswellbrook, New South Wales). In cases where mines are located close to urban centres, a number of mechanisms, both formal and informal, must be in place to ensure that

sustainable relationships are established by companies with various stakeholders, including local communities (as between Bendigo Mining NL and the City of Bendigo). Particularly stringent regulations apply where mining operations are located near or next to ecologically sensitive areas, requiring comprehensive environmental protection measures and agreements with governments and local communities (such as the Century Zinc mine lease in north-western Queensland and the 1997 Gulf Communities Agreement).

### Legislation on environment

Under Australian constitutional and legal arrangements, the state and territory governments have key responsibility for the management of mineral resources on land. Offshore the Commonwealth has overall responsibility with administrative arrangements shared with state and territory governments (Mining Working Group 1991). The Commonwealth may also exercise its powers and responsibilities where developments may affect the national interest.

The key Commonwealth legislation dealing with environmental impacts, the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act), came into effect on 16 July 2000. Under the Act, actions that are likely to have a significant impact on a matter of national environmental significance are subject to a comprehensive referral, assessment, and approval process. The Act has relevance to mining (particularly uranium mining as a nuclear related matter) and any impact it may have on a Commonwealth area (such as a national park).

States and territories administer mineral rights through the issue of permits for exploration and mining according to their own mineral end environmental legislative frameworks. Prescribed standards of environmental performance are set out in respective state and territory legislation establishing powers and regulations which control the collection of royalties, and inspection and control of exploration and mining (Hancock 1993). Regulatory authorities in the states and territories are usually departments of mines and/or environmental protection authorities.

The Commonwealth and each state and territory has legislation relating to Environmental Impact Assessment (EIA)

(EA 2002). EIA is the process of assessing likely environmental impacts of a proposal and identifying options to minimise damage. It is only necessary for a project that has a potential significant environmental impact. The main purpose of EIA is to inform decision makers of the likely impacts of a proposal before a decision is made.

### Rehabilitation

The amount of 'rehabilitation' to an area disturbed by mining can range from restoration, where an area is brought to as near as possible to pre-mining condition, to recontouring and revegetating to a state that is non-polluting and compatible with environmental regeneration and community expectations (Hancock 1993). Recontouring can involve construction of pit walls and waste dumps, covering of reactive materials, dismantling of buildings/plant, revegetation, and ongoing environmental quality monitoring. Under legislation, mining companies are required to pay performance guarantee bonds which act as an administrative and environmental management tool. Bonds are usually paid to a state mining authority (repaid after successful rehabilitation), creating a financial incentive to ensure that rehabilitation is carried out. Bonds also provide a source of funds for remediation efforts in the event of a corporate failure of a mining venture.

### Minerals Industry Code

A key industry initiative is the Australian Minerals Industry Code for Environmental Management. The aim of the code was not to set standards or to instruct companies how they should run their operations, but to change values and behaviour towards improving environmental performance and public accountability. The minerals industry launched the Code (which is voluntary) in December 1996. As at 1 January 2002, 43 companies have committed themselves to the 2000 Code, representing over 300 operations and well over 85% of production in the Australian minerals industry (AMEEF 2002).

An essential feature of the Code is provision for greater public accountability and verification of the industry's impact on the environment measured against the implementation of the Code's principles. A company's performance is assessed on key areas covering energy use and

efficiency, water consumption, land rehabilitation, air emissions, biodiversity, and incidence and severity of environmental issues.

At least 45 company environmental reports have now been released since the Code was initiated in 1996. An External Environmental Advisory Group was also established to serve as a forum for the industry to seek independent advice on assessing and improving environmental performance (MCA 2001). More recently the mining industry has developed expertise in environmental management, to ensure that environmental protection is achieved in planning and operating resource developments. This expertise has been built up across a wide variety of climatic and geographic conditions in Australia and overseas.

Many environmental impacts associated with the mining industry are now reduced or removed, due to improved management by the industry and an increase in environmental

responsibilities of the industry imposed by government. Part of the improvement lies in the requirement for companies to budget for expenditure on environmental protection measures, including rehabilitation of mined-out areas and waste control.

### Environment protection expenditure by the mining industry

Total expenditure for environment protection by the mining industry increased by 6% from \$368.9m in 1996–97 to \$390.6m in 2000–01. Metal ore mining accounted for most of this expenditure (58%), followed by coal mining (24%), and oil and gas extraction (8%).

In 2000–01, current expenditure accounted for 73% of total expenditure (table 18.18), an increase from 62% in 1996–97. This was due to an increase in current expenditure of 24% and a decline in capital expenditure of 24% (table 18.19).

#### 18.18 CURRENT ENVIRONMENT PROTECTION EXPENDITURE(a), Mining industry

Industry	1996–97						2000–01	
	Total	Mine site rehabilitation	Solid waste	Liquid waste	Air emissions	Other	Administration	Total
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Coal mining	58.5	35.8	21.2	6.3	4.0	5.8	9.4	82.4
Oil and gas extraction	21.9	1.8	3.3	6.3	0.9	3.5	7.8	23.5
Metal ore mining	103.9	50.2	24.6	11.4	34.1	7.7	26.4	154.4
Other mining	31.2	9.9	4.7	0.9	1.5	2.0	4.4	23.5
<b>Total mining</b>	<b>(b)228.1</b>	<b>97.7</b>	<b>53.8</b>	<b>24.8</b>	<b>40.5</b>	<b>19.0</b>	<b>48.0</b>	<b>283.8</b>

(a) Current expenditure generally relates to payments of a non-capital nature, for example payments to government agencies or private businesses for waste removal services, environmental audits, site cleaning and environmental impact assessments.

(b) Includes current expenditure in Services to mining which accounts for \$12.7m. This industry was not covered in the 2000–01 survey.

Source: ABS 1999; ABS 2002.

#### 18.19 CAPITAL ENVIRONMENT PROTECTION EXPENDITURE(a), Mining industry

Industry	1996–97					2000–01	
	Total	Mine site rehabilitation	Solid waste	Liquid waste	Air emissions	Other	Total
	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Coal mining	44.4	n.p.	3.4	4.4	n.p.	n.p.	11.6
Oil and gas extraction	10.4	n.p.	0.4	0.8	n.p.	n.p.	14.5
Metal ore mining	69.2	4.4	47.7	11.6	4.7	3.0	71.5
Other mining	15.7	1.2	2.6	0.4	4.7	0.3	9.2
<b>Total mining</b>	<b>(b)140.8</b>	<b>7.4</b>	<b>54.2</b>	<b>17.3</b>	<b>23.1</b>	<b>4.9</b>	<b>106.8</b>

(a) Capital cost can be regarded as expenditure on the acquisition of assets designed specifically to assist with environmental protection measures. (b) Includes capital expenditure in Services to mining which accounts for \$1.1m. This industry was not covered in the 2000–01 survey.

Source: ABS 1999; ABS 2002.

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## Minerals processing and treatment

As few minerals can be directly used in the form in which they are mined, most minerals undergo processing and treatment before use.

Table 18.20 shows the production of the main manufactured products of mineral origin.

## Exports

Export earnings from Australian mineral resources rose to a record \$55.6b in 2000–01, an increase of \$11.8b or 27% on the previous year. This much stronger performance in 2000–01 reflected significantly higher export prices and volumes for the majority of minerals and energy commodities. In particular, average oil and gas export unit prices increased by between 31% and 40%. For a number of other commodities (alumina, aluminium, coal, iron ore, titanium dioxide pigment, zinc and zircon), export unit

prices rose by between 15% and 23%. Reflecting the general rise in prices, the index of export unit returns for mineral resources (prices received in A\$ terms) increased by 21% in 2000–01.

Coal remained the biggest export earning mining commodity, with a value of \$8.8b in 2000–01, representing 9% of total merchandise exports. Other major exports were gold (\$5.1b, 4%), crude petroleum oils (\$7.6b, 6%), iron ore (\$4.9b, 4%) and alumina (\$4.4b, 4%).

Some of the commodities for which export earnings increased in 2000–01 included: crude oil, up \$2,817m (53%); coking coal, up \$1,413m (27%); iron ore, up \$1,133m (30%); steaming coal, up \$1,085m (35%); alumina, up \$1,031m (30%); aluminium, up \$932m (28%); LNG, up \$722m (37%); refined petroleum products, up \$683m (57%); copper, up \$680m (42%); zinc up \$537m (44%); nickel, up \$194m (10%); LPG up \$182m (28%); and uranium oxide, up \$130m (35%).

## 18.20 PRODUCTION OF PRINCIPAL MANUFACTURED PRODUCTS OF MINERAL ORIGIN

	Units	1996-97	1997-98	1998-99	1999-2000	2000-01
<b>METALS</b>						
<b>Non-ferrous</b>						
Alumina	'000 t	13 252	13 581	14 207	15 037	16 098
Refined aluminium	'000 t	1 395	1 589	1 686	1 742	1 788
Refined copper(a)	'000 t	305	284	306	477	517
Lead bullion(b)	'000 t	191	171	157	165	153
Refined lead	'000 t	202	185	199	233	215
Refined zinc	'000 t	319	304	323	405	534
Refined tin(a)	t	570	650	595	600	1 039
<b>Ferrous</b>						
Pig iron	'000 t	7 545	7 928	7 513	n.a.	n.a.
Iron and steel(a)	Mt	n.a.	n.a.	8 549	8 053	8 105
<b>Precious</b>						
Refined gold	t	326	348	419	383	361
Refined silver	t	339	227	410	543	532
<b>FUELS</b>						
<b>Petroleum products</b>						
Diesel automotive oil	ML	12 968	13 183	12 968	12 737	13 212
Industrial and marine fuel	ML	45	48	32	60	98
Fuel oil	ML	1 795	1 662	1 634	1 839	1 951
Petrol	ML	18 084	18 589	18 705	18 652	17 887
<b>BUILDING MATERIALS</b>						
Clay bricks	m	1 467	1 532	1 594	1 735	1 448
Portland cement	'000 t	6 701	7 235	7 704	7 937	6 821
<b>CHEMICALS</b>						
Superphosphate	'000 t	1 511	1 819	1 464	1 429	1 379

(a) ABARE estimate. (b) Metallic content.

Source: *Manufacturing Production, Australia (8301.0)*; ABARE, 'Australian Mineral Statistics'.

From 1999-2000 to 2000-01, Australian exports of crude oil and other refinery feedstock increased by 14.7% to 23,986 ML, while LPG declined by 2.6% to 2,785 ML. Automotive gasoline exports declined by 2.9%. Export earnings from crude oil and condensate rose by 57% to \$7.6b, those from LNG rose by 37% to \$2.7b, and those from LPG rose by 28% to \$830m.

The major markets for Australian crude oil and other refinery feedstock were Singapore (6,808 ML), Korea (4,358 ML), Japan (4,069 ML) and Taiwan (3,656 ML). The major markets for LPG were Japan (2,241 ML) and China (416 ML); the major market for automotive gasoline was the United States of America (174 ML).

## Imports

Mineral resource imports were valued at \$14.14b in 2000-01, an increase of \$2.08b (17%) from 1999-2000. The main contributors to the rise

were: crude oil, up \$2,367m (37%) to \$8,680m; and refinery petroleum products, up \$404m (29%) to \$1,779m. Smaller increases were also recorded for diamonds, iron ore and phosphate rock.

In 2000-01 Australian imports of crude oil and other refinery feedstocks decreased by 2.9% to 26,238 ML, and imports of petroleum products decreased by 2.4% to 30,559 ML. Major petroleum products which recorded significant increases were automotive gasoline (11.6%) and aviation turbine fuel (127.2%).

The major sources of Australian imports of crude oil and other refinery feedstocks were Vietnam (6,282 ML), Saudi Arabia (4,016 ML), Indonesia (3,681 ML) and United Arab Emirates (3,170 ML). The major source of both automotive gasoline imports and diesel fuel was Singapore, at 542 ML and 734 ML respectively.

## Administrative and financial arrangements

### Administrative arrangements

Mineral and petroleum resources are owned either by the Commonwealth Government or the state/territory governments. The Commonwealth Government owns resources found outside the first three nautical miles from the territorial sea baseline (referred to as ‘beyond coastal waters’). The state and territory governments own resources found onshore and out to three nautical miles from the baseline (referred to as ‘coastal waters’).

The Commonwealth Government is responsible for setting national policy, including fiscal, monetary and taxation policy and foreign investment policy.

State and territory government responsibilities include managing and allocating mineral and petroleum property rights, land administration, and regulation of operations (including environmental, and occupational health and safety).

### Exploration and mining licences

State and territory governments are responsible for the granting and administration of exploration and mining licences. An exploration licence authorises the exploration phase of a project and confers exclusive rights to the exploration for and the recovery of mineral or petroleum samples from the licence area. A mining licence covers the commercial mining phase of a project and authorises the exploration for and full recovery of minerals from the licence area. A retention licence is an intermediate form of tenure, designed to ensure the retention of rights pending the transition of a project from the exploration phase to the commercial mining phase.

### Mineral and petroleum royalties

Royalties are collected by state and territory governments for mining onshore and up to three nautical miles offshore, and by the Commonwealth Government outside that area. The basis of the mineral royalties varies between states and between commodities.

Onshore and within coastal waters, royalties are levied on petroleum production. Petroleum produced in offshore areas of Australia (but not

including the North West Shelf) is generally subject to an offshore Petroleum Resource Rent Tax levied by the Commonwealth. This is in addition to income tax payments. State petroleum royalties and Commonwealth crude oil excise apply onshore in coastal waters. Commonwealth petroleum royalties and crude oil excise apply to the North West Shelf project.

### Native title

Native title was first recognised in Australia by the High Court of Australia in 1992. In a historic decision (*Mabo* (no. 2)), the Court decided that the common law of Australia recognises a form of native land title which exists in accordance with the laws and customs of Indigenous people where:

- those people have maintained their traditional connection with the land
- their title has not been extinguished by a law or other action of government (such as a grant of a freehold title).

The Native Title Act (NTA) commenced on 1 January 1994, and in 1998 the Federal Parliament passed a comprehensive package of amendments which commenced on 30 September 1998. On land where native title may exist, applicants for exploration and mining titles are required to undertake formal negotiations or consultations with native title holders or native title claimants who have registered a claim over the area. This process needs to be undertaken before the exploration permit or mining title is granted. The negotiations relate to seeking agreement with the native title parties on the activities to be pursued.

The NTA enables the state and territories to establish their own Commonwealth-accredited regimes to address native title requirements, provided that the legislation is consistent with the requirements of the NTA. It also enables the parties concerned in any native title claim to negotiate voluntary but legally binding agreements, called Indigenous Land Use Agreements, as a flexible means of resolving native title claims in exploration or mining.

### Research

Research into exploration, mining, ore dressing and metallurgy is conducted by government bodies, universities, private enterprise, and by the combined efforts of all these. A summary of the main organisations and their functions follows.

## Geoscience Australia

Geoscience Australia is the national geoscience research and spatial information agency. It assists government and the community to make appropriate and informed decisions about the use of resources, management of the environment, and the safety and wellbeing of Australians. Its main activities centre on the following:

- geoscience for onshore activities, focusing on enhancing mineral exploration and environmental land-use planning through the production of geoscientific maps, databases and information systems, and conducting regional geological and mineral systems research
- geoscience for offshore activities, focusing on identifying potential hydrocarbon areas and new prospective basins in Australia's offshore territories, mapping the outer limits of Australia's jurisdiction under the UN Convention on the Law of the Sea, and undertaking studies of the marine environment and estuarine health studies
- spatial information activities, focusing on the provision of fundamental spatial data of Australia from national mapping, remote sensing and geodesy. The activity also includes the maintenance of fundamental gravity and seismic networks and the coordination of the implementation of the Commonwealth Policy on Spatial Data and Access and Pricing.

## AMIRA International Limited

AMIRA is a not-for-profit private sector company, established in 1959 to facilitate the technological advancement of its members in the mineral, coal, petroleum and associated industries. It has membership and support of more than 90 companies in Australia and internationally.

AMIRA brokers and manages jointly funded research projects on a fee for service basis. Project sponsors are required to be AMIRA members. Typically, at any one time there are 70 projects under management valued at \$40m.

The primary benefit delivered by AMIRA is the output from project sponsorship.

## Australian Bureau of Agricultural and Resource Economics (ABARE)

ABARE is a professionally independent agency devoted to applied economic research. For over 50 years ABARE has worked with industry and government to provide stakeholders in Australia's rural and resource industries with up-to-date public policy analysis and commodity forecasts. ABARE's research seeks to clearly and independently identify the benefits and costs of alternative policy options for consideration by government and private decision makers.

ABARE services include:

- deriving supply and demand projections
- assessing the outlook for commodity prices
- examining patterns of national and world production and consumption
- analysing the impact of economic policies
- developing analytical computer programs and economic policies
- undertaking regional and environmental economic assessments
- providing economic assessments of factors affecting the competitiveness of the resources sector.

ABARE undertakes economic research on issues affecting the full range of major minerals, energy, agricultural and natural resources industries, as well as on climate change, and on macroeconomic, microeconomic and trade issues relating to these industries.

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*Australian System of National Accounts* (5204.0)

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*Directory of Mining Statistics* (8416.0)

*Electricity, Gas, Water and Sewerage Industries, Australia* (8226.0)

*Manufacturing, Australia* (8225.0)

*Manufacturing Industry, Australia* (8221.0)

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*Australian Mineral Statistics*

Commonwealth Department of Industry, Science and Resources (DISR), *Australian Petroleum Statistics*

Geoscience Australia, *Australia's Identified Mineral Resources*

MIM Publications, *The Minerex Report*

WA Department of Minerals and Energy, *Statistics Digest 99/00*

### Web sites

#### Federal agencies

ABARE, <<http://www.abareconomics.com>>

Australian Bureau of Statistics, <<http://www.abs.gov.au>>

A mining theme page may be found under the category *Themes*, providing information about the ABS mining statistics, and links to other useful web sites

Commonwealth Department of Industry, Tourism and Resources, <<http://www.industry.gov.au>>

Commonwealth Scientific and Industrial Research Organisation, <<http://www.csiro.au>>

Geoscience Australia, <<http://www.ga.gov.au>>

National Native Title Tribunal, <<http://www.nntt.gov.au>>

Uranium Information Centre, <<http://www.uic.com.au>>

### **State departments**

Department of Mineral and Petroleum Resources, Western Australia, <<http://www.mpr.wa.gov.au>>

Department of Mineral Resources, New South Wales, <<http://www.minerals.nsw.gov.au>>

Department of Natural Resources and Environment, Victoria, <<http://www.nre.vic.gov.au>>

Department of Natural Resources and Mines, Queensland, <<http://www.nrm.qld.gov.au>>

Minerals Resources, Tasmania, <<http://www.mrt.tas.gov.au>>

Northern Territory Department of Business, Industry and Resource Development,  
<<http://www.dbird.nt.gov.au>>

Primary Industries and Resources, South Australia, <<http://www.pir.sa.gov.au>>

### **Industry organisations**

Association of Mining and Exploration Companies (Inc), <<http://www.amec.asn.au>>

Australian Aluminium Council, <<http://www.aluminium.org.au>>

Australian Gold Council, <<http://www.australiangold.org.au>>

Australian Institute of Petroleum, <<http://www.aip.com.au>>

Australian Mineral Foundation, <<http://www.amf.com.au>>

Australian Mineral Industries Research Association Limited, <<http://www.amira.com.au>>

Australian Minerals and Energy Environment Foundation, <<http://www.ameef.com.au>>

Australian Petroleum Production and Exploration Association Limited, <<http://www.appea.com.au>>

Chamber of Minerals and Energy of WA, <<http://www.mineralswa.asn.au>>

Coal Services Pty Ltd, <<http://www.jcb.org.au>>

Minerals Council of Australia, <<http://www.minerals.org.au>>

New South Wales Minerals Council, <<http://www.nswmin.com.au>>

Queensland Mining Council, <<http://www.qmc.com.au>>

Resource Information Unit, <<http://www.riu.com.au>>

South Australia Chamber of Mines and Energy, <<http://www.resourcessa.org.au>>

Tasmania Minerals Council, <<http://www.tasminerals.com.au>>

Victorian Minerals and Energy Council, <<http://www.vicmins.com.au>>

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## Introduction

Manufacturing broadly relates to the physical or chemical transformation of materials or components into new products, whether the work is performed by power-driven machinery or by hand. Manufacturing covers a range of production techniques ranging from computer-assisted production using robots to production of fine jewellery by hand.

The manufacturing industry is an important sector of the Australian economy, contributing around 13% of Australia's gross domestic product (GDP) and employment. However, despite significant increases in the value of the manufacturing industry's gross value added (by

more than 30% over the past 20 years), the industry's share of Australian GDP has fallen from around 18% to its current level.

The number employed in the manufacturing industry has regained ground after dipping marginally in the middle of 2001; it stood at 1.1 million in May 2002.

This chapter presents a range of data about the manufacturing sector as a whole, and about broad categories of manufacturing industry. These categories are referred to as 'subdivisions'.

Some data are provided from the annual manufacturing survey, for which the latest results relate to the preliminary findings for 2000–01, while others, relating to 2001–02 in most instances, have been derived from various monthly and quarterly surveys.

## Manufacturing and the environment

### Introduction

The manufacturing industry consumes natural resources such as energy and water to provide goods and services to households and businesses, and for export. As a direct result of this consumption process, waste is disposed of into the atmosphere, rivers and oceans, or as landfill. All of this places pressures on the environment. Increasingly, such pressures result in governments creating policies which influence the behaviour of manufacturers. Manufacturers react to these regulatory and social pressures through environmental plans and expenditure on environment protection.

### Use of natural resources: energy and water

Both primary and secondary energy sources are consumed by the manufacturing industry. Primary energy sources can be renewable or non-renewable. Renewable energy sources include solar, wind, wood and bagasse. Non-renewable sources include raw materials (such as coal, oil and gas) and uranium concentrates.

Secondary energy sources are those derived from a primary energy source such as thermal electricity. Thermal electricity is derived mainly from coal and refined petroleum products (e.g. automotive petrol) which in turn is derived

from crude oil. Renewable energy currently accounts for a small proportion of these secondary sources, the principal type being hydro-electricity.

In 1997–98, energy use by the manufacturing industry was 2,489 PJ of primary energy and 521 PJ of secondary energy (table 19.1). This accounted for 19% of total primary energy use and 21% of total secondary energy use in Australia. Renewable energy contributed 160 PJ or 6% of primary and 4% of secondary sources. Of the primary energy used, manufacturing produced 1,696 PJ or 68% of secondary energy supply.

Over the period 1992–93 to 1997–98, primary energy use by manufacturing increased by 11% and secondary energy by 9%. For the same period, all users increased their use of primary energy by 36% and their use of secondary energy by 13%.

The manufacturing industry was the sixth highest water user in Australia, consuming 1% of water extracted (727 GL) in 1996–97. By 2000–01 this use had increased to 793 GL (one and a half times the volume of Sydney Harbour). The majority of water intake for this industry was mains supplied (70%), reflecting the tendency for manufacturing industry to be located around urban communities.

**19.1 ENERGY USE**

	Manufacturing		All users(a)	
	Primary energy	Secondary energy	Primary energy	Secondary energy
	PJ	PJ	PJ	PJ
1992-93	2 244	478	9 727	2 203
1993-94	2 303	494	9 865	2 253
1994-95	2 367	513	10 410	2 319
1995-96	2 414	514	11 787	2 387
1996-97	2 464	502	12 676	2 435
1997-98	2 489	521	13 250	2 489

(a) Industries, household and exports.

Source: ABS 2001.

### Manufacturing as a source of pollution and waste

Most manufacturing businesses do not generate waste in quantities significant enough to report on the National Pollutant Inventory. However, 675 manufacturing locations (approximately 1% of all manufacturing locations) reported particulate emissions (dust particles smaller than 10 micrometres) amounting to 11% of the estimated total particulate emissions for 2000-01. Depending on the type of dust, particulate matter can be a hazardous material which can cause irritation of the mucous membrane, allergic reactions, fibrosis and cancer.

In 1997-98, the manufacturing industry released 57,166 Gg of carbon dioxide equivalent emissions (CO<sub>2</sub>-e), accounting for 17% of total CO<sub>2</sub>-e by Australian industries (table 19.2). Manufacturing is the second highest source of greenhouse gas emissions after the electricity industry. The level of emissions reached in 1997-98 represented a 9% increase over the 1992-93 level. The majority of emissions are carbon dioxide, with a marginal amount of nitrous oxide and methane.

**19.2 GREENHOUSE GAS EMISSIONS**

	Manufacturing	All sources
	CO <sub>2</sub> -e	CO <sub>2</sub> -e
1992-93	52 431	285 168
1993-94	52 934	289 325
1994-95	55 665	302 959
1995-96	56 603	313 355
1996-97	55 437	320 975
1997-98	57 166	339 597

Source: ABS 2001.

### Response by government for environment protection

Governments react to environment pressures exerted by manufacturing activity through legislation and partnership programs. These programs are based on reducing greenhouse emissions, waste minimisation, resource recovery and reducing material inputs to the manufacturing process.

Government regulations concentrate on protecting the environment. Regulations range from licence fees for pollution emissions to the environment, to compulsory reporting requirements through legislation such as the *Corporations Act 2000* (Cwlth), and fines from prosecutions.

Voluntary programs promoted by the Commonwealth Government and state governments focus on the provision of reporting measures for businesses such as *A Framework for Public Environmental Reporting: An Australian Approach* (Environment Australia 2000) and eco-efficiency agreements (relating to waste minimisation, energy minimisation and an overall reduction of materials into the manufacturing industry). Targets are set by government and industry collaboration on the basis of which indicators are agreed upon, measuring the extent to which businesses meet those targets.

More recently, the Global Reporting Initiative program (Global Reporting Initiative 2001) details a series of environment, social and governance measures for companies to report on.

### Response by manufacturing on environment protection

Manufacturers react to regulatory and social pressures by establishing environmental plans or policies and by expenditure on environment protection. Their expenditure in 2000-01 is shown in table 19.3 in respect of the following domains: solid waste management; liquid waste management; air emissions management; other environment protection including protection of soil resources, biodiversity and habitat; and administration of the environment.

### 19.3 ENVIRONMENT PROTECTION EXPENDITURE — 2000–01

Domain	Current \$m	Capital \$m
Solid waste	284.0	90.3
Liquid waste and waste water management	183.5	176.1
Air emissions	34.5	124.0
Other	32.7	47.7
Administration	133.8	..
<b>Total</b>	<b>668.5</b>	<b>438.1</b>

Source: ABS 2002a.

Current environment protection expenditure for the manufacturing sector of \$669m was about 0.3% of total current expenditure of the sector. The highest expenditure was on waste management (\$502m), in the fields of solid waste management (\$284m), liquid waste and waste water management (\$184m) and air emissions management (\$35m).

Capital environment protection expenditure for the sector of \$438m was about 4% of its total capital expenditure. The highest expenditure was again on waste management (\$390m), in the fields of liquid waste and waste water management (\$176m), air emissions management (\$124m) and solid waste management (\$90m).

Approximately 13% of manufacturers had an environmental plan in place at 30 June 2001. Of these businesses, 54% constructed a voluntary environment management system or code of practice and 52% had a written policy or environmental plan (table 19.4). However, of businesses with 100 or more employees, 64% had environmental plans; the great majority of these (87%) had a written policy or plan.

### Barriers to environment protection

A number of barriers can prevent businesses from implementing environment management measures. Such barriers include lack of time, resources or knowledge on environment management.

Approximately 46% of manufacturers had no barriers to improving environment protection expenditure for the financial year 2000–01 (table 19.5). The main reasons for not improving environment protection were reported to be the likely costs involved (28% of businesses), and lack of time and staff resources (26%).

About 44% of manufacturing businesses sought some form of environment management information in 2000–01. Some 21% obtained information from state government and 19% from their industry and professional associations (table 19.6).

### 19.4 BUSINESSES WITH ENVIRONMENT PLANS — 2000–01

Employment size (persons)	With environment plans	Without environment plans	Written policy or plan	Public Environment Report	Voluntary EMS(a)	Certified EMS(a)
	%	%	%	%	%	%
0–19	10.2	89.8	39.4	(b)10.4	57.9	(b)9.8
20–99	28.3	71.7	72.0	(b)7.1	39.2	(b)7.3
100 or more	63.3	36.7	86.0	21.1	58.0	24.2
<b>All businesses</b>	<b>13.4</b>	<b>86.6</b>	<b>52.0</b>	<b>(b)11.0</b>	<b>54.0</b>	<b>(b)11.0</b>

(a) Environment management system. (b) Standard error of more than 10%.

Source: ABS 2002a.

**19.5 BARRIERS TO ENVIRONMENT PROTECTION — 2000–01**

	Proportion of manufacturing businesses
	%
Lack of time/staff resources	26
Lack of expertise within the business	11
Likely costs involved	28
Lack of market demand	7
Risks involved (e.g. interfering with product/service quality)	4
Lack of evidence of likely benefits	21
Lack of awareness of potential for environmental improvements	7
Lack of government assistance	12
Other barriers	5
No barriers	46

Source: ABS 2002a.

**19.6 SOURCES OF ENVIRONMENT INFORMATION USED — 2000–01**

	Proportion of manufacturing businesses
	%
Internet or world wide web	12
Commonwealth government agencies	9
State government agencies	21
Industry and professional associations	19
External consultants	6
Seminars and conferences	5
Other businesses	12
Parent company	3
Other sources	4
Information on environment management not sought	56

Source: ABS 2002a.

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- ABS 2001, *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992–93 to 1997–98*, cat. no. 4604.0, ABS, Canberra.
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- Global Reporting Initiative 2001, *Draft 2002 Sustainability Reporting Guidelines*, <<http://www.globalreporting.org/GRIGuidelines/2002draft.htm>>.

**Contribution to gross domestic product**

Graph 19.7 shows that the total volume of production (measured in terms of industry gross value added) of the manufacturing industry in chain volume terms (measuring 'real' output unaffected by price change) increased in most years from 1982–83 to 2000–01. Production levels peaked in 1988–89 before dropping back to around the level achieved in 1987–88. Since then manufacturing production has continued to increase at an average rate of 3% per year.

Manufacturing gross value added has risen by 13% over the past five years, 22% over the past 10 years and 38% over the past 20 years.

However, in percentage terms manufacturing's contribution to GDP has been trending down for some years, and has declined by 1.3 percentage points of GDP since 1994–95 (table 19.8).

Over the period 1994–95 to 2000–01, gross value added rose in five of the nine manufacturing subdivisions, the largest growth being recorded in Food, beverage and tobacco manufacturing (by 42%), Machinery and equipment manufacturing (by 25%), and Petroleum, coal, chemical and associated product manufacturing (by 23%). Production levels for some subdivisions declined over the same period, most noticeably in Textile, clothing, footwear and leather manufacturing (by 15%) and Other manufacturing (by 10%).

## 19.7 PRODUCTION VOLUMES(a)



(a) Production as measured by industry gross value added, chain volume measures based on 1999–2000 reference year.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

## 19.8 GROSS VALUE ADDED, Chain volume measures(a) — Contribution to GDP

Industry subdivision	Units	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
Food, beverage and tobacco manufacturing	\$m	11 989	12 428	12 603	13 622	14 488	15 392	17 001
Textile, clothing, footwear and leather manufacturing	\$m	3 345	3 173	3 147	3 206	3 246	3 044	2 855
Wood and paper product manufacturing	\$m	4 778	4 881	4 710	4 762	4 719	5 357	4 697
Printing, publishing and recorded media	\$m	6 125	6 195	6 566	6 495	6 611	7 012	6 432
Petroleum, coal, chemical and associated product manufacturing	\$m	8 861	9 372	9 567	9 817	10 429	10 389	10 867
Non-metallic mineral product manufacturing	\$m	4 771	4 419	4 480	4 644	5 236	4 271	4 572
Metal product manufacturing	\$m	11 055	11 345	11 610	11 694	11 981	11 402	11 440
Machinery and equipment manufacturing	\$m	11 240	11 686	12 053	12 551	12 924	14 365	14 028
Other manufacturing	\$m	2 520	2 496	2 589	2 723	2 730	2 660	2 258
<b>All manufacturing(b)</b>	<b>\$m</b>	<b>64 187</b>	<b>65 632</b>	<b>66 976</b>	<b>69 161</b>	<b>71 891</b>	<b>73 892</b>	<b>74 150</b>
Contribution to GDP(c)	%	13.8	13.5	13.3	13.1	13.0	12.8	12.5

(a) Reference year for these chain volume measures is 1999–2000. (b) Chain volume measures are not additive for most periods; the component measures do not sum to a total in the same way as the corresponding current price components do. (c) Strictly gross value added at basic prices, chain volume measures.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

## Structure of the manufacturing industry

At 30 June 2001, manufacturing businesses in Australia employed 985,700 persons. During 2000–01 those businesses paid \$39,536m in wages and salaries, generated \$253,938m of sales and service income and \$74,640m of IVA (table 19.9).

The manufacturing subdivisions with the most persons employed at 30 June 2001 were Machinery and equipment manufacturing (215,300), Food, beverage and tobacco manufacturing (195,100) and Metal product

manufacturing (149,800). Non-metallic mineral product manufacturing (39,300) was the smallest employer, accounting for only 4% of manufacturing employment. Information on manufacturing employment by state/territory is in table 19.13.

Food, beverage and tobacco manufacturing was the largest contributor to total manufacturing sales and service income and the second largest contributor to total IVA. The industry's sales and service income of \$56,080m was 22% of the total for manufacturing, and its IVA of \$14,643m accounted for 20%. Other subdivisions making major contributions were Machinery and

equipment manufacturing (20% of sales and service income and 20% of IVA), Petroleum, coal, chemical and associated product manufacturing (17% and 13%) and Metal product manufacturing (17% and 19%). Information on IVA and sales and service income by state/territory is contained in tables 19.11 and 19.12 respectively.

The generally close relationship between share of employment and contribution to IVA is indicated in graph 19.10. The three largest industry subdivisions for both employment and IVA, namely Machinery and equipment manufacturing; Food, beverage and tobacco manufacturing; and Metal product manufacturing, employed 57% of the manufacturing workforce in 2000–01 and contributed 59% of IVA.

### Industry value added by state

In 2000–01 New South Wales and Victoria continued to be the largest contributors to IVA, accounting for 33% and 32% respectively of national manufacturing IVA (table 19.11). New South Wales contributed 40% of the national IVA of the Printing, publishing and recorded media industry and between 26% and 34% of the national IVA of the remaining manufacturing industries. Victoria contributed 51% of the national IVA of the Textile, clothing, footwear and leather manufacturing industry, 39% of the national IVA of the Petroleum, coal, chemical and associated product manufacturing industry and between 24% and 36% of the national IVA of the remaining manufacturing industries.

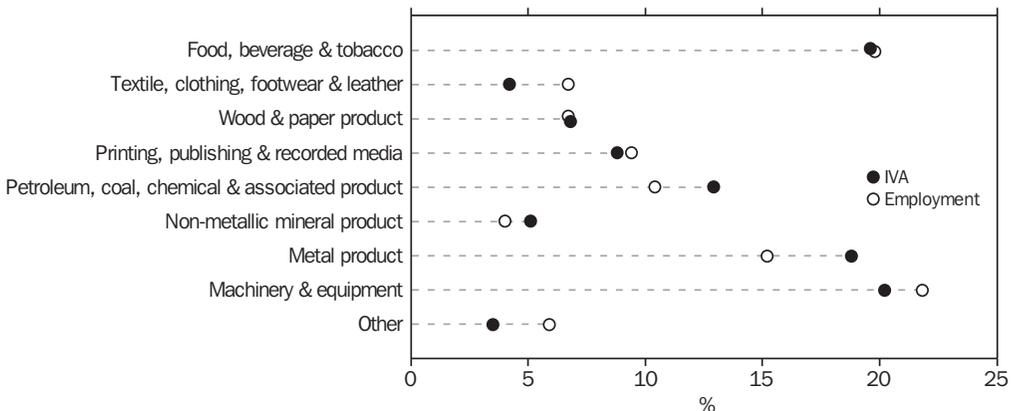
#### 19.9 SUMMARY OF OPERATIONS(a) — 2000–01

Industry subdivision	Employment at 30 June(b)	Wages and salaries(c)	Sales and service income	Industry value added
	'000	\$m	\$m	\$m
Food, beverage and tobacco manufacturing	195.1	7 395	56 080	14 643
Textile, clothing, footwear and leather manufacturing	65.9	2 031	10 306	3 159
Wood and paper product manufacturing	66.2	2 501	15 731	5 063
Printing, publishing and recorded media	92.7	3 811	15 760	6 603
Petroleum, coal, chemical and associated product manufacturing	103.0	4 999	44 040	9 650
Non-metallic mineral product manufacturing	39.3	1 722	10 780	3 813
Metal product manufacturing	149.8	6 356	42 263	14 025
Machinery and equipment manufacturing	215.3	9 030	51 412	15 044
Other manufacturing	58.5	1 692	7 565	2 641
<b>Total manufacturing</b>	<b>985.7</b>	<b>39 536</b>	<b>253 938</b>	<b>74 640</b>

(a) The business unit for which statistics are presented in this table is the management unit. (b) Includes working proprietors. (c) Excludes the drawings of working proprietors.

Source: *Manufacturing Industry, Australia, Preliminary, 2000–01 (8201.0)*.

#### 19.10 INDUSTRY VALUE ADDED AND EMPLOYMENT, By industry subdivision — 2000–01



Source: *Manufacturing Industry, Australia, Preliminary, 2000–01 (8201.0)*.

Although Queensland accounted for only 15% of national manufacturing IVA overall, it contributed 19% for Metal product manufacturing and 18% for Food, beverages and tobacco manufacturing. South Australia, which accounted for 9% of national manufacturing IVA overall, contributed 14% of national IVA for Machinery and equipment manufacturing. Western Australia, which accounted for 8% of national manufacturing IVA overall, contributed 14% of national IVA for both Non-metallic mineral and Metal product manufacturing. Tasmania, which accounted for 2% of national manufacturing IVA overall, contributed 7% of national IVA for Wood and paper product manufacturing.

## Manufacturing sales and service income by state

Sales and service income is a key measure of the performance of manufacturing businesses in an industry. Sales and service income comprises sales of goods whether or not produced by the business (including goods produced for the business on a commission basis) and income from service activities. Service income includes income from work done or sales made on a commission basis, income from repair, maintenance or servicing, advertising income, installation and delivery charges separately invoiced to customers, and management fees/charges received from related and unrelated businesses.

In 2000–01 Victoria (with 34% of national manufacturing sales and service income) and New South Wales (with 31%) continued to be the largest manufacturing states (table 19.12). Victoria contributed 49% of the national sales and service income of the Textile, clothing, footwear and leather manufacturing industry, 42% of the national sales and service income of the Machinery and equipment manufacturing industry and between 22% and 39% of the national sales and service income of the remaining manufacturing industries. New South Wales contributed 43% of the national sales and service income of the Printing, publishing and recorded media industry, and between 24% and 35% of the national sales and service income of the remaining manufacturing industries.

Although Queensland accounted for only 15% of national manufacturing sales and service income overall, it contributed 20% of national sales and service income for Food, beverage and tobacco manufacturing. South Australia, which accounted for 9% of national manufacturing sales and service income overall, contributed 17% of national sales and service income for Machinery and equipment manufacturing. Western Australia, which accounted for 8% of national manufacturing sales and service income overall, contributed 14% for Non-metallic mineral product manufacturing. Tasmania, which accounted for 2% of national manufacturing sales and service income overall, contributed 7% of national sales and service income for Wood and paper product manufacturing.

### 19.11 INDUSTRY VALUE ADDED — 2000–01

Industry subdivision	NSW \$m	Vic. \$m	Qld \$m	SA \$m	WA \$m	Tas. \$m	NT \$m	ACT \$m	Aust. \$m
Food, beverage and tobacco manufacturing	4 789	4 423	2 567	1 495	936	372	32	27	14 643
Textile, clothing, footwear and leather manufacturing	835	1 611	230	252	164	61	n.p.	n.p.	3 159
Wood and paper product manufacturing	1 580	1 493	771	524	323	340	6	26	5 063
Printing, publishing and recorded media	2 665	1 979	800	375	547	81	31	125	6 603
Petroleum, coal, chemical and associated product manufacturing	3 315	3 748	1 127	572	740	138	6	3	9 650
Non-metallic mineral product manufacturing	1 315	915	609	282	532	106	29	25	3 813
Metal product manufacturing	4 703	3 373	2 672	814	1 929	497	n.p.	n.p.	14 025
Machinery and equipment manufacturing	4 681	5 488	1 620	2 145	857	168	34	52	15 044
Other manufacturing	835	900	441	191	244	12	6	11	2 641
<b>Total manufacturing</b>	<b>24 718</b>	<b>23 930</b>	<b>10 837</b>	<b>6 651</b>	<b>6 273</b>	<b>1 775</b>	<b>165</b>	<b>290</b>	<b>74 640</b>

Source: *Manufacturing Industry, Australia, Preliminary, 2000–01 (8201.0)*.

## 19.12 INCOME FROM SALES OF GOODS AND SERVICES(a) — 2000–01

Industry subdivision	NSW \$m	Vic. \$m	Qld \$m	SA \$m	WA \$m	Tas. \$m	NT \$m	ACT \$m	Aust. \$m
Food, beverage and tobacco manufacturing	17 262	17 344	11 168	5 027	3 787	1 296	118	78	56 080
Textile, clothing, footwear and leather manufacturing	2 904	5 084	706	939	494	163	n.p.	n.p.	10 306
Wood and paper product manufacturing	4 864	5 035	2 206	1 507	887	1 146	19	67	15 731
Printing, publishing and recorded media	6 798	4 956	1 700	796	1 030	168	56	256	15 760
Petroleum, coal, chemical and associated product manufacturing	14 764	17 148	5 811	1 755	4 155	372	26	9	44 040
Non-metallic mineral product manufacturing	3 556	2 415	1 909	896	1 535	254	133	82	10 780
Metal product manufacturing	14 941	9 594	7 651	2 577	5 276	1 752	n.p.	n.p.	42 263
Machinery and equipment manufacturing	12 568	21 835	5 207	8 673	2 622	304	93	111	51 412
Other manufacturing	2 275	2 748	1 190	565	700	40	13	33	7 565
<b>Total manufacturing</b>	<b>79 930</b>	<b>86 158</b>	<b>37 548</b>	<b>22 736</b>	<b>20 487</b>	<b>5 497</b>	<b>869</b>	<b>713</b>	<b>253 938</b>

(a) In current prices. For chain volume measures see table 19.18.

Source: *Manufacturing Industry, Australia, Preliminary, 2000–01 (8201.0)*.

## Employment by state

Victoria and New South Wales are the major contributors to manufacturing employment, accounting for 32% and 31% respectively of total manufacturing employment in Australia. Together they account for almost two-thirds of national manufacturing employment at 30 June 2001 (table 19.13). In all industries, either New South Wales or Victoria is the largest employing state.

Victorian manufacturing businesses employ 50% of all persons working in the Textile, clothing, footwear and leather manufacturing industry in Australia. New South Wales accounts for some 38% of the national total for the Printing, publishing and recorded media. Queensland manufacturing businesses employ 22% of persons in Food, beverage and tobacco manufacturing and 19% of those in Non-metallic mineral product manufacturing. South Australia accounts for 16% of employment in the Machinery and equipment manufacturing industry and Western Australia 13% of employment in the Non-metallic mineral product manufacturing industry.

For further information on employed wage and salary earners and the characteristics of the manufacturing labour force see *Chapter 6, Labour*.

## Industrial disputes

There were 221 industrial disputes in the manufacturing industry in calendar year 2001. These disputes involved 89,800 employees and resulted in the loss of over 195,400 working days (table 19.14). Compared with 2000, this represented a decrease of 7.5% in the number of disputes. This is the first decline in the number of industrial disputes in the manufacturing industry in four years. However, the number of manufacturing employees involved in industrial disputes in 2001 increased markedly (by 44.8%) from the number in 2000, and this was also reflected by an increase (of 33.7%) in the number of working days lost.

The manufacturing industry accounted for 32.7% of all industrial disputes during 2001, compared with 34.2% in 2000. Manufacturing industry employees involved in industrial disputes made up 39.8% of all employees involved in disputes during 2001, compared with 19.1% for 2000. Working days lost due to manufacturing industrial disputes accounted for 49.7% of all working days lost during 2001, representing a large increase on the 31.2% share recorded in 2000.

## 19.13 INDUSTRY EMPLOYMENT — 2000–01

Industry subdivision	NSW '000	Vic. '000	Qld '000	SA '000	WA '000	Tas. '000	NT '000	ACT '000	Aust. '000
Food, beverage and tobacco manufacturing	55.4	54.2	42.6	21.1	14.2	6.6	0.5	0.5	195.1
Textile, clothing, footwear and leather manufacturing	17.5	32.7	5.7	4.5	4.0	1.3	0.1	0.2	65.9
Wood and paper product manufacturing	20.2	19.6	12.1	5.9	4.4	3.4	0.2	0.3	66.2
Printing, publishing and recorded media	35.3	30.1	11.7	5.0	6.9	1.4	0.4	1.8	92.7
Petroleum, coal, chemical and associated product manufacturing	36.2	39.6	11.9	7.2	6.9	0.9	0.1	—	103.0
Non-metallic mineral product manufacturing	12.1	10.6	7.5	2.8	4.9	0.8	0.3	0.1	39.3
Metal product manufacturing	53.0	39.0	24.1	12.9	15.2	4.0	1.3	0.3	149.8
Machinery and equipment manufacturing	59.4	73.1	31.2	33.9	13.4	2.8	0.7	0.8	215.3
Other manufacturing	17.5	20.1	9.6	4.6	5.8	0.4	0.1	0.3	58.5
<b>Total manufacturing</b>	<b>306.7</b>	<b>319.0</b>	<b>156.5</b>	<b>97.9</b>	<b>75.8</b>	<b>21.8</b>	<b>3.7</b>	<b>4.4</b>	<b>985.7</b>

Source: *Manufacturing Industry, Australia, Preliminary, 2000–01* (8201.0).

## 19.14 INDUSTRIAL DISPUTES

	Manufacturing	All industries
<b>TOTAL INDUSTRIAL DISPUTES (no.)</b>		
1997	78	447
1998	125	519
1999	208	731
2000	239	698
2001	221	675
<b>EMPLOYEES INVOLVED DIRECTLY AND INDIRECTLY ('000)</b>		
1997	65.8	310.1
1998	41.2	348.4
1999	113.9	461.1
2000	62.0	325.4
2001	89.8	225.7
<b>WORKING DAYS LOST ('000)</b>		
1997	145.7	534.2
1998	95.2	526.3
1999	184.6	650.6
2000	146.2	469.1
2001	195.4	393.1

Source: *Industrial Disputes, Australia* (6321.0); ABS data available on request, *Industrial Disputes Collection*.

## Trade union membership in the manufacturing industry

Trade union membership in the manufacturing industry has been falling reasonably steadily for some years. Despite a small increase in the number of trade union members in 2000, the proportion of employees with trade union membership has decreased from a little over 50% in the mid 1980s to a little over 30% in 2001. This represents a fall in union membership of around 230,000 manufacturing employees over that period.

From 2000 to 2001 the numbers of manufacturing employees with union membership declined by 6%. The proportion of manufacturing employees with union membership also fell, from 31.1% to 30.4% (table 19.15). The manufacturing industry continues to have a higher rate of union membership than the average for all industries. In percentage terms, union membership in all industries has followed a downward trend similar to that in manufacturing.

Table 19.16 shows that, while 34% of permanent manufacturing employees belonged to a trade union in 2001, only 11% of casual manufacturing employees were union members. Membership rates for permanent female employees (24%) remained significantly lower than for corresponding male employees although the membership rate for casual females increased to equal the male rate (at 11%), up from 7% in 2000.

## 19.15 EMPLOYEES WITH TRADE UNION MEMBERSHIP — August

	Manufacturing		All industries	
	Trade union members	Proportion of total employment	Trade union members	Proportion of total employment
	'000	%	'000	%
1992	450.0	44.5	2 508.8	39.6
1993	428.9	43.5	2 376.9	37.6
1994	421.6	40.8	2 283.4	35.0
1995	412.0	39.4	2 251.8	32.7
1996	410.1	38.7	2 194.3	31.1
1997	378.2	36.6	2 110.3	30.3
1998	354.4	34.5	2 037.5	28.1
1999	325.8	32.8	1 878.2	25.7
2000	330.8	31.1	1 901.8	24.7
2001	310.8	30.4	1 902.7	24.5

Source: *Employee Earnings, Benefits and Trade Union Membership, Australia* (6310.0).

## 19.16 TRADE UNION MEMBERS — August 2001

Employees	Manufacturing	All industries
	%	%
<b>MALES</b>		
Permanent	36.4	31.1
Casual(a)	10.9	9.6
All employees	33.8	26.0
<b>FEMALES</b>		
Permanent	24.1	28.8
Casual(a)	11.0	9.3
All employees	20.9	22.7
<b>PERSONS</b>		
Permanent	33.6	30.1
Casual(a)	11.0	9.4
All employees	30.4	24.5

(a) Employees without leave entitlements.

Source: *Employee Earnings, Benefits and Trade Union Membership, Australia, August 2001* (6310.0).

## Capital expenditure

As table 19.17 shows, new capital expenditure by private sector businesses in the manufacturing industry declined (by 13.3%) between 1999–2000 and 2000–01 following an increase of 2.6% between 1998–99 and 1999–2000. Three of the nine manufacturing subdivisions experienced an increase in new capital expenditure in 2000–01. The rises were for Textile, clothing, footwear and leather manufacturing (by 18.9% from a low base), Machinery and equipment manufacturing (by 11.6%), and Non-metallic mineral product manufacturing (by 9.2%). The largest percentage

falls were for Wood and paper product manufacturing (by 41.1%), Metal product manufacturing (by 25.8%), and Petroleum, coal, chemical and associated product manufacturing (by 23.4%).

Comparing private new capital expenditure levels in 2000–01 with those of two years earlier shows lower levels in seven of the nine manufacturing subdivisions. The largest decreases were in Metal product manufacturing (by 43.4%), Wood and paper product manufacturing (by 26.1%), and Printing, publishing and recorded media (by 15.6%). The only increases were for Machinery and equipment manufacturing (by 27.5%) and Non-metallic mineral product manufacturing (by 2.4%).

## Income from sales of goods and services

Table 19.18 shows that, after removal of the effects of price changes, the income from sales of goods and services by private manufacturing businesses increased by 1.4% in 2000–01 over 1999–2000. Food, beverage and tobacco manufacturing recorded the largest increase (by 10.6%), followed by Petroleum, coal, chemical and associated product manufacturing (by 8.9%). Wood and paper product manufacturing recorded the largest fall (15.6%), followed by Other manufacturing (by 13.1%) and Printing, publishing and recorded media (by 8.2%).

**19.17 PRIVATE NEW CAPITAL EXPENDITURE, Current prices(a)**

Industry subdivision	1998–99 \$m	1999–2000 \$m	2000–01 \$m
Food, beverage and tobacco manufacturing	2 089	2 221	2 035
Textile, clothing, footwear and leather manufacturing	263	196	233
Wood and paper product manufacturing	786	987	581
Printing, publishing and recorded media	802	782	677
Petroleum, coal, chemical and associated product manufacturing	1 513	1 801	1 379
Non-metallic mineral product manufacturing	500	469	512
Metal product manufacturing	1 941	1 482	1 099
Machinery and equipment manufacturing	1 334	1 524	1 701
Other manufacturing	208	221	180
<b>Total manufacturing</b>	<b>9 436</b>	<b>9 685</b>	<b>8 397</b>

(a) The annual estimates are the sum of the four quarters' estimates in the year.

Source: *Private New Capital Expenditure and Expected Expenditure, Australia* (5625.0).

**19.18 INCOME FROM SALES OF GOODS AND SERVICES, Chain volume measures(a)**

Industry subdivision	1998–99 \$m	1999–2000 \$m	2000–01 \$m
Food, beverage and tobacco manufacturing	49 839	52 140	57 673
Textile, clothing, footwear and leather manufacturing	11 899	11 246	10 653
Wood and paper product manufacturing	15 940	18 264	15 421
Printing, publishing and recorded media	16 713	17 245	15 823
Petroleum, coal, chemical and associated product manufacturing	39 022	39 047	42 528
Non-metallic mineral product manufacturing	11 271	9 639	10 332
Metal product manufacturing	34 694	34 208	33 620
Machinery and equipment manufacturing	46 183	50 418	50 656
Other manufacturing	7 973	7 746	6 728
<b>Total manufacturing(b)</b>	<b>233 506</b>	<b>239 949</b>	<b>243 434</b>

(a) Reference year for chain volume measures is 1999–2000. The annual estimates are the sum of the four quarters' estimates in the year. (b) Chain volume measures are not additive for most periods; the component measures do not sum to a total in the same way as the corresponding current price components do.

Source: *Business Indicators, Australia* (5676.0).

Comparing the levels of income from sales of goods and services in 2000–01 with those of 1998–99 shows lower levels in six of the nine manufacturing subdivisions. Despite this, the income for the manufacturing division increased (by 4.3%) over that period. The increases were in Food, beverage and tobacco manufacturing (by 15.7%), Machinery and equipment manufacturing (by 9.7%), and Petroleum, coal, chemical and associated product (by 9.0%). The largest decreases were in Other manufacturing (by 15.6%), Textile, clothing, footwear and leather manufacturing (by 10.5%), and Non-metallic mineral product manufacturing (by 8.3%).

**Company profits**

Profits before income tax earned by incorporated manufacturing businesses with 20 or more employees decreased by 2.7% between 1999–2000 and 2000–01, following an increase of 9.7% from 1998–99 to 1999–2000 (table 19.19). Profits rose between 1999–2000 and 2000–01 in three of the nine manufacturing subdivisions; by far the largest increase was recorded in Metal product manufacturing (\$1,059m, or 95.9%) which is an increase of 333.5% in profits since 1998–99. Large declines occurred between 1999–2000 and 2000–01 in Other manufacturing (by 69%), Non-metallic mineral product manufacturing (by 40.1%), Textile, clothing, footwear and leather manufacturing (by 37.2%), and Petroleum, coal, chemical and associated product manufacturing (by 32.0%).

Industry subdivisions contributing most to manufacturing industry profits for 2000–01 were Food, beverage and tobacco manufacturing (27.3%), Metal product manufacturing (18.5%), Machinery and equipment manufacturing (13.6%), Petroleum, coal, chemical and associated product manufacturing (13.5%), and Printing, publishing and recorded media (11.1%).

## Principal manufactured commodities

Table 19.20 shows the production of selected manufactured commodities for the three years 1998–99 to 2000–01.

### 19.19 PROFITS BEFORE INCOME TAX, Current prices(a)

Industry subdivision	1998–99	1999–2000	2000–01
	\$m	\$m	\$m
Food, beverage and tobacco manufacturing	3 115	2 798	3 191
Textile, clothing, footwear and leather manufacturing	167	285	179
Wood and paper product manufacturing	901	996	926
Printing, publishing and recorded media	1 421	1 657	1 292
Petroleum, coal, chemical and associated product manufacturing	2 284	2 314	1 574
Non-metallic mineral product manufacturing	895	1 169	700
Metal product manufacturing	499	1 104	2 163
Machinery and equipment manufacturing	1 540	1 454	1 582
Other manufacturing	110	213	66
<b>Total manufacturing</b>	<b>10 927</b>	<b>11 992</b>	<b>11 671</b>

(a) The annual estimates are the sum of the four quarters' estimates in the year.

Source: *Business Indicators, Australia* (5676.0).

### 19.20 SELECTED COMMODITIES PRODUCED(a)

Commodity	Units	1998–99	1999–2000	2000–01
Red meat	'000 t	3 009	3 031	3 171
Chicken meat	'000 t	564	598	619
Cheese	'000 t	320	369	361
Butter	'000 t	176	170	160
Beer(b)	ML	1 738	1 768	1 745
Tobacco and cigarettes	t	21 045	20 688	19 125
Newsprint	'000 t	399	381	392
Wood pulp	'000 t	871	861	895
Undressed sawn timber	'000 m <sup>3</sup>	3 613	3 983	3 523
Hardwood woodchips	'000 t	4 856	6 164	6 402
Automotive gasoline	ML	18 705	18 652	17 887
Fuel oil	ML	1 634	1 839	1 951
Aviation turbine fuel	ML	5 218	5 539	5 836
Automotive diesel oil	ML	12 968	12 737	13 212
Portland cement	'000 t	7 705	7 937	6 820
Clay bricks	m	1 593	1 736	1 448
Ready mixed concrete	'000 m <sup>3</sup>	18 600	20 634	17 250
Alumina	'000 t	14 208	15 037	16 099
Zinc	'000 t	323	404	533
Silver	t	410	543	532
Copper	'000 t	313	476	518
Lead	'000 t	199	235	215
Tin	t	595	600	1 039
Gold	t	419	383	361
Electricity	mill. kWh	179 630	184 790	188 546
Gas(c)	PJ	675	726	768

(a) Data in this table exclude production by single establishment businesses employing fewer than four persons. (b) Includes ale, stout and porter. Excludes extra light beer containing less than 1.15% by volume of alcohol. (c) Available for issue through mains. Includes natural gas.

Source: *Manufacturing Production, Australia* (8301.0).

## Price indexes

The ABS compiles two price indexes relating to the manufacturing sector: the Price Indexes of Materials Used in Manufacturing Industries; and

the Price Indexes of Articles Produced by Manufacturing Industries (see *Chapter 28, Prices* for more details). Tables 19.21 and 19.22 set out index numbers for selected components of those indexes.

**19.21 PRICE INDEXES(a)(b), Materials used**

	1994–95	1995–96	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02
Food, beverages and tobacco	111.0	111.7	106.2	110.0	110.5	110.8	121.0	137.8
Textiles and textile products	103.0	100.9	93.0	96.3	94.0	91.6	102.3	106.9
Knitting mills and clothing	109.3	111.4	105.9	107.1	106.4	102.6	106.5	109.2
Footwear	109.5	111.7	111.0	109.7	110.3	107.4	120.3	130.3
Leather and leather products	101.9	95.1	95.0	91.9	93.5	97.8	107.2	102.7
Sawmilling and timber products	111.3	114.0	113.7	119.8	119.8	123.0	132.8	136.1
Paper and paper products	95.8	108.3	97.0	96.4	97.6	99.8	110.0	109.7
Printing and publishing	101.1	114.1	105.8	105.5	108.1	107.7	116.5	119.3
Petroleum and coal products	100.2	103.5	117.2	108.4	94.4	157.8	217.7	175.9
Chemicals	107.8	113.9	110.7	111.9	111.4	114.0	126.3	121.0
Rubber and plastics	118.8	122.0	113.4	113.4	110.1	110.8	123.9	121.6
Non-metallic mineral products	114.3	113.7	113.1	112.6	111.3	110.7	111.5	115.4
Basic metal products	94.0	99.4	93.1	93.4	91.7	92.5	101.7	106.0
Fabricated metal products	104.4	108.7	106.2	107.3	106.2	106.1	111.7	110.6
Transport equipment and parts	116.2	115.1	110.1	113.5	116.8	120.5	125.2	124.6
Electronic equipment and other machinery	106.5	107.8	102.7	104.6	103.7	103.4	108.0	107.2
Other manufacturing	112.3	112.8	110.9	113.8	115.3	118.8	125.6	124.4
<b>All materials</b>	<b>107.6</b>	<b>110.1</b>	<b>106.0</b>	<b>107.0</b>	<b>105.9</b>	<b>115.8</b>	<b>132.4</b>	<b>132.4</b>

(a) Reference base year 1989–90 = 100.0. (b) The index is on a net basis and relates in concept only to transactions in materials used in the industry that are produced from other industries or from overseas.

Source: *Producer Price Indexes, Australia (6427.0)*.

**19.22 PRICE INDEXES(a)(b), Articles produced**

	1994–95	1995–96	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02
Food, beverages and tobacco	115.2	117.8	119.0	122.0	122.6	125.1	131.4	139.9
Textiles and textile products	102.3	103.0	103.4	104.7	102.9	103.8	108.6	111.8
Knitting mills, clothing, footwear and leather	110.2	113.2	114.5	116.5	117.9	119.5	120.7	122.3
Log sawmilling and other wood products	116.6	116.2	116.8	118.9	121.0	126.0	130.7	132.4
Paper and paper products	108.8	113.0	111.5	110.2	110.4	111.3	114.9	115.9
Printing, publishing and recorded media	123.9	132.3	136.3	139.2	143.6	148.9	152.4	155.5
Petroleum and coal products	102.1	105.5	109.9	101.7	86.8	137.5	190.2	158.5
Chemicals	108.9	112.2	111.3	110.7	110.8	111.7	115.8	113.9
Rubber and plastics	108.9	112.8	114.0	113.8	114.0	114.9	119.1	123.9
Non-metallic mineral products	114.3	114.7	115.4	116.7	117.1	117.5	117.8	118.7
Basic metal products	101.6	104.1	98.2	102.2	98.7	104.8	115.4	107.9
Fabricated metal products	107.7	110.5	111.8	113.1	113.6	115.2	116.7	118.6
Transport equipment and parts	114.3	115.9	115.5	116.6	117.8	119.6	124.1	128.5
Electronic equipment and other machinery	106.8	107.9	109.0	109.7	109.1	109.9	112.3	114.2
Other manufacturing	114.4	117.3	118.7	119.6	121.4	123.8	128.8	131.0
<b>All articles</b>	<b>110.9</b>	<b>113.7</b>	<b>114.3</b>	<b>115.9</b>	<b>115.6</b>	<b>120.6</b>	<b>128.5</b>	<b>128.8</b>

(a) Reference base year 1989–90 = 100.0. (b) The index is on a net basis and relates in concept only to transactions in articles produced by the industry that are sold or transferred outside the industry, or used as capital equipment, or exported.

Source: *Producer Price Indexes, Australia (6427.0)*.

## Research and experimental development

Research and experimental development (R&D) activity, in the business context, is defined as systematic investigation or experimentation involving innovation or technical risk, the outcome of which is new knowledge, with or without a specific practical application or new or improved products, processes, materials, devices or services. R&D activity also extends to modifications to existing products/processes. In 2000–01, manufacturing industry accounted for 45% of R&D expenditure by all industries (down from 49% in 1999–2000).

As table 19.23 shows, between 1999–2000 and 2000–01 R&D expenditure within the manufacturing industry increased by \$168m (8.4%). Of the 12 manufacturing industries, eight increased their R&D expenditure. The largest increases were in Textile, clothing, footwear and leather manufacturing (by 50%), Photographic and scientific equipment manufacturing (by 41%), Motor vehicle and part and other transport equipment manufacturing (by 15%), and Other manufacturing (by 15%). These increases were partly offset by decreases in four industries,

including Printing, publishing and recorded media, and Non-metallic mineral product manufacturing, each down by 13%.

Industries contributing the most to manufacturing R&D expenditure in 2000–01 were Motor vehicle and part and other transport equipment manufacturing (22%), Electronic and electrical equipment and appliance manufacturing (18%), and Petroleum, coal, chemical and associated product manufacturing (18%). Together, these industries accounted for 57% of total R&D expenditure of the manufacturing industry.

Table 19.24 shows that, of the manufacturing industry's total R&D expenditure for 2000–01, 9% was on capital expenditure, 45% on labour costs and 46% on other current expenditure. The Motor vehicle and part and other transport equipment manufacturing industry contributed the largest expenditure on R&D for the manufacturing industry in terms of capital expenditure (17%), labour costs (20%), and other current expenditure (24%).

*Chapter 25, Science and innovation* discusses expenditure on and human resources devoted to R&D activity for all sectors of the economy.

**19.23 EXPENDITURE ON RESEARCH AND DEVELOPMENT**

	1998–99	1999–2000	2000–01
	\$m	\$m	\$m
Food, beverage and tobacco manufacturing	209	184	205
Textile, clothing, footwear and leather manufacturing	21	18	27
Wood and paper product manufacturing	84	102	100
Printing, publishing and recorded media	20	15	13
Petroleum, coal, chemical and associated product manufacturing	324	377	385
Non-metallic mineral product manufacturing	53	47	41
Metal product manufacturing	296	227	199
Motor vehicle and part and other transport equipment manufacturing	379	410	473
Photographic and scientific equipment manufacturing	107	128	180
Electronic and electrical equipment and appliance manufacturing	399	342	385
Industrial machinery and equipment manufacturing	116	131	140
Other manufacturing	19	20	23
<b>Total manufacturing</b>	<b>2 027</b>	<b>2 002</b>	<b>2 170</b>

Source: *Research and Experimental Development, Businesses, Australia (8104.0)*.

## 19.24 TYPE OF EXPENDITURE ON RESEARCH AND DEVELOPMENT — 2000–01

Industry	Capital expenditure \$m	Labour costs(a) \$m	Other current expenditure \$m	Total \$m
Food, beverage and tobacco manufacturing	27.5	90.6	87.4	205.5
Textile, clothing, footwear and leather manufacturing	2.7	12.7	11.3	26.7
Wood and paper product manufacturing	7.1	25.7	67.2	100.0
Printing, publishing and recorded media	1.0	6.8	4.8	12.7
Petroleum, coal, chemical and associated product manufacturing	29.2	170.9	184.5	384.6
Non-metallic mineral product manufacturing	4.0	15.4	21.5	40.9
Metal product manufacturing	31.1	74.7	92.7	198.5
Motor vehicle and part and other transport equipment manufacturing	32.0	198.9	242.2	473.2
Photographic and scientific equipment manufacturing	11.7	98.8	69.0	179.6
Electronic and electrical equipment and appliance manufacturing	22.5	195.0	167.7	385.1
Industrial machinery and equipment manufacturing	20.6	72.7	46.6	139.9
Other manufacturing	3.5	12.9	7.2	23.5
<b>Total manufacturing</b>	<b>192.8</b>	<b>975.1</b>	<b>1 002.1</b>	<b>2 170.1</b>

(a) Includes wages and salaries, payroll tax, payments to contract staff on the payroll, fringe benefits tax and workers' compensation, holiday pay, long service leave payments, sick pay, and employer contributions to superannuation and pension schemes.

Source: *Research and Experimental Development, Businesses, Australia, 2000–01 (8104.0)*.

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## Introduction

The construction industry has a major influence on every Australian. It provides the homes in which we live, the places in which most of us work and play, our schools and hospitals, and the infrastructure such as roads, water and electricity supply, and telecommunications, essential for our day to day living. A number of other parts of the Australian economy are also closely linked to the construction industry and its activities. These include in particular, parts of the manufacturing, wholesale and retail trade, and finance industries, in supplying components, fittings and furnishings, and in financing construction. Parts of the professional services industry — such as the architectural and engineering professions — are also closely linked to the construction industry.

In 2000–01, the construction industry contributed 4.6% to the gross product of all industries, as measured by production-based gross domestic product (GDP) (chain volume measures). This was significantly lower than its contribution in recent years (5.6% in 1998–99, 5.7% in 1999–2000), and reflects the downturn that occurred in the industry after the introduction of The New Tax System in July 2000. Following its introduction, the construction industry contracted sharply, contributing significantly to a negative GDP result for the December quarter 2000.

In May 2001 the industry employed 668,000 people, either as employees or as self-employed contractors. This represented 7.0% of the employment in all industries.

As an integral component of the Australian economy, being directly affected by most macroeconomic decisions, the Australian construction industry is of significant importance to policy makers. The industry's relationship with interest rates and tax reform, combined with its sizeable contribution to GDP, ensures that issues within the sector are given significant attention by financial markets, policy makers and planners at all levels. This importance is illustrated by the Commonwealth Government's implementation of the extended First Home Owners Grant (FHOG) in February 2001 in response to the significant downturn in the industry.

The construction industry engages in three broad areas of activity: residential building (houses, flats, etc.), non-residential building (offices, shops, hotels, etc.), and engineering construction (roads, bridges, water and sewerage, etc.). Construction activity is undertaken by both the private and public sectors in Australia. The private sector is engaged in all three categories of construction, and plays the major role in residential and other building activity. The public sector plays a key role in initiating and undertaking engineering construction activity, and building activity relating to health and education.

## Performance of the construction industry

### Summary by industry

A detailed survey of the construction industry was undertaken for the reference year 1996–97. The survey found that businesses in the construction industry providing predominantly trade services accounted for over 80% of the number of businesses and almost three-quarters of the people working in the industry.

More recent information about the performance of businesses in the industry is available from the ABS Economy Wide Surveys, supplemented by business income tax data.

Selected summary measures of performance for sectors of the construction industry are shown in table 20.1. The construction trade services sector dominated the number of persons employed, with 64% of the total employment in the construction industry in 1999–2000. However, this was significantly lower than in 1996–97.

### Summary by state

Selected statistics by state show that New South Wales had the largest share of construction activity in 1999–2000, which was in part due to the preparations for the Olympic Games (table 20.2).

## 20.1 CONSTRUCTION INDUSTRY, Summary of industry performance(a) — 1999–2000

Selected indicators	Units	General construction						Total construction
		Building construction			Non-building construction			
		Residential construction	Non-residential building construction	Total	Total	Construction trade services	Total	
Employment	'000	n.a.	n.a.	187	62	249	447	<b>696</b>
Total operating income	\$m	26 700	14 563	41 263	14 639	55 901	46 767	<b>102 669</b>
Total operating expenses	\$m	25 491	13 753	39 245	14 094	53 338	39 780	<b>93 118</b>
Operating profit before tax	\$m	1 858	750	2 608	572	3 180	7 195	<b>10 376</b>

(a) Estimates in tables 20.1 and 20.2 differ marginally due to differences in the timing of their production.

Source: *Australian Industry, 1999–2000 (8155.0)*; *Labour Force, Australia, June 2000 (6203.0)*.

## 20.2 CONSTRUCTION INDUSTRY, Summary of state/territory performance(a) — 1999–2000

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Operating income									
General construction	20 887	11 540	12 298	2 833	6 252	550	576	965	<b>55 901</b>
Construction trade services	17 342	10 161	9 186	3 463	4 720	695	442	756	<b>46 767</b>
Operating expenses									
General construction	19 837	11 279	11 550	2 768	5 973	509	524	897	<b>53 338</b>
Construction trade services	14 934	8 659	7 785	3 060	3 796	566	350	629	<b>39 780</b>
Operating profit before tax	3 879	2 022	2 189	495	1 262	171	153	205	<b>10 376</b>
Labour costs	5 723	3 316	2 902	892	1 662	195	137	236	<b>15 061</b>

(a) Estimates in tables 20.1 and 20.2 differ marginally due to differences in the timing of their production.

Source: *Experimental Estimates, Australian Industry, a State Perspective, 1999–2000 (8156.0)*.

## Trends in construction activity

Trends over recent years in the level of activity of the construction industry as a whole are shown in table 20.3, which indicates the value of work done, in chain volume terms, by kind of activity. Chain volume measures show changes in value after the direct effects of price changes have been eliminated. The table illustrates that, in 2000–01, Residential construction accounted for 39% of the activity, with Engineering construction accounting for a further 36%, and Non-residential construction for the remaining 25%. The introduction of The New Tax System was a significant factor behind the value of work done in that year being substantially lower than in 1999–2000, reversing the growth in the preceding four years.

The table also illustrates how the pattern of building activity changes over time. The biggest change in the sectoral shares of total construction activity occurred in 1993–94. Then Residential building accounted for 45% of the total while Non-residential building only accounted for 24%. Only two years before, in 1991–92, the

composition of total construction activity was 39% Residential building, 31% Engineering construction and the remaining 30% Non-residential building.

A longer time series of the data presented in table 20.3 is shown in graph 20.4. It shows the decline in the value of Residential construction from mid 1995, followed by a steady recovery from about mid 1997, accelerating to record levels ahead of the introduction of The New Tax System in July 2000, followed by a significant downturn.

Construction activity for the public sector has remained relatively constant at around \$15b annually over the last 10 years, as shown in the graph 20.5. The volatility evident in the total construction series is mainly due to private sector construction activity. The growth in total construction activity from June 1997 until June 2000 was driven by the growth in private sector activity. The decline in private sector construction activity following July 2000 is evident.

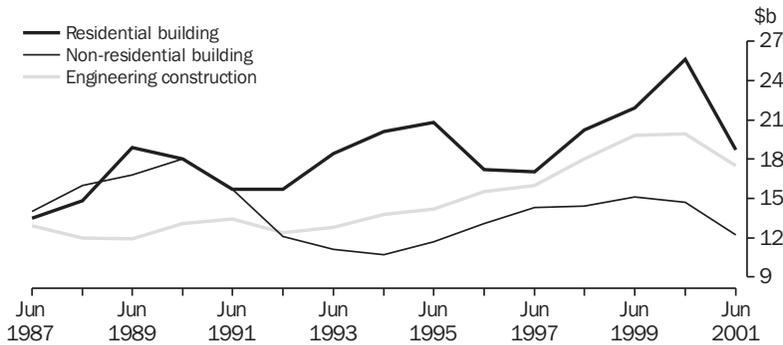
**20.3 TOTAL CONSTRUCTION ACTIVITY(a), Value of work done — By type of activity**

	Residential building	Non-residential building	Engineering construction	Total construction(b)
	\$m	\$m	\$m	\$m
1991–92	15 748	12 146	12 370	40 246
1992–93	18 375	11 051	12 751	42 213
1993–94	20 065	10 746	13 821	44 762
1994–95	20 779	11 699	14 158	46 720
1995–96	17 207	13 092	15 485	45 805
1996–97	17 025	14 282	15 964	47 254
1997–98	20 208	14 350	17 982	52 570
1998–99	21 896	15 058	19 804	56 802
1999–2000	25 552	14 690	19 908	60 150
2000–01	18 747	12 193	17 544	48 485

(a) Chain volume measures, reference year is 1999–2000. (b) Chain volume measures are not additive for most periods; the component measures do not sum to a total in the same way as the corresponding current price components do.

Source: *Building Activity, Australia (8752.0); Engineering Construction Activity, Australia (8762.0)*.

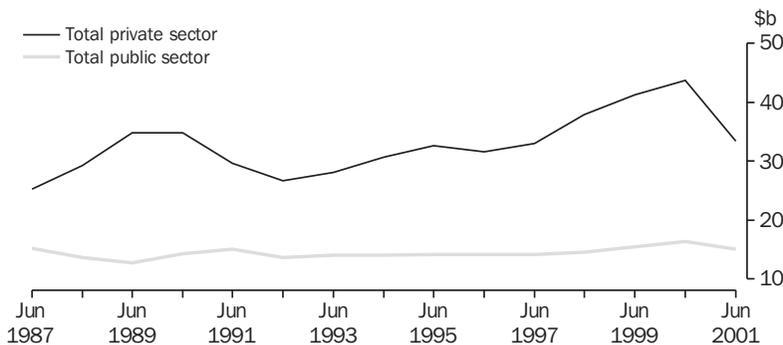
**20.4 ANNUAL CONSTRUCTION ACTIVITY(a), By type of activity**



(a) Chain volume measures, reference year 1999–2000.

Source: *Building Activity, Australia (8752.0); Engineering Construction Activity, Australia (8762.0)*.

**20.5 ANNUAL CONSTRUCTION ACTIVITY(a), By sector**



(a) Chain volume measures, reference year 1999–2000.

Source: *Building Activity, Australia (8752.0); Engineering Construction Activity, Australia (8762.0)*.

More detailed information on the value of residential and non-residential building work done, in chain volume terms, is presented in table 20.6. The value of building work done fell by \$9,301m (23.1%) to \$30,941m in 2000–01, following a rise of 8.9% in 1999–2000. The

2000–01 decline was most heavily influenced by the drop in work done on new houses (contributing some 73.2% of the fall). Non-residential construction activity fell by \$2,497m.

## 20.6 BUILDING ACTIVITY(a), Value of work done — By type of activity

	New residential building			Alterations and additions to residential buildings	Non-residential building	Total building(b)
	Houses	Other residential buildings	Total(b)			
	\$m	\$m	\$m			
1991–92	10 369.5	2 936.4	13 382.1	2 366.4	12 146.3	27 959.5
1992–93	11 919.4	3 888.8	15 871.8	2 510.1	11 050.9	29 566.4
1993–94	12 873.2	4 494.0	17 419.3	2 655.5	10 745.9	31 022.8
1994–95	12 700.1	5 183.6	17 892.6	2 893.2	11 698.4	32 668.5
1995–96	10 141.3	4 274.6	14 416.5	2 790.5	13 091.8	30 326.1
1996–97	10 023.2	4 215.6	14 239.8	2 785.0	14 282.1	31 297.3
1997–98	12 034.5	4 927.3	16 966.6	3 241.1	14 350.1	34 585.0
1998–99	12 779.1	5 676.9	18 458.4	3 438.2	15 058.1	36 983.0
1999–2000	15 336.9	6 322.0	21 658.8	3 892.9	14 690.0	40 241.9
2000–01	10 663.3	5 100.8	15 764.2	2 983.2	12 193.5	30 940.8

(a) Chain volume measures, reference year is 1999–2000. (b) Chain volume measures are not additive; for most periods the component measures do not sum to a total in the same way as the corresponding current price components do.

Source: *Building Activity, Australia (8752.0)*.

## The WasteWise Construction Program

*This article was contributed by the Environmental Stewardship Team, Sustainable Industries Branch, Environment Australia.*

### Introduction

Australians currently send approximately one tonne of waste per person per year to landfill. Construction and demolition (C&D) wastes can make up to 40% of this waste.

C&D wastes are potentially valuable recoverable resources being wasted. Materials include metals, concrete and bricks, glass, fittings and fixtures from demolished or refurbished buildings, wood and wall panelling.

In 1995 the Australian and New Zealand Environment and Conservation Council (ANZECC) approached five major Australian construction companies to pioneer best practice waste reduction in the industry in an effort to reduce the amount of C&D waste going to landfill. ANZECC negotiated a voluntary industry waste reduction agreement incorporating waste reduction and recycling targets, known as the WasteWise Construction Program.

### Phase I of the program

Waste management is the responsibility of state and territory governments. WasteWise was established to assist the Commonwealth establish and promote a cohesive national approach to waste reduction. The \$5m Waste Management Awareness Program is administered by Environment Australia under the Natural Heritage Trust.

Through WasteWise, participating construction companies conducted the first detailed assessment of waste reduction opportunities from supply through to production and recycling.

The original WasteWise Memorandum of Understanding (MoU) stated:

It is a national program to encourage best practice approaches to waste minimising construction and demolition waste.

A best practice approach to environmental management can protect the environment, save resources; avoid waste, increase reuse and recycling of materials, and reduce the amount of waste going into landfill.

The application of waste minimisation principles to project operations will facilitate the contribution of the construction and demolition industry to the national waste reduction target.

Five leading construction companies signed up for Phase 1 (November 1995–98), and funded their own participation in order to adopt a best practice approach to environmental management. They all achieved significant waste reduction within the bounds of normal commercial imperatives, and found that waste reduction could be increased by:

- recognising the ‘bottom line’ benefits of waste minimisation
- participating in the development of a national approach
- conducting waste reduction trials in their operations
- addressing coordination issues and barriers so that industry can work to overcome them
- being involved, through industry representative groups or as key stakeholders, in the development of future arrangements
- accepting, adopting and promoting best practice waste reduction.

A review of the program was undertaken in 1997 and published in the *WasteWise Construction Program Review*, which details the individual successes of the five partners.

Subsequently, the *WasteWise Handbook (1998)* became a ‘how to’ booklet with examples and company achievements and procedures from their waste reduction manuals. Both of these publications informed the development of the *Waste Reduction Guidelines (2000)*, which provided organisational tools for adoption.

## Phase II of the program

Phase II commenced in late 1998, running until the end of 2001. The intention was to widen participation in best practice waste minimisation to other scales of construction and other industry members. While the new MoU had a common statement of commitment for all participants, separate schedules for industry sub-sectors identified their waste roles and responsibilities. The industry sub-sectors were invited to participate, included:

- architects and designers
- material suppliers
- C&D companies
- waste collectors for recycling
- industry organisations.

Fourteen leading companies and peak industry organisations committed themselves to the Phase II WasteWise Construction Program by signing the MoU.

## Highlights of the WasteWise Construction Program 1995–2001

For the participating organisations the WasteWise program has successfully decreased the amount of waste going to landfill, sometimes by more than 90%. While the individual performance of WasteWise partners varied from year to year and from project to project, some of the highlights are summarised below:

- Barclay Mowlem Construction diverted over 80% of its total waste from landfill in 2000.
- Bovis Lend Lease recycled 98% of material from the State Office Block site in Sydney in 1997. In 2001, 87% (280,790 m<sup>3</sup>) was reused, recycled or reprocessed on all Bovis Lend Lease sites.
- The John Holland Group avoided, recovered, reused or recycled 83% (8,851,000 kg) of waste generated on all its sites in 2001.
- Multiplex Constructions recycled 60% of site waste at the Homebush Bay Olympic Stadium site between April and August 1997, and 87% (1,250 tonnes) of waste from the Campbelltown Hospital site was recycled in 2001.

- Project Coordination (Australia) recycled 68% (240 tonnes) of waste material generated at the Canberra Hospital Pathology Building Refurbishment and the Calvary Hospital Redevelopment by separating waste streams at their source.
- Thies recycled or reused 94% waste generated at the Royal Prince Alfred Hospital site in 2001. A total of 32,641 m<sup>3</sup> of waste was diverted from landfill, resulting in waste removal cost savings of around 40%.
- Fletcher Construction reused or recycled 43% of all waste from the Dandenong Police and Court Buildings, saving 55% of the company's waste removal costs. Waste reduction techniques developed under WasteWise have been used by the company in the United States of America, New Zealand, Sweden, and the United Kingdom.

## Residential building

Residential building involves the construction of dwelling units, which comprise new houses, new other residential buildings (flats, apartments, villa units, townhouses, duplexes, etc.), and dwellings created as part of alterations and additions to existing buildings (including conversions to dwelling units) and as part of the construction of non-residential buildings. Building approvals are a key indicator of future activity, as nearly all building activity must be approved by local and/or other authorities.

The trend in total dwelling unit approvals grew for three and half years from February 1991, peaking in July 1994 (see graph 20.7). The trend then declined until December 1995, to a level almost 40% below the July 1994 peak. The trend for dwelling units approved grew steadily between December 1995 and June 1996 prior to

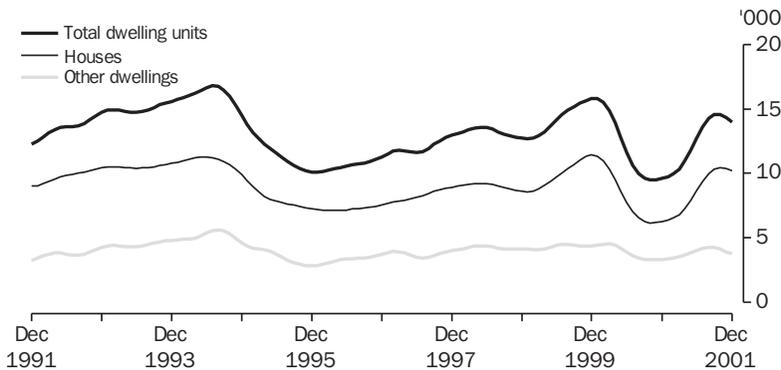
strong growth until April 1998. From mid 1998 until early 1999 the number of approvals declined.

Activity brought forward ahead of The New Tax System created the sharp increase and decrease experienced between early 1999 and mid to late 2000. The FHOG was a driver behind the accelerated increase of the number of houses approved to November 2001.

## New houses

The general cyclical pattern of new house commencements is illustrated by graph 20.8. Lows were recorded in 1990 and 1996, with peaks in 1994 and 1998. New house construction grew throughout 1992, 1993 and 1994, the number of commencements peaking in the June quarter 1994. New house commencements fell in each quarter of 1994–95 and 1995–96, but grew in each quarter of 1996–97. There was continued growth in the trend up to the June quarter 1998, although the rate of growth in the trend eased in the first half of 1998.

20.7 DWELLING UNITS APPROVED: Trend estimates



Source: Building Approvals, Australia (8731.0).

The New Tax System introduced a shock to the system that altered this general cyclical pattern. After a slight contraction in the second half of 1998, the number of new house commencements grew at record rates in 1999 and early 2000 as a result of the rush to ‘beat the Goods and Services Tax (GST)’. From July 2000, there was a significant downturn in commencements, with completions falling at a slightly slower rate. In the period from June to December 2001, the effect of lower interest rates and the FHOG on the market has seen an acceleration in the trend estimates of house commencements.

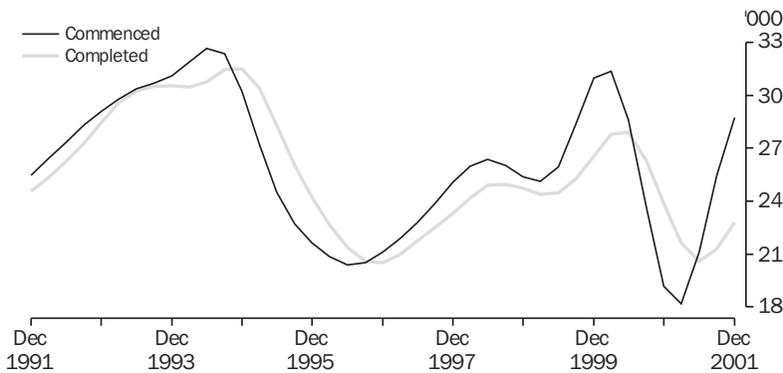
Graph 20.8 also illustrates the relationship between new house commencements and completions. Generally, in periods of downturn

in new house construction activity, completions exceed commencements, while in periods of growth this pattern is reversed.

New house commencements are the major component of residential building activity, as shown in table 20.9. In 2001 new houses accounted for approximately 70% of new residential dwelling units commenced (i.e. excluding approvals for conversions). This proportion is similar for approvals and completions.

Table 20.9 also identifies that residential building activity is dominated by the private sector. In 2001 this sector accounted for around 98% of approvals, commencements and completions of new houses. The public sector was slightly more significant in ‘new other residential building’ work, accounting for at least 5% of approvals, commencements and completions.

**20.8 NEW HOUSES COMMENCED AND COMPLETED: Trend estimates**



Source: *Building Activity, Australia (8752.0)*.

**20.9 RESIDENTIAL BUILDING — 2001**

	New houses	New other residential dwelling units	Conversions etc.
<b>Private sector</b>			
Approved	102 542	40 492	1 638
Commenced	93 265	40 433	2 156
Completed	84 888	33 998	2 672
<b>Public sector</b>			
Approved	1 518	2 509	103
Commenced	1 427	2 433	182
Completed	1 243	2 501	36
<b>Total</b>			
Approved	104 060	43 001	1 741
Commenced	94 693	42 867	2 338
Completed	86 131	36 499	2 708

Source: *Building Activity, Australia (8752.0)*; *Building Approvals, Australia (8731.0)*.

### New other residential building

Other residential building refers to structures other than houses which are built for accommodation purposes. This includes buildings such as blocks of flats, home units, attached townhouses, villa units, terrace houses, semidetached houses and maisonettes. The level of activity for this type of building is highly variable and does not follow the regular pattern experienced in house construction. This is because of the generally larger size of other residential building construction jobs and the varying extent of speculative building of private townhouses, flats, home units and similar residential building projects over time.

Whereas table 20.9 presented the number of new other residential dwelling units approved, commenced and completed in 2001, graph 20.10 shows a 10-year time series of commencements and completions of these types of buildings ending with the December quarter 2001. It can be seen that the completions series generally has

lagged the commencements series by one to two quarters, although this pattern has been less clear since the June quarter 1997.

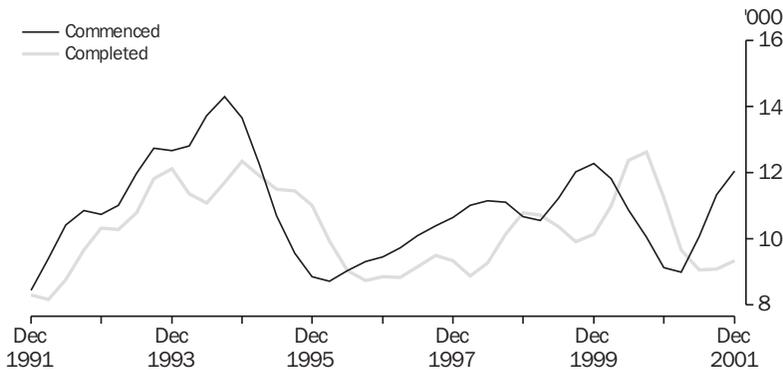
The number of new other residential dwelling units commenced in the December quarter 2001 was 35% greater than in the December quarter 2000. On the other hand, the number of other residential dwelling units completed in the December quarter 2001 was 17% lower than in the December quarter 2000.

### Value of residential building

Total approvals for new residential building were valued at \$20,840m in 2001, increasing by 9% from the value of approvals in 2000 (\$18,202m, see table 20.11). This pattern was reversed for the value of work done, which decreased by 10% in 2001. This reflects the impact of the lead time between approvals and activity in the period after the introduction of The New Tax System, as shown in graphs 20.8 and 20.10.

The value of new houses, in terms of both approvals and activity, dominates the residential sector.

20.10 NEW OTHER RESIDENTIAL UNITS: Trend estimates



Source: Building Activity, Australia (8752.0).

## 20.11 VALUE OF RESIDENTIAL BUILDING

	Approved		Work done	
	2000	2001	2000	2001
	\$m	\$m	\$m	\$m
New residential buildings				
New houses	12 599	14 709	14 720	13 207
New other residential buildings	5 604	6 131	6 420	5 848
Total	18 202	20 840	21 140	19 055
Alterations and additions to residential buildings(a)	3 075	3 428	3 665	3 821

(a) Valued at \$10,000 or more.

Note: Due to seasonal adjustment methods, totals do not necessarily equal the sum of the components.

Source: *Building Activity, Australia (8752.0)*; *Building Approvals, Australia (8731.0)*.

## Attitudes of residential builders to energy issues and usage

*This article was contributed by Paul Giles, Senior Project Manager, BIS Shrapnel.*

The bulk of Australian building companies believe that mounting pressure by regulators will compel the industry to build energy efficient housing within five years.

A study by BIS Shrapnel, *Attitudes of Residential Builders to Energy Issues and Usage in Australia, 2001–02*, demonstrates that most builders are sympathetic to the concept of the ‘clean, green’ home, but are deterred by perceived higher building and installation costs. Further, builders believe that greater community education of the benefits of energy efficient housing is required. The study involved interviews with 121 building firms in all the mainland state capital cities.

It found substantial increases over the past 12–24 months in the installation of building products with a significant bearing on energy efficiency and usage, including air conditioners, floor and wall insulation, hot water temperature controls, water efficient shower heads, and even solar hot water systems, where the level of acceptance has been low.

The study also identified substantial differences in attitude and product usage between the states, and between sectors of the building industry. For

example, small builders tend to be more sympathetic to environmental considerations in housing design than their larger colleagues, who are much more likely to cite competitive price advantage for a lukewarm attitude.

But the industry is almost unanimous in its view that change will be driven by the regulators, and particularly by local authorities, with one builder commenting: ‘Legislation is required ... because people are not interested in more expensive options. Hence it must be forced’. The three most compelling reasons cited by builders for support of the concept are energy efficiency, long-term cost savings and reduced environmental impacts. Builders nominate increased construction costs as the standout reason for not recommending energy-efficient solutions. ‘To be green is more expensive,’ said one respondent. For example, only 3% of new homes have solar hot water heaters installed. Builders believe that only lower costs and/or rebates will result in an increase in this figure.

The study identifies and researches the incidence of 15 major building products which impact on energy efficiency (table 20.12).

### 20.12 INCIDENCE OF PRODUCT INSTALLATION — 2001-02

Selected products with a bearing on energy efficiency	Builders using product	%
Dual flush toilets		99
Ceiling insulation		71
Wall insulation		63
Gas hot water systems		60
Hot water temperature control		56
Roof insulation		43
Water efficient shower heads		39
Electric hot water systems		38
Insulated hot water pipes		37
Air conditioning		27
Water efficient taps		24
Ducted gas heating		23
Ducted evaporative cooling		14
Floor insulation		6
Solar hot water systems		3

Source: BIS Shrapnel, 'Attitudes of Residential Builders to Energy Issues and Usage in Australia 2001-02'. Further information about this study can be found at <<http://www.bis.com.au>>.

The study discovers considerable variations between the states: New South Wales is the leading installer of air conditioning and well above average installer of ceiling insulation, wall insulation and gas hot water systems; Victoria is the leader in ceiling insulation, gas hot water systems, insulated hot water pipes, ducted gas heating and ducted evaporative cooling; Queensland leads in the installation of roof insulation and electric hot water systems, but lags well behind other states in wall insulation, gas hot water systems and air conditioning; South Australia is a high installer of energy-efficient products, and the leader in wall insulation, water efficient devices and floor insulation; Western Australia is the leading installer of hot water temperature control and solar hot water systems, but has a very low rate of wall insulation due to the prevalence of double brick housing.

Builders identified trade magazines as their main source of information on energy efficient products and developments, followed by trade representatives. The Housing Industry Association, government bodies and trade shows and seminars are also important sources.

## Non-residential building

The total value of non-residential building work approved in 2001 (\$13.3b) increased by 8% over the value approved in 2000 (table 20.13). The value of non-residential building work done in 2001 fell 6% (to \$12.6b) from the total work done in 2000.

The value of non-residential building work approved in 2001 was 5% higher than the value of work done (reversing the outcome in 2000, when approvals exceeded work done by 10% ). A pattern of the value of approvals exceeding the

value of work done has, in the past, indicated a period of accelerating activity in this sector, with more new work coming on stream.

In 2001, shops and offices together accounted for about 37% of the value of non-residential building approved and of work done. This was similar to their share of approvals and work done in 2000.

## Engineering construction

This section contains estimates of engineering construction activity in Australia for both public and private sector organisations. These estimates, together with the preceding data on residential and non-residential building, complete the picture of construction activity in Australia.

## 20.13 VALUE OF NON-RESIDENTIAL BUILDING(a)

	Approved		Work done	
	2000	2001	2000	2001
	\$m	\$m	\$m	\$m
Hotels, etc.	528	586	839	405
Shops	2 237	2 233	2 379	2 366
Factories	915	807	945	790
Offices	2 278	2 646	2 492	2 337
Other business premises	1 819	1 840	1 868	1 558
Educational	1 768	1 884	1 688	1 957
Religious	102	112	137	109
Health	1 084	1 490	1 341	1 351
Entertainment and recreational	770	931	1 016	886
Miscellaneous	731	724	783	856
<b>Total</b>	<b>12 231</b>	<b>13 251</b>	<b>13 487</b>	<b>12 615</b>

(a) Valued at \$50,000 or more.

Source: *Building Activity, Australia (8752.0)*; *Building Approvals, Australia (8731.0)*.

The total value of engineering construction work done across the different sectors for the last 15 years is shown in graph 20.14. It shows that until 1992 the values of engineering construction work done by the public and private sectors were at similar levels. Following government deregulation, the amount of engineering construction undertaken by the private sector has exceeded the amount undertaken by the public sector. The drop in the amount of total engineering construction experienced in 2000 brought the work done by the two sectors closer together, and the gap remained about the same in 2001.

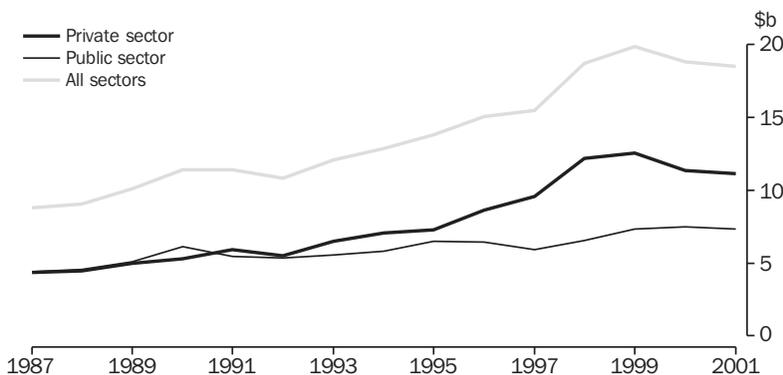
The total value of engineering construction work for 2001 in original terms (\$18,471m) was 2% lower than in 2000 (table 20.15). The decrease of \$355m was substantially due to a fall (by \$219m) in the work done by the private sector accentuated by a fall of \$137m (2%) in the value

of work done by the public sector. The private sector accounted for 60% of the value of all work done in both 2000 and 2001.

In 2000, over half of the value of work done was attributable to Roads, highways and subdivisions, and Telecommunications. These construction activities still provided almost half the value of work done in 2001, though many others increased their contribution to the value of work done.

The change from 2000 to 2001 is shown in graph 20.16. There was a substantial increase in the value of engineering construction work done for Harbours (by 92%), and for Coal and coal handling facilities (by 78%). On the other hand Pipelines, and Sewerage and drainage experienced decreases in work done (by 34% and 33% respectively). In absolute terms, the biggest contributor to the overall change in total engineering construction activity was Telecommunication activity, which fell by 9% in 2001.

## 20.14 TOTAL ENGINEERING CONSTRUCTION



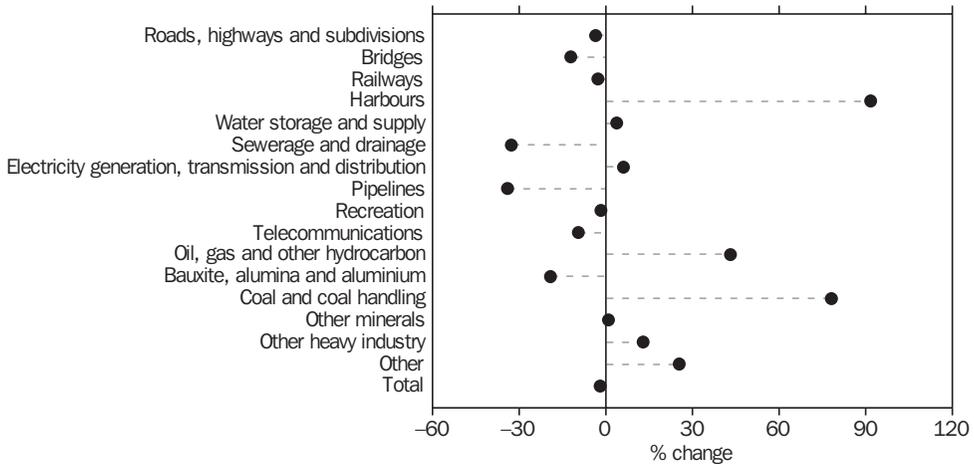
Source: *Engineering Construction Activity, Australia (8762.0)*.

20.15 VALUE OF ENGINEERING CONSTRUCTION WORK DONE

	2000								2001	
	By the private sector	By the public sector	Total	Activity share of total	By the private sector	By the public sector	Total	Activity share of total		
	\$m	\$m	\$m	%	\$m	\$m	\$m	%		
Roads, highways and subdivisions	3 803	1 709	5 511	29	3 599	1 723	5 322	29		
Bridges	285	86	371	2	206	120	327	2		
Railways	238	416	654	3	178	458	635	3		
Harbours	125	28	152	1	243	49	292	2		
Water storage and supply	358	262	620	3	376	268	644	3		
Sewerage and drainage	852	288	1 140	6	526	242	768	4		
Electricity generation, transmission and distribution	1 648	1 289	2 938	16	1 701	1 413	3 114	17		
Pipelines	335	33	367	2	217	25	242	1		
Recreation	934	150	1 084	6	876	190	1 066	6		
Telecommunications	793	3 215	4 008	21	771	2 858	3 629	20		
Oil, gas and other hydrocarbon	469	—	469	2	671	—	671	4		
Bauxite, alumina and aluminium	121	—	121	1	98	—	98	1		
Coal and coal handling	240	—	240	1	428	—	428	2		
Other minerals	680	—	680	4	686	—	686	4		
Other heavy industry	296	15	310	2	341	9	350	2		
Other	156	4	160	1	198	2	201	1		
<b>Total</b>	<b>11 333</b>	<b>7 494</b>	<b>18 826</b>	<b>100</b>	<b>11 114</b>	<b>7 357</b>	<b>18 471</b>	<b>100</b>		

Source: Engineering Construction Activity, Australia (8762.0).

20.16 CHANGE IN VALUE OF ENGINEERING CONSTRUCTION WORK DONE, By activity — 2000 to 2001



Source: Engineering Construction Activity, Australia (8762.0).

Price indexes for construction

Price indexes measure changes in prices received, or paid, by producers of commodities and are used extensively to analyse and monitor price behaviour. In Australia they generally relate to prices for goods and services as they affect businesses, for example the input price of

materials used in the building industry. A more detailed explanation of price indexes is contained in *Chapter 28, Prices*.

Output of the building industry

The price index of the output of the building industry rose by 1.9% in 2001–02 (table 20.17). As the index is compiled using basic prices (before

the imposition of indirect taxes on products and any transport and trade margins) the price movements exclude the impact of The New Tax System.

### 20.17 PRICE INDEX OF THE OUTPUT OF THE BUILDING INDUSTRY(a)

	Index no.	Change %
1996–97	94.3	n.a.
1997–98	97.0	2.8
1998–99	100.0	3.1
1999–2000	104.9	4.9
2000–01	106.5	1.5
2001–02	108.5	1.9

(a) Reference base year 1998–99 = 100.0.

Source: *Producer Price Indexes, Australia (6427.0)*.

### Price index of materials used in house building

The all groups index (a weighted average of the six state capital cities) rose by 1.6 index points in 2001–02, following an identical rise in 2000–01.

Table 20.18 shows that there were rises in all capital cities, with Hobart experiencing the largest (2.4 index points).

### Price index of materials used in building other than house building

In 2001–02, the price index for materials used in building other than house building grew by 2.2 index points (table 20.19). Melbourne had the largest movement (2.4 index points). The growth for the weighted average of six state capital cities was slightly higher than in the previous five years.

The composition of the index in terms of the materials used is presented in the table 20.20. This shows that the rise in the index reflected increases between 2000–01 and 2001–02 in most of the selected materials components. The exception was Steel decking cladding and sheet products (which fell by 1.0 index points after a 3.6 index point rise between 1999–2000 and 2000–01). The index of Ready mixed concrete ceased a falling trend which had started from 1997–98, when the index was at 107.2, to stabilise between 2000–01 and 2001–02 at 99.7 index points.

### 20.18 PRICE INDEX OF MATERIALS USED IN HOUSE BUILDING(a)(b)

	Weighted average of six state capital cities	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart
1994–95	115.4	115.0	115.9	115.9	118.8	112.7	117.3
1995–96	115.7	115.9	115.4	115.1	118.2	114.8	120.7
1996–97	116.1	116.3	115.3	115.3	120.6	115.3	120.1
1997–98	118.2	119.7	117.1	117.1	123.3	115.9	121.0
1998–99	119.5	121.6	118.0	118.2	125.0	116.1	122.2
1999–2000	122.8	126.8	121.7	120.8	127.2	117.7	123.8
2000–01	124.4	130.0	123.1	120.6	129.6	118.8	126.0
2001–02	126.0	132.0	125.0	122.0	130.6	119.4	128.4

(a) Reference base year 1989–90 = 100.0. (b) The separate city indexes measure price movement within each city individually. They do not compare price levels between cities.

Source: *Producer Price Indexes, Australia (6427.0)*.

### 20.19 PRICE INDEX OF MATERIALS USED IN BUILDING OTHER THAN HOUSE BUILDING(a)(b)

	Weighted average of six state capital cities	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart
1994–95	110.4	110.3	108.9	112.9	110.9	110.1	112.2
1995–96	112.7	112.6	111.1	115.0	112.7	113.2	115.1
1996–97	113.2	113.1	110.9	115.9	114.1	114.6	116.3
1997–98	114.2	114.4	111.4	117.2	115.1	114.6	117.4
1998–99	115.2	115.2	113.2	118.4	115.5	114.1	118.5
1999–2000	116.1	116.0	114.4	119.3	116.1	115.4	119.0
2000–01	116.4	116.1	115.4	119.1	116.8	115.6	119.3
2001–02	118.6	118.2	117.8	120.8	118.8	117.7	121.3

(a) Reference base year 1989–90 = 100.0. (b) The separate city indexes measure price movements within each city individually. They do not compare price levels between cities.

Source: *Producer Price Indexes, Australia (6427.0)*.

**20.20 PRICE INDEX OF MATERIALS USED IN BUILDING OTHER THAN HOUSE BUILDING(a),  
By type of material**

	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
Structural timber	120.5	116.4	121.7	125.4	131.1	134.3	134.7
Clay bricks	110.0	108.7	114.6	119.1	123.7	128.0	128.7
Ready mixed concrete	108.2	106.6	107.2	106.3	103.6	99.7	99.7
Steel decking cladding and sheet products	110.9	112.9	114.9	114.4	114.9	118.5	117.5
Structural steel	109.3	112.5	113.1	113.4	112.0	113.1	115.1
Reinforcing steel bar fabric and mesh	112.0	111.6	112.7	109.9	104.5	102.4	103.1
Aluminium windows	108.4	108.5	109.0	110.5	114.3	119.9	122.7
Non-ferrous pipes and fittings	129.4	128.8	135.6	128.6	131.5	141.0	142.7
Builders' hardware	119.5	118.3	120.0	123.4	130.0	135.9	139.3
Paint and other coatings	129.1	135.7	136.0	142.7	148.8	152.2	154.6
<b>All groups</b>	<b>112.7</b>	<b>113.2</b>	<b>114.2</b>	<b>115.2</b>	<b>116.1</b>	<b>116.4</b>	<b>118.6</b>

(a) Reference base year 1989-90 = 100.0.

Source: Price Index of Materials Used in Building Other Than House Building, Six State Capital Cities (6407.0).

## The use of forest products

*This article was contributed by A Yainshet, R Nelson and G Love, Australian Bureau of Agricultural and Resource Economics.*

### Domestic consumption of structural wood

The demand for structural wood is derived from the demand for building and construction, and to a lesser extent by the demand for furniture (Love, Yainshet & Grist 1999). Historically, rises or falls in new dwelling commencements show a close relationship with rises and falls in apparent consumption of sawnwood (graph 20.21).

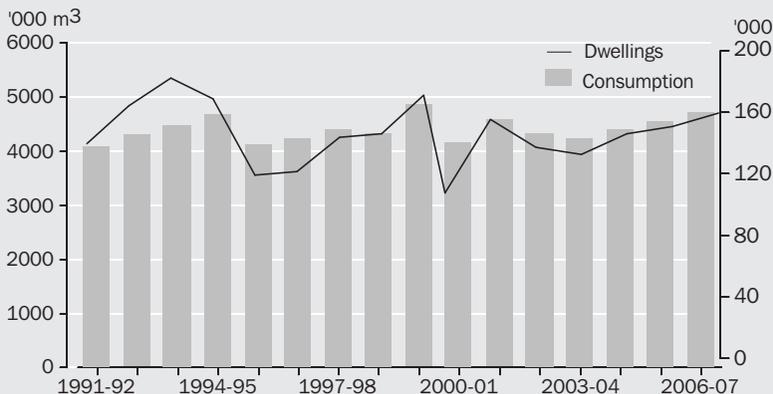
Reflecting a number of influences such as low interest rates and increased grants for new home buyers, new dwelling commencements in Australia rose in 2001-02. However, with

interest rates expected to rise, residential construction is forecast to be lower in 2002-03 and 2003-04, but begin to rise again thereafter.

As a consequence, sawnwood consumption is projected to fall from 4.5 million cubic metres in 2001-02 to 4.1 million cubic metres in 2003-04, but rise to around 4.7 million cubic metres in the medium term.

The main macroeconomic and other assumptions underlying these projections are described in the next section.

**20.21 SAWNWOOD CONSUMPTION AND NEW DWELLING COMMENCEMENTS**



## Assumptions for structural wood consumption projections

Projections of structural wood consumption are based on the underlying demand for new dwellings, and other uses such as alterations and additions to existing homes, non-residential construction and furniture (Love, Yainshet & Grist 1999). Structural wood consumption is modelled from the number of new single-unit and multiple-unit dwellings, and income. The demand for new dwellings is projected from expected rates of household formation, with adjustment for replacement of housing stock, and vacancy rates. Rates of household formation are projected from the expected number of persons per household, and projections of population growth (table 20.22).

In the past decade, reduced availability of hardwood sawlogs and increased availability of softwood sawlogs and pulpwood resulted in significant changes in the relative prices of these production inputs, and consequently in the production mix of structural wood products and their prices to consumers. Sawn hardwood prices rose strongly relative to sawn softwood- and pulpwood-based products such as wood-based panels (graph 20.23).

With these trends projected to continue throughout the current decade, sawn hardwood consumption is projected to decline from 1.2 million cubic metres in 2000–01 to 1.0 million cubic metres in 2006–07, while sawn softwood consumption is projected to rise from 2.9 million to 3.7 million cubic metres.

Consumption of wood-based panels and reconstituted wood products is also projected to rise in the medium term, from 1.5 million cubic metres in 2000–01 to 1.7 million cubic metres in 2006–07 (graph 20.24).

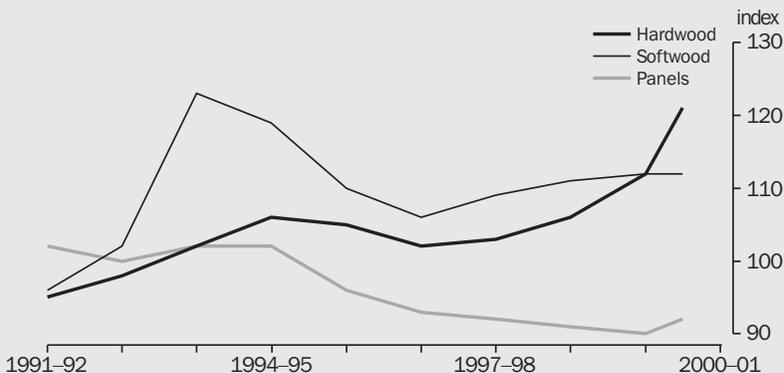
### 20.22 MACROECONOMIC AND DEMOGRAPHIC ASSUMPTIONS

	Units	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07
Population	'000	19 622	19 820	20 015	20 206	20 395	20 579
Households	'000	7 532	7 658	7 784	7 910	8 036	8 162
New dwellings	'000	154	138	134	146	150	158
Ratio of detached to total dwellings	ratio	0.71	0.69	0.69	0.69	0.68	0.68
Annual real GDP growth	%	3.8	3.8	3.8	3.5	3.5	3.5
Interest rates(a)	%	7.9	8.3	8.5	8.5	8.5	8.5

(a) Prime lending rates to large businesses.

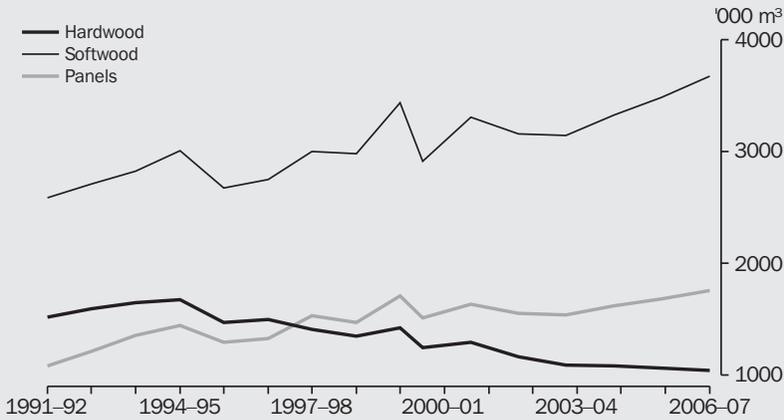
Source: ABS 2000; Love, Yainshet and Grist 1999.

### 20.23 STRUCTURAL WOOD PRICES, Price indexes(a)



(a) Reference base year 1989 = 100.

20.24 STRUCTURAL WOOD CONSUMPTION, Past and projected



The projected lower rate of increase in consumption of wood-based panels and reconstituted wood products relative to that of sawn softwood reflects expectations that higher sawn softwood production will increase the availability of low-priced soft sawnwood, and that, while reconstituted structural wood products will remain competitively priced, their use will continue to be constrained to niche markets by building preferences.

**Structural wood production**

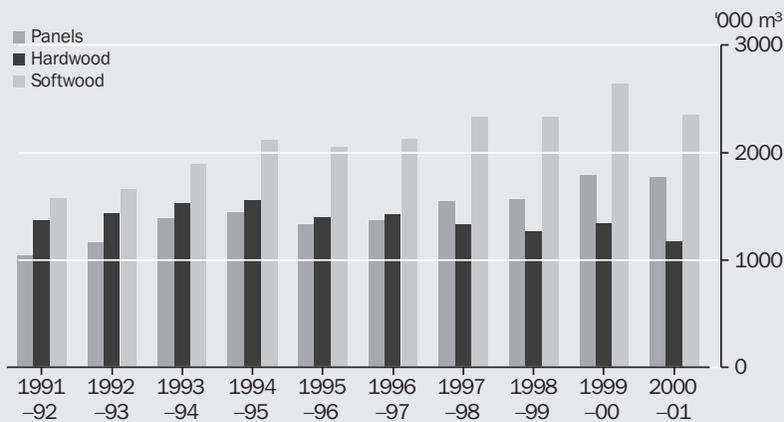
Australia produced 5.3 million cubic metres of structural wood in 2000-01, consisting of 1.2 million cubic metres of sawn hardwood,

2.3 million cubic metres of sawn softwood and 1.8 million cubic metres of wood-based panels (graph 20.25).

The average recovery rate (the ratio of sawnwood produced to the volume of sawlogs milled) is estimated to be around 40% from plantation sourced softwood logs and 33% from native forest sourced hardwood logs.

Production of wood-based panels includes reconstituted structural wood products that are direct substitutes for sawn timber, such as laminated veneer lumber and composite beams.

20.25 PRODUCTION OF STRUCTURAL WOOD PRODUCTS



If all of the sawlog component of the industrial roundwood supply projected for the period 2005–06 to 2009–10 were to be processed into sawn timber, then reduced hardwood sawlog availability from native forests could result in annual sawn hardwood production falling by around 15–20% to average 1.0 million cubic metres, and sawn softwood production rising by around 60–70% to average 4.1 million cubic metres a year.

The increased supply of pulpwood directly and as mill residue could also reduce the cost of producing wood-based panels and reconstituted structural products, the combined production of which could potentially average 2.2 million cubic metres a year in the period 2005–06 to 2009–10 (see graph 20.25).

### Structural wood imports and exports

There has been a long-term decline in the share of imports in structural wood consumption, as domestically produced sawn softwood has become more competitive with imports.

At the same time, the share of wood-based panels imports in total wood-based panels consumption has been rising, reflecting the availability of low cost imported wood-based panels and reconstituted structural wood products.

Future trends in Australian trade in soft sawnwood (both imports and exports) will depend largely on the international competitiveness of softwood processing in Australia. Although the share of sawn softwood imports in Australian sawn softwood consumption is expected to continue to decline, it is expected that imported special applications timbers such as Douglas fir and western red cedar will continue to hold around 10–15% of the market.

In the reconstituted structural wood market, imports represent a high share of total consumption and are likely to continue to do so, as the size of the mills required for economic production of many of these products exceeds the likely requirements of Australia's relatively small domestic market.

While some of the projected additional sawn softwood production (see next section) is likely to be absorbed by the domestic market (probably at lower prices), a large proportion

would be available for export. However, the ability to export sawn softwood will depend on Australia's international competitiveness in Pacific Rim markets.

To compete, Australian sawmillers will need to be able to produce and transport sawn softwood to export markets at a lower cost than competing nations. This may prove increasingly difficult as sawn softwood from plantations in other nations such as Argentina and New Zealand also comes on stream in the latter half of the current decade.

### Plantations and structural wood markets

Forest plantations have provided progressively more of Australia's structural wood resources in recent years. Some recent revisions to projected wood supplies from both forest plantations and native forest, however, suggest that this process is occurring more quickly than previously expected. It is now possible that forest plantations could be providing 75% of domestic industrial wood supplies by 2010, compared with expectations of only around 62% several years ago.

The forecast net increase in wood flow is also much larger than previously expected — at around 5.5 million cubic metres — after expected decreases in flows from native forest are taken into account. The potential increase in plantation wood supplies will have many implications for Australia's wood and paper industries.

If all of the sawlog component of the industrial roundwood supply projected for the period 2005–06 to 2009–10 were to be processed into sawn timber, then sawn hardwood production in Australia would fall by 15–20% and sawn softwood production would rise by 60–70% relative to current levels. This would represent a significant addition to domestic sawn softwood availability.

The issues relating to the potential to export the increased stock of sawn softwood that is not required for domestic consumption were discussed in the previous section. Large increases in domestic production of sawn softwood would also likely alter the relative prices for, and therefore the domestic use of, sawn softwood, sawn hardwood, wood-based panels and reconstituted wood products.

### Industrial roundwood removals

Reflecting steady increases in wood flows from forest plantations in the past decade, Australia's production of industrial roundwood reached 24.2 million cubic metres in 2000–01. Hardwood plantations have emerged as a 'third source' of industrial roundwood, alongside native forests (which provide mainly hardwood) and the softwood plantations established mainly during the two decades from around the mid 1960s to the mid 1980s.

Recently revised figures for industrial wood flows indicate expected lower wood flows from native forests over the next decade, but a further steady increase in wood flows from softwood plantations and large increases in wood flows from relatively recently established hardwood plantations (graph 20.26).

For native forests, the recently announced intentions by the governments of Victoria and Western Australia to reduce the volume of wood being harvested are expected to reduce Australia's annual removals of industrial

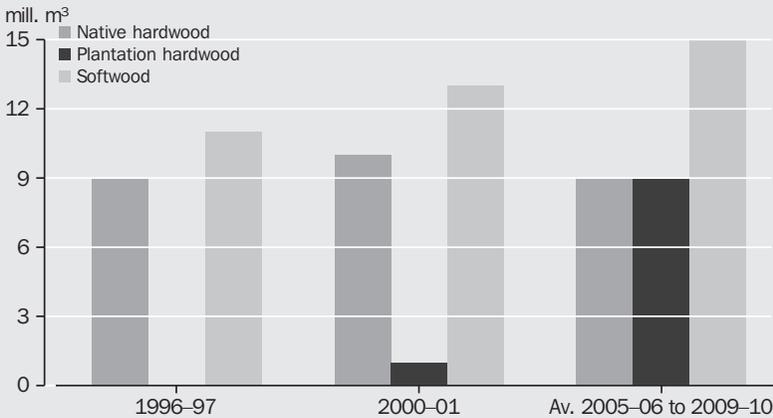
roundwood from native forests to an average of 8.2 million cubic metres in the period 2005–06 to 2009–10, compared with estimated removals of 10.2 million cubic metres in 2000–01.

In comparison, potential log availability from softwood plantations is projected to average 15.0 million cubic metres a year in the latter half of this decade, significantly higher than previously projected (Ferguson et al. 2002).

The supply of plantation hardwood pulplogs is also expected to rise significantly as existing hardwood plantations approach the end of their first 10-year rotation. Wood flows from hardwood plantations are projected to rise from 1.0 million cubic metres in 2000–01 to an average of 9.2 million cubic metres a year in the latter half of the current decade (Ferguson et al. 2002).

Consequently, total industrial roundwood removals could potentially increase from 24.2 million cubic metres in 2000–01 to average 32.4 million cubic metres a year in the latter half of the current decade.

20.26 ROUNDWOOD REMOVALS, Actual and projected



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## Average weekly earnings

Average weekly earnings provide useful information on the cost of labour in the construction industry. This complements the information provided in the previous section on the cost of materials in the industry.

In May 2002, the average weekly earnings of all employees in the construction industry was \$798, 16% higher than the all industries average (\$687) (table 20.27). In May 2001, construction employees had average weekly earnings 7% greater than for all industries.

While average weekly earnings for all employees in the construction industry had fallen in the previous two years, in 2002 there was an increase of 13%, from \$707 to \$798. This increase was greater than the growth of average weekly earnings for all industries from \$663 in May 2001 to \$687 in May 2002 (a 4% increase). The increase of average weekly earnings in the construction industry is, in part, attributed to the sudden

increase in demand for labour that accompanied the upturn in the construction industry in late 2001.

## Industrial disputes

Building and construction is a sector that has high levels of industrial disputation. Given the nature of the house building industry, where individual builders directly subcontract labour as required, disputation tends to be more a feature of non-residential building projects than of residential building projects.

Of the 675 industrial disputes in Australia during 2001, 225 (33%) affected the construction industry (table 20.28). These disputes involved (either directly or indirectly) 69,200 construction industry employees and resulted in the loss of 120,600 working days. This represents 31% of the total number of working days lost due to all industrial disputes in Australia in 2001.

**20.27 AVERAGE WEEKLY EARNINGS**

At May	Construction		All industries	
	Full-time adult employees	All employees	Full-time adult employees	All employees
	\$	\$	\$	\$
1994	709	635	656	532
1995	730	662	688	548
1996	751	681	715	564
1997	792	718	737	578
1998	808	739	768	596
1999	831	750	791	611
2000	797	720	822	635
2001	786	707	861	663
2002	879	798	906	687

Source: *Average Weekly Earnings, Australia* (6302.0).

**20.28 INDUSTRIAL DISPUTES — 2001**

	Units	Construction	All industries
Total industrial disputes	no.	225	675
Employees involved (directly and indirectly)	'000	69.2	225.7
Working days lost	'000	120.6	393.1

Source: *Industrial Disputes, Australia, December 2001* (6321.0) and supplementary data.

The level of industrial disputes in the construction industry has moderated in recent years (graph 20.29). The 'spikes' of 1996 and 1998 experienced by the construction industry in terms of working days lost can largely be attributed to specific industrial disputes.

The effect of specific industrial disputes is identified through a snapshot of the months of 2001 (graph 20.30). The 'spikes' in the graph can be explained by increased industrial action in New South Wales and Victoria. This also reflects that these two states had the largest number of working days lost per 1,000 employees (see table 20.31).

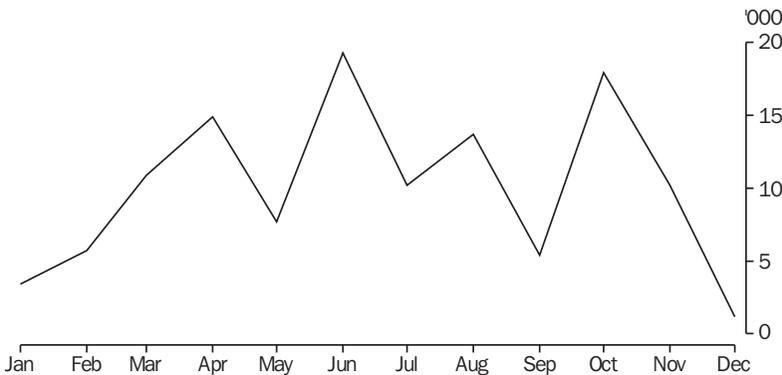
In 2001 the construction industry recorded an average of 275 working days lost per thousand employees, five and a half times the average across all industries combined, as shown in table 20.31. Victoria, New South Wales and Western Australia were the most affected, with 427, 278 and 225 working days lost per thousand construction industry employees, respectively. Tasmania and Northern Territory reported little or no strike activity in the construction industry in 2001.

**20.29 WORKING DAYS LOST**



Source: *Industrial Disputes, Australia, December 2001* (6321.0).

**20.30 WORKING DAYS LOST — 2001**



Source: *Industrial Disputes, Australia, December 2001* (6321.0).

**20.31 WORKING DAYS LOST DUE TO INDUSTRIAL DISPUTES — 2001**

	Construction no.(a)	All industries no.(a)
New South Wales	278	62
Victoria	427	65
Queensland	213	38
South Australia	63	27
Western Australia	225	32
Tasmania	—	7
Northern Territory	—	2
Australian Capital Territory	17	3
Australia	275	50

(a) Per thousand employees.

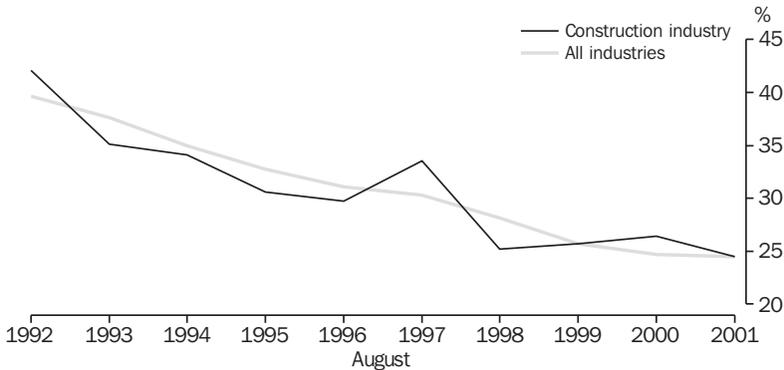
Source: *Industrial Disputes, Australia, December 2001* (6321.0).

**Trade union membership**

The general trend of declining membership of trade unions across both the construction and all industries, is highlighted in graph 20.32. Over the years the proportion of trade union membership in the construction industry has been generally similar to that for all industries.

In the year to August 2001, there was a drop in the number of trade union members in the construction industry, from 116,200 to 106,800. This resulted in the proportion of trade union members in construction (24.5%) being about the same as that across all industries.

In the construction industry, a higher proportion of full-time male employees (29%) than part-time male employees (11%) were trade union members (table 20.33). Across all industries a much higher proportion of female employees were trade union members (26%) than in the construction industry (4%).

**20.32 TRADE UNION MEMBERSHIP, Proportion of employees**

Source: *Employee Earnings, Benefits and Trade Union Members, Australia* (6310.0).

## 20.33 TRADE UNION MEMBERS — August 2001

	Construction		All industries	
	'000	%(a)	'000	%(a)
Males				
Full-time	102.4	29.0	989.8	28.2
Part-time	*3.3	*10.7	99.0	14.8
Total	105.7	27.6	1 088.8	26.0
Females				
Full-time	*1.1	*4.1	505.8	26.1
Part-time	—	—	308.1	18.7
Total	*1.1	*2.1	813.9	22.7
Persons				
Full-time	103.5	27.3	1 495.6	27.4
Part-time	*3.3	*5.8	407.1	17.6
<b>Total</b>	<b>106.8</b>	<b>24.5</b>	<b>1 902.7</b>	<b>24.5</b>

(a) Includes 161,400 persons who did not know their trade union membership status (approximately 12,300 persons employed in the construction industry).

Source: *Employee Earnings, Benefits and Trade Union Members, Australia, August 2001* (6310.0).

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Commercial Property Monitor Pty Ltd, <<http://www.cpm.com.au>>

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Housing Industry Association, <<http://www.buildingonline.com.au>>

Master Builders Australia Inc., <<http://www.masterbuilders.com.au>>

Property Council of Australia, <<http://www.propertyoz.com.au>>

Real Estate Institute of Australia, <<http://www.reiaustralia.com.au>>

# Construction and the environment

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## Introduction

Construction of residential buildings, commercial buildings and other infrastructure has significant impact on the environment. Direct impacts include use of land, materials and energy; this use in turn leads to greenhouse gas emissions and the production of other wastes. Indirect impacts depend on a range of factors including location (whether the development is in an ecologically sensitive area), the use of the building throughout its life span and the urban form created through construction. The layout of towns and cities leads to further environmental impacts from activities such as transport (see the article *Environmental impacts of Australia's transport system* in *Chapter 23, Transport*). This article focuses on the direct environmental impacts of construction.

## Use of land and materials

A direct impact of construction activity on the environment is its use of resources. The actual impacts vary depending on the amounts and types of materials used.

There has been growth in consumption of construction materials over at least the last 50 years. A 'boom period' at the end of WWII was sustained for almost a quarter of a century. In 1997, Australia produced 98 million tonnes of construction materials, 99% of which were consumed within Australia. This amounted to an average of just over 5,200 kg per person. As well as being the main final consumer of construction materials, the building and construction industries also use 55% of timber products (mainly for residential buildings), 27% of plastic products and 12% of iron and steel (Newton et al. 2001). (See the chapter article *The use of forest products*.)

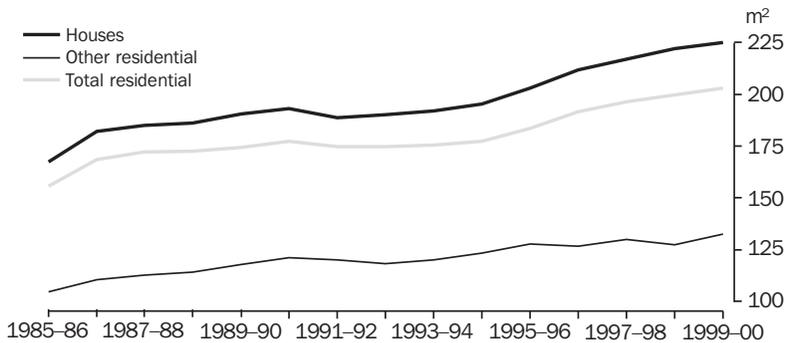
A trend in construction that clearly has consequences for resource use is an increase in the number and size of buildings being constructed. During the five years ending June 2001, there was a steady increase in the number of building approvals across Australia. During this

time, there were about 717,000 residential dwelling approvals in Australia, representing a 10% increase from the level of approvals in 1996 (ABS 2001b).

Although the average number of people in a household has declined, from 3.3 persons in 1976 to 2.6 persons in 1996, the average floor area of new houses has steadily increased over the last 15 years (Newton et al. 2001; ABS 2001a). The average floor area of new dwellings increased by 28% during this time, from 155.6 square metres to 199.5 square metres (graph S20.1), increasing in all states and territories. The average floor area of new houses in capital cities is higher than in regions outside capital cities (e.g. in 1999–2000 the average floor area was 19.4 square metres higher in capital cities). This is significant considering that some 60% of the population live in big cities (Newton et al. 2001).

The materials selected for building also influence the environmental impact of construction. The main factors determining the level of impact are the source of materials and the way they are processed. Similar materials can have greatly different environmental impacts depending on these factors. Important factors influencing selection of residential construction materials are their durability compared to intended life span, lifecycle energy consumption, source and environmental impact of all component materials and processes, recycling potential, and distances required for transportation of components.

The harvesting of many materials used in building a home can cause adverse impacts on biodiversity, including extinction of species, destruction of natural systems and habitat, degradation of ecosystems and fragmentation of habitat and populations. For example, harvesting of timber for construction from native forests can reduce the habitat of native species (AGO 2002c).

**S20.1 AVERAGE FLOOR AREA OF NEW RESIDENTIAL BUILDINGS(a)**

(a) Includes private dwellings only.

Source: ABS 2001a.

These impacts are rarely apparent at the point of use, so it is difficult for builders to take them into account when selecting construction materials. More information is becoming available to help builders in selecting environmentally preferred materials. Choosing an appropriate combination of materials to build houses, taking into account the climate and location, will increase thermal comfort, lower costs and reduce the overall environmental impact (AGO 2002a).

As well as using more materials and, in some cases, more land, increased construction activity can lead to increased production of waste, use of energy and greenhouse gases emissions.

## Waste

Australians generate on average about one tonne of solid waste per person per year, which goes to landfill (AGO 2002d). Construction and demolition of buildings contributes 30–40% of this waste (table S20.2). This equates to about

eight million tonnes nationwide, or 430 kg/year per capita (Newton et al. 2001). The impacts of landfill disposal include use of land that could be used for other purposes, release of methane from the decomposition of organic wastes, and greenhouse gas emissions through the transportation of wastes to landfills, which are mostly on the fringes of cities (Newton et al. 2001). Other environmental implications of disposing of construction waste can include depletion of natural resources and wastage of energy required to produce materials.

The main type of waste is soil rubble, followed by concrete-based masonry and clay-based waste such as bricks and tiles (graph S20.3). Some types have greater impact than others. For example, gypsum plasterboard disposed of in landfill produces poisonous hydrogen sulfide (AGO 2002d).

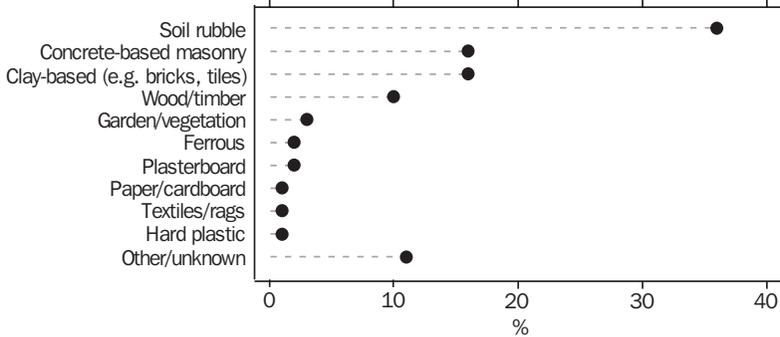
**S20.2 COMPOSITION OF SOLID WASTES IN METROPOLITAN AREAS**

	Inner Sydney(a)	Sydney metro(b)	ACT(c)	Brisbane(d)	Melbourne(e)	Perth metro(f)	Tasmania(g)	Average(h)
	%	%	%	%	%	%	%	%
Municipal	14	36	40	51	34	28	50	40
Commercial and industrial	26	23	24	17	32	17	26	23
Construction and demolition	60	40	36	32	34	55	24	37

(a) 1996–97 (Inner Sydney Waste Board 2000). (b) Average 1995–99, data supplied by EPA NSW 2000. (c) Average 1994–99, domestic including private delivery (ACT Government 2000). (d) 1994 (EPA Qld 1999). (e) 1996–97 (EcoRecycle Vic. 1998a, 1998b). (f) Average 1997–2000 (Department of Environment Protection WA 2001). (g) Data supplied by Department of Primary Industries, Water and the Environment, Tas. 2000). (h) Excluding inner Sydney.

Source: Newton et al. 2001.

S20.3 TYPES OF BUILDING WASTE(a) — 1997



(a) Proportion of total by weight.

Source: AGO 2002d.

The amount of waste is being reduced by construction companies using the following established hierarchy for waste minimisation: reducing consumption of resources where possible; reusing existing buildings and materials; and recycling resources that are left over or have reached the end of their useful life. Effective waste minimisation strategies are being agreed to and implemented by all parties involved in building at the design, construction and operation stages. Decisions on what to build, whether to demolish, what materials to use and how they might be recycled are now made from the earliest stages of design and incorporate waste minimisation strategies (AGO 2002d).

The chapter article *The WasteWise Construction Program* discusses in detail the coordinated responses to achieve waste reductions.

## Energy consumption

Energy consumption impacts on the environment through its depletion of non-renewable resources and emission of greenhouse gases. The impact depends to a large extent on the energy source. This is discussed further in the section *Energy and the environment* in Chapter 15, *Energy*.

Energy consumption by the construction industry in residential, commercial and other developments is relatively low. In 1997–98, the industry consumed 73 PJ of energy, only 0.5% of total energy use. Primary energy (raw materials) used by the construction industry consisted of 2 PJ of natural gas and 2 PJ of liquefied petroleum gas. Secondary energy products (those that have

been enhanced or changed before consumption) consisted of 7 PJ of automotive petrol, and 62 PJ of gas oil or fuel oil (ABS 2001c).

Despite the low direct energy use by the construction industry, once buildings have been constructed they become high consumers of energy. An understanding of energy consumption and the associated greenhouse gas emissions needs to take into account both embodied energy and operating energy.

## Embodied energy

Embodied energy is the energy consumed by processes associated with the production of a building, from the acquisition of natural resources to final consumption including mining, manufacturing, transport and other functions.

The energy embodied in the existing building stock in Australia is equivalent to about 10 years of the total energy consumption for the entire nation. The embodied energy per unit mass of materials used in building varies enormously, from about two gigajoules per tonne for concrete to hundreds of gigajoules per tonne for aluminium. However, other factors also affect environmental impact, such as differing lifetimes of materials, differing quantities required to perform the same task and different design requirements. Materials such as concrete and timber have the lowest embodied energy intensities, but are

consumed in very large quantities, whereas materials with high energy content such as stainless steel are used in much smaller amounts (Newton et al. 2001).

The principal material of the outside walls for dwellings in Australia is brick veneer (41% of dwellings) (ABS 1999). In brick veneer construction, the bricks have no structural role, but high embodied energy. Lightweight materials such as fibre cement have lower embodied energy but similar structure and thermal performance (AGO 2002a).

Embodied energy is becoming of greater significance as a proportion of whole-of-life energy consumption, particularly in the commercial building sector, due to several trends — more energy intensive materials such as aluminium and stainless steel are being used in buildings; these are often bigger and therefore require greater quantities of materials; buildings are being refurbished more frequently, requiring more materials; more machine intensive techniques that require energy derived from fossil fuel sources are used in construction; and building materials are transported greater distances, so that transport energy is likely to be greater (AGO 1999a).

Recycling building materials can reduce embodied energy substantially. For example, aluminium is 100% recyclable. Recycling

aluminium reduces embodied energy by 95%, while recycling steel reduces embodied energy by 72% (AGO 2002d).

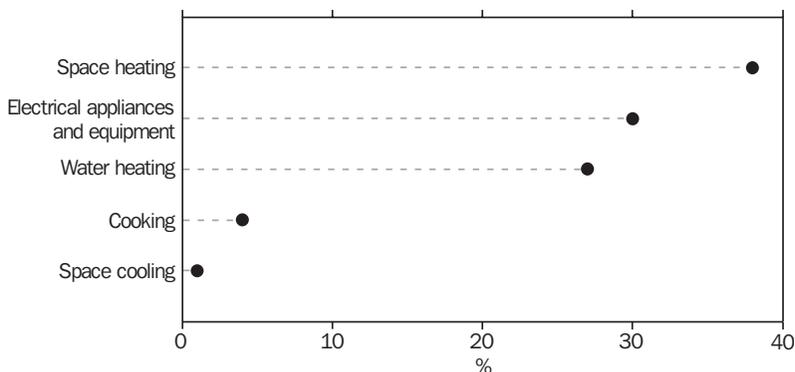
### Operating energy

Operating energy is the energy consumed in maintaining and using a building throughout its life span. Levels of operating energy can be influenced by the design and materials initially used in construction.

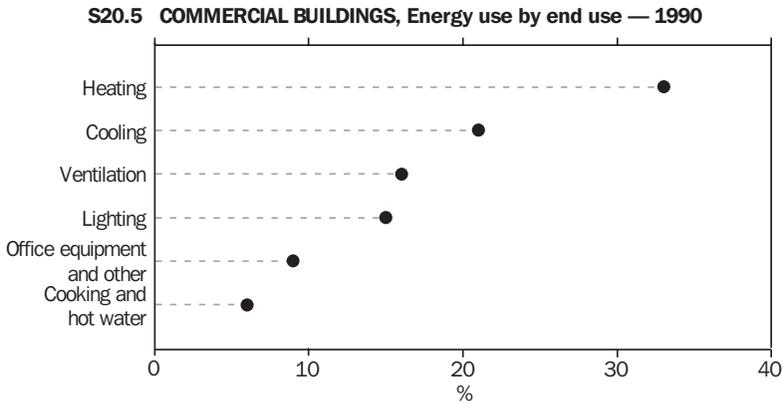
In residential buildings, space heating and cooling accounted for 39%, or approximately 125 PJ, of total residential operational energy consumption in 1998 (graph S20.4). The main energy sources used in the residential sector are electricity, natural gas and wood. The vast majority of natural gas and wood consumption in Australia is for space heating. Firewood is often collected from areas where the fallen timber provides crucial habitat and food for native animals, and this practice can pose a threat to forest biodiversity (ANZECC 2001).

In commercial buildings, heating is the largest single end use of energy at 33% of total energy use in 1990 (graph S20.5). By type of energy, electricity accounted for 65% of energy used, followed by natural gas at 25% (AGO 1999a).

**S20.4 RESIDENTIAL ENERGY USE, By end use — 1998**



Source: AGO 1999b.



Source: AGO 1999a.

Technologies for reducing operating energy are being developed and implemented. In the foreseeable future it is likely that buildings will generate some of their own operating energy, by devices such as photovoltaics, which may be integrated within the building fabric.

## Greenhouse gas emissions

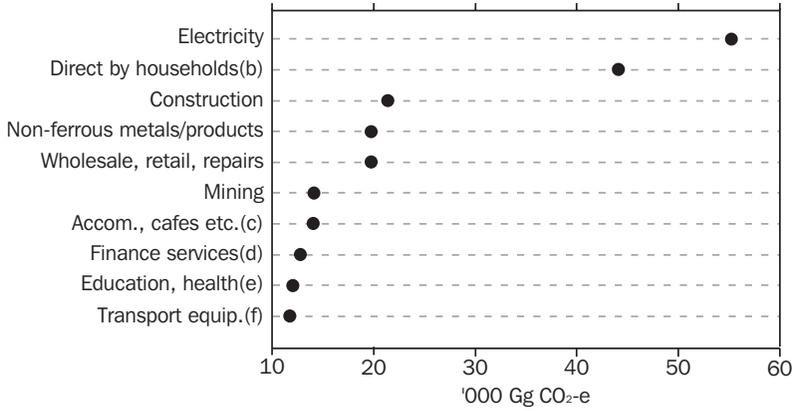
It is becoming widely recognised that human activities such as energy consumption are influencing global climate change through emissions of greenhouse gases such as carbon dioxide. *Chapter 14, Environment* provides information on greenhouse gases.

Although the construction industry itself induces a fairly small amount of direct greenhouse gas emissions, buildings and other forms of construction contain high levels of embodied energy due to their use of building materials which are energy-intensive to produce, and therefore induce a large amount of greenhouse gases indirectly.

The direct greenhouse gas emissions from the construction industry were 4,958 Gg CO<sub>2</sub>-e in 1997–98, compared with the total emissions of all industries and direct emissions by households 339,597 Gg CO<sub>2</sub>-e. Greenhouse gas emissions can also be calculated indirectly. This method includes emissions from the extraction, harvesting, processing and transportation of materials used in the construction industry, as well as those produced by the industry itself. Construction produced 7.1% (21,397 Gg CO<sub>2</sub>-e) of total indirect greenhouse gas emissions in 1994–95. This is the third highest overall level of energy-related domestic emissions after electricity and direct consumption by households (graph S20.6).

The average household's energy use is responsible annually for about eight tonnes of carbon dioxide, the main greenhouse gas. Space heating and cooling accounted for nearly 15% of residential sector greenhouse gas emissions in 1998 (graph S20.7). This is a lower share of greenhouse gas emissions than energy use (39%) because a large share of the energy used for heating and cooling is less greenhouse gas intensive (involving use of natural gas and wood rather than electricity).

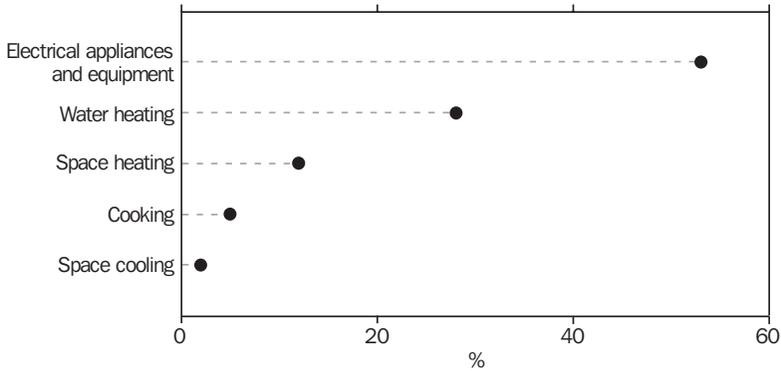
**S20.6 GREENHOUSE GASES INDUCED(a), By industry — 1994-95**



(a) Refers to energy-related greenhouse gas emissions only. Emissions produced indirectly via consumption of products, except direct emissions by households. (b) Direct production by households, mainly through motor vehicle use. (c) Includes restaurants, cultural and recreational services, personal and other services. (d) Includes insurance, ownership of dwellings, property and business services. (e) Includes community services. (f) Includes other machinery.

Source: ABS 2001a.

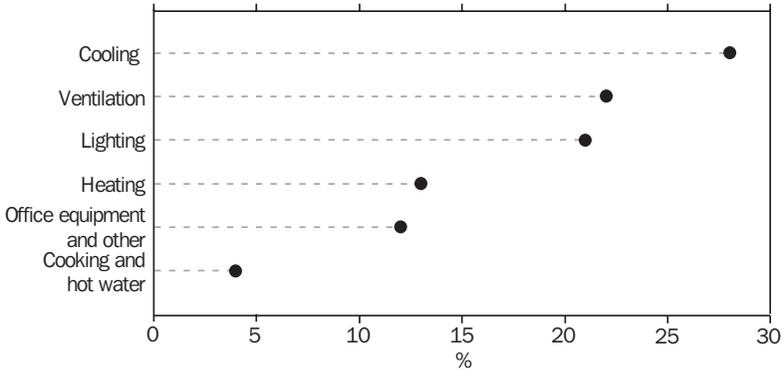
**S20.7 RESIDENTIAL GREENHOUSE GAS EMISSIONS, By end use — 1998**



Source: AGO 1999b.

In commercial buildings, space cooling, ventilation and lighting were found in 1990 to be the three most significant causes of emissions, together accounting for 71% of the total (graph S20.8). The actual proportion applicable to a specific building type may vary substantially from this commercial sector average. A study

assessing greenhouse gas emissions by commercial building type found offices to be the most significant, responsible for an estimated 27% of total sector emissions in that year. Hospitals formed the next largest group at 13% (AGO 1999a).

**S20.8 COMMERCIAL BUILDINGS, Greenhouse gas emissions by end use — 1990**

Source: AGO 1999a.

Greenhouse gas emissions related to embodied energy were found to be less significant than those related to operating energy. In a study of four buildings, embodied energy emissions were found to be approximately 8–10% of greenhouse emissions by buildings, assuming a 40-year life span. This proportion would vary substantially for different building types; for those using less operating energy (e.g. warehouses, non-air conditioned offices) it would be much higher.

## Energy efficiency

Many factors can contribute to reducing energy consumption and greenhouse gas emissions. Dwelling design can significantly affect the amount of sunlight entering a home. By siting the rooms that are principally used by the household (e.g. living areas and bedrooms) so that they face north, sunlight can be employed to heat the dwelling in winter. Insulation has a large impact on the heating and cooling requirements for buildings by creating a thermal barrier which reduces the rate of transfer of heat from and into a building. The use of insulation can reduce the amount of energy used to heat or cool a building.

Residential buildings in Australia are generally poorly insulated — 38% of houses have neither wall or ceiling insulation. Only one-fifth of all residential buildings have both wall and ceiling insulation and a further 42% have only ceiling insulation. In 1999, just over half of Australian households reported that their dwellings had some form of insulation. Achieving a more comfortable temperature was the main reason for insulation having been installed (87% of

households), and cost was the main factor discouraging people from installing insulation (ABS 1999).

Improving the insulating qualities of new residential buildings goes a significant way towards meeting greenhouse gas emission reduction targets. Residential buildings potentially have a very long life — of the order of 50–100 years — and so any measure implemented will continue to have an impact on energy and greenhouse gas emissions for decades to come (AGO 1999b).

## Energy efficiency measures in the Building Code of Australia (BCA)

The BCA is one of the main legislative methods available in Australia to ensure energy efficient buildings. The BCA sets minimum standards with which all buildings must comply. Individual builders may choose to use better performing systems. In 2000, the Commonwealth Government and the state and territory governments reached agreement to develop suitable national energy efficiency provisions for domestic and commercial buildings. The objective of the energy efficiency measures is to reduce greenhouse gas emissions by efficiently using energy. The proposed measures for buildings are intended to achieve significant improvement and eliminate worst practice, thereby reducing greenhouse gas emissions, while avoiding excessive technical and commercial risks and unreasonable costs. Performance requirements relate to building fabrics with an appropriate level of thermal

performance, and to building services that use energy efficiently. The energy efficiency measures in the BCA Housing Provisions are expected to

come into effect on 1 January 2003 and the commercial energy efficiency measures at a later stage (ABCA 2002).

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## Introduction

The service industries sector is the most significant component of the Australian economy. This chapter presents an overview of the sector and provides a range of statistical information for a selection of service industries, with a particular focus on those that have recently been surveyed as part of the ABS rotating program of service industries collections.

For the purposes of this chapter, the service industries sector has been defined as all industries other than the goods producing industries (agriculture, mining, manufacturing, electricity, construction, and gas and water supply). In terms of the Australian and New Zealand Standard Industrial Classification (ANZSIC), the service industries cover wholesale and retail trade, accommodation, cafes and restaurants, transport and storage, communication services, finance and insurance, property and business services, government administration and defence, education, health and community services, cultural and recreational services, and personal and other services.

## Overview

The service industries sector is the largest component of the Australian economy in terms of number of businesses, employment and gross value added.

Of the estimated 1,164,100 private sector businesses in Australia in 2000–01, some 833,100 (72%) were in the service industries sector. For small businesses (those with less than 20 employees), the proportions are virtually the same, with service industries accounting for 71% of the 1.1 million small businesses in Australia (table 21.1).

The service industries sector accounted for 68% of the gross value for all industries in 2000–01, and also showed the greatest increase in output in chain volume terms (measuring 'real' output

unaffected by price change), with an increase of 26% over the period from 1995–96 to 2000–01 (table 21.2). In comparison, the goods producing industries recorded an increase of 13% over the same period.

The largest contributor to the service industry sector in 2000–01 was the property and business services industry, which accounted for 20% of the gross value added of the service industries sector and 14% of the gross value added of all industries. The next largest within the service industries sector was finance and insurance services, which accounted for 11% of the gross value added of the sector.

In the five-year period 1995–96 to 2000–01, the gross value added of the services industries increased by an average annual rate of 5%, while that of the goods producing industries recorded an average annual growth rate of 3%.

From within the service industries sector, the communication services industry recorded the largest percentage increase in output in the five-year period, of 64% in real terms, which is the equivalent of an average annual growth rate of 10%. The next highest growth rate was recorded in the service industries by the property and business services industry, with a 43% increase in output over the five-year period, and an average annual growth rate of 8%. The lowest growth in real terms in the period 1995–96 to 2000–01 was in the goods producing sector, where the construction industry recorded only a 6% increase. In comparison, the lowest increase in real terms in the service industries sector over this same period was by the education industry with an increase of 10%.

In terms of employment the service industries sector is dominant, accounting for 74% of total employment for all industries in 2000–01 (table 21.3). Total employment in the service industries sector in 2000–01 was 6,702,800 persons.

### 21.1 BUSINESSES — 2000–01

Industries	Units	Small businesses	Other businesses	Total
Goods producing	'000	322.3	8.7	331.0
Service	'000	799.7	33.4	833.1
<b>Total</b>	<b>'000</b>	<b>1 122.0</b>	<b>42.1</b>	<b>1 164.1</b>
Businesses in service industries as a percentage of all businesses	%	71.3	79.3	71.6

Source: *Small Business in Australia, 2000–01* (1321.0).

## 21.2 GROSS VALUE ADDED(a), Chain volume measures(b)

Industries	Units	1995-96	2000-01
<b>Goods producing</b>			
Agriculture, forestry and fishing	\$m	16 820	19 376
Mining	\$m	24 123	29 738
Manufacturing	\$m	65 632	74 240
Electricity, gas and water	\$m	14 408	15 988
Construction	\$m	27 911	29 534
<i>Total</i>	<i>\$m</i>	<i>148 894</i>	<i>168 876</i>
<b>Service</b>			
Wholesale trade	\$m	26 348	32 332
Retail trade	\$m	27 330	32 901
Accommodation, cafes and restaurants	\$m	11 557	14 679
Transport and storage	\$m	27 741	31 432
Communication services	\$m	12 396	20 362
Finance and insurance services	\$m	31 445	40 417
Property and business services	\$m	51 507	73 829
Government administration and defence	\$m	22 268	24 829
Education	\$m	24 960	27 540
Health and community services	\$m	30 751	35 191
Cultural and recreational services	\$m	9 534	12 105
Personal and other services	\$m	11 645	15 415
<i>Total</i>	<i>\$m</i>	<i>287 482</i>	<i>361 032</i>
<b>Total(c)</b>	<b>\$m</b>	<b>436 376</b>	<b>529 908</b>
Service industries as a percentage of all industries	%	65.9	68.1

(a) At basic prices, which include subsidies, but are before any taxes on products. (b) Reference year for chain volume measures is 1999-2000. (c) Excludes ownership of dwellings.

Source: Australian System of National Accounts (5204.0).

## 21.3 EMPLOYED PERSONS, By industry

Industries	Units	1995-96(a)	2000-01(a)
<b>Goods producing</b>			
Agriculture, forestry and fishing	'000	419.3	429.1
Mining	'000	85.0	78.3
Manufacturing	'000	1 113.7	1 131.3
Electricity, gas and water	'000	80.6	65.7
Construction	'000	602.4	683.2
<i>Total</i>	<i>'000</i>	<i>2 301.1</i>	<i>2 387.6</i>
<b>Service</b>			
Wholesale trade	'000	500.8	439.1
Retail trade	'000	1 230.5	1 335.3
Accommodation, cafes and restaurants	'000	381.8	470.7
Transport and storage	'000	389.3	421.8
Communication services	'000	159.0	182.6
Finance and insurance	'000	317.0	337.6
Property and business services	'000	799.4	1 082.6
Government administration and defence	'000	379.3	366.2
Education	'000	586.3	621.6
Health and community services	'000	759.5	876.6
Cultural and recreational services	'000	188.4	225.9
Personal and other services	'000	315.8	343.0
<i>Total</i>	<i>'000</i>	<i>6 006.8</i>	<i>6 702.8</i>
<b>Total</b>	<b>'000</b>	<b>8 307.9</b>	<b>9 090.4</b>
Service industries as a percentage of all industries	%	72.3	73.7

(a) Annual average.

Source: Labour Force, Australia (6203.0).

In the five-year period from 1995–96, employment in the service industries increased by 696,000 persons or 12%, representing an average annual growth rate of 2%. In the same period the goods producing industries recorded an increase in employment of 86,500 persons. This represented an increase of 4%, an average annual growth rate of just over 0.7%.

Within the service industries, the major employing industry was retail trade with employment in 2000–01 of 1,335,300 persons, accounting for 15% of all employment and 20% of employment in the service industries sector. Other large employing service industries were property and business services (1,082,600 persons), health and community services (876,600 persons), and education (621,600 persons). The industries showing the greatest employment growth in the five-year period since 1995–96 were property and business services, with a 35% increase from 799,400 persons to 1,082,600 persons, accommodation, cafes and restaurants with an increase of 23% in the period, and health and community services with an increase of 15%. In contrast, employment in the wholesale trade and the government administration and defence sectors fell by 12% and 4% respectively over this period.

## Statistics for selected service industries

The remainder of the chapter presents statistics for a selection of service industries. The information provided is based primarily on the rotating program of service industries collections conducted by the ABS. The exceptions are the retail trade and wholesale trade industries where information has been drawn from the monthly and quarterly sales collections respectively.

### Retail and wholesale trade

#### Retail trade

The retail trade industry comprises businesses primarily engaged in the sale of new or used goods to final consumers for personal or household consumption, or in selected repair activities such as repair of household equipment or motor vehicles.

Retail turnover estimates (graph 21.4 and table 21.5) relate to the value of turnover for retailing (such as supermarkets, clothing and

department stores, etc.) and hospitality and selected service industries (such as cafes and restaurants, hotels and licensed clubs, etc.). In order to measure the actual value paid by consumers from 1 July 2000, retail turnover is recorded inclusive of the Goods and Services Tax (GST).

These estimates are used by retailers, industry associations, economists, governments and media to analyse consumer spending behaviour and, in conjunction with other economic indicators, to help assess current Australian economic performance. Quarterly retail turnover estimates, along with other data, are used in the calculation of household final consumption expenditure in the Australian national accounts.

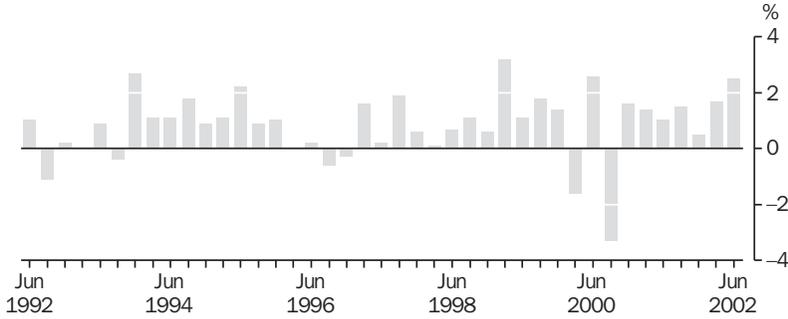
Graph 21.4 presents quarterly changes in the seasonally adjusted chain volume measures of Australian total retail turnover (including selected services). The series rose from \$30,146m in the June quarter 1992 to \$41,998m in the June quarter 2002, an increase of 39% representing average growth of 0.8% per quarter.

Since 1992, the retail turnover trend series in volume terms has either declined or recorded minimal quarterly growth in two periods. The first occurred from September 1992 to September 1993 with growth averaging zero per quarter, and the second occurred from March to December 1996 with growth averaging –0.1% per quarter. Two periods of sustained growth occurred prior to the year 2000. The first was from March 1993 to December 1995 when growth averaged 1.0% per quarter, and the second was from March 1997 to December 1999 when growth averaged 1.2% per quarter.

The series also rose by 2.6% in the June quarter 2000, reflecting the unusual increase in the volume of goods sold in some industries prior to the introduction of The New Tax System (TNTS) on 1 July 2000.

While the price of most goods rose from 1 July 2000, the volume of goods sold across most industries and states dropped as the apparent pull forward in spending in June unwound and the impact of the GST flowed through the economy. This led to a decrease of 3.3% in September quarter 2000. This was followed by another sustained period of growth from December 2000 to June 2002 at an average of 1.3% per quarter.

**21.4 QUARTERLY CHANGE IN RETAIL TURNOVER, Chain volume measures(a): Seasonally adjusted**



(a) Reference year for chain volume measures is 2000–01.

Source: ABS data available on request, Retail Business Survey, quarterly data.

As shown in table 21.5, the annual original chain volume measure of Australian total retail turnover increased from \$116,549m in 1990–91 to \$163,374m in 2001–02, an increase of 40% representing an average annual rise of 3.1%.

During this period, the strongest annual growth occurred in 1994–95 (6%). The three periods of weakest growth occurred in 2000–01 (0.2%), closely followed by 1992–93 (0.3%) and 1996–97 (0.4%). Growth of 5.3% was achieved in both 1999–2000 and the latest year, 2001–02. Growth in 2000–01 was considerably lower, but was affected by the unusual increase in the volume of goods sold prior to the introduction of TNTS on 1 July 2000 and the subsequent decline in the volume of goods sold.

The industry group representing the largest component of retail turnover in 2001–02 was food retailing with 39%. The next largest industry was hospitality and services with a 18% share of total turnover in 2001–02, followed by household good retailing with a 13% share of total turnover.

A comparison of the share of retail turnover held by the industry groups in 1990–91 and 2001–02 shows that two industry groups increased their shares, namely household good retailing by 4.6 percentage points and other retailing by 3.3 percentage points. In contrast, five industry groups decreased their shares, namely food retailing (–3.9 percentage points), hospitality and services (–2.6 percentage points), recreational goods (–1.3 percentage points), department stores (–1.0 percentage point) and clothing and soft good retailing (–0.5 percentage points).

**21.5 RETAIL TURNOVER, Chain volume measures(a) — By industry group: Original**

	Food retailing	Department stores	Clothing and soft good retailing	Household good retailing	Recreational good retailing	Other retailing	Hospitality and services	Total(b)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
1990–91	49 788	10 979	8 418	9 244	6 750	9 530	23 417	<b>116 549</b>
1991–92	51 785	11 371	8 756	9 575	6 822	10 031	22 454	<b>119 360</b>
1992–93	52 034	11 540	8 453	10 193	6 575	10 182	21 803	<b>119 673</b>
1993–94	52 584	11 625	8 475	10 979	6 828	11 112	22 716	<b>123 461</b>
1994–95	55 380	11 990	8 703	11 803	7 229	11 761	24 573	<b>130 537</b>
1995–96	57 996	12 315	8 882	12 591	7 623	12 307	25 002	<b>135 885</b>
1996–97	58 406	12 241	8 758	13 795	7 251	12 742	23 603	<b>136 411</b>
1997–98	60 453	12 593	8 989	14 314	7 391	13 835	23 965	<b>141 220</b>
1998–99	61 482	12 994	10 068	14 717	7 492	14 639	26 007	<b>147 081</b>
1999–2000	62 218	13 768	10 781	17 344	7 612	15 863	27 363	<b>154 884</b>
2000–01	62 004	13 140	10 213	17 972	7 310	17 020	27 563	<b>155 222</b>
2001–02	63 340	13 714	11 005	20 554	7 393	18 785	28 584	<b>163 374</b>

(a) Reference year for chain volume measures is 2000–01. (b) Chain volume measures are not additive for most periods; the component measures do not sum to a total in the same way as the corresponding current price components do.

Source: ABS data available on request, Retail Business Survey, aggregated quarterly data.

## Wholesale trade

The wholesale trade industry covers those businesses involved in the sale of new or used goods to businesses or to institutional (including government) users.

Along with the retail trade industry, the wholesale trade industry is a significant component of the Australian economy and provides a key indicator of economic activity.

As shown in graph 21.6, the quarterly trend chain volume measures of Australian total wholesale sales by private businesses reflected a downturn in the economy, with wholesale sales declining by 0.6% in the December quarter 1992 and 0.3% in the March quarter 1993. In 1994 all quarters recorded growth in wholesale sales, with the largest increase (5.4%) in the June quarter 1994. In 1996 growth in wholesale sales was lower and averaged 0.5% per quarter, but growth was stronger in both 1997 and 1998, with average quarterly growth of 2.3%. A break in the series occurred between the June and September quarters 1999 as a result of the inclusion of three significant privatised marketing authorities. After declining in the September and December 2000 quarters, the following five quarters from March 2001 to March 2002 recorded growth in wholesale sales averaging 1.5% per quarter.

The series rose from \$31,276m in the March quarter 1992 to \$50,050m in the June quarter 1999, an overall increase of 60%

representing average growth of 1.6% per quarter. Following a series break between the June and September quarters 1999, wholesale sales by private business rose from \$52,462m in the September quarter 1999 to \$58,488m in the March quarter 2002, an overall increase of 12% representing average growth of 1.1% per quarter.

## Hospitality industries

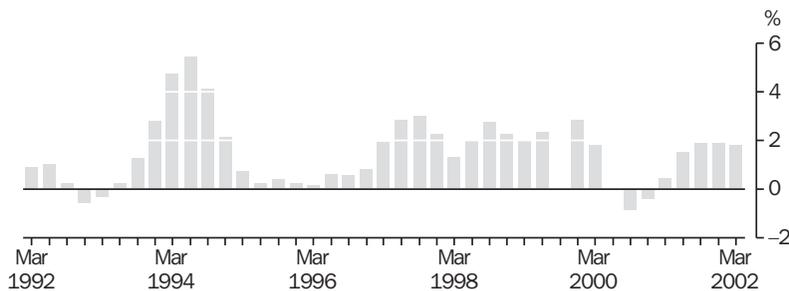
### Accommodation

The accommodation industry, an important part of the tourism and hospitality sector, consists of hotels, motels, caravan parks and similar businesses mainly engaged in providing short-term accommodation. It excludes those hotels that provide short-term accommodation, but whose main activity is selling alcoholic beverages for consumption on the premises.

At 30 June 2001, there were 5,884 employing businesses in the accommodation industry, operating 6,525 separate accommodation establishments (table 21.7). These establishments included 2,279 motel establishments, 1,417 caravan parks/camping grounds, 652 licensed hotels, 543 serviced apartment establishments, 504 visitor hostels and 239 bed and breakfast establishments.

At 30 June 2001, the accommodation industry had employment of 106,051 persons, an increase of 12% on the figure at 30 June 1998. Casual employees (45,866) accounted for 43% of total employment at 30 June 2001.

**21.6 QUARTERLY CHANGE IN WHOLESALE SALES,  
Chain volume measures(a): Trend**



(a) Reference year for chain volume measures is 1999–2000.

Note: A break in series occurred between the June and September 1999 quarters.

Source: ABS data available on request, Quarterly Economic Activity Survey.

In 2000–01, the total income received by businesses in the accommodation industry was \$8,286m, of which, \$5,001m (60%) was received from takings for accommodation. In addition, \$1,393m (17%) was received from takings for meals and \$613m (7%) from the sale of liquor and other beverages.

Total expenses for the accommodation industry in 2000–01 were \$7,680m. Labour costs (\$2,739m) was the largest expenditure item, accounting for 36% of total expenses. Other major expenses for the industry were purchases (\$1,017m), rent, leasing and hiring expenses (\$682m), interest expenses (\$513m) and depreciation and amortisation (\$410m).

Both total income and total expenses of the accommodation industry increased by 26% during the period 1997–98 to 2000–01.

The industry recorded an operating profit before tax of \$620m for the 2000–01 financial year, representing an operating profit margin of 8.1%.

### 21.7 ACCOMMODATION INDUSTRY

	Units	1997–98	2000–01
Businesses at 30 June	no.	5 640	5 884
Employment at 30 June	persons	94 348	106 051
<b>Income</b>			
Takings from accommodation	\$m	4 024.9	5 000.7
Takings from meals	\$m	1 124.1	1 393.3
Sale of liquor and other beverages	\$m	509.2	612.8
Other income	\$m	936.3	1 279.6
<i>Total</i>	<i>\$m</i>	<i>6 594.5</i>	<i>8 286.4</i>
<b>Expenses</b>			
Labour costs	\$m	1 987.4	2 738.9
Purchases of foodstuffs for use in preparing meals	\$m	412.1	483.9
Purchases of liquor and other beverages	\$m	200.8	240.6
Other expenses	\$m	3 509.8	4 216.5
<i>Total</i>	<i>\$m</i>	<i>6 110.1</i>	<i>7 679.8</i>
Operating profit before tax	\$m	492.2	619.7
Operating profit margin	%	7.9	8.1

Source: Accommodation Industry, Australia (8695.0).

### Clubs, pubs, taverns and bars

Along with the accommodation industry, the clubs, pubs, taverns and bars industries are important elements of the tourism and hospitality sector. The clubs industry covers businesses

mainly engaged in the provision of hospitality services to members, while the pubs, taverns and bars industry covers businesses which mainly sell alcoholic beverages for consumption on the premises.

At 30 June 2001, there were 2,911 organisations in the hospitality clubs industry, a decrease of 8% in the three years since June 1998 (table 21.8). These organisations employed 64,990 persons at 30 June 2001, comprising 34,020 permanent staff and 30,970 casual staff. The major occupations of employees in the hospitality clubs industry were bar managers and bar staff (23,544 persons), catering staff (11,145 persons) and gaming staff and cashiers (10,141 persons).

The total income for organisations in the hospitality clubs industry was \$6,297m in 2000–01, with gambling income of \$3,835m being the main source of income, representing 61% of total industry income. Other major sources of income for the industry were the sale of liquor and other beverages of \$1,407m (22% of industry income) and takings from the sale of meals and food of \$547m (9% of industry income).

In 2000–01, the hospitality clubs industry incurred total expenses of \$5,925m, with labour costs being the most significant at \$1,777m, representing 30% of total expenses.

There were 4,003 businesses in the pubs, taverns and bars industry at 30 June 2001, a 12% decrease since June 1998 when there were 4,540 businesses operating. Despite the decrease in businesses, employment increased by 7% from 78,654 persons in June 1998 to 84,158 persons in June 2001.

Total income for the industry in 2000–01 was \$9,007m. The major sources of income were from the sale of liquor and other beverages (\$5,682m) and gambling income (\$2,121m). Gambling income increased by 64% over the 1997–98 figure of \$1,296m.

Total expenses of businesses in the pubs, taverns and bars industry were \$8,344m, with the main items of expenditure being purchases of liquor and other beverages of \$3,270m and labour costs of \$1,776m.

For 2000–01, the operating profit before tax for the industry was \$709m, which represented an operating profit margin of 7.9%, a slight decrease on the operating profit margin of 8.3% recorded for 1997–98.

## 21.8 CLUBS (HOSPITALITY) AND PUBS, TAVERNS AND BARS INDUSTRIES

	Units	1997–98	2000–01
CLUBS (HOSPITALITY)			
Businesses at 30 June	no.	3 168	2 911
Employment at 30 June	persons	63 375	64 990
Income			
Sales of meals and alcohol and other beverages	\$m	1 975.3	1 953.5
Takings from gambling	\$m	3 095.7	3 835.2
Other	\$m	632.5	508.4
<i>Total</i>	<i>\$m</i>	5 703.5	6 297.1
Expenses			
Labour costs	\$m	1 517.8	1 777.0
Poker/gaming machine and other gambling taxes and levies	\$m	691.2	770.7
Purchases	\$m	1 031.3	998.0
Other	\$m	1 941.1	2 378.9
<i>Total</i>	<i>\$m</i>	5 181.5	5 924.6
Operating profit before tax	\$m	530.6	374.4
Operating profit margin	%	9.4	6.1
PUBS, TAVERNS AND BARS			
Businesses at 30 June	no.	4 540	4 003
Employment at 30 June	persons	78 654	84 158
Income			
Sales of meals and alcohol and other beverages	\$m	6 280.0	6 507.4
Takings from gambling	\$m	1 295.6	2 121.3
Other	\$m	379.8	378.5
<i>Total</i>	<i>\$m</i>	7 955.4	9 007.2
Expenses			
Labour costs	\$m	1 411.9	1 776.4
Poker/gaming machine and other gambling taxes and levies	\$m	346.2	590.3
Purchases	\$m	3 681.0	3 807.7
Other	\$m	1 882.9	2 169.5
<i>Total</i>	<i>\$m</i>	7 322.0	8 343.9
Operating profit before tax	\$m	657.6	708.7
Operating profit margin	%	8.3	7.9

Source: *Clubs, Pubs, Taverns and Bars, Australia (8687.0)*.

### Cafes and restaurants

Another important industry in the hospitality sector is the cafes and restaurants industry. This includes businesses mainly engaged in operating cafes and restaurants for consumption of meals on the premises and businesses mainly engaged in catering services. Businesses mainly engaged in selling takeaway food are excluded.

At 30 June 1999 there were 12,845 employing businesses in the cafes and restaurants industry (table 21.9). These businesses operated at 14,199 locations, comprising 4,552 licensed cafes and restaurants, 1,891 licensed and BYO cafes and restaurants, 2,748 BYO cafes and restaurants and 3,291 unlicensed cafes and restaurants. In addition, there were 1,716 locations operated by catering businesses. At 30 June 1999 the cafes and restaurants in the industry had 1,057,100 seats available for consuming food on the premises, which represented an average of 85 seats per café and restaurant location.

During 1998–99, businesses in the cafes and restaurants industry generated \$7,174m in income. Over half of this income (55%) was generated from sales of meals consumed on the premises. Sales of beverages accounted for a further \$1,117m (16%) while catering services generated \$1,265m (18%) of total income.

Total expenses of businesses in the industry during 1998–99 were \$6,805m. The two largest expense items were purchases (\$2,917m) and labour costs (\$2,109m), which represented 43% and 31% respectively of total expenses.

During 1998–99, the industry recorded an operating profit before tax of \$334m, representing an operating profit margin of 4.8%. The operating profit before tax (excluding caterers) represented an annual return per available seat of \$251.

At 30 June 1999 total employment in the cafes and restaurants industry was 152,107 persons, of whom 63,093 (41%) were waiters and waitresses. Just over half (51%) of persons working in the industry were casuals, which was reflected in the average labour cost per employee of \$15,000.

### 21.9 CAFES AND RESTAURANTS INDUSTRY — 1998–99

	Units	Value
<b>Businesses at 30 June</b>		
Licensed cafes and restaurants	no.	4 197
Licensed and BYO cafes and restaurants	no.	1 801
BYO cafes and restaurants	no.	2 668
Unlicensed cafes and restaurants	no.	2 861
Catering businesses	no.	1 318
<i>Total</i>	<i>no.</i>	<i>12 845</i>
<b>Employment at 30 June</b>		
Waiters/waitresses	persons	63 093
Kitchen hands	persons	25 655
Managers/supervisors	persons	18 025
Chefs/cooks	persons	28 893
Other	persons	16 441
<i>Total</i>	<i>persons</i>	<i>152 107</i>
<b>Income</b>		
Takings from meals consumed on the premises	\$m	3 947.7
Takings from take-away food	\$m	444.6
Takings from beverages	\$m	1 117.2
Takings from catering services	\$m	1 264.7
Other income	\$m	400.0
<i>Total</i>	<i>\$m</i>	<i>7 174.3</i>
<b>Expenses</b>		
Labour costs	\$m	2 109.4
Purchases	\$m	2 917.2
Rent of land, buildings and other structures	\$m	504.0
Other expenses	\$m	1 274.6
<i>Total</i>	<i>\$m</i>	<i>6 805.2</i>
Operating profit before tax	\$m	334.2
Operating profit margin	%	4.8

Source: *Cafes and Restaurants Industry, Australia, 1998–99* (8655.0).

## Selected business professions

### Accounting services

At 30 June 1996 there were 8,389 businesses in the accounting services industry (table 21.10). Most accounting businesses were small, 95% employing fewer than 20 employees. There were 18 businesses in the industry employing 100 or more persons, less than 1% of total businesses,

but these 18 large businesses accounted for significant proportions of total employment (26%) and total income (39%).

There were 66,792 persons employed in the accounting services industry at the end of June 1996. The majority (83%) of employment was full-time. Females accounted for 51% of total employment in the industry. While females comprised 76% of support staff, they represented only 17% of working principals and 41% of accountants working as employees.

### 21.10 ACCOUNTING SERVICES INDUSTRY

	Units	1992–93	1995–96
<b>Businesses</b>			
	no.	8 699	8 389
<b>Employment</b>			
Principals	persons	14 143	15 409
Qualified employees	persons	18 277	22 207
Other employees	persons	27 580	29 175
<i>Total</i>	<i>persons</i>	<i>60 000</i>	<i>66 792</i>
Total income	\$m	4 086.4	4 939.1
Operating profit before tax	\$m	828.6	954.6
Operating profit margin	%	20.5	19.4

Source: *Legal and Accounting Services, Australia* (8678.0).

During 1995–96 the accounting services industry generated \$4,939m in total income, an average of \$588,800 per business. After expenses, the industry recorded an operating profit before tax of \$955m, representing an operating profit margin of 19.4%, slightly less than in 1992–93.

Income from accounting services (\$4,407m) contributed 89% of total income in 1995–96. As shown in table 21.11, taxation services (36%) generated the largest proportion of income from accounting services, followed by general business and personal accounting services (30%) and auditing services (20%).

### Consultant engineering services

The ABS conducted a survey of the consultant engineering services industry for 1995–96, updating the results of a survey in respect of 1992–93. There were 5,514 businesses in the industry at 30 June 1996 (table 21.12). This represented an increase of only 1% in the three-year period from 30 June 1993.

### 21.11 INCOME FROM ACCOUNTING SERVICES — 1995–96

Type of accounting service	Value \$m	Contribution to total %
Auditing	895.9	20.3
General business and personal accounting	1 311.6	29.8
Insolvency, reconstruction	236.3	5.4
Investment financial planning advice	167.1	3.8
Taxation	1 574.6	35.7
Other accounting services	221.7	5.0
<b>Total</b>	<b>4 407.2</b>	<b>100.0</b>

Source: *Legal and Accounting Services, Australia, 1995–96* (8678.0).

The consultant engineering services industry employed a total of 30,736 persons at 30 June 1996, of which full-time employment accounted for 83% (25,384 persons). Employment in the industry at 30 June 1996 represented a 9% increase from 30 June 1993. In addition to 30,736 employed persons, a further 8,212 persons were working on a contract or agency basis in the industry at 30 June 1996. The number of staff working on this basis more than doubled in the three years from June 1993, when there were 3,954 contract and agency staff. Overall 38,948 persons were working in the industry at 30 June 1996, an increase of 21% on the June 1993 figure.

The 5,514 businesses operating at 30 June 1996 generated total income of \$3,233m and had expenses of \$2,736m. The main sources of income were civil engineering (\$505m), mining and geotechnical engineering services (\$463m), and building/structural engineering services (\$391m). The main items of expense were labour costs and payments to contractors and agency staff, which together accounted for 64% of all expenses in 1995–96.

The consultant engineering services industry recorded an operating profit before tax of \$351m for the 1995–96 financial year, which represented an operating profit margin of 11%. This was a significant increase on the profit margin (6.7%) recorded in 1992–93.

Businesses in the consultant engineering services industry were concentrated in four states. Businesses operating in New South Wales accounted for 28% of total income, while Victoria (29%), Queensland (18%), and Western Australia (18%) were the other significant contributors.

### 21.12 CONSULTANT ENGINEERING SERVICES INDUSTRY

	Units	1992–93	1995–96
Businesses at 30 June	no.	5 454	5 514
Employment at 30 June			
Full-time	persons	23 244	25 384
Part-time	persons	4 964	5 352
Total	persons	28 208	30 736
Contract and agency staff	persons	3 954	8 212
Total income	\$m	2 358	3 233
Expenses			
Labour costs	\$m	971	1 242
Payments to contract and agency staff	\$m	449	499
Other expenses	\$m	782	996
Total	\$m	2 202	2 736
Operating profit before tax	\$m	156	351
Operating profit margin	%	6.7	11.0

Source: *Consultant Engineering Services, Australia* (8693.0).

### Legal services

At 30 June 1999 there were 11,026 organisations involved in the legal services industry. The large majority (98%) of these organisations were either solicitor practices (7,115 organisations) or barrister practices (3,704 organisations). The remaining organisations comprised 39 patent attorney businesses, 9 government solicitors, 8 legal aid authorities and 152 community legal centres.

The 7,115 solicitor practices (table 21.13) operating at 30 June 1999 represented an increase of 11% on the 6,403 practices operating at 30 June 1996. Employment within solicitor practices increased by 10% over the same period, with 67,278 persons employed at 30 June 1999. There were 25,044 qualified solicitors and barristers working in solicitor practices at 30 June 1999. Other persons working for solicitor practices were para legals (6,383 persons), articulated clerks (1,894 persons) and other staff (33,957 persons). On average there were 1.7 other staff for every qualified solicitor.

During 1998–99, solicitor practices generated \$6,192m in income, representing an average gross income per practice of \$870,200. The main sources of income were from commercial law (\$1,821m), property law (\$1,152m) and personal injury law (\$966m). These three fields of law accounted for 64% of solicitor practice income.

The total expenses of solicitor practices during 1998–99 were \$4,252m, a 19% increase on the figure for 1995–96. Labour costs (\$2,132m) accounted for 50% of total expenses. The major components of labour costs were wages and salaries paid to solicitors and barristers of \$805m (representing \$63,300 per employed solicitor/barrister) and wages and salaries paid to other employees of \$1,153m (representing \$27,300 per other employee).

After expenses, the operating profit before tax of solicitor practices during 1998–99 was \$1,940m. The operating profit margin in 1998–99 was 31.4%, a small increase on the operating profit margin of 27.5% in 1995–96.

During 1998–99 solicitor practices spent 1,782,000 hours on pro bono work, made up of 826,000 hours providing legal services without expecting a fee, 835,200 hours providing legal services at a reduced fee and 120,300 hours of involvement in free community legal education and law reform work.

### 21.13 SOLICITOR PRACTICES

	Units	1995–96	1998–99
Practices at 30 June	no.	6 403	7 115
Employment at 30 June			
Qualified solicitors/barristers	persons	23 495	25 044
Other	persons	37 555	42 234
Total	persons	61 051	67 278
Income			
Income from legal services			
Commercial and finance	\$m	1 509.0	2 194.3
Property	\$m	1 022.2	1 152.3
Personal injury	\$m	735.8	966.4
Family	\$m	275.4	279.1
Other	\$m	985.2	1 235.1
Total	\$m	4 527.7	5 827.2
Other income	\$m	307.9	364.3
Total	\$m	4 835.6	6 191.5
Expenses			
Labour costs	\$m	1 816.5	2 131.7
Other expenses	\$m	1 757.6	2 120.0
Total	\$m	3 574.1	4 251.7
Operating profit before tax	\$m	1 325.1	1 939.8
Operating profit margin	%	27.5	31.4

Source: *Legal Services Industry, Australia* (8667.0).

At 30 June 1999 there were 3,704 barrister practices, an 11% increase over the number of practices operating at 30 June 1996 (table 21.14). At 30 June 1999 there were 5,908 persons working in barrister practices. In terms of employment, all barrister practices were small businesses, with average employment per practice of 1.6 persons. There were 3,704 qualified barristers, the remainder being support staff. Males comprised 89% of barristers.

Barrister practices generated \$843m in income during 1998–99, a 23% increase on the \$687m generated in 1995–96.

The main sources of income for barrister practices in 1998–99 were from personal injury law (\$235m), commercial law (\$228m), and criminal law (\$89m). Significant income was also sourced from administrative and constitutional law (\$54m), family law (\$43m), banking and finance law (\$38m), intellectual property law (\$33m) and property law (\$31m).

Total expenses of barrister practices during 1998–99 were \$299m. The two major expenses were chamber fees of \$54m and labour costs of \$49m. The operating profit before tax of these practices was \$544m, which represented an operating profit margin of 64.7%. This compares with an operating profit margin of 60.5% in 1995–96.

### 21.14 BARRISTER PRACTICES

	Units	1995–96	1998–99
Practices at 30 June	no.	3 350	3 704
Employment at 30 June	persons	5 779	5 908
Income			
Income from legal services			
Personal injury	\$m	161.1	234.9
Commercial and finance	\$m	273.1	266.4
Criminal	\$m	63.0	89.0
Other	\$m	174.9	247.0
Total	\$m	672.1	837.3
Other income	\$m	14.6	5.5
Total	\$m	686.7	842.8
Expenses			
Labour costs	\$m	66.5	49.3
Other expenses	\$m	220.9	249.8
Total	\$m	287.4	299.2
Operating profit before tax	\$m	411.7	543.6
Operating profit margin	%	60.5	64.7

Source: *Legal Services Industry, Australia* (8667.0).

### Real estate services

The real estate services industry covers businesses mainly engaged in valuing, purchasing, selling (by auction or private treaty), managing or renting real estate on behalf of other people. The most recent survey of the industry was in respect of 1998–99.

There were 7,589 private sector businesses in the real estate services industry at 30 June 1999 (table 21.15). This represented a fall of 6% in the three-year period since June 1996. At 30 June 1999 there were 52,079 persons employed in the industry, a decrease of 5% on the June 1996 figure. The industry comprised 21,276 sales staff (41% of total employment), 9,439 property managers (18%), 2,399 leasing staff (5%), 1,581 valuers (3%) and 17,384 other staff, who were mainly administrative staff. Female staff (28,167 persons) accounted for 54% of total industry employment at 30 June 1999, compared to 49% at 30 June 1996.

During 1998–99, private sector businesses in the real estate services industry generated \$3,903m in income, an increase of 19% on the 1995–96 figure. Most income (64%) was derived from property sales and leasing commissions. The other major source of income was property management commissions, which accounted for 24% of total income. After expenses, the industry had an operating profit before tax of \$465m. This represented an operating profit margin of 12%, significantly higher than the operating profit margin (8.2%) recorded in 1995–96.

Businesses in the real estate services industry were concentrated in four states. In 1998–99, New South Wales accounted for 34% of total income, while Victoria (26%), Queensland (19%) and Western Australia (12%) were also major contributors.

In conjunction with the survey of real estate services, the ABS conducted its first survey of government valuer-general organisations, in respect of 1998–99. Results of this survey are presented in table 21.16.

At 30 June 1999, there were 9 government valuer-general organisations, employing 979 persons, of which 602 worked as valuers.

The large majority (96%) of total income (\$131m during 1998–99) came from property valuations, which also included government funding for this valuation activity. Of the total expenses of \$126m, 42% was attributable to labour costs. Other major

expenses were contract payments to private sector valuers (\$23m) and corporate overhead payments (\$19m).

#### 21.15 REAL ESTATE SERVICES INDUSTRY

	Units	1995–96	1998–99
<b>Businesses at 30 June</b>			
Real estate agency	no.	n.a.	6 216
Property valuation service	no.	n.a.	429
Conveyancing	no.	n.a.	463
Other	no.	n.a.	481
<i>Total</i>	<i>no.</i>	<i>8 079</i>	<i>7 589</i>
<b>Employment at 30 June</b>	persons	54 817	52 079
<b>Income from property</b>			
Sales and leasing commissions	\$m	2 018.8	2 502.8
Management commissions	\$m	855.7	925.0
Other income	\$m	412.9	475.0
<i>Total</i>	<i>\$m</i>	<i>3 287.5</i>	<i>3 902.7</i>
<b>Expenses</b>			
Labour costs	\$m	1 600.1	1 847.5
Other expenses	\$m	1 422.9	1 590.2
<i>Total</i>	<i>\$m</i>	<i>3 023.1</i>	<i>3 437.7</i>
Operating profit before tax	\$m	264.4	465
<b>Operating profit margin</b>	%	8.2	12.0

Source: Real Estate Services Industry, Australia (8663.0).

#### 21.16 GOVERNMENT VALUER-GENERAL ORGANISATIONS — 1998–99

	Units	Value
<b>Organisations at 30 June</b>	no.	9
<b>Employment at 30 June</b>		
Permanent full-time	persons	865
Permanent part-time	persons	37
Casual/temporary	persons	77
<i>Total</i>	<i>persons</i>	<i>979</i>
<b>Income</b>		
Income from property valuations	\$m	125.5
Other income	\$m	5.4
<i>Total</i>	<i>\$m</i>	<i>130.9</i>
<b>Expenses</b>		
Labour costs	\$m	53.4
Other expenses	\$m	72.6
<i>Total</i>	<i>\$m</i>	<i>126.0</i>

Source: Real Estate Services Industry, Australia, 1998–99 (8663.0).

## Market research services

The ABS conducted its first survey of the market research services industry in respect of 1998–99. The industry is composed of businesses mainly engaged in providing market research services, but excludes businesses mainly providing business consulting services and/or marketing services.

At 30 June 1999 there were 272 businesses in the industry, of which 224 businesses mainly provided market research consultancy services, and 48 businesses mainly provided field work services supporting other businesses in the industry (table 21.17).

At 30 June 1999 there were 10,744 persons working in the market research services industry, including 1,580 consultants, researchers and data analysts with an average salary of \$60,900. In comparison, the average salary of the 9,164 other employees was \$9,000, reflecting the very high incidence (75%) of casual staff.

During 1998–99 total income within the market research services industry was \$456m, the key components being quantitative research (\$307m) and qualitative research, which accounted for \$104m. Labour costs (\$203m) represented 53% of total expenses (\$384m). An operating profit before tax of \$72m in 1998–99 represented an operating profit margin of 15.9%.

During 1998–99 total income from market research activity was \$439m (96% of total income). Table 21.18 shows that 144 businesses in the industry received income of \$98m from market research in fast moving consumer goods. The other main spheres of work were retail with 126 businesses receiving \$62m, and finance and insurance services with 132 businesses receiving \$56m.

In 1998–99 the market research services industry was concentrated in New South Wales, with 59% of market research businesses operating in that state and accounting for 50% of total industry employment and 53% of total industry income. The only other state with substantial market research activity was Victoria, which accounted for 31% of total industry employment and 31% of total industry income.

## 21.17 MARKET RESEARCH SERVICES INDUSTRY — 1998–99

	Units	Value
<b>Businesses at 30 June</b>		
Market research consultancy businesses	no.	224
Field work for market research consultancy businesses	no.	48
<b>Total</b>	no.	272
<b>Employment at 30 June</b>		
Consultants, researchers and data analysts	persons	1 580
Administrative support	persons	651
Data collection/processing	persons	8 414
Other	persons	98
<b>Total</b>	persons	10 744
<b>Income</b>		
Income from market research services		
Qualitative research	\$m	104.2
Quantitative research	\$m	306.5
Other (including desk research)	\$m	28.1
<b>Total</b>	\$m	438.8
Other income	\$m	16.9
<b>Total</b>	\$m	455.8
<b>Expenses</b>		
Labour costs	\$m	203.4
Other expenses	\$m	180.5
<b>Total</b>	\$m	383.9
Operating profit before tax	\$m	71.9
<b>Operating profit margin</b>	%	15.9

Source: *Market Research Services, Australia, 1998–99* (8556.0).

## 21.18 INCOME FROM MARKET RESEARCH, By sphere of work — 1998–99

	Businesses at end June(a)		Value
	no.	\$m	
Fast moving consumer goods	144	97.5	
Retail (excluding fast moving consumer goods)	126	62.2	
Tourism and hospitality	83	22.0	
Communication and information technology	122	31.4	
Automotive	66	18.1	
Utilities	73	17.6	
Finance and insurance services	132	56.1	
Health and pharmaceutical	118	43.1	
Media	61	40.6	
Other	127	50.1	
<b>Total</b>	<b>272</b>	<b>438.8</b>	

(a) Businesses may have more than one sphere of work. Therefore, the counts of businesses for each sphere of work do not sum to the total.

Source: *Market Research Services, Australia, 1998–99* (8556.0).

## Selected business services

### Hire industries

The ABS conducted its first survey of the hire industries in respect of 1999–2000. The hire industries included the plant hiring and leasing industry, and the personal and household goods hiring industry. Excluded from this survey were: non-employing businesses, businesses mainly retailing plant and goods which also hire plant and goods as a secondary activity, businesses mainly hiring transport equipment, and businesses which mainly hire plant and equipment with an operator. However, because of the close alignment of crane hire to the plant hiring and leasing industry, all employing businesses mainly involved in the hire of cranes were included.

At 30 June 2000, there were 1,332 employing businesses involved in the two hiring industries, comprising 923 businesses in the plant hiring and leasing industry and 409 businesses in the personal and household goods hiring industry (table 21.19).

Employment of the two hiring industries at the end of June 2000 was 16,728, with 13,235 persons working in the plant hiring and leasing industry and 3,493 persons in the personal and household goods hiring industry. Persons employed on a permanent full-time basis made up the majority of employment in both industries, with the plant hiring and leasing industry having 10,494 persons (79%) employed on this basis, and the personal and household goods hiring industry showing 2,119 persons (61%) working on a permanent full-time basis. The average labour costs per employee for the two industries were \$44,700. The higher incidence of permanent full-time employees in the plant hiring and leasing industry resulted in an average labour cost per employee of \$48,300. In comparison, the personal and household goods hiring industry showed an average labour cost per employee of \$30,700.

During 1999–2000, the total income for businesses in the two hiring industries was \$2,606m, with income received from the provision of hire services being the most significant source of income for both industries. Businesses in the plant hiring and leasing industry generated \$1,890m from the provision of hire services, which included income from the hiring of scaffolding (\$237m), access equipment (\$187m), cranes (\$162m), earthmoving equipment (\$162m), forklifts (\$107m), compaction equipment (\$98m), portable

accommodation (\$82m) and air equipment (\$74m). Income from hire services for the personal and household goods hiring industry was \$333m, with the main sources of income coming from the hire of televisions, radios, VCRs and related equipment (\$122m), event/exhibition goods and equipment (\$74m) and whitegoods (\$49m).

During 1999–2000, businesses in the plant hiring and leasing, and personal household goods hiring industries incurred total expenses of \$2,314m, the most significant being labour costs of \$732m (32% of total expenses). Total expenses for the plant hiring and leasing industry were \$1,986m, and after labour costs (\$630m), the most significant expenses were depreciation of plant and equipment for hire (\$244m) and repair and maintenance of hire equipment (\$154m). The total expenses of the personal and household goods hiring industry were \$327m, with labour costs of \$102m representing 31% of total expenses. Other significant expenses for this industry were depreciation of plant and equipment for hire (\$58m), rental of premises (\$17m) and repair and maintenance of hire equipment (\$14m).

For 1999–2000, the two hire industries combined recorded an operating profit margin of 9.9%. Businesses in the plant hiring and leasing industry had an operating profit margin of 10.4%, compared to 7.2% in the personal and household goods hiring industry.

### Business events venues

The first census of businesses involved in the business events venues industry was conducted in respect of the 2000–01 financial year. For the purposes of these statistics, the business events venues industry has been defined as businesses and establishments which provided space to stage business events for 500 or more delegates. These business events included conferences, conventions, exhibitions and other business meetings of a commercial, financial, technological or scientific nature. As such, venues which mainly held social and entertainment events were excluded.

At 30 June 2001, there were 121 businesses within the scope of the business events industry, comprising 13 convention/exhibition businesses and 108 businesses with other business events venues such as accommodation, casinos and showground businesses. These 121 businesses contained 1,495 lettable rooms with event floor space of 657,011 square metres (table 21.20).

## 21.19 HIRE INDUSTRIES — 1999–2000

	Units	Plant hiring and leasing	Personal and household goods hiring	Total hire industries
Businesses at 30 June	no.	923	409	1 332
Employment at end June				
Working proprietors and partners	persons	*191	171	362
Employees				
Permanent full-time	persons	10 494	2 119	12 613
Permanent part-time	persons	513	330	843
Casual	persons	2 037	873	2 910
Total	persons	13 044	3 322	16 366
Total	persons	13 235	3 493	16 728
Income				
Hire services				
Hired to business sector	\$m	1 791.5	158.8	1 950.3
Hired to households for personal use	\$m	98.5	174.4	272.9
Total	\$m	1 890.0	333.2	2 223.2
Other goods and services	\$m	306.5	18.9	325.4
Other	\$m	49.2	8.2	57.4
Total	\$m	2 245.7	360.3	2 606.0
Expenses				
Labour costs	\$m	629.9	102.1	732.0
Depreciation of plant and equipment for hire	\$m	244.0	57.6	301.6
Repair and maintenance of equipment for hire	\$m	153.8	14.0	167.8
Other	\$m	958.7	153.6	1 112.3
Total	\$m	1 986.4	327.3	2 313.7
Operating profit before tax	\$m	224.5	24.9	249.4
Operating profit margin	%	10.4	7.2	9.9

Source: Hire Industries, Australia, 1999–2000 (8567.0).

## 21.20 BUSINESS EVENTS VENUES — 2000–01

	Units	Convention/exhibition businesses	Other business events venues	Total
Businesses at end June	no.	13	108	121
Event floor space at end June	square metres	226 950	430 061	657 011
Total delegate/attendee days for events	days	7 625 157	13 262 705	20 887 862
Employment				
Permanent	persons	863	1 619	2 482
Casuals	persons	2 257	5 608	(a) 7 865
Total	persons	3 120	7 227	10 347
Income				
Food and beverage income	\$m	67.1	234.6	301.7
Venue hire	\$m	55.4	56.0	111.4
Takings from car park operations	\$m	18.1	.	18.1
Audio visual equipment income	\$m	12.4	24.9	37.4
Other	\$m	16.0	170.1	185.9
Total	\$m	169.0	485.6	654.5
Expenses				
Labour costs	\$m	88.9	120.9	209.7
Purchases	\$m	18.6	67.2	85.9
On-hire equipment expenses	\$m	4.4	22.5	26.9
Depreciation and amortisation	\$m	24.1	.	24.1
Other	\$m	43.0	31.2	74.2
Total	\$m	179.0	241.8	420.8

(a) Includes 1,543 casuals sourced from other businesses.

Source: Business Events Venues Industry, Australia, 2000–01 (8566.0).

At 30 June 2001, there were 10,347 persons working in the business events venues industry, of whom 7,865 or 76% were casuals. There were 2,482 permanent employees in the industry, comprising 863 permanent employees of convention/exhibition businesses and 1,619 permanent employees of other business events venues.

During 2000–01, the total income for the business events venues industry was \$655m, the main sources of income being food and beverage income (\$302m) and income from venue hire (\$111m). Food and beverage income accounted for \$67m (40%) of the income of convention and exhibition businesses and \$235m (48%) of income other businesses. Venue hire income was \$55m for convention and exhibition businesses, and \$56m for other business event venues. Other major income items for the business events venues industry included audio visual equipment hire (\$37m), car parking (\$18m) and on-hire income of goods and equipment (\$12m).

The total expenses during 2000–01 for the business events venues industry were \$421m, with convention/exhibition businesses and other business events venues reporting total expenses of \$179m and \$242m respectively. Half (50%) of the industry's expenses were in the form of labour costs (\$210m), with other significant expenses being purchases (\$86m), on-hire equipment expenses (\$27m) and depreciation and amortisation (\$24m).

### Cleaning services

The ABS conducted its first survey of the cleaning services industry in respect of 1998–99. The industry includes businesses mainly engaged in the cleaning of windows and building interiors, and related cleaning services. Businesses mainly involved in the cleaning of building exteriors or cleaning of carpets and curtains are excluded.

At 30 June 1999 there were 5,938 businesses in the cleaning services industry, of which 2,864 were sole proprietorships or partnerships. As shown in table 21.21, the cleaning of commercial buildings and offices was the main cleaning activity for 2,899 businesses (49% of all businesses in the industry).

At 30 June 1999, total employment in the cleaning services industry was 95,001 persons, of whom 90,267 persons (95%) worked as cleaners. Nearly half (48%) of the persons working in the industry were permanent part-time employees. Casual employees accounted for 26% and full-time

employees accounted for 22% of total employment. The remaining 5% of employment comprised working proprietors and partners.

During 1998–99 the total income of the cleaning services industry was \$2,137m, of which \$2,044m was derived from general cleaning services. Some 42% of the latter came from the cleaning of commercial buildings and offices, 16% from the cleaning of education premises, 15% from retail premises and 8% from industrial premises.

#### 21.21 CLEANING SERVICES INDUSTRY — 1998–99

	Units	Value
<b>Businesses at 30 June</b>		
Sole proprietors or partnerships	no.	2 864
Incorporated companies	no.	2 415
Trusts	no.	659
<i>Total</i>	no.	5 938
<b>Businesses by main cleaning activity</b>		
Commercial buildings/office premises	no.	2 899
Industrial premises	no.	345
Retail premises	no.	532
Domestic premises	no.	717
Event venues	no.	28
Education premises	no.	776
Hospitality premises	no.	449
Health premises	no.	85
Transport facilities	no.	38
Other	no.	69
<i>Total</i>	no.	5 938
<b>Employment at 30 June</b>		
Cleaning	persons	90 267
Other	persons	4 734
<i>Total</i>	persons	95 001
<b>Income</b>		
Income from general cleaning services		
From the private sector	\$m	1 555.4
From the public (government) sector	\$m	488.7
<i>Total</i>	\$m	2 044.1
Other income	\$m	92.9
<i>Total</i>	\$m	2 137.0
<b>Expenses</b>		
Labour costs	\$m	1 377.1
Payments to sub-contractors for general cleaning services	\$m	166.0
Purchases	\$m	100.2
Other expenses	\$m	337.9
<i>Total</i>	\$m	1 981.0
Operating profit before tax	\$m	155.5
<b>Operating profit margin</b>	%	7.3

Source: *Cleaning Services Industry, Australia, 1998–99* (8672.0).

Labour costs of \$1,377m represented 70% of total expenses (\$1,981m) of the cleaning services industry during 1998–99. The average labour costs per employee were \$15,200, which reflected the high incidence of casual and part-time employees working in the industry. After expenses, the operating profit before tax for the cleaning services industry was \$156m, representing an operating profit margin of 7.3%.

Of the 5,938 businesses in the cleaning services industry, only 101 businesses (less than 2% of all businesses) employed more than 100 persons. These large businesses accounted for 52% of industry income, and 55% of industry employment.

### Security services

The first ABS survey of the security services industry was conducted in respect of 1998–99. The industry is defined as all businesses mainly engaged in providing security, protection and private enquiry services. It excludes police services and businesses mainly providing locksmith services, alarm installing, or manufacturing and wholesaling of alarms.

At 30 June 1999 there were 1,714 businesses in the security services industry (table 21.22). The provision of static guard/crowd control services was the main activity of 811 businesses within the sector, and the provision of mobile patrol services was the main activity of 420 businesses. Of the remainder, 368 businesses were mainly involved in private investigative and enquiry services, 54 businesses in security monitoring services, and 26 businesses in cash-in-transit/armoured car services.

At 30 June 1999 there were 31,752 persons working in the security services industry. Casual employees accounted for 47% of total employment, while full-time employees and permanent part-time employees accounted for 37% and 14% respectively.

During 1998–99, the total income of the security services industry was \$1,395m. Businesses in the industry carried out a diverse range of security work, with 38% of total income generated from static guard and crowd control services, 23% from mobile patrol services and 22% from other security services including cash-in-transit and armoured car services. Other major sources of income were security monitoring services (9% of total income) and private investigator and enquiry services (4% of total income).

Expenses of \$1,304m were incurred by the security services industry during 1998–99. Labour costs of \$756m accounted for 58% of total expenses. In 1998–99, the industry recorded an operating profit before tax of \$90m, which represented an operating profit margin of 6.5%.

### 21.22 SECURITY SERVICES INDUSTRY — 1998–99

	Units	Value
Businesses by main security activity at 30 June		
Cash-in-transit/armoured car service	no.	26
Mobile patrol service	no.	420
Static guard/crowd control service	no.	811
Security monitoring service	no.	54
Private investigator/enquiry service	no.	368
Other security services	no.	35
<b>Total</b>	<b>no.</b>	<b>1 714</b>
Employment at 30 June	persons	31 752
Income		
Income from security services		
Mobile patrol service	\$m	320.9
Static guard/crowd control service	\$m	532.2
Security monitoring service	\$m	121.2
Private investigator/enquiry service	\$m	53.3
Other security services	\$m	311.6
<b>Total</b>	<b>\$m</b>	<b>1 339.2</b>
Other income	\$m	55.6
<b>Total</b>	<b>\$m</b>	<b>1 394.8</b>
Expenses		
Labour costs	\$m	756.2
Payments to sub-contractors for security services	\$m	205.9
Other expenses	\$m	341.5
<b>Total</b>	<b>\$m</b>	<b>1 303.6</b>
Operating profit before tax	\$m	89.7
<b>Operating profit margin</b>	<b>%</b>	<b>6.5</b>

Source: Security Services, Australia, 1998–99 (8557.0).

At 30 June 1999 there were 19 businesses in the security services industry employing 100 persons or more. These businesses accounted for 54% of industry employment and 63% of industry income in 1998–99; the operating profit before tax of these large businesses was \$68m, accounting for 76% of the industry's operating profit before tax.

## Employment services

The first ABS survey of the employment services industry was conducted in respect of 1998–99. The industry includes all businesses mainly involved in the provision of employment services such as personnel recruitment, search, selection, referral and job placement on a permanent, temporary and contract employment basis.

At 30 June 1999 there were 2,127 businesses involved in the provision of employment services (table 21.23). Of these, 1,719 (82%) were for profit, with the remainder being not-for-profit organisations. During 1998–99 there were 2,736,333 job placements made by these businesses, of which 88% were temporary and contract placements.

At 30 June 1999 there were 28,912 persons working directly for businesses in the employment services industry, with 50% of these persons working as employment consultants. A further 278,937 persons were employed by businesses in the employment services industry and were on-hired to other businesses.

During 1998–99, the total income generated by the employment services industry was \$7,818m. The main components of this income were derived from employers for persons on-hired (\$5,784m or 74%) and income derived from job network placement activity of \$595m. Income generated from employer payments for permanent placement and personnel recruitment services was \$548m.

Total expenditure of businesses in the employment services industry during 1998–99 was \$7,404m. Labour costs were the highest single expense (\$5,758m), representing 78% of total expenses. The average labour costs per person working directly for businesses in the employment services industry were \$39,500. Other significant expenses incurred by the industry were rent, leasing and hiring expenses (\$130m) and advertising expenses (\$83m).

In 1998–99 the industry recorded an operating profit/surplus before tax of \$426m, representing an operating profit margin of 5.6%.

## 21.23 EMPLOYMENT SERVICES INDUSTRY — 1998–99

	Units	Value
Businesses at 30 June	no.	2 127
Placements during the year ended 30 June		
By for profit businesses	no.	2 561 676
By not-for-profit businesses	no.	174 657
Total	no.	2 736 333
Employment at 30 June		
Persons working directly for employment placement businesses	persons	28 912
Persons on-hired to other businesses/organisations	persons	278 937
Total	persons	307 849
Income		
Income from employers for		
Permanent placement/personnel recruitment	\$m	547.5
Persons on-hired	\$m	5 783.7
Other	\$m	501.0
Total	\$m	6 832.1
Income from job network placement activity	\$m	594.6
Government funding	\$m	164.7
Other	\$m	226.3
Total	\$m	7 817.7
Expenses		
Labour costs	\$m	5 757.7
Rent, leasing and hiring expenses	\$m	130.1
Advertising expenses	\$m	82.9
Other expenses	\$m	1 433.4
Total	\$m	7 404.1
Operating profit/surplus before tax	\$m	426.1
Operating profit margin	%	5.6

Source: *Employment Services, Australia, 1998–99* (8558.0).

## Community services

The ABS conducted its second survey of community services in respect of 1999–2000, following the first survey in respect of 1995–96.

The survey covered businesses and organisations providing community services including personal and social support, financial and material assistance, job placement and support for persons with disabilities, child care, accommodation for the aged, and other residential and non-residential care in both the government and non-government sectors.

At 30 June 2000, there were 9,287 employing businesses and organisations involved in the provision of community services within the scope of the survey, representing a 15% increase on the number of employing community services businesses and organisations at 30 June 1996 (table 21.24).

The 9,287 businesses and organisations comprised 2,800 'for profit' organisations, 5,938 'not for profit' organisations and 548 government organisations. While the number of government organisations remained virtually the same since June 1996, the numbers of 'for profit' and 'not for profit' organisations increased by 32% and 10% respectively.

A total of \$12,643m was spent on community services and related activities during 1999–2000. This expenditure represented a 32% increase from 1995–96, and comprised \$10,748m of direct community service expenditure and \$1,895m of expenditure on community service-related activities. The total expenditure comprised \$2,111m by 'for profit' organisations, \$7,086m by 'not for profit' organisations and \$3,445m by government organisations.

Direct community service expenditure by these organisations increased by 28% from 1995–96. However, the increases varied by sector; expenditure by 'for profit' organisations increased by 16%, 'not for profit' organisations by 47% and government organisations by 6%.

Of the total of 9,287 organisations, there were 8,355 businesses and organisations classified to the community services industry (i.e. their main activity was the provision of community services) (table 21.25). In terms of number of organisations, the industry was dominated by child care (3,575 organisations) and non-residential care services (2,452 organisations), which accounted for 43% and 29% respectively of the number of organisations in the community services industry. The remaining industries included nursing homes (793 organisations), accommodation for the aged (690 organisations) and other residential care services (845 organisations). The 8,355 organisations represented a 16% increase since June 1996. These organisations operated from 16,519 locations, with 9,503 in capital cities and suburbs and 7,017 locations in other areas.

During June 2000, there were 558,669 persons working for community services organisations in these industries, comprising 269,022 employees at the end of June, 276,333 volunteers working at

some time during June 2000, and 13,314 contract persons. The main employing industries were the nursing homes industry (31% of the employees) and non-residential care services industry (29% of the employees). Of the total number of volunteers, 77% worked in the non-residential care services industry.

During 1999–2000, the total income of organisations in these industries was \$9,580m. The major components of income were government funding and income from direct community services provision (also referred to as fee for service income), which accounted for 58% and 24% respectively of total income. Total expenses of these community service industries came to \$9,155m, of which labour costs accounted for 64%.

The total value added of these industries was \$5,534m.

#### 21.24 COMMUNITY SERVICES

	Units	1995–96	1999–2000
<b>Organisations at 30 June</b>			
For profit organisations	no.	2 115	2 800
Not for profit organisations	no.	5 403	5 938
Government organisations	no.	540	548
<b>Total</b>	<b>no.</b>	<b>8 058</b>	<b>9 287</b>
<b>Expenditure on community service activities</b>			
<b>Direct expenditure</b>			
Personal and social support	\$m	1 456.2	2 170.4
Child care	\$m	991.0	1 156.3
Training and employment for persons with disabilities	\$m	374.1	498.5
Financial and material assistance	\$m	146.6	141.6
Residential care	\$m	4 889.1	6 091.8
Foster care placement	\$m	112.5	189.9
Statutory protection and placement	\$m	196.2	232.8
Juvenile and disability corrective services	\$m	191.7	246.4
Other direct community services activities	\$m	33.6	20.4
<b>Total</b>	<b>\$m</b>	<b>8 390.8</b>	<b>10 748.1</b>
Community services related activities	\$m	1 209.0	1 894.6
<b>Total</b>	<b>\$m</b>	<b>9 599.9</b>	<b>12 642.7</b>

Source: Community Services, Australia (8696.0).

## 21.25 COMMUNITY SERVICES INDUSTRY — 1999–2000

	Units	Nursing homes	Child care services	Accommodation for the aged	Residential care services n.e.c.	Non-residential care services n.e.c.	Total
<b>Businesses/organisations at 30 June</b>							
For profit organisations	no.	452	2 002	164	126	51	2 795
Not for profit organisations	no.	341	1 573	526	719	2 400	5 559
<i>Total</i>	<i>no.</i>	<i>793</i>	<i>3 575</i>	<i>690</i>	<i>845</i>	<i>2 452</i>	<i>8 355</i>
<b>Locations at 30 June</b>							
Capital cities and suburbs	no.	1 015	2 836	873	1 123	3 655	9 503
Other areas	no.	678	1 595	583	865	3 296	7 017
<i>Total</i>	<i>no.</i>	<i>1 693</i>	<i>4 431</i>	<i>1 455</i>	<i>1 989</i>	<i>6 951</i>	<i>16 519</i>
<b>Persons working at 30 June</b>							
<b>Employment</b>							
Direct service delivery	no.	75 298	38 346	35 569	19 022	52 446	220 681
Other	no.	9 221	2 763	6 833	3 136	26 388	48 341
<i>Total</i>	<i>no.</i>	<i>84 519</i>	<i>41 109</i>	<i>42 402</i>	<i>22 158</i>	<i>78 834</i>	<i>269 022</i>
Volunteers for the month of June	no.	15 751	11 344	16 877	20 620	211 741	276 333
Contract workers	no.	2 242	2 492	2 068	1 189	5 322	13 314
<i>Total</i>	<i>no.</i>	<i>102 512</i>	<i>54 945</i>	<i>61 347</i>	<i>43 967</i>	<i>295 897</i>	<i>558 669</i>
<b>Income</b>							
Government funding	\$m	2 195.8	463.1	878.9	568.0	1 415.9	5 521.7
Fee for service	\$m	822.7	572.8	510.2	113.5	319.2	2 338.4
Other income	\$m	157.1	24.8	171.2	116.4	1 249.9	1 719.4
<i>Total</i>	<i>\$m</i>	<i>3 175.6</i>	<i>1 060.7</i>	<i>1 560.3</i>	<i>797.9</i>	<i>2 985.0</i>	<i>9 579.5</i>
<b>Expenses</b>							
Labour costs	\$m	2 158.2	697.4	950.2	527.1	1 521.7	5 854.6
Other expenses	\$m	873.1	311.0	525.3	245.9	1 345.0	3 300.2
<i>Total</i>	<i>\$m</i>	<i>3 031.3</i>	<i>1 008.4</i>	<i>1 475.5</i>	<i>773.0</i>	<i>2 866.7</i>	<i>9 154.9</i>
Operating profit before tax	\$m	144.3	*52.3	84.7	*24.9	118.3	424.6
Operating profit margin	%	4.5	4.9	5.4	*3.1	4.0	4.4
Industry value added	\$m	2 351.1	778.1	1 029.8	495.4	879.5	5 533.9

Source: Community Services, Australia, 1999–2000 (8696.0).

## Libraries, museums, commercial art galleries and botanic gardens

### Libraries

The ABS conducted a survey of public libraries in respect of 1999–2000, following a survey of libraries in respect of 1996–97. The survey included local government libraries, national and state libraries, and archival service organisations. The 1996–97 survey differed from the 1999–2000 survey in that it included libraries in the industry other than public libraries (the latter were covered by the 1999–2000 survey). Excluded from the 1999–2000 collection were libraries with restricted access such as those operated by educational institutions (universities and schools), and libraries operated by businesses and organisations for internal reference purposes.

At 30 June 2000, there were 505 local government library organisations with 1,510 library locations, 8 national and state library organisations with 26 locations, and 8 national and state archive organisations with 27 locations. During 1999–2000, there were 99.4 million visits to local government, national and state libraries, with visits to local government libraries accounting for 94% of this figure (93.3 million visits) (table 21.26).

The total library holding stock of these organisations was 54.3 million books and other library materials at the end of June 2000, of which 36.4 million were available as lending stock and 17.9 million as non-lending stock.

In total, 12,596 employees worked for libraries and archives at the end of June 2000, with 9,592 persons (76%) employed by local government

libraries. Of the 12,596 employees, 3,513 persons (28%) were employed as qualified librarians and archivists.

Total income of the industry in 1999–2000 was \$792m. The great majority of income was from government funding, which accounted for \$725m or 91% of total income. Expenses incurred by the industry totalled \$767m, with wages and salaries of \$362m accounting for 47% of all expenses.

### Museums

The most recent survey of the museums industry was conducted in respect of financial year 1999–2000. This survey differed from those conducted in respect of 1996–97 and 1997–98 in that the 1999–2000 survey attempted to cover all museum establishments, whereas previous surveys were both of limited scope. For the purpose of the 1999–2000 survey, a museum establishment was defined as an enclosed area which stored artefacts, artworks and museum objects and which was open to the general public.

At 30 June 2000, there were 2,049 museum establishments in Australia, of which 1,188 (58%) were operated on a volunteer basis (table 21.27).

The 2,049 museums contained a total of 61.6 million artefacts, artworks and museum objects at 30 June 2000, and were visited by 27.5 million visitors during 1999–2000. The majority of admissions to museums were free of charge (60%) and, on average, museums were open for 30 hours per week during 1999–2000.

At 30 June 2000, there were 37,402 persons working in museums, comprising 6,956 persons directly employed by the museums, 29,963 volunteers and 484 persons paid by other (related) organisations. The volunteers worked a total of 379,110 hours during June 2000, representing an average of 13 hours per volunteer for the month.

During 1999–2000, museums accrued a total of \$716m in income. The main sources were government funding (\$487m), fundraising income (\$54m) and admissions income (\$52m).

Of the \$643m incurred in expenses by museums during 1999–2000, labour costs were the most significant at \$233m (36% of total expenses). Other major expenses for museum establishments included depreciation and amortisation (\$45m), repair and maintenance expenses (\$43m), and exhibition/display development costs (\$25m).

### 21.26 PUBLIC LIBRARIES — 1999–2000

	Units	Local government libraries	National and state libraries	National and state archives	Total
Organisations at 30 June	no.	505	8	8	521
Locations at 30 June	no.	1 510	26	27	1 563
Visits to library locations	'000	93 335.1	6 063.5	n.a.	99 398.6
Library holdings					
Lending stock	'000	36 416.4	..	..	36 416.4
Non-lending stock	'000	2 963.9	14 925.0	n.a.	17 888.9
Total	'000	39 380.3	14 925.0	n.a.	54 305.3
Employees at 30 June					
Librarians and archivists	persons	2 422	732	359	3 513
Other employees	persons	7 170	1 516	397	9 083
Total	persons	9 592	2 248	756	12 596
Income					
Government funding	\$m	455.7	190.9	78.2	724.8
Income from services to clients	\$m	17.1	11.4	8.2	36.6
Other income	\$m	5.3	24.7	0.8	30.7
Total	\$m	478.0	227.0	87.2	792.2
Expenses					
Wages and salaries	\$m	244.0	88.0	30.1	362.1
Other expenses	\$m	212.5	144.1	48.2	404.8
Total	\$m	456.4	232.1	78.3	766.9

Source: *Public Libraries, Australia, 1999–2000* (8561.0).

## 21.27 MUSEUMS INDUSTRY — 1999–2000

	Units	Employment size					Total
		Nil employment	1–4 persons	5–19 persons	20–99 persons	100 or more persons	
Museum/gallery establishments at 30 June	no.	1 188	461	237	84	78	2 049
Artefacts/art works/museum objects at 30 June	'000	9 960.0	8 340.1	n.p.	n.p.	36 574.9	61 635.3
Admissions during the year ended 30 June							
Paid	'000	1 379.1	1 676.1	2 660.6	1 709.3	3 540.6	10 965.7
Free	'000	3 623.3	1 574.3	4 235.4	1 213.4	5 919.9	16 566.1
Total	'000	5 002.4	3 250.4	6 895.8	2 922.7	9 460.5	27 531.8
Average hours per week museum/gallery open during year ended 30 June	no.	23.6	38.2	38.9	40.6	50.2	30.4
Total employment paid by the museum/gallery at 30 June	persons	—	822	1 198	1 098	3 838	6 956
Employees paid by a related organisation at 30 June	persons	364	*80	40	—	—	484
Volunteers during the month of June	persons	14 570	6 045	4 490	1 888	2 970	29 963
Volunteer hours worked per volunteer during the month of June	no.	11.8	14.6	13.5	14.7	10.5	12.7
Income							
Government funding	\$m	4.4	24.3	51.5	38.9	368.2	487.2
Fundraising income	\$m	1.8	3.9	8.0	14.0	25.7	53.5
Admissions income	\$m	2.9	5.9	9.6	9.4	24.6	52.4
Sales of goods	\$m	1.6	*4.1	7.8	*8.3	29.9	51.7
Other income	\$m	1.6	4.8	*10.8	13.3	41.0	71.6
Total	\$m	12.3	43.0	87.7	83.9	489.4	716.4
Expenses							
Labour costs	\$m	—	17.2	30.1	29.3	156.7	233.4
Depreciation and amortisation	\$m	*0.3	*1.9	2.8	5.3	35.0	45.3
Repair and maintenance(a)	\$m	*3.5	*4.2	*5.5	8.0	21.9	43.2
Exhibition/display development costs	\$m	*0.9	3.1	6.2	1.9	12.8	24.9
Other expenses	\$m	5.7	15.7	21.1	32.2	221.1	295.7
Total	\$m	10.4	42.1	65.7	76.7	447.5	642.5

(a) Includes conservation expenses of artefacts, artworks and museum objects.

Source: *Museums, Australia, 1999–2000 (8560.0)*.

### Commercial art galleries

The ABS conducted the second survey of the commercial art galleries industry in respect of 1999–2000, following an earlier collection in respect of 1996–97. The businesses included in the survey were those mainly engaged in the display and sale of artworks, including Aboriginal and Torres Strait Islander art centres. The survey did not cover direct sales by the artist, or sales of artworks by auction houses, art museums, department stores, etc.

At the end of June 2000, there were 514 commercial art gallery businesses operating in Australia. Commercial art gallery businesses employed 1,409 persons, with females accounting for 61% of total persons employed (table 21.28).

The total income of commercial art gallery businesses in 1999–2000 was \$132m. Income from the sale of artworks owned by the business was \$73m (55% of total income), while commission income from the sale of artworks (selling artworks on behalf of others) was \$43m, or 33% of total income.

Commercial art gallery businesses incurred total expenses of \$122m during 1999–2000, the most significant expense being the purchase of artworks for resale at \$44m (36% of total expenses).

The total value of artworks sold by commercial art gallery businesses in 1999–2000 was \$218m. Artworks sold on commission accounted for \$145m; Aboriginal and Torres Strait Islander artists artworks sold for \$36m; while the sale of artworks of other Australian artists raised \$168m.

### 21.28 COMMERCIAL ART GALLERIES INDUSTRY — 1999–2000

	Units	Value
Businesses at 30 June	no.	514
Employment at end June		
Males	no.	552
Females	no.	857
Persons	no.	1 409
Income		
Commission income from the sales of artworks	\$m	43.4
Income from sales of artworks owned by the business	\$m	72.7
Other income	\$m	15.6
Total	\$m	131.8
Cost of artworks sold		
Purchases of artworks for resale plus opening inventories of artworks	\$m	44.4
less closing inventories of artworks	\$m	33.1
Total	\$m	45.3
Other expenses		
Wages and salaries(a)	\$m	22.0
Other	\$m	55.7
Total	\$m	77.7
Operating profit before tax	\$m	*8.8
Operating profit margin	%	*7.0

(a) Excludes drawings of working proprietors and partners of unincorporated businesses.

Source: *Commercial Art Galleries, Australia, 1999–2000* (8651.0).

### Botanic gardens

The ABS conducted its second survey of botanic gardens in respect of 1999–2000, following a previous collection in respect of 1996–97. The information relates to employing businesses and statutory authorities, the main activity of which was the operation of a botanic garden, herbarium or arboretum. In addition, botanic garden activities of Commonwealth and state government departments and local government authorities which employ staff to operate and maintain botanic gardens were included in the collection. However, non-employing organisations operating botanic gardens were excluded.

At 30 June 2000, there were 72 employing organisations operating botanic gardens. These organisations operated from 123 locations, comprising 74 mainly botanic gardens, 24 arboreta and 25 herbaria. During 1999–2000 there were 11.8 million visits to botanic gardens (table 21.29).

There were 1,250 employees and 1,991 volunteers working for botanic gardens at 30 June 2000, a total workforce of 3,241 persons. The number of volunteers increased by 33% between 1996–97 and 1999–2000 while the number of employees increased by only 11% during this time. The main employment groupings of employees were curatorial, horticultural and gardening (692 persons), managerial and administrative (186 persons), educational, public relations and retail sales (183 persons) and specialists and research (158 persons).

The total income of botanic gardens during 1999–2000 was \$92m, income from government funding (\$73m) accounting for 80% of their total income. Other significant sources of income were fundraising (\$5m) and rent, leasing and hiring income (\$4m).

During 1999–2000, botanic gardens had total expenses of \$82m, the major expense being labour costs of \$50m, of which wages and salaries accounted for \$44m. Other major expenses included depreciation and amortisation (\$6m), repair and maintenance expenses (\$5m) and electricity, gas and water charges (\$3m).

### 21.29 BOTANIC GARDENS

	Units	1996–97	1999–2000
Organisations at 30 June	no.	53	72
Locations at end June			
Botanic gardens	no.	64	74
Arboreta	no.	19	24
Herbaria	no.	20	25
Total	no.	103	123
Employees at end June	no.	1 129	1 250
Volunteers during June	no.	1 493	1 991
Number of visits	millions	n.a.	11.8
Income			
Government funding	\$m	70.9	73.4
Other income	\$m	11.8	18.4
Total	\$m	82.7	91.8
Expenses			
Wages and salaries	\$m	40.7	44.0
Other expenses	\$m	29.5	37.5
Total	\$m	70.2	81.5

Source: *Botanic Gardens, Australia* (8563.0).

## Film, video and television industries

### Film and video production

The ABS conducted its third survey of the film and video production industry in respect of 1999–2000. Previous surveys were conducted in respect of 1993–94 and 1996–97. This industry covers businesses mainly engaged in the production of motion pictures on film or video tape for theatre or television projection. Also included are businesses mainly providing post-production services such as dubbing, sub-titling and editing.

At 30 June 2000 there were 1,975 businesses in the film and video production industry, a slight fall from the 2,004 businesses operating at 30 June 1997 (table 21.30). While the number of businesses decreased marginally, employment increased by 58% to 15,195 persons over the three years from 30 June 1997. It should be noted that employment in the industry at the end of June can fluctuate depending on the productions underway at that time.

The film and video industry generated \$1,474m in total income for 1999–2000, an increase of 24% on 1996–97 income of \$1,185m. The main source of income was from the production of television programs, at \$472m (32% of total industry income). Income from the provision of post-production/laboratory services was \$263m (18% of total income), while income from the provision of production services to other businesses was \$233m (16% of total income).

Expenses for the industry during 1999–2000 totalled \$1,398m, the most significant expenses being wages and salaries of \$374m and payments to other businesses for production services of \$251m.

The industry recorded an operating profit before tax of \$77m, representing an operating profit margin of 5.6% for 1999–2000. This can be compared with the small negative operating profit margin for 1996–97.

The main activity of businesses in the industry was making productions specifically for television (\$516m), accounting for 55% of the total value of production activity in 1999–2000 (\$945m) (table 21.31). The other major activities were the production of commercials and advertisements

(\$194m), and feature films (\$149m), which accounted for 21% and 16% respectively of the total value of activity.

### 21.30 FILM AND VIDEO PRODUCTION INDUSTRY

	Units	1996–97	1999–2000
Businesses at 30 June	no.	2 004	1 975
Total employment at 30 June	persons	9 591	15 195
<b>Income</b>			
Production of television programs	\$m	377.8	472.2
Provision of production services to other businesses	\$m	122.3	233.1
Provision of post-production/laboratory services	\$m	146.6	262.6
Other income	\$m	537.8	505.9
<b>Total</b>	<b>\$m</b>	<b>1 184.5</b>	<b>1 473.8</b>
<b>Expenses</b>			
Wages and salaries	\$m	335.7	373.5
Payments to other businesses for production services	\$m	199.8	250.8
Other expenses	\$m	726.1	773.6
<b>Total</b>	<b>\$m</b>	<b>1 261.6</b>	<b>1 397.9</b>
Operating profit/loss before tax	\$m	-77.0	76.5
Operating profit margin	%	-0.1	5.4

Source: *Film and Video Production and Distribution, Australia (8679.0)*.

### 21.31 FILM AND VIDEO PRODUCTION COSTS — 1999–2000

Type of activity	Value	Contribution to total
	\$m	%
Productions made specifically for television	516.0	54.6
Commercials and advertisements	194.9	20.6
Feature films	148.6	15.7
Corporate/marketing/training videos	45.0	4.8
Documentaries	4.3	0.5
Music/video clips	3.2	0.3
Other	32.3	3.4
<b>Total</b>	<b>944.3</b>	<b>100.0</b>

Source: *Film and Video Production and Distribution, Australia, 1999–2000 (8679.0)*.

## Film and video distribution

In conjunction with the survey of the film and video production industry, the ABS also conducted its third survey of the film and video distribution industry in respect of 1999–2000. The survey covered employing businesses mainly engaged in leasing or wholesaling motion pictures on film, video tape or DVD to organisations for exhibition or sale. It also included businesses that provided pre-packaged programs to pay television operators.

At the end of June 2000 there were 58 businesses operating in the film and video distribution industry, a fall from the 66 businesses operating at the end of June 1997 (table 21.32). There were 1,426 persons working in the industry at the end of June 2000, an increase of 6% over employment at 30 June 1997. The majority of persons (74%) in the industry worked on a permanent, full-time basis.

The total income for the industry was \$1,142m during 1999–2000, an increase of 17% on the \$974m recorded for 1996–97. The two main sources of income were from the rental or lease of pre-recorded video tapes, DVDs, films and video games (\$581m), which accounted for 51% of industry income, and sales of pre-recorded video tapes and DVDs (\$260m), which accounted for 23% of total income.

Businesses in the film and video distribution industry had total expenses of \$1,038m. The three major expenses were copyright fees and licences of \$236m (23% of total expenses), advertising expenses of \$127m and program rights used of \$124m (each 12%).

During 1999–2000, the film and video distribution industry recorded an operating profit before tax of \$104m, a significant increase on \$3m for 1996–97.

## Motion picture exhibition

The most recent survey of the motion picture exhibition industry was conducted in respect of 1999–2000. This was the fifth time the ABS surveyed the industry, and while the most recent three surveys have shown a decline in the number of businesses, other indicators such as the number of cinema screens, paid admissions and employment have all shown steady increases. This has been primarily due to the emergence of multiplex (3 to 13 screens) and megaplex (14 or more screens) sites.

At 30 June 2000 there were 173 businesses in the motion picture exhibition industry, a reduction on the 188 businesses at the end of June 1997, and the 224 businesses at the end of June 1994 (table 21.33). However, over this six-year period, the number of cinema screens increased by over 100% to 1,519, and paid admissions increased by 32% to 79.4 million. Based on the estimated resident population at June 2000, paid admissions represented 4.1 visits per person during 1999–2000, compared to 4.0 visits per person in 1996–97.

### 21.32 FILM AND VIDEO DISTRIBUTION INDUSTRY

	Units	1996–97	1999–2000
	no.	66	58
Businesses at 30 June			
Employment at 30 June			
Permanent full-time	persons	1 107	1 059
Permanent part-time and casuals(a)	persons	234	366
<i>Total</i>	<i>persons</i>	<i>1 341</i>	<i>1 426</i>
Income			
Rental/lease of pre-recorded video tapes, DVDs, films and video games	\$m	434.1	580.8
Sales of pre-recorded video tapes, DVDs, films and video games	\$m	254.3	260.3
Provision of channels to pay TV operators	\$m	156.0	169.2
Other	\$m	129.5	131.5
<i>Total</i>	<i>\$m</i>	<i>973.9</i>	<i>1 141.8</i>
Expenses			
Wages and salaries	\$m	62.1	66.8
Copyright fees/licences for film and video distribution(b)	\$m	n.a.	235.6
Advertising expenses	\$m	90.1	127.1
Program rights/licence fees used	\$m	136.1	124.4
Other expenses	\$m	682.5	484.5
<i>Total</i>	<i>\$m</i>	<i>970.8</i>	<i>1 038.4</i>
Operating profit/loss before tax	\$m	3.1	103.6
Operating profit margin	%	0.3	9.3

(a) For 1996–97, employment at end of June excluded casual employees. (b) For 1996–97, copyright fees/licences were published under licence fees.

Source: *Film and Video Production and Distribution, Australia* (8679.0).

Employment in the industry was 9,282 persons at 30 June 2000, an increase of 20% over the 7,739 persons employed at end June 1997. The majority of employees in the motion picture exhibition industry at 30 June 2000 were casuals (7,492), accounting for 81% of total employment.

Total income for the industry for the financial year 1999–2000 was \$1,046m, up 26% on 1996–97 income of \$832m. Gross box office receipts of \$679m were the most significant source of income, representing 65% of total income, while sales of food and beverages (\$176m) accounted for 17% of income.

The major expense items for the industry in 1999–2000 were wages and salaries of \$130m (14% of total expenses), and film hire and rental which accounted for \$268m or 29% of total expenses.

The industry recorded an operating profit before tax of \$113m, a 6% decrease on the 1996–97 figure (\$120m). The operating profit margin for 1999–2000 was 11.4%, on 14.9% for 1996–97 and 12.0% for 1993–94.

### Video hire

The first ABS survey of the video hire industry was conducted in respect of 1999–2000. The industry includes all businesses mainly engaged in hiring pre-recorded video cassettes and DVDs for personal use, but excludes businesses which receive only a minor part of their income from the hiring of videos, such as service stations, chemists and newsagents.

At 30 June 2000, there were 1,166 businesses in the video hire industry, operating from 1,228 locations in capital cities and suburbs and 387 locations in rural areas (table 21.34). At 30 June 2000, there were 5,499,400 active video hire store memberships, and the industry recorded 151,897,300 video rental transactions during the year ending 30 June 2000.

At 30 June 2000, there were 11,034 persons employed by the video hire industry, of whom 7,279 (66%) were employed on a casual basis. This high rate of casual employment was reflected in the average labour cost per employee of \$12,500.

### 21.33 MOTION PICTURE EXHIBITION INDUSTRY

	Units	1993–94	1996–97	1999–2000
Businesses at 30 June	no.	224	188	173
Cinema details				
Cinema sites at 30 June	no.	329	325	326
Cinema screens at 30 June	no.	754	1 050	1 513
Cinema seats at 30 June	'000	227	323	373.5
Paid admissions during year	'000	60 047	73 262	79 384.3
Drive-in theatre sites at 30 June	no.	41	28	17
Drive-in screens at 30 June	no.	52	36	27
Total employment at 30 June	no.	5 729	7 739	9 282
Income				
Gross box office receipts	\$m	447.5	551.8	678.9
Sales of food and beverages	\$m	105.0	142.1	175.9
Other income	\$m	82.8	138.3	191.3
<i>Total</i>	<i>\$m</i>	635.3	832.2	1 046.1
Expenses				
Labour costs	\$m	99.0	123.1	129.9
Film hire/rental	\$m	168.1	211.2	268.2
Other expenses	\$m	293.0	378.9	536.1
<i>Total</i>	<i>\$m</i>	560.1	713.2	934.3
Operating profit before tax	\$m	75.1	119.9	113.3
Operating profit margin	%	12.0	14.9	11.4

Source: Motion Picture Exhibition, Australia (8654.0).

Total income of the video hire industry in 1999–2000 was \$595m, with income from the rental of videos the most significant income source, accounting for \$444m (75% of total income). Other major sources were income from the rental of video games (\$38m), income from the sale of videos and video related material (\$36m) and income from the sale of food and beverages (\$40m).

The major items of expenditure for the industry during 1999–2000 were labour costs, which accounted for \$129m (23% of total expenditure), and depreciation and amortisation of \$103m (19%). Other significant expense items were the rental of premises (\$74m) and purchases of videos (\$68m).

In 1999–2000 the operating profit before tax for the video hire industry was \$42m, which translated into an operating profit margin of 7.2%.

### Television services

The ABS conducted its third survey of the television services industry in respect of 1999–2000, following earlier collections in respect of 1993–94 and 1996–97.

At 30 June 2000 there were 41 private sector television broadcasters and 2 public sector television broadcasters operating in Australia (table 21.35). The private sector television broadcasters comprised 34 commercial free-to-air broadcasting businesses and 7 pay television broadcasting businesses.

At 30 June 2000 there were 10,668 persons employed by private sector television broadcasters, of whom 7,807 persons were employed by commercial free-to-air broadcasters, and 2,861 persons were employed by pay television broadcasters.

The total income of \$4,182m of private sector broadcasters comprised \$3,271m from commercial free-to-air broadcasters and \$911m from pay television broadcasters. The major source of income received by commercial free-to-air broadcasters was the sale of airtime (\$2,821m), while the main source of income from pay television broadcasters was subscription and membership fees of \$789m.

### 21.34 VIDEO HIRE INDUSTRY — 1999–2000

	Units	Value
Businesses at end June	no.	1 166
Locations at end June		
Capital city and suburbs	no.	1 228
Total	no.	1 615
Active video hire store membership at end June	'000	5 499.4
Video rental transactions for the year ended 30 June	'000	151 897.3
Employment at 30 June		
Working proprietors and partners of unincorporated businesses	persons	741
Employees		
Permanent employees	persons	3 014
Casuals	persons	7 279
Total	persons	10 293
Total employment	persons	11 034
Income		
Income from the rental of videos	\$m	443.8
Income from the rental of video games	\$m	38.3
Sale of videos and video related goods	\$m	36.3
Sale of food and beverages	\$m	40.0
Other income	\$m	36.8
Total	\$m	595.2
Expenses		
Labour costs	\$m	128.9
Depreciation and amortisation	\$m	103.4
Rental of premises	\$m	74.3
Purchases of videos	\$m	67.8
Other expenses	\$m	184.3
Total	\$m	558.7
Operating profit before tax	\$m	42.0
Operating profit margin	%	7.2

Source: Video Hire Industry, Australia, 1999–2000 (8562.0).

Total expenses of the private sector broadcasters were \$4,083m during 1999–2000, of which \$2,468m was outlaid by commercial free-to-air broadcasters and \$1,616m by pay television broadcasters. The main component of expenses of commercial free-to-air broadcasters was program rights used of \$864m, while for pay television broadcasters it was payments to channel providers of \$470m.

During 1999–2000, the private sector broadcasters recorded an operating profit before tax of \$128m.

## 21.35 TELEVISION SERVICES INDUSTRY — 1999–2000

	Units	Commercial free-to-air television	Pay television	Total private sector television broadcasters
Businesses at 30 June	no.	34	7	41
Employees at 30 June				
Permanent full-time	no.	6 392	2 379	8 771
Permanent part-time and casuals	no.	1 415	482	1 897
Total	no.	7 807	2 861	10 668
Income				
Gross income from the sale of airtime	\$m	2 821.1	. .	2 821.1
Subscription and membership income	\$m	. .	789.1	789.1
Other income	\$m	449.9	121.7	571.6
Total	\$m	3 271.0	910.9	4 181.9
Expenses				
Wages and salaries	\$m	302.2	159.4	461.6
Program rights used/payments to channel providers	\$m	863.9	469.8	1 333.7
Other expenses	\$m	1 301.4	986.5	2 287.9
Total	\$m	2 467.5	1 615.7	4 083.2
Operating profit before tax	\$m	803.5	-675.8	127.7

Source: *Television Services, Australia, 1999–2000 (8559.0)*.

## Performing arts

The ABS conducted its second survey of the performing arts industries in respect of 1999–2000, following an earlier survey in respect of 1996–97. These industries are made up of businesses mainly engaged in activities including the provision of music and theatre productions, the operation of performing arts venues, and the provision of other services to the arts such as casting agency operation and costume design.

There were 1,437 employing organisations in the performing arts industries at 30 June 2000 (table 21.36). There were 705 organisations in the music and theatre production industry, 125 organisations in the performing arts venues industry, and 606 organisations in the services to the arts industry. Of the latter, 152 organisations operated performing arts festivals, and 454 organisations provided other services to the arts.

In total, these industries employed 16,429 persons at 30 June 2000. A further 17,718 persons worked as volunteers for festivals during their operation in the 1999–2000 financial year, and 3,034 volunteers worked during June 2000 for organisations in the music and theatre production industry.

During 1999–2000, the total income for the performing arts industries was \$1,634m, of which government funding accounted for \$470m and box office takings \$461m.

Total expenses for the performing arts industries during 1999–2000 were \$1,584m, and the operating profit before tax was \$50.4m. This represented an operating profit margin of 4.8%.

There were 47,083 paid performances in the music and theatre production industry during 1999–2000, while performing arts festivals had 19,896 paid performances. In total, there were 15.2 million paid attendances, with music and theatre production performances accounting for 13.3 million of these paid attendances.

## 21.36 PERFORMING ARTS INDUSTRIES — 1999–2000

	Units	Music and theatre production	Performing arts venues	Festivals	Other services to the arts	Total
Organisations at 30 June	no.	705	125	152	454	1 437
Performing arts spaces at 30 June	no.	68	260	—	—	328
Productions with paid performances						
Paid performances	no.	47 083	21 136	19 896	—	n.a.
Paid attendances	'000	13 268.6	n.a.	1 890.7	—	15 159.3
Employment at 30 June						
Working proprietors and partners	persons	144	—	—	77	221
Employees	persons	6 916	5 149	374	3 769	16 208
Total	persons	7 060	5 149	374	3 846	16 429
Volunteers	persons	(a)3 034	—	(b)17 718	—	20 752
Income						
Income from box office	\$m	233.1	40.8	42.2	144.3	460.5
Government funding	\$m	116.7	93.5	27.1	232.7	470.0
Other income	\$m	155.5	181.6	33.3	332.8	703.3
Total	\$m	505.4	315.9	102.7	709.8	1 633.8
Expenses						
Wages and salaries	\$m	171.6	97.1	12.5	82.8	364.0
Contract payments to performers/artists	\$m	46.8	16.1	24.9	78.6	166.4
Other expenses	\$m	259.1	195.5	61.7	537.0	1 053.2
Total	\$m	477.6	308.7	99.1	698.4	1 583.7
Operating profit/surplus before tax	\$m	27.8	7.2	n.a.	11.7	50.4
Operating profit margin	%	8.0	3.7	n.a.	2.5	4.8

(a) Volunteers during the month of June 2000. (b) Volunteers during the duration of festivals.

Source: *Performing Arts Industries, Australia, 1999–2000* (8697.0).

## Gambling services

The ABS conducted its third survey of the gambling services industries in respect of 2000–01, following previous surveys in respect of 1994–95 and 1997–98. The industries include businesses mainly engaged in lotteries and lotto operations (excluding lottery agencies), casino operations and other gambling services such as totalisator and bookmaker operations.

There were 1,092 employing businesses in the gambling services industries at 30 June 2001, a decrease of 16% since the end of June 1998 (1,306 businesses) (table 21.37). Employment in the gambling industries also decreased from 34,954 persons at the end of June 1998 to 32,591 persons at the end of June 2001, a fall of 7%.

Total income (net of payouts to players) of businesses in the three gambling industries was \$9,543m in 2000–01, a 21% increase on the 1997–98 figure. Total income (net of payouts to players) of Casinos (\$3,137m) increased by 16%, while total income of businesses classified to

Gambling service n.e.c. (\$4,776m) increased by 81%. However, total income of Lottery operators (\$1,630m) decreased by 36% over the 1997–98 figure.

Total expenses in 2000–01 for the gambling services industry was \$8,179m, representing an increase of 9.3% on the 1997–98 figure. The main expense item was gambling/gaming taxes and levies (\$3,017m), which accounted for 37% of total expenses.

Other businesses with gambling activity included businesses classified to the hospitality clubs and pubs, taverns and bars industries (see the section *Clubs, pubs, taverns and bars*). Inclusion of gambling activity from these businesses with businesses classified to the gambling services industry resulted in total net takings for gambling for 2000–01 of \$13,839m.

Further information is included in the article *Gambling in Australia* in *Year Book Australia 2000*.

## 21.37 GAMBLING SERVICES INDUSTRIES

	Units	Lotteries	Casinos	Other gambling services	Total
Businesses at					
30 June 1998	no.	11	13	1 282	1 306
30 June 2001	no.	10	13	1 069	1 092
Change	%	-9.1	—	-16.6	-16.4
Employment at					
30 June 1998	no.	2 243	20 531	12 180	34 954
30 June 2001	no.	984	20 413	11 194	32 591
Change	%	-56.1	-0.6	-8.1	-6.8
Net takings from gambling					
1997-98	\$m	2 440.3	2 165.1	2 468.5	7 073.9
2000-01	\$m	1 565.5	2 503.5	4 485.1	8 554.1
Change	%	-35.8	15.6	81.7	20.9
Commissions from gambling					
1997-98	\$m	..	1.5	75.9	77.4
2000-01	\$m	..	1.8	98.7	100.5
Change	%	..	18.1	30.1	29.8
Total income (net of payouts to players)					
1997-98	\$m	2 525.8	2 709.7	2 646.2	7 881.6
2000-01	\$m	1 630.1	3 136.8	4 776.2	9 543.0
Change	%	-35.5	15.8	80.5	21.1
Operating profit before tax					
1997-98	\$m	215.3	-287.9	482.1	409.4
2000-01	\$m	110.0	536.8	710.9	1 357.7
Change	%	-48.9	..	43.7	227.2
Operating profit margin					
1997-98	%	4.5	-10.8	4.0	2.1
2000-01	%	6.8	17.4	14.9	14.3

Source: *Gambling Industries, Australia (8684.0)*.

## Amusement and leisure

The ABS conducted surveys of major amusement and theme parks and amusement centres in respect of financial year 2000-01. While the ABS has conducted surveys of these operations in the past, the results were combined with those from other industries. Therefore these are the first detailed ABS surveys of these two industries.

### Amusement and theme parks

In the 2000-01 survey, the ABS restricted its coverage to only the major amusement and theme parks. These parks are operated on a commercial basis, are permanently based at a fixed site, have multiple rides and attractions, and have over 50,000 attendees per year. This definition excludes single water slide parks, travelling side shows and a number of smaller parks.

At 30 June 2001, there were 30 major amusement and theme parks operating in Australia, with a total of 4,150 persons working in them (table 21.38).

During 2000-01, there were 8,903,500 visits to the major amusement and theme parks, representing an average of 297,000 visits per park for the year. Amusement and theme parks in Queensland attracted the most visits, with 56% of the total, while parks in New South Wales attracted 27% of total visits.

The total income of the 30 amusement and theme parks during 2000-01 was \$287m, with takings from admissions and rides of \$162m the most significant source of income. These theme parks incurred total expenses of \$313m, resulting in an operating profit before tax of -\$27m. This represented an operating profit margin of -9.4%.

### 21.38 MAJOR AMUSEMENT AND THEME PARKS — 2000–01

	Units	Value
Amusement and theme parks at 30 June	no.	30
Employment at 30 June		
Permanent	persons	1 907
Casual	persons	2 243
Total	persons	4 150
Total visits during the year ended June	'000	8 903.5
Income		
Takings from admissions and rides	\$m	161.5
Gross takings from the sale of food and beverages	\$m	51.5
Income from the sale of merchandise	\$m	42.5
Other income	\$m	31.7
Total	\$m	287.2
Expenses		
Labour costs	\$m	118.3
Rent, leasing and hiring expenses	\$m	50.9
Purchases	\$m	40.6
Other expenses	\$m	103.0
Total	\$m	312.8
Operating profit before tax	\$m	-26.7
Operating profit margin	%	-9.4

Source: *Selected Amusement and Leisure Industries, Australia, 2000–01* (8688.0).

### Amusement centres

Amusement centres include indoor play centres, amusement machine centres, mini-golf centres, go-kart venues and similar operations.

At 30 June 2001, there were 288 businesses operating amusement centres in Australia from 384 locations, with 236 locations in capital cities and suburbs and 148 in other areas. There were 2,793 persons employed by these amusement centres, the majority of which (61%) worked on a casual basis (table 21.39).

The total income in 2000–01 for amusement centres was \$137m, with 53% (\$73m) received as takings from coin operated amusement machines. Almost all of these takings (\$72m) were accrued from amusement machine centres. Other major sources of income for amusement centres included income from playing fees/admissions (\$42m) and sales of goods (\$17m).

Total expenses for 2000–01 were \$136m, of which labour costs (\$41m) and rent, leasing and hiring expenses (\$32m) were the highest contributors.

### 21.39 AMUSEMENT CENTRES — 2000–01

	Units	Amusement machine centres	Other	Total
Businesses at 30 June	no.	59	229	288
Locations at end June				
Capital city and suburbs	no.	98	138	236
Other areas	no.	40	109	148
Total	no.	138	246	384
Employment at end June				
Working proprietors and partners	persons	65	256	321
Permanent employees	persons	480	294	774
Casual employees	persons	568	1 130	1 698
Total	persons	1 114	1 679	2 793
Income				
Takings from coin operated amusement machines	\$m	71.7	*0.8	72.6
Income from playing fees/admissions	\$m	*0.5	41.6	42.1
Other income	\$m	10.1	12.2	22.2
Total	\$m	82.3	54.7	136.9
Expenses				
Labour costs	\$m	25.2	15.9	41.0
Purchases	\$m	6.5	8.5	15.1
Other expenses	\$m	54.6	25.2	79.9
Total	\$m	86.4	49.6	136.0
Operating profit before tax	\$m	*-5.1	5.1	**0.1
Operating profit margin	%	*-6.2	9.5	**0.1

Source: *Selected Amusement and Leisure Industries, Australia, 2000–01* (8688.0).

## Sports industries

The ABS conducted a survey of organisations involved in sports and physical recreation industries in respect of 2000–01. It was an important year for these industries in Australia with the conduct of Sydney Olympic and Paralympic Games.

For the purposes of the 2000–01 survey, the industries included were:

- horse and dog racing
- health and fitness centres and gymnasia
- other sports and physical recreation venues, grounds and facilities
- sports and physical recreation administrative organisations
- sports and physical recreation clubs, teams and sports professionals

- sports and physical recreation support services.

Government involvement in sport and physical recreation activities was also measured.

At the end of June 2001, there were 7,147 employing organisations involved in the provision of sport and physical recreation activities. These included 3,668 organisations in the 'for profit' sector, 2,849 in the 'not for profit' sector and 630 government organisations (table 21.40). 'Not for profit' organisations predominated in the sports and physical recreation administrative organisations industry, in which all organisations were 'not for profit', and in the sports and physical recreation clubs, teams and sports professionals industry, with 81% of organisations being 'not for profit'.

### 21.40 SPORTS AND PHYSICAL RECREATION INDUSTRIES, By sector — 2000–01

	Units	For profit	Not for profit	Government organisations	Total
Businesses/organisations at 30 June	no.	3 668	2 849	630	7 147
Total employment at 30 June	no.	37 705	49 743	10 820	98 267
Total volunteers during the month of June	no.	4 404	174 433	—	178 837
<b>Income</b>					
Funding from government	\$m	119.0	149.6	462.7	731.3
Income from other grants and distributions	\$m	26.7	228.8	—	255.5
Income from sponsorship and fundraising	\$m	780.7	433.2	6.7	1 220.7
Income from players/participants playing fees	\$m	385.6	147.5	—	533.2
Income from admissions	\$m	665.6	323.0	153.1	1 141.7
Rent, leasing and hiring of sports grounds and facilities	\$m	43.6	92.0	50.9	186.4
Income from television and broadcasting rights	\$m	1 132.8	216.6	—	1 349.4
Other	\$m	1 203.7	1 788.1	56.1	3 047.9
<i>Total</i>	<i>\$m</i>	<i>4 357.7</i>	<i>3 379.0</i>	<i>729.5</i>	<i>8 466.2</i>
<b>Expenses</b>					
Labour costs(a)	\$m	955.5	937.5	254.8	2 147.8
Grants to other organisations	\$m	11.9	267.5	215.8	495.2
Repair and maintenance of sporting grounds and recreational facilities	\$m	66.6	111.5	168.5	346.5
Rent, leasing and hiring of sporting venues, facilities and equipment	\$m	99.0	60.5	—	159.6
Gambling taxes and levies	\$m	*0.2	8.4	—	8.6
Other expenses	\$m	3 187.0	1 936.5	326.3	5 450.1
<i>Total</i>	<i>\$m</i>	<i>4 320.4</i>	<i>3 322.2</i>	<i>965.3</i>	<i>8 607.9</i>

(a) For government organisations, labour costs include only wages and salaries.

Source: *Sports Industries, Australia, 2000–01 (8686.0)*.

During 2000–01, the total income of organisations in the sports and physical recreation industries was \$8,466m. This income included that generated by organisations involved in the 2000 Sydney Olympic and Paralympic Games. Industries with the highest industry income were the other sports and

physical recreation venues, grounds and facilities industry (total income of \$3,563m), the sports and physical recreation clubs, teams and sports professionals industry (\$1,382m), the sports and physical recreation administrative organisations industry (\$1,147m), and the horse and dog racing industry (\$1,136m) (table 21.41).

#### 21.41 SPORTS AND PHYSICAL RECREATION INDUSTRIES, By industry — 2000–01

	Units	Horse and dog racing	Health centres(a)	Other sports venues(b)	Sports admin(c)	Sports clubs(d)	Other sports services(e)	Govt(f)	Total
Businesses/organisations at 30 June									
For profit	no.	750	620	745	—	372	1 181	..	3 668
Not for profit	no.	284	47	119	756	1 565	78	..	2 849
Government	no.	..	..	..	..	..	..	630	630
<i>Total</i>	no.	1 034	667	864	756	1 937	1 259	630	7 147
Locations at end June									
Capital cities and suburbs	no.	n.a.	527	591	571	1 106	1 310	n.a.	n.a.
Non-metropolitan areas	no.	n.a.	270	434	393	1 118	630	n.a.	n.a.
<i>Total</i>	no.	n.a.	797	1 025	965	2 224	1 940	n.a.	n.a.
Total employment at end June	no.	15 900	12 552	15 842	11 814	23 312	8 028	10 820	98 267
Total volunteers during the month of June	no.	n.a.	*546	*7 962	106 427	61 950	1 952	n.a.	178 837
Members at end June	no.	105 833	501 264	224 343	n.a.	1 669 111	*81 901	n.a.	2 582 452
Income									
Net TAB distributions	\$m	555.4	..	..	..	..	..	..	555.4
Income from membership fees	\$m	20.8	190.7	29.7	80.5	313.1	11.7	n.a.	646.6
Income from admissions	\$m	26.5	0.6	644.8	228.6	87.3	0.7	153.1	1 141.7
Funding from government	\$m	—	*1.1	131.2	106.1	10.9	19.3	462.7	731.3
Other income	\$m	533.0	101.9	2 757.4	731.4	970.5	183.5	113.8	5 391.4
<i>Total</i>	\$m	1 135.6	294.3	3 563.1	1 146.7	1 381.8	215.2	729.5	8 466.2
Expenses									
Labour costs	\$m	242.2	119.8	627.9	224.8	595.1	83.2	254.8	2 147.8
Prizemoney and trophy expenses	\$m	404.2	*0.2	2.6	29.7	19.1	0.6	n.a.	456.4
Grants to other organisations	\$m	—	1.7	5.2	237.4	32.9	2.2	215.8	495.2
Repair and maintenance expenses	\$m	41.0	11.1	43.2	8.2	69.0	5.6	168.5	346.5
Other expenses	\$m	419.9	145.3	2 904.6	600.1	670.8	94.9	326.3	5 161.9
<i>Total</i>	\$m	1 107.3	278.1	3 583.6	1 100.2	1 386.9	186.5	965.3	8 607.9
Operating profit before tax	\$m	30.6	16.0	*-18.6	45.7	**-12.5	28.0	..	(g)89.3
Operating profit margin	%	2.7	5.6	*-3.0	*7.4	**-1.3	16.2	..	2.1
Industry value added	\$m	260.7	140.6	668.4	229.2	542.8	100.1	..	1 941.9

(a) Also includes fitness centres and gymnasia. (b) Also includes grounds and other facilities mainly used for physical recreation purposes. (c) Includes sports and physical recreation administrative organisations. (d) Includes sports and physical recreation clubs, teams and sports professionals. (e) Includes sports services such as education and coaching. (f) Includes the sports and physical recreation activities of general government organisations. (g) For businesses/organisations other than government organisations.

Source: *Sports Industries, Australia, 2000–01* (8686.0).

Major income items included income from television and broadcasting rights (\$1,349m), income from admissions (\$1,142m), membership fees (\$647m), funding from government (\$731m) and net TAB distributions (\$555m).

Total expenses of these industries were \$8,608m. Labour costs of \$2,148m accounted for 25% of total expenses.

The operating profit before tax of \$89m for the sports and physical recreation industries represented an operating profit margin of 2%. However, only 51% of organisations in these industries were 'for profit' organisations.

At the end of June 2001, total employment in the sport and physical recreation industries was 98,267 persons. Of these persons, 30,631 were employed as professional sportspersons, sports coaches, trainers, or development officers. In addition, there were 178,837 volunteers working for organisations in these industries during June 2001.

The industry value added for the sports and physical recreation industries in 2000–01 was \$1,942m.

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## Introduction

Tourism encompasses most short-term travel away from the normal place of work and residence.

It is defined by the World Tourism Organization (WTO) as: ‘the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes’.

This identifies ‘tourism’ as being more than just leisure travel. It also encompasses travel for business, health, education, religious and other reasons.

Tourism comprises both domestic and international travel. As it involves the consumption or purchase by tourists — or ‘visitors’ in the WTO terminology — of any good or service, its economic impact is felt across many sectors of the economy. In Australia the industries most affected by direct tourism demand are transport, accommodation, cafes, restaurants, takeaway food outlets and other retail trade. Indirectly, tourism affects a wide range of other industries. When a visitor buys a meal, for example, tourism indirectly creates demand in the food manufacturing, transportation and electricity industries in order to produce the inputs required to make the meal.

Tourism also draws on services provided by the Commonwealth Government, state and territory governments and local government organisations without direct charge to tourists. These include: the construction and maintenance of roads, airports, harbours, railways and national parks; tourism promotion; immigration and customs services; information services; and the provision of a large number of recreational facilities.

While tourism has long been an economic factor in Australia, in recent times it has grown to the extent that it is now recognised as a major contributor to total economic activity. Direct tourism consumption contributed 4.7% to gross domestic product in 2000–01 (see graph 22.2).

International tourism has experienced substantial growth in recent years, with the exception of 2001. This growth is expected to continue. The Tourism Forecasting Council predicts that the number of international visitor arrivals will double between 2001 and 2012.

Australia’s island status and distance from most of its international source markets mean that tourism in Australia will continue to be

dominated by domestic tourism for the foreseeable future. Despite high annual growth rates, international tourism only accounts for around one-quarter of total tourism consumption.

In addition to the economic, social and cultural effects of tourism, there are also environmental considerations. Increasingly, people are seeking to limit any harmful effects of tourism on the environment and to ensure that tourism development is sustainable.

## Nature-based tourism

Australia’s beaches, national and state parks and other natural attractions such as the World Heritage listed Great Barrier Reef, attract millions of visitors (domestic and international) each year and generate significant economic benefits for regions. Increasingly, people are becoming aware of the need to protect the environment and are embracing ‘ecotourism’. Recently, the United Nations designation of 2002 as the International Year of Ecotourism has done much to raise ecotourism’s profile.

## Ecotourism

There are many definitions of ecotourism. Most of these definitions are centred around the concept of sustainable nature-based tourism. The International Ecotourism Society defines ecotourism as ‘responsible travel to natural areas that conserves the environment and sustains the wellbeing of local people’.

Australia is one of only two countries with an accreditation program for ecotourism (Costa Rica is the other). The Ecotourism Association of Australia (EAA) operates the Nature and Ecotourism Accreditation Program (NEAP). The program accredits accommodation, tours and attractions. The NEAP principles of ecotourism accreditation focus on:

- experiencing and understanding nature
- ecologically sustainable tourism
- sensitivity to different cultures
- contributions to conservation and local communities.

The article following this chapter, *Sustainable tourism in the Great Barrier Reef Marine Park*, discusses ecotourism in a major Australian tourism attraction.

A 2001 survey conducted by the EAA estimated that there are about 3,000 ecotourism and nature tourism operators in Australia, with annual industry turnover of about \$100m. Some examples of ecotourism attractions in Australia include the Valley of the Giants tree top walk (Western Australia), the Boondall Wetlands in Queensland, and *Manyallaluk* (Frog Dreaming) in the Northern Territory. *Manyallaluk* is an example of an Aboriginal owned and operated tourism venture.

**Visitors to national and state parks and World Heritage areas**

There are 730 properties on the World Heritage list (563 cultural, 144 natural and 23 mixed properties). Australia has 14 World Heritage sites, including the largest World Heritage area, the Great Barrier Reef. The most recent Australian additions to the World Heritage list are the Heard and McDonald Islands, Macquarie Island, and the Greater Blue Mountains area. The Wet Tropics of Queensland is also a World Heritage area.

Bureau of Tourism Research data show that in 1998 the Gold Coast, which has a World Heritage listed rainforest at its northern end, was the third most visited Australian region for international visitors, with 5.4 million visitor nights (6% of all international visitor nights) spent there. It is likely that some of the Gold Coast’s other attractions, including its beaches, also played a part in its popularity. Tropical North Queensland was the fourth most visited Australian region for international visitors, with 4.8 million visitor nights spent there (5% of all international visitor nights). Petermann, which includes Uluru, was the eighth most visited region. Several other regions which include World Heritage areas were

also among the 20 regions most visited by international visitors, including: Hervey Bay/Maryborough (which includes Fraser Island); Northern Rivers in New South Wales (which includes parts of the Central Eastern Rainforest Reserves); the Great Barrier Reef; and the Blue Mountains.

In March 2001, one in two Australians over the age of 18 reported that they had visited a World Heritage area, national or state park (54%) in the 12 months prior to the survey. This was a decline from 1992, when almost two-thirds (63%) of Australians had visited one of these areas in the previous 12 months (graph 22.1).

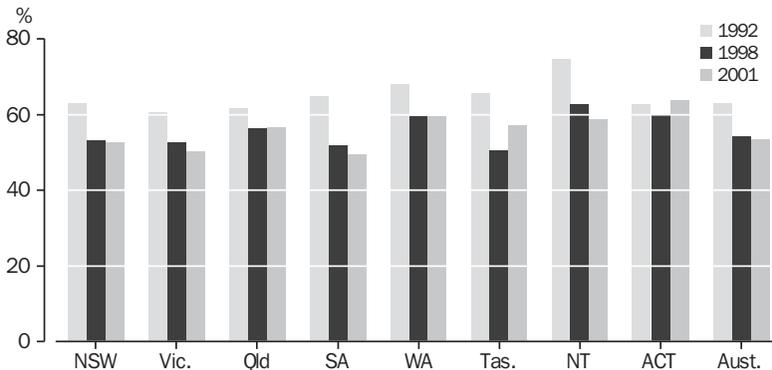
People in the Australian Capital Territory were the most likely to have visited a World Heritage area or park, with 64% stating that they had made a trip. South Australians and Victorians were the least likely to engage in this activity (50%).

Visits to World Heritage areas, national parks or state parks by people aged 55 and over (46.4%) were markedly less than by other population groups.

Households with dependent child(ren) recorded the highest proportion of visits to a World Heritage area, national park or state park. Couples with dependent children ranked highest (62%), followed by one parent with dependent child(ren) households (57%). One-person households were the least likely to use these areas (44%).

The reasons given for decisions not to visit a World Heritage area or park included cost, access, age/health, lack of time, and lack of interest.

**22.1 VISITS TO WORLD HERITAGE AREAS, NATIONAL AND STATE PARKS**



Source: *Environmental Issues: People's Views and Practices* (4602.0).

## The economic contribution of tourism

Tourism is important to the Australian economy, underpinning a wide range of industries. The Tourism Satellite Account (TSA) reported that more than \$70b worth of tourism goods and services were consumed in 2000–01. A TSA has been recognised internationally as the best method for measuring the economic contribution of tourism and as an important information base for the calculation of its economic effects.

Tourism is not a conventional industry in the System of National Accounts. It is defined by the customer (visitor) rather than the goods and services produced. For example, consumption of a restaurant meal by a visitor is defined as 'tourism'. When the meal is consumed by a resident, the consumption is not 'tourism'. The TSA creates a broad picture of tourism which allows it to be compared to conventional industries like agriculture, manufacturing and retail trade.

The estimates of tourism gross value added relate to the direct impact of tourism activity. This means that only the value added where there is a direct economic or physical relationship between the visitor and the producer of a good or service is included. Similarly, the employment estimates only include employment generated where visitors have a direct relationship with the producer of the good or service.

The indirect effects of tourism consumption are measured in *Research Paper No. 6: Tourism's Indirect Economic Effects 1997–98* (Bureau of Tourism Research 2001).

## Tourism gross value added

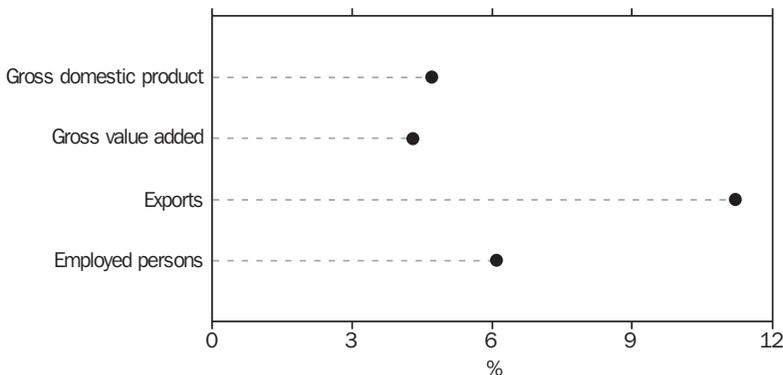
Gross value added is the preferred national accounts measure of industry production as it excludes taxes and subsidies on products. In 2000–01, tourism gross value added was \$26.3b, contributing 4.3% to total industry gross value added (graph 22.2). The industries which accounted for the largest shares of tourism gross value added were: air and water transport (15%); accommodation (11%); cafes, restaurants and takeaway food outlets (9%); and the other retail trade industry (9%). The remaining share was distributed widely among other industries.

In 1997–98, indirect tourism gross value added was 4.4%. When added to the direct figure (4.3%), the total tourism gross value added for 1997–98 was 8.7%.

## Employment

Tourism generated a total (direct and indirect) of 853,500 jobs in 1997–98 (10% of national employment). Of this, 340,600 jobs (4% of national employment) were created by the indirect effects of tourism demand, and 512,900 (6%) jobs were directly created. By 2000–01, the number of persons directly employed by tourism had grown to 551,000 persons.

22.2 TOURISM'S SHARE OF THE AUSTRALIAN ECONOMY — 2000–01



Source: Australian National Accounts: Tourism Satellite Account, 2000–01 (5249.0).

Retail trade generated the most direct tourism employment (143,600 persons) in 2000–01. Retail trade, accommodation, and cafes and restaurants accounted for more than half of the employment generated by tourism.

## Domestic tourism

Australian residents aged 15 and over spent a total of 289.6 million nights visiting other parts of the country in 2001 (table 22.3). Each trip took an average of 3.9 nights, and each person in the population made an average of 4.8 trips during the year. Residents of the Australian Capital Territory were the most frequent travellers (averaging 7.6 trips per person), while residents

of the Northern Territory tended to stay away for the longest period (averaging 6.1 nights per trip). These trends are similar to those in 2000.

As table 22.4 shows, 'holiday/leisure' was the most common purpose of visit, accounting for 49% of visitor nights, followed by 'visiting friends/relatives' (30%). 'Business' visits accounted for 15% of all visitor nights.

New South Wales was the most popular destination, accounting for almost a third of all visitor nights (31%). Queensland was the next most popular destination, with over a quarter of all visitor nights (26%), while Victoria accounted for nearly one-fifth of all visitor nights (19%).

### 22.3 SUMMARY OF PERSON TRIPS AND NIGHTS AWAY(a), By state/territory of origin — 2001

	Estimated resident population as at 30 June 2001(b)	Person trips	Average trips	Total nights away	Average nights away
	'000	'000	per person	'000	per person trip
New South Wales	5 259	25 433	4.8	94 045	3.7
Victoria	3 858	18 746	4.9	69 466	3.7
Queensland	2 860	14 177	5.0	58 672	4.1
South Australia	1 222	5 310	4.3	21 582	4.1
Western Australia	1 503	6 570	4.4	27 011	4.1
Tasmania	374	1 650	4.4	7 141	4.3
Northern Territory	149	757	5.1	4 646	6.1
Australian Capital Territory	256	1 941	7.6	7 080	3.6
<b>Australia</b>	<b>15 483</b>	<b>74 585</b>	<b>4.8</b>	<b>289 644</b>	<b>3.9</b>

(a) Australian residents aged 15 years and over. (b) Population aged 15 years and over, sourced from 'Australian Demographic Statistics' (3101.0).

Source: Bureau of Tourism Research, 'National Visitor Survey'.

### 22.4 VISITOR NIGHTS(a), By state/territory of destination and main purpose of visit — 2001

	Business	Holiday/leisure	Visiting friends/relatives	Other	Total(b)
	'000	'000	'000	'000	'000
New South Wales	12 803	41 524	29 973	4 210	89 447
Victoria	7 504	27 252	17 733	2 772	55 747
Queensland	9 720	39 843	20 008	4 523	75 002
South Australia	2 663	8 965	6 059	1 109	19 508
Western Australia	5 145	12 878	6 870	1 281	28 068
Tasmania	998	4 356	1 951	*340	7 970
Northern Territory	2 259	3 031	845	*345	7 174
Australian Capital Territory	1 247	1 830	2 305	*352	5 749
<b>Australia(c)</b>	<b>42 346</b>	<b>140 616</b>	<b>85 777</b>	<b>14 934</b>	<b>289 644</b>

(a) Australian residents aged 15 years and over. (b) Includes visitor nights where purpose of visit was not asked. (c) Components may not add to total as total includes unspecified and offshore visits that could not be allocated to a state or territory.

Source: Bureau of Tourism Research, 'National Visitor Survey'.

In 2001, the most frequently used accommodation by domestic travellers was the property of friends or relatives (40% of visitor nights), followed by hotels, resorts, motels and motor inns (24%). A similar pattern occurred in the states and territories with the exception of the Northern Territory, where hotels, resorts, motels and motor inns were a more popular choice of accommodation than friends' or relatives' property (26% and 18% respectively) (table 22.5).

Intrastate visits accounted for most domestic tourism visitor nights in 2001 (56%). They were particularly important in Western Australia, New South Wales and Victoria where 70%, 62% and

60% respectively of domestic visitor nights in the state were accounted for by residents of the state (table 22.6).

In terms of numbers of visitor nights, net beneficiaries from domestic tourism (i.e. where inbound interstate visitor nights are greater than outbound interstate visitor nights) in 2001 were Queensland, Western Australia, Tasmania and the Northern Territory. Queensland and the Northern Territory benefited most from tourism in relative terms, with nearly twice the number of inbound visitor nights as outbound visitor nights. Victoria contributed the most to tourism in relative terms, with the number of outbound visitor nights over one and a half times that of inbound visitor nights.

### 22.5 VISITOR NIGHTS(a), Type of accommodation used — 2001

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.(b)
	'000	'000	'000	'000	'000	'000	'000	'000	'000
Hotel, resort, motel, motor inn	21 810	12 194	20 136	4 094	5 592	2 373	1 842	1 908	70 009
Guest house/B&B	1 348	1 330	702	*192	*302	*185	**43	**34	4 137
Self-catering cottage/apartment	7 546	4 023	10 795	1 475	2 245	774	494	484	27 836
Caravan park or commercial camping ground	9 147	5 646	6 071	2 393	3 359	667	1 044	*162	28 492
Caravan or camping on private property	2 590	1 895	2 990	1 058	1 993	*265	564	**80	12 312
Friends' or relatives' property	38 906	23 861	27 935	7 668	9 823	2 795	1 266	2 786	115 073
Own property (e.g. holiday house)	4 347	4 228	2 199	923	1 302	*425	*119	**11	13 554
Other/not stated(c)	2 816	2 084	3 267	994	1 557	*160	1 108	*270	12 262
<b>Total(d)</b>	<b>89 447</b>	<b>55 747</b>	<b>75 002</b>	<b>19 508</b>	<b>28 068</b>	<b>7 970</b>	<b>7 174</b>	<b>5 749</b>	<b>289 644</b>

(a) Australian residents aged 15 years and over. (b) Components may not add to total as total includes unspecified and offshore visits that could not be allocated to a state or territory. (c) Other accommodation includes backpacker/hostel, university/school dormitory/college, hospital/hospital-related accommodation for relatives, and privately owned boat/yacht etc. (d) Includes visitor nights where accommodation type was not asked.

Source: Bureau of Tourism Research, 'National Visitor Survey'.

### 22.6 VISITOR NIGHTS(a) — 2001

Destination	Residence								
	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	'000	'000	'000	'000	'000	'000	'000	'000	'000
New South Wales	55 648	13 982	10 797	2 210	1 500	705	510	4 096	89 447
Victoria	10 327	33 200	4 205	3 764	1 537	1 350	*373	990	55 747
Queensland	17 226	11 017	39 442	2 249	1 899	1 095	745	1 329	75 002
South Australia	2 291	3 642	690	10 912	1 001	*179	518	*275	19 508
Western Australia	2 325	2 921	1 178	960	19 634	*238	719	*94	28 068
Tasmania	1 295	1 730	1 022	*308	*335	3 162	**35	**83	7 970
Northern Territory	1 523	1 033	900	776	861	*267	1 619	*195	7 174
Australian Capital Territory	3 359	1 112	*437	*314	*243	*146	*121	**18	5 749
<b>Total(b)</b>	<b>94 045</b>	<b>69 466</b>	<b>58 672</b>	<b>21 582</b>	<b>27 011</b>	<b>7 141</b>	<b>4 646</b>	<b>7 080</b>	<b>289 644</b>

(a) Australian residents aged 15 years and over. (b) Includes other and not stated.

Source: Bureau of Tourism Research, 'National Visitor Survey'.

## International inbound tourism

### Characteristics

There were 4,768,294 visitors in 2001–02, a 2.5% increase in visitor arrivals from 1999–2000 (table 22.7). In the decade beginning 1991–92, international inbound visitors to Australia increased by 2,248,582 (89%).

In 2001–02, New Zealand was Australia's largest source of international visitors, accounting for 17% of total inbound visitors, followed by Japan (14%) and the United Kingdom (13%).

Almost two-thirds (66%) of all international visitors who arrived during 2001–02 came to Australia for a holiday. Another 12% arrived for business purposes (table 22.8).

Visitors from Japan, New Zealand and the United Kingdom constituted almost half (46%) of all international visitors who came to Australia for a holiday. New Zealand was the main source of visitors for business purposes (27%), while the United Kingdom accounted for most visitors arriving for employment (23%).

Asian countries accounted for nearly two-thirds (62%) of all visitors arriving in Australia for 'education' purposes.

### 22.7 INBOUND VISITORS

	Visitors	Change(a)
	no.	%
1991–92	2 519 712	13.1
1992–93	2 785 597	10.6
1993–94	3 168 961	13.8
1994–95	3 535 265	11.6
1995–96	3 966 161	12.2
1996–97	4 252 654	7.2
1997–98	4 220 005	-0.8
1998–99	4 288 027	1.6
1999–2000	4 651 785	8.5
2000–01	n.y.a.	n.y.a.
2001–02	4 768 294	(b)2.5

(a) From previous financial year. (b) Percentage change calculated on 1999–2000. Overseas arrivals data for 2000–01 are not yet available due to delays in processing passenger cards.

Source: *Overseas Arrivals and Departures, Australia (3401.0)*.

### 22.8 INBOUND VISITORS, By country/region of residence and main purpose of trip — 2001–02

Country/region of residence	Main purpose of trip					Total visitors '000	Change on 1999–2000(c) %
	Business(a) '000	Holiday(b) '000	Employment '000	Education '000	Other and not stated '000		
New Zealand	149.6	516.1	11.2	8.9	101.9	787.7	1.9
Other Oceania	12.5	71.1	1.3	4.4	30.5	119.8	-11.6
Germany	11.3	102.8	2.2	5.4	15.0	136.8	-7.1
United Kingdom	41.1	495.7	18.3	4.7	67.3	627.1	13.1
Other Europe	44.2	278.5	9.6	20.6	55.6	408.4	-4.8
Indonesia	9.2	52.2	1.2	14.2	17.9	94.7	13.9
Malaysia	13.2	106.8	1.4	13.0	19.7	154.3	5.1
Singapore	34.2	186.4	2.6	16.9	55.6	295.8	6.8
Hong Kong (SAR of China)	17.4	100.2	1.0	12.3	17.8	148.6	-0.3
Japan	34.4	435.6	5.9	15.8	167.5	659.2	-6.6
Korea	14.1	120.4	2.0	14.7	29.9	181.1	30.0
Taiwan	4.6	71.2	0.5	6.8	16.0	99.1	-29.7
Other Asia	65.1	193.4	6.1	37.9	71.2	373.7	28.5
United States of America	79.8	253.6	11.4	24.9	54.8	424.4	-2.9
Other America	15.7	84.2	2.1	7.1	17.5	126.7	11.0
Middle East and North Africa	5.4	37.4	0.7	1.9	10.9	56.3	8.2
Other Africa	11.8	44.6	1.6	2.1	12.5	72.7	0.4
Not stated	0.3	1.0	—	—	0.7	2.0	-55.0
<b>Total</b>	<b>563.8</b>	<b>3 151.2</b>	<b>79.3</b>	<b>211.6</b>	<b>762.4</b>	<b>4 768.3</b>	<b>2.5</b>

(a) Includes those visitors attending a convention or conference. (b) Includes those visitors whose main purpose is visiting friends and relatives. (c) Data for 2000–01 are not yet available, so the percentage change has been calculated on 1999–2000.

Source: ABS data available on request, *Overseas Arrivals and Departures Collection*.

The long travelling distances to Australia contribute to long stays for international visitors. In 2001–02, 43% of visitors stayed a minimum of two weeks, while 22% stayed for at least a month (table 22.9). Visitors arriving for ‘education’ purposes tended to stay for long periods (82% of these visitors stayed for a minimum of two weeks and 43% for six months or more), but their absolute numbers were relatively small.

In 2001–02 most arrivals were in December (11% of total arrivals), while the fewest arrivals (7%) were in May. December was the

month in which the highest number of ‘holiday’ visitors arrived and the fewest visitors came for business purposes. April had the highest number of business visitors and May the fewest visitors arriving for a holiday (table 22.10).

A number of factors contribute to the relative lack of seasonality, primarily the attractive climate experienced in different parts of Australia throughout the whole year and the wide diversity of source countries.

## 22.9 INBOUND VISITORS, By intended length of stay and main purpose of trip — 2001–02

Intended length of stay	Main purpose of trip					Total	Proportion of total %
	Business(a)	Holiday(b)	Employment	Education	Other and not stated		
	'000	'000	'000	'000	'000	'000	
Under 1 week	251.6	809.7	8.0	9.4	207.9	1 286.6	27.0
1 week and under 2 weeks	175.6	892.6	11.3	28.0	339.0	1 446.4	30.3
2 weeks and under 1 month	73.1	799.9	6.4	19.6	106.0	1 005.0	21.1
1 month and under 2 months	24.5	330.6	5.3	11.7	43.6	415.8	8.7
2 months and under 3 months	11.4	102.9	4.7	11.9	16.8	147.6	3.1
3 months and under 6 months	14.7	125.8	13.2	39.0	23.1	215.8	4.5
6 months and under 12 months	12.8	89.8	30.5	92.0	25.9	251.1	5.3
<b>Total</b>	<b>563.8</b>	<b>3 151.2</b>	<b>79.3</b>	<b>211.6</b>	<b>762.4</b>	<b>4 768.3</b>	<b>100.0</b>

(a) Includes those visitors attending a convention or conference. (b) Includes those visitors whose main purpose is visiting friends and relatives.

Source: ABS data available on request, Overseas Arrivals and Departures Collection.

## 22.10 INBOUND VISITORS, By month and main purpose of trip

	Main purpose of trip					Total visitors	Proportion of total %
	Business(a)	Holiday(b)	Employment	Education	Other and not stated		
	'000	'000	'000	'000	'000	'000	
<b>2001</b>							
July	51.8	282.5	4.9	42.2	65.5	446.9	9.4
August	47.1	254.7	4.7	11.7	66.4	384.6	8.1
September	47.5	239.3	5.5	10.5	63.5	366.3	7.7
October	52.6	240.5	6.8	13.4	65.3	378.5	7.9
November	48.8	261.1	5.0	6.9	54.3	376.2	7.9
December	34.6	395.0	5.9	7.8	80.0	523.2	11.0
<b>2002</b>							
January	35.3	237.9	9.0	29.1	68.0	379.3	8.0
February	46.4	274.5	7.2	37.0	72.2	437.2	9.2
March	49.0	300.9	9.6	16.5	70.5	446.5	9.4
April	55.9	241.5	8.5	13.2	41.3	360.3	7.6
May	54.3	204.9	6.5	9.2	55.0	329.9	6.9
June	40.7	218.5	5.7	14.2	60.4	339.4	7.1
<b>Total</b>	<b>563.8</b>	<b>3 151.2</b>	<b>79.3</b>	<b>211.6</b>	<b>762.4</b>	<b>4 768.3</b>	<b>100.0</b>

(a) Includes those visitors attending a convention or conference. (b) Includes those visitors whose main purpose is visiting friends and relatives.

Source: Overseas Arrivals and Departures, Australia (3401.0).

New South Wales is by far the most popular state for all categories of international visitors. In 1999–2000 (the most recent data available), 38% of all nights spent by international visitors were spent in New South Wales. Queensland was the next most popular state, accounting for 22% of all international visitor nights. Tasmania and the Australian Capital Territory were the least popular destinations, each accounting for less than 2% of international visitor nights in 1999–2000 (table 22.11).

## Expenditure

In 1999–2000, international visitors to Australia spent an average of \$4,066 on each trip. Visitors from China spent the most, averaging \$6,070, followed by those from the United States of America (\$5,899), 'Other Europe' (\$5,411) and Indonesia (\$5,279). The lowest average expenditure, \$1,808 per visitor, was by visitors from New Zealand (table 22.12).

The largest expenditure items for visitors from Canada, the United Kingdom, Europe and New Zealand were prepaid international airfares and food, drink and accommodation. The only exception was visitors from Germany, with a quarter of their total expenditure on package tours. Visitors from the United States of America

spent about one-fifth (18%) of their total expenditure on food, drink and accommodation, around one-quarter (26%) on package tours and just over a third (35%) on prepaid international airfares (table 22.12).

Visitors from Asian countries also spent relatively large amounts on food, drink and accommodation. However, for most of these countries education fees also accounted for a large proportion of their total expenditure, with visitors from Indonesia and China spending an average of \$1,400 and \$1,076 respectively on education. The most notable exception to this trend were visitors from Japan, with more than half of their total expenditure going to package tours.

People visiting for 'other' reasons (e.g. education, employment, health) had the highest average expenditure (\$7,126 per person) (table 22.13). These visitors spent just over half their total expenditure on food, drink and accommodation (26%) and education fees (25%). Business visitors had the next highest average expenditure (\$3,941). Their largest expenditure items were prepaid international airfares and food, drink and accommodation (42% and 27% of total expenditure respectively).

### 22.11 INBOUND VISITOR NIGHTS(a), By state/territory and main purpose of trip — 1999–2000

	Main purpose of trip					Total '000	Proportion of total %
	Business '000	Visiting friends/ relatives '000	Holiday '000	All other reasons '000	Total '000		
New South Wales	2 702	7 738	16 168	15 623	42 232	37.6	
Victoria	1 573	4 693	5 667	8 709	20 642	18.4	
Queensland	803	4 593	14 342	4 440	24 177	21.5	
South Australia	288	1 089	1 700	2 011	5 089	4.5	
Western Australia	435	3 107	4 820	4 836	13 197	11.7	
Tasmania	123	308	619	651	1 702	1.5	
Northern Territory	136	333	2 399	429	3 297	2.9	
Australian Capital Territory	179	299	286	1 240	2 004	1.8	
<b>Australia</b>	<b>6 259</b>	<b>22 161</b>	<b>46 002</b>	<b>37 939</b>	<b>112 361</b>	<b>100.0</b>	

(a) All visitors aged 15 years and over.

Source: Bureau of Tourism Research, 'International Visitor Survey'.

## 22.12 AVERAGE VISITOR EXPENDITURE — 1999–2000

Country/region of residence	Items of expenditure								Total
	Package tours	Prepaid international airfares	Transport(a)	Food, drink and accommodation	Shopping	Entertainment and gambling	Education fees	Other(b)	
	\$	\$	\$	\$	\$	\$	\$	\$	\$
New Zealand	219	422	179	520	334	55	9	70	1 808
Germany	1 302	1 372	847	1 177	307	65	16	73	5 159
United Kingdom	857	1 713	608	1 267	348	107	4	91	4 995
Other Europe	1 027	1 559	730	1 336	385	90	160	124	5 411
Indonesia	276	625	599	1 228	612	257	1 400	282	5 279
Malaysia	291	514	238	808	463	178	835	142	3 469
Singapore	423	574	332	719	434	167	533	105	3 287
Hong Kong (SAR of China)	609	700	474	963	526	159	721	120	4 272
Japan	2 062	320	266	347	630	59	88	33	3 804
Korea	857	573	305	909	570	180	531	104	4 030
Taiwan	887	504	215	586	577	100	517	93	3 479
Thailand	327	667	284	1 087	522	151	924	175	4 137
China	743	887	468	1 369	740	612	1 076	175	6 070
Other Asia	280	984	310	783	548	152	485	97	3 638
United States of America	1 510	2 044	505	1 055	371	82	227	105	5 899
Canada	692	1 646	581	1 199	349	98	101	106	4 772
Other countries	359	1 109	333	674	502	76	147	107	3 307
<b>All countries</b>	<b>913</b>	<b>985</b>	<b>412</b>	<b>853</b>	<b>451</b>	<b>109</b>	<b>248</b>	<b>95</b>	<b>4 066</b>

(a) Includes: organised tours; international airfares bought in Australia; domestic airfares; other transport fares; self-drive cars, rent-a-cars, campervans; petrol and oil for self-drive cars or other vehicles; and motor vehicles. (b) Includes: phone, Internet, fax and postage; convention registration fees; medical expenses; and other expenses not elsewhere specified.

Source: Bureau of Tourism Research, 'International Visitor Survey'.

## 22.13 AVERAGE VISITOR EXPENDITURE, By expenditure item and main purpose of trip — 1999–2000

Expenditure item	Main purpose of trip				Total
	Business	Visiting friends and relatives	Holiday	All other reasons	
	\$	\$	\$	\$	\$
Package tours	378	174	1 373	599	913
Prepaid international airfares	1 662	1 228	690	1 180	985
Transport(a)	270	270	414	774	412
Food, drink and accommodation	1 065	499	703	1 842	853
Shopping	337	433	471	516	451
Entertainment and gambling	80	105	98	199	109
Education fees	6	77	28	1 754	248
Other(b)	144	57	57	263	95
<b>All items</b>	<b>3 941</b>	<b>2 843</b>	<b>3 834</b>	<b>7 126</b>	<b>4 066</b>

(a) Includes: organised tours; international airfares bought in Australia; domestic airfares; other transport fares; self-drive cars, rent-a-cars, campervans; petrol and oil for self-drive cars or other vehicles; and motor vehicles. (b) Includes: phone, Internet, fax and postage; convention registration fees; medical expenses; and other expenses not elsewhere specified.

Source: Bureau of Tourism Research, 'International Visitor Survey'.

## International outbound tourism

In 2001–02 there were over 1.4 million more international visitors to Australia than Australians travelling abroad (tables 22.7 and 22.14). Consequently, tourism continues to improve the net contribution of the travel item to Australia's balance on current account (in table 30.8 of *Chapter 30, International accounts and trade*, the difference between travel services credits and debits).

Australians travel abroad to visit a wide variety of destinations. As table 22.15 shows, the most popular main destination is New Zealand, accounting for 18% of Australian residents visiting other countries in 2001–02. The next most popular destinations were the United Kingdom (9%) and the United States of America (8%).

### 22.14 AUSTRALIANS TRAVELLING ABROAD, Number of departures

	Change	
	no.	%
1991–92	2 173 453	2.7
1992–93	2 299 504	5.8
1993–94	2 303 964	0.2
1994–95	2 421 983	5.1
1995–96	2 624 359	8.4
1996–97	2 837 207	8.1
1997–98	3 031 897	6.9
1998–99	3 188 692	5.2
1999–2000	3 332 258	4.5
2000–01	n.y.a.	n.y.a.
2001–02	3 367 870	(a)1.1

(a) Percentage change calculated on 1999–2000. Overseas departures data for 2000–01 are not yet available due to delays in processing passenger cards.

Source: *Overseas Arrivals and Departures, Australia (3401.0)*.

### 22.15 AUSTRALIANS TRAVELLING ABROAD, By country/region of main destination and main purpose of trip — 2001–02

Country/region of main destination	Main purpose of trip					Total	Change on 1999–2000(c)
	Business(a)	Holiday(b)	Employment	Education	Other and not stated		
	'000	'000	'000	'000	'000	'000	%
Fiji	9.7	95.9	1.1	0.3	6.3	113.3	5.7
New Zealand	124.2	408.5	5.8	4.4	49.3	592.2	16.9
Other Oceania	22.7	90.5	12.9	2.6	9.4	138.2	-15.2
Italy	9.8	53.7	0.4	1.8	5.2	70.8	9.4
United Kingdom	40.6	230.3	12.7	3.6	20.9	308.0	-6.7
Other Europe	48.1	219.4	6.1	6.3	26.1	305.9	-0.4
Indonesia	27.7	218.4	5.5	2.6	16.8	270.9	5.5
Malaysia	29.2	68.3	3.5	0.7	7.8	109.5	-13.3
Philippines	9.3	42.3	0.5	0.2	6.0	58.3	4.9
Singapore	56.5	83.6	7.2	2.3	13.6	163.2	11.9
Thailand	22.5	128.6	1.6	1.0	9.7	163.4	10.6
China	40.5	65.4	3.5	3.4	8.5	121.3	40.6
Hong Kong (SAR of China)	39.9	84.1	7.1	1.6	9.3	142.0	-5.1
Other Asia	67.6	193.1	12.5	7.0	23.5	303.7	13.4
United States of America	88.5	151.5	9.0	5.5	21.5	276.0	-26.1
Other America	13.8	70.3	2.1	1.2	7.4	94.8	0.9
Middle East and North Africa	11.0	51.3	4.7	1.1	8.8	77.0	0.5
Other Africa	12.4	37.3	1.9	1.1	4.1	56.8	-1.7
Not stated	0.3	1.8	0.2	—	0.2	2.5	-83.3
<b>Total</b>	<b>674.2</b>	<b>2 294.4</b>	<b>98.2</b>	<b>46.6</b>	<b>254.4</b>	<b>3 367.9</b>	<b>1.1</b>

(a) Includes those visitors attending a convention or conference. (b) Includes those visitors whose main purpose is visiting friends and relatives. (c) Data for 2000–01 are not yet available, so the percentage change has been calculated on 1999–2000.

Source: ABS data available on request, *Overseas Arrivals and Departures Collection*.

Over two-thirds (68%) of Australian residents travelling abroad in 2001–02 went for a holiday. 'Holiday' (which includes those travellers visiting friends and relatives) was the main purpose of trip for Australians travelling to all destinations.

Australians travelling for 'business' reasons accounted for 20% of Australian outbound travellers. Their main destinations were New Zealand and the United States of America.

The long distances Australian residents travel to other countries are reflected in the length of time spent per trip. In 2001–02 only 13% stayed abroad

less than a week (predominantly business travellers), while almost a third (32%) stayed away for at least a month (table 22.16).

While the number of Australian residents departing for visits abroad varies from month to month, there are not large seasonal fluctuations. The highest number of departures in 2001–02 were in September and December (9.9% each), while February recorded the lowest number of departures (6.5%) (table 22.17).

### 22.16 AUSTRALIANS TRAVELLING ABROAD, By intended length of stay and main purpose of trip — 2001–02

Intended length of stay	Main purpose of trip						Total '000	Proportion of total %
	Business(a) '000	Holiday(b) '000	Employment '000	Education '000	Other and not stated '000	Total '000		
Under 1 week	234.7	166.8	5.1	3.5	22.0	432.1	12.8	
1 week and under 2 weeks	201.2	669.9	7.5	10.6	100.0	989.2	29.4	
2 weeks and under 1 month	124.5	690.0	7.9	10.1	49.7	882.1	26.2	
1 month and under 2 months	51.0	435.3	11.7	5.1	29.5	532.5	15.8	
2 months and under 3 months	20.7	136.6	9.3	2.8	14.1	183.5	5.4	
3 months and under 6 months	21.8	116.2	16.8	5.0	15.7	175.5	5.2	
6 months and under 12 months	20.4	79.4	40.1	9.6	23.4	173.0	5.1	
<b>Total</b>	<b>674.2</b>	<b>2 294.4</b>	<b>98.2</b>	<b>46.6</b>	<b>254.4</b>	<b>3 367.9</b>	<b>100.0</b>	

(a) Includes those visitors attending a convention or conference. (b) Includes those visitors whose main purpose is visiting friends and relatives.

Source: ABS data available on request, Overseas Arrivals and Departures Collection.

### 22.17 AUSTRALIANS TRAVELLING ABROAD, By month of departure and main purpose of trip — 2001–02

	Main purpose of trip					Total '000	Proportion of total %
	Business(a) '000	Holiday(b) '000	Employment '000	Education '000	Other and not stated '000		
<b>2001</b>							
July	58.6	217.8	6.7	3.8	26.6	313.5	9.3
August	56.9	200.4	8.1	3.8	22.5	291.7	8.7
September	59.6	236.9	5.4	9.1	22.1	333.0	9.9
October	55.6	159.8	8.7	3.2	19.1	246.5	7.3
November	51.3	148.8	7.1	3.1	17.0	227.4	6.8
December	31.4	266.0	7.9	3.8	24.2	333.2	9.9
<b>2002</b>							
January	50.4	151.9	12.0	5.2	19.9	239.5	7.1
February	52.8	134.7	8.9	2.1	20.2	218.6	6.5
March	63.6	187.2	7.6	2.5	22.6	283.5	8.4
April	66.7	172.9	8.6	3.3	16.4	267.9	8.0
May	63.3	200.3	9.0	2.3	19.6	294.5	8.7
June	64.1	217.7	8.1	4.5	24.2	318.6	9.5
<b>Total</b>	<b>674.2</b>	<b>2 294.4</b>	<b>98.2</b>	<b>46.6</b>	<b>254.4</b>	<b>3 367.9</b>	<b>100.0</b>

(a) Includes those visitors attending a convention or conference. (b) Includes those visitors whose main purpose is visiting friends and relatives.

Source: Overseas Arrivals and Departures, Australia, June 2002 (3401.0).

## Tourist accommodation

At 31 December 2001 there were 198,133 rooms available in Australia in hotels, motels, guest houses and serviced apartments having 15 or more rooms or units (table 22.18). This was an increase of 2% over the number available at 31 December 2000. Serviced apartments with 15 or more rooms or units recorded the biggest increase in room capacity (5%). Supply of accommodation exceeded demand in 2001, with room occupancy rates of 62% for hotels, 52% for motels and 61% for serviced apartments.

Takings from these accommodation establishments recorded a small increase (1%) in the calendar year 2001 compared to 2000. This

increase was due to rises in takings (which include Goods and Services Tax, introduced on 1 July 2000) in the March and June 2001 quarters compared to the corresponding quarters in 2000. Takings from accommodation fell in the September and December quarters of 2001 compared to 2000, by 8% and 5% respectively. It is likely that the twin crises of September 2001, the demise of Ansett and the terrorist attacks in the United States of America of September 11, contributed to the decline in takings during those two quarters. The higher takings during the Olympic and Paralympic Games period, affecting the September and December quarters of 2000, are also a contributing factor.

**22.18 TOURIST ACCOMMODATION(a)**

	Units	1997	1998	1999	2000	2001
<b>LICENSED HOTELS WITH FACILITIES(b)</b>						
Establishments(c)	no.	738	747	766	780	781
Guest rooms(c)	no.	68 027	70 802	73 416	76 783	78 574
Bed spaces(c)	no.	182 349	191 147	196 329	204 109	206 592
Room occupancy rates(d)	%	63.2	61.5	63.1	63.5	61.6
Bed occupancy rates(d)	%	38.9	37.5	38.5	38.8	38.8
Gross takings from accommodation(d)	\$m	1 994.6	2 030.6	2 103.6	2 459.1	2 446.9
<b>MOTELS AND GUEST HOUSES WITH FACILITIES(b)</b>						
Establishments(c)	no.	2 377	2 386	2 413	2 402	2 400
Guest rooms(c)	no.	83 476	84 701	86 019	84 722	84 430
Bed spaces(c)	no.	250 289	252 044	255 588	250 170	247 776
Room occupancy rates(d)	%	54.5	53.8	54.4	53.0	52.0
Bed occupancy rates(d)	%	32.0	31.8	32.2	31.4	31.2
Gross takings from accommodation(d)	\$m	1 264.2	1 283.3	1 342.7	1 424.5	1 403.4
<b>SERVICED APARTMENTS(b)</b>						
Establishments(c)	no.	472	552	600	646	657
Guest rooms(c)	no.	20 831	26 558	30 644	33 421	35 129
Bed spaces(c)	no.	75 169	93 563	107 748	113 267	117 192
Room occupancy rates(d)	%	62.3	60.5	60.4	59.3	60.7
Bed occupancy rates(d)	%	n.a.	37.0	37.2	37.9	39.9
Gross takings from accommodation(d)	\$m	469.1	564.0	693.3	841.4	915.2
<b>TOTAL HOTELS, MOTELS AND SERVICED APARTMENTS(b)</b>						
Establishments(c)	no.	3 587	3 685	3 779	3 828	3 838
Guest rooms(c)	no.	172 334	182 061	190 079	194 926	198 133
Bed spaces(c)	no.	507 807	536 754	559 665	567 546	571 560
Room occupancy rates(d)	%	58.9	57.7	58.7	58.1	57.3
Bed occupancy rates(d)	%	n.a.	34.7	35.3	35.3	35.7
Room nights occupied(d)	'000	36 182.9	37 324.4	39 822.2	41 079.6	41 176.3
Gross takings from accommodation(d)	\$m	3 727.8	3 877.8	4 139.7	4 725.0	4 765.5

(a) Comprising establishments with 15 or more rooms or units. (b) For definitions see the source below. (c) As at 31 December. (d) Year ended December.

Source: *Tourist Accommodation, Australia (8635.0)*.

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# Sustainable tourism in the Great Barrier Reef Marine Park

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*This article was contributed by Hilary Skeat of the Tourism and Recreation Section in the Great Barrier Reef Marine Park Authority.*

## About the Great Barrier Reef

The Great Barrier Reef off Queensland's east coast is an international tourism icon. It is made up of about 2,900 unconnected coral reefs, stretching over 2,000 km from south of Papua New Guinea to Bundaberg. There are also about 900 islands within the Great Barrier Reef.

The Great Barrier Reef is a massive formation and is the only living structure that can be seen from the moon — astronauts describe it as 'a thin white line in the blue ocean'. The living reefs of today have grown since the last Ice Age 8,000 years ago. All the sandy islands within the Great Barrier Reef are less than about 6,000 years old.

The Great Barrier Reef is the largest, most complex and diverse coral reef system in the world. It is home to over 1,500 species of fish, 400 species of coral and many rare and endangered species. The area supports one of the largest dugong populations in the world and is an important breeding and feeding ground for whales and dolphins. Six of the world's seven species of marine turtles can also be found there.

Complementing the Reef's natural wonders is a rich cultural heritage. For thousands of years, this unique marine environment has been central to the social, economic and spiritual life of nearby coastal Aboriginal and Torres Strait Islander peoples.

The Great Barrier Reef was inscribed as a World Heritage area in 1981 in recognition of its natural significance. It is the largest World Heritage area ever established. Under the World Heritage Convention, Australia has an international obligation to protect, conserve, present and transmit this magnificent area for all future generations.

Map S22.1 shows the boundary of the Great Barrier Reef Marine Park, and the World Heritage area.

## Great Barrier Reef Marine Park

The Great Barrier Reef Marine Park is a marine protected area which includes almost all of the Great Barrier Reef. It encompasses an area of about 345,400 square kilometres, commencing at the tip of Cape York and extending along the Queensland coast to just north of Bundaberg. The Marine Park includes all of the marine environment below low water mark, except for a small number of exclusions around major shipping ports.

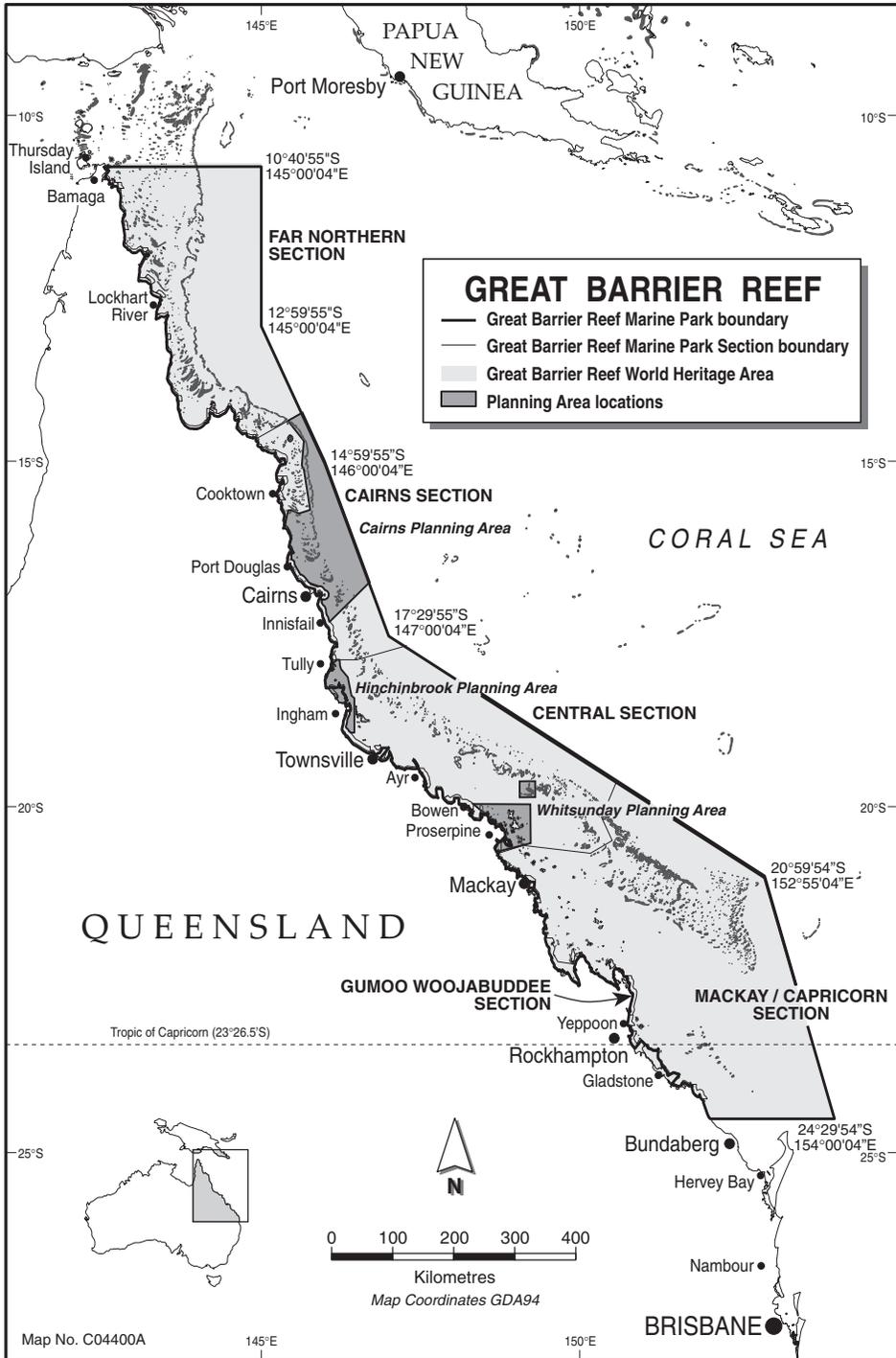
The Great Barrier Reef Marine Park is a protected area with a difference. While protection of the area and its values is the principal aim, a range of commercial and extractive activities is undertaken within the Marine Park. The major uses include tourism, commercial and recreational fishing, and shipping.

The Great Barrier Reef Marine Park Authority, a Commonwealth government agency, is responsible for ensuring that this multiple use Marine Park is used sustainably and is preserved for future generations. It is also the lead agency responsible for ensuring that Australia's obligations under the World Heritage Convention are met.

## History of tourism use

The earliest instance of organised tourism on the Great Barrier Reef was in the 1890s when Green Island became a destination for pleasure cruises offshore of Cairns. By the 1930s tourism resorts had begun to develop at Green Island and at Heron Island further south. During the first half of the 20th century, most tourist activity was inshore and close to regional centres, being limited by vessel technology and poor transport links to southern capitals.

S22.1 GREAT BARRIER REEF



Source: Great Barrier Reef Marine Park Authority.

During the 1960s and 1970s there was steady growth in visitor numbers, particularly at Green Island and in the Whitsundays. By the end of the 1970s new, faster vessels extended the range of a day trip to the Reef to between 15 and 20 nautical miles.

Reef tourism grew rapidly in the 1980s and early 1990s, assisted by improved air access to a number of regional centres (including an international airport in Cairns) and improved road transport links. In the early 1980s visitor numbers to the Marine Park were increasing by about 30% per year. There was also a steady growth in the number of operations over this time, and the capacity, range and diversity of products offered expanded markedly. High-speed modern vessels extended the range of a day trip to the reef to over 50 nautical miles.

### Tourism today

Tourism is now the largest commercial activity in the Great Barrier Reef Marine Park. Generating over \$1b per annum, the marine tourism industry is a major contributor to the local and Australian economies.

About 1.6 million tourists now visit the Great Barrier Reef Marine Park each year. This number has remained relatively static since the mid 1990s. About 85% of tourists visit the Marine Park in the area offshore of Cairns and in the Whitsundays, a combined area of less than 10% of the Marine Park.

There are approximately 730 tourism operators and 1,500 vessels and aircraft permitted to operate in the Great Barrier Reef Marine Park. About 60% of these permitted operators are actively undertaking a tourism operation in the Marine Park.

There is a diverse range of tourism operations catering to the differing needs of visitors to the Great Barrier Reef. However the basis of any trip to the Reef is usually nature-based activities focused on the coral and other marine life. Activities typically include: snorkelling; scuba diving; fishing; excursions in glass-bottomed boats and semi-submersible vessels; and learning about the marine environment.

The marine tourism industry plays an important role in presenting the World Heritage area to a wide range of visitors. In fact, for many visitors to coastal Queensland, the tourism fleet is their

primary means of experiencing the Great Barrier Reef and learning about its World Heritage values.

### Managing tourism use of the Great Barrier Reef

Keeping the Barrier Reef 'Great' for future generations requires the cooperative effort of the Great Barrier Reef Marine Park Authority, the Queensland Parks and Wildlife Service, other government agencies, the marine tourism industry and other stakeholders. By working together, the diversity, integrity and productivity of the Great Barrier Reef can be maintained and the impacts of all activities in the Marine Park can be minimised. The goal is to provide for the protection, wise use, understanding and enjoyment of the Great Barrier Reef in perpetuity.

In managing tourism use of the Marine Park, particular attention is given to:

- protecting coral reefs and other habitats such as seagrass from anchor damage, poor diving practices, waste disposal, reef walking and collecting
- protecting turtles and seabirds from disturbance, especially during nesting seasons
- respecting the cultural importance of the Great Barrier Reef to Aboriginal and Torres Strait Islanders
- minimising conflicts in access within this multiple use Marine Park
- informing the community about the Great Barrier Reef and its World Heritage values
- encouraging the adoption of best practices within tourism operations
- assisting the marine tourism industry to contribute to management initiatives and monitoring programs.

Fundamental to management is the *Great Barrier Reef Marine Park Act 1975* (Cwlth). Its regulations provide the framework for the establishment, care and ongoing management of the Marine Park. There is also a reef-wide system of zoning which defines in broad terms a set of management objectives for each zone along with a description of what activities, especially extractive activities, may or may not take place, including those that require a permit.

Permits are required for all tourism activities in the Marine Park. It is through these permits that the activities that may be undertaken by each operator are defined and any necessary conditions described.

Management issues relating to tourism use of a specific region can be further addressed through plans of management. Such plans have been developed for the Cairns Area and Whitsundays (the two major tourism nodes in the Marine Park). These plans are designed to manage:

- environmental protection of these high-use sites
- separation of different uses
- resolution of conflicting use
- limiting use where necessary.

Tourism use is also managed on a finer scale through specific management initiatives for popular reefs and bays. Here the focus is on localised issues, and any plans and management strategies are developed in close consultation with local users.

A set of best practices has been developed to guide the activities of tourism operators and visitors in the Marine Park. Many of the tourism associations have developed voluntary codes of conduct to ensure that their members' operations are sustainable. The Great Barrier Reef Marine Park Authority communicates information about management requirements and sustainable use through a range of quality information products and training opportunities.

Increasingly, the Great Barrier Reef Marine Park Authority is recognising the important role the marine tourism industry plays in presenting the area to the general public and its potential to work in partnership with managers to achieve best practice, sustainable use of the Marine Park. Through working cooperatively with the marine tourism industry, we aim to ensure a sustainable and vibrant future for tourism on the Great Barrier Reef.

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## Introduction

Transport can be described broadly as the movement of goods or people from an origin to a destination.

Transport is one of the most fundamental aspects of an advanced economy. Buildings cannot be constructed without transportation of materials and people, food must be transported from farms to shops, and people must travel to get to and from work, school, recreation and other facilities. Information about all aspects of transport and its support industries is vital to effective planning by governments and industry.

Transport also has enormous economic and social impact. While it generates substantial employment and contributes significantly to the gross domestic product (GDP), with numerous support industries ranging from automotive manufacturers to travel agencies, it also generates costs such as accidents, which can result in injury and loss of life, through to the inconvenience of traffic congestion.

The impact of transport on the environment ranks among the top issues of national community concern. Areas where transport directly or indirectly impacts on the environment include fuel emissions, noise pollution, impact on wildlife, and land and water pollution from spillages of dangerous cargoes. A number of these issues are discussed in the article *Environmental impacts of Australia's transport system* at the end of this chapter.

In addition to environmental aspects relating to transport, this chapter also covers issues surrounding domestic and international transportation of people and freight, safety, transport infrastructure and equipment, and transport organisations. The modes of transportation discussed in this chapter are those of road, rail, sea and air.

## Transport activity

### General transport activity

This section provides data relating to the movement of goods and persons. Examples include distance travelled, tonnes of freight carried and number of passengers.

### Road transport activity

Motor vehicles travelled a total distance of 180,782 million kilometres in the year ended 31 October 2000 at an average of 15,400 km per vehicle on the road (table 23.1). Business use accounted for an estimated 34.4% of distance travelled, while the journey to and from work accounted for a further 22.1%. Private use made up the remaining 43.5%.

Table 23.2 shows the areas in which motor vehicles travelled. Only 5.4% of total distance travelled was interstate while 55.5% was within the capital city of the state or territory in which the vehicle was registered.

### Rail transport activity

The Australian rail industry is very diverse. It comprises rail operators, (freight, passenger, tourist and heritage), manufacturers, suppliers, consultants, track access corporations, maintenance and construction contractors, logistics providers and a wide range of other companies covering all sectors of the industry. The majority of companies in the rail industry are private profitable enterprises trading in highly competitive domestic and international markets. They generate 1.6% of Australia's GDP with output of goods and services worth \$8b each year, including \$0.5b per year in exports.

Australia's railways are undergoing significant change. Privatisation has resulted in a decline in government ownership and management of railways. There are over 180 private and public companies involved in the Australian rail industry, employing around 75,000 people in urban and regional Australia. In many rural and regional centres, employment in the rail or rail-related sector comprises a major source of employment.

Each part of the rail industry has quite different business and community objectives. Freight services are profitable, commercial enterprises; urban and rural passenger services are community services financed by fares and taxation; and track access providers are charged with the responsibility of making commercial rates of return that include full accounting for capital investment and capital stock.

In New South Wales, Victoria, Western Australia and Tasmania, government rail freight operations have been sold to private organisations. Passenger services in New South Wales, Western Australia and Queensland remain government operations.

## 23.1 BUSINESS AND PRIVATE VEHICLE USE — Year ended 31 October 2000(a)

Type of vehicle	Business			Total to and from work	Private	Total
	Laden	Unladen	Total(b)			
TOTAL KILOMETRES TRAVELLED (million)						
Passenger vehicles	n.a.	n.a.	31 085	35 050	72 590	138 725
Motor cycles	n.a.	n.a.	131	449	587	1 167
Light commercial vehicles	12 704	4 833	17 537	4 318	5 281	27 136
Rigid trucks	4 406	1 834	6 240	94	81	6 415
Articulated trucks	3 887	1 436	5 323	*6	*2	5 331
Non-freight carrying trucks	n.a.	n.a.	252	**1	**1	254
Buses	n.a.	n.a.	1 664	19	70	1 754
<b>Total</b>	<b>20 997</b>	<b>8 104</b>	<b>62 233</b>	<b>39 937</b>	<b>78 612</b>	<b>180 782</b>
AVERAGE KILOMETRES TRAVELLED PER VEHICLE(c) ('000)						
Passenger vehicles	n.a.	n.a.	10.2	7.1	8.5	14.7
Motor cycles	n.a.	n.a.	2.6	4.6	3.1	4.6
Light commercial vehicles	14.3	8.3	17.6	7.5	6.1	17.1
Rigid trucks	15.9	8.5	22.3	4.4	2.7	21.3
Articulated trucks	71.3	30.2	96.5	2.9	*1.3	94.4
Non-freight carrying trucks	n.a.	n.a.	13.9	*3.2	*1.8	13.8
Buses	n.a.	n.a.	34.2	4.3	9.4	32.6
<b>Total</b>	<b>17.2</b>	<b>9.5</b>	<b>13.9</b>	<b>7.1</b>	<b>8.2</b>	<b>15.4</b>

(a) Because of changes to methodology, caution should be used when comparing these data with data from the 1995 and earlier surveys presented in previous editions of Year Book Australia. (b) Includes business travel of non-freight carrying vehicles.

(c) Calculated using total kilometres travelled divided by the average number of registered vehicles, for each type of vehicle, by type of use.

Source: Survey of Motor Vehicle Use, Australia, 12 months ended 31 October 2000 (9208.0).

## 23.2 AREA OF OPERATION — Year ended 31 October 2000(a)

Type of vehicle	Within state/territory of registration					Interstate(c)	Australia
	Capital city(b)	Provincial urban	Other areas of state or territory	Total			
TOTAL KILOMETRES TRAVELLED (million)							
Passenger vehicles	82 488	17 986	31 219	131 692	7 032	138 725	
Motor cycles	536	212	318	1 066	*101	1 167	
Light commercial vehicles	12 049	4 351	9 830	26 230	906	27 136	
Rigid trucks	3 405	757	2 022	6 184	231	6 415	
Articulated trucks	977	338	2 539	3 854	1 477	5 331	
Non-freight carrying types	108	**74	*63	245	*9	254	
Buses	820	268	589	1 678	76	1 754	
<b>Total</b>	<b>100 383</b>	<b>23 987</b>	<b>46 580</b>	<b>170 950</b>	<b>9 833</b>	<b>180 782</b>	
AVERAGE KILOMETRES TRAVELLED PER VEHICLE(d) ('000)							
Passenger vehicles	11.6	6.7	9.8	14.0	8.4	14.7	
Motor cycles	4.1	3.7	2.9	4.3	*5.1	4.6	
Light commercial vehicles	15.4	10.2	13.1	16.7	8.9	17.1	
Rigid trucks	22.4	11.6	14.4	20.7	14.7	21.3	
Articulated trucks	29.9	19.3	64.1	70.5	86.9	94.4	
Non-freight carrying types	16.1	*17.3	*7.5	13.7	*13.7	13.8	
Buses	27.0	18.5	25.6	31.6	19.7	32.6	
<b>Total</b>	<b>12.2</b>	<b>7.3</b>	<b>10.9</b>	<b>14.7</b>	<b>9.8</b>	<b>15.4</b>	

(a) Because of changes to methodology caution must be taken when comparing these data with data from the 1995 and earlier surveys presented in previous editions of Year Book Australia. (b) Relates to travel within the capital of the state/territory where a vehicle is registered (i.e. Sydney for vehicles registered in NSW). (c) Interstate travel relates to distance travelled in states/territories other than the one in which the vehicle was registered (e.g. distance travelled by a NSW registered vehicle in Vic.). It is not classified by capital city/provincial urban/other area (i.e. distance travelled by a NSW registered vehicle in Melbourne is shown as interstate travel and not capital city travel). (d) Calculated as total kilometres travelled divided by the number of vehicles travelling, for each type of vehicle, by area of operation.

Source: Survey of Motor Vehicle Use, Australia, 12 months ended 31 October 2000 (9208.0).

### Domestic airline activity

Table 23.3 shows the hours flown and aircraft departures for the major domestic and regional airlines. Aircraft departures decreased by 1.1% in 2001 compared to departures in 2000. The number of hours flown in 2001 decreased by 1.2% from 2000.

In addition to scheduled services of domestic and regional airlines shown in table 23.3, a wide range of other activities is undertaken by the aviation industry, including business flying, aerial agriculture, charter, training and private flying (table 23.4). Charter operations and training have, in recent years, made up more than half of general aviation hours flown. Charter operations involve the use of aircraft in non-scheduled operations for the carriage of passengers and

cargo for hire or reward. General aviation hours flown in 2001 were marginally lower across all activity types (except private/business) than hours flown in 2000.

### International air transport activity

Table 23.5 shows the number of flights into and out of Australia in 2001 both increased marginally over 2000 levels. Other airlines (i.e. overseas operators) represented 65.8% of all scheduled international airline traffic. In 2001 these airlines marginally decreased their flights (incoming flights by 0.5% and outgoing flights by 0.1%) compared with 2000, while Qantas increased flights into and out of Australia by 6.9% and 6.5% respectively. In contrast, the number of Ansett flights fell sharply, with flights into and out of the country both dropping by 28% as a result of that airline's operations ceasing.

#### 23.3 DOMESTIC AIRLINE(a) ACTIVITY, Major airlines

	1996	1997	1998	1999	2000(a)	2001(a)
	'000	'000	'000	'000	'000	'000
Hours flown	454	440	440	442	463	458
Aircraft departures	254	242	239	240	249	246

(a) Includes Ansett Australia, Qantas Airways Ltd, Virgin Blue and the jet services of Impulse Airline.

Source: Department of Transport and Regional Services.

#### 23.4 GENERAL AVIATION ACTIVITY, Hours flown

	1996	1997	1998	1999	2000(a)	2001(b)
	'000	'000	'000	'000	'000	'000
Charter	483	487	498	508	480	469
Agricultural	126	137	148	135	124	115
Flying training	450	455	484	454	419	414
Other aerial work	293	315	319	314	304	301
Private/business	447	446	430	432	388	411
<b>Total</b>	<b>1 799</b>	<b>1 839</b>	<b>1 878</b>	<b>1 842</b>	<b>1 715</b>	<b>1 711</b>

(a) Revised data. (b) 2001 figures are preliminary.

Source: Department of Transport and Regional Services.

#### 23.5 SCHEDULED INTERNATIONAL AIRLINE TRAFFIC TO AND FROM AUSTRALIA(a)(b)(c)

Type of traffic	1999	2000	2001
TRAFFIC TO AUSTRALIA			
Qantas Airways Limited	12 675	13 751	14 702
Ansett Australia	1 640	1 450	1 046
Other airlines	27 219	30 633	30 484
<b>All airlines</b>	<b>41 534</b>	<b>45 834</b>	<b>46 232</b>
TRAFFIC FROM AUSTRALIA			
Qantas Airways Limited	12 733	13 817	14 714
Ansett Australia	1 646	1 454	1 048
Other airlines	26 713	30 083	30 051
<b>All airlines</b>	<b>41 092</b>	<b>45 354</b>	<b>45 813</b>

(a) Includes Norfolk Island. (b) Includes Qantas flights using aircraft leased from other airlines and vice versa. (c) The difference between to and from numbers arises because some outward flights are operated as non-scheduled, and so are not counted in the table.

Source: Department of Transport and Regional Services.

## Domestic freight activity

Movement of freight within Australia is a significant part of the transport task. Goods are transported across vast distances because of the size of the country and the dispersed locations of its agricultural, mining, production and population centres. Key measures used to capture the freight transport task are tonnes carried and tonne-kilometres, which represents mass moved by distance.

In the 12 months ended 31 March 2001, the transport network in Australia, comprising the modes of road (articulated vehicles only), rail, sea and air, accounted for an estimated 320,108 million tonne-kilometres and handled 1,171 million tonnes of freight. The following sections provide further information on the domestic freight task for each of these modes.

## Road freight activity

Articulated trucks are responsible for the largest percentage (approximately three-quarters) of the freight transport task performed by road. In the 12 months ended 31 March 2001, articulated vehicles in Australia lifted an estimated 614 million tonnes of freight (table 23.6), equating to over 88 billion tonne-kilometres travelled. Freight originating in New South Wales accounted for 29.9% of both the total tonne-kilometres travelled (26,440 million) and the total tonnes carried by road (184 million).

Table 23.7 provides details of the major commodities moved by road in the 12 months to 31 March 2001. Food accounted for 21.9% of the tonne-kilometres travelled and 14.4% (89 million) of the tonnes carried by road. The second highest

percentage (14%) of tonnes carried by road was for stone, sand and gravel, yet because of shorter trip distances this commodity only accounted for 3.8% (3,373 million) of the total tonne-kilometres travelled.

### 23.6 ROAD FREIGHT(a) — Year ended 31 March 2001

State/territory of origin	Travelled	Carried
	million tonne-kilometres(b)	million tonnes
New South Wales	26 440	184
Victoria	18 746	121
Queensland	19 174	127
South Australia	9 286	46
Western Australia	11 281	105
Tasmania	1 504	21
Northern Territory	1 728	8
Australian Capital Territory	216	1
<b>Australia</b>	<b>88 374</b>	<b>614</b>

(a) Articulated vehicles only. (b) Total tonne-kilometres are the total tonnes carried multiplied by the distance travelled in kilometres.

Source: *Freight Movements, Australia, Summary, year ended 31 March 2001 (9220.0)*.

## Rail freight activity

An estimated 134,109 million tonne-kilometres, representing 509 million tonnes of freight, were moved on the rail network in the 12 months ended 31 March 2001 (table 23.8). Freight originating in Western Australia and Queensland combined accounted for over three-quarters (76.7%) of the total tonne-kilometres travelled by rail. This was primarily due to the large movements of commodities over longer trip distances in these geographically larger states.

### 23.7 MAJOR COMMODITIES MOVED BY ROAD(a) — Year ended 31 March 2001

	Tonne-kilometres(b)		Tonnes	
	million	% of total	million	% of total
Food (for human and animal consumption)	19 326	21.9	89	14.4
General freight(c)	15 408	17.4	46	7.5
Other manufactured goods	7 276	8.2	38	6.2
Petroleum and petroleum products	4 807	5.4	30	4.8
Machinery and transport equipment	4 207	4.8	22	3.5
Cork and wood	4 093	4.6	35	5.8
Cereal grains	4 031	4.6	42	6.9
Crude materials	3 895	4.4	35	5.7
Stone, sand and gravel	3 373	3.8	86	14.0

(a) Articulated vehicles only. (b) Total tonne-kilometres are the total tonnes carried multiplied by the distance travelled in kilometres. (c) Consignments not classified by commodity.

Source: *Freight Movements, Australia, Summary, year ended 31 March 2001 (9220.0)*.

### 23.8 RAIL FREIGHT(a) — Year ended 31 March 2001

State/territory of origin	million tonne-kilometres(b)	million tonnes
New South Wales	19 621	112
Victoria	6 188	10
Queensland	42 458	172
South Australia	5 176	19
Western Australia	60 429	196
Tasmania	n.a.	n.a.
Northern Territory	234	—
Australian Capital Territory	3	—
<b>Australia</b>	<b>134 109</b>	<b>509</b>

(a) Excludes rail freight movements in Tas. due to confidentiality. (b) Total tonne-kilometres are the total tonnes carried multiplied by the distance travelled in kilometres.

Source: *Freight Movements, Australia, Summary, year ended 31 March 2001 (9220.0)*.

Of the total tonne-kilometres travelled by rail, nearly three-quarters (74.5% or 99,868 million) were for metalliferous ores and metal scrap, and coal (table 23.9). General freight, while accounting for only 2.9% (15 million) of the total tonnes carried on the rail network, represented 11.9% (16,018 million) of the tonne-kilometres travelled by this mode, indicating longer trip distances than those travelled by some other commodity types.

#### Sea freight activity

In the 12 months ended 31 March 2001, the sea network carried 47 million tonnes (table 23.10). This tonnage was moved over 97,349 million tonne-kilometres, or 30.4% of tonne-kilometres travelled by all modes combined in Australia. Due to the long average hauls for domestic shipping, sea freight accounted for a much higher proportion of total tonne-kilometres travelled than of total tonnage moved.

Metalliferous ores and metal scrap accounted for the highest percentages of tonnes carried (42.5%) and tonne-kilometres travelled (62.8%) by sea in the 12 months ended 31 March 2001 (table 23.11). Nearly three-quarters (74.1%) of all tonne-kilometres travelled for petroleum and petroleum products by all modes was by sea.

#### Air freight activity

Air accounted for less than 1% of the total domestic freight task in the year ended 31 March 2001. Freight originating in New South Wales and Victoria combined accounted for over half (53.5%) of all tonne-kilometres travelled on the air network (table 23.12).

The two major commodities moved by air were general freight, at 166 million tonne-kilometres (60.1% of the total) and other commodities n.e.s. at 66 million tonne-kilometres (23.8% of the total) (table 23.13).

### 23.10 SEA FREIGHT — Year ended 31 March 2001

State/territory of origin	million tonne-kilometres(a)	million tonnes
New South Wales	6 808	5
Victoria	8 342	7
Queensland	31 736	16
South Australia	10 184	7
Western Australia	33 691	7
Tasmania	4 283	5
Northern Territory	2 307	1
Australian Capital Territory	—	—
<b>Australia</b>	<b>97 349</b>	<b>47</b>

(a) Total tonne-kilometres are the total tonnes carried multiplied by the distance travelled in kilometres.

Source: *Freight Movements, Australia, Summary, year ended 31 March 2001 (9220.0)*.

### 23.9 MAJOR COMMODITIES MOVED BY RAIL(a) — Year ended 31 March 2001

	Tonne-kilometres(b)		Tonnes	
	million	% of total	million	% of total
Metalliferous ores and metal scrap	55 615	41.5	197	38.6
Coal	44 254	33.0	221	43.6
General freight(c)	16 018	11.9	15	2.9
Cereal grains	5 787	4.3	19	3.7
Iron and steel	3 993	3.0	6	1.2
Crude materials	2 334	1.7	33	6.4

(a) Excludes rail freight movements in Tas. due to confidentiality. (b) Total tonne-kilometres are the total tonnes carried multiplied by the distance travelled in kilometres. (c) Consignments not classified by commodity.

Source: *Freight Movements, Australia, Summary, year ended 31 March 2001 (9220.0)*.

## 23.11 MAJOR COMMODITIES MOVED BY SEA — Year ended 31 March 2001

	Tonne-kilometres(a)		Tonnes	
	million	% of total	million	% of total
Metalliferous ores and metal scrap	61 118	62.8	20	42.5
Petroleum and petroleum products	16 159	16.6	11	22.9
Crude materials	4 272	4.4	4	8.0
Cement	3 131	3.2	3	5.5
Coal	3 013	3.1	3	5.3
Iron and steel	1 929	2.0	2	3.5
Food (for human and animal consumption)	1 923	2.0	1	2.8

(a) Total tonne-kilometres are the total tonnes carried multiplied by the distance travelled in kilometres.

Source: *Freight Movements, Australia, Summary, year ended 31 March 2001 (9220.0)*.

## 23.12 AIR FREIGHT — Year ended 31 March 2001

State/territory of origin	million tonne-kilometres(a)	million tonnes
New South Wales	74	0.1
Victoria	74	0.1
Queensland	48	—
South Australia	14	—
Western Australia	46	—
Tasmania	9	—
Northern Territory	10	—
Australian Capital Territory	2	—
<b>Australia</b>	<b>276</b>	<b>0.2</b>

(a) Total tonne-kilometres are the total tonnes carried multiplied by the distance travelled in kilometres.

Source: *Freight Movements, Australia, Summary, year ended 31 March 2001 (9220.0)*.

## 23.13 MAJOR COMMODITIES MOVED BY AIR — Year ended 31 March 2001

	million tonne-kilometres(a)	% of total
General freight(b)	166	60.1
Other commodities n.e.s.(c)	66	23.8
Food (for human and animal consumption)	32	11.7
Miscellaneous manufactured articles(d)	12	4.4

(a) Total tonne-kilometres are the total tonnes carried multiplied by the distance travelled in kilometres.

(b) Consignments not classified by commodity. (c) All other commodities not elsewhere specified (n.e.s.) including empty used containers, personal effects and furniture not for sale. (d) Manufactured goods for final consumption and/or made of more than one material.

Source: *Freight Movements, Australia, Summary, year ended 31 March 2001 (9220.0)*.

## International freight activity

Details on the tonnages of freight moved into and out of Australia by sea and air are shown below.

## Sea freight activity

The nature of Australia's trade means that the weight of exports (e.g., coal, iron ore, and agricultural products) far exceeds that of imports. Most of the tonnage of exports and imports is shipped by bulk carriers or tankers.

Between 1997–98 and 2001–02 the weight of total exports moved by sea increased by 18.3%, from 428 million tonnes to 506 million tonnes (table 23.14). Tonnages of food and live animal exports rose every year between 1997–98 and 2000–01, before falling by 7% in 2001–02 to 28 million tonnes. The export of mineral fuels, lubricants and related materials has risen consistently in the five years to 2001–02 (from 181 million tonnes to 223 million tonnes). This commodity group also accounted for the greatest proportion of total exports by weight for 2001–02 (44.1%), whereas for previous years the greatest proportion of tonnage of sea freight exports was of commodities classified to crude materials, inedible, except fuels. The other commodity group, the export of which has increased every year between 1997–98 and 2001–02, is beverages and tobacco.

The weight of total imports increased by 11.4% between 1997–98 and 2001–02, from 52 million tonnes to 58 million tonnes. Over this period beverages and tobacco imports rose by 56.2%, miscellaneous manufactured articles imports by 45%, food and live animal imports by 35.5%, and imports of manufactured goods classified chiefly by material by 23.3%.

### Air freight activity

The tonnage of total cargo moved into Australia by air fell by 12.4% in 2001 over the previous year (table 23.15). Tonnage of outgoing freight continued to exceed that of incoming freight (by 20.9% in 2001). In contrast, the tonnage of mail

moved out of Australia in 2001 (which increased by 3.9% on 2000 levels) remained 5.9% less than the tonnage of incoming mail (which fell by 4.6% from 2000). In 2001, the Australian airlines accounted for 24.6% of incoming and 29.3% of outgoing cargo.

### 23.14 INTERNATIONAL SEA FREIGHT

Commodity group	1997-98	1998-99	1999-2000	2000-01	2001-02
	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes
<b>EXPORTS</b>					
Food and live animals	28 087	28 920	29 910	30 369	28 239
Beverages and tobacco	406	432	576	805	884
Crude materials, inedible, except fuels	197 863	192 479	207 784	222 897	221 780
Mineral fuels, lubricants and related materials	180 900	186 903	198 148	218 191	223 125
Animal and vegetable oils, fats and waxes	414	474	455	484	689
Chemicals and related products n.e.c.	1 307	1 336	1 423	1 949	1 725
Manufactured goods classified chiefly by material	7 507	7 891	7 702	6 836	12 100
Machinery and transport equipment	569	573	629	941	800
Miscellaneous manufactured articles	144	152	202	301	296
Commodities and transactions not classified elsewhere in the SITC(a)	10 530	13 392	15 861	13 431	16 540
<b>Total</b>	<b>427 726</b>	<b>432 551</b>	<b>462 690</b>	<b>496 204</b>	<b>506 179</b>
<b>IMPORTS</b>					
Food and live animals	1 327	1 362	1 443	1 565	1 798
Beverages and tobacco	185	198	243	311	289
Crude materials, inedible, except fuels	8 979	8 163	8 045	7 863	8 076
Mineral fuels, lubricants and related materials	24 321	28 917	26 952	26 369	27 035
Animal and vegetable oils, fats and waxes	215	208	225	233	245
Chemicals and related products n.e.c.	7 951	8 289	9 196	8 929	9 234
Manufactured goods classified chiefly by material	5 255	5 406	6 327	5 640	6 478
Machinery and transport equipment	2 409	2 352	2 654	2 372	2 512
Miscellaneous manufactured articles	959	1 090	1 204	1 221	1 391
Commodities and transactions not classified elsewhere in the SITC(a)	263	246	73	77	742
<b>Total</b>	<b>51 863</b>	<b>56 232</b>	<b>56 361</b>	<b>54 579</b>	<b>57 798</b>

(a) Standard International Trade Classification.

Source: ABS data available on request, ABS International Trade Special Data Service.

### 23.15 SCHEDULED INTERNATIONAL AIRLINE TRAFFIC TO AND FROM AUSTRALIA(a)

Type of traffic	2000			2001		
	Freight tonnes	Mail tonnes	Total cargo tonnes	Freight tonnes	Mail tonnes	Total cargo tonnes
<b>TRAFFIC TO AUSTRALIA</b>						
Qantas Airways Limited	76 526	5 476	82 002	63 724	5 762	69 486
Ansett Australia	7 597	306	7 903	5 361	143	5 504
Other airlines	247 972	9 760	257 732	220 638	8 947	229 555
<b>All airlines</b>	<b>332 095</b>	<b>15 542</b>	<b>347 637</b>	<b>289 723</b>	<b>14 822</b>	<b>304 545</b>
<b>TRAFFIC FROM AUSTRALIA</b>						
Qantas Airways Limited	83 426	11 560	94 986	88 034	12 430	100 464
Ansett Australia	8 499	12	8 511	6 256	9	6 265
Other airlines	255 927	1 850	257 777	256 088	1 508	257 596
<b>All airlines</b>	<b>347 852</b>	<b>13 422</b>	<b>361 274</b>	<b>350 379</b>	<b>13 946</b>	<b>364 325</b>

(a) Includes Norfolk Island.

Source: Department of Transport and Regional Services.

Table 23.16 shows the main origin/destination pairs for freight moving into and out of Australia. The tonnage of freight carried fell by 5.9% between 2000 and 2001. The Auckland/Sydney route remains the major contributor, accounting for 7.7% of the total freight carried. The Singapore/Perth and Singapore/Sydney routes recorded the most significant increases in 2001 (8.1% and 4.0% respectively).

**Domestic passenger activity**

People travel within Australia for many reasons, including school, business, recreation and travel to and from work. This section provides details of rail and air passenger activity within Australia.

**Rail passenger activity**

The number of passengers carried by private and government rail operators is shown in table 23.17. Since 1992–93 there have been annual increases

in the number of rail passengers, urban and non-urban passengers increasing by 27.3% and 65.7% respectively. Heavy rail has consistently accounted for more than three-quarters of urban rail passenger operations.

**Air passenger activity**

As at 30 June 2002 there were two major domestic carriers operating in Australia, Qantas and Virgin Blue. A third major domestic carrier, Ansett Australia, ceased operations in September 2001. As at 30 June 2002, 27 regional operators provided regular public transport air services to about 170 airports in Australia.

The *Aircraft fleet* section provides details of domestic fleets.

**23.16 FREIGHT CARRIED, By city pairs(a)**

	1998 tonnes	1999 tonnes	2000 tonnes	2001 tonnes
Auckland/Sydney	54 849	54 047	50 090	49 142
Singapore/Melbourne	34 935	51 096	48 574	48 457
Singapore/Sydney	38 758	43 689	46 313	48 164
Hong Kong/Sydney	36 789	34 252	33 976	30 658
Los Angeles/Sydney	26 500	36 061	32 721	27 672
Auckland/Melbourne	32 199	34 722	29 559	30 355
Singapore/Perth	26 160	27 436	27 822	30 073
Hong Kong/Melbourne	23 821	26 031	25 879	23 632
Seoul/Sydney	11 399	12 316	18 792	16 973
Singapore/Brisbane	11 823	14 988	18 337	18 293
Other city pairs	334 674	346 878	347 887	316 684
<b>All city pairs</b>	<b>631 908</b>	<b>681 515</b>	<b>679 948</b>	<b>640 102</b>

(a) The table does not necessarily show the final origin/destination of freight. For example, all freight going to or coming from Europe would require a stopover, generally in Asia.

Source: Department of Transport and Regional Services.

**23.17 RAIL PASSENGER OPERATIONS(a)**

	Urban			Non-urban million persons	Total million persons
	Heavy rail million persons	Tram and light rail million persons	Total million persons		
1992–93	396	103	498	7	<b>505</b>
1993–94	402	106	507	8	<b>516</b>
1994–95	420	111	530	9	<b>539</b>
1995–96	441	116	556	9	<b>566</b>
1996–97	456	118	574	10	<b>584</b>
1997–98	457	121	578	10	<b>588</b>
1998–99	463	123	585	10	<b>595</b>
1999–2000	482	137	619	11	<b>629</b>
2000–01	498	137	634	12	<b>646</b>

(a) Excludes historical and tourist services. There are no rail passenger services in Tas., NT or ACT.

Source: Australasian Railway Association Inc.

Total passenger departures increased by 13.4% over the five years to 2001, with the largest increase (7.3%) occurring between 1999 and 2000 (table 23.18). The major domestic and regional airlines both increased their number of passengers over these five years. In 2001, the major domestic airlines accounted for 82.1% of total Australian domestic passenger departures. Over the five years to 2001, the regional airlines increased their share of passenger departures from 16.8% in 1997 to 17.9% in 2001.

The major domestic airlines reduced the overall ratio of vacant seat kilometres to distance travelled between 1997 and 2000. In 2000 the ratio was 22.6%, down from 25.6% in 1997. However, in 2001 this ratio increased to 23.5%.

Table 23.19 shows the number of passengers boarding or departing by major domestic and regional airlines at the main airports. In 2001 all

capital city airports except Darwin, Canberra and Perth recorded increased passenger movements compared with 2000. Hobart recorded the strongest growth (with 42.9%), followed by Brisbane (12.9%), Adelaide (5.8%), Melbourne (2.9%) and Sydney (1.8%). Sydney airport recorded 16.6 million passenger movements, Melbourne airport 13.3 million movements and Brisbane almost 10 million movements. Of the smaller airports Launceston recorded the highest growth in movements between 2000 and 2001 (72.2%), followed by Townsville (23.7%).

By contrast, passenger movements at Darwin airport dropped by 6.5% over the same period, and movements at Canberra and Perth airports both fell by 3.5%.

### 23.18 DOMESTIC AIRLINE ACTIVITY

	Units	1997	1998	1999	2000(a)	2001(a)
Passenger departures(b)						
Domestic airlines	'000	23 375	23 575	24 392	25 660	26 152
Regional airlines	'000	4 713	4 851	5 039	5 929	5 700
Total	'000	28 088	28 426	29 431	31 590	31 852
Other activity (domestic airlines only)						
Passenger kilometres performed(c)	million	26 357	26 774	27 853	29 601	30 410
Seat kilometres available(d)	million	35 403	35 467	36 119	38 232	39 739
Percentage of vacant seat kilometres	%	25.6	24.5	22.9	22.6	23.5

(a) Includes estimates for regional airlines data. (b) The unit of measurement is traffic on board (which includes transit traffic). Includes revenue passengers only. (c) The sum for all flights of the number of passengers on each flight multiplied by the distance travelled. (d) The sum for all flights of the number of seats on a flight multiplied by distance travelled.

Source: Department of Transport and Regional Services.

### 23.19 PASSENGER MOVEMENTS(a) WITH MAJOR DOMESTIC AND REGIONAL AIRLINES AT PRINCIPAL AIRPORTS

Airport	1997 '000	1998 '000	1999 '000	2000 '000	2001 '000
Sydney	14 070	(b)14 276	(b)14 879	16 265	(b)16 565
Melbourne	11 228	11 429	(b)11 902	12 939	(b)13 308
Brisbane	7 470	(b)7 438	(b)7 833	8 811	(b)9 951
Adelaide	3 636	(b)3 789	(b)3 869	3 982	(b)4 212
Perth	3 153	3 236	3 258	3 463	3 342
Canberra	1 788	1 805	1 901	2 041	(b)1 970
Hobart	832	(b)856	(b)878	928	(b)1 326
Darwin	823	854	(b)879	907	(b)848
Cairns	1 918	1 916	(b)2 023	2 133	(b)2 025
Coolangatta	1 918	1 889	(b)1 938	1 918	(b)1 795
Townsville	686	(b)704	(b)740	772	(b)955
Launceston	559	536	(b)545	532	(b)916

(a) The number of passengers on board arriving at or departing from each airport. Includes passengers in transit who are counted as both arrivals and departures at airports through which they transit. (b) Includes estimates for unreported data.

Source: Department of Transport and Regional Services.

## International passenger activity

The primary form of international passenger activity is air transportation. Details of this activity are shown in the following section.

### International scheduled air services

During 2001 there were 50 international scheduled airlines operating services to and from Australia. Eight of these were dedicated freight only operators (airlines operating only via code share arrangements have been excluded). This compares to 54 international scheduled airlines and 8 dedicated freight only operators in 2000.

Also during 2001, Air Canada (which took over Canadian Airlines International's operations), and Lufthansa German Airlines (which began freight services in its own right) commenced services to and from Australia.

The following airlines ceased services to and from Australia:

- Ansett International
- Canadian Airlines International (operations taken over by Air Canada)
- KLM Royal Dutch Airlines
- SriLankan Airlines.

The *Aircraft fleet* section provides details of international fleets.

#### *International non-scheduled services* —

Passenger charter policies in Australia encourage inbound tourism by non-scheduled services, particularly over routes not served by the scheduled carriers. In 2001, the majority of these flights originated from Canada, the United Kingdom and Japan. There were also significant charter operations to and from East Timor in 2000.

*International traffic* — Passenger traffic to and from Australia combined grew by 1.8% in 2001, significantly less than the 10.0% growth recorded in 2000 (table 23.20). The number of passengers coming to Australia in 2001 increased by 2.2% while departures increased by 1.4%. Despite the collapse of Ansett during 2001, the Australian airlines' share of traffic to Australia fell only marginally from 37.3% in 2000 to 36.9% in 2001, while their share of outgoing traffic remained at 37.2%.

### 23.20 SCHEDULED INTERNATIONAL AIRLINE TRAFFIC TO AND FROM AUSTRALIA(a)

Type of traffic	1999 '000 passengers	2000 '000 passengers	2001 '000 passengers
TRAFFIC TO AUSTRALIA			
Qantas Airways Limited	2 647	2 805	2 910
Ansett Australia	260	274	202
Other airlines	4 636	5 184	5 330
<b>All airlines</b>	<b>7 542</b>	<b>8 263</b>	<b>8 442</b>
TRAFFIC FROM AUSTRALIA			
Qantas Airways Limited	2 622	2 793	2 908
Ansett Australia	258	265	195
Other airlines	4 564	5 164	5 238
<b>All airlines</b>	<b>7 444</b>	<b>8 222</b>	<b>8 341</b>

(a) Includes Norfolk Island.

Source: Department of Transport and Regional Services.

Table 23.21 shows the number of international passengers arriving at and departing from each of Australia's international airports. Sydney's share of total international passenger traffic was 49.0% in 2001 (down 1.0% from 2000), followed by Melbourne with 19.7% (down 1.2% from 2000), and Brisbane with a 15.1% share (down 0.2% from 2000). Melbourne, Brisbane and Perth all recorded growth from the previous year, with passenger traffic increasing through Melbourne by 8.8%, through Brisbane by 3.2% and through Perth by 0.4%. During 2001, Coolangatta recorded the greatest increase in passenger traffic with growth of 47.8%, followed by Norfolk Island with 16.3%.

## Safety

An unwanted side effect of transport activity is accidents, the costs of which include loss of life or injury to persons, and the destruction of, and damage to, equipment and infrastructure.

Transport-related deaths fell by 12.4% between 1995 and 2000. Deaths from transport accidents occurred across all transport modes; however, the great majority (93.2% in 2000) were associated with road transport. Table 23.22 shows transport-related deaths across each of the transport modes for the six years to 2000.

## Rail and water accidents

As shown in table 23.22, in 2000 there were 51 deaths relating to water transport accidents, a 10.5% decrease from 1999, and 15.0% lower than the 60 deaths from water accidents in 1995. There were 43 rail transport accident-related deaths recorded in 2000, representing 2.1% of total transport accident deaths in Australia.

## Road traffic accidents

### Accidents involving fatalities

In 2001 the number of accidents involving fatalities in Australia fell by 2.5% (table 23.23). Tasmania, Victoria and Queensland recorded increases in fatal road traffic accidents in 2001, while the remaining states and territories recorded falls. Tasmania recorded the largest rise in these accidents (by 33.3%) from 2000.

### 23.21 PASSENGER TRAFFIC THROUGH AUSTRALIAN INTERNATIONAL AIRPORTS

Airport	1998 '000 passengers	1999 '000 passengers	2000(a) '000 passengers	2001 '000 passengers
Sydney	6 934	7 388	8 237	8 224
Melbourne	2 489	2 655	3 044	3 312
Brisbane	2 251	2 376	2 461	2 540
Perth	1 434	1 475	1 581	1 587
Cairns	688	661	680	665
Adelaide	223	241	270	242
Darwin	178	156	169	152
Coolangatta	15	17	28	42
Norfolk Island	16	15	14	16
Broome(b)	—	—	3	2
Newcastle(c)	—	—	—	1
Port Hedland(d)	4	3	—	—
Christmas Island(e)	3	—	—	—
Hobart(f)	3	—	—	—
<b>Total</b>	<b>14 237</b>	<b>14 987</b>	<b>16 488</b>	<b>16 783</b>

(a) Contains revised data for Sydney and Melbourne. (b) International operations recommenced in April 2000 and ceased in August 2001. (c) International operations commenced December 2001. (d) International operations ceased in January 2000. (e) International operations commenced in November 1993, ceased in February 1997, recommenced in October 1997 and ceased again in April 1998. (f) International operations ceased in April 1998.

Source: Department of Transport and Regional Services.

### 23.22 DEATHS(a) FROM TRANSPORT ACCIDENTS

Mode	1995	1996	1997	1998	1999	2000
Road						
Motor vehicle traffic accidents	2 029	1 943	1 801	1 731	1 741	1 776
Other	97	89	75	82	120	102
<b>Total</b>	<b>2 126</b>	<b>2 032</b>	<b>1 876</b>	<b>1 813</b>	<b>1 861</b>	<b>1 878</b>
Rail	48	34	39	43	43	43
Water	60	59	48	39	57	51
Air	65	71	49	63	50	43
<b>Total(b)</b>	<b>2 301</b>	<b>2 197</b>	<b>2 014</b>	<b>1 958</b>	<b>2 011</b>	<b>2 015</b>

(a) Based on the International Classification of Deaths, Edition 9 (ICD9) for years up to and including 1998 and Edition 10 from 1999. Data in this table relate to year of registration of death and are based on death occurring up to one year following a transport accident. Data will therefore differ from the traffic fatalities shown in tables 23.23, 23.24 and 23.25 as data in those tables are based on year of occurrence of transport-related deaths which occur within 30 days of an incident. (b) Includes vehicle accidents n.e.c.

Source: Registrar of Births, Deaths and Marriages in each state and territory, data available on request.

## 23.23 ROAD TRAFFIC ACCIDENTS INVOLVING FATALITIES

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
ACCIDENTS INVOLVING FATALITIES									
1994	552	345	364	143	195	52	36	15	<b>1 702</b>
1995	563	371	408	163	194	53	56	14	<b>1 822</b>
1996	538	382	338	162	220	53	58	17	<b>1 768</b>
1997	525	346	322	123	184	29	56	17	<b>1 602</b>
1998	491	348	257	152	199	47	59	20	<b>1 573</b>
1999	506	345	273	132	188	47	44	17	<b>1 552</b>
2000	543	373	275	151	185	39	48	16	<b>1 631</b>
2001	494	404	296	137	150	52	43	15	<b>1 591</b>
PERSONS KILLED									
1994	646	377	418	159	211	59	41	17	<b>1 928</b>
1995	620	418	456	181	209	57	61	15	<b>2 017</b>
1996	581	417	385	181	247	64	72	23	<b>1 970</b>
1997	576	377	361	148	197	32	60	17	<b>1 768</b>
1998	556	390	279	168	223	48	69	22	<b>1 755</b>
1999	577	383	314	151	217	53	49	19	<b>1 763</b>
2000	603	407	317	166	213	46	51	18	<b>1 821</b>
2001	524	444	324	153	164	61	50	16	<b>1 736</b>

Source: Australian Transport Safety Bureau, 'Road Fatalities Australia'.

Australia-wide, there were 1,736 deaths in 2001 from road traffic accidents, a decrease of 85 people or 4.7% on the previous year. Tasmania recorded the highest increase (32.6%), while Western Australia recorded the largest decrease in persons killed (23.0%). Between 1994 and 2001 the number of persons killed from road traffic accidents fell in all states and territories except Victoria, Tasmania and the Northern Territory, with Queensland recording the largest fall of 22.5%. During this period the largest annual movement in total road fatalities was recorded in 1997 with a fall of 10.3%.

## Road traffic fatalities

The fatality rate from road traffic accidents per 100,000 persons fell from 9.5 in 2000 to 8.9 in 2001. Decreases over this period were recorded in New South Wales, South Australia, Western Australia, Northern Territory and Australian Capital Territory. In contrast, Tasmania recorded an increase from 9.1 road accident deaths per 100,000 persons in 2000 to 12.9 per 100,000 persons in 2001. Road traffic deaths per 100,000 persons in the Northern Territory in 2001 were significantly higher than the national rate, at 25.0 deaths per 100,000 persons (table 23.24). The Australian Capital Territory had the lowest rate of fatalities (5.0 per 100,000 persons) for 2001.

## 23.24 ROAD TRAFFIC FATALITIES

	2000				2001			
	no.	per 100,000 population(a)	per 10,000 motor vehicles registered(b)	no.	per 100,000 population(c)	per 10,000 motor vehicles registered(d)		
New South Wales	603	9.3	1.6	524	7.9	1.4		
Victoria	407	8.5	1.2	444	9.2	1.3		
Queensland	318	8.9	1.4	324	8.9	1.4		
South Australia	166	11.1	1.6	153	10.1	1.5		
Western Australia	213	11.3	1.6	164	8.6	1.2		
Tasmania	43	9.1	1.3	61	12.9	1.8		
Northern Territory	51	26.1	4.9	50	25.0	4.9		
Australian Capital Territory	18	5.8	0.9	16	5.0	0.8		
<b>Australia</b>	<b>1 819</b>	<b>9.5</b>	<b>1.5</b>	<b>1 736</b>	<b>8.9</b>	<b>1.4</b>		

(a) Estimated resident population at 30 June 2000. (b) Number of registered motor vehicles and motor cycles (excluding tractors, caravans, plant and equipment) at 31 October 1999. (c) Estimated resident population at 30 June 2001. (d) Number of registered motor vehicles and motor cycles (excluding tractors, caravans, plant and equipment) at 31 March 2001.

Source: Australian Transport Safety Bureau, 'Road Fatalities Australia'; Population data — Australian Demographic Statistics, December Quarter 2001 (3101.0); Registered vehicles data — Motor Vehicle Census, Australia, 31 March 2001 (9309.0).

**23.25 ROAD TRAFFIC ACCIDENTS INVOLVING CASUALTIES(a)**

	1999			2000		
	no.	per 100,000 of population(b)	per 10,000 motor vehicles registered(c)	no.	per 100,000 of population(d)	per 10,000 motor vehicles registered(e)
New South Wales(f)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Victoria	5 298	112.4	16.2	5 519	116.0	16.6
Queensland	3 787	107.8	16.4	4 085	114.4	17.4
South Australia	1 371	91.8	13.3	1 366	90.7	13.0
Western Australia	2 070	111.2	15.4	1 850	98.4	13.5
Tasmania	416	88.5	12.6	437	92.6	13.2
Northern Territory	369	191.3	35.8	364	184.4	35.4
Australian Capital Territory(g)	185	59.6	9.4	n.a.	n.a.	n.a.

(a) Accidents reported to the police or other relevant authority which occurred in public thoroughfares and which resulted in death within 30 days or personal injury to the extent that the injured person was admitted to hospital. (b) Estimated resident population at 30 June 2000. (c) Number of registered motor vehicles and motor cycles (excluding tractors, caravans, plant and equipment) at 31 October 1999. (d) Estimated resident population at 30 June 2001. (e) Number of registered motor vehicles and motor cycles (excluding tractors, caravans, plant and equipment) at 31 March 2001. (f) Release of these data for NSW has been suspended by the NSW Roads and Traffic Authority. (g) Data for the ACT were unavailable for 12 months ended 31 December 2000.

Source: Australian Transport Safety Bureau, Road Injury Database; Population data — Australian Demographic Statistics, December Quarter 2001 (3101.0); Registered vehicles data — Motor Vehicle Census, Australia, 31 March 2001 (9309.0).

**Road traffic accidents involving casualties**

In 2000, the Northern Territory had the highest rate of road traffic accidents involving casualties (184.4 per 100,000 persons and 35.4 per 10,000 registered motor vehicles), as shown in table 23.25. Tasmania recorded the lowest rate at 90.7 accidents per 100,000 persons and 13.2 per 10,000 registered motor vehicles in 2000. Both Western Australia and the Northern Territory recorded lower rates of road accidents involving casualties per 100,000 persons in the year ended December 2000 (98.4 and 184.4 respectively) than recorded in the previous year (111.2 and 191.3 respectively).

**International comparison of road traffic fatalities**

Table 23.26 shows for 1999 how the number of fatalities in Australia compare with those for selected other countries. Australia's rate of 9.3 road traffic-related fatalities per 100,000 persons is comparable to that of Canada (9.7), Japan and Switzerland (both 8.2), while it is considerably lower than the rates for the United States of America (15.3), France (14.4) and New Zealand (13.4). Australia's rate is, however, markedly higher than that recorded for Sweden (6.6) and the United Kingdom (6.0).

**23.26 ROAD TRAFFIC FATALITIES, International comparisons — 1999**

Country	no.	Persons killed	Total population
		per 100,000 of population	millions
<b>Australia</b>	<b>1 763</b>	<b>9.3</b>	<b>19.0</b>
Canada	2 972	9.7	30.5
France	8 487	14.4	59.0
Japan	10 372	8.2	126.7
New Zealand	509	13.4	3.8
Sweden	580	6.6	8.9
Switzerland	583	8.2	7.1
United Kingdom	3 564	6.0	59.5
United States of America	41 611	15.3	272.7

Source: Australian Transport Safety Bureau, 'Bench-marking Road Safety — The 1999 Report'.

**Air accidents****Accidents and fatalities**

Since 1991, the number of aircraft accidents has declined by 37.6%, from 322 in 1991 to 201 in 2001 (table 23.27). In 2001 there were 51 fatalities, a rise of 10.9% compared with 2000, although this was considerably lower than fatalities recorded during the early 1990s.

**23.27 AIR TRANSPORT(a), Accidents and fatalities(b)**

	Accidents	Fatalities
1991	322	54
1992	310	66
1993	318	67
1994	266	64
1995	267	51
1996	243	51
1997	254	38
1998	227	56
1999	196	49
2000	222	46
2001	201	51

(a) Includes airlines, general aviation and sport aviation. Excludes data for ballooning accidents. (b) Includes accidents involving Australia-registered aircraft occurring overseas and accidents involving foreign-registered aircraft occurring in Australia. Therefore, data presented in this table are not comparable with those relating to road traffic accidents in table 23.23.

Source: Australian Transport Safety Bureau.

## Transport infrastructure

Transport infrastructure comprises three elements, all of which are required to perform the transport task:

- physical infrastructure — for example, roads, rail track, ports, airports, pipelines
- transport equipment — for example, motor vehicles, trains, ships, aeroplanes
- people with the necessary skills — for example, licensed drivers, pilots etc.

### Physical infrastructure

The costs in constructing and maintaining the physical infrastructure Australia requires for its vast transport network are very high. The value of public and private sector engineering construction done during 2001 was \$5,322m on roads, highways and subdivisions; \$327m on bridges; \$635m on railways; \$292m on harbours; and \$242m on pipelines.

### Length of the road system

Table 23.28 shows the map lengths of Australian roads while map 23.31 displays the National Highway System. Of all the states and territories, New South Wales has the greatest length of bitumen or concrete roads (91,344 km) representing just over half of all roads in that state.

The Australian Capital Territory has the highest percentage of total road surface consisting of bitumen or concrete (95.2%) while South Australia has the lowest percentage of bitumen or concrete roads to total roads at 28.9%.

### Rail network

Australia's rail systems comprise nearly 40,000 km of private and government broad, standard and narrow gauge track. Table 23.29 and map 23.30 show the diversity of track gauge in Australia, reflecting the historical development of state infrastructure. It also reflects private development, such as the 4,150 route-kilometres of narrow gauge associated with the Queensland sugar industry. The mainline rail system includes the 8,000 km standard gauge interstate network plus the 1,680 km narrow gauge link between Brisbane and Cairns. The rail system also includes the 240 km tram network in Melbourne, the 11 km tram line in Adelaide, the 6.6 km tram line in Sydney, the 8.5 km skitube from Jindabyne to Mt Kosciuszko in the New South Wales Snowy Mountains and the 3.6 km Sydney monorail. Competition reform and government policy to allow open access have resulted in private companies offering freight and passenger services over government-owned track.

### Sea ports

Map 23.30 shows Australia's major sea ports. Under Section 15 of the Customs Act, Australia has 97 appointed ports. Western Australia has the greatest number of such ports (22), while the Northern Territory has the fewest (3). Of the remaining states, Queensland has 20 ports, South Australia 18, Tasmania 15, New South Wales 14, and Victoria 5 ports.

### Airports

At 6 August 2002, there were 261 licensed airports in Australia and its external territories. Of these, 12 were operating as international airports servicing scheduled international airlines. Map 23.31 shows Australia's international airports. The majority of licensed airports are owned and operated by local councils, state government departments and private companies. The remaining airports are owned and operated by the Department of Defence or leased by the Commonwealth to private sector companies or government corporations.

**23.28 LENGTHS OF ROADS OPEN FOR GENERAL TRAFFIC(a) — At 30 June 2002**

	Units	NSW(b)	Vic.(c)	Qld	SA	WA(d)	Tas.(e)	NT(f)	ACT
Bitumen or concrete	km	91 344	75 400	67 860	28 009	49 165	10 386	6 493	2 542
Gravel, crushed stone or other improved surface	km	90 662	54 250	51 764	41 115	55 927	(g)13 044	6 619	128
Formed only	km	(h)	26 850	43 373	18 549	28 986	700	7 618	(h)
Cleared only	km	n.a.	(i)	15 320	9 219	13 777	(i)	922	—
<b>Total</b>	<b>km</b>	<b>182 006</b>	<b>156 500</b>	<b>178 317</b>	<b>96 892</b>	<b>147 855</b>	<b>24 130</b>	<b>21 652</b>	<b>2 670</b>
Percentage of total surface with bitumen or concrete	%	50.2	48.2	38.1	28.9	33.3	43.0	30.0	95.2

(a) Road length is defined as follows, for NSW, SA & WA — route (end-to-end) length plus ramps, connections, additional carriageways, etc. All reported lengths include roads, bridges and ferry route lengths. For Vic. — route (end-to-end) length excluding ramps, connections, additional carriageways, etc. All reported lengths include roads and bridges, but exclude ferry route lengths. For Qld — length of the primary through carriageway. For Tas. — point-to-point direct travel distance. For NT — road centreline length in one direction of travel only. For ACT — route (end-to-end) length plus ramps, connections, additional carriageways, etc. Includes roads and bridges, but excludes forestry, private roads and roads not managed by the ACT Government. (b) Excludes Lord Howe Island, forestry-controlled roads or crown roads. (c) Excludes in excess of 40,000 km of roads in areas such as parks and forests coming under the responsibility of organisations such as the Department of Natural Resources and Environment, Parks Victoria and Water Catchment Authorities. Includes VicRoads declared roads as at June 2002 and unclassified roads as at June 2001. (d) Excludes approximately 27,100 km of forestry-controlled roads. (e) Includes an estimate for forestry roads. (f) Excludes roads not managed by the NT Government. (g) Includes local government roads in Formed only and Cleared only categories. (h) Included in gravel, crushed stone or other improved surface. (i) Included with Formed only.

Source: Derived primarily from Road and Traffic Authorities and local government sources in each state and territory.

**23.29 AUSTRALIAN TRACK NETWORK(a), Route kilometres operated — At 30 June**

Gauge	1999	2000	2001
Narrow			
610 mm	4 150	4 150	4 150
1067 mm	15 122	15 081	15 054
Standard			
1435 mm	16 381	16 339	16 343
Broad			
1600 mm	4 009	4 009	4 017
Dual	264	265	266
<b>Total</b>	<b>39 926</b>	<b>39 844</b>	<b>39 830</b>

(a) Includes tram and light rail.

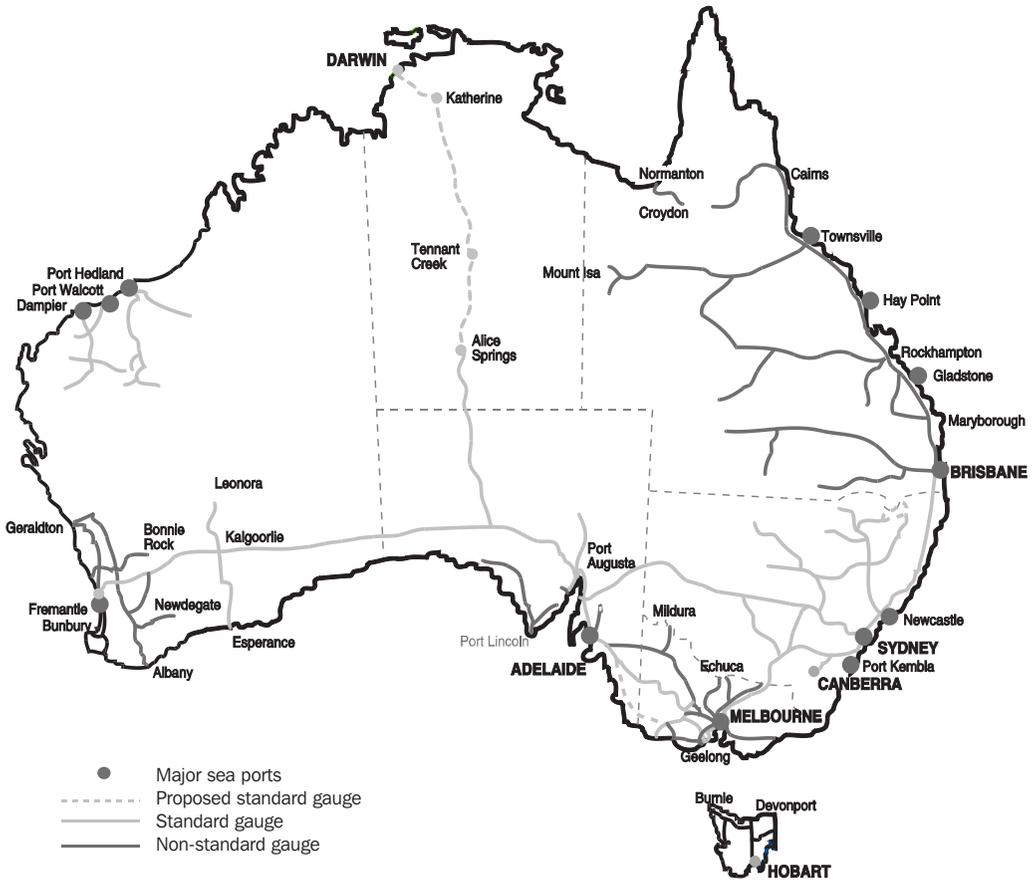
Source: Australasian Railway Association.

**Transport equipment****Registered motor vehicles**

The number of motor vehicles registered in Australia has steadily increased since 1996. At 31 March 2001 there were some 12 million motor vehicles (excluding motor cycles, tractors, plant and equipment, caravans and trailers) registered in Australia (table 23.32). This represents an increase of 1.6% since the previous census taken on 31 October 1999. Approximately eight out of every 10 vehicles are passenger vehicles. Table 23.33 shows registered motor vehicles by state/territory of registration. New South Wales, Victoria and Queensland predominate with 30.1%, 26.6% and 18.8% of the total vehicle fleet respectively.

At 31 March 2001 the average age of the Australian motor vehicle fleet was 10.5 years (table 23.34), a 72.1% increase on the 1971 average of 6.1 years. Tasmania recorded the highest average age at 12.4 years while the Northern Territory recorded the lowest average age at 9.2 years. For vehicle type, campervans had the oldest average age at 19.0 years, while buses recorded the lowest at 9.9 years.

23.30 MAJOR RAILWAYS AND SEA PORTS — 2000



Source: Australasian Railway Association, 2000 ARA Yearbook.

23.31 NATIONAL HIGHWAYS(a) AND INTERNATIONAL AIRPORTS — 2000



(a) The National highway system excludes state highways such as the Princes and Great Western highways.  
 Source: Bureau of Transport Regional Economics.

23.32 REGISTERED MOTOR VEHICLES

Motor vehicle census years(c)	Passenger vehicles(a) '000	Light commercial vehicles '000	Trucks				Buses '000	Total(b) '000	Motor cycles '000
			Rigid '000	Articulated '000	Non-freight carrying '000				
1996	9 022	1 602	341	58	16	59	11 097	304	
1997	9 240	1 632	342	59	17	61	11 351	313	
1998	9 561	1 686	347	62	18	64	11 738	329	
1999	9 720	1 721	347	63	18	66	11 935	334	
2001	9 870	1 770	338	63	18	68	12 126	351	

(a) Includes campervans. (b) Excludes motor cycles, tractors, plant and equipment, caravans and trailers. (c) As at 31 March for 2001 and as at 31 October for all previous years shown.

Source: Motor Vehicle Census, Australia (9309.0).

## 23.33 REGISTERED MOTOR VEHICLES — At 31 March 2001

	Passenger vehicles(a) '000	Light commercials '000	Trucks				Buses '000	Total(b) '000	Motor cycles '000
			Rigid '000	Articulated '000	Non-freight carrying '000				
New South Wales	3 014	502	103	15	3	17	3 655	91	
Victoria	2 690	411	83	18	6	16	3 223	95	
Queensland	1 773	409	68	13	3	15	2 280	74	
South Australia	857	128	25	6	2	4	1 023	28	
Western Australia	1 045	216	44	8	3	10	1 327	45	
Tasmania	246	62	9	2	1	2	323	8	
Northern Territory	68	25	3	1	—	3	99	4	
Australian Capital Territory	176	17	2	—	—	1	197	6	
<b>Australia</b>	<b>9 870</b>	<b>1 770</b>	<b>338</b>	<b>63</b>	<b>18</b>	<b>68</b>	<b>12 126</b>	<b>351</b>	

(a) Includes campervans. (b) Excludes motor cycles, tractors, plant and equipment, caravans and trailers.

Source: Motor Vehicle Census, Australia, 31 March 2001 (9309.0).

## 23.34 ESTIMATED AVERAGE AGE OF THE VEHICLE FLEET(a) — At 31 March 2001

Type of vehicle	State/territory of registration									
	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.	
Passenger vehicles	9.0	10.6	10.1	11.8	10.4	12.0	8.9	10.0	10.1	
Campervans	17.2	19.7	16.9	19.4	21.0	19.5	19.4	19.6	19.0	
Light commercial vehicles	10.3	12.4	11.1	12.6	11.9	13.2	9.9	10.9	11.4	
Rigid trucks with GVM(b) 3.5 and less than 4.5 tonnes	11.2	14.6	12.2	14.5	14.1	17.0	7.6	12.0	12.7	
Rigid trucks with GVM(b) 4.5 tonnes and over	13.8	17.2	14.6	17.6	17.4	17.1	12.8	10.9	15.7	
Articulated trucks	10.9	12.0	11.5	11.2	13.6	10.9	12.0	7.9	11.7	
Non-freight carrying trucks	13.9	15.5	11.6	14.2	16.8	17.3	12.6	15.6	14.6	
Buses	9.3	10.5	10.1	11.6	8.5	13.9	7.6	9.6	9.9	
Motor cycles	9.0	9.6	10.7	(c)9.6	11.7	10.3	8.0	9.4	10.0	
<b>Total</b>	<b>9.4</b>	<b>11.0</b>	<b>10.5</b>	<b>12.0</b>	<b>11.0</b>	<b>12.4</b>	<b>9.2</b>	<b>10.1</b>	<b>10.5</b>	

(a) Excludes plant and equipment, caravans and trailers. (b) Gross vehicle mass. (c) Year of manufacture is frequently not reported for SA motor cycles.

Source: Motor Vehicle Census, Australia, 31 March 2001 (9309.0).

## 23.35 MOTOR VEHICLES(a)(b) ON REGISTER PER 1,000 OF POPULATION

	1991	1993	1995	1996	1997	1998	1999	2001
New South Wales	525	529	545	556	563	581	574	575
Victoria	622	642	637	669	677	682	693	689
Queensland	569	593	614	624	627	645	659	652
South Australia	637	638	653	667	671	693	692	700
Western Australia	653	665	679	694	706	725	723	720
Tasmania	643	661	676	686	686	684	701	704
Northern Territory	507	497	520	529	530	538	535	522
Australian Capital Territory	556	591	604	613	637	631	635	649
<b>Australia</b>	<b>582</b>	<b>595</b>	<b>606</b>	<b>614</b>	<b>630</b>	<b>644</b>	<b>647</b>	<b>645</b>

(a) Excludes motor cycles, tractors, plant and equipment, caravans and trailers. (b) Motor vehicle census years, as at 31 March for 2001 and as at 31 October for all previous years shown.

Source: Australian Demographic Statistics (3101.0); Motor Vehicle Census, Australia (9309.0).

The number of registered motor vehicles (excluding motor cycles) relative to the resident population increased steadily over the seven years to 1998, from 582 vehicles per 1,000 persons in 1991 to 644 per 1,000 persons in 1998 (table 23.35). The number stayed much the same in 1999 and 2001.

### Sales of new motor vehicles

The number of new motor vehicles sold in Australia rose from 616,000 in 1994 to a peak of 807,000 vehicles sold in 1998. Annual sales have fluctuated since that time with 775,000 vehicles sold in 2001 (table 23.36). Of the total vehicles sold in 2001, 68.4% were passenger vehicles; in 1994 some 74.9% of vehicle sales had been passenger vehicles.

**23.36 SALES OF NEW MOTOR VEHICLES, By type of vehicle: Seasonally adjusted**

	Passenger vehicles '000	Other vehicles '000	Total vehicles '000
1994	462	155	<b>616</b>
1995	489	154	<b>643</b>
1996	491	158	<b>649</b>
1997	541	183	<b>723</b>
1998	583	224	<b>807</b>
1999	547	238	<b>784</b>
2000	556	235	<b>791</b>
2001	531	245	<b>775</b>

Source: *Sales of New Motor Vehicles, Australia (Electronic Publication) (9314.0)*.

Table 23.37 shows sales of new motor vehicles for each state and territory. In 2001, New South Wales had the highest sales of new motor vehicles in Australia (almost 271,000), representing 34.9% of all sales in that year, followed by Victoria (27.9%) and Queensland (17.5%). The Northern Territory had the lowest annual sales at 0.9% of total sales.

### Rail rolling stock

The number of locomotives, passenger cars and wagons in the Australian rail fleet is shown in table 23.38. A large number of the narrow gauge diesel locomotives are owned by Queensland operators (Queensland Rail and Sugar Cane Railways), and service the Brisbane to Cairns route or the extensive rail network transporting sugar cane. Queensland Rail has the largest fleet of locomotives with 350 narrow gauge diesel and 184 narrow gauge electric. Other operators with large locomotive fleets are Freight Corp (NSW) and Tranz Rail (NZ) which operates in Tasmania.

**23.37 SALES OF NEW MOTOR VEHICLES: Seasonally adjusted**

	State/territory of registration								Aust. '000
	NSW '000	Vic. '000	Qld '000	SA '000	WA '000	Tas. '000	NT '000	ACT '000	
1994	225	143	115	40	62	13	6	13	<b>616</b>
1995	235	152	116	42	64	14	8	13	<b>643</b>
1996	231	157	119	42	67	13	7	11	<b>649</b>
1997	257	179	130	47	73	14	8	14	<b>723</b>
1998	286	203	146	53	80	15	9	15	<b>807</b>
1999	282	206	142	48	70	14	8	14	<b>784</b>
2000	282	214	139	47	71	14	8	16	<b>791</b>
2001	271	216	136	48	69	14	7	14	<b>775</b>

Source: *Sales of New Motor Vehicles, Australia (Electronic Publication) (9314.0)*.

**23.38 AUSTRALIAN RAIL FLEET — At 30 June**

	2000	2001
<b>LOCOMOTIVES</b>		
Diesel		
Broad gauge	131	142
Standard gauge	886	875
Narrow gauge	1 050	1 018
Electric		
Standard gauge	60	60
Narrow gauge	184	184
XPT standard gauge	19	21
<b>Total</b>	<b>2 330</b>	<b>2 300</b>
<b>PASSENGER CARS</b>		
Locomotive hauled	711	668
Diesel rail cars		
Non-urban	117	117
Suburban	106	100
Total	223	217
Electric railcars		
Interurban(a)	283	283
Suburban	2 566	2 593
Total	2 849	2 876
Tram/light rail	556	565
Charter/heritage	47	40
<b>Total</b>	<b>4 386</b>	<b>4 366</b>
<b>WAGONS</b>		
Revenue		
Broad gauge	2 025	2 020
Standard gauge	20 703	20 928
Narrow gauge(b)	19 336	18 614
Total	42 064	41 562
Other	1 719	1 650
<b>Total</b>	<b>43 783</b>	<b>43 212</b>

(a) Includes 12 tilt cars. (b) Excludes 54,000 610 mm sugar cane wagons.

Source: Australasian Railway Association Inc.

**Shipping fleet**

There were 8,888 ships registered in Australia at 28 June 2002 (table 23.39), with Queensland having the largest fleet (2,829 ships). In all states and territories except South Australia and Tasmania, over half the fleets were registered for recreational use. High percentages of ships registered in South Australia (49.1%) and Tasmania (40.7%) were registered for fishing purposes.

The major Australian trading fleet (vessels of 2,000 deadweight tonnes (DWT) and over) comprised 54 ships at 30 June 2000 (table 23.40). The largest registered coastal ships were the *Iron Whyalla* and the *Iron Spencer* (both 141,475 DWT) which shipped iron ore and coal. The minor trading fleet, consisting of vessels with gross tonnage (GRT) of between 150 and 2,000 tonnes, comprised 23 ships.

**Aircraft fleet**

The following information, relating to the aircraft fleet in Australia at 30 June 2002, was provided by the Department of Transport and Regional Services.

At 30 June 2002 there were 11,779 aircraft registered in Australia, including 10,696 aeroplanes and helicopters, and 1,083 gliders. Of these the main airlines had 172 aircraft, a 17.7% decrease on the previous year following the collapse of Ansett Airlines in September 2001.

More than half the regional airline fleet comprised turbine engine and jet aircraft each carrying up to about 90 passengers.

## 23.39 SHIPS REGISTERED(a) IN AUSTRALIA — At 28 June 2002

	Nature of registration					Total
	Recreational	Fishing	Government	Demise chartered(b)	Other	
New South Wales	1 807	280	4	6	251	2 348
Victoria	666	199	—	1	100	966
Queensland	1 634	756	18	10	411	2 829
South Australia	283	317	1	—	45	646
Western Australia	623	412	1	3	147	1 186
Tasmania	259	219	2	—	58	538
Northern Territory	284	61	1	—	29	375
<b>Australia</b>	<b>5 556</b>	<b>2 244</b>	<b>27</b>	<b>20</b>	<b>1 041</b>	<b>8 888</b>

(a) Australian-owned commercial or trading ships of 24 metres or more in tonnage length. All ships, regardless of tonnage length, must be registered before departing on a voyage from Australia or from a foreign port where there is an Australian diplomatic representative. (b) Demise charter is the charter of a foreign ship operated by an Australian company in Australian waters. These ships are not necessarily engaged in trade or commerce.

Source: Australian Maritime Safety Authority.

## 23.40 THE AUSTRALIAN TRADING FLEET, Ships 150 gross tonnes or more — At 30 June 2000

Ships	no.	DWT(a)	GRT(b)
Major Australian fleet(c)			
Coastal			
Australian registered	40	1 362 268	912 856
Overseas registered	5	124 353	75 881
Total	45	1 486 621	988 737
Overseas			
Australian registered	8	633 694	636 346
Overseas registered	1	149 235	88 122
Total	9	782 929	724 468
Total	54	2 269 550	1 713 205
Minor trading ships(d)			
Australian registered	22	12 986	10 947
Overseas registered	1	800	5 618
Total	23	13 786	16 565
<b>Australian trading fleet</b>	<b>77</b>	<b>2 283 336</b>	<b>1 729 770</b>

(a) Deadweight tonnes is the weight that a vessel can carry, including cargo, bunkers, water and stores. (b) Gross tonnage is the measure of internal capacity of a ship that is available within the hull and enclosed spaces for cargo, stores, passenger and crew. (c) 2,000 DWT and over. (d) Minor trading ships are between 150 GRT and 2,000 DWT.

Source: Department of Transport and Regional Services.

## Licensed operators

### Drivers' and riders' licences

Table 23.41 shows the number of motor vehicle drivers' and riders' licences on issue for each state and territory at 30 June 2002. New South Wales recorded almost 5.1 million licences, the highest number on issue of all states and territories and 17.5% more than the nearly 4.3 million licences issued in Victoria. Queensland has the highest number of motor cycle licences on issue (including combined licences) at almost 518,000.

### Air pilot licences

At 31 July 2002 there were 31,395 holders of a current aeroplane pilot licence, including 15,860 private pilots, 4,577 commercial pilots and 5,969 air transport pilots.

In addition, there were 1,634 holders of a current helicopter pilot licence (including student licences), of whom there were 372 private pilots, 836 commercial pilots and 379 air transport pilots. Other licences in force related to 98 commercial balloonists and 299 flight engineers.

These figures show only the highest level of licence held and include only those pilots who have a current medical certificate enabling them to exercise the privileges of the licence.

**23.41 DRIVERS' AND RIDERS' LICENCES(a) — At 30 June 2002**

Type of licence	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
Motor vehicle	4 602 171	3 944 691	2 305 490	964 664	1 177 797	290 879	142 352	216 733
Motor cycle	4 966	8 836	1 150	1 003	1 025	1 655	204	(b)24 147
Combined	459 355	357 230	517 893	164 789	242 979	33 468	32 827	..
<b>Total</b>	<b>5 066 492</b>	<b>4 310 757</b>	<b>2 824 533</b>	<b>1 130 456</b>	<b>1 421 801</b>	<b>326 002</b>	<b>175 383</b>	<b>240 880</b>

(a) Data include learner licences. (b) Includes combined licences.

Source: AustRoads National Exchange of Vehicle and Driver Information System (NEVDIS) for NSW, Vic., Qld, SA, WA and NT. Motor Registries for Tas. and ACT.

## Transport organisations

### General transport organisations

#### Australian Transport Council

The Australian Transport Council was established on 11 June 1993, subsuming the functions of the Australian Transport Advisory Council.

It comprises Commonwealth, state, territory and New Zealand ministers responsible for transport, roads, marine and ports matters. The Papua New Guinea minister for transport matters, and the Australian Local Government Association have formal observer status on the Council.

The Council meets biannually; its primary role is to review and coordinate various aspects of transport policy, development and administration. It initiates discussion and reports on issues raised by Council members, and provides advice to governments on the coordination and integration of all transport and road policy issues at a national level.

#### Standing Committee on Transport and Regional Services

Formed after the 2001 general election, this committee was created to cover transport matters. It is the successor to the Standing Committee on Communications, Transport and the Arts. The committee is one of 13 general purpose investigatory committees established by the House of Representatives of the Parliament of Australia. The role of the Standing Committee on Transport and Regional Services is to carry out inquiries into matters referred to it by the House of Representatives or a minister of the Commonwealth Government. The matters that may be referred by the House include reports by the Commonwealth Auditor-General. The committee can also inquire into matters raised in annual reports of Commonwealth government departments and authorities.

At July 2002 the committee was active in two inquiries:

*Inquiry into commercial regional aviation services in Australia and transport links to major populated islands* — examining the adequacy of regional and rural air services in Australia, the adequacy of alternative sea services to major populated islands, and the policies and measures required to assist the development of regional air services.

*Inquiry into variable speed limits — a case study of intelligent transport systems* — looking into the potential to apply variable speed limits on the F3 Freeway and the Hume Highway between Sydney and Canberra as case studies of the effectiveness of intelligent transport systems.

#### Commonwealth Department of Transport and Regional Services (DOTRS)

The department promotes economic, social and regional development by enhancing Australia's infrastructure performance. It is committed to the integration of transport and regional development. Divisional business units of the department include:

*Bureau of Transport and Regional Economics (BTRE)* — A centre for applied economic research, the BTRE undertakes studies and investigations that contribute to an improved understanding of the economic factors influencing the efficiency and growth of the transport sector and regional Australia, and the development of effective transport policies. The BTRE also undertakes consultancy work for a number of external agencies, and one-off projects.

*Australian Transport Safety Bureau (ATSB)* — Created as an independent division-level unit within DOTRS on 1 July 1999, the ATSB works closely with the states and territories, which investigate transport accidents. It deals with the non-regulatory aspects of road, rail, air and sea safety.

- *Road.* The ATSB's road safety activities include: the federal road safety Black Spots Program; road safety research and statistical analysis; the National Road Safety Strategy; vehicle recall investigations (reflecting the Commonwealth Government's responsibilities under the Trade Practices Act); Australian Design Rules; and vehicle importing and certification.
- *Rail.* ATSB's Rail Safety Unit will adopt a 'no-blame' systems approach to rail safety investigations on the interstate rail track when Commonwealth legislation has been enacted. It currently investigates, if requested, on behalf of states and is establishing a national rail safety database. The Government has also announced that it intends to legislate to give the ATSB the power to initiate its own investigations on the interstate rail system.
- *Air and Sea.* Using a 'no-blame' whole-of-system approach, ATSB investigates accidents, incidents and safety deficiencies, and analyses safety data to prevent repeat occurrences and to minimise the effects of those that do eventuate. As a Commonwealth body, the bureau has legislative authority to investigate cases involving all civilian aircraft and large marine vessels. It works independently of regulators such as the Civil Aviation Safety Authority (CASA), Airservices Australia (Airservices), and the Australian Maritime Safety Authority (AMSA).
- *Aviation.* The role of this division is to advise on international and domestic aviation issues; regulate international airline operations; and manage Australia's participation in the work of the International Civil Aviation Organisation (ICAO). It also manages the continuing relationship between the Government and Australia's airlines, and with the aviation safety organisations — particularly Airservices and CASA, and it publishes Australia's international and domestic air-service statistics from AVSTATS (Aviation Statistics and Analysis Section).

### **Commonwealth Scientific and Industrial Research Organisation (CSIRO)**

The CSIRO is conducting research, in collaboration with the transport industry, into intelligent transport systems. These systems involve the application of information technology and telecommunications to traffic control and management.

### **Institute of Transport Studies, The University of Sydney**

The primary objective of the Institute is to undertake graduate teaching, management development programs, grant and contract research and development in the fields of transport and logistics studies.

## **Road transport organisations**

### **AUSTROADS**

AUSTROADS is the association of Australian and New Zealand road transport and traffic authorities; its purpose is to contribute to the achievement of improved Australian and New Zealand transport related outcomes by:

- developing and promoting best practice for the safe and effective management and use of the road system
- providing professional support and advice to member organisations and national and international bodies
- acting as a common vehicle for national and international action
- undertaking performance assessment and development of Australian and New Zealand standards
- developing and managing the National Strategic Research Program for roads and their use.

AUSTROADS aims to provide strategic direction for the integrated development, management and operation of the Australian and New Zealand road system, through the promotion of national uniformity and harmony, elimination of unnecessary duplication and the identification and application of world best practice. Its membership comprises the six Australian state and two territory road transport and traffic authorities, DOTRS, the Australian Local Government Association and Transit New Zealand.

### **National Exchange of Vehicle and Driver Information System (NEVDIS)**

NEVDIS has been developed under the authority of AUSTROADS. It is a national database that provides access to all registered vehicles and licensed drivers in Australia. It was implemented in an effort to reduce licence fraud, vehicle theft and vehicle fraud. The aim of the NEVDIS registration module is to ensure that vehicles in Australia can be uniquely identified through the

vehicle's VIN (Vehicle Identification Number) and that a vehicle can only be identified and registered in one state at any given time.

A review of NEVDIS commenced during the final quarter of 2001. The purpose of the review was to map out future direction, key functions and indicative costs to ensure NEVDIS achieves its original objectives and is capable of meeting future demands placed on the system.

### **ARRB Transport Research Ltd**

ARRB Transport Research Ltd is a leading provider of value-added technology and research services addressing land transport problems. The company's National Strategic Research Program, performed under contract to AUSTROADS, keeps Australia at the leading edge of developments in the road transport industry.

ARRB Transport Research Ltd employs over 100 people who form a multi-disciplinary pool of scientists, engineers, and specialist technical and support staff for infrastructure design, asset management, construction quality, materials testing, traffic operations, safety analysis, environmental sustainability, and freight issues.

The company has its headquarters in Melbourne, with extensive laboratory and testing facilities, and offices in Perth, Queensland and Jakarta. It also has business links in North and South America and Europe.

### **National Road Transport Commission (NRTC)**

The NRTC is a small, independent body established in 1991. Its charter is to develop nationally uniform or consistent policies, practices and laws that improve the safety and efficiency of road transport, and reduce its environmental impacts and the costs of administration. Much of the focus is on heavy vehicles because this delivers major benefits to Australia. The NRTC and its national transport legislation were to have expired in January 1998, but have been extended until 2004.

Transport reforms are developed in close consultation with the Commonwealth Government, the state and territory governments, the road transport industry, road user groups and other interested persons and organisations, for approval by Australia's transport ministers.

## **Rail transport organisations**

### **Australasian Railway Association (ARA)**

The ARA is the political voice for rail in Australia and New Zealand. It represents over 160 companies across all sectors of the rail industry, private and government, passenger and freight. The ARA's members employ 80,000 people and are profitable enterprises trading in highly competitive domestic and international markets.

## **Water transport organisations**

### **Australian Maritime Safety Authority (AMSA)**

AMSA is a government business enterprise established under the *Australian Maritime Safety Authority Act 1990* (Cwlth) on 1 January 1991. AMSA is responsible, on behalf of the Commonwealth Government, for the regulation and safety oversight of Australia's shipping fleet and management of Australia's international maritime obligations. These activities include aviation and marine search and rescue, and protection of the marine environment from ship-sourced pollution, through marine environment protection services. AMSA is funded largely through levies on the shipping industry.

## **Air transport organisations**

### **Airservices Australia**

Airservices Australia, established in July 1995 under the *Air Services Act 1995* (Cwlth), is a government-owned commercial authority responsible for the management of air traffic control over 11% of the world's surface. Its principal functions are: air traffic control and airspace management; aeronautical information; communications; radio navigation aids; search and rescue alerting; and airport rescue and fire fighting services.

Airservices Australia works with other government organisations concerned with aviation policy, safety and regulation in Australia, namely DOTRS, CASA and the Bureau of Air Safety Investigation.

Airservices Australia has a prominent role in the implementation of the global Communications, Navigation and Surveillance/Air Traffic Management system, which uses satellite technology to provide a more efficient air traffic system.

### **Civil Aviation Safety Authority (CASA)**

CASA was established as an independent statutory authority on 6 July 1995. Its primary focus is delivering aviation safety to the Australian public. It does this by: setting aviation standards and rules; licensing pilots and aviation engineers; certifying aircraft and operators; carrying out safety surveillance; enforcing safety standards and rules; providing regulatory oversight of the national airways system, air traffic services and rescue and fire fighting services; and actively assisting the aviation industry to maintain high safety levels through education, training advice and consultation.

CASA reports to the Commonwealth Minister for Transport and Regional Services.

### **International organisations**

Australia is one of the 188 members (as at 20 June 2002) of ICAO and is a member of the 33-member governing council. Australia is also represented on the 15-member Air Navigation Commission which is responsible for drafting international standards and procedures for the safety and efficiency of air navigation. In addition, Australia participates in the South Pacific Forum, meetings of the directors-general of Civil Aviation for Asia and the Pacific, and aviation-related work undertaken in Asia Pacific Economic Cooperation.

### **International agreements**

As at 30 June 2002, Australia has bilateral air services arrangements with 57 countries. Capacity and route rights are renegotiated from time to time to accommodate traffic growth and increase commercial flexibility for airlines on international routes to and from Australia. These arrangements enable airlines of Australia and its bilateral partners to operate a network of international air services to and from Australia.

### **International Air Services Commission (IASC)**

The IASC is an independent statutory authority responsible for the allocation of capacity and route entitlements negotiated under air services arrangements to existing and prospective Australian international carriers.

The Commission was established on 1 July 1992 following the Commonwealth Government's decision to allow Australian airlines other than Qantas to fly internationally. The Government decided that the process of allocating capacity to Australian airlines should be at arms length from the negotiation function.

The IASC works within a legislative and policy framework laid down by the Government. Under the *International Air Services Act 1992* (Cwlth), the IASC objectives are to foster competition, consumer benefits, tourism, trade and the maintenance of competitive Australian airlines.

When considering applications for capacity, the Commission takes into account public benefit criteria outlined in a policy statement issued by the minister for Transport and Regional Services.

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Institute of Transport Studies, The University of Sydney, <<http://www.its.usyd.edu.au>>

National Road Transport Commission, <<http://www.nrtc.gov.au>>

Standing Committee on Transport and Regional Services, <<http://www.aph.gov.au/house/committee/trs>>

# Environmental impacts of Australia's transport system

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## Overview

Australia has long suffered from the 'tyranny of distance' due to its geographical location and size. Australia's pattern of human settlement is characterised by high rates of urbanisation, low density cities and a high population density within 50 km of the coast. In particular, there is high population density on the south-east and east coasts between Adelaide and Cairns and on the west coast south of Perth (Newton et al. 2001). This population distribution, along with the dispersed locations of its agricultural, mining and production centres, underlies Australia's heavy reliance on transport.

The environmental impacts of transport are diverse. Most attention is focused on the greenhouse gas emissions (GHG) associated with transport use. Indeed, emissions are one of the furthest reaching impacts of transport, as they impact on the global environment, whereas other impacts are more localised. Fuel use is closely associated with transport emissions. Much of Australia's fuel is from non-renewable sources, and there is concern that current technology for powering transport systems may be unsustainable in the long-term. The fuels used produce many of the emissions affecting the environment. Managing the use of fuels is a key part of minimising transport's impact on the environment.

This article discusses the environmental impacts directly associated with transport and the transport industry. Topics covered include the use of energy and GHG by the transport system, and the impact of transport on wildlife, biodiversity and aquatic environments. There are many indirect impacts of transport, such as air pollution and related illnesses, the reduced livability of urban environments and the environmental impacts of the materials used by the transport system. These impacts are

theoretical and difficult to quantify, and it is beyond the scope of this article to discuss them in depth.

## Energy use and greenhouse gas emissions by transport

Transport uses a large amount of energy, with some 970 petajoules (PJ) (a petajoule is  $10^{15}$  joules) used in 1994–95. The key transport energy users are household passenger vehicles (525.3 PJ), air transport (162.7 PJ), commercial road transport (125.7 PJ) and water transport (62.2 PJ) (ABS 2001a). The energy used and emissions caused by the consumption of almost 25,000 million litres of fuel by motor vehicles in 2000 are considerable.

Energy is sourced primarily from non-renewable fossil fuels, an environmentally unfriendly source of energy. The use of fossil fuels for energy contributed significant amounts to Australia's GHG. Australia contributed a small amount of emissions in a global sense, but is one of the highest per capita contributors. Transport contributed just under 15% of Australia's total GHG for 2000 (AGO 2002).

In 1997, Australia had very high levels of transport-related emissions per capita, with 4,183 kg of carbon dioxide (CO<sub>2</sub>) released per person by transport (table S23.1). Australia produces 1.5% of global transport-related CO<sub>2</sub>, but it produces twice the per capita average for Europe (as calculated by the Organisation of Economic Co-operation and Development (OECD)), and over four and a half times the world average. However, Australia is not unique in its high per capita emissions; the United States of America, Canada and New Zealand have high levels of emissions as well.

**S23.1 COMPARISONS OF CO<sub>2</sub> EMISSIONS, Selected countries — 1997**

	CO <sub>2</sub> emissions for transport	Percentage increase since 1990	Proportion of total CO <sub>2</sub> emissions from fuel consumption	Per capita emissions by transport	Per capita emissions by road transport
	Mt	%	%	kg CO <sub>2</sub>	kg CO <sub>2</sub>
Australia	78	17.2	25.3	4 183	3 307
New Zealand	13	29.1	40.2	3 543	1 744
Canada	149	17.0	31.2	4 921	3 641
United States of America	1 685	13.4	30.3	6 216	4 979
Japan	267	24.4	22.8	2 116	1 753
OECD Europe average	985	14.3	24.6	1 936	1 614
World	5 208	15.3	22.7	901	660

Source: *Energy and Greenhouse Gas Emissions Accounts, Australia, 1992–93 to 1997–98 (4604.0)*.

The contribution of GHG from Australia's energy sector, which includes transport emissions, was 372 Mt (megatonnes) of carbon dioxide equivalents (CO<sub>2</sub>-e) or 69.5% of Australia's net national emissions in 2000 (table S23.2). Transport contributed 14.3% (76 Mt) of net national emissions, an increase of 3.3% of 1999 levels and 24.2% of 1990 levels. In 2000, road transport contributed 90.2% (69 Mt CO<sub>2</sub>-e) of transport emissions or 12.9% of net national emissions (table S23.3). Cars contributed 62.4% (43 Mt CO<sub>2</sub>-e) of transport emissions or 8% of the net national emissions. Trucks and light commercial vehicles contributed 35.3% (24 Mt CO<sub>2</sub>-e) or 6.5% of the net national emissions.

**Total emissions**

Overall, Australia's emissions per urban passenger kilometre travelled have increased by 7.5% between 1990 and 1999 (1999 figures are the latest reliable figures). Emissions per non-urban passenger kilometre travelled have fallen by 9.7% in the same period, and emissions per tonne-kilometre of freight have decreased by

9.5% since 1991. The volumes of travel have increased in this time as well, leading to a net increase in emissions (AGO 2002).

**Emissions by transport mode**

Passenger cars contributed 56.3% (43 Mt CO<sub>2</sub>-e) of transport emissions, an increase of 22.2% over 1990 levels (table S23.3). The number of vehicles on Australia's roads and number of kilometres travelled have increased, and on-road fuel efficiency has also increased. Liquid petroleum gas, a less polluting source of fuel, has increased its usage level by more than double since 1990.

Truck emissions increased by 33.9% between 1990 and 2000, to 15 Mt. The fuel efficiency of trucks fell by 4% over the same time period (AGO 2002). Light commercial vehicles emissions increased by 31.2% in this period despite an increase in fuel efficiency of 2%. Bus emissions increased by 17.9%.

**S23.2 CONTRIBUTIONS TO AUSTRALIA'S CO<sub>2</sub> EMISSIONS(a), Selected industries**

	1990	1995	1999	2000
	Mt CO <sub>2</sub> -e	Mt CO_{2}-e	Mt CO_{2}-e	Mt CO_{2}-e
Energy				
Stationary energy(b)	209	227	260	264
Transport	62	68	74	76
Fugitive emissions from fuels(c)	30	30	31	32
Agricultural	91	88	94	98
Waste and industrial processes	27	24	26	27
Forestry and other	-27	-25	-26	38
<b>Total emissions(d)</b>	<b>391</b>	<b>413</b>	<b>458</b>	<b>535</b>

(a) Carbon dioxide equivalents (CO<sub>2</sub>-e) are used to standardise the impacts of a range of emissions (such as methane and nitrous oxide) based on their greenhouse effect relative to carbon dioxide. (b) Includes electricity generation. (c) Includes emissions released in the extraction, processing or transportation of fuel types. (d) Sums may not add to totals due to rounding.

Source: AGO 2000; AGO 2001; AGO 2002.

**S23.3 TRANSPORT EMISSIONS, By mode — 2000**

	Mt CO <sub>2</sub> -e	% of total transport emissions	% change 1999 to 2000	% change 1990 to 2000
Road transport				
Passenger cars	43	56	2.4	22.2
Other road transport	26	34	4.9	32.8
Domestic aviation	4	6	4.8	68.5
Railways(a)	2	2	—	-7.8
Domestic shipping	2	2	1.5	-33.0
<b>Total emissions</b>	<b>76</b>	<b>100</b>	<b>3.3</b>	<b>24.2</b>

(a) Rail figures do not include emissions from electrified rail; these emissions are included in electricity generation emissions.

Source: AGO 2002.

**S23.4 ESTIMATED GREENHOUSE GAS EMISSION LEVELS, By gas type(a) — 1999**

Transport mode	Units	CO <sub>2</sub>	CO	NO <sub>x</sub>	CH <sub>4</sub>	NVMOCS	SO <sub>2</sub>	N <sub>2</sub> O
Road	(b)Gg	62 355	2 356	340	20.8	405.6	41.0	12.4
Rail	Gg	1 560	5	35	0.1	1.6	2.6	0.1
Civil aviation	Gg	4 109	87	13	0.2	2.7	0.8	0.1
Water	Gg	1 438	127	19	2.4	21.8	14.2	—
Other	Gg	41	4	—	—	0.7	—	—
<b>All transport</b>	<b>Gg</b>	<b>69 503</b>	<b>2 579</b>	<b>407</b>	<b>23.5</b>	<b>432.3</b>	<b>58.5</b>	<b>12.6</b>
Proportion of total energy-related emissions of specific gas	%	21.5	70.3	27.3	1.8	50.4	8.7	79.0

(a) CO<sub>2</sub>: carbon dioxide; CO: carbon monoxide; NO<sub>x</sub>: nitrogen oxides; CH<sub>4</sub>: methane; NVMOCS: non-methane volatile organic compounds; SO<sub>2</sub>: sulphur dioxide; N<sub>2</sub>O: nitrous oxide. (b) Gigagrams.

Source: BTRE 2002a.

Emissions from aircraft have increased by an average of 5.4% each year since 1990, due to an increase in domestic air passengers and freight. Coastal shipping emissions were 1.5 Mt in 2000 (2% of transport emissions).

## Types of transport emissions

Most transport emissions are CO<sub>2</sub>, with small amounts of nitrous oxide and methane (table S23.4). Nitrous oxide emissions have doubled in proportion to other gases, from 2.7% of transport emissions in 1990 to 5.4% in 2000. This has been attributed to the increase in vehicles with catalytic converters and other pollution prevention technology. Three-way catalytic converters reduce emissions, but produce 12% more methane and 154% more nitrous oxide per kilometre than cars with two-way converters or those without pollution control devices. Catalytic converters have been fitted to new cars since 1987, and aim to reduce the contribution of car emissions to air pollution (AGO 2002). For more detail on the environmental impact of emissions, see *Chapter 14, Environment*.

## Impacts of road transport

### Use of road transport

Of the Australian vehicle fleet, passenger vehicles constituted 9.7 million (80%) of the 12.2 million vehicles on Australian roads during the 12 months ended 31 October 2000. Light commercial vehicles were the second most populous vehicle type, with just under 1.7 million vehicles (14%). During this period, the total fuel consumed by Australian vehicles amounted to 24,926 million litres, passenger vehicles accounting for 16,190 million litres (65%). Total kilometres travelled in this time were 180,782 million. These measures all rose in the three years to 31 October 2000 and provide an indication of the growth of the road transport task in Australia (ABS 2001b).

### Road transport's fuel efficiency

In 2000 the average rate of fuel consumption of passenger cars was the second lowest (at an average of 11.7 L/100 km travelled) after motorcycles (6 L/100 km). The vehicle type with the highest average fuel use was articulated trucks, consuming 52.3 L/100 km). Energy efficiency, while

increasing slightly, has been offset by increases in vehicle weights and power outputs. For example, engines have become more efficient, but are bigger and more powerful, leading to only slightly lower fuel use levels per car (ABS 2001).

The average age of passenger vehicles, the largest component of the vehicle fleet, was 10.1 years at 31 March 2001. Some 44% of the passenger vehicle fleet was 13 years or older and 24% was 8 years or older. The rate of fuel consumption of these vehicles is important.

The Bureau of Transport and Regional Economics has recently published figures on both fuel consumption and engine performance of Australia's passenger vehicle fleet, from the mid 1970s. Trends indicate that both are decreasing, but only slightly, and less than could be expected with the current advance in efficiencies and technology.

Car manufacturers are responding to buyers' demands for bigger, more powerful cars, and as a result, fuel efficiencies and fuel consumption have decreased by slightly more than 10% (BTRE 2002a). Several manufacturers are now offering dedicated LPG fuel vehicles and hybrid petrol and electric vehicles with the aim of reducing the environmental impacts of motor vehicle use. A major initiative of the Australian Greenhouse Office is to encourage the purchase of fuel efficient vehicles by placing a fuel consumption sticker on new cars, showing the on-road fuel efficiencies. Some 24% of Australian households purchased a motor vehicle in the 12 months to March 2000. The environmental impact of the car was the least important factor in households' decision to buy a car (rated most important by only 3% of households), while the cost of the motor vehicle was the major factor (rated as such by 53% of households) (ABS 2000).

### **Minimising road transport travel demand and vehicle kilometres travelled**

Reducing vehicle kilometres travelled (VKT) and managing the demand for transport are key areas for minimising the environmental impact of transport. Overall VKT has increased over time. Passenger vehicles contribute the bulk of VKT (Newton et al. 2001). Initiatives to minimise VKT include programs to reduce the demand for transport, maximise vehicle occupancy rates and

maximise uses of public transport services which will reduce fuel use, emissions and congestion. Private vehicles are the most common form of transport to work or school, with 76% of households driving to work or school in 2000. In contrast, 6% walked or cycled, and 12% took public transport. Only 2% took public transport for environmental reasons (ABS 2000).

### **Road transport's impacts on biodiversity and wildlife**

Although only limited research has been carried out, transport is thought to impact on biodiversity and wildlife in several ways. Road transport is responsible for a large number of deaths and injuries to animals each year, although the numbers are difficult to obtain. WIRES (NSW Wildlife Information & Rescue Service) estimates that 3,400 native animals are killed every day on Australian roads. Table S23.5 shows deaths or injuries to native wildlife in New South Wales in 1993–94. Other estimates of roadkill suggest that up to 5.5 million frogs and reptiles are killed on sealed Australian roads each year (Mackey et al. 1998).

Roads themselves impact upon biodiversity and wildlife. Roads are a barrier to movements by some native species, and can isolate species and alter the interactions of wildlife populations as a result. Roads enhance the dispersal and movement of weeds and feral predators. In the same way that species can travel unknowingly in ballast water, seeds and spores can travel on vehicles in mud deposits and colonise new areas, while feral animals (such as cats, dogs and foxes) use the roads as a corridor to move into areas previously unaffected by the feral species (Mackey et al. 1998). Road and track construction can also impact locally on the natural environment, as it can lead to changes in an area's water flows and increase sedimentation in local waterways. Off-road vehicles have an effect on local areas, through increased erosion levels, frightened wildlife, revegetation of adjacent areas and increased access to remote areas, thereby decreasing the wilderness values of areas (ABS 1997).

**S23.5 NATIVE FAUNA DEATHS OR INJURIES FROM ROAD VEHICLES, NSW — 1993–94**

Species	Killed(a)	Injured/ treated(b)	Not requiring treatment(c)	Fate unknown(d)	Total
Birds(e)	1 215	522	13	138	1 888
Kangaroos	154	45	1	96	296
Wallabies	115	20	1	52	188
Koalas	11	4	—	2	17
Possums	247	124	4	35	410
Wombats	19	10	1	9	39
Echidnas	10	5	5	—	20
Reptiles	123	52	11	10	196
Other(f)	25	5	—	2	32
<b>Total</b>	<b>1 919</b>	<b>787</b>	<b>36</b>	<b>344</b>	<b>3 086</b>

(a) Animals that were found dead on arrival, died after being taken into care or were euthanased while in care. (b) Animals that were either released, taken into permanent care, reunited with parents or owner or were still in long-term rehabilitation. (c) Animals that were left and observed or animals which were relocated without being taken into care. (d) Animals that had disappeared before rescue or those that escaped while in care. (e) Includes wildfowl, water birds, owls, seabirds and other native birds. (f) Includes species such as bandicoots, bats, flying foxes and quolls.

Source: ABS 1997.

### Road transport's impacts on urban stormwater

Urban sprawl in cities increases the amount of impervious areas in a catchment area. This leads to increased run-off into local waterways, as less water soaks into the ground. Increased run-off has been linked to the increase in pollution levels of local waterways. Vehicles contribute to this pollution through the buildup of deposits from emissions and from mechanical parts wearing out. Tyres and brake linings (from brake pads etc.) are a major source of heavy metals in urban environments, as are petrol and oil deposits. Cars deposit small amounts of these contaminants as they travel, and as more cars travel the deposits build up. When it rains, the deposits can be washed into the stormwater systems, eventually polluting waterways, estuaries and beaches, where the stormwater is released (ABS 1997).

### Road transport's impacts on the urban environment

The quality and distribution of urban transport systems has a major bearing on the livability of urban environments. The private car maintains its place as the dominant form of transport for personal travel (ABS 2000). Cars have had a profound impact on the structure of urban areas, leading to the concept of car-centered urban sprawl. Dispersed cities put greater strain on infrastructure such as water supply and sewerage systems and lead to stalled traffic, excessive noise and polluted air (Brown 2001). Congestion is another product of urban dependence on the private vehicle. The costs of congestion are

considerable, as fuel, time and other resources are wasted (Newton et al. 2001). Urban areas have become more congested as more automobiles are being driven and mobility has decreased.

### Impacts of marine transport

Australia's coastal environment is threatened by our heavy dependence on international and coastal shipping to transport goods to, from and around the country.

Oil spills cause a significant impact on marine environments. Fortunately, Australia has not suffered a catastrophic oil spill as other countries have. Australia has, however, experienced several spills that have impacted upon the local environment. Some of the major spills are shown in table S23.6. These spills have been the result of various circumstances and have had significantly different impacts. Some spills have been a result of extreme weather forcing vessels, such as the *Korean Star*, to run aground and leak fuel and oil, while other ships have been damaged in ports, allowing the subsequent spill to be successfully contained to minimise the impacts. Several spills occurred in open water, and resulted in the loss of wildlife and severely damaged local environments, such as the spill from the *Arthur Phillip*, which killed or seriously affected 200 fairy penguins. Other spills have been the result of the transfer of cargoes, such as between the *Laura D'Amato* and the *Mobil Refinery*.

## S23.6 MAJOR OIL SPILLS IN AUSTRALIAN WATERS

Date	Vessel name	Location	Tonnes of oil spilled
20.05.1988	Korean Star	Cape Cuvier, WA	600
28.07.1988	Al Qurain	Portland, Vic.	184
21.05.1990	Arthur Phillip	Cape Otway, Vic.	Unknown
14.02.1991	Sanko Harvest	Esperance, WA	700
21.07.1991	Kirki	WA	17 280
30.08.1992	Era	Port Bonython, SA	300
10.07.1995	Iron Baron	Hebe Reef, Tas.	325
28.06.1999	Mobil Refinery	Port Stanvac, SA	230
03.08.1999	Laura D'Amato	Sydney Harbour, NSW	250

Source: AMSA 2002.

Ballast water, bilge water, sewage, wastes from vessel maintenance and anti-fouling paints cause some of the other environmental impacts associated with shipping. Ballast water, used to stabilise empty ships when travelling to pick up cargoes, presents the potential for major environmental impact. Ballast water is discharged when loading, and may contain invasive non-native organisms that can impact on local environments (Newton et al. 2001). Ballast water

can introduce non-native and environmentally harmful organisms, diseases, toxins and parasites that affect humans and ecosystems. At least 55 species of fish and invertebrates and a number of seaweeds have been introduced through ballast water discharge (ABS 1997). Anti-fouling paints are used on vessels to stop organisms growing on hulls. The paints contain toxic chemicals that leach into the surrounding water, polluting harbours and waterways.

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## Introduction

This chapter presents information on the characteristics and performance of industries involved in the production of information and communications technology goods and services. It also provides statistics on Internet activity in Australia and the use of information technology by businesses, farms, households and government organisations.

## The communication services industries

The communication services industries encompass telecommunication services, and postal and courier services. These industries comprise the Communication Services Division of the Australian and New Zealand Standard Industrial Classification (ANZSIC).

Table 24.1 shows key measures of industry structure and performance for the Communication Services Division as a whole, compiled from the ABS annual Economic Activity Survey. As can be seen from the table, by some measures the communication services sector overall has been one of the fastest growing in Australia. For example, sales grew from over \$21b in 1995–96 to over \$34b in 2000–01 (an increase of 59%). Other measures have fluctuated over the years, though most indicators for 2000–01 were positive:

- The number of communication services businesses continued to grow, reaching 4,389 businesses at 30 June 2001. The number of businesses increased by 5% in the year to 30 June 2001, following a 7% increase in the year to 30 June 2000.
- Employment reached a peak in 1995–96 (137,000 persons) and fluctuated over the next few years. In the year to 30 June 2001, employment increased by 0.4% to 120,000 persons.

- Gross operating surplus increased by 5% between 1999–2000 and 2000–01, turning around the decrease of 1% between 1998–99 and 1999–2000.
- Operating profit before tax increased by 5% between 1999–2000 and 2000–01, following a fall of less than 1% between 1998–99 and 1999–2000.
- Net worth grew by 10% in 2000–01, replicating a 10% rise in 1999–2000.
- Capital spending has fluctuated over the years, but increased by 80% between 1999–2000 and 2000–01, following an increase of 30% between 1998–99 and 1999–2000.
- Industry value added for the communication service industries increased by 6% between 1999–2000 and 2000–01, after a fall of 0.5% between 1998–99 and 1999–2000.

## Telecommunications services within Australia

On 1 July 1997, the Australian Communications Authority (ACA) was formed by the merger of the Australian Telecommunications Authority and the Spectrum Management Agency. The ACA, along with the Australian Competition and Consumer Commission (ACCC), is responsible for administering the telecommunications industry and the management of the radiocommunications spectrum, under legislation passed in March 1997. This enables Australia to take advantage of the social and economic opportunities presented by technological developments in the communication services industry. These bodies work to provide an environment of competition in the telecommunication services industry, reinforcing consumer protection arrangements and reforming technical regulation in the communication services industry. The Telecommunications Industry Ombudsman (TIO) is an industry funded scheme formed in 1993 to resolve disputes between telecommunications companies and residential and small business customers. Since 1997 the TIO has extended its function to include complaints relating to Internet Service Providers (ISPs).

## 24.1 COMMUNICATION SERVICES INDUSTRIES, Structure and performance

	Units	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
<b>Industry structure</b>							
Businesses at 30 June	no.	2 363	3 049	3 540	3 899	4 172	4 389
Employment at 30 June	'000	137	125	118	119	119	120
<b>Income statement</b>							
Sales of goods and services	\$m	21 631	23 691	24 696	29 432	32 696	34 407
less Cost of sales	\$m	9 271	11 135	9 827	13 548	17 077	17 469
<i>equals</i> Trading profit	\$m	12 360	12 556	14 869	15 884	15 619	16 938
<i>plus</i> Interest	\$m	179	171	140	155	137	180
<i>plus</i> Other operating income	\$m	624	77	19	252	886	894
less Labour costs	\$m	6 273	6 605	6 122	5 548	5 578	6 071
less Depreciation	\$m	2 791	3 026	2 961	3 354	3 787	3 640
less Other operating expenses	\$m	142	442	426	399	373	1 037
<i>equals</i> Earnings before interest and tax	\$m	3 957	2 731	5 520	6 989	6 904	7 264
less Interest expenses	\$m	723	742	916	836	798	858
<i>equals</i> Operating profit before tax	\$m	3 234	1 989	4 603	6 153	6 105	6 406
Total assets	\$m	34 373	37 964	36 358	40 608	45 798	55 898
Total liabilities	\$m	17 729	23 713	21 196	22 530	25 882	34 039
<i>Net worth</i>	\$m	16 643	14 251	15 162	18 079	19 916	21 858
Capital expenditure	\$m	6 217	5 365	5 304	6 173	8 004	14 373
Gross operating surplus	\$m	6 615	8 351	9 585	11 558	11 447	11 994
Industry gross product(a)	\$m	12 888	14 956	15 648	..	..	..
Industry value added(a)	\$m	..	..	16 205	17 107	17 025	18 065

(a) From 1997-98, under the new international standard, the 1993 edition of the 'System of National Accounts' (SNA93), the contribution to gross domestic product (GDP) by industries is measured by 'industry value added' (IVA). Estimates for IVA measure the value added by an industry to the intermediate inputs used by that industry. Previously the corresponding contribution to GDP was measured by 'industry gross product'. Further information on the changes to international standards can be found in the 'Information Paper: Implementation of Revised International Standards in the Australian National Accounts' (5251.0).

Source: *Business Operations and Industry Performance, Australia, 2000-01* (8140.0).

## Role of the Australian Communications Authority (ACA)

The ACA is responsible for regulating telecommunications and radiocommunications, including promoting industry self-regulation and managing the radiofrequency spectrum. The ACA also has significant consumer protection responsibilities. The ACA was established under the *Australian Communications Authority Act 1997* (Cwlth), and exercises powers under the *Telecommunications Act 1997* (Cwlth), the *Radiocommunications Act 1992* (Cwlth), and other related legislation.

The ACA licenses telecommunications carriers, ensures compliance with carrier licence conditions and service provider rules, and monitors service performance and quality. The ACA also administers legislative provisions relating to powers and immunities of carriers in the construction of telecommunications facilities, and protection of consumers through safeguards and service guarantees. The Universal Service Obligation (USO) is administered by the ACA to ensure reasonable and equitable access across Australia to standard telecommunication services.

Under the USO, Telstra is obliged to ensure that standard telephone services and pay phones are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business. The ACA also manages the National Numbering Plan and information programs on key issues affecting consumers.

Industry self-regulation is encouraged through the development of voluntary industry codes of practice and technical standards, and the Australian Communications Industry Forum (ACIF) was established by the communication services industry to support this process. The aim of self-regulation is to encourage industry to respond to customer needs without first having to overcome excessive regulatory restrictions. When a code fails or proves inadequate, the ACA is empowered to intervene and enforce a code or develop a mandatory standard. In this environment of industry self-regulation, the Customer Service Guarantee (CSG) and the USO provide for consumer protection. Under the CSG, telephone subscribers are legally entitled to claim compensation from carriage service providers (CSPs) who fail to: keep appointments; provide service connections; repair faults; and provide certain other services, within set timeframes.

Access to the radiofrequency spectrum is facilitated by the ACA through licensing, managing interference and ensuring industry compliance with mandatory standards and conditions. Spectrum auctions are used in areas of spectrum scarcity and high market demand as a means of allocating spectrum. The ACA also advises on the use of telecommunications and the radiofrequency spectrum and investigates interference complaints.

The ACA monitors compliance with technical standards for communications equipment and cabling, including the new standard for electromagnetic radiation, and for electromagnetic compatibility of electrical and electronic equipment. The ACA is also responsible for standards protecting the integrity of communications networks and the interoperability of the standard telephone service.

The ACA represents Australia's communications interests internationally through its membership of the International Telecommunication Union, the Asia-Pacific Telecommunity and other appropriate bodies.

### **Role of the Australian Competition and Consumer Commission (ACCC) in telecommunications**

The ACCC was formed in November 1995 by the merger of the Trade Practices Commission and the Prices Surveillance Authority. It administers the *Trade Practices Act 1974* (Cwlth) and the *Prices Surveillance Act 1983* (Cwlth) and has additional responsibilities under other legislation. The ACCC's telecommunications group has prime responsibility for administering the Commission's functions for competition and economic regulation of telecommunications which include:

- administering telecommunications-specific competitive safeguards, which enables the Commission to deal with anti-competitive conduct by carriers and carriage service providers as well as allowing it to issue tariff filing directions and record-keeping rules to assist with its telecommunications powers and functions

- administering the telecommunications-specific regime for facilitating access to the networks of carriers. This includes declaring services for access, approving access codes, approving access undertakings, arbitrating disputes for declared services and registering access agreements
- administering other legislative provisions in the Telecommunications Act and other related legislation, including in relation to price control of Telstra's retail services, international conduct rules, number portability, electronic addressing, interconnection standards and arbitration of disputes about access to network information, access to facilities, operator services, directory assistance services, provision of number portability, preselection, emergency call services and carriage services for use by the Defence forces.

### **Role of the Telecommunications Industry Ombudsman (TIO)**

The TIO is an industry funded scheme formed in 1993 to resolve disputes between telecommunications companies and residential and small business customers. The TIO also covers complaints relating to Internet Service Providers (ISPs), and is a free service to consumers.

The TIO derives its income from members who are charged fees for complaint resolution services provided by the TIO. The *Telecommunications Act 1997* (Cwlth) requires all carriers and eligible carriage service providers to be members of the TIO and comply with the Constitution and Memorandum and Articles of Association of the Scheme. Eligible CSPs are those which supply:

- a standard telephone service where some of the customers are residential or small business customers
- a public mobile telecommunications service
- a carriage service which enables end users to access the Internet.

The TIO has the authority to make binding decisions, and recommendations which are legally binding upon the telecommunications company.

## Telecommunication services industry

The telecommunication services industry is made up of businesses mainly providing telecommunication services to the public by wire, cable or radio. The primary activities of the industry include cable and communication channel services, network communication services, operation of radio relay stations, satellite communication services, telecommunications, telephone services, teleprinter and telex services, and operation of television relay stations.

The industry excludes businesses which manufacture telecommunications equipment, businesses engaged in cable laying and transmission line construction, and those providing secretarial services (e.g. personalised telephone answering services or message delivery services). Also, the ABS classifies the provision of radio and television services (as distinct from the operation of radio and television relay stations) as part of the Cultural and Recreational Services Division of ANZSIC. Information on radio and television broadcasting, including the role of the Australian Broadcasting Corporation, the Special Broadcasting Service and commercial radio and television services, as well as the Australian Broadcasting Authority, is included in *Chapter 12, Culture and recreation*.

Major changes have been occurring in the telecommunication services industry as a result of the 1997 legislative changes, particularly the deregulation of the telecommunications market and the introduction of competition. The *Telecommunications Act 1997* (Cwlth) allows any person to provide a range of telecommunication

services, provided they comply with the provisions of the Act. Providers may use telecommunications capacity acquired from a licensed carrier or, in defined circumstances, from non-carrier infrastructure, to supply a range of local or national telecommunication services to consumer and commercial markets. Service providers typically purchase network capacity from carriers at discounted rates. In theory this allows them to provide either similar services at competitive prices or a variety of value-adding services. These services include basic telephony services, mobile phone services, data and value-adding services, Internet services and other telecommunication services.

The number of licensed telecommunication carriers operating in Australia has increased from 3 at June 1997 to 68 at June 2001 and 83 at June 2002. At June 2001, there were 814 businesses operating in Australia whose predominant activity was providing telecommunication services, with 513 of these providing Internet services. These numbers exclude businesses for which telecommunication service provision was a minor part of their business operation. The next section, *Internet activity*, provides updated information on the number of ISPs, with an annual comparison from March quarter 2001 to March quarter 2002.

Table 24.2 shows summary indicators of the performance of the telecommunication services industry from surveys conducted by the ABS in 1996–97, 1998–99 and 2000–01. The growth in this industry is demonstrated by the increase in total income by 19% (or \$5.1b) between 1998–99 and 2000–01, to reach over \$31b. However, operating profit before tax declined by \$0.6b or 11% between 1998–99 and 2000–01.

**24.2 TELECOMMUNICATION SERVICES INDUSTRY(a), Summary indicators**

Indicator	Units	1996–97	1998–99	2000–01
Businesses at 30 June	no.	411	868	814
Employment at 30 June	no.	79 654	74 471	77 275
Income from IT&T services	\$m	19 762	25 398	29 827
Total income	\$m	20 927	26 417	31 505
Total expenses	\$m	19 458	20 637	26 661
Operating profit before tax	\$m	1 473	5 566	4 954

(a) Excludes businesses for which telecommunication service provision was a minor part of their business operation.

Note: IT&T — Information technology and telecommunications.

Source: *Information Technology, Australia, 2000–01 (8126.0)*.

## Internet activity

In the September quarter 2000, the ABS commenced a quarterly survey of all identified businesses in Australia providing Internet connectivity services, except for libraries, Internet kiosks and Internet cafes. The survey includes businesses for which telecommunication service provision was a minor part of their business operation. From the March quarter 2002, the collection frequency of the survey was changed from quarterly to biannual. Table 24.3 shows summary indicators of Internet activity for the March quarters 2001 and 2002:

- Over the year to the end of March 2002, the total number of ISPs fell from 665 to 571, mainly as a result of a decrease in the number of smaller ISPs (those with 1,000 or fewer subscribers). The number of smaller ISPs declined by 81.
- Points of presence of ISPs fell from 2,310 to 2,131 (by 8%) over the year to the end of March 2002, and access lines decreased from 490,108 to 447,050 (by 9%). These indicators recorded declines in capital cities and in other areas.
- Data downloaded by subscribers were 1,234 million megabytes (MBs) during the March quarter 2002, up from 1,040 million MBs during the March quarter 2001. On average, each subscriber downloaded 290 MBs during the March quarter 2002.

- The number of subscribers increased from 4.0 million to 4.2 million (7%), representing an average of 9.5 subscribers per access line at the end of March 2002.
- Although there was a wide distribution of ISPs across Australia, capital cities accounted for 75% of access lines and 73% of subscribers at the end of March 2002, and 81% of MBs downloaded during the March quarter 2002.
- Increasing numbers of subscribers are accessing the Internet using permanent broadband methods such as Digital Subscriber Line (DSL). The number of subscribers using DSL increased from 27,000 to 60,000 over the year to the end of March 2002, with the number of ISPs offering this service increasing from 52 to 131.

## Postal communications

### Australian Postal Corporation

The Australian Postal Corporation (trading as Australia Post) is a government business enterprise owned by the Commonwealth of Australia. It operates under the *Australian Postal Corporation Act 1989* (Cwlth). Australia Post is independent of government funding, achieves a substantial profit from its activities, and pays a full range of taxes and charges. In 2000–01, Australia Post paid \$459m in taxes and government charges (\$327m in 1999–2000).

**24.3 INTERNET ACTIVITY, Summary indicators**

	Units	Capital cities	Other areas	Total
<b>MARCH QUARTER 2001</b>				
Internet Service Providers(a)(b)	no.	496	277	665
Internet access				
Points of presence(a)	no.	1 030	1 280	2 310
Access lines(a)	no.	349 888	140 220	490 108
Subscribers(a)	'000	2 888	1 080	3 968
Data downloaded(c)	million MBs	791	249	1 040
Average number of subscribers per access line(a)	no.	8.3	7.7	8.1
Average data downloaded per subscriber(c)(d)	MBs	301	191	273
<b>MARCH QUARTER 2002</b>				
Internet Service Providers(a)(b)	no.	427	247	571
Internet access				
Points of presence(a)	no.	921	1 210	2 131
Access lines(a)	no.	334 086	112 964	447 050
Subscribers(a)	'000	3 109	1 121	4 230
Data downloaded(c)	million MBs	997	237	1 234
Average number of subscribers per access line(a)	no.	9.3	9.9	9.5
Average data downloaded per subscriber(c)(d)	MBs	320	205	290

(a) As at the end of the reference quarter. (b) As ISPs could have a presence in capital cities and in other areas the components will not add to total. (c) During the three months of the reference quarter. (d) Calculated by dividing data downloaded with an estimate of the number of subscribers at the midpoint of the reference quarter.

Source: *Internet Activity, Australia (8153.0)*.

Australia Post offers letter and parcel delivery services within Australia and internationally. It also provides a range of related services including electronic bulk mail handling, advertising mail, bill payment, money order and banking services, express delivery services and philatelic products and services.

Australia Post's legal obligations require it to:

- provide Australians with a universal letter service
- carry standard letters within Australia at a uniform price

- ensure that the letter service meets the social, industrial and commercial needs of the community
- perform its functions according to sound business practice
- perform its functions consistent with the Commonwealth's general policies.

Financial and other operating statistics for Australia Post are shown in tables 24.4, 24.5 and 24.6.

**24.4 AUSTRALIAN POSTAL CORPORATION, Consolidated financial statement**

	Units	1997-98	1998-99	1999-2000	2000-01
Revenue	\$m	3 294	3 450	3 739	3 733
Expenditure	\$m	2 959	3 077	3 347	3 331
<i>Operating profit before income tax</i>	<i>\$m</i>	<i>335</i>	<i>373</i>	<i>392</i>	<i>402</i>
Dividends	\$m	215	149	156	275
Total taxes and government charges(a)	\$m	295	328	327	459
Cost of Universal Service Obligation(b)	\$m	72	75	82	92
Total assets(c)	\$m	2 736	2 854	3 037	3 199
Return on assets(d)	%	12.8	13.8	14.0	13.4

(a) Includes sales tax and customs duty, payroll tax, local government taxes and charges, federal excise duty, and fringe benefits tax. (b) The Universal Service Obligation ensures that all Australians have reasonable access to the letter service; this includes the delivery of standard letters by ordinary post at a uniform price even when the delivery cost is higher. (c) At 30 June of the financial years shown. (d) Operating profit before net interest and income tax divided by average total assets.

Source: Australian Postal Corporation.

**24.5 AUSTRALIAN POSTAL CORPORATION, Mail delivery network and post outlets**

	1997-98	1998-99	1999-2000	2000-01
Households receiving mail	7 348 319	7 668 143	7 922 702	8 110 865
Businesses receiving mail	822 412	838 009	856 598	901 482
<b>Total delivery points</b>	<b>8 170 731</b>	<b>8 506 152</b>	<b>8 779 300</b>	<b>9 012 347</b>
Corporate outlets and licensed post offices	3 922	3 903	3 887	3 872

Source: Australian Postal Corporation.

**24.6 AUSTRALIAN POSTAL CORPORATION, Total postal articles handled**

	1997-98	1998-99	1999-2000	2000-01
	million	million	million	million
Posted in Australia for delivery in Australia	4 046	4 194	4 461	4 380
Posted in Australia for delivery overseas	165	172	193	209
Posted overseas for delivery in Australia	161	164	169	173
<b>Total articles through mail network</b>	<b>4 372</b>	<b>4 530</b>	<b>4 823</b>	<b>4 761</b>

Source: Australian Postal Corporation.

## The information technology and telecommunications (IT&T) sector

The IT&T sector is that part of the economy which produces information technology and telecommunications goods and services. It includes businesses involved in telecommunication services, computer services, and selected manufacturing and wholesale trade industries. The IT&T sector overlaps with part of the Communication Services Division discussed earlier.

Table 24.7 provides statistics for a selection of industries considered to be the prominent contributors to the production and distribution of IT&T goods and services. The table is based on ABS surveys conducted in respect of 1998–99 and 2000–01.

At June 2001, there were 22,475 IT&T specialist businesses in the industries surveyed. Generally, IT&T specialists are those businesses for which the income from the sale, distribution and provision of IT&T goods and services forms the greater part of the total income of the business.

The number of IT&T specialist businesses in 2000–01 increased by 25% (or 4,487) since the previous survey in respect of 1998–99. This increase was mainly due to growth in the numbers of computer wholesale businesses by 50% (or 775 businesses) and of computer consultancy services businesses by 24% (or 3,350 businesses).

There were 238,521 persons working in IT&T specialist businesses at the end of June 2001, a 20% increase since June 1999. The highest increases in employment occurred in the computer services industry grouping (32%) and the wholesale trade industry grouping (30%). The manufacturing industry grouping recorded a 17% increase in employment, while the telecommunication services industry increased by 4%.

During 2000–01, IT&T specialist businesses generated a total operating profit before tax of \$4,925m, representing a decline of 35% between 1998–99 and 2000–01. The telecommunication services industry generated an operating profit before tax of \$4,954m, while the IT&T wholesale trade industry grouping recorded an operating loss before tax of \$388m.

**24.7 INDUSTRIES IN THE IT&T SECTOR, Employment, income and profit**

	Employment		Total income		Operating profit before tax	
	1998–99 no.	2000–01 no.	1998–99 \$m	2000–01 \$m	1998–99 \$m	2000–01 \$m
<b>Manufacturing</b>						
Computer and business machines	3 587	3 398	1 399	1 343	39	39
Telecommunication, broadcasting and transceiving equipment	6 235	8 373	1 681	2 341	81	70
Electronic equipment n.e.c.	—	—	—	—	—	—
Electric cable and wire	998	928	307	470	29	46
<b>Total</b>	<b>10 820</b>	<b>12 699</b>	<b>3 387</b>	<b>4 153</b>	<b>148</b>	<b>155</b>
<b>Wholesale trade</b>						
Computers	26 816	38 656	15 569	20 618	672	185
Business machines and electrical and electronic equipment n.e.c.	12 411	12 327	6 717	6 704	289	-573
<b>Total</b>	<b>39 227</b>	<b>50 983</b>	<b>22 285</b>	<b>27 323</b>	<b>961</b>	<b>-388</b>
<b>Telecommunication services</b>	<b>74 471</b>	<b>77 275</b>	<b>26 417</b>	<b>31 505</b>	<b>5 566</b>	<b>4 954</b>
<b>Computer services</b>						
Data processing	1 829	3 718	143	477	12	52
Information storage and retrieval	920	1 174	101	150	10	12
Computer maintenance	2 544	4 451	294	983	-16	31
Computer consultancy	68 779	88 222	9 972	12 927	840	110
<b>Total</b>	<b>74 072</b>	<b>97 565</b>	<b>10 509</b>	<b>14 538</b>	<b>845</b>	<b>204</b>
<b>Total</b>	<b>198 589</b>	<b>238 521</b>	<b>62 599</b>	<b>77 518</b>	<b>7 520</b>	<b>4 925</b>

Source: Information Technology, Australia, 2000–01 (8126.0).

Income in the Australian IT&T sector continued to grow, and was approaching \$78b in 2000–01, an increase of 24% between 1998–99 and 2000–01. The IT&T industry groupings contributing to this outcome were computer services, with an increase of 38%, and manufacturing and wholesale trade, which both recorded increases of 23% between 1998–99 and 2000–01. Income of the telecommunication services industry increased by 19% between 1998–99 and 2000–01.

Total income from the domestic production of selected IT&T goods and services was \$50b in 2000–01, an increase of 24% between 1998–99 and 2000–01 (table 24.8). Over the two years to 2000–01, increases in income occurred in the provision of packaged software and computer services (by 33%), computer and communications hardware, equipment and cables (by 31%) and telecommunication services (by 19%).

Imports of selected IT&T goods and services totalled \$17.3b during 2000–01, and mainly comprised computer and communications hardware, equipment, cables and other computer

parts, and consumables (\$13.5b), imports of which increased by 33% between 1998–99 and 2000–01.

### Research and experimental development (R&D) undertaken by the IT&T sector

Chapter 25 presents a range of R&D statistics based on various ABS surveys. The data presented here have been drawn from the ABS business sector R&D surveys for the particular ANZSIC industries covered by the IT&T sector.

During 2000–01, expenditure on R&D by the IT&T sector was \$1,444m, 30% of total business sector R&D expenditure (\$4,825m). In current price terms this expenditure was 23% higher than the level recorded in 1999–2000 (table 24.9).

Major IT&T research fields where R&D expenditure occurred were Computer software (\$480m) and Communication technologies (\$471m), each 33% of the total.

The bulk of the R&D expenditure in the IT&T sector was in the Computer services industry grouping (\$602m or 42%), followed by the Manufacturing industry grouping (\$325m or 23%).

#### 24.8 IT&T GOODS AND SERVICES, Domestic production and imports

Industry	Income from domestic production			Imports		
	1998–99 \$m	2000–01 \$m	Change %	1998–99 \$m	2000–01 \$m	Change %
Computer and communications hardware, equipment and cables	3 620	4 728	31	10 757	14 328	33
Packaged software and computer services	11 698	15 560	33	1 310	1 192	–9
Telecommunication services	25 175	29 910	19	1 467	1 766	20
<b>Total</b>	<b>40 492</b>	<b>50 199</b>	<b>24</b>	<b>13 534</b>	<b>17 286</b>	<b>28</b>

Source: *Information Technology, Australia, 2000–01 (8126.0)*.

## 24.9 R&amp;D EXPENDITURE, By IT&amp;T industry groupings and research field

	Manufacturing \$m	Wholesale trade \$m	Telecommunication services \$m	Computer services \$m	Total \$m
1999–2000					
Information systems and technologies	10.4	n.p.	n.p.	93.1	137.7
Computer hardware	8.3	4.0	—	5.9	18.2
Computer software	94.5	29.1	3.6	298.7	426.0
Communication technologies	99.9	102.2	107.9	14.7	324.6
Other information, computer and communication technologies	8.7	n.p.	n.p.	10.0	75.7
<i>Total</i>	221.8	n.p.	n.p.	422.3	982.2
Other fields	60.8	n.p.	n.p.	119.8	195.5
<b>Total</b>	<b>282.6</b>	<b>234.8</b>	<b>118.2</b>	<b>542.1</b>	<b>1 177.7</b>
2000–01					
Information systems and technologies	12.2	n.p.	n.p.	95.0	119.4
Computer hardware	7.4	n.p.	n.p.	6.9	18.6
Computer software	71.7	39.6	3.8	365.3	480.4
Communication technologies	168.0	n.p.	n.p.	26.6	470.8
Other information, computer and communication technologies	7.0	76.7	80.0	16.3	180.0
<i>Total</i>	266.3	n.p.	n.p.	510.0	1 269.1
Other fields	58.6	n.p.	n.p.	91.6	175.0
<b>Total</b>	<b>324.9</b>	<b>251.6</b>	<b>266.0</b>	<b>601.6</b>	<b>1 444.1</b>

Source: ABS data available on request, Survey of Research and Experimental Development — Business Sector.

## Use of information technology

### Business use of information technology

The proportion of Australian businesses using information technology continues to increase. Computer use has grown steadily, from 49% of employing businesses in 1993–94 to 84% in 2000–01. Internet use has grown more rapidly, from 29% of employing businesses in 1997–98 to 69% in 2000–01. Over the same period, the proportion of businesses with web sites or home pages has more than tripled (from 6% to 22% of employing businesses).

### Adoption of information technology by Australian businesses

The likelihood that a business has adopted information technology is related to its industry and the size of the business. At June 2001, 100% of large businesses (those with employment of 100 or more persons) used a computer, 99% had

access to the Internet and 81% had a web site or home page. Very small businesses (those with fewer than five employees) had much lower adoption of information technology at June 2001, with 79% using a computer, 64% having Internet access, but only 14% having a web site or home page (table 24.10).

At June 2001, computer use and Internet access were highest in the Electricity, gas and water supply industry, where 95% of businesses used computers and 89% had access to the Internet. In contrast, in the Accommodation, cafes and restaurants industry and the Personal and other services industry, 71% and 72% respectively of businesses used computers and 53% and 52% of businesses had Internet access. The incidence of businesses with a web site was highest in the Electricity, gas and water supply industry, with 44% of businesses having a web site or home page, and lowest in the Construction industry (10% of businesses).

## 24.10 BUSINESS USE OF SELECTED INFORMATION TECHNOLOGIES — At 30 June 2001

	Number of businesses '000	Businesses with(a)		
		Computers %	Internet access %	Web site or home page %
<b>Employment size</b>				
Less than 5 persons	457	79	64	14
5–19 persons	196	91	75	32
20–99 persons	39	99	92	56
100 or more persons	6	100	99	81
<b>Industry</b>				
Mining	2	88	79	30
Manufacturing	58	81	66	28
Electricity, gas and water supply	—	95	89	44
Construction	100	80	64	10
Wholesale trade	48	89	77	33
Retail trade	119	78	57	22
Accommodation, cafes and restaurants	35	71	53	26
Transport and storage	34	76	60	19
Communication services	5	78	58	20
Finance and insurance	26	90	81	22
Property and business services	164	93	85	25
Health and community services	55	89	72	14
Cultural and recreational services	20	87	74	30
Personal and other services	32	72	52	22
<b>Total businesses</b>	<b>698</b>	<b>84</b>	<b>69</b>	<b>22</b>

(a) Proportions are of all businesses in each category.

Source: *Business Use of Information Technology, Australia, 2000–01 (8129.0)*.

### Business use of the Internet

While the proportion of Australian businesses with access to the Internet continues to rise, the range of activities being undertaken via the Internet also increases.

At June 2000, one in every five businesses (20%) which accessed the Internet, only used it for email or to search for information. By June 2001, this had dropped to only 10% of businesses with Internet access. Between 2000 and 2001, large increases occurred in the proportion of businesses accessing the Internet to order goods and services (from 18% to 29% of businesses accessing the Internet) and banking and financial services (from 36% to 59%).

After email (92% of businesses with Internet access) and information searches (80%), the more common Internet activities by 30 June 2001 were those related to banking and financial services (59%), access to government services (57%) and purchasing-related activities (56%). Overall, 39% of

businesses with Internet access used the Internet for selling-related activities. The most prevalent selling-related activity was advertising or promoting goods or services (26%), while the most prevalent purchasing-related activity was product searches (44%).

### Business use of web sites

The great majority of businesses with web sites or home pages at June 2001 used their site to display information about the business (91%). An inquiry or contact facility and advertising of the products of the business (both 73%) were the next highest reported functions. While 14% of businesses with web sites offered on-line ordering, only 4% of businesses with web sites had shopping cart software and only 5% had an on-line payments facility. An estimated 5% of businesses with web sites offered secure access or secure transactions on those sites. The integration of web site technology with back-end systems, such as existing accounting and stock control software, occurred in only 3% of businesses with a web site or home page.

### The significance of Internet commerce in Australia

The ABS defines Internet commerce as purchasing or selling via the Internet. More precisely, Internet commerce is either placing or receiving orders for goods and services via the Internet or web, with or without associated on-line payments.

At 30 June 2001, nearly one-quarter of all businesses (24%) had undertaken Internet commerce during the previous 12 months. These businesses were more than twice as likely to purchase via the Internet or web as they were to sell via the Internet or web (20% of all businesses compared with 9%).

The estimated value of income earned by businesses from the sale of goods and services ordered via the Internet in 2000–01 was \$9.4b. This represented approximately 0.7% of the total income for that year in the industries surveyed. Readers should note that many businesses were only able to provide an estimate of their Internet income; therefore the estimated value of Internet income for all businesses should be used with caution.

Of the 61,000 businesses estimated to be receiving income from sales via the Internet in 2000–01, 32% generated less than 1% of their total income in this manner. A further 33% generated between 1% and 5% of their total income via the Internet, while 35% of businesses generated at least 5% of their total income via the Internet. Only 7% of these businesses generated 50% or more of their total income from sales via the Internet.

### Barriers to greater use of information technology by businesses

While the level of use of computer and Internet technology appeared to be relatively high among Australian businesses by June 2001, one in six businesses did not use a computer and nearly one-third of all businesses did not have access to the Internet. Use of web sites was much lower, with over three out of every four businesses not having a web site or home page. It is clearly of interest to know why some businesses are not embracing information technology at even the most basic level.

The most commonly reported barrier to using information technology, whether a computer, the Internet or a web site, was the perception by the business that the technology was 'not suited to

the nature of the business'. In each of the last three surveys, this has been the most common reason reported by businesses.

At June 2001, nearly 37% of the businesses not using a computer reported that computer use was not suited to the nature of the business, while 23% identified lack of skills or appropriate training as a barrier to computer use. For businesses without Internet access, the most frequent reason given was that Internet access did not suit the nature of the business (44%) followed by a lack of interest in having Internet access (18%). The most frequent reason given for not using a web site or home page within a business was also that it did not suit the nature of the business (48% of businesses without a web site/home page).

### Benefits of Internet or web selling

The 2000–01 survey also asked businesses involved in Internet or web selling to report the effect on their business. Overall, 86% reported a benefit to the business. About two-thirds (63%) of businesses reported that the ability to sell goods or services via the Internet or web had increased trading outside their local area. Other important effects were increased trading outside normal business hours (61%) and increased efficiency of business procedures (57%). On the other hand, 68% of businesses reported either an increase or no change to business costs.

### Farm use of information technology

There has been steady growth in the use of information technology by farms in Australia. At June 2000, 58% of Australian farms with an estimated value of agricultural operations (EVAO) of \$5,000 or more used a computer, compared with 49% at March 1999 and 40% at March 1998.

An estimated 34% of farms in Australia used the Internet at June 2000, compared with 18% at March 1999 and 11% at March 1998 (table 24.11). Although fewer farms used the Internet than used a computer at June 2000, the 91% increase in the number of farms using the Internet over the 15 months to June 2000 far exceeded the percentage growth in the use of computers for the same period.

At June 2000:

- the Northern Territory showed the highest proportion of farms using a computer (71%) and the highest proportion of farms using the Internet (49%)

- New South Wales showed the lowest proportion of farms using a computer (53%) and the lowest proportion of farms using the Internet (31%)
- the Poultry farming industry showed the highest proportion of farms using a computer (72%) and the highest proportion of farms using the Internet (45%)
- the Grain, sheep and beef cattle farming industry showed the lowest proportion of farms using a computer (55%) and the lowest proportion of farms using the Internet (31%)
- there was a strong relationship between farm size, as measured by the EVAO, and the use of a computer and the Internet. As farm size increased so did the proportion of farms using a computer and the Internet. For example,

68% of farms with an EVAO of \$1m or more used the Internet, compared with 25% of those with an EVAO less than \$50,000.

**Household use of information technology**

In 2000, 53% of households (3.8 million) had a computer, an 11% increase over 1999. About one-third (33%) of households (2.3 million) had Internet access, a 49% increase over 1999 (graph 24.12). The graph also shows estimates for households with a home computer and those with Internet access in 2001 based on the reported intentions of those households without either in 2000. On that basis, a little over 60% of households were expected to have a home computer and almost 50% were expected to have home Internet access.

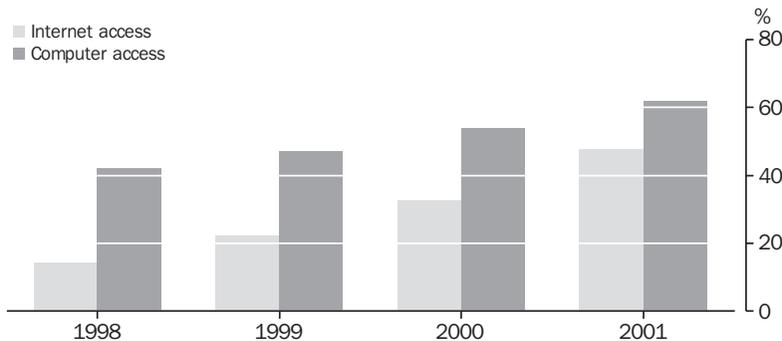
**24.11 FARMS USING A COMPUTER AND THE INTERNET(a)**

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
	%	%	%	%	%	%	%	%	%
<b>June 2000</b>									
Farms using a computer	53	58	58	64	68	57	71	70	58
Farms using the Internet	31	33	32	40	40	35	49	42	34
<b>March 1999</b>									
Farms using a computer	49	49	45	53	59	49	65	64	49
Farms using the Internet	19	17	16	19	18	22	31	26	18
<b>March 1998</b>									
Farms using a computer	40	37	37	43	49	36	52	55	40
Farms using the Internet	12	10	10	12	10	12	22	20	11

(a) Data were collected in the Agricultural Commodity Survey, reference periods March 1998, March 1999 and June 2000.

Source: *Use of Information Technology on Farms, Australia, 1999–2000 (8150.0)*.

**24.12 HOUSEHOLD COMPUTER AND INTERNET ACCESS(a)**



(a) Projected data for 2001.

Source: *Household Use of Information Technology, Australia, 2000 (8146.0)*.

### Characteristics of households with home Internet access

Households with children and those on higher incomes were more likely to have access to computers and the Internet at home (table 24.13).

### Characteristics of adult Internet users

An estimated 6.5 million adults in Australia (47% of all adults) accessed the Internet from any site (home, work or other site) at some time in 2000 (table 24.14). The comparable figure for 1999 was 5.6 million adults (41% of all adults).

During 2000:

- 75% of 18–24 year olds accessed the Internet from any site, compared with 62% of 25–34 year olds, 52% of 35–44 year olds, 47% of 45–54 year olds, 26% of 55–64 year olds and 9% of adults aged 65 years and over
- 50% of adult males and 43% of adult females accessed the Internet from any site
- 50% of adults in capital cities accessed the Internet from any site, compared with 40% of adults who resided in other areas.

**24.13 HOUSEHOLD COMPUTER AND INTERNET ACCESS**

	Computer access(a)			Internet access(a)		
	1998	1999	2000	1998	1999	2000
	%	%	%	%	%	%
Households						
With children under 18	64	66	72	22	31	45
Without children under 18	33	37	43	13	17	26
Household income						
Under \$25,000	20	21	24	5	6	10
\$25,000–\$49,999	44	45	52	12	17	28
\$50,000–\$74,999	61	64	66	21	31	40
\$75,000–\$99,999	71	73	78	32	39	55
\$100,000 or more	80	81	85	44	52	69
All households	45	48	53	16	22	33

(a) Proportions are of all households in each category.

Source: *Household Use of Information Technology, Australia, 2000* (8146.0).

**24.14 ADULTS ACCESSING THE INTERNET(a)(b), Main characteristics — 2000**

	Site of Internet access(c)			
	Home	Work	Other sites	Any site
	%	%	%	%
Age group (years)				
18–24	39	24	59	75
25–34	34	33	33	62
35–44	35	28	19	52
45–54	33	29	14	47
55–64	18	13	8	26
65 or over	7	2	2	9
Sex				
Males	32	26	24	50
Females	25	20	21	43
Region				
Capital cities	32	25	24	50
Rest of Australia	22	19	20	40
All adults	29	23	22	47

(a) Proportions are of all persons in each category. (b) Internet access occurred during the preceding 12 months. (c) Persons may have accessed the Internet at only one or any number of sites.

Source: *Household Use of Information Technology, Australia, 2000* (8146.0).

During 2000, adults were most likely to access the Internet from home, a significant change from the patterns of 1998 and 1999 (graph 24.15). This reflects the strong growth over recent years in the number of households with home Internet access. The most prevalent uses of the Internet by adults at home during 2000 were to use email or chat rooms (68% of adults accessing the Internet at home), general browsing (57%) and to find information related to work (36%).

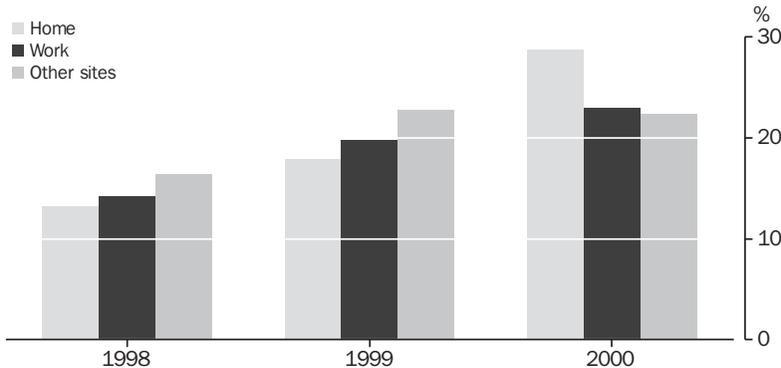
**Characteristics of children accessing the Internet**

An estimated 2.5 million children (47% of all children) in Australia aged 5–14 years accessed the Internet from any site (home, school or elsewhere) at some time during the 12 months to April 2000 (table 24.16).

Among children aged 5–14 years:

- regardless of whether Internet access occurred at home, school or elsewhere, the likelihood that a child had accessed the Internet increased with age
- there was virtually no difference in the likelihood that a child of either sex had accessed the Internet, either at home, school or elsewhere
- overall, there was no difference in the likelihood that the Internet had been accessed between children in capital cities and those in other areas. However, children in capital cities were more likely to access the Internet at home than children in other areas.

**24.15 ADULT INTERNET ACCESS, By access site**



Source: Household Use of Information Technology, Australia, 2000 (8146.0).

**24.16 CHILDREN ACCESSING THE INTERNET(a)(b), Main characteristics — April 2000(c)**

	Site of Internet access(d)				
	Home %	School %	Someone else's home %	Public library %	Any site %
Age groups (years)					
5–8	12	12	3	1	22
9–11	30	37	10	3	55
12–14	42	51	19	7	72
Sex					
Males	27	32	10	4	47
Females	25	30	9	3	46
Region					
Capital cities	28	30	10	3	47
Rest of Australia	23	33	10	4	47
All children	26	31	10	3	47

(a) Children were aged 5–14 years. (b) Proportions are of all children in each category. (c) Internet access occurred during the preceding 12 months. (d) Children may have accessed the Internet at only one or any number of sites.

Source: Use of the Internet by Householders, Australia, August 2000 (8147.0).

The most prevalent uses of the Internet at home by children aged 5–14 years were for school or educational activities (83% of all 5–14 year olds who accessed the Internet at home), to use email or chat rooms (51%), browsing the Internet for leisure (50%) and to play games (40%).

### **Internet purchasing**

About 7% of Australian adults (967,000) used the Internet to purchase or order goods or services for their own private use in 2000, compared to 5% of Australian adults (653,000) in 1999. The majority of Internet users (5.5 million adults) were not Internet shoppers during 2000.

In 2000, adults mainly purchased or ordered the following items over the Internet:

- books or magazines (by 33% of adult Internet shoppers)
- music (by 21%)
- computer software (by 19%).

During this period, 82% of adult Internet shoppers paid for all or part of their purchases/orders on-line. On average, over a 12-month period, each Internet shopper in 2000 spent \$600 purchasing or ordering goods or services for private use via the Internet.

### **Government use of information technology**

During 1999–2000, government organisations spent an estimated \$4.3b, or 5% of total government operating expenditure, on IT&T. By level of government, Federal government expenditure on IT&T was 7% of total Federal

government operating expenditure, state/territory expenditure on IT&T was 4% of total state/territory operating expenditure, and local government expenditure on IT&T was 2% of total local government operating expenditure.

Federal departments and agencies accounted for just under half (47%) of the total government expenditure on IT&T. State/territory departments and agencies accounted for slightly less (45%) and local government accounted for the balance (8%).

IT&T outsourcing expenses in 1999–2000 were \$1,168m, or 27% of the total IT&T expenditure by government organisations. While the ratio of IT&T outsourcing expenses to total IT&T operating expenses showed little variation between the Federal Government and state/territory governments, at 29% and 27% respectively, a ratio of only 15% was reported by local government.

During 1999–2000, total IT&T operating expenses per employee were \$4,800. However, there was considerable variation across the three levels of government, with total IT&T operating expenses estimated at \$9,500 per Federal government employee, \$3,600 per state/territory government employee and \$2,300 per local government employee.

IT&T employees accounted for only 2% of total employment of government organisations at the end of June 2000. Federal departments and agencies had the highest proportion of IT&T employees to total employment (4%), compared to 1% for both state/territory and local government departments and agencies.

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*Business Use of Information Technology, Australia, 2000–01* (8129.0)

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*Household Use of Information Technology, Australia, 2000* (8146.0)

*Information Paper: Implementation of Revised International Standards in the Australian National Accounts* (5251.0)

*Information Technology, Australia, 2000–01* (8126.0)

*Internet Activity, Australia, March Quarter 2002* (8153.0)

*Use of Information Technology on Farms, Australia, June 2000* (8150.0)

*Use of the Internet by Householders, Australia, August 2000* (8147.0)

### Other publications

Australia Post, *Annual Report 2000–01*

National Office for the Information Economy, *Current State of Play — A quarterly information economy statistical report* (available from its web site <<http://www.noie.gov.au>>)

### Web sites

Australian Bureau of Statistics, <<http://www.abs.gov.au>>, for Information Technology Statistics Theme Page, select *Themes* from menu on home page

Australian Communications Authority, <<http://www.aca.gov.au>>

Australian Competition and Consumer Commission, <<http://www.accc.gov.au>>

Australian Information Industries Association, <<http://www.aiia.com.au>>

Commonwealth Department of Communications, Information Technology and the Arts, <<http://www.dcita.gov.au>>

National Office for the Information Economy, <<http://www.noie.gov.au>>

Telecommunications Industry Ombudsman, <<http://www.tio.com.au>>

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## Introduction

The application of science and technological innovation to industrial processes influences the strength and competitiveness of industry by providing a basis for technological change and encouraging economic growth and development.

Australia has a range of statistics relating to science and innovation, many of which are compiled by the ABS. The key indicators relate to Australia's Research and Development (R&D) effort and the extent to which businesses innovate. Australia's statistics in this field are based on international standards, particularly the *Frascati Manual* developed by the Organisation for Economic Co-operation and Development (OECD), which is the basic international source of methodology for collecting and using R&D statistics.

A number of additional indicators on science and innovation, not included in this chapter, are compiled by the Department of Industry, Tourism and Resources and the Department of Education, Science and Training. See the Bibliography at the end of this chapter for details.

## Expenditure and human resources devoted to R&D

The ABS defines R&D as systematic investigation or experimentation involving innovation or technical risk, the outcome of which is new knowledge, with or without a specific practical application, or new or improved products, processes, materials, devices or services.

Statistics on the amount of expenditure and human resources devoted to R&D in the business sector are collected annually through a survey of all likely R&D performers. Comparable statistics on the higher education, government and private non-profit sectors are collected biennially.

Tables 25.1 and 25.2 summarise the latest statistics available. These data show that after levelling off in the period 1996–97 to 1998–99, gross expenditure on R&D increased by 15% from \$8,936m in 1998–99 to \$10,251m in 2000–01. All sectors showed an increase in R&D expenditure compared with 1998–99.

In the business sector, R&D expenditure at current prices in 2000–01 was 18% higher than that recorded in 1999–2000. This represented the highest level recorded to date and reversed the declines of the previous four years. In volume terms, with the effect of changes in prices and wages and salaries removed, business R&D expenditure increased by 12% compared with 1999–2000, but remained 5% below the peak level of 1995–96.

## Expenditure on R&D — how does Australia compare internationally?

The most commonly used indicator for comparison purposes is the ratio of expenditure on R&D to gross domestic product (GDP). As table 25.3 shows, in 2000–01 Australia's R&D expenditure was 1.53% of its GDP, ranking it below Sweden (3.78%), Finland (3.37%), Japan (2.98%), the United States of America (2.70%), Korea (2.68%), Switzerland (2.64%), Germany (2.48%), France (2.15%), Denmark (2.09%), the Netherlands (2.02%), Belgium (1.96%), the United Kingdom (1.86%), Canada (1.84%) and Norway (1.70%).

**25.1 EXPENDITURE ON R&D**

	1995–96	1996–97	1997–98	1998–99	1999–2000	2000–01
Sector	\$m	\$m	\$m	\$m	\$m	\$m
Business	4 356.6	4 234.7	4 218.2	4 091.2	4 084.8	4 825.3
Government						
Commonwealth	n.a.	1 266.6	n.a.	1 207.1	n.a.	1 424.8
State/territory	n.a.	797.7	n.a.	862.8	n.a.	943.6
Total	n.a.	2 064.3	n.a.	2 069.8	n.a.	2 368.4
Higher education(a)	2 039.1	2 307.6	n.a.	2 555.1	n.a.	2 774.6
Private non-profit	n.a.	185.8	n.a.	220.1	n.a.	283.2
<b>Total</b>	<b>n.a.</b>	<b>8 792.4</b>	<b>n.a.</b>	<b>8 936.4</b>	<b>n.a.</b>	<b>10 251.4</b>

(a) Data for the calendar year ending within the financial year shown.

Source: Research and Experimental Development, All Sector Summary, Australia (8112.0); Research and Experimental Development, Businesses, Australia (8104.0); Research and Experimental Development, Higher Education Organisations, Australia (8111.0).

## 25.2 HUMAN RESOURCES DEVOTED TO R&amp;D

Sector	1995-96 '000 person years	1996-97 '000 person years	1997-98 '000 person years	1998-99 '000 person years	1999-2000 '000 person years	2000-01 '000 person years
Business	27.1	26.4	24.8	25.1	26.4	27.8
Government						
Commonwealth	n.a.	10.4	n.a.	9.5	n.a.	9.7
State/territory	n.a.	8.8	n.a.	9.2	n.a.	8.7
Total	n.a.	19.2	n.a.	18.7	n.a.	18.4
Higher education(a)	n.a.	42.7	n.a.	45.5	n.a.	46.3
Private non-profit	n.a.	2.4	n.a.	2.5	n.a.	2.7
<b>Total</b>	<b>n.a.</b>	<b>90.7</b>	<b>n.a.</b>	<b>91.8</b>	<b>n.a.</b>	<b>95.3</b>

(a) Data for the calendar year ending within the financial year shown.

Source: *Research and Experimental Development, All Sector Summary, Australia (8112.0)*; *Research and Experimental Development, Businesses, Australia (8104.0)*.

In terms of business enterprise R&D, Australia's ratio of R&D expenditure to GDP (0.72%) is again below the ratios for the industrialised countries referred to earlier, and is also below the rate for the Czech Republic.

For government sector R&D as a percentage of GDP, Australia ranks higher. An R&D to GDP ratio of 0.35% places it fourth in the group of OECD member countries for which data are available, behind only France (0.38%), Korea (0.36%) and

Finland (0.36%). Government sector R&D as a percentage of GDP is much higher for Australia than for the United States of America or Canada.

For the higher education sector, Australia ranks in the top half. With an R&D to GDP ratio of 0.41%, Australia ranks behind Sweden (0.81%), Switzerland (0.61%), Finland (0.60%), Canada (0.57%), the Netherlands (0.53%), Norway (0.49%), Belgium (0.47%), Japan (0.43%) and Denmark (0.42%).

## 25.3 EXPENDITURE ON R&amp;D AS A PERCENTAGE OF GDP, OECD countries — 2000-01

Country	Business %	Government %	Higher education %	All sectors(a) %
Sweden(b)	2.84	0.13	0.81	3.78
Finland	2.39	0.36	0.60	3.37
Japan	2.11	0.29	0.43	2.98
United States of America	2.04	0.20	0.37	2.70
Korea	1.98	0.36	0.30	2.68
Switzerland	1.95	0.03	0.61	2.64
Germany	1.76	0.33	0.40	2.48
France	1.37	0.38	0.36	2.15
Denmark(b)	1.32	0.32	0.42	2.09
Netherlands(b)	1.14	0.33	0.53	2.02
Belgium(b)	1.40	0.06	0.47	1.96
United Kingdom	1.22	0.23	0.38	1.86
Canada	1.04	0.21	0.57	1.84
Norway(b)	0.95	0.26	0.49	1.70
<b>Australia</b>	<b>0.72</b>	<b>0.35</b>	<b>0.41</b>	<b>1.53</b>
Czech Republic	0.81	0.34	0.19	1.35
Italy(b)	0.51	0.20	0.33	1.04
Spain	0.50	0.15	0.28	0.94
Hungary	0.36	0.21	0.19	0.81
Poland	0.25	0.23	0.22	0.70
Slovak Republic	0.45	0.17	0.07	0.69

(a) Includes private non-profit. (b) Data for 1999-2000.

Source: *OECD, Main Science and Technology Indicators 2002-1*.

## Source of funds for expenditure on R&D

In 2000–01, the business sector funded 46% of all Australian R&D. This compares with 41% recorded in 1990–91. The Commonwealth Government funded 38% of R&D in 2000–01 (down from 44% in 1990–91) and the state governments funded 8% (down from 11% in 1990–91).

In 2000–01, 92% of funding for R&D carried out by businesses came from the business sector (down from 95% in 1990–91). Commonwealth government organisations provided 4% of funding for business R&D expenditure in 2000–01.

About 85% of Commonwealth government sector R&D was funded by Commonwealth government organisations in 2000–01. The Commonwealth government proportion of self-funding has dropped from 91% 10 years ago.

About 69% of state government R&D was funded by state government organisations in 2000–01. This is significantly lower than a decade earlier, when the proportion was 79%.

About 86% of higher education R&D funding in 2000–01 came from the Commonwealth Government (compared with 89% in 1990–91). Business enterprises provided 5% of the funding in 2000–01, up from 2% a decade earlier.

Commonwealth government organisations funded 26% of the R&D of the private non-profit sector in 2000–01, while the contribution by state governments was 11%.

Tables 25.4 and 25.5 show the data for 2000–01 and 1990–91 respectively.

**25.4 EXPENDITURE ON R&D, Source of funds — 2000–01**

Sector	Commonwealth Government		State government		Businesses		Other Australian(a)		Overseas		Total
	\$m	% of total	\$m	% of total	\$m	% of total	\$m	% of total	\$m	% of total	\$m
Business	170.7	3.5	8.4	0.2	4 415.8	91.5	23.0	0.5	207.4	4.3	4 825.3
Government											
Commonwealth	1 213.2	85.1	27.5	1.9	76.9	5.4	73.0	5.1	34.2	2.4	1 424.8
State/territory	71.4	7.6	650.1	68.9	54.5	5.8	159.9	16.9	7.7	0.8	943.6
Total	1 284.6	54.2	677.6	28.6	131.4	5.5	232.9	9.8	41.9	1.8	2 368.4
Higher education(b)	(c) 2 395.6	86.3	87.9	3.2	136.2	4.9	94.2	3.4	60.7	2.2	2 774.6
Private non-profit	72.5	25.6	29.8	10.5	18.4	6.5	136.2	48.1	26.3	9.3	283.2
<b>Total</b>	<b>3 923.5</b>	<b>38.3</b>	<b>803.6</b>	<b>7.8</b>	<b>4 701.8</b>	<b>45.9</b>	<b>486.3</b>	<b>4.7</b>	<b>336.3</b>	<b>3.3</b>	<b>10 251.4</b>

(a) Includes funds provided via government levies. (b) Data for calendar year 2000. (c) Includes \$1,746m of General University funds, the majority of which is funding from the Commonwealth Government.

Source: *Research and Experimental Development, All Sector Summary, Australia, 2000–01 (8112.0)*.

**25.5 EXPENDITURE ON R&D, Source of funds — 1990–91**

Sector	Commonwealth Government		State government		Businesses		Other Australian(a)		Overseas		Total
	\$m	% of total	\$m	% of total	\$m	% of total	\$m	% of total	\$m	% of total	\$m
Business	54.2	2.6	8.8	0.4	1 991.4	94.8	6.0	0.3	39.3	1.9	2 099.8
Government											
Commonwealth	939.5	90.9	8.5	0.8	74.6	7.2	2.5	0.2	9.1	0.9	1 034.0
State	73.9	11.0	526.9	78.6	44.6	6.7	21.1	3.1	3.4	0.5	670.0
Total	1 013.3	59.5	535.4	31.4	119.2	7.0	23.6	1.4	12.5	0.7	1 704.0
Higher education(b)	1 190.6	89.3	29.6	2.2	29.9	2.2	73.4	5.5	9.3	0.7	1 332.8
Private non-profit	24.3	28.5	12.0	14.1	7.7	9.0	38.3	44.9	3.0	3.5	85.5
<b>Total</b>	<b>2 282.4</b>	<b>43.7</b>	<b>585.8</b>	<b>11.2</b>	<b>2 148.2</b>	<b>41.1</b>	<b>141.4</b>	<b>2.7</b>	<b>64.2</b>	<b>1.2</b>	<b>5 222.0</b>

(a) Includes funds provided via government levies. (b) Data for calendar year 1990.

Source: *Research and Experimental Development, All Sector Summary, Australia, 1990–91 (8112.0)*.

## Resources devoted to R&D

### Business sector

Business expenditure on R&D (BERD) in Australia in 2000–01 (table 25.6) was 18% higher than in 1999–2000. Although human resources (in person years) devoted to R&D in 2000–01 was only 5% higher than in 1999–2000, the labour costs of these human resources increased by 16%.

In 2000–01, BERD was 0.72% of GDP compared to 0.65% in 1999–2000. This is the first time that BERD as a percentage of GDP has increased since 1995–96 when it was 0.87%.

The increase in R&D expenditure between 1999–2000 and 2000–01 was attributable to a 57% increase by the Mining industry, an 8% increase

by the Manufacturing industry and a 23% increase by Other industries in total. It should be noted that mineral exploration is excluded from the definition of R&D.

Major research fields (table 25.7) in which BERD took place were Computer software (15%), Communications technologies (11%), Manufacturing engineering (8%), Automotive engineering (7%), and Medical and health sciences (6%).

A slightly different pattern applied to human resources devoted to R&D, with 20% in Computer software, 9% in Manufacturing engineering, 9% in Automotive engineering, 8% in Communications technologies, and 6% in Medical and health sciences.

**25.6 R&D RESOURCES, Businesses by industry**

	Businesses		Expenditure on R&D		Effort on R&D	
	1999–2000	2000–01	1999–2000	2000–01	1999–2000 '000 person years	2000–01 '000 person years
	no.	no.	\$m	\$m		
Mining (including services to mining)	100	89	291	456	0.8	1.2
Manufacturing						
Food, beverage and tobacco	135	141	184	205	1.1	1.2
Textile, clothing, footwear and leather	51	51	18	27	0.2	0.2
Wood and paper product	36	33	102	100	0.4	0.3
Printing, publishing and recorded media	28	32	15	13	0.2	0.1
Petroleum, coal, chemical and associated product	331	348	377	385	2.2	2.5
Non-metallic mineral product	49	51	47	41	0.3	0.3
Metal product	182	171	227	199	1.1	1.0
Motor vehicle and part and other transport equipment	139	135	410	473	3.1	3.0
Photographic and scientific equipment	174	162	128	180	1.1	1.4
Electronic and electrical equipment and appliance	323	372	342	385	2.8	2.8
Industrial machinery and equipment	245	239	131	140	1.2	1.1
Other manufacturing	88	88	20	23	0.2	0.3
Total	1 781	1 823	2 002	2 170	14.0	14.2
Other industries						
Wholesale and retail trade	297	291	387	388	2.6	2.6
Finance and insurance	35	36	138	264	1.0	0.9
Property and business services	874	932	744	831	6.0	6.4
Scientific research	148	152	211	218	1.3	1.3
Other n.e.c.	192	194	312	498	0.9	1.2
Total other industries	1 546	1 605	1 792	2 199	11.7	12.5
<b>Total all industries</b>	<b>3 427</b>	<b>3 517</b>	<b>4 085</b>	<b>4 825</b>	<b>26.4</b>	<b>27.8</b>

Source: Research and Experimental Development, Businesses, Australia (8104.0).

## 25.7 R&amp;D RESOURCES, Businesses by field of research — 2000–01

	Type of expenditure				Human resources '000 person years
	Capital expenditure	Labour costs	Other current expenditure	Total	
	\$m	\$m	\$m	\$m	
Mathematical sciences	1.3	17.9	11.5	30.7	0.2
Physical sciences	3.2	26.5	21.7	51.4	0.4
Chemical sciences	12.4	80.7	80.6	173.7	1.2
Earth sciences	3.3	11.5	35.6	50.4	0.2
Biological sciences	11.5	51.2	59.3	122.0	0.7
Information systems	19.3	108.3	93.8	221.5	1.3
Computer software	58.3	470.2	200.4	728.9	5.7
Other information, computing and communication sciences	32.9	126.7	149.2	308.9	1.5
Industrial biotechnology and food sciences	15.9	62.5	50.2	128.6	0.8
Chemical engineering	16.6	23.9	32.8	73.3	0.3
Manufacturing engineering	46.5	158.0	185.2	389.7	2.5
Automotive engineering	26.7	157.2	165.4	349.3	2.4
Mechanical and industrial engineering	31.8	69.2	62.4	163.4	1.0
Resources engineering	28.6	79.6	179.3	287.6	0.9
Electrical and electronic engineering	12.7	72.4	61.8	147.0	1.1
Metallurgy	8.7	32.2	117.1	158.0	0.4
Materials engineering	9.7	42.5	50.8	103.1	0.7
Communications technologies	38.7	189.4	320.3	548.3	2.2
Other engineering and technology	26.0	143.1	136.3	305.5	1.7
Agricultural, veterinary and environmental sciences	12.3	58.7	82.7	153.7	0.9
Medical and health sciences	15.5	126.7	157.3	299.5	1.6
Other research fields	2.8	21.2	7.1	31.0	0.3
<b>Total</b>	<b>434.9</b>	<b>2 129.7</b>	<b>2 260.7</b>	<b>4 825.3</b>	<b>27.8</b>

Source: Research and Experimental Development, Businesses, Australia, 2000–01 (8104.0).

In terms of socioeconomic objectives (table 25.8), most BERD (\$4,318m or 89%) was directed towards Economic development. Of this, \$1,947m (45%) was directed towards Manufacturing. About 6% was directed towards Society, 2% towards Defence and 2% towards Environment.

A similar pattern applied to human resources devoted to R&D, with 90% directed towards Economic development, 6% directed towards Society, 3% towards Defence and 1% towards Environment.

### General government sector

Expenditure on R&D carried out by government organisations in Australia in 2000–01 was estimated to be \$2,368m, a 14% increase on expenditure in 1998–99 (see table 25.1).

As shown in table 25.9, the research fields in which most government R&D expenditure took place were: Agricultural, veterinary and environmental sciences (\$773m, or 33%); Engineering and technology (\$385m, or 16%); Biological sciences (\$260m, or 11%); Information, computing and communication sciences (\$217m, or 9%); Earth sciences (\$215m, or 9%); and Medical and health sciences (\$183m, or 8%).

A slightly different pattern applied to human resources devoted to R&D, with Agricultural, veterinary and environmental sciences accounting for 33%, Engineering and technology 15%, Medical and health sciences 12%, Biological sciences 11%, Earth sciences 7% and Information, computing and communication sciences 7%.

## 25.8 R&amp;D RESOURCES, Businesses by socioeconomic objective — 2000–01

	Type of expenditure					Human resources '000 person years
	Capital expenditure	Labour costs	Other current expenditure	Total		
	\$m	\$m	\$m	\$m	\$m	
Defence	0.9	71.9	45.2	117.9		0.7
Economic development						
Plant — production and primary products	5.3	23.0	18.5	46.8		0.4
Animal — production and primary products	2.5	18.1	34.9	55.5		0.3
Mineral resources (excl. energy)	38.3	91.2	187.7	317.2		1.1
Energy resources	5.9	27.0	70.7	103.6		0.3
Energy supply	30.8	48.1	42.9	121.8		0.6
Manufacturing	169.9	818.7	958.3	1 947.0		12.1
Construction	5.4	23.2	31.4	59.9		0.3
Transport	6.7	41.3	32.5	80.6		0.6
Information and communication services	115.8	662.3	590.6	1 368.7		7.8
Commercial services and tourism	23.4	135.7	49.8	209.0		1.3
Economic framework	0.8	5.4	1.6	7.8		0.1
Total	404.9	1 894.1	2 018.8	4 317.8		24.9
Society						
Health	19.1	117.7	139.3	276.1		1.5
Education and training	0.5	5.5	3.6	9.5		0.1
Social development and community services	3.3	12.7	8.9	24.9		0.2
Total	22.8	135.9	151.7	310.4		1.8
Environment						
Environmental policy frameworks and other aspects	1.5	4.3	4.7	10.6		0.1
Environmental management	4.4	20.3	37.3	62.0		0.3
Total	5.9	24.7	42.0	72.6		0.4
Non-oriented research	0.4	3.1	3.0	6.5		0.1
<b>Total</b>	<b>434.9</b>	<b>2 129.7</b>	<b>2 260.7</b>	<b>4 825.3</b>		<b>27.8</b>

Source: Research and Experimental Development, Businesses, Australia, 2000–01 (8104.0).

## 25.9 R&amp;D RESOURCES, Government organisations by field of research — 2000–01

	Type of expenditure					Human resources '000 person years
	Land and buildings	Other capital expenditure	Labour costs	Other current expenditure	Total	
	\$m	\$m	\$m	\$m	\$m	
Mathematical sciences	1.3	1.9	15.3	6.7	25.1	0.2
Physical sciences	4.3	6.9	52.5	29.6	93.3	0.7
Chemical sciences	5.2	4.0	52.1	34.0	95.3	0.7
Earth sciences	10.1	10.8	95.1	99.2	215.1	1.3
Biological sciences	32.5	10.0	126.2	91.1	259.8	2.0
Information, computing and communication sciences	4.2	6.8	99.6	106.1	216.8	1.2
Engineering and technology	17.9	15.5	206.7	144.7	384.8	2.8
Agricultural, veterinary and environmental sciences	27.3	20.3	379.6	346.1	773.3	6.1
Medical and health sciences	23.4	5.8	104.7	48.8	182.7	2.3
Economics	0.2	0.4	31.7	18.6	50.8	0.4
Law, justice and law enforcement	1.0	0.3	13.8	7.6	22.7	0.2
Other research fields	1.0	1.0	30.6	16.1	48.8	0.5
<b>Total</b>	<b>128.3</b>	<b>83.7</b>	<b>1 207.7</b>	<b>948.6</b>	<b>2 368.4</b>	<b>18.4</b>
Commonwealth	75.1	58.2	734.6	557.0	1 424.8	9.7
State	53.3	25.6	473.2	391.6	943.6	8.7

Source: Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2000–01 (8109.0).

In terms of socioeconomic objectives (table 25.10), most government sector R&D expenditure (\$1,375m or 58%) was directed towards Economic development. Of this, \$392m (29%) was directed towards Plant production and primary products, \$298m (22%) towards Animal production and primary products and \$233m (17%) towards Manufacturing. About 18% was

directed towards Environment, 12% towards Society, 10% towards Defence, and 1% to Non-oriented research.

A slightly different pattern applied to human resources devoted to R&D, with 53% directed towards Economic development, 18% towards Society, 17% towards Environment, 11% towards Defence, and 1% to Non-oriented research.

### 25.10 R&D RESOURCES, Government organisations by socioeconomic objective — 2000–01

	Type of expenditure					Human resources '000 person years
	Land and buildings	Other capital expenditure	Labour costs	Other current expenditure	Total	
	\$m	\$m	\$m	\$m	\$m	
Defence	0.4	5.5	165.3	67.4	238.7	2.0
Economic development						
Plant — production and primary products	13.4	10.4	196.8	171.8	392.5	3.2
Animal — production and primary products	10.0	8.2	141.8	137.8	297.8	2.2
Mineral resources (excl. energy)	4.3	3.6	42.3	31.7	81.9	0.5
Energy resources	3.0	2.5	28.9	30.8	65.3	0.4
Energy supply	2.3	0.9	16.1	9.0	28.3	0.2
Manufacturing	21.7	9.6	101.5	100.0	232.8	1.6
Construction	2.3	1.7	17.3	11.9	33.2	0.2
Transport	0.4	1.0	6.8	12.2	20.3	0.1
Information and communication services	3.4	3.6	30.3	15.4	52.8	0.4
Commercial services and tourism	0.6	1.1	5.6	4.1	11.4	0.1
Economic framework	4.9	1.4	66.7	85.6	158.7	0.9
Total	66.4	44.0	654.2	610.4	1 375.0	9.8
Society						
Health	32.6	7.9	114.8	57.7	213.0	2.6
Education and training	0.2	0.7	8.6	5.2	14.8	0.1
Social development and community services	2.3	1.8	36.0	21.7	61.8	0.6
Total	35.1	10.3	159.5	84.7	289.6	3.2
Environment						
Environmental policy frameworks and other aspects	1.3	1.1	28.9	19.1	50.4	0.4
Environmental management	21.1	18.3	184.7	156.8	380.9	2.7
Total	22.4	19.4	213.6	175.9	431.3	3.1
Non-oriented research	4.0	4.6	15.1	10.2	33.8	0.3
<b>Total</b>	<b>128.3</b>	<b>83.7</b>	<b>1 207.7</b>	<b>948.6</b>	<b>2 368.4</b>	<b>18.4</b>

Source: Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2000–01 (8109.0).

## Higher education sector

Estimated expenditure on R&D carried out in Australia by the higher education sector in 2000 was \$2,775m, an increase of 9% over expenditure in 1998, and 20% over expenditure in 1996 (see table 25.1).

Table 25.11 shows that major fields of research in which higher education R&D expenditure took place in 2000 were Medical and health sciences (\$668m, or 24% of total expenditure), Biological

sciences (\$325m, or 12%), Engineering and technology (\$309m, or 11%) and Agricultural, veterinary and environmental sciences (\$205m, or 7%). Direct labour costs accounted for 44% of total R&D expenditure.

A slightly different pattern applied to human resources devoted to R&D, with 19% on Medical and health sciences, 11% on Engineering and technology, 10% on Biological sciences and 7% on Agricultural, veterinary and environmental sciences.

### 25.11 R&D RESOURCES, Higher education organisations by field of research — 2000

	Type of expenditure						Human resources '000 person years
	Land and buildings	Other capital expenditure	Direct labour costs	Scholarships	Other current expenditure	Total	
	\$m	\$m	\$m	\$m	\$m	\$m	
Mathematical sciences	0.3	2.6	29.5	3.3	23.8	59.4	0.8
Physical sciences	2.0	12.8	46.7	4.8	45.6	112.0	1.3
Chemical sciences	2.1	15.4	50.0	9.0	50.8	127.2	1.7
Earth sciences	1.2	7.6	38.8	6.9	40.2	94.6	1.6
Biological sciences	9.5	24.8	132.3	19.1	138.8	324.5	4.7
Information, computing and communication sciences	2.1	6.8	51.5	8.5	44.2	113.1	1.8
Engineering and technology	5.2	25.9	123.7	25.1	129.1	309.1	5.0
Agricultural, veterinary and environmental sciences	2.8	8.7	85.6	15.0	92.5	204.5	3.1
Medical and health sciences	7.2	34.7	299.6	33.2	292.9	667.7	8.8
Education	2.0	2.8	41.5	6.0	34.3	86.6	2.4
Economics	0.7	2.5	31.5	3.4	28.8	66.8	1.1
Commerce, management, tourism and services	1.8	3.6	55.8	5.6	44.1	111.0	2.1
Studies in human society	1.5	2.8	41.7	6.8	40.8	93.7	2.0
Behavioural and cognitive sciences	2.3	4.2	39.2	6.8	35.2	87.8	2.0
Other research fields	7.8	10.0	146.6	29.7	122.4	316.5	7.9
<b>Total</b>	<b>48.6</b>	<b>165.3</b>	<b>1 214.0</b>	<b>183.2</b>	<b>1 163.5</b>	<b>2 774.6</b>	<b>46.3</b>

Source: Research and Experimental Development, Higher Education Organisations, Australia, 2000 (8111.0).

In terms of socioeconomic objectives (table 25.12), most higher education R&D expenditure (\$1,123m or 40%) was directed towards Society. About 29% was directed towards Economic development, 25% towards Non-oriented research and 6% towards Environment. The major subdivision within Society was Health with 27% of total R&D expenditure.

A similar pattern applied to human resources devoted to R&D, with 41% directed towards Society, 27% towards Economic development, 26% towards Non-oriented research and 6% to Environment.

### 25.12 R&D RESOURCES, Higher education organisations by socioeconomic objective — 2000

	Type of expenditure						Human resources '000 person years
	Land and buildings	Other capital expenditure	Direct labour costs	Scholarships	Other current expenditure	Total	
	\$m	\$m	\$m	\$m	\$m	\$m	
Defence	0.1	0.2	1.8	0.2	2.0	4.4	0.1
Economic development							
Plant — production and primary products	1.5	4.6	45.9	8.3	48.3	108.6	1.6
Animal — production and primary products	1.0	2.8	26.8	4.4	29.5	64.5	0.9
Mineral resources (excl. energy)	0.9	2.7	14.9	3.1	20.6	42.1	0.5
Energy resources	0.7	2.9	14.0	2.0	12.9	32.4	0.4
Energy supply	1.0	2.6	12.3	3.1	12.0	31.1	0.5
Manufacturing	2.0	15.9	58.1	10.9	53.8	140.7	2.1
Construction	0.9	3.0	23.3	4.7	22.2	54.1	1.1
Transport	0.6	1.3	10.1	1.7	9.0	22.8	0.4
Information and communication services	2.1	8.3	56.7	9.5	51.2	127.7	2.0
Commercial services and tourism	0.7	1.7	20.6	1.8	15.6	40.4	0.6
Economic framework	1.6	4.0	64.8	6.8	53.7	130.9	2.4
Total	13.1	49.8	347.5	56.2	328.8	795.3	12.7
Society							
Health	10.6	35.6	333.0	38.4	326.8	744.3	10.2
Education and training	2.4	4.0	51.8	7.0	44.8	110.0	2.7
Social development and community services	6.8	8.9	124.5	22.6	106.0	268.7	6.1
Total	19.8	48.4	509.3	67.9	477.6	1 123.0	19.0
Environment							
Environmental policy frameworks and other aspects	0.7	1.1	11.1	1.7	10.5	25.2	0.4
Environmental management	2.7	7.6	54.6	10.4	59.7	134.9	2.4
Total	3.4	8.7	65.7	12.1	70.2	160.1	2.8
Non-oriented research	12.2	58.2	289.6	46.9	284.8	691.7	11.8
<b>Total</b>	<b>48.6</b>	<b>165.3</b>	<b>1 214.0</b>	<b>183.2</b>	<b>1 163.5</b>	<b>2 774.6</b>	<b>46.3</b>

Source: Research and Experimental Development, Higher Education Organisations, Australia, 2000 (8111.0).

## Private non-profit sector

Expenditure on R&D carried out by private non-profit organisations in 2000–01 (\$283m) increased by 29% (table 25.1) over 1998–99 expenditure.

Medical and health sciences comprised the major field of research for R&D expenditure in the private non-profit sector, accounting for \$181m (64%) of the sector's total R&D expenditure in 2000–01. Labour costs continued to be the main component of R&D expenditure (47%) (table 25.13).

Medical and health sciences also comprised the leading field of research in terms of human resource use.

In the private non-profit sector, Health was the main socioeconomic objective (table 25.14), accounting for 91% or \$257m of total R&D expenditure. Education and training accounted for \$17m (6%), while \$5m (2%) was directed towards Economic development.

A similar pattern applied to human resources devoted to R&D, with 92% directed towards Health, 4% towards Education and training, and 2% towards Economic development.

### 25.13 R&D RESOURCES, Private non-profit organisations by field of research — 2000–01

	Type of expenditure					Human resources person years
	Land and buildings	Other capital expenditure	Labour costs	Other current expenditure	Total	
	\$m	\$m	\$m	\$m	\$m	
Mathematical sciences	—	0.1	0.4	0.6	1.1	8
Physical sciences	—	0.1	0.2	0.3	0.6	4
Chemical sciences	—	0.2	1.1	1.3	2.6	21
Earth sciences	—	—	—	—	—	—
Biological sciences	0.7	5.2	40.5	30.7	77.1	883
Information, computing and communication sciences	—	0.2	1.5	1.2	2.9	27
Engineering and technology	—	n.p.	n.p.	n.p.	n.p.	4
Agricultural, veterinary and environmental sciences	—	n.p.	n.p.	n.p.	n.p.	9
Medical and health sciences	24.9	10.7	80.1	65.1	180.8	1 665
Other research fields	0.1	0.4	8.2	7.8	16.5	101
<b>Total</b>	<b>25.8</b>	<b>17.0</b>	<b>132.7</b>	<b>107.6</b>	<b>283.2</b>	<b>2 721</b>

Source: Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2000–01 (8109.0).

### 25.14 R&D RESOURCES, Private non-profit organisations by socioeconomic objective — 2000–01

	Type of expenditure					Human resources person years
	Land and buildings	Other capital expenditure	Labour costs	Other current expenditure	Total	
	\$m	\$m	\$m	\$m	\$m	
Defence	—	—	—	—	—	—
Economic development	—	0.3	2.9	2.1	5.4	45
Society						
Health	25.6	16.0	119.0	96.2	256.9	2 515
Education and training	n.p.	n.p.	8.0	8.0	16.9	109
Social development and community services	n.p.	n.p.	1.0	0.4	1.4	15
<b>Total society</b>	<b>25.8</b>	<b>16.7</b>	<b>128.0</b>	<b>104.6</b>	<b>275.2</b>	<b>2 639</b>
Environment	—	—	1.5	0.7	2.2	28
Non-oriented research	—	—	0.3	0.2	0.5	9
<b>Total</b>	<b>25.8</b>	<b>17.0</b>	<b>132.7</b>	<b>107.6</b>	<b>283.2</b>	<b>2 721</b>

Source: Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2000–01 (8109.0).

## Scientific publications

One of the main outputs of R&D, especially that performed in the higher education sector, is scientific publications. Such publications are also often an intermediate output of innovation. In 1997, the publication of Australian scientific and technical articles per capita was well above the OECD average and that of countries including the United States of America, Germany and Japan, and on a par with Canada and the United Kingdom (graph 25.15).

## Innovation statistics

Innovation is a measure of the extent to which science and technology are used within businesses to create new products or to implement new processes for the provision of goods and services. Innovation surveys provide a wider measure of the innovation process than R&D surveys.

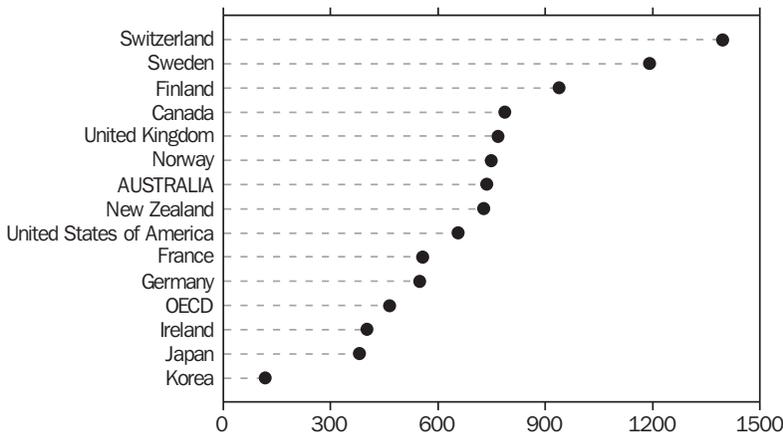
The ABS has conducted two surveys of innovation, the first in respect of 1993–94 and a second, more comprehensive survey, in respect of 1996–97. These surveys were based on the

concepts and standard questions developed jointly by the OECD and Eurostat (the statistical office for the European community). While the main ABS innovation surveys obtained data from manufacturing businesses, exploratory surveys have also been conducted for the mining, agriculture, construction and telecommunications industries.

The total amount spent by manufacturing businesses on technological innovation during 1996–97 was estimated at \$3.9b. About half of this was spent on R&D. See *Innovation in Manufacturing, Australia* (8116.0) and previous editions of Year Book Australia for further data from the innovation surveys.

An intermediate measure of innovation is number of patents obtained by Australian residents. Graph 25.16 shows the number of United States of America patents by Australian inventors during the period 1980–2000. Given the dominance of the United States of America market for innovative products, this is an indicator of Australian innovation. The number of such patents has grown significantly over this period, particularly since 1997, but remains well below that of several OECD countries of similar population.

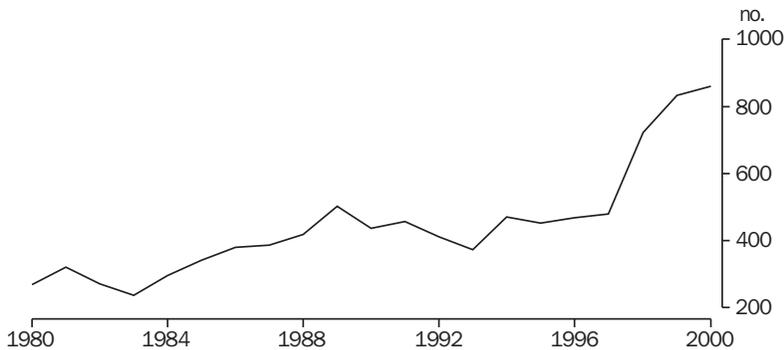
**25.15 SCIENTIFIC AND TECHNICAL ARTICLES(a),  
Per million of population — 1997**



(a) Article counts were based on fractional assignments; for example, an article with two authors from different countries was counted as one-half article to each country.

Source: OECD *Science, Technology and Industry Scoreboard 2001*; National Science Foundation, *Science and Engineering Indicators 2000*.

## 25.16 UNITED STATES OF AMERICA PATENTS BY AUSTRALIAN INVENTORS



Source: Department of Industry, Tourism and Resources, 'Australia as a Modern Economy, Some Statistical Indicators 2002.

Innovation depends on other aspects of what the OECD calls a 'knowledge-based economy', such as human capital and information and communications technology. In August 2002, the ABS published a framework for analysis, *Discussion Paper: Measuring a Knowledge-based Economy and Society — An Australian Framework* (1375.0). The aim of the framework is to enable assessment, through use of relevant statistics, of the degree to which Australia is a knowledge-based economy and society.

## Official organisations and administration

There are many organisations in Australia concerned in some way with the development of science and innovation.

The Commonwealth Government's commitment to science and innovation was reaffirmed in the innovation statement of January 2001, *Backing Australia's Ability*. This statement gathered together a range of new and continuing programs in support of innovation and allocated nearly \$3b to these programs. Implementation of these programs, and other related programs and policies, rests with the Department of Industry, Tourism and Resources, the Department of Education, Science and Training and the Department of Communications, Information Technology and the Arts. These departments are concerned with the development and maintenance of Australia's scientific and innovative capability. The R&D activity summarised in tables 25.1–25.14 does not show

the full impact of *Backing Australia's Ability*. Further information on the preliminary outcomes are reported in the Government's annual report on innovation for 2002.

A number of other Commonwealth government organisations either support or carry out science and innovation related activities. State governments are also involved in science and innovation through state government departments, science and technology councils and other organisations. Non-government organisations participating in scientific and innovative activities include higher education institutions, professional and learned bodies, private organisations and industry groups.

## Department of Industry, Tourism and Resources

The Department of Industry, Tourism and Resources is responsible for a number of federally supported innovation-related industry development programs. The department includes the Innovation and Industry Policy Division, Geoscience Australia, Biotechnology Australia, IP Australia and AusIndustry, including the Industry Research and Development Board programs.

The department, through AusIndustry, administers a number of programs, under *Backing Australia's Ability*, to support innovation, of which the biggest are the Tax Concession for Research and Development scheme and the Strategic Assistance for Research and Development (Start) Program.

### R&D Tax Concession Program

The tax concession for R&D, which commenced from July 1985, is the focus of one of the major programs in the Commonwealth Government's package of measures to encourage R&D in Australia.

The concession allows companies incorporated in Australia, public trading trusts and partnerships of eligible companies, to deduct up to 125%, in some cases up to 175%, of eligible expenditure on R&D activities when lodging their corporate tax returns. Small companies, which are otherwise eligible but are making a tax loss, may claim the concession in the form of a cash rebate.

### Strategic Assistance for Research and Development (Start) Program

The R&D Start Program provides grants and concessional loans to support research, development and commercialisation by Australian firms. Grants of up to \$15m are available, although they typically range between \$50,000 and \$5m. Assistance is provided on a competitive basis to companies incorporated in Australia. The program aims to:

- increase the number of R&D projects with high commercial potential that are undertaken by companies
- foster greater commercialisation of the outcomes from R&D projects
- foster collaborative R&D and related activities through companies working together, or working with research institutions
- increase the level of R&D and its commercialisation that provides benefit to Australia.

Other complementary programs supporting commercialisation (beyond R&D) include the Innovation Access Program (which facilitates technology diffusion from overseas) and the Commercialising Emerging Technologies Program (which provides management assistance to innovative small businesses).

### Biotechnology Australia

Biotechnology Australia is a collaboration of five Commonwealth departments, created to assist in coordinating the Government's approach to biotechnology.

Biotechnology Australia's aim is to increase the public's general awareness of biotechnology and its uses, through the provision of balanced and

factual information explaining the technology, its applications, and regulations to safeguard people and the environment.

The goal is to ensure that Australia captures the benefits arising from the medical, agricultural and environmental application of biotechnology, while ensuring maximum safety for people as well as the environment.

### Department of Education, Science and Training

The Department of Education, Science and Training is responsible for a number of federally supported science and technology-related development programs. The department includes the Science Group which provides quality analysis and policy advice, and delivers programs to help build and promote Australia's science and technology base. The Group includes the Science and Technology Policy Branch, the National Research Priorities Task Force, the International Relations and Collaboration Branch, the Science Programmes Branch and the Office of the Chief Scientist.

The department administers a number of programs to support innovation, including the Cooperative Research Centres Program.

The scientific and technological bodies of the portfolio include the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Nuclear Science and Technology Organisation and the Australian Institute of Marine Science.

### Cooperative Research Centres (CRC) Program

The CRC Program was launched in May 1990.

The CRC bring together researchers from universities, CSIRO and other government laboratories, and private industry or public sector agencies, in long-term collaborative arrangements which support research and development, and educational activities, that achieve real outcomes of national economic and social significance.

The program emphasises the importance of developing collaborative arrangements between researchers, and between researchers and research users in the private and public sectors, in order to maximise the capture of the benefits of publicly funded research through an enhanced process of commercialisation or utilisation by the users of that research.

## **Commonwealth Scientific and Industrial Research Organisation (CSIRO)**

The CSIRO is an independent statutory authority constituted and operating under the provisions of the *Science and Industry Research Act 1949* (Cwlth) and the *Commonwealth Authorities and Companies Act 1997* (Cwlth). Its primary role is as an applications-oriented research organisation in support of major industry sectors and selected areas of community interest, with a strong commitment to the effective transfer of its results to users.

It is one of the largest and most diverse scientific institutions in the world, with a staff of over 6,000 located at 60 sites throughout Australia.

Briefly, the CSIRO's primary statutory functions are to:

- carry out scientific research for the benefit of Australian industry, the community, national objectives, national or international responsibilities, or for any other purpose determined by the minister
- encourage or facilitate the application or utilisation of the results of such research.

Other functions include dissemination and publication of scientific information, international liaison in scientific matters, and provision of services and facilities.

The CSIRO's work is planned and prioritised on a sectoral basis and conducted through core business units — CSIRO divisions. External advice on research priorities is channelled through sector advisory committees. Each sector represents an industry group, market, or natural resource of national significance. There are 22 sectors covering research in five broad groupings:

*Agribusiness* — field crops; food processing; forestry, wood and paper industries; horticulture; meat, dairy and aquaculture; wool and textiles.

*Environment and Natural Resources* — biodiversity; climate and atmosphere; land and water; marine.

*Information Technology, Infrastructure and Services* — information technology and telecommunications; built environment; measurement standards; radio astronomy; services.

*Manufacturing* — chemicals and plastics; integrated manufactured products; pharmaceuticals and human health.

*Minerals and Energy* — coal and energy; mineral exploration and mining; mineral processing and metal production; petroleum.

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### Other publications

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### Additional information

Additional information on topics presented in this chapter may be found in the Commonwealth Government's annual report on innovation and in the annual reports and other publications of the organisations mentioned, particularly the Department of Education, Science and Training, the Department of Industry, Tourism and Resources and the CSIRO. See also the innovation statement of January 2001, *Backing Australia's Ability*.

Additional information on some technology-related issues, particularly on the use of information technology, can be found in *Chapter 24, Communications and information technology*.

### Web sites

Information about all Commonwealth government policies and programs relating to science and innovation can be found through the portal <<http://www.scienceandindustry.gov.au>>

Australian Bureau of Statistics, <<http://www.abs.gov.au>>. A *science and innovation* theme page may be found under the category *Themes*

Commonwealth Department of Education, Science and Training, <<http://www.dest.gov.au>>. The innovation statement, *Backing Australia's Ability*, can be found at <<http://www.innovation.gov.au>>

Commonwealth Department of Industry, Tourism and Resources, <<http://www.industry.gov.au>>

Commonwealth Scientific and Industrial Research Organisation, <<http://www.csiro.au>>

Organisation for Economic Co-operation and Development, <<http://www.oecd.org>>. A summary of the *Frascati Manual*, the basic international source of methodology for collecting and using research and development statistics, can be found at <<http://www.oecd.org/dsti/sti/stat-ana/prod>>



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## Introduction

The financial system in Australia can be thought of as having three overlapping components. The first consists of financial enterprises (such as banks) and regulatory authorities, the Reserve Bank and the Australian Prudential Regulation Authority (APRA). The second consists of financial markets (e.g. the bond market) and their participants (issuers such as governments, and investors such as superannuation funds). The third is the payments system — that is, the cash, cheque and electronic means by which payments are effected — and its participants (e.g. banks). The interaction of these components enables funds for investment or consumption to be made available from savings in other parts of the national or international economy.

This chapter provides a summary of the structure and activities of the three financial system components as they function currently. However, the financial system can, and does, change its structure and activities as a result of regulation or deregulation processes.

## Regulation

From 1 July 1998 a new financial regulatory framework came into effect, in response to the recommendations of the Financial System Inquiry (the Wallis Committee). Under the new structure a single prudential supervisor, APRA, was established to take responsibility for the supervision of banks, life and general insurance companies and superannuation funds. The Australian Securities and Investments Commission (ASIC) assumed responsibility for market integrity and consumer protection across the financial system. The Reserve Bank retained responsibility for monetary policy and the maintenance of financial stability, including stability of the payments system.

From 1 July 1999 building societies and credit unions have been supervised by APRA. APRA supervises benefit funds of friendly societies under the *Life Insurance Act 1995* (Cwlth), while health benefit funds of friendly societies are regulated by the Private Health Insurance Administration Council under the *National*

*Health Act 1959* (Cwlth). Prior to 1 July 1999, building societies, credit unions and friendly societies were regulated under state legislation.

On 1 July 2000 regulation of self-managed superannuation funds was transferred to the Australian Taxation Office (ATO). From September 2001 the *Financial Sector (Collection of Statistics) Act 2001* (Cwlth) provided APRA with powers to collect information previously collected under the range of legislation for which it was responsible, and under the Financial Corporations Act administered by the Reserve Bank. The new legislation enables harmonised and consistent data collection from financial institutions; APRA will commence collection from registered financial corporations during 2003.

## Inter-sectoral financial flows

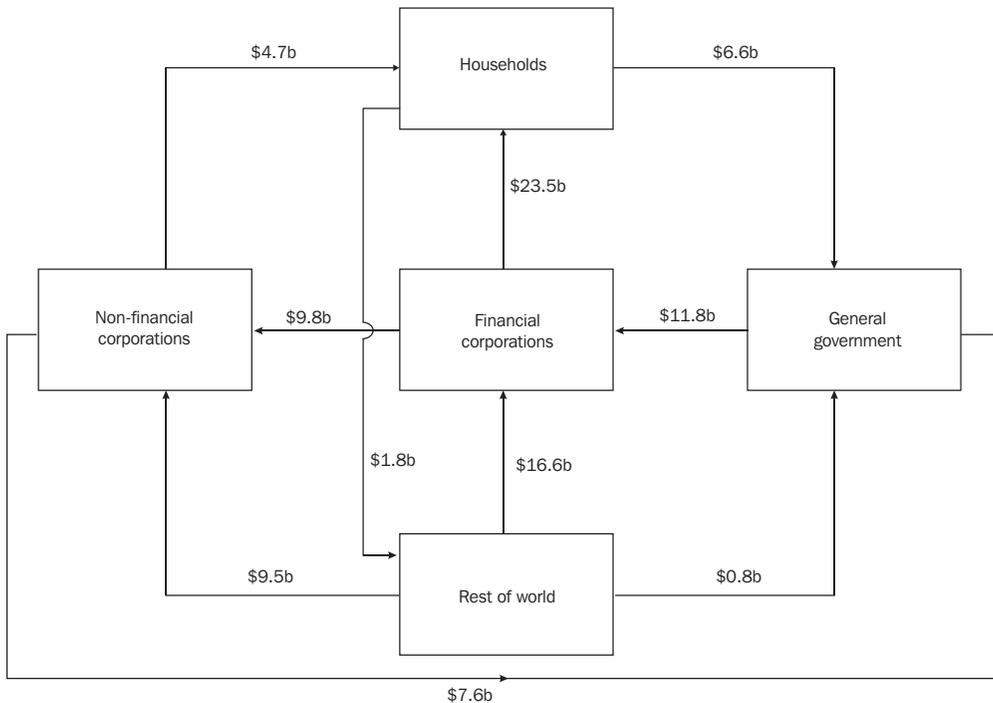
Diagram 26.1 provides an overview of the flows of capital through the financial system and summarises the end result of applying the current statistical framework. It illustrates the net financial flows between sectors during the year 2001–02. The arrows show the net flow from lenders to borrowers. For example, there is a \$23.5b net flow from the financial corporations sector to households. There is also an \$9.8b net flow from financial corporations to non-financial corporations. This is mainly attributable to increased loans by financial intermediaries and increased share purchases by financial institutions such as life offices and pension funds.

## Financial enterprises

Financial enterprises are institutions which engage in acquiring financial assets and incurring liabilities, for example, by taking deposits, borrowing and lending, providing superannuation, supplying all types of insurance cover, leasing, and investing in financial assets.

For national accounting purposes, financial enterprises are grouped into six sectors: Depository corporations; Life insurance corporations; Pension funds; Other insurance corporations; Central borrowing authorities; and Financial intermediaries n.e.c.

## 26.1 INTER-SECTORAL FINANCIAL FLOWS — 2001–02



Note: The arrows show the direction of net financial flows from lending sectors to borrowing sectors. The number relating to each arrow indicates the value of that net flow during the period. Other claims are omitted from the diagram. For this reason, inter-sectoral borrowing does not equal inter-sectoral lending.

Source: Australian National Accounts: Financial Accounts, June 2002 (5232.0).

*Depository corporations* — are those included in the Reserve Bank of Australia's *broad money* measure (see *Money supply measures*). The Reserve Bank itself is a depository corporation; authorised depository institutions are those supervised by APRA and include banks, building societies and credit unions; non-supervised depository corporations registered under the *Financial Statistics (Collection of Data) Act 2001* (Cwth) include merchant banks, pastoral finance companies, finance companies and general financiers; finally cash management trusts are also included in depository corporations.

*Life insurance corporations* — cover the statutory and shareholders' funds of life insurance companies and similar business undertaken by friendly societies and long-service-leave boards.

*Pension funds* — cover separately constituted superannuation funds.

*Other insurance corporations* — cover health, export and general insurance companies.

*Central borrowing authorities* — are corporations set up by state and territory governments to provide liability and asset management services for those governments.

*Financial intermediaries n.e.c.* — cover common funds, mortgage, fixed interest and equity unit trusts, issuers of asset-backed securities, economic development corporations and cooperative housing societies.

Table 26.2 shows the relative size of these groups of financial enterprises in terms of their financial assets. This table has been compiled on a consolidated basis, that is, financial claims between institutions in the same grouping have been eliminated. The total is also consolidated, that is, financial claims between the groupings have been eliminated. For this reason, and because there are a number of less significant adjustments made for national accounting purposes, the statistics in the summary table will differ from those presented later in this chapter and published elsewhere.

## 26.2 FINANCIAL INSTITUTIONS, Financial assets

At 30 June	Depository corporations								
	Reserve Bank	Banks	Other	Life insurance corporations	Pension funds	Other insurance corporations	Central borrowing authorities	Financial intermediaries n.e.c.	Consolidated financial sector total
	\$b	\$b	\$b	\$b	\$b	\$b	\$b	\$b	\$b
1997	49.1	519.6	156.2	143.7	256.7	52.6	92.0	114.3	1 021.7
1998	45.1	584.1	172.0	148.9	300.4	62.9	96.2	161.7	1 135.0
1999	44.6	637.9	179.5	168.8	345.5	65.8	97.0	163.3	1 212.6
2000	51.1	725.6	189.9	190.5	425.3	65.3	91.3	214.8	1 394.4
2001	56.0	800.0	223.1	193.1	459.1	70.3	91.8	230.5	1 501.3
2002	56.8	866.0	239.0	191.8	453.4	74.9	94.5	250.9	1 588.1

Source: Australian National Accounts: Financial Accounts (5232.0).

## Banks

Between 1940 and 1959, central banking business was the responsibility of the Commonwealth Bank. The *Reserve Bank Act 1959* (Cwth) established the Reserve Bank of Australia as the central bank, and from 1959 to 1998 the Reserve Bank was responsible for the supervision of commercial banks. From 1 July 1998, APRA assumed responsibility for bank supervision while the Reserve Bank retains responsibility for monetary policy and the maintenance of financial stability, including stability of the payments system.

Banks are the largest deposit-taking and financial institutions in Australia. At the end of June 2002 there were 49 banks operating in Australia. All are authorised to operate by the *Banking Act*

1959 (Cwth). Four major banks: the Australia and New Zealand Banking Group, Commonwealth Bank of Australia, National Australia Bank, and the Westpac Banking Corporation, account for over half the total assets of all banks. These four banks provide widespread banking services and an extensive retail branch network throughout Australia. The remaining banks provide similar banking services through limited branch networks often located in particular regions. As at 30 June 2002, banking services were provided at 2,978 giroPost locations and 14,714 Automatic Teller Machines (ATM) throughout Australia.

The liabilities and financial assets of the Reserve Bank are set out in table 26.3. The liabilities and financial assets of the banks operating in Australia are shown in table 26.4.

## 26.3 RESERVE BANK OF AUSTRALIA, Financial assets and liabilities

	Amounts outstanding at 30 June		
	2000	2001	2002
	\$m	\$m	\$m
<b>FINANCIAL ASSETS</b>			
Monetary gold and SDRs(a)	1 374	1 564	1 661
Currency and deposits	9 969	12 020	12 367
One name paper	1 199	1 013	1 897
Bonds	36 858	39 709	40 163
Derivatives	58	73	—
Loans and placements	1 521	1 454	637
Other accounts receivable	125	137	122
<b>Total(b)</b>	<b>51 104</b>	<b>55 970</b>	<b>56 847</b>
<b>LIABILITIES</b>			
Currency and deposits	30 998	28 229	34 103
Unlisted shares and other equity(c)	10 446	12 265	11 399
Other accounts payable	4 329	3 462	3 795
<b>Total</b>	<b>45 773</b>	<b>43 956</b>	<b>49 297</b>

(a) Special Drawing Rights. (b) Excludes non-financial assets (e.g. fixed assets, property, inventories, etc.). (c) Estimates based on net asset values.

Source: Australian National Accounts: Financial Accounts (5232.0).

## 26.4 BANKS(a), Financial assets and liabilities

	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
<b>FINANCIAL ASSETS</b>			
Currency and deposits	25 711	32 629	39 441
Acceptance of bills of exchange	75 825	80 838	78 389
One name paper	11 560	10 781	15 328
Bonds	22 921	30 229	24 390
Derivatives	25 249	31 604	41 068
Loans and placements	502 581	544 784	606 411
Equities	56 821	59 675	58 109
Prepayments of premiums and reserves	1 478	1 515	1 679
Other accounts receivable	3 653	7 958	1 320
<b>Total(b)</b>	<b>725 799</b>	<b>800 013</b>	<b>866 135</b>
<b>LIABILITIES</b>			
Currency and deposits	363 011	409 637	454 983
Acceptance of bills of exchange	54 302	54 261	42 523
One name paper	89 398	86 854	86 075
Bonds	82 098	101 523	110 406
Derivatives	26 380	28 218	43 369
Loans and placements	34 904	36 094	41 961
Equity	133 216	169 502	181 668
Other accounts payable	3 076	2 741	2 618
<b>Total</b>	<b>786 385</b>	<b>888 830</b>	<b>963 603</b>

(a) Does not include the Reserve Bank of Australia. (b) Excludes non-financial assets (e.g. fixed assets, property, inventories, etc.).

Source: Australian National Accounts: Financial Accounts (5232.0).

## Other depository corporations

In addition to banks, financial institutions such as building societies, credit unions and merchant banks play an important part in the Australian financial system. In the Australian financial accounts, Other depository corporations are defined as those, apart from banks, with liabilities included in the Reserve Bank's definition of *broad money*. Non-bank institutions included in broad money are Other authorised depository institutions (building societies and credit cooperatives), cash management trusts, and corporations registered under the *Financial Statistics (Collection of Data) Act 2001* (Cwlth)

which include money market corporations, pastoral finance companies, finance companies and general financiers.

Table 26.5 shows the total assets of each category of non-bank deposit-taking institution.

There are seven categories of other depository corporations.

*Permanent building societies* are usually organised as financial cooperatives. They are authorised to accept money on deposit. They provide finance principally in the form of housing loans to their members.

## 26.5 OTHER DEPOSITORY CORPORATIONS, Total assets

	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
Permanent building societies	12 723	13 073	12 465
Credit cooperatives	21 509	23 945	25 538
Money market corporations	63 703	81 248	85 837
Pastoral finance companies	5 922	10 230	12 805
Finance companies	44 272	47 869	44 455
General financiers	20 660	24 240	30 003
Cash management trusts	24 776	28 693	29 453
<b>Total</b>	<b>193 565</b>	<b>229 298</b>	<b>240 556</b>

Source: Managed Funds, Australia (5655.0); APRA; Australian Financial Institutions Commission; Reserve Bank of Australia.

*Credit cooperatives* also known as credit unions — are similar to building societies. As their name implies, they are organised as financial cooperatives which borrow from and provide finance to their members. Credit cooperatives mainly lend for purposes other than housing.

Supervision of building societies and credit cooperatives was transferred to APRA on 1 July 1999.

*Money market corporations* are similar to wholesale banks and for this reason they are often referred to as merchant or investment banks. They have substantial short-term borrowings which they use to fund business loans and investments in debt securities.

*Pastoral finance companies* incur liabilities to lend to rural producers. *Finance companies* borrow mainly on financial markets, for example, by issuing debentures. They lend these funds to both businesses and persons. Their lending to businesses is sometimes called commercial lending and covers, for example, financial leasing of vehicle fleets. Their lending to persons is often in the form of instalment credit to finance retail sales by others. In contrast with finance companies, *general financiers* are funded by their parent or another member of their company group. Typically they lend to corporate customers who buy products produced by member companies of their group. For example, a general financier within a motor vehicle manufacturing group will lend to the group's dealers to finance their inventory of vehicles.

*Cash management trusts* are investment funds which are open to the public. They invest the pooled monies of their unit holders mainly in money-market securities such as bills of exchange and bank certificates of deposit. As with other public unit trusts their operations are governed by a trust deed and their units are redeemable by the trustee on demand or within a short time. They are not subject to supervision by APRA or registered under the *Financial Statistics (Collection of Data) Act 2001* (Cwlth).

## Life insurance corporations

Life insurance corporations offer termination insurance and investment policies. Termination insurance includes the payment of a sum of money on the death of the insured or on the insured receiving a permanent disability. Investment products include annuities and superannuation plans. The life insurance industry in Australia consists of 42 direct insurers, including six reinsurers. As with the banking industry, the life insurance industry is dominated by a few very large companies holding a majority of the industry's assets.

Life insurance companies are supervised by the APRA under the *Life Insurance Act 1995* (Cwlth).

Table 26.6 shows the financial assets and liabilities arising from both policyholder and shareholder investment in life insurance corporations.

## Pension funds

Pension funds have been established to provide retirement benefits for their members. Members make contributions during their employment and receive the benefits of this form of saving in retirement. In order to receive concessional taxation treatment, a pension fund must elect to be regulated under the *Superannuation Industry (Supervision) Act 1993* (Cwlth) (SIS Act). These funds are supervised by either APRA or the ATO. Public sector funds, being funds sponsored by a government employer or government controlled business enterprise, are exempt from direct APRA supervision.

The largest number of pension funds comprise self-managed superannuation funds (also known as 'do it yourself' funds). From 1 July 2000 the ATO assumed responsibility for regulating self-managed superannuation funds.

Self-managed superannuation funds are superannuation funds:

- that have less than five members and
- each individual trustee of the fund is a fund member and
- each member of the fund is a trustee and
- no member of the fund is an employee of another member of a fund, unless they are related and
- if the trustee of the fund is a body corporate each director of the body corporate is a member of the fund.

## 26.6 LIFE INSURANCE CORPORATIONS, Financial assets and liabilities

	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
<b>FINANCIAL ASSETS</b>			
Currency and deposits	12 524	13 123	11 760
Bills of exchange	3 810	4 693	4 031
One name paper	14 002	10 389	12 212
Bonds	45 070	41 074	37 891
Derivatives	119	28	359
Loans and placements	10 375	9 235	6 097
Equities	100 336	110 404	113 762
Other accounts receivable	5 469	5 551	8 864
<b>Total</b>	<b>191 705</b>	<b>194 497</b>	<b>194 976</b>
<b>LIABILITIES</b>			
Bills of exchange	—	—	36
One name paper issued offshore	—	674	431
Bonds etc. issued in Australia	1 240	1 115	1 104
Bonds etc. issued offshore	1 327	1 261	1 012
Derivatives	295	371	—
Loans and placements	4 885	4 914	3 695
Listed and unlisted equity	38 091	46 192	36 723
Net equity in reserves	60 410	53 518	53 337
Net equity of pension funds	108 079	116 070	117 729
Other accounts payable	4 170	4 879	5 477
<b>Total</b>	<b>218 497</b>	<b>228 994</b>	<b>219 544</b>

Source: Australian National Accounts: Financial Accounts (5232.0).

Corporate funds are funds sponsored by a single non-government employer, or group of employers. Industry funds generally have closed memberships restricted to the employees of a particular industry and are established under an agreement between the parties to an industrial award.

Public sector funds are those funds sponsored by a public sector employer. Retail funds are pooled superannuation products sold through an intermediary to the general public. Funds with less than five members but which do not qualify as self-managed superannuation funds are known as small APRA funds.

In addition to separately constituted funds, the SIS Act also provides for special accounts operated by financial institutions earmarked for superannuation contributions, known as Retirement Savings Accounts, that also qualify for concessional taxation under the supervision of APRA. The liabilities represented by these accounts are liabilities of the institutions concerned and are included with the relevant institution in this chapter (e.g. retirement savings

accounts operated by banks are included in bank deposits in table 26.4), but are also footnoted in table 26.8 for completeness.

The number of pension funds is shown in table 26.7. The assets of pension funds are shown in table 26.8 and include unfunded pension claims by pension funds on the Commonwealth Government where these have been formally recognised in accounting systems. The assets in the table do not include any provision for the pension liabilities of Australian governments to public sector employees in respect of unfunded retirement benefits. At 30 June 2002 the ABS estimate for claims by households on government for these outstanding liabilities was \$121.1b.

## 26.7 PENSION FUNDS(a) — 30 June 2002

Type of fund	no.
Corporate	3 235
Industry	139
Public sector	94
Retail	274
Small APRA funds	(a)8 100
Self-managed superannuation funds	(a)214 700
<b>Total</b>	<b>(a)226 500</b>

(a) Approximate number, June 2002 not yet available.

Source: APRA and ATO.

## 26.8 PENSION FUNDS(a), Financial assets

	Amounts outstanding at 30 June		
	2000	2001	2002
	\$m	\$m	\$m
Currency and deposits	28 907	36 422	33 784
Bills of exchange	6 193	6 399	6 003
One name paper	13 473	11 813	12 388
Bonds	36 476	35 954	39 346
Loans and placements	14 522	15 977	14 400
Equities	205 930	225 476	218 887
Unfunded superannuation claims	8 013	6 329	5 879
Net equity of pension funds in life office reserves	108 079	116 070	117 729
Other accounts receivable	3 671	4 611	4 939
<b>Total</b>	<b>425 264</b>	<b>459 051</b>	<b>453 355</b>

(a) Retirement savings accounts were valued at \$404m at 30 June 2001 (APRA).

Source: Australian National Accounts: Financial Accounts (5232.0).

### Other insurance corporations

This sector includes all corporations that provide insurance other than life insurance. Included are general, fire, accident, employer liability, household, health and consumer credit insurers.

Private health insurers are regulated by the Private Health Insurance Administration Council (PHIAC) under the *National Health Act 1959* (Cwlth). At 30 June 2002 there were 44 private health insurers, including health benefit funds of friendly societies. Other private insurers are supervised by APRA under the *Insurance Act 1973* (Cwlth). At 30 June 2002 there were 146 insurers authorised to conduct new or renewal general insurance supervised by APRA. In addition, there were 10 public sector insurers at 30 June 2002. Table 26.9 sets out the financial assets and liabilities of Other insurance corporations at 30 June 2002 and the preceding two years.

### Central borrowing authorities

Central borrowing authorities are institutions established by the state governments and the Northern Territory Government primarily to provide finance for public corporations and quasi-corporations, and other units owned or controlled by those governments, and to arrange investment of the units' surplus funds. The central borrowing authorities borrow funds, mainly by issuing securities, and on-lend them to their public sector clientele. However, they also engage in other financial intermediation activity for investment purposes, and may engage in the financial management activities of the parent government.

Table 26.10 shows the financial assets and liabilities held by the central borrowing authorities at 30 June of the most recent three years.

**26.9 OTHER INSURANCE CORPORATIONS, Financial assets and liabilities**

	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
<b>FINANCIAL ASSETS</b>			
Currency and deposits	5 409	5 372	6 187
Bills of exchange	1 811	2 055	2 740
One name paper	2 805	2 286	3 280
Bonds	19 418	21 647	24 785
Loans and placements	8 961	7 600	5 671
Equities	24 626	26 543	27 218
Other accounts receivable	5 132	7 492	7 543
<b>Total</b>	<b>68 162</b>	<b>72 995</b>	<b>77 424</b>
<b>LIABILITIES</b>			
Bonds on issue	566	224	366
Loans and placements	1 396	1 513	1 805
Listed shares and other equity	5 180	10 371	8 905
Unlisted shares and other equity	15 249	14 621	16 494
Prepayment of premiums	49 248	50 511	55 978
Other accounts receivable	6 935	5 162	9 937
<b>Total</b>	<b>78 574</b>	<b>82 402</b>	<b>93 485</b>

Source: Australian National Accounts: Financial Accounts (5232.0); APRA; PHIAC.

**26.10 CENTRAL BORROWING AUTHORITIES, Financial assets and liabilities**

	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
<b>FINANCIAL ASSETS</b>			
Currency and deposits	1 388	1 236	2 341
Holdings of bills of exchange	6 239	5 714	5 232
One name paper	4 816	4 819	4 896
Bonds	3 272	4 939	4 895
Derivatives	3 736	3 949	5 597
Loans and placements	70 807	70 258	70 578
Other accounts receivable	1 075	836	917
<b>Total(a)</b>	<b>91 333</b>	<b>91 751</b>	<b>94 456</b>
<b>LIABILITIES</b>			
Drawings of bills of exchange	100	39	258
One name paper	6 718	8 101	9 490
Bonds	70 450	70 085	68 997
Derivatives	3 397	4 033	5 064
Loans and placements	12 142	13 328	12 648
Equity	30	30	87
Other accounts payable	82	888	396
<b>Total</b>	<b>92 919</b>	<b>96 504</b>	<b>96 940</b>

(a) Excludes non-financial assets (e.g. fixed assets, property, inventories, etc.).

Source: Australian National Accounts: Financial Accounts (5232.0).

### Financial intermediaries not elsewhere classified (n.e.c.)

This subsector comprises all institutions that meet the definition of a financial enterprise and have not been included elsewhere. It includes:

- economic development corporations owned by governments
- cash, mortgage, equity and fixed interest common funds
- mortgage, fixed interest, balanced and equity public unit trusts
- wholesale trusts
- securitisers
- investment companies
- cooperative housing societies
- housing finance schemes established by state governments to assist first home buyers.

In addition to enterprises which engage directly in intermediation, the subsector also includes enterprises which undertake activity closely associated with intermediation such as:

- fund managers
- insurance brokers
- arrangers of hedging instruments such as swaps, options and futures.

Table 26.11 shows the financial assets of selected groups of financial intermediaries n.e.c.

*Economic development corporations* — are owned by governments. As their name implies, these bodies are expected to finance infrastructure developments mainly in their home state or territory.

*Common funds* — are set up by trustee companies and are governed by state Trustee Acts. They allow the trustee companies to combine depositors' funds and other funds held in trust in an investment pool. They are categorised according to the main types of assets in the pool, for example, cash funds or equity funds.

**26.11 FINANCIAL INTERMEDIARIES n.e.c., Financial assets**

	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
<i>Public unit trusts(a)</i>	80 971	95 596	<i>n.p.</i>
Equity unit trusts	52 960	65 352	<i>n.p.</i>
Other unit trusts	28 011	30 244	28 494
Common funds	7 502	8 157	7 872
Securitisers	65 014	84 835	110 370
Cooperative housing societies	987	973	<i>n.y.a.</i>
Other(b)	60 661	41 254	<i>n.y.a.</i>
<b>Total</b>	<b>215 135</b>	<b>230 815</b>	<b>252 526</b>

(a) Excludes property and trading trusts. (b) Includes investment companies, economic development corporations, fund managers, insurance brokers, hedging instrument arrangers, wholesale trusts, and state government housing schemes.

Source: *Annual Statistics on Financial Institutions on Hardcopy* (5661.0.40.001); *Australian National Accounts: Financial Accounts* (5232.0); *Managed Funds, Australia* (5655.0).

*Public unit trusts* — are investment funds open to the Australian public. Their operations are governed by a trust deed which is administered by a management company. Under the *Managed Investments Act 1997* (Cwlth), the management company has become the single responsible entity for both investment strategy and custodial arrangements; the latter previously had been the responsibility of a trustee. These trusts allow their unit holders to dispose of their units relatively quickly. They may sell them back to the manager if the trust is unlisted, or sell them on the Australian Stock Exchange (ASX) if the trust is listed. Public unit trusts are categorised according to the main types of assets in the pool; for example, property or equity. Only those which invest primarily in financial assets — mortgages, fixed interest, futures or equity securities — are included here. While public unit trusts are not subject to supervision by APRA or registered under the *Financial Statistics (Collection of Data) Act 2001* (Cwlth), they are subject to the provisions of corporations law which includes having their prospectus registered with ASIC.

*Wholesale trusts* — are investment funds that are only open to institutional investors — life insurance corporations, superannuation funds, retail trusts, corporate clients, high net worth individuals — due to high entry levels (e.g. \$500,000 or above). They may issue a prospectus, but more commonly issue an information memorandum. Only those which invest in financial assets are included here.

*Securitisers* — issue short- and/or long-term debt securities which are backed by specific assets. The most common assets bought by securitisation trusts/companies are residential mortgages. These mortgages are originated by financial institutions such as banks and building societies or specialist mortgage managers. Other assets can also be used to back these securities, such as credit card receivables and financial leases. Securitisers generally pool the assets and use the income on them to pay interest to the holders of the asset-backed securities.

*Investment companies* — are similar to equity trusts in that they invest in the shares of other companies. However, investors in investment companies hold share assets, not unit assets.

*Cooperative housing societies* — are similar to permanent building societies. In the past they were wound up after a set period, but now they too are continuing bodies. They raise money through loans from members (rather than deposits) and provide finance to members in the form of housing loans. Over recent years many cooperative housing societies have originated mortgages on behalf of securitisers.

*Fund managers, insurance brokers and arrangers of hedging instruments* — are classified as financial auxiliaries as they engage primarily in activities closely related to financial intermediation, but they themselves do not perform an intermediation role. Auxiliaries primarily act as agents for their clients (usually other financial entities) on a fee-for-service basis, and as such the financial asset remains on the balance sheet of the client, not the auxiliary. However, a small portion of the activities of auxiliaries is brought to account on their own balance sheet, and these amounts are included in table 26.11.

## Financial markets

Financial markets are used by participants to either raise funds (e.g. by issuing securities) or invest savings (by buying securities and other financial assets). The major markets in the Australian financial system include the share market, bond market and money market. Descriptions and tables indicating prices and activity in various financial markets are provided in this section.

A significant influence in financial markets is the participation of institutional investors controlling large pools of investment funds. These pools are accumulated by collective investment institutions and are often managed on a fee-for-service basis by investment managers. A summary of the activities of these institutions is also provided.

## Credit market

Credit may be defined broadly as funds provided to those seeking to borrow. However, analytically useful measures of credit usually exclude borrowings by financial enterprises because their main role is as an intermediary, that is, they borrow in order to lend. Also, lending and borrowing between enterprises which have a special relationship, such as between companies in the same group or between government agencies, are often excluded from credit measures because transactions between these bodies frequently are of a non-market nature. Similarly, some types of financial instrument, such as trade debts, are not considered to be part of an organised market. All of these types of transactions are omitted from table 26.12, which presents a summary of the demand for credit in Australia by the non-financial sectors. It includes raisings by the issue of both debt and equity securities.

## Stock market

The stock market is a mechanism for trading equities (shares), units in trusts, options, and some fixed-interest securities.

Operated nationally by ASX, which is responsible for the day-to-day running and surveillance of trading, the Australian system is electronic, conducted using the Stock Exchange Automated Trading System, allowing buyers and sellers to be located anywhere in the country.

ASX classifies listed companies according to their major activity and produces indexes based on these classifications. Table 26.13 summarises the performance of the major indexes over the last three financial years.

Table 26.14 shows the market value of Australian shares and units in trusts on issue — both listed and unlisted. It shows the amount on issue by sector of issuer and sector of holder of equities and units.

### 26.12 DEMAND FOR CREDIT(a)

	Net transactions during year		
	1999–2000	2000–01	2001–02
	\$m	\$m	\$m
Funds (including equity) raised on conventional credit markets by			
Private non-financial corporations	62 083	48 861	36 941
National public non-financial corporations	18 665	4 071	776
State and local public non-financial corporations	941	3 273	1 175
National general government	-10 701	-9 541	-2 680
State and local general government	-3 361	-4 067	-508
Households	61 124	43 513	78 366
<b>Total</b>	<b>128 751</b>	<b>86 110</b>	<b>114 070</b>

(a) Positive numbers indicate an increase in raisings. Negative numbers indicate repayment or redemption.

Source: *Australian National Accounts: Financial Accounts (5232.0)*.

## 26.13 AUSTRALIAN STOCK MARKET INDEXES(a)

	1999-2000	2000-01	2001-02
All ordinaries			
Index(b)	3 257.6	3 425.2	3 163.2
High(c)	3 274.1	3 425.2	3 440.0
Low(c)	2 779.7	3 094.3	2 867.4
All industrials			
Index(b)	5 791.9	5 892.7	5 445.7
High (c)	5 797.6	5 892.7	5 998.7
Low(c)	5 058.5	5 385.6	5 111.8
All resources			
Index(b)	1 344.3	1 582.2	1 576.0
High(c)	1 458.7	1 643.7	1 740.2
Low(c)	1 145.6	1 301.4	1 245.4

(a) Base 31 December 1979 = 500. (b) Share prices on joint trading floors; June closing value. (c) Over a 12-month period.

Source: BRW Media, 'Shares' magazine; Reuters data service.

## 26.14 EQUITY MARKET(a)

	Amounts on issue at 30 June					
	2000		2001		2002	
	Listed	Unlisted	Listed	Unlisted	Listed	Unlisted
	\$m	\$m(b)	\$m	\$m(b)	\$m	\$m(b)
<b>Total equities and units in trusts</b>	<b>742 698</b>	<b>475 391</b>	<b>776 152</b>	<b>508 469</b>	<b>738 866</b>	<b>567 793</b>
ISSUED BY						
National public non-financial corporations(c)	87 315	8 509	69 224	8 444	59 960	4 854
State and local non-financial corporations(c)	—	99 384	—	98 998	—	91 897
Private corporate trading enterprises	451 976	144 680	470 523	163 036	434 545	174 334
Central bank(c)	—	10 446	—	12 265	—	11 399
Banks	134 179	4 362	170 873	7 408	181 323	7 990
Other depository corporations	243	15 488	145	19 972	227	23 402
Life insurance corporations	32 509	6 025	30 064	17 251	22 457	15 342
Central borrowing authorities	5 180	15 447	10 371	14 713	8 905	16 883
Other insurance corporations	—	30	—	30	—	87
Financial intermediaries	31 296	71 274	24 952	88 485	31 449	96 384
Rest of world	—	282 059	—	298 247	—	278 360
HELD BY						
National public non-financial corporations	—	1 852	—	2 689	—	6 211
State and local public non-financial corporations	13	70	—	71	—	76
Private non-financial corporations	12 881	165 856	11 303	177 519	8 122	163 252
Banks	14 659	47 487	8 779	59 675	8 572	57 182
Other depository corporations	—	5 864	—	9 750	—	10 430
Life insurance corporations	57 967	42 812	63 558	47 969	61 509	53 329
Other insurance corporations	108 997	20 939	122 204	22 545	112 446	23 734
Pension funds	3 885	96 933	4 090	103 272	3 873	106 441
Financial intermediaries	—	36 437	—	42 728	—	45 606
National general government	71 358	19 217	67 015	20 978	71 011	16 541
State and local general government	50 030	101 272	34 682	100 619	30 040	92 609
Households	537	55 247	—	72 888	—	83 805
Rest of world	155 319	63 708	186 857	68 146	165 886	61 716

(a) Includes units in trusts. (b) The unlisted estimated market values are considered to be of poor quality unless based on net asset values. They should be used cautiously. See footnote (c). (c) Net asset values.

Source: Australian National Accounts: Financial Accounts (5232.0).

## Money market

Liquidity management by Australian corporations, financial institutions and governments is conducted through an informally arranged market for deposits, loans and placements and by issuance, purchase and sale of short-term debt securities. Rates in the market at end June of the last three financial years are shown in table 26.15.

**26.15 SHORT-TERM MONEY MARKET RATES**  
— As at 30 June

	2000	2001	2002
	% p.a.	% p.a.	% p.a.
11 am call	6.01	5.00	4.72
Bank-accepted bills—90 days	6.23	4.97	5.07

Source: Reserve Bank of Australia Bulletin.

Money market securities have an original term to maturity of less than one year, often 30, 90 or 180 days. They are issued by borrowers at a discount to face value and carry no income payment other than the repayment of face value at maturity. To enhance liquidity, money market securities conform to standardised attributes concerning risk and discount rates. Because of the standardisation, the securities of different issuers are often combined in the one parcel of securities for trading purposes. There are two types of securities: bills of exchange and one name paper (promissory notes, treasury notes, commercial paper and bank certificates of deposit), both of which are covered by the *Bills of Exchange Act 1909* (Cwlth). The risk of default of a bill of exchange is reduced by an acceptor or endorser adding their name to the security for a fee. Most bills of exchange traded in the market are bank-accepted bills. Promissory notes are issued by institutions whose credit worthiness is

equal to or better than banks; they are not accepted by a bank and unlike bills of exchange they are not endorsed by the parties which sell them in the market. The Commonwealth Government issues treasury notes, state governments and large corporations issue commercial paper and banks issue negotiable certificates of deposit. Table 26.16 shows the amount on issue by sector of issuer and sector of holder of the various types of money market securities.

## Bond market

Bonds are issued with original terms to maturity of one or more years. Usually the investors are paid a set periodic interest, called a coupon, for the life of the bond and receive their initial investment back at maturity. Some bonds have variable interest rates, some have principal repayments indexed, and there are small amounts of zero-coupon or deep discount securities which are issued at a discount to face value. Governments, trading enterprises and financial institutions issue bonds to finance long-term requirements. For these entities, the bond market generally provides a cheaper source of funds than borrowing from banks and other financial institutions. Table 26.17 shows the market yields at end June of the last three financial years for a range of bonds.

Historically, the main issuers of bonds have been the Commonwealth Government and state governments, the latter through their central borrowing authorities. Corporate bonds are issued only by very large private trading and financial enterprises. In recent years banks and asset-backed security trusts have issued increasing amounts as government issuance has decreased. The amounts outstanding on bonds at end June of the last three financial years are shown in table 26.18.

## 26.16 SHORT-TERM DEBT SECURITIES

	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
ISSUED BY			
Private non-financial corporations	84 547	85 140	80 362
National public non-financial corporations	3 587	3 841	2 637
State and local public non-financial corporations	264	409	576
Banks	96 755	91 811	104 051
Other depository corporations	32 068	42 829	35 989
Life insurance corporations	—	674	467
Other insurance corporations	—	—	22
Central borrowing authorities	7 241	8 199	9 957
Financial intermediaries n.e.c.	17 002	21 470	25 150
National general government	5 800	5 100	4 201
Households	8 384	8 936	8 923
Rest of world	3 207	3 625	2 182
<b>Total</b>	<b>258 855</b>	<b>272 034</b>	<b>274 517</b>
HELD BY			
Private non-financial corporations	32 972	23 138	18 717
National public non-financial corporations	370	779	797
State and local public non-financial corporations	48	182	126
Central bank	1 199	1 013	1 897
Banks	40 440	42 315	69 170
Other depository corporations	29 761	34 440	28 302
Life insurance corporations	17 812	15 082	16 243
Pension funds	19 666	18 212	18 391
Other insurance corporations	4 616	4 341	6 020
Central borrowing authorities	11 478	10 592	10 337
Financial intermediaries n.e.c.	27 542	28 533	22 121
State and local general government	204	315	533
Households	7 101	6 850	3 090
Rest of world	65 646	86 242	78 773
<b>Total</b>	<b>258 855</b>	<b>272 034</b>	<b>274 517</b>

Source: Australian National Accounts: Financial Accounts (5232.0).

## 26.17 BOND MARKET, Market yields — As at 30 June

	2000 % p.a.	2001 % p.a.	2002 % p.a.
Treasury bonds			
3 years	5.97	5.55	5.61
5 years	6.05	5.78	5.78
10 years	6.16	6.04	5.99
New South Wales T-corp bonds			
3 years	6.29	5.88	5.79
5 years	6.42	6.13	6.04
10 years	6.60	6.24	6.29
Finance company debentures			
2 years	6.30	5.20	5.45
3 years	6.40	5.45	5.60

Source: Reserve Bank of Australia Bulletin.

## 26.18 BONDS

	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
ISSUED BY			
Private non-financial corporations			
Issued in Australia	10 481	15 630	17 872
Issued offshore	41 998	44 676	42 597
National public non-financial corporations			
Issued in Australia	3 919	3 387	4 976
Issued offshore	4 565	9 376	10 708
State and local public non-financial corporations			
Issued in Australia	—	—	—
Issued offshore	—	—	—
Banks			
Issued in Australia	21 543	25 783	27 980
Issued offshore	64 864	81 097	88 041
Other depository corporations			
Issued in Australia	15 844	16 242	12 778
Issued offshore	10 996	12 691	13 071
Other insurance corporations			
Issued in Australia	116	123	128
Issued offshore	450	101	238
Life insurance corporations			
Issued in Australia	1 431	1 261	1 261
Issued offshore	1 327	1 261	1 012
Central borrowing authorities			
Issued in Australia	51 487	54 453	52 999
Issued offshore	23 114	19 545	18 622
Financial intermediaries n.e.c.			
Issued in Australia	24 883	30 723	42 782
Issued offshore	23 153	30 774	35 687
National general government			
Issued in Australia	76 617	68 090	64 165
Issued offshore	1 468	1 314	1 449
State and local general government			
Issued in Australia	424	430	305
Issued offshore	—	—	—
Rest of the world			
Issued in Australia	—	—	—
Issued offshore	41 676	56 060	57 062
<b>Total</b>	<b>420 356</b>	<b>473 017</b>	<b>493 733</b>
HELD BY			
Private non-financial corporations	2 194	4 681	4 564
National public non-financial corporations	22	1 457	1 408
State and local public non-financial corporations	192	200	71
Central bank	36 858	39 709	40 163
Banks	27 230	35 586	30 005
Other depository corporations	9 670	13 580	19 306
Life insurance corporations	45 261	41 220	38 048
Pension funds	36 476	35 954	39 346
Other insurance corporations	19 418	21 647	24 785
Central borrowing authorities	7 423	8 852	7 519
Financial intermediaries n.e.c.	21 525	30 769	35 231
State and local general government	154	274	315
National general government	11	9	9
Households	12 758	9 936	7 315
Rest of world	201 164	229 143	245 648
<b>Total</b>	<b>420 356</b>	<b>473 017</b>	<b>493 733</b>

Source: Australian National Accounts: Financial Accounts (5232.0).

## Foreign exchange market

The foreign exchange market is the means whereby currencies of different countries can be bought and sold. In October 1983, the Commonwealth Government decided to float the Australian dollar, allowing its value to be determined by market forces with few exchange controls and little Reserve Bank intervention. Prior to 1983, the Australian dollar was pegged to a basket of currencies which were weighted according to their trading significance to Australia. Table 26.19 shows the value of the Australian dollar against major currencies at end June of the last three financial years.

**26.19 VALUE OF AUSTRALIAN DOLLAR(a),  
Against major currencies — At 30 June**

	2000	2001	2002
United States of America dollar	0.5941	0.5180	0.5684
United Kingdom pound	0.3929	0.3686	0.3829
Japanese yen	62.9703	63.1775	70.0348
Euro	0.6261	0.6070	0.5961

(a) Rate given is the midpoint between the buying and selling rates.

Source: *Average of Daily Exchange Rates, Data Report (5654.0.40.001)*.

Currencies are traded for many reasons: because of exporting or importing requirements, investing or borrowing overseas, arbitraging (i.e. taking advantage of short-term discrepancies in rates) or speculating on possible exchange rate movements with a view to making a profit. Table 26.20 shows daily averages of foreign exchange turnover against all currencies.

**26.20 FOREIGN EXCHANGE TURNOVER  
AGAINST ALL CURRENCIES, Daily averages(a)**

	1999–2000	2000–01	2001–02
	\$m	\$m	\$m
Transactions by foreign exchange dealers(b)			
Outright spot(c)	22 740	21 367	22 772
Outright forward(d)	3 830	5 094	6 407
Swaps	36 609	46 824	58 404
Options	2 517	3 103	4 998
<b>Total</b>	<b>65 696</b>	<b>76 388</b>	<b>92 581</b>

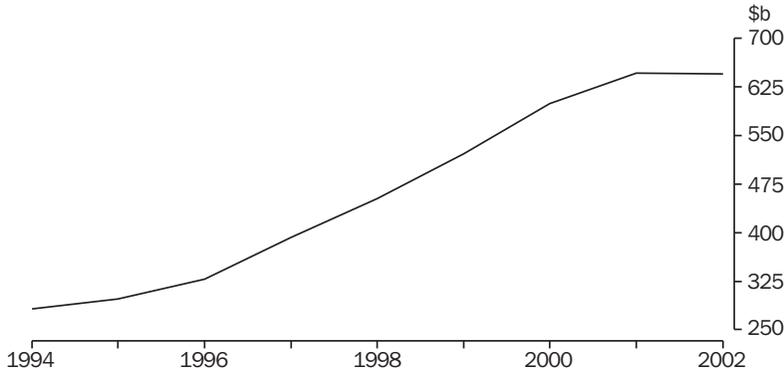
(a) Figures given are the average daily turnover for the financial year. (b) Australian banks and non-bank financial intermediaries authorised to deal in foreign exchange. (c) An outright spot transaction is one for receipt or delivery within two business days. (d) An outright forward transaction is one for receipt or delivery in more than two business days.

Source: *Reserve Bank of Australia Bulletin*.

## Managed funds

The term 'managed funds' is used loosely in the financial community to embrace two broad types of institutions. The first are collective investment institutions (such as life insurance companies) which buy assets on their own account. The second are investment or fund managers which act as investment agents for the collective investment institutions as well as others with substantial funds to invest. Investment managers have relatively small balance sheets because most of the assets they acquire are purchased on behalf of clients. The significant growth in managed funds (graph 26.21) has been a major development in the financial sector over the last decade.

**26.21 MANAGED FUNDS, Consolidated assets — At 30 June**



Source: *Managed Funds, Australia (5655.0)*.

## Collective investment institutions

As the name implies, collective investment institutions pool the funds of many small investors and use them to buy a particular type or mix of assets. The asset profile can be structured to satisfy individual investor requirements regarding, for example, the degree of risk, the mix of capital growth and income, and the degree of asset diversification. Collective investment institutions comprise the following:

- life insurance corporations
- pension and approved deposit funds
- public unit trusts
- friendly societies
- common funds
- cash management trusts.

Funds of a speculative nature that do not offer redemption facilities — for example, agricultural and film trusts — are excluded.

To derive the total assets of collective investment institutions in Australia on a consolidated basis, it is necessary to eliminate the cross investment between the various types of institution. For example, investments by superannuation funds in public unit trusts are excluded from the assets of superannuation funds in a consolidated presentation.

Although statistics for each of these institutions were presented earlier in this chapter, the accompanying tables summarise their consolidated position (i.e. after the cross investment between the institutions has been eliminated). Table 26.22 shows their assets by type of institution and table 26.23 shows assets by type of investment.

## Investment managers

A further development within the managed funds industry is the emergence of specialist investment managers. They are employed on a fee-for-service basis to manage and invest in approved assets on their clients' behalf. They usually act for the smaller collective investment institutions such as public unit trusts. They are not accessible to the small investor. Investment managers provide a sophisticated level of service, matching assets and liabilities. They act in the main as the managers of pooled funds, but also manage clients' investments on an individual portfolio basis.

### 26.22 ASSETS OF MANAGED FUNDS — 30 June 2002

Type of institution	Total \$m	Cross invested \$m	Consolidated \$m
Life insurance corporations(a)	199 167	25 673	173 494
Pension funds	360 445	63 494	296 951
Public unit trusts	154 145	22 326	131 819
Friendly societies	6 035	487	5 548
Common funds	7 941	170	7 771
Cash management trusts	29 453	—	29 453
<b>Total</b>	<b>757 186</b>	<b>112 150</b>	<b>645 036</b>

(a) Investments by pension funds which are held and administered by life insurance offices are included under life insurance offices.

Source: *Managed Funds, Australia, June 2002* (5655.0).

### 26.23 MANAGED FUNDS, Consolidated assets

Type of investment	Amounts outstanding at 30 June		
	2000 \$m	2001 \$m	2002 \$m
Deposits, loans and placements	72 071	76 719	72 670
Short-term debt securities	63 747	62 875	61 061
Long-term debt securities	72 729	66 312	63 445
Equities and units in trusts	197 641	230 899	227 783
Land and buildings	64 237	67 051	70 041
Overseas assets	115 367	120 090	125 285
Other assets	21 214	22 198	24 750
<b>Total</b>	<b>607 006</b>	<b>646 143</b>	<b>645 036</b>

Source: *Managed Funds, Australia* (5655.0).

A considerable proportion of the assets of collective investment institutions, particularly the statutory funds of life insurance corporations and assets of pension funds, is channelled through investment managers. At 30 June 2002, \$459.3b (75% of the unconsolidated assets of collective investment institutions) were channelled through investment managers. Table 26.24 shows the total unconsolidated assets of each type of collective investment institution and the amount of these assets invested through investment managers.

Investment managers also accept money from investors other than collective investment institutions. At 30 June 2002, investment managers invested \$150.6b on behalf of government bodies, general insurers and other clients, including overseas clients.

**26.24 ASSETS OF MANAGED FUNDS, Invested through investment managers — 30 June 2002**

Type of fund	Unconsolidated assets of managed funds \$m	Assets invested with investment managers \$m
Life insurance corporations(a)	199 167	139 009
Pension and approved deposit funds	360 445	182 672
Public unit trusts	154 145	100 569
Friendly societies	6 035	3 002
Common funds	7 941	5 688
Cash management trusts	29 453	28 364
<b>Total</b>	<b>757 186</b>	<b>459 304</b>

(a) Includes both superannuation and ordinary business.

Source: *Managed Funds, Australia, June 2002* (5655.0).

**Lending by financial institutions**

The lending activities of financial institutions are grouped for statistical purposes into four major types of lending — housing, personal, commercial and leasing. Information regarding housing finance is presented in *Chapter 8, Housing*. Table 26.25 shows the size of commitments by financial institutions for the four types of lending. It should be noted that, although commitments are firm offers of finance made by institutions that have been accepted by borrowers, not all commitments are taken up by borrowers.

**26.25 FINANCIAL INSTITUTIONS, Lending commitments**

Type of lending activity	1999–2000 \$m	2000–01 \$m	2001–02 \$m
Housing finance	74 952	74 424	96 482
Personal finance	51 822	52 700	58 128
Commercial finance	168 924	183 815	204 473
Lease finance	7 908	6 061	6 613
<b>Total</b>	<b>303 606</b>	<b>317 000</b>	<b>365 696</b>

Source: *Lending Finance, Australia* (5671.0).

**Lease finance**

The statistics in tables 26.26 and 26.27 measure lease finance commitments made by significant lenders (banks, money market corporations, finance companies, general financiers, etc.) to trading and financial enterprises, non-profit organisations, governments, public authorities and individuals.

**26.26 LEASE FINANCE COMMITMENTS, By type of lessor**

	1999–2000 \$m	2000–01 \$m	2001–02 \$m
All banks	3 135	2 062	1 905
Finance companies	2 556	1 571	1 812
General financiers	1 472	1 580	1 625
Other(a)	744	849	1 271
<b>Total</b>	<b>7 908</b>	<b>6 061</b>	<b>6 613</b>

(a) Includes money market corporations.

Source: *Lending Finance, Australia* (5671.0).

**26.27 LEASE FINANCE COMMITMENTS, By type of good leased**

	1999–2000 \$m	2000–01 \$m	2001–02 \$m
Motor vehicles and other transport equipment	3 639	2 529	2 844
Construction and earth moving equipment	319	217	232
Agricultural machinery and equipment	328	212	220
Automatic data processing equipment and office machinery	1 996	1 944	2 124
Shop and office furniture, fittings and equipment	454	343	340
Other goods	1 171	815	857
<b>Total</b>	<b>7 907</b>	<b>6 060</b>	<b>6 617</b>

Source: *Lending Finance, Australia* (5671.0).

## Personal finance

Tables 26.28 and 26.29 present statistics of commitments made by significant lenders (banks, credit cooperatives, finance companies, etc.) to lend to individuals for their own personal (non-business) use. The revolving credit commitments provided in table 26.29 include commitments for overdrafts, credit cards and other personal revolving lines of credit.

**26.28 PERSONAL FINANCE COMMITMENTS, By type of lender(a)**

	1999–2000	2000–01	2001–02
	\$m	\$m	\$m
All banks	39 866	40 170	43 721
Finance companies	6 907	6 855	7 885
Credit cooperatives	3 158	3 060	3 326
Other lenders(b)	1 892	2 614	3 197
<b>Total</b>	<b>51 823</b>	<b>52 699</b>	<b>58 129</b>

(a) Includes both fixed loan facilities and new and increased lending commitments under revolving credit facilities.

(b) Includes permanent building societies, general financiers and retailers.

Source: *Lending Finance, Australia* (5671.0).

**26.29 PERSONAL FINANCE COMMITMENTS**

Type of facility	1999–2000	2000–01	2001–02
	\$m	\$m	\$m
Fixed loan commitments	22 266	22 697	25 619
Revolving credit commitments			
New and increased credit limits	29 557	30 003	32 503
Cancellations and reductions in credit limits	9 126	11 046	14 961
Credit limits at 30 June			
Total	102 805	115 274	129 536
Used	46 665	55 582	60 954

Source: *Lending Finance, Australia* (5671.0).

## Commercial finance

The statistics in tables 26.30 and 26.31 measure commitments, made by significant lenders (banks, finance companies, money market corporations, etc.) to lend to government, private and public enterprises, non-profit organisations and individuals for investment and business purposes.

**26.30 COMMERCIAL FINANCE COMMITMENTS(a)**

Type of lender	1999–2000	2000–01	2001–02
	\$m	\$m	\$m
All banks	144 130	153 893	169 370
Finance companies	4 553	5 615	6 861
Money market corporations	12 324	12 658	11 313
Other lenders(b)	7 916	11 650	16 928
<b>Total</b>	<b>168 923</b>	<b>183 816</b>	<b>204 472</b>

(a) Includes both fixed loan facilities and new and increased lending commitments under revolving credit facilities.

(b) Includes permanent building societies, general financiers and pastoral finance companies.

Source: *Lending Finance, Australia* (5671.0).

**26.31 FIXED COMMERCIAL FINANCE COMMITMENTS**

Purpose	1999–2000	2000–01	2001–02
	\$m	\$m	\$m
Construction	9 373	7 968	9 987
Purchase of real property(a)	36 310	34 837	53 125
Purchase of plant and equipment	8 723	9 249	13 364
Refinancing	9 210	10 325	10 262
Other purposes	30 343	37 030	41 862
<b>Total</b>	<b>93 959</b>	<b>99 409</b>	<b>128 598</b>

(a) Purchase of real property includes those finance commitments to individuals for the purchase of dwellings for rental or resale.

Source: *Lending Finance, Australia* (5671.0).

## Money and the payments system

The payments system supports trade and commerce in a market economy. Notes and coin are one means of payment. Liquid balances held at financial institutions are also available potentially for transactions needs, under cheque and other forms of transfer facilities, and thus add to the money supply.

From 1 July 1998 a new financial regulatory framework came into effect, in response to the recommendations of the Financial System Inquiry (the Wallis Committee). Under these arrangements the Reserve Bank has stronger regulatory powers in the payments system in accordance with the *Payments Systems (Regulations) Act 1998* (Cwlth), to be exercised by a Payments System Board within the Bank.

## Money

Australia has a decimal system of currency, the unit being the dollar, which is divided into 100 cents. Australian notes are issued in the denominations of \$5, \$10, \$20, \$50 and \$100 and coins in the denominations of 5c, 10c, 20c, 50c, \$1 and \$2. \$1 and \$2 notes were replaced by coins in 1984 and 1988 respectively, and 1c and 2c coins ceased to be issued from 1 February 1992. Table 26.32 shows the value of notes on issue at the last Wednesday of June in the last three financial years. Table 26.33 shows the value of coin on issue at the same time points.

**26.32 VALUE OF AUSTRALIAN NOTES ON ISSUE**

	Units	Last Wednesday in June		
		2000	2001	2002
\$2	\$m	46	45	45
\$5	\$m	397	431	530
\$10	\$m	646	662	791
\$20	\$m	1 917	2 014	2 789
\$50	\$m	11 188	12 055	14 718
\$100	\$m	11 240	11 961	13 057
<b>Total</b>	<b>\$m</b>	<b>25 434</b>	<b>27 168</b>	<b>31 930</b>
Increase	%	8.0	6.8	17.5

Source: Reserve Bank of Australia.

**26.33 VALUE OF AUSTRALIAN DECIMAL COIN ON ISSUE**

	Units	Last Wednesday in June		
		2000	2001	2002
1c	\$m	22	22	22
2c	\$m	29	29	29
5c	\$m	123	129	143
10c	\$m	114	120	135
20c	\$m	162	169	198
50c	\$m	234	246	281
\$1	\$m	396	411	483
\$2	\$m	589	616	748
<b>Total</b>	<b>\$m</b>	<b>1 669</b>	<b>1 746</b>	<b>2 039</b>
Increase	%	5.1	4.6	16.8

Source: Reserve Bank of Australia.

## Money supply measures

The money supply, as measured and published by the Reserve Bank, refers to the amount of cash held by the public plus deposits with specified financial institutions. The measures range from the narrowest category, money base, through to the widest category, broad money, with other measures in between. The measures mainly used are as follows:

*Money base* — which comprises holdings of notes and coin by the private sector, deposits of banks with the Reserve Bank, and other Reserve Bank liabilities to the private sector.

*M3* — which is defined as currency plus bank deposits of the private non-bank sector.

*Broad money* — which is defined as M3 plus borrowings from the private sector by non-bank financial intermediaries (including cash management trusts) less their holdings of currency and bank deposits.

The money supply under each of these measures at end June of the last three years is shown in table 26.34.

**26.34 MONEY SUPPLY MEASURES  
— As at 30 June**

	Units	2000	2001	2002(a)
Money base	\$m	28 085	29 607	34 936
M3	\$m	406 501	439 990	474 254
Broad money	\$m	480 135	516 391	545 070
Percentage change(b)	%	6.3	7.6	5.6

(a) Series break due to changes in coverage of non banks.

(b) Of broad money, over level at end of preceding June.

Source: Reserve Bank of Australia.

## Payments system

Following recommendations by the Financial System (the Wallis Committees) Inquiry, the Payments System Board was established within the Reserve Bank on 1 July 1998. The Payments System Board has responsibility for determining the Reserve Bank's payments system policy, under the powers set out in the *Payments Systems (Regulation) Act 1998* (Cwlth). The payments system has components for settling large amounts, and components for settling retail amounts.

The High Value Clearing System (HVCS) was implemented in August 1997. The HVCS allows all holders of Reserve Bank exchange settlement accounts to settle large value payments through a system designed to process a high volume of transactions. On 1 March 1999 the Payments System Board announced easing of restrictions on eligibility for holding exchange settlement accounts. APRA-supervised institutions and some institutions not supervised by APRA potentially now have access.

Initially, the settlement of payments was on a net deferred basis, where settlement of interbank obligations was not completed until 9 am on the day following the sending of payment instructions. This was changed to a real-time gross settlement basis on 22 June 1998. This new settlement basis, where payments are settled immediately, contributes substantially to the reduction of settlement risk and systemic risk in the Australian payments system.

About 75% of the value exchanged in the payments system is cleared via the HCVS.

Table 26.35 shows the number of points of access to the payments system. Branches are access points staffed by employees of financial institutions. Agencies are staffed by other than employees of financial institutions such as postmasters or storekeepers, and exclude school agencies and giroPost agencies. giroPost provides a limited range of services at Australia Post offices

on behalf of participating financial institutions. Electronic points of access include ATM and electronic funds transfer at point of sale (EFTPOS) terminals.

**26.35 POINTS OF ACCESS TO THE AUSTRALIAN PAYMENTS SYSTEM — As at 30 June**

	2000	2001	2002
<b>Branches</b>			
Banks	5 003	4 712	n.y.a.
Building societies and credit unions	1 208	1 428	n.y.a.
<b>Agencies</b>			
Banks	5 043	n.y.a.	n.y.a.
Building societies and credit unions	887	n.y.a.	n.y.a.
giroPost	2 814	2 821	2 978
ATM	10 818	11 915	14 714
<b>EFTPOS terminals</b>	<b>320 372</b>	<b>362 848</b>	<b>402 084</b>

Source: APRA; Australian Payments Clearing Association, Annual Report 2000.

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## Introduction

The main functions of government are the provision of non-market services, the regulation of economic and social conditions, and the redistribution of income between sections of the community. These activities are primarily financed by taxation and are carried out by entities in the general government sector. In addition to this core activity, governments can also own or control enterprises that sell goods or services to the public and which operate largely on a commercial (or market) basis (public non-financial corporations) or engage in financial intermediation (public financial corporations).

The term 'government finance statistics' refers to statistics that measure the financial activities of governments and reflect the impact of those activities on other sectors of the economy. The Australian system of Government Finance Statistics (GFS), which is used to derive the statistics presented in this chapter, is designed to provide statistical information on public sector entities in Australia classified in a uniform and systematic way.

The public sector comprises general government entities and public financial and public non-financial corporations. These entities are described in the next section. This is followed by an outline of the roles of the different levels of government and a description of the GFS classifications.

GFS enable policy makers and users to analyse the financial operations and financial position of the public sector at either the level of a specific government, institutional sector or set of transactions.

The GFS system is based on international standards set out in the *System of National Accounts* and the accrual version of the International Monetary Fund's *A Manual of Government Finance Statistics*.

## Public sector

The public sector can be divided into the institutional sectors described below, based on the characteristics of the organisations it comprises.

**General government** — The principal function of general government entities is to provide non-market goods and services (e.g. roads, hospitals, libraries) primarily financed by taxes, to regulate and influence economic activity, to

maintain law and order, and to redistribute income by means of transfer payments.

This institutional sector covers the departments of the Commonwealth Government, state governments and local government municipalities. It also includes agencies and government authorities under departmental administration which are engaged in the provision of public administration, defence, law enforcement, welfare, public education, and health. Also included are non-departmental bodies which independently perform the government functions of regulation (e.g. Nurses Registration Boards and the Maritime Safety Authority), provision of non-market services (e.g. the Australian Broadcasting Corporation), and redistribution of income (e.g. the Aboriginal and Torres Strait Islander Commission). Some of these bodies may be corporations, but they are still considered part of the general government sector if they perform general government functions. Universities are also considered part of the general government sector.

Unincorporated government enterprises which provide goods and services to their governments and to the public at prices that are not economically significant are also included in this sector. In addition, government quasi-corporations which sell their output exclusively to other government units, while not in open competition with other producers, are classified as general government units.

**Public non-financial corporations (PNFCs)** — The main function of PNFCs is to provide goods and services which are predominantly market, non-regulatory and non-financial in nature, and financed through sales to consumers of these goods and services.

Enterprises in the PNFCs sector differ from those in the general government sector in that all or most of their production costs are recovered from consumers, rather than being financed from the general taxation revenue of government. Some enterprises, however, do receive subsidies to make up for shortfalls incurred as a result of government policy, for example, in the provision of 'community service obligations' at concessional rates.

PNFCs vary in their degree of 'commercialism', from those which are quite heavily reliant on parent governments for subsidies, such as rail and bus transport undertakings, to those which are net contributors to government revenue. Governments may exercise control over PNFCs by

either owning more than 50% of the voting stock or otherwise controlling more than half the shareholders' voting power, or through legislation, decree or regulation which empowers the government to determine corporate policy or to appoint the directors. Examples of PNFCs are Telstra, Australia Post, State Rail, and local bus and transport operations.

*Public financial corporations (PFCs)* — PFCs are government-owned or controlled enterprises which engage in financial intermediation (i.e. trade in financial assets and liabilities), such as central borrowing authorities, government banks and insurance offices, or home lending schemes. The inclusion of PFCs in GFS makes GFS consistent in scope with the Australian accounting standard for whole of government reporting Australian Accounting Standard AAS31, *Financial Reporting by Governments*.

### Levels of government

The public sector comprises all organisations owned or controlled by any of the four levels of government within the Australian political system; Commonwealth, state, local, and multi-jurisdictional.

### Commonwealth Government

The Commonwealth Government has exclusive responsibility under the Constitution for the administration of a wide range of functions including defence, foreign affairs and trade, and immigration. A distinctive feature of the Australian federal system is that the Commonwealth Government levies and collects all income tax, from individuals as well as from enterprises. It also collects a significant portion of other taxes, including taxes on the provision of goods and services. The Commonwealth distributes part of this revenue to other levels of government, principally the states.

### State governments

State and territory governments (referred to as 'state' governments in this chapter) perform the full range of government functions, other than those the Constitution deems the exclusive domain of the Commonwealth. The functions mainly administered by state governments include public order, health, education, administration, transport and maintenance of infrastructure. The revenue base of state governments is narrower than that of the Commonwealth and consists of taxes on property, on employers' payrolls, and on

provision and use of goods and services. This revenue base is supplemented by grants from the Commonwealth, which now includes an allocation of Goods and Services Tax (GST) revenue.

### Local governments

Local government authorities govern areas typically described as cities, towns, shires, boroughs, municipalities and district councils. Although the range of functions undertaken by local governments varies between the different jurisdictions, their powers and responsibilities are generally similar and cover such matters as:

- the construction and maintenance of roads, streets and bridges
- water, sewerage and drainage systems
- health and sanitary services
- the regulation of building standards
- the administration of regulations relating to items such as slaughtering, weights and measures, and registration of dogs.

Local governments also provide transport facilities, hospitals, charitable institutions, recreation grounds, parks, swimming pools, libraries, museums and other business undertakings. Local governments' own-source revenue is derived mainly from property taxes. They also rely on grants from the Commonwealth and their parent state governments. The Australian Capital Territory has no separate local government.

### Multi-jurisdictional

Universities are classified to a 'multi-jurisdictional' category, because of the combined role of the Commonwealth Government and the state governments in their financing and control. No other units are currently classified as multi-jurisdictional.

## Understanding the GFS financial statements

The GFS conceptual framework is divided into a number of separate statements, each of which is designed to draw out analytical aggregates or balances of particular economic significance and which, taken together, provide for a thorough understanding of the financial positions of jurisdictions individually and collectively. These published statements are the Operating Statement, the Cash Flow Statement, and the Balance Sheet.

## Operating Statement

The Operating Statement presents details of transactions in GFS revenues, GFS expenses and the net acquisition of non-financial assets for an accounting period. GFS revenues are broadly defined as transactions that increase net worth and GFS expenses as transactions that decrease net worth. Net acquisition of non-financial assets equals gross fixed capital formation, less depreciation, plus changes in inventories and plus other transactions in non-financial assets. Two key GFS analytical balances in the operating statement are GFS Net Operating Balance (NOB) and GFS Net Lending(+)/Borrowing(-).

GFS NOB is the difference between GFS revenues and GFS expenses. It reflects the sustainability of government operations. GFS Net Lending(+)/Borrowing(-) is equal to NOB minus the total net acquisition of non-financial assets. A positive result reflects a net lending position while a negative result reflects a net borrowing position.

## Cash Flow Statement

The Cash Flow Statement identifies how cash is generated and applied in a single accounting period. 'Cash' means cash on hand (notes and coins held and deposits held at call with a bank or other financial institution) and cash equivalents (highly liquid investments which are readily convertible to cash on hand at the investor's option and overdrafts considered integral to the cash management function).

The Cash Flow Statement reflects a cash basis of recording (the other statements are on an accruals accounting basis) where the information has been derived indirectly from underlying accrued transactions and movements in balances. This, in effect, means that transactions are captured when cash is received or when cash payments are made. Cash transactions are specially identified because they allow the

compilation of the cash-based Surplus(+)/Deficit(-) measure and because the management of cash is often considered an integral function of accrual accounting.

The Surplus(+)/Deficit(-) is a broad indicator of a sector's cash flow requirements. When it is positive (i.e. in surplus), it reflects the extent to which cash is available to government to either increase its financial assets or decrease its liabilities (assuming that no revaluations and other changes occur). When it is negative (i.e. in deficit), it is a measure of the extent to which government requires cash, either by running down its financial assets or by drawing on the cash reserves of the domestic economy, or from overseas.

## Balance Sheet

The Balance Sheet is the statement of an entity's financial position at a specific point in time. It shows the entity's stock of assets, liabilities and GFS Net Worth. GFS Net Worth is an economic measure of 'wealth' calculated as assets less liabilities for the general government sector and as assets less liabilities less shares and other contributed capital for the PNFCs and PFCs sectors.

## Total public sector, all Australian governments combined

This section sets out the Operating Statement, Cash Flow Statement and Balance Sheet for the total public sector for all Australian governments combined.

### Operating Statement

As table 27.1 shows, in 2000–01 the GFS NOB for the total public sector for all Australian governments combined was \$10,983m and GFS Net Lending was \$6,496m.

**27.1 ALL AUSTRALIAN GOVERNMENTS, Total public sector: Operating Statement — 2000–01**

	Commonwealth	Multi-jurisdictional(a)	State	Local	All Australian governments(b)
	\$m	\$m	\$m	\$m	\$m
GFS Revenue	209 998	9 683	130 879	16 930	310 671
less					
GFS Expenses	203 002	9 330	127 757	15 724	299 688
equals					
<b>Net Operating Balance</b>	<b>6 996</b>	<b>353</b>	<b>3 122</b>	<b>1 206</b>	<b>10 983</b>
less					
Net acquisition of non-financial assets	-143	326	3 247	1 026	4 487
equals					
<b>GFS Net Lending(+)/Borrowing(-)</b>	<b>7 140</b>	<b>27</b>	<b>-125</b>	<b>180</b>	<b>6 496</b>

(a) The multi-jurisdictional sector currently contains only universities. (b) The sums of individual levels of government may not agree with total figures for all Australian governments due to transfers between levels of government.

Source: *Government Finance Statistics, Australia, 2000–01 (5512.0)*.

### Cash Flow Statement

As shown in table 27.2, in 2000–01 the total public sector surplus for all Australian governments combined was \$10,132m. The main contributors to this result were net cash inflows from operating activities of \$31,774m being partly offset by net cash outflows from investments in non-financial assets of \$20,410m.

### Balance Sheet

GFS Net Worth reflects the contribution of governments to the wealth of Australia. As shown in table 27.3, the consolidated net worth as at 30 June 2001 for all Australian governments combined was \$331,784m.

## General government, all Australian governments combined

This section sets out the Operating Statement, Cash Flow Statement and Balance Sheet for the general government sector for all Australian governments combined.

### Operating Statement

Table 27.4 provides an Operating Statement for the general government sector for 2000–01.

In 2000–01 the GFS NOB for the general government sector for all Australian governments combined was \$7,939m. The two largest

contributors to this result were the NOBs for the Commonwealth Government and the state governments of \$4,807m and \$1,950m respectively.

GFS Net Lending for the general government sector for all Australian governments combined was \$4,737m. The Commonwealth Government and the state governments contributed \$5,976m and -\$1,204m respectively to the aggregate result.

### Cash Flow Statement

As table 27.5 shows, in 2000–01 the general government sector for all Australian governments combined recorded a cash surplus of \$8,473m. The Commonwealth Government and state governments contributed surpluses of \$5,625m and \$2,810m to this result respectively. Negative figures denote outflows.

### Balance Sheet

The consolidated GFS Net Worth as at 30 June 2001 for the general government sector for all Australian governments combined, as shown in table 27.6, was \$387,617m. The most significant assets held were land and fixed assets of \$390,047m followed by equity in financial assets of \$173,737m. The most significant liabilities were unfunded superannuation liability and other employee entitlements of \$142,685m, followed by borrowings of \$115,756m.

**27.2 ALL AUSTRALIAN GOVERNMENTS, Total public sector: Cash Flow Statement — 2000–01**

	Commonwealth \$m	Multi- jurisdictional(a) \$m	State \$m	Local \$m	All Australian governments(b) \$m
<b>CASH FLOW STATEMENT</b>					
Cash receipts from operating activities	206 523	9 569	131 632	16 309	302 105
Cash payments for operating activities	-195 717	-8 568	-115 792	-12 339	-270 332
<i>Net cash flows from operating activities</i>	<i>10 807</i>	<i>1 001</i>	<i>15 840</i>	<i>3 970</i>	<i>31 774</i>
Net cash flows from investments in non-financial assets	-3 322	-965	-12 301	-3 832	-20 410
Net cash flows from investments in financial assets for policy purposes	5 839	-2	2 004	16	7 311
Net cash flows from investments in financial assets for liquidity purposes	-12 447	-16	-4 643	-88	-17 537
Net cash flows from financing activities	-3 137	48	-3 796	-107	-6 283
<b>Net Increase(+)/Decrease(-) in Cash Held</b>	<b>-2 260</b>	<b>66</b>	<b>-2 895</b>	<b>-42</b>	<b>-5 145</b>
<b>SURPLUS(+)/DEFICIT(-)</b>					
<b>Surplus(+)/Deficit(-)</b>	<b>6 269</b>	<b>34</b>	<b>3 532</b>	<b>131</b>	<b>10 132</b>

(a) The multi-jurisdictional sector currently contains only universities. (b) The sums of individual levels of government may not agree with total figures for all Australian governments due to transfers between levels of government.

Note: Negative figures denote outflows.

Source: *Government Finance Statistics, Australia, 2000–01 (5512.0)*.

**27.3 ALL AUSTRALIAN GOVERNMENTS, Total public sector: Balance Sheet — 30 June 2001**

	Commonwealth \$m	Multi- jurisdictional(a) \$m	State \$m	Local \$m	All Australian governments(b) \$m
<b>Assets</b>					
Financial assets	135 535	7 445	85 951	8 571	224 607
Non-financial assets	72 094	17 615	351 449	148 115	589 269
<i>Total</i>	<i>207 628</i>	<i>25 059</i>	<i>437 400</i>	<i>156 686</i>	<i>813 876</i>
<b>Liabilities</b>					
Shares and other contributed capital	264 409	5 133	179 379	9 088	445 159
	36 940	—	—	40	36 932
<b>GFS Net Worth</b>	<b>-93 722</b>	<b>19 926</b>	<b>258 022</b>	<b>147 558</b>	<b>331 784</b>
Net debt(c)	37 972	-4 048	16 117	-903	49 137
Net financial worth(d)	-165 815	2 311	-93 427	-557	-257 484

(a) The multi-jurisdictional sector currently contains only universities. (b) The sums of individual levels of government may not agree with total figures for all Australian governments due to assets and liabilities held between levels of government. (c) Equals deposits held, advances received, Reserve Bank notes on issue and borrowing less cash and deposits, advances paid, and investments, loans and placements. (d) Equals total financial assets less total liabilities less shares and other contributed capital.

Source: *Government Finance Statistics, Australia, 2000–01 (5512.0)*.

## 27.4 ALL AUSTRALIAN GOVERNMENTS, General government: Operating Statement — 2000-01

	Commonwealth \$m	Multi- jurisdictional(a) \$m	State \$m	Local \$m	All Australian governments(b) \$m
<b>GFS Revenue</b>					
Taxation revenue	175 010	—	32 604	6 388	213 766
Current grants and subsidies	—	4 295	44 501	2 147	89
Sales of goods and services	3 952	4 382	9 542	5 425	22 241
Interest from public non-financial corporations	60	—	201	—	262
Interest from public financial corporations	702	26	498	47	1 272
Interest from other sources	842	263	1 439	385	2 662
Dividend income	2 242	42	3 105	4	5 393
Other	2 570	675	9 129	2 529	11 170
<i>Total</i>	185 379	9 683	101 019	16 925	256 855
<i>less</i>					
<b>GFS Expenses</b>					
Gross operating expenses					
Depreciation	1 464	649	4 750	3 537	10 400
Employee expenses	12 816	5 298	41 213	5 296	64 620
Other operating expenses	32 936	2 985	26 751	6 280	67 876
<i>Total</i>	47 216	8 932	72 713	15 113	142 897
Nominal superannuation interest expenses	4 878	—	2 456	—	7 334
Other interest expenses	6 220	27	2 760	415	9 155
Other property expenses	—	—	—	—	—
Current transfers					
Grant expenses to state governments	44 314	1	180	—	180
Grant expenses to the private sector	6 083	27	8 278	19	14 406
Grant expenses to universities	4 118	—	125	—	—
Grant expenses to local governments	102	—	1 917	—	—
Grant expenses n.e.c.	—	—	11	—	1
Subsidy expenses to public corporations	287	—	3 665	—	3 952
Subsidy expenses to other	3 707	8	881	—	4 580
Other current transfers	60 085	331	1 341	141	61 455
Capital transfers					
Grant expenses to public non-financial corporations	—	—	1 282	—	1 282
Grant expenses to public financial corporations	—	—	—	—	—
Grant expenses to other levels of government	2 468	—	720	—	—
Grant expenses n.e.c.	1 096	—	2 380	23	3 499
Other capital transfers	—	5	362	15	175
<i>Total</i>	180 572	9 330	99 070	15 726	248 916
<i>equals</i>					
<b>GFS Net Operating Balance</b>					
<i>less</i>					
Net acquisition of non-financial assets					
Gross fixed capital formation	759	936	7 763	4 310	13 806
<i>less</i> Depreciation	1 464	649	4 750	3 537	10 400
<i>plus</i> Change in inventories	1 042	6	-19	-12	1 017
<i>plus</i> Other transactions in non-financial assets	-1 506	34	160	89	-1 220
<i>Total</i>	-1 168	326	3 154	850	3 202
<i>equals</i>					
<b>GFS Net Lending(+)/Borrowing(-)</b>					
	<b>5 976</b>	<b>27</b>	<b>-1 204</b>	<b>349</b>	<b>4 737</b>

(a) The multi-jurisdictional sector currently contains only universities. (b) The sums of individual levels of government may not agree with total figures for all Australian governments due to transfers between levels of government.

Source: Government Finance Statistics, Australia, 2000-01 (5512.0).

## 27.5 ALL AUSTRALIAN GOVERNMENTS, General government: Cash Flow Statement — 2000–01

	Commonwealth	Multi-jurisdictional(a)	State	Local	All Australian governments(b)
	\$m	\$m	\$m	\$m	\$m
<b>CASH FLOW STATEMENT</b>					
Cash receipts from operating activities					
Taxes received	169 713	—	32 207	6 302	205 279
Receipts from sales of goods and services	3 889	3 575	8 890	5 495	20 417
Grants and subsidies received	—	4 443	47 066	2 913	307
Interest received from public non-financial corporations	50	—	246	—	297
Interest received from public financial corporations	—	6	514	102	622
Interest from other sources	1 090	261	1 877	352	3 313
Other receipts	5 548	1 284	11 071	1 142	17 388
<i>Total</i>	<i>180 290</i>	<i>9 569</i>	<i>101 871</i>	<i>16 306</i>	<i>247 622</i>
Cash payments for operating activities					
Payments for goods and services	-46 660	-7 140	-65 521	-11 236	-125 446
Grants and subsidies paid to state governments	-46 369	-1	-23	—	—
Grants and subsidies paid to the private sector	-10 110	—	-11 393	-30	-21 533
Grants and subsidies paid to universities	-4 127	—	-129	—	—
Grants and subsidies paid to local governments	-109	—	-2 432	—	—
Grants and subsidies paid to public corporations	-433	—	-5 166	—	-5 599
Interest paid	-6 222	-26	-3 284	-408	-9 705
Other payments	-61 670	-1 401	-3 147	-684	-65 313
<i>Total</i>	<i>-175 700</i>	<i>-8 568</i>	<i>-91 094</i>	<i>-12 359</i>	<i>-227 595</i>
<i>Net cash flows from operating activities</i>	<i>4 590</i>	<i>1 001</i>	<i>10 778</i>	<i>3 948</i>	<i>20 026</i>
Net cash flows from investments in non-financial assets					
Sales of non-financial assets	2 339	97	731	552	3 719
Purchases of new non-financial assets	-1 245	-1 063	-8 693	-4 195	-15 195
Purchases of secondhand non-financial assets	—	—	—	-3	-2
<i>Total</i>	<i>1 094</i>	<i>-965</i>	<i>-7 962</i>	<i>-3 646</i>	<i>-11 479</i>
Net cash flows from investments in financial assets for policy purposes	5 673	-2	5 914	-163	10 879
Net cash flows from investments in financial assets for liquidity purposes	-5 197	-16	-2 290	-73	-7 263
Net cash flows from financing activities					
Advances received (net)	—	46	-388	7	76
Borrowing (net)	-7 929	2	-6 795	-102	-14 810
Deposits received (net)	61	1	-117	-3	-58
Other financing (net)	-680	-1	-87	-1	-682
<i>Total</i>	<i>-8 548</i>	<i>48</i>	<i>-7 386</i>	<i>-100</i>	<i>-15 475</i>
<b>Net Increase(+)/Decrease(-) in Cash Held</b>	<b>-2 388</b>	<b>66</b>	<b>-947</b>	<b>-34</b>	<b>-3 311</b>
<b>SURPLUS(+)/DEFICIT(-)</b>					
Net cash flows from operating activities and net cash flows from investments in non-financial assets	5 684	36	2 815	302	8 547
Acquisitions of assets under finance leases and similar arrangements	-59	-2	-6	-7	-74
<b>Surplus(+)/Deficit(-)</b>	<b>5 625</b>	<b>34</b>	<b>2 810</b>	<b>295</b>	<b>8 473</b>

(a) The multi-jurisdictional sector currently contains only universities. (b) The sums of individual levels of government may not agree with totals for all Australian governments due to transfers between levels of government.

Note: Negative figures denote outflows.

Source: Government Finance Statistics, Australia, 2000–01 (5512.0).

## 27.6 ALL AUSTRALIAN GOVERNMENTS, General government: Balance Sheet — 30 June 2001

	Commonwealth \$m	Multi- jurisdictional(a) \$m	State \$m	Local \$m	All Australian governments(b) \$m
<b>Assets</b>					
Financial assets					
Cash and deposits	1 168	600	5 423	2 117	9 292
Advances paid	21 190	9	4 649	8	20 655
Investments, loans and placements	22 996	3 823	23 016	4 534	53 406
Other non-equity assets	12 569	2 607	11 095	1 859	26 240
Equity	52 622	407	120 104	604	173 737
<i>Total</i>	<i>110 545</i>	<i>7 445</i>	<i>164 287</i>	<i>9 122</i>	<i>283 329</i>
Non-financial assets					
Land and fixed assets	32 077	17 578	194 084	146 308	390 047
Other non-financial assets	2 090	37	2 236	932	5 293
<i>Total</i>	<i>34 167</i>	<i>17 615</i>	<i>196 320</i>	<i>147 240</i>	<i>395 339</i>
<i>Total</i>	<i>144 713</i>	<i>25 059</i>	<i>360 607</i>	<i>156 362</i>	<i>678 669</i>
<b>Liabilities</b>					
Deposits held	293	20	1 262	196	1 754
Advances received	—	24	3 987	43	—
Borrowing	82 111	339	30 128	5 289	115 756
Unfunded superannuation liability and other employee entitlements	85 173	3 565	52 423	1 523	142 685
Other provisions	1 632	4	5 231	84	6 951
Other non-equity liabilities	13 392	1 181	9 554	1 670	23 906
<i>Total</i>	<i>182 601</i>	<i>5 133</i>	<i>102 585</i>	<i>8 804</i>	<i>291 051</i>
<b>GFS Net Worth</b>	<b>-37 889</b>	<b>19 926</b>	<b>258 021</b>	<b>147 558</b>	<b>387 617</b>
Net debt(c)	37 050	-4 048	2 288	-1 132	34 157
Net financial worth(d)	-72 056	2 311	61 701	318	-7 723

(a) The multi-jurisdictional sector currently contains only universities. (b) The sums of individual levels of government may not agree with total figures for all Australian governments due to assets and liabilities held between levels of government. (c) Equals deposits held, advances received and borrowing less cash and deposits, advances paid and investments, loans and placements. (d) Equals total financial assets less total liabilities.

Source: Government Finance Statistics, Australia, 2000-01 (5512.0).

## Total public sector, state governments

This section provides the Operating Statement, Cash Flow Statement and Balance Sheet for the total public sector for each of the state governments. The results for local government appear separately in this chapter and are not reflected in these tables.

### Operating Statement

Table 27.7 summarises the net operating results for the total public sector for each state government for 2000-01.

## Cash Flow Statement

Table 27.8 summarises the cash results for 2000-01 for the total public sector for each state government. Negative figures denote outflows.

## Balance Sheet

Table 27.9 summarises the Balance Sheet results as at 30 June 2001 for the total public sector for each state government.

**27.7 STATE GOVERNMENTS, Total public sector: Operating Statement — 2000–01**

	NSW \$m	Vic. \$m	Qld \$m	SA \$m	WA \$m	Tas. \$m	NT(a) \$m	ACT \$m	Total(a)(b) \$m
GFS Revenue	44 491	29 473	23 149	10 142	15 293	3 780	n.a.	2 465	130 879
less GFS Expenses	42 140	28 449	23 677	10 268	14 982	3 609	n.a.	2 397	127 757
<i>equals</i> <b>GFS Net Operating Balance</b>	<b>2 351</b>	<b>1 024</b>	<b>-528</b>	<b>-126</b>	<b>311</b>	<b>172</b>	<b>n.a.</b>	<b>69</b>	<b>3 122</b>
less Net acquisition of non-financial assets	1 233	920	1 431	-1 107	788	-69	n.a.	-10	3 247
<i>equals</i> <b>GFS Net Lending(+)/Borrowing(-)</b>	<b>1 118</b>	<b>104</b>	<b>-1 959</b>	<b>982</b>	<b>-477</b>	<b>241</b>	<b>n.a.</b>	<b>79</b>	<b>-125</b>

(a) Data for the NT were unavailable at the time of preparation of the publication 'Government Finance Statistics, Australia, 2000–01' (5512.0). However, estimates were included in the calculation of the total. These estimates are available electronically on request. (b) The sums of all individual state jurisdictions may not agree with total state figures, due to transfers between jurisdictions.

Source: Government Finance Statistics, Australia, 2000–01 (5512.0).

**27.8 STATE GOVERNMENTS, Total public sector: Cash Flow Statement — 2000–01**

	NSW \$m	Vic. \$m	Qld \$m	SA \$m	WA \$m	Tas. \$m	NT(a) \$m	ACT \$m	Total(a)(b) \$m
<b>CASH FLOW STATEMENT</b>									
Cash receipts from operating activities	45 377	28 632	22 887	10 327	16 161	3 963	n.a.	2 224	131 632
Cash payments for operating activities	-39 258	-25 491	-19 284	-9 430	-15 009	-3 475	n.a.	-1 861	-115 792
<i>Net cash flows from operating activities</i>	<i>6 119</i>	<i>3 141</i>	<i>3 602</i>	<i>897</i>	<i>1 151</i>	<i>488</i>	<i>n.a.</i>	<i>362</i>	<i>15 840</i>
Net cash flows from investments in non-financial assets	-4 478	-2 024	-3 859	611	-1 874	-239	n.a.	-158	-12 301
Net cash flows from investments in financial assets for policy purposes	-8	-49	393	-36	1 459	16	n.a.	210	2 004
Net cash flows from investments in financial assets for liquidity purposes	-1 352	-867	-2 094	956	-200	-33	n.a.	48	-4 643
Net cash flows from financing activities	-694	180	1 578	-5 185	-627	-338	n.a.	-47	-3 796
<b>Net Increase(+)/Decrease(-) in Cash Held</b>	<b>-412</b>	<b>381</b>	<b>-380</b>	<b>-2 758</b>	<b>-90</b>	<b>-106</b>	<b>n.a.</b>	<b>415</b>	<b>-2 895</b>
<b>SURPLUS(+)/DEFICIT(-)</b>									
<b>Surplus(+)/Deficit(-)</b>	<b>1 642</b>	<b>1 117</b>	<b>-259</b>	<b>1 508</b>	<b>-721</b>	<b>249</b>	<b>n.a.</b>	<b>198</b>	<b>3 532</b>

(a) Data for the NT were unavailable at the time of preparation of the publication 'Government Finance Statistics, Australia, 2000–01' (5512.0). However, estimates were included in the calculation of the total. These estimates are available electronically on request. (b) The sums of individual state jurisdictions may not agree with total state figures, due to transfers between jurisdictions.

Note: Negative figures denote outflows.

Source: Government Finance Statistics, Australia, 2000–01 (5512.0).

**27.9 STATE GOVERNMENTS, Total public sector: Balance Sheet — 30 June 2001**

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT(b)	ACT	Total(b)(c)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>Assets</b>									
Financial assets	13 289	25 332	20 293	8 057	10 416	2 831	n.a.	2 276	85 951
Non-financial assets	128 817	62 495	67 717	21 951	45 149	11 153	n.a.	7 942	351 449
<i>Total</i>	<i>142 106</i>	<i>87 827</i>	<i>88 010</i>	<i>30 007</i>	<i>55 565</i>	<i>13 984</i>	<i>n.a.</i>	<i>10 219</i>	<i>437 400</i>
<b>Liabilities</b>									
	50 138	44 048	30 387	15 170	22 687	7 784	n.a.	2 894	179 379
<b>GFS Net Worth</b>	<b>91 968</b>	<b>43 779</b>	<b>57 623</b>	<b>14 837</b>	<b>32 878</b>	<b>6 201</b>	<b>n.a.</b>	<b>7 325</b>	<b>258 022</b>
Net debt(d)	18 475	-7 348	-3 263	951	4 413	1 959	n.a.	-217	16 117
Net financial worth(e)	-36 849	-18 716	-10 094	-7 113	-12 271	-4 952	n.a.	-618	-93 427

(a) The consolidation methodology applied by the ABS differs from that applied by NSW Treasury, resulting in slightly different balance sheet liability values and analytical balances. (b) Data for the NT were unavailable at the time of preparation of the publication 'Government Finance Statistics, Australia, 2000-01' (5512.0). However, estimates were included in the calculation of the total. These estimates are available electronically on request. (c) The sums of individual state jurisdictions may not agree with total state figures, due to assets and liabilities held between jurisdictions. (d) Equals deposits held, advances received and borrowing less cash and deposits, advances paid and investments, loans and placements. (e) Equals total financial assets less total liabilities less shares and other contributed capital.

Source: Government Finance Statistics, Australia, 2000-01 (5512.0).

## General government, state governments

This section sets out the Operating Statement, Cash Flow Statement and Balance Sheet for the general government sector for each state government.

### Operating Statement

Table 27.10 summarises the net operating results for the general government sector for each state government for 2000-01.

### Cash Flow Statement

Table 27.11 summarises the cash results for 2000-01 for the general government sector for each state government. Negative figures denote outflows.

### Balance Sheet

Table 27.12 summarises the Balance Sheet results as at 30 June 2001 for the general government sector for each state government.

## 27.10 STATE GOVERNMENTS, General government: Operating Statement — 2000–01

	NSW	Vic.	Qld	SA	WA	Tas.	NT(a)	ACT	Total(a)(b)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>GFS Revenue</b>									
Taxation revenue	13 333	8 517	4 256	2 197	2 889	547	n.a.	639	32 604
Current grants and subsidies	13 738	9 910	8 192	3 992	4 771	1 555	n.a.	828	44 501
Sales of goods and services	2 605	2 781	1 747	982	890	283	n.a.	276	9 542
Interest income	484	336	852	169	140	30	n.a.	109	2 139
Other	3 484	2 178	3 212	768	1 851	269	n.a.	271	12 234
<i>Total</i>	33 645	23 723	18 258	8 108	10 540	2 684	n.a.	2 123	101 019
<i>less</i>									
<b>GFS Expenses</b>									
Gross operating expenses									
Depreciation	1 332	800	1 395	334	454	145	n.a.	132	4 750
Employee expenses	13 235	9 080	8 195	3 517	4 402	1 164	n.a.	795	41 213
Other operating expenses	8 797	7 562	3 467	2 476	2 638	697	n.a.	704	26 751
<i>Total</i>	23 364	17 442	13 057	6 327	7 494	2 006	n.a.	1 631	72 713
Nominal superannuation interest expenses	438	859	467	248	304	67	n.a.	9	2 456
Other interest expenses	992	478	338	353	245	122	n.a.	75	2 760
Other property expenses	—	—	—	—	—	—	n.a.	—	—
Current transfers									
Grant expenses	3 282	2 003	2 517	702	1 389	206	n.a.	274	10 511
Subsidy expenses	1 252	681	1 380	569	448	128	n.a.	8	4 545
Other current transfers	440	191	82	47	322	46	n.a.	87	1 341
Capital transfers									
Grants to local governments	174	100	361	3	62	2	n.a.	—	708
Other capital transfers	2 002	757	911	156	151	2	n.a.	10	4 035
<i>Total</i>	31 943	22 512	19 115	8 406	10 415	2 578	n.a.	2 093	99 070
<i>equals</i>									
<b>GFS Net Operating Balance</b>	<b>1 701</b>	<b>1 211</b>	<b>-856</b>	<b>-298</b>	<b>125</b>	<b>106</b>	<b>n.a.</b>	<b>30</b>	<b>1 950</b>
<i>less</i>									
Net acquisition of non-financial assets									
Gross fixed capital formation	2 365	1 301	2 248	424	978	105	n.a.	112	7 763
<i>less</i> Depreciation	1 332	800	1 395	334	454	145	n.a.	132	4 750
<i>plus</i> Change in inventories	6	—	-17	-3	-7	2	n.a.	—	-19
<i>plus</i> Other transactions in non-financial assets	-49	207	-24	—	13	—	n.a.	9	160
<i>Total</i>	990	708	812	87	530	-38	n.a.	-11	3 154
<i>equals</i>									
<b>GFS Net Lending(+)/Borrowing(-)</b>	<b>711</b>	<b>503</b>	<b>-1 668</b>	<b>-385</b>	<b>-405</b>	<b>144</b>	<b>n.a.</b>	<b>40</b>	<b>-1 204</b>

(a) Data for the NT were unavailable at the time of preparation of the publication 'Government Finance Statistics, Australia, 2000–01' (5512.0). However, estimates were included in the calculation of the total. These estimates are available electronically on request. (b) The sums of all individual state jurisdictions may not agree with total state figures, due to transfers between jurisdictions.

Source: Government Finance Statistics, Australia, 2000–01 (5512.0).

## 27.11 STATE GOVERNMENTS, General government: Cash Flow Statement — 2000–01

	NSW	Vic.	Qld	SA	WA	Tas.	NT(a)	ACT	Total(a)(b)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>CASH FLOW STATEMENT</b>									
Cash receipts from operating activities									
Taxes received	13 189	8 458	4 141	2 200	2 855	525	n.a.	613	32 207
Receipts from sales of goods and services	2 451	2 260	1 552	1 102	890	429	n.a.	232	8 890
Grants and subsidies received	14 632	10 369	8 676	4 196	5 104	1 640	n.a.	867	47 066
Other receipts	3 917	2 456	3 585	751	2 288	225	n.a.	381	13 709
<i>Total</i>	<i>34 188</i>	<i>23 543</i>	<i>17 954</i>	<i>8 248</i>	<i>11 137</i>	<i>2 820</i>	<i>n.a.</i>	<i>2 092</i>	<i>101 871</i>
Cash payments for operating activities									
Payments for goods and services	-21 323	-17 189	-9 530	-5 982	-7 045	-1 984	n.a.	-1 252	-65 521
Grants and subsidies paid	-6 012	-3 408	-4 793	-1 486	-2 246	-386	n.a.	-333	-19 142
Interest paid	-1 044	-483	-762	-414	-239	-138	n.a.	-64	-3 284
Other payments	-1 584	-330	-260	-71	-743	-58	n.a.	-81	-3 147
<i>Total</i>	<i>-29 962</i>	<i>-21 410</i>	<i>-15 345</i>	<i>-7 953</i>	<i>-10 273</i>	<i>-2 567</i>	<i>n.a.</i>	<i>-1 730</i>	<i>-91 094</i>
<i>Net cash flows from operating activities</i>	<i>4 226</i>	<i>2 134</i>	<i>2 609</i>	<i>295</i>	<i>864</i>	<i>253</i>	<i>n.a.</i>	<i>362</i>	<i>10 778</i>
Net cash flows from investments in non-financial assets									
Sales of non-financial assets	133	150	263	30	67	46	n.a.	8	731
Purchases of new non-financial assets	-2 536	-1 613	-2 520	-432	-1 053	-149	n.a.	-124	-8 693
Purchases of secondhand non-financial assets	—	—	—	—	—	—	n.a.	—	—
<i>Total</i>	<i>-2 403</i>	<i>-1 463</i>	<i>-2 257</i>	<i>-402</i>	<i>-986</i>	<i>-103</i>	<i>n.a.</i>	<i>-115</i>	<i>-7 962</i>
Net cash flows from investments in financial assets for policy purposes									
	3 214	167	668	1 238	446	30	n.a.	155	5 914
Net cash flows from investments in financial assets for liquidity purposes									
	-354	-836	-1 122	-6	-75	-3	n.a.	57	-2 290
Net cash flows from financing activities									
Advances received (net)	-85	4	5	-91	-105	-116	n.a.	—	-388
Borrowing (net)	-4 206	-94	-593	-2 347	265	88	n.a.	49	-6 795
Deposits received (net)	-25	-22	-1	-103	32	—	n.a.	—	-117
Other financing (net)	—	99	1	-12	-50	-134	n.a.	-100	-87
<i>Total</i>	<i>-4 316</i>	<i>-13</i>	<i>-587</i>	<i>-2 552</i>	<i>142</i>	<i>-161</i>	<i>n.a.</i>	<i>-51</i>	<i>-7 386</i>
<b>Net Increase(+)/Decrease(-) in Cash Held</b>	<b>368</b>	<b>-10</b>	<b>-688</b>	<b>-1 427</b>	<b>390</b>	<b>16</b>	<b>n.a.</b>	<b>407</b>	<b>-947</b>
<b>SURPLUS(+)/DEFICIT(-)</b>									
Net cash flows from operating activities and net cash flows from investments in non-financial assets									
	1 824	671	352	-106	-122	150	n.a.	247	2 815
Acquisitions of assets under finance leases and similar arrangements									
	—	—	—	—	—	—	n.a.	-6	-6
<b>Surplus(+)/Deficit(-)</b>	<b>1 824</b>	<b>671</b>	<b>353</b>	<b>-106</b>	<b>-122</b>	<b>150</b>	<b>n.a.</b>	<b>241</b>	<b>2 810</b>

(a) Data for the NT were unavailable at the time of preparation of the publication 'Government Finance Statistics, Australia, 2000–01' (5512.0). However, estimates were included in the calculation of the total. These estimates are available electronically on request. (b) The sums of all individual state jurisdictions may not agree with total state figures, due to transfers between jurisdictions.

Note: Negative figures denote outflows.

Source: Government Finance Statistics, Australia, 2000–01 (5512.0).

## 27.12 STATE GOVERNMENTS, General government: Balance Sheet — 30 June 2001

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT(b)	ACT	Total(b)(c)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>Assets</b>									
Financial assets									
Cash and deposits	1 035	927	66	1 806	196	767	n.a.	571	5 423
Advances paid	1 440	314	158	1 258	862	149	n.a.	418	4 649
Investments, loans and placements	3 951	3 309	12 978	127	1 658	43	n.a.	462	23 016
Other non-equity assets	3 997	987	4 639	325	727	91	n.a.	237	11 095
Equity	47 636	25 049	14 007	10 207	15 258	3 666	n.a.	2 903	120 104
<i>Total</i>	<i>58 059</i>	<i>30 587</i>	<i>31 848</i>	<i>13 723</i>	<i>18 701</i>	<i>4 715</i>	<i>n.a.</i>	<i>4 592</i>	<i>164 287</i>
Non-financial assets									
Land and fixed assets	65 796	34 773	43 599	10 635	24 095	5 511	n.a.	5 159	194 084
Other non-financial assets	846	1 029	—	62	59	5	n.a.	235	2 236
<i>Total</i>	<i>66 642</i>	<i>35 802</i>	<i>43 599</i>	<i>10 697</i>	<i>24 154</i>	<i>5 516</i>	<i>n.a.</i>	<i>5 394</i>	<i>196 320</i>
<i>Total</i>	<i>124 701</i>	<i>66 389</i>	<i>75 447</i>	<i>24 420</i>	<i>42 855</i>	<i>10 232</i>	<i>n.a.</i>	<i>9 985</i>	<i>360 607</i>
<b>Liabilities</b>									
Deposits held	71	337	—	469	207	20	n.a.	13	1 262
Advances received	2 041	6	1	844	621	360	n.a.	112	3 987
Borrowing	11 525	6 343	3 120	3 123	2 309	1 532	n.a.	639	30 128
Unfunded superannuation liability and other employee entitlements	12 248	14 163	10 578	4 180	6 230	2 014	n.a.	1 662	52 423
Other provisions	4 256	291	612	—	—	1	n.a.	—	5 231
Other non-equity liabilities	2 593	1 479	3 513	966	610	105	n.a.	233	9 554
<i>Total</i>	<i>32 734</i>	<i>22 620</i>	<i>17 824</i>	<i>9 582</i>	<i>9 977</i>	<i>4 032</i>	<i>n.a.</i>	<i>2 660</i>	<i>102 585</i>
<b>GFS Net Worth</b>	<b>91 968</b>	<b>43 769</b>	<b>57 623</b>	<b>14 838</b>	<b>32 877</b>	<b>6 200</b>	<b>n.a.</b>	<b>7 325</b>	<b>258 021</b>
Net debt(d)	7 212	2 135	-10 081	1 246	421	953	n.a.	-686	2 288
Net financial worth(e)	25 326	7 967	14 024	4 141	8 724	684	n.a.	1 932	61 701

(a) The consolidation methodology applied by the ABS differs from that applied by NSW Treasury, resulting in slightly different balance sheet liability values and analytical balances. (b) Data for the NT were unavailable at the time of preparation of the publication 'Government Finance Statistics, Australia, 2000-01' (5512.0). However, estimates were included in the calculation of the total. These estimates are available electronically on request. (c) The sums of all individual state jurisdictions may not agree with total state figures, due to assets and liabilities held between jurisdictions. (d) Equals deposits held, advances received and borrowing less cash and deposits, advances paid, and investments, loans and placements. (e) Equals total financial assets less total liabilities.

Source: Government Finance Statistics, Australia, 2000-01 (5512.0).

## Total public sector, local governments

This section sets out the Operating Statement, Cash Flow Statement and Balance Sheet for the total public sector for local governments.

### Operating Statement

Table 27.13 summarises the net operating results for the total public sector for local governments for 2000-01.

### Cash Flow Statement

Table 27.14 summarises the cash results for 2000-01 for the total public sector for local governments. Negative figures denote outflows.

### Balance Sheet

Table 27.15 summarises the Balance Sheet results as at 30 June 2001 for the total public sector for local governments.

## 27.13 LOCAL GOVERNMENTS, Total public sector: Operating Statement — 2000–01

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT(a)	Total(b)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>GFS Revenue</b>									
Taxation revenue	2 176	1 543	1 248	545	669	164	43	..	6 388
Current grants and subsidies	553	598	473	130	284	68	41	..	2 147
Sales of goods and services	1 880	692	2 074	193	355	191	47	..	5 433
Interest income	217	55	84	19	44	10	3	..	433
Other	953	532	764	62	161	32	26	..	2 530
<i>Total</i>	5 779	3 419	4 644	949	1 513	465	161	..	16 930
<i>less</i>									
<b>GFS Expenses</b>									
Gross operating expenses									
Depreciation	1 139	644	1 002	227	369	121	46	..	3 548
Employee expenses	1 907	1 073	1 304	304	513	138	64	..	5 303
Other operating expenses	1 954	1 631	1 445	392	519	173	128	..	6 241
<i>Total</i>	4 999	3 348	3 750	923	1 402	431	238	..	15 092
Property expenses									
Other interest expenses	102	43	230	29	13	15	2	..	433
Income tax equivalent expenses	—	—	2	—	—	—	—	..	2
Current transfers									
Grant expenses	—	—	—	7	12	—	—	..	19
Tax expenses	6	—	14	—	5	—	—	..	25
Other current transfers	96	—	2	4	6	9	—	..	116
Capital transfers									
Grant expenses	—	—	22	—	—	—	1	..	23
Other capital transfers	—	—	6	8	—	—	—	..	15
<i>Total</i>	5 202	3 391	4 027	971	1 437	455	241	..	15 724
<i>equals</i>									
<b>GFS Net Operating Balance</b>	<b>577</b>	<b>28</b>	<b>617</b>	<b>-22</b>	<b>76</b>	<b>9</b>	<b>-80</b>	<b>..</b>	<b>1 206</b>
<i>less</i>									
Net acquisition of non-financial assets									
Gross fixed capital formation	1 373	755	1 551	203	456	113	47	..	4 497
<i>less</i> Depreciation	1 139	644	1 002	227	369	121	46	..	3 548
<i>plus</i> Change in inventories	—	—	-12	-1	—	1	—	..	-12
<i>plus</i> Other transactions in non-financial assets	119	-68	46	—	-11	3	—	..	89
<i>Total</i>	353	43	583	-25	75	-4	1	..	1 026
<i>equals</i>									
<b>GFS Net Lending (+)/Borrowing(-)</b>	<b>223</b>	<b>-15</b>	<b>34</b>	<b>3</b>	<b>2</b>	<b>14</b>	<b>-81</b>	<b>..</b>	<b>180</b>

(a) The ACT has no separate local government. (b) The sums of all individual state jurisdictions may not agree with total state figures, due to transfers between jurisdictions.

Source: Government Finance Statistics, Australia, 2000–01 (5512.0).

## 27.14 LOCAL GOVERNMENTS, Total public sector: Cash Flow Statement — 2000–01

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT(a)	Total(b)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>CASH FLOW STATEMENT</b>									
Cash receipts from operating activities									
Taxes received	2 105	1 543	1 237	548	671	159	40	..	6 302
Receipts from sales of goods and services	2 045	693	1 786	222	466	185	99	..	5 497
Grants and subsidies received	728	696	821	164	344	74	86	..	2 913
Other receipts	667	294	525	24	43	40	4	..	1 597
<i>Total</i>	<i>5 544</i>	<i>3 226</i>	<i>4 369</i>	<i>958</i>	<i>1 525</i>	<i>458</i>	<i>229</i>	<i>..</i>	<i>16 309</i>
Cash payments for operating activities									
Payments for goods and services	-4 051	-2 592	-2 839	-714	-503	-311	-188	..	-11 199
Grants and subsidies paid	—	-4	—	-8	-18	—	—	..	-30
Interest paid	-103	-43	-215	-31	-14	-21	-1	..	-426
Other payments	—	-112	—	-7	-556	-9	—	..	-684
<i>Total</i>	<i>-4 154</i>	<i>-2 751</i>	<i>-3 054</i>	<i>-760</i>	<i>-1 091</i>	<i>-340</i>	<i>-189</i>	<i>..</i>	<i>-12 339</i>
<i>Net cash flows from operating activities</i>	<i>1 390</i>	<i>475</i>	<i>1 315</i>	<i>198</i>	<i>434</i>	<i>118</i>	<i>39</i>	<i>..</i>	<i>3 970</i>
Net cash flows from investments in non-financial assets									
Sales of non-financial assets	209	135	95	36	65	8	5	..	552
Purchases of new non-financial assets	-1 414	-629	-1 264	-223	-506	-118	-48	..	-4 201
Purchases of secondhand non-financial assets	—	—	-180	—	-3	—	—	..	-183
<i>Total</i>	<i>-1 205</i>	<i>-494</i>	<i>-1 349</i>	<i>-187</i>	<i>-444</i>	<i>-110</i>	<i>-43</i>	<i>..</i>	<i>-3 832</i>
Net cash flows from investments in financial assets for policy purposes									
	19	—	—	-2	-3	—	1	..	16
Net cash flows from investments in financial assets for liquidity purposes									
	-68	—	-18	7	-6	-2	-2	..	-88
Net cash flows from financing activities									
Advances received (net)	—	-1	—	—	—	8	—	..	7
Borrowing (net)	-21	-38	3	-49	5	-7	—	..	-107
Deposits received (net)	—	—	—	—	-4	—	—	..	-3
Other financing (net)	-2	59	-12	30	23	-104	4	..	-3
<i>Total</i>	<i>-23</i>	<i>19</i>	<i>-9</i>	<i>-19</i>	<i>24</i>	<i>-104</i>	<i>4</i>	<i>..</i>	<i>-107</i>
<b>Net Increase(+)/Decrease(-) in Cash Held</b>	<b>113</b>	<b>—</b>	<b>-60</b>	<b>-2</b>	<b>5</b>	<b>-97</b>	<b>-1</b>	<b>..</b>	<b>-42</b>
<b>SURPLUS(+)/DEFICIT(-)</b>									
Net cash flows from operating activities and net cash flows from investments in non-financial assets									
	185	-19	-33	11	-10	8	-4	..	138
Acquisitions of assets under finance leases and similar arrangements									
	-5	—	—	-2	—	—	—	..	-7
<b>Surplus(+)/Deficit(-)</b>	<b>180</b>	<b>-19</b>	<b>-33</b>	<b>9</b>	<b>-10</b>	<b>8</b>	<b>-4</b>	<b>..</b>	<b>131</b>

(a) The ACT has no separate local government. (b) The sums of all individual state jurisdictions may not agree with total state figures, due to transfers between jurisdictions.

Note: Negative figures denote outflows.

Source: Government Finance Statistics, Australia, 2000–01 (5512.0).

## 27.15 LOCAL GOVERNMENTS, Total public sector: Balance Sheet — 30 June 2001

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT(a)	Total(b)
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>Assets</b>									
Financial assets									
Cash and deposits	291	428	1 134	29	168	40	37	..	2 126
Advances paid	—	4	—	—	—	3	—	..	7
Investments, loans and placements	3 140	534	236	58	436	101	46	..	4 552
Other non-equity assets	610	549	435	67	160	45	9	..	1 874
Equity	—	—	—	11	—	—	—	..	11
<i>Total</i>	<i>4 041</i>	<i>1 515</i>	<i>1 805</i>	<i>164</i>	<i>764</i>	<i>190</i>	<i>92</i>	<i>..</i>	<i>8 571</i>
Non-financial assets									
Land and fixed assets	63 123	28 044	32 647	8 030	10 454	3 955	927	..	147 180
Other non-financial assets	920	—	—	—	8	4	5	..	936
<i>Total</i>	<i>64 043</i>	<i>28 044</i>	<i>32 647</i>	<i>8 030</i>	<i>10 462</i>	<i>3 958</i>	<i>932</i>	<i>..</i>	<i>148 115</i>
<i>Total</i>	<i>68 084</i>	<i>29 559</i>	<i>34 452</i>	<i>8 194</i>	<i>11 226</i>	<i>4 148</i>	<i>1 023</i>	<i>..</i>	<i>156 686</i>
<b>Liabilities</b>									
Deposits held	—	48	—	145	—	3	—	..	196
Advances received	25	7	—	11	—	-1	—	..	42
Borrowing	1 428	611	3 000	69	219	207	11	..	5 546
Unfunded superannuation liability and other employee entitlements	703	269	362	69	81	35	9	..	1 529
Other provisions	74	—	7	7	2	6	—	..	96
Other non-equity liabilities	638	382	364	96	165	17	18	..	1 680
<i>Total</i>	<i>2 868</i>	<i>1 316</i>	<i>3 733</i>	<i>397</i>	<i>468</i>	<i>267</i>	<i>38</i>	<i>..</i>	<i>9 088</i>
Shares and other contributed capital	—	—	40	—	—	—	—	..	40
<b>GFS Net Worth</b>	<b>65 216</b>	<b>28 243</b>	<b>30 679</b>	<b>7 797</b>	<b>10 758</b>	<b>3 881</b>	<b>985</b>	<b>..</b>	<b>147 558</b>
Net debt(c)	-1 978	-301	1 630	138	-385	65	-71	..	-903
Net financial worth(d)	1 173	199	-1 968	-233	296	-77	54	..	-557

(a) The ACT has no separate local government. (b) The sums of all individual state jurisdictions may not agree with total state figures, due to assets and liabilities held between jurisdictions. (c) Equals deposits held, advances received and borrowing less cash and deposits, advances paid, and investments, loans and placements. (d) Equals total financial assets less total liabilities less shares and other contributed capital.

Source: Government Finance Statistics, Australia, 2000-01 (5512.0).

## Taxation revenue

Table 27.16 shows, for the general government sector, the amount of taxation revenue collected in Australia during 2000-01 by level of government and by type of tax. Total taxation revenue collected during the period was \$213,766m. Commonwealth government taxation revenue totalled \$175,010m and accounted for 82% of total taxation revenue while total state and local government taxation revenue totalled \$38,986m and accounted for 18% of total taxation revenue.

Income taxes continue to be the largest component of the Commonwealth Government's taxation revenue, although their proportion of the total in 2000-01 fell when compared with the previous year as a result of the introduction of GST and other tax changes. Property taxes continue to be the largest component of state and local governments' taxation revenue.

At the end of this section is an article looking at the impact of recent tax reforms.

## 27.16 TAXATION REVENUE, General government: All levels of government — 2000–01

Type of tax	Commonwealth \$m	State and local \$m	All Australian governments(a) \$m
<b>Taxes on income</b>			
Income taxes levied on individuals	77 392	—	77 392
Income taxes levied on enterprises	42 221	—	42 221
Income taxes levied on non-residents	1 242	—	1 242
<i>Total</i>	120 855	—	120 855
<b>Employers' payroll taxes</b>			
General taxes (payroll tax)	—	9 512	9 322
Other employers' labour force taxes	3 577	—	3 537
<i>Total</i>	3 577	9 512	12 859
<b>Taxes on property</b>			
Taxes on immovable property	—	9 062	9 062
Taxes on financial and capital transactions	12	9 754	9 766
<i>Total</i>	12	18 817	18 829
<b>Taxes on provision of goods and services</b>			
General taxes (sales tax)	1 976	—	1 976
Goods and services tax (GST)	23 854	—	23 854
Excise and levies			
Crude oil and liquid petroleum gas (LPG)	12 447	—	12 447
Other excises	6 572	—	6 572
Agricultural production taxes	451	3	453
Levies on statutory corporations	—	14	14
<i>Total</i>	19 470	17	19 487
Taxes on international trade	4 606	—	4 606
Taxes on gambling	6	3 547	3 553
Taxes on insurance	—	2 402	2 402
<i>Total</i>	49 911	5 966	55 877
<b>Taxes on use of goods and performance of activities</b>			
Motor vehicle taxes	—	4 030	4 030
Franchise taxes	—	325	325
Other	655	337	992
<i>Total</i>	655	4 692	5 347
<b>Total taxes</b>	<b>175 010</b>	<b>38 986</b>	<b>213 766</b>

(a) The sum of individual levels of government may not agree with totals for all levels of government, due to intergovernmental taxes.

Source: *Taxation Revenue, Australia, 2000–01* (5506.0).

## Recent tax reforms

The tax reforms introduced from 1 July 2000, as part of The New Tax System, have affected GFS aggregates and the composition of taxation revenue from 2000–01. The main aspects of these taxation reforms are:

- As part of the Intergovernmental Agreement on the Principles for the reform of Commonwealth–State Financial Relations (IGA) of June 1999, endorsed by the Prime Minister, all premiers and chief ministers, the Commonwealth Government enacted
- legislation to impose the GST from 1 July 2000 and provide for all of the GST revenue to be granted to the states and territories.
- Under the IGA, the Commonwealth permanently ceased the Commonwealth wholesale sales tax and the so-called safety net tax arrangements from 1 July 2000. At the same time, state governments also permanently ceased bed taxes, financial institutions duties, and stamp duties on marketable securities, and adjusted their gambling taxes to take account of the impact

of the GST on gambling operators. State debit taxes are to cease no later than July 2005, and the need to continue a number of state stamp duties on financial instruments and leases is also to be reviewed in 2005. As part of the tax reform, the Commonwealth retains income tax for its own purposes.

### Federal–state financial relations

Table 27.17 shows the change in the components of state general government operating revenue between 1999–2000 and 2000–01, on an accrual GFS basis. The 13.8% decline in total taxes levied by state governments, from \$37,826m in 1999–2000 to \$32,604m in 2000–01, is due to the removal of certain state government taxes from 1 July 2000, as mentioned earlier.

The 33.6% increase in grants received by state governments, from \$33,301m in 1999–2000 to \$44,501m in 2000–01, reflects an increase in grants paid by the Commonwealth which includes the replacement of revenue lost by the removal of certain state taxes.

### Composition of total taxation revenue

Table 27.18 shows the major components of taxation for the Commonwealth, state and local governments combined between in 1999–2000 and 2000–01, on a GFS basis.

Major factors affecting taxation revenue in 2000–01 are outlined in the following sections. This information has been derived from budget

statements and annual reports published by the Commonwealth Government and the state governments.

### Taxes on income

*Income taxes levied on individuals* — The major cause of the 7.5% fall in income taxes levied on individuals was a decrease in Commonwealth government personal income tax collections, reflecting a decrease in personal income tax rates associated with tax reform.

*Income taxes levied on enterprises* — The 43.0% increase in taxes levied on enterprises was mainly due to strong company income growth and the introduction of the Pay As You Go system, which effectively brought some company tax assessments forward into 2000–01. This was in spite of a fall in the general tax rate for companies from 36% to 34% for the 2000–01 income year. The scheduled increase in the superannuation guarantee from 7% to 8% in 2000–01 also boosted tax levied on contributions from superannuation funds. Furthermore, the addition of fringe benefits to group certificates from 2000–01 increased revenue from the superannuation surcharge that applies to contributions from higher income earners.

*Income taxes levied on non-residents* — The 2.7% decrease in income taxes levied on non-residents largely reflects the impact of some large one-off dividend payments in 1999–2000 upon dividend withholding taxes, partly offset by a rise in interest withholding taxes.

#### 27.17 STATE GENERAL GOVERNMENT OPERATING REVENUE

GFS Revenue	1999–2000	2000–01	Change	Contributions to total taxes 2000–01
	\$m	\$m	%	%
Taxation revenue	37 826	32 604	-13.8	32.3
Current grants and subsidies	33 301	44 501	33.6	44.1
Sales of goods and services	9 321	9 542	2.4	9.4
Interest income	2 912	2 138	-26.6	2.1
Dividend income	3 430	3 105	-9.5	3.1
Other	8 356	9 129	9.3	9.0
<b>Total</b>	<b>95 146</b>	<b>101 019</b>	<b>6.2</b>	<b>100.0</b>

Source: ABS data available on request, Government Finance Statistics.

**27.18 MAJOR COMPONENTS OF TAXATION REVENUE, General government: All levels of government**

	1999–2000	2000–01	Change	Contribution to total taxes 2000–01
	\$m	\$m	%	%
<b>Taxes on income</b>				
Income taxes levied on individuals	83 623	77 392	-7.5	36.2
Income taxes levied on enterprises	29 516	42 221	43.0	19.8
Income taxes levied on non-residents	1 276	1 242	-2.7	0.6
<b>Employers payroll taxes</b>				
General taxes (payroll tax)	8 739	9 322	6.7	4.4
Other employers labour force taxes	3 467	3 537	2.0	1.7
<b>Taxes on property</b>				
Taxes on immovable property	8 446	9 062	7.3	4.2
Taxes on financial and capital transactions	9 667	9 766	1.0	4.6
<b>Taxes on provision of goods and services</b>				
General taxes (sales tax)	15 644	1 976	-87.4	0.9
Goods and services tax (GST)	..	23 854	..	11.2
Excises and levies	14 660	19 487	32.9	9.1
Taxes on international trade	3 799	4 606	21.2	2.2
Taxes on gambling	4 426	3 553	-19.7	1.7
Taxes on insurance	2 139	2 402	12.3	1.1
<b>Taxes on the use of goods and performance of activities</b>				
Motor vehicle taxes	3 911	4 030	3.0	1.9
Franchise taxes	5 819	325	-94.4	0.2
<b>Other taxes</b>	1 016	992	-2.4	0.5
<b>Total</b>	<b>196 148</b>	<b>213 766</b>	<b>9.0</b>	<b>100.0</b>

Source: Taxation Revenue, Australia, 2000–01 (5506.0).

### Employers payroll taxes

Payroll tax revenues increased across all states. This was due to growth in employment and employee remuneration during 2000–01, partly offset by a reduction in payroll tax rates in many states.

### Taxes on property

*Taxes on immovable property* — Revenue from taxes on immovable property increased in all states. Revenue from land taxes rose in all states except Tasmania, reflecting growth in taxable land values.

*Taxes on financial and capital transactions* — Revenue from taxes on financial and capital transactions increased in all states except Queensland and South Australia. There was a decrease in revenue from stamp duties on conveyances in all states, except Western Australia. These decreases were a result of a more subdued turnover in the property market than in the previous year when transactions were brought forward due to the introduction

of the GST. There were significant one-off stamp duty transactions in the previous year associated with a restructuring of the electricity industry in Queensland, and stamp duty on conveyances in South Australia which included \$103m received upon the sale of electricity assets. An increase in financial institutions transaction taxes occurred in all states except Queensland. The fall in Queensland was due to the trend toward non-cheque payments since the introduction of the Bank Account Debits Tax which is the main transaction tax for that state.

### Taxes on provision of goods and services

*General taxes (sales tax)* — The 87.4% decrease in general taxes reflects the abolition of the wholesale sales tax from 1 July 2000.

*Goods and services tax (GST)* — In 2000–01, \$23,854m was collected.

*Excises and levies* — The major cause of the 32.9% rise in tax revenue from excises and levies was a 35.0% increase in Commonwealth government excises, from \$14,091m in 1999–2000 to \$19,019m in 2000–01. Two factors largely contributed to this movement. The major contributor was changes in the arrangements under which the excise revenue previously collected on behalf of the states and territories has been retained as Commonwealth revenue from 1 July 2000 as a part of The New Tax System. In addition, an increase in revenues from unleaded petrol and diesel, reflecting continued growth in these products, contributed to the movement.

*Taxes on international trade* — The 21.2% rise in taxes on international trade largely reflects an increase in the customs duty rates applying to imported alcoholic beverages from 1 July 2000. This increase in customs duty offsets the removal of the wholesale sales tax on beer and spirits which was levied at a rate of 37%, and mirrors an equivalent increase in excise on domestically produced beer and spirits.

*Taxes on gambling* — Revenue from taxes on gambling decreased in all states, reflecting adjustments to gambling taxation arrangements by the states to take into account the impact of the GST on gambling operators.

*Taxes on insurance* — Revenue from taxes on insurance increased in all states, reflecting higher premium levels which included GST impacts (both directly on premiums and indirectly through the change in the value of property insured), a higher level of natural disaster claims, and less competition due to several reinsurers going out of business.

### **Taxes on the use of goods and performance of activities**

*Motor vehicle taxes* — The major cause of the 3.0% rise in motor vehicle tax revenues was an increase in revenue from stamp duty on vehicle registration. This increased in all states except Queensland, where it remained steady, and was in line with increased sales of motor vehicles which followed the replacement of the wholesale sales tax with the GST and the net effect on retail prices.

*Franchise taxes* — Revenue from total franchise taxes decreased across all states in 2000–01. The 94.4% decline in franchise tax revenues reflected new arrangements under which excise revenue previously collected on behalf of the states and territories and distributed to them as safety net taxes have been retained as Commonwealth revenue from 1 July 2000 and included as excises.

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*Taxation Statistics* can be accessed by selecting the 'About the ATO' link, then the 'Catalogue of Corporate Publications' link

Commonwealth Department of Finance and Administration, <<http://www.finance.gov.au>>



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## Introduction

Prices are a key factor in the operation of an economy. Price indexes, which provide summary measures of the movements in various categories of prices, are used extensively to analyse and monitor price behaviour, and to adjust government payments such as pensions.

This chapter provides an outline of the major price indexes, their history, and their underlying concepts and methodology. More detailed information is contained in the source publications referred to throughout the chapter and in the Bibliography.

## Consumer price index (CPI)

The description of the CPI commonly adopted by users is in terms of its perceived uses; hence the frequent references to the CPI as a measure of inflation, a measure of changes in purchasing power, or a measure of changes in the cost of living. In practice, the CPI is a measure of changes, over time, in prices of a constant basket of goods and services acquired by metropolitan households in Australia. As such, the CPI has been designed as a general measure of price inflation for the household sector in Australia.

The simplest way of thinking about the CPI is to imagine a basket of goods and services of the kind acquired by Australian households. As prices vary, the total cost of this basket will also vary. The CPI is simply a measure of the changes in the cost of this basket as the prices of items in it change.

The price of the CPI basket in the reference base period is assigned a value of 100.0 and the prices in other periods are expressed as percentages of the price in the base period. For example, if the price of the basket had increased by 35% since the base year, then the index would read 135.0. Similarly, if the price had fallen by 5% since the base year, the index would stand at 95.0.

For practical reasons, the CPI basket cannot include every item bought by households, but it does include all the important kinds of items. It is not necessary to include every item that people buy since many related items are subject to similar price changes. The idea is to select representative items so that the index reflects price changes for a much wider range of goods and services than is actually priced.

From the September quarter 2000 onwards, the total basket is divided into the following 11 major commodity groups: food; alcohol and tobacco; clothing and footwear; housing; household furnishings, supplies and services; health; transportation; communication; recreation; education; and miscellaneous. These groups are in turn divided into 34 subgroups, and the subgroups into 89 expenditure classes.

In addition to the aggregate 'All groups' index, indexes are also compiled and published for each of the groups, subgroups and expenditure classes for each state capital city, Darwin and Canberra. National indexes are constructed as the weighted average of the indexes compiled for each of the eight capital cities.

The 14th Series CPI is the latest of a number of retail price indexes which have been constructed for various purposes by the ABS. The history of retail price indexes in Australia is published in *Year Book Australia 1995*.

## Index population

The CPI measures price changes relating to the spending pattern of metropolitan private households. This group is termed the CPI population group. 'Metropolitan' is defined as the state capital cities, together with Darwin and Canberra.

This population group differs from that applying to CPIs calculated and published prior to the September quarter 1998. For more information see the article *Outcomes of the 13th Series Australian Consumer Price Index Review* in *Year Book Australia 1999*.

## Conceptual basis

The CPI is a quarterly measure of the change in average price levels. It provides a method of comparing the average price level for a quarter with the average price level of other periods such as the reference base year, or other quarters. Changes in the average price level between periods can be calculated from their respective index levels.

The CPI aims to measure only pure price changes. In other words, it is concerned with isolating and measuring only that element of price change which is not caused by any change to either the quantity or the quality of the goods or services concerned (i.e. it aims to measure, each quarter, the change in the cost of acquiring an identical basket of goods and services). This involves evaluating any changes in the quality of

goods and services included in the index and removing the effects of such changes from the prices used to construct the index.

The CPI measures changes in the prices actually paid by consumers for the goods and services they buy. It is not concerned with nominal, recommended or list prices (unless they are the prices consumers actually pay).

The CPI basket includes goods and services ranging from steak to motor cars and from dental fillings to restaurant meals. The items are chosen not only because they represent the spending habits of the CPI population group, but also because the items are those for which the prices can be associated with identifiable and specific commodities and services. While government taxes and charges which are associated with the use of specific goods and services (such as excise and customs duties, goods and services taxes, local government rates, etc.) are included, income taxes and the income-related Medicare levy are excluded because they cannot be clearly associated with the purchase or use of a specific quantity of any good or service.

Items are not excluded from the CPI basket on the basis of moral or social judgements. For example, some people may regard the use of tobacco and alcohol as socially undesirable, but these commodities are included in the CPI basket because they are significant items of household expenditure and their prices can be accurately measured. However, to assist in understanding the effect that major item groups have on the CPI, the ABS publishes a range of supplementary indexes which exclude, in turn, each of the 11 major commodity groups. These supplementary indexes can also be used in their own right for evaluating price changes, or for indexation purposes.

### **Periodic reviews of the CPI**

Like any other long-standing and important statistical series, the CPI is reviewed from time to time to ensure that it continues to be relevant to

current conditions. Over time, household spending habits change, as does the range of available goods and services. The CPI needs to be updated to take account of these changes. Regular reviews also provide an opportunity to reassess the scope and coverage of the index and other methodological issues.

The CPI was first compiled in 1960, with index numbers backcast to 1948. Since its inception in its current form in 1960, reviews of the CPI have usually been carried out at about five-yearly intervals. Following each review, which involves revising the list of items and their weights, the new series are linked to the old to form continuous series. This linking is carried out in such a way that the resulting continuous series reflect only price changes and not differences in the composition of the old and new baskets.

The current (14th Series) CPI reflects expenditure patterns derived mainly from the 1998–99 Household Expenditure Survey (HES) and has a reference base of 1989–90. It was introduced in the September quarter 2000.

In addition to revising weights to reflect new expenditure patterns, the 14th Series CPI introduced a new utility-based commodity classification to better address possible consumer substitution between commodities in response to relative price changes arising from The New Tax System.

### **Weighting pattern**

The composition of the CPI basket is based on the pattern of household expenditure in the 'weighting base period', which is 1998–99 for the 14th Series CPI. Measures of expenditure are obtained primarily from the ABS HES. The HES data, modified for known instances of under-reporting (the most notable being for alcohol and tobacco), are then used to derive a weight for each of the 89 expenditure classes. The weights for the 14th Series groups and subgroups based on June quarter 2000 prices are shown in table 28.1.

### 28.1 CONSUMER PRICE INDEX, Weighted average of capital cities(a)(b) — 14th Series

Groups and subgroups	Weight in CPI basket
<b>Food</b>	
Dairy and related products	1.51
Bread and cereal products	2.20
Meat and seafoods	2.62
Fruit and vegetables	2.30
Non-alcoholic drinks and snack food	2.48
Meals out and take away foods	4.93
Other food	1.69
<i>Total</i>	17.72
<b>Alcohol and tobacco</b>	
Alcoholic drinks	5.14
Tobacco	2.27
<i>Total</i>	7.41
<b>Clothing and footwear</b>	
Men's clothing	0.98
Women's clothing	1.80
Children's and infants' clothing	0.47
Footwear	0.83
Clothing accessories, supplies and services	1.10
<i>Total</i>	5.19
<b>Housing</b>	
Rents	5.60
Utilities	3.23
Other housing	10.91
<i>Total</i>	19.75
<b>Household furnishings, supplies and services</b>	
Furniture and furnishings	3.58
Household appliances, utensils and tools	1.98
Household supplies	1.91
Household services	0.62
<i>Total</i>	8.09
<b>Health</b>	
Health services	3.55
Pharmaceuticals	1.14
<i>Total</i>	4.69
<b>Transportation</b>	
Private motoring	14.40
Urban transport fares	0.85
<i>Total</i>	15.25
<b>Communication</b>	
Communication	2.88
<i>Total</i>	2.88
<b>Recreation</b>	
Audio, visual and computing	2.70
Books, newspapers and magazines	1.08
Sport and other recreation	4.16
Holiday travel and accommodation	4.35
<i>Total</i>	12.29
<b>Education</b>	
Education	2.69
<i>Total</i>	2.69
<b>Miscellaneous</b>	
Insurance services	1.46
Personal care	2.14
Childcare	0.44
<i>Total</i>	4.04
<b>All groups</b>	<b>100.00</b>

(a) Percentages may not add due to rounding. (b) Weights shown are those applicable from the June quarter 2000 onwards.

Source: *A Guide to the Consumer Price Index: 14th Series* (6440.0).

## Price collection

Since the CPI is designed to measure the impact of changing prices on metropolitan private households, information about prices is collected in the kinds of retail outlets or other places where these households normally purchase goods and services. Prices are collected from many sources, including supermarkets, department stores, footwear stores, restaurants, motor vehicle dealers and service stations, dental surgeries, hotels and clubs, schools, hairdressers, telephone carriers, travel agents and airlines, bus operators, electricians and plumbers. Items like rail fares, electricity, gas and water and sewerage charges, and property rates and charges, are collected from the authorities concerned. Information on rents is obtained from property management companies and from government housing commissions. In total, around 100,000 separate price quotations are collected each quarter.

The collection of prices in each capital city is carried out by trained ABS field staff.

The prices used in the CPI are those that any member of the public would have to pay to purchase the specified good or service, including any taxes, excise and customs duties, etc. relating to goods and services. Sale prices, discount prices and 'specials' are reflected in the CPI so long as the items concerned are of normal quality (i.e. not damaged or shop-soiled), and are offered for sale in reasonable quantities. To ensure that the price movements reflect the buying experience of the bulk of the metropolitan population, the brands and the varieties of the items priced are generally those which sell in greatest volume.

## Price movements by city

Table 28.2 presents All groups index numbers for each of the eight capital cities and for the weighted average of the eight capital cities, together with percentage changes.

The capital city indexes measure price movements over time in each city individually. They do not measure differences in price levels between cities. For example, the index for Adelaide in 2001–02 of 137.2, compared with the corresponding index for Perth of 133.1, does not mean that prices in Adelaide are higher than those in Perth. It simply means that, since the reference base period (1989–90), prices in Adelaide have increased by a greater percentage than those in Perth (37.2% compared with 33.1%).

## Price movements by broad commodity group

Table 28.3 presents, for the weighted average of the eight capital cities, index numbers for each of the 11 major commodity groups of the 14th Series CPI and for All groups, together with percentage changes.

### 28.2 CONSUMER PRICE INDEX, All groups index numbers(a)(b)

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	Weighted average of eight capital cities
INDEX NUMBER(c)									
1996-97	120.4	119.9	121.0	122.3	118.3	121.4	121.6	121.2	120.3
1997-98	120.5	119.8	121.6	121.6	118.0	121.3	121.3	120.4	120.3
1998-99	122.5	120.9	122.9	123.2	120.1	122.5	122.4	121.5	121.8
1999-2000	125.4	124.1	125.0	126.3	122.9	124.8	124.2	124.2	124.7
2000-01(d)	133.2	131.6	132.4	133.5	129.6	132.0	130.9	131.9	132.2
2001-02	137.2	135.3	136.3	137.2	133.1	134.7	133.7	135.2	136.0
CHANGE FROM PREVIOUS YEAR (%)									
1996-97	1.4	1.3	1.6	0.9	1.4	1.5	1.8	0.7	1.3
1997-98	0.1	-0.1	0.5	-0.6	-0.3	-0.1	-0.2	-0.7	—
1998-99	1.7	0.9	1.1	1.3	1.8	1.0	0.9	0.9	1.2
1999-2000	2.4	2.6	1.7	2.5	2.3	1.9	1.5	2.2	2.4
2000-01(d)	6.2	6.0	5.9	5.7	5.5	5.8	5.4	6.2	6.0
2001-02	3.0	2.8	2.9	2.8	2.7	2.0	2.1	2.5	2.9

(a) Reference base year 1989-90 = 100.0. (b) The separate city indexes measure price movements within each city individually. They do not compare price levels between cities. (c) Index numbers for financial years are calculated as the simple arithmetic averages of the quarterly index numbers. (d) The 2000-01 data were affected by the introduction of The New Tax System, in particular, the introduction of the Goods and Services Tax (GST) from 1 July 2000.

Source: Consumer Price Index, Australia (6401.0).

### 28.3 CONSUMER PRICE INDEX, Group index numbers — Weighted average of capital cities(a)(b)

	Food	Alcohol and tobacco	Clothing and footwear	Housing	Household furnishings, supplies and services	Health	Transportation	Communication	Recreation	Education	Miscellaneous	All groups
INDEX NUMBER(c)												
1996-97	119.7	161.4	107.3	101.6	113.5	159.7	124.3	106.5	115.0	156.0	133.4	120.3
1997-98	121.8	164.6	107.4	94.5	113.8	165.4	123.5	106.6	117.8	165.6	138.5	120.3
1998-99	126.5	168.7	106.7	95.8	113.7	163.4	122.1	102.9	119.4	174.1	143.5	121.8
1999-2000	129.2	175.2	105.5	99.9	113.3	158.7	128.9	97.8	120.4	182.4	153.2	124.7
2000-01(d)	135.6	194.7	112.5	107.9	117.3	164.3	137.0	104.7	124.6	191.4	166.0	132.2
2001-02	142.7	203.1	112.4	111.1	119.7	169.9	137.3	105.2	128.6	200.0	171.8	136.0
CHANGE FROM PREVIOUS YEAR (%)												
1996-97	3.2	3.4	0.3	-4.1	1.6	6.3	1.4	-0.7	0.7	6.1	4.2	1.3
1997-98	1.8	2.0	0.1	-7.0	0.3	3.6	-0.6	0.1	2.4	6.2	3.8	—
1998-99	3.9	2.5	-0.7	1.4	-0.1	-1.2	-1.1	-3.5	1.4	5.1	3.6	1.2
1999-2000	2.1	3.9	-1.1	4.3	-0.4	-2.9	5.6	-5.0	0.8	4.8	6.8	2.4
2000-01(d)	5.0	11.1	6.6	8.0	3.5	3.5	6.3	7.1	3.5	4.9	8.4	6.0
2001-02	5.2	4.3	-0.1	3.0	2.0	3.4	0.2	0.5	3.2	4.5	3.5	2.9

(a) Groups based on 14th Series CPI structure. (b) Reference base year 1989-90 = 100.0. (c) Index numbers for financial years are calculated as the simple arithmetic averages of the quarterly index numbers. (d) The 2000-01 data were affected by the introduction of The New Tax System, in particular, the introduction of the Goods and Services Tax (GST) from 1 July 2000.

Source: Consumer Price Index, Australia (6401.0).

## Long-term price series

Although the CPI has only been compiled from 1948, an approximate long-term measure of retail price change has been constructed by linking together other selected retail price index series (see table 28.4). The index numbers are expressed on a reference base 1945 = 100.0. The successive series are:

- from 1850 to 1901, Sydney retail price index
- from 1901 to 1914, the A series index

- from 1914 to 1946–47, the C series index
- from 1946–47 to 1948–49, a combination of the C series index (excluding rent) and the housing group of the CPI
- from 1948–49 onwards, the CPI.

For more information about these series see *Year Book Australia 1995*.

### 28.4 RETAIL PRICE INDEX NUMBERS(a)(b)

Year	Index no.	Year	Index no.	Year	Index no.	Year	Index no.	Year	Index no.	Year	Index no.
1850	53	1876	51	1902	50	1928	89	1954	206	1980	844
1851	56	1877	53	1903	49	1929	91	1955	211	1981	926
1852	56	1878	51	1904	46	1930	87	1956	224	1982	1 028
1853	69	1879	45	1905	48	1931	78	1957	229	1983	1 132
1854	89	1880	45	1906	48	1932	74	1958	233	1984	1 177
1855	103	1881	46	1907	48	1933	71	1959	237	1985	1 257
1856	78	1882	56	1908	51	1934	73	1960	245	1986	1 370
1857	82	1883	55	1909	51	1935	74	1961	252	1987	1 487
1858	86	1884	52	1910	52	1936	75	1962	251	1988	1 594
1859	73	1885	53	1911	53	1937	78	1963	252	1989	1 714
1860	72	1886	56	1912	59	1938	80	1964	258	1990	1 839
1861	71	1887	52	1913	59	1939	82	1965	268	1991	1 898
1862	65	1888	52	1914	61	1940	85	1966	276	1992	1 917
1863	58	1889	51	1915	70	1941	89	1967	286	1993	1 952
1864	60	1890	51	1916	71	1942	97	1968	293	1994	1 989
1865	64	1891	50	1917	75	1943	101	1969	302	1995	2 082
1866	60	1892	49	1918	80	1944	100	1970	313	1996	2 136
1867	50	1893	48	1919	91	1945	100	1971	332	1997	2 141
1868	54	1894	42	1920	103	1946	102	1972	352	1998	2 159
1869	46	1895	42	1921	90	1947	106	1973	385	1999	2 191
1870	48	1896	42	1922	87	1948	117	1974	443	2000	2 289
1871	47	1897	42	1923	89	1949	128	1975	510	2001	2 389
1872	43	1898	41	1924	88	1950	140	1976	579		
1873	47	1899	45	1925	88	1951	167	1977	650		
1874	52	1900	43	1926	90	1952	196	1978	702		
1875	53	1901	47	1927	89	1953	205	1979	766		

(a) Reference base year 1945 = 100.0. (b) The index numbers relate to Sydney from 1850 to 1900; from 1901 to 1980 they relate to the weighted average of six state capital cities; and from 1981 to the weighted average of eight capital cities. Index numbers are for calendar years.

Source: ABS data available on request, Consumer Price Index.

## International comparisons

In analysing price movements in Australia, an important consideration is Australia's performance relative to other countries. However, due to the many differences in the structure of the housing sector in different countries and in the way that housing is treated in their CPIs, a simple comparison of All groups (or headline) CPIs is often inappropriate. In order to provide a better basis for international comparisons, the Fourteenth International

Conference of Labour Statisticians adopted a resolution which called for countries to 'provide for dissemination at the international level of an index which excludes shelter, in addition to the all items index'.

Table 28.5 presents indexes for selected countries on a basis consistent with the resolution and broadly comparable with the Australian series 'All groups excluding Housing'.

**28.5 CONSUMER PRICE INDEX, International comparisons(a)(b)**

	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
INDEX NUMBER							
<b>Australia(c)</b>	<b>121.1</b>	<b>123.9</b>	<b>125.4</b>	<b>126.9</b>	<b>129.4</b>	<b>136.4</b>	<b>140.4</b>
New Zealand	111.9	113.7	114.9	116.9	118.7	123.5	127.0
Hong Kong (SAR of China)	160.3	167.6	173.9	172.0	166.6	164.8	162.5
Indonesia	163.7	174.1	232.7	368.3	367.1	402.6	458.3
Japan	107.3	108.2	112.4	112.4	111.6	111.0	107.7
Republic of Korea	144.4	151.3	162.1	169.0	172.1	179.2	185.0
Singapore	116.0	118.1	119.4	118.5	120.7	123.0	122.7
Taiwan	122.5	125.7	127.2	128.2	129.3	130.9	130.6
Canada	116.0	118.8	120.6	122.0	125.0	128.1	130.3
United States of America	120.9	124.3	125.8	127.2	130.9	135.3	136.4
Germany	117.0	118.2	120.3	120.7	121.8	124.2	126.6
United Kingdom	128.3	131.5	134.6	137.2	139.3	141.4	143.5
CHANGE SINCE PREVIOUS YEAR (%)							
<b>Australia(c)</b>	<b>3.9</b>	<b>2.3</b>	<b>1.2</b>	<b>1.2</b>	<b>2.0</b>	<b>5.4</b>	<b>2.9</b>
New Zealand	1.3	1.6	1.1	1.7	1.5	4.0	2.8
Hong Kong (SAR of China)	5.9	4.6	3.8	-1.1	-3.1	-1.1	-1.4
Indonesia	8.9	6.4	33.7	58.3	-0.3	9.7	13.8
Japan	-0.5	0.8	3.9	—	-0.7	-0.5	-3.0
Republic of Korea	4.6	4.8	7.1	4.3	1.8	4.1	3.2
Singapore	1.3	1.8	1.2	-0.8	1.9	1.9	-0.2
Taiwan	2.9	2.6	1.2	0.8	0.9	1.2	-0.2
Canada	2.3	2.4	1.5	1.2	2.5	2.5	1.7
United States of America	2.5	2.8	1.2	1.1	2.9	3.4	0.8
Germany	1.0	1.0	1.8	0.3	0.9	2.0	1.9
United Kingdom	2.8	2.5	2.4	1.9	1.5	1.5	1.5

(a) Reference base year 1989-90 = 100.0. (b) All groups excluding housing. (c) The 2000-01 data for Australia were affected by the introduction of The New Tax System, in particular, the introduction of the Goods and Services Tax (GST) from 1 July 2000.

Source: *Consumer Price Index, Australia (6401.0)*.

## Producer price indexes

The producer price indexes measure changes in prices received, or paid, by producers of commodities and providers of services. In Australia they generally relate to prices for goods and services as they affect businesses, for example, the price of goods used as input to or output from the manufacturing sector, the price of materials used as input to the building industry and, more recently, the price of services provided by the property and business services, and transport (freight) and storage industries. This contrasts with the CPI which measures changes in the retail prices paid by consumers, as explained earlier in this chapter.

## Long-term price series

Table 28.6 presents a set of producer price indexes for the years 1861 to 2001–02. The indexes comprise the linked wholesale price indexes from 1861 to 1967–68, the producer price index for manufacturing outputs from 1968–69 to 1999–2000, and the final stage of production index for all commodities in 2000–01 and 2001–02.

The first price index of this kind, compiled by the Commonwealth Bureau of Census and Statistics, was the Melbourne wholesale price index, which was introduced in 1912 with index numbers compiled back to 1861 using prices extracted from newspapers and trade publications. Index numbers were compiled up to 1961. The index related chiefly to basic materials and foods weighted in accordance with consumption in about the year 1910.

The next index published was the wholesale price (basic materials and foodstuffs) index which was introduced in 1939; index numbers are available for the period 1928 to 1970. The index related to commodities in their basic or primary form, and prices were obtained as near as possible to the point where they made their first effective impact on the local price structure. With few exceptions, prices were obtained from Melbourne sources.

The present range of producer price indexes was developed and produced progressively from the 1960s. Until recently, the range of indexes was restricted to the measurement of prices for goods used in or purchased by the building industry, manufacturing industry, and (not included in this chapter) the mining industry, as well as outputs of the manufacturing industry.

As part of a long-term program, the ABS is expanding the coverage of the producer price indexes to include the measurement of price changes for the output of the service industries and the construction industry (see the section *Services output price indexes*). In parallel with this expansion in coverage, an economy wide 'stage of production' framework has been implemented for the producer price indexes, to supplement the current industry sector approach (see the section *Stage of production producer price indexes*). The stage of production final commodities index is now the headline producer price index.

### 28.6 PRODUCER AND WHOLESALE PRICE INDEXES(a)

	Index no.
Melbourne wholesale price index (All groups)	
1861	24.2
1871	19.3
1881	17.6
1891	14.9
1901	15.3
1911	15.7
1921	30.0
1925–26	29.7
Wholesale price (basic materials and foodstuffs) index (All groups)	
1930–31	25.4
1935–36	23.9
1940–41	29.3
1945–46	36.5
1950–51	62.7
1955–56	85.9
1960–61	92.5
1961–62	86.4
1962–63	87.4
1963–64	90.0
1964–65	91.3
1965–66	95.4
1966–67	98.4
1967–68	99.7
Price index of articles produced by manufacturing industry	
1968–69	100.0
1969–70	103.9
1970–71	108.5
1971–72	113.9
1972–73	120.7
1973–74	134.6
1974–75	158.1
1975–76	177.8
1976–77	196.9
1977–78	213.8

For footnotes see end of table.

...continued

## 28.6 PRODUCER AND WHOLESALE PRICE INDEXES(a) — *continued*

	Index no.
Price index of articles produced by manufacturing industry — <i>continued</i>	
1978–79	237.4
1979–80	274.9
1980–81	305.2
1981–82	328.9
1982–83	360.2
1983–84	382.8
1984–85	404.8
1985–86	430.3
1986–87	458.5
1987–88	492.1
1988–89	526.0
1989–90	559.9
1990–91	584.6
1991–92	586.7
1992–93	600.9
1993–94	607.3
1994–95	620.9
1995–96	636.7
1996–97	639.9
1997–98	648.3
1998–99	646.7
1999–2000	674.5
Stage of production — final	
2000–01	703.4
2001–02	715.4

(a) Reference base year 1968–69 = 100.0.

Source: *Labour Report; Price Indexes of Articles Produced by Manufacturing Industry, Australia (6412.0); Producer Price Indexes, Australia (6427.0)*.

### Stage of production producer price indexes

These indexes are compiled using the stage of production concept. Under this concept, flows of commodities are categorised according to their economic destination on a sequential basis along the production chain. The basis for the categorisation is the 1994–95 Australian input-output tables. The primary categorisation is between final commodities (i.e. commodities destined for final consumption, capital formation or export) and non-final commodities (i.e. commodities that flow into intermediate consumption for further processing).

This initial breakdown of the commodity flows into final and non-final represents a useful economic dissection of producers' transactions. However, the non-final commodities can flow into the production of both final and other non-final commodities. Therefore, to aid analysis, the non-final commodity flows have been divided on a sequential basis between stage 1 (or

preliminary) commodities and stage 2 (or intermediate) commodities. This approach results in three separate stages of production.

In order to avoid multiple counting of transactions, the three stages are not aggregated.

Under this framework, preliminary (stage 1) commodities are used in the production of intermediate (stage 2) commodities which, in turn, flow into the production of final (stage 3) commodities.

The framework allows for analyses of price change as commodities flow through production processes. Price changes for earlier stages of production may be indicators of possible future price changes for later stages.

### Market transactions approach

The ABS has adopted a market transactions approach in disaggregating commodity supply into the various production stages. Under this approach, the individual transactions in a given commodity are assigned to the relevant stage, based on identification of the market(s) in which that commodity is transacted, which in turn is determined by the usage pattern of that commodity. A particular 'commodity', within the index classification system, can be assigned to more than one stage of production, on the basis of its usage pattern as identified in the input-output tables.

### Index coverage

In concept, the scope of the stage of production indexes is economy-wide, relating to the output of *all* the goods and services industries. However, there are limits on the availability of price indexes for service industries, and coverage is currently restricted to the output of the Transport (freight) and storage, and Property and business services sectors. Similarly, coverage of the Construction sector is confined to indexes for the output of the following industries: House construction, Residential building construction n.e.c., Non-residential building construction, and Road and bridge construction. Coverage of the stage of production index will be progressively extended as additional service and construction industry collections are established. Table 28.7 shows stage of production producer price indexes from 1998–99 to 2001–02.

**28.7 STAGE OF PRODUCTION PRODUCER PRICE INDEXES, By stage and source**

	Preliminary			Intermediate			Final (excluding exports)		
	Domestic	Imports	Total	Domestic	Imports	Total	Domestic	Imports	Total
1998–99	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1999–2000	104.1	107.1	104.5	103.4	104.4	103.6	104.3	95.7	102.6
2000–01	110.3	126.1	112.4	108.9	119.7	110.3	107.7	104.0	107.0
2001–02	111.8	120.3	112.9	111.3	115.9	111.9	110.0	103.7	108.8

Source: *Producer Price Indexes, Australia* (6427.0).

## Manufacturing price indexes

### Price indexes of articles produced by manufacturing industries

These indexes measure movements in the prices of articles produced by establishments classified to the Manufacturing Division of the Australian and New Zealand Standard Industrial Classification (ANZSIC), 1993 edition.

The indexes are constructed on a net sector basis. This approach means that the all manufacturing industry index represents price movements of goods which are produced by establishments in the Manufacturing Division, for sale or transfer to establishments outside the Manufacturing Division, for export, or for use as capital equipment. Articles which are sold or transferred to other establishments within the manufacturing industry, for further processing or for use as inputs, are excluded.

The composition and weighting pattern of these indexes are based on the value of production in 1993–94 and have a reference base of 1989–90 = 100.0.

The indexes were first published in June 1976 on a reference base of 1968–69 = 100.0, with indexes compiled retrospectively to July 1968. The composition and weighting patterns of the indexes were based on the value of production in 1971–72.

Table 28.8 sets out a summary index for articles produced. More detailed index numbers are contained in table 19.22 of *Chapter 19, Manufacturing*.

### 28.8 PRICE INDEXES OF ARTICLES PRODUCED BY MANUFACTURING INDUSTRIES(a)(b)

	Manufacturing Division index
1993–94	108.5
1994–95	110.9
1995–96	113.7
1996–97	114.3
1997–98	115.9
1998–99	115.6
1999–2000	120.6
2000–01	128.5
2001–02	128.8

(a) Reference base year 1989–90 = 100.0. (b) For a full description of Division C, Manufacturing and the subdivisions within the Manufacturing Division, see the 'Australian and New Zealand Standard Industrial Classification (ANZSIC), 1993' (1292.0).

Source: *Producer Price Indexes, Australia* (6427.0).

### Price indexes of materials used in manufacturing industries

These indexes measure changes in prices of materials used by establishments classified to the Manufacturing Division of ANZSIC, 1993 edition.

Indexes are published for materials used in the manufacturing industry as a whole (split into imported and domestic materials) and for each of 17 separate manufacturing sectors (defined in terms of ANZSIC subdivisions or ANZSIC groups). Indexes are also published for materials sourced domestically and those that are imported.

The indexes are compiled and published on a net sector basis. That is, each index includes only those materials which are used in the defined sector of Australian manufacturing industry and which have been produced by establishments outside that sector.

The current index series were introduced in July 1996 on a reference base of 1989–90 = 100.0. The items included in the indexes were allocated weights in accordance with the estimated value of manufacturing usage in 1989–90.

The indexes were first compiled on a reference base of 1968–69 = 100.0, using a weighting pattern derived from estimated manufacturing usage in 1971–72. Index numbers for this first series are available for the period July 1968 to November 1985.

A rebased series was introduced in December 1985 on a reference base of 1984–85 = 100.0 using a weighting pattern based on estimated manufacturing usage in 1977–78.

Table 28.9 shows summary indexes for materials used. More detailed index numbers are contained in table 19.21 of *Chapter 19, Manufacturing*.

### 28.9 PRICE INDEXES OF MATERIALS USED IN MANUFACTURING INDUSTRIES(a)

	Imported materials	Domestic materials	All materials
1993–94	108.8	102.5	104.7
1994–95	112.7	104.9	107.6
1995–96	117.6	106.0	110.1
1996–97	109.4	104.2	106.0
1997–98	112.2	104.1	107.0
1998–99	113.5	101.5	105.9
1999–2000	118.8	114.5	115.8
2000–01	134.0	131.9	132.4
2001–02	130.3	134.1	132.4

(a) Reference base year 1989–90 = 100.0.

Source: *Producer Price Indexes, Australia (6427.0)*.

## Construction price indexes

### Price indexes of the output of the building industry

The price index of the output of the building industry (table 28.10) measures changes in the prices of the output of ANZSIC Group 411 — Building construction. This includes house construction (measured with the CPI project home series, excluding state and Commonwealth home buyers schemes), other residential building construction and non-residential building construction. This index is used for the following purposes:

- as an important input into the national accounts, that is, by providing a deflator for current price expenditure on building construction to calculate chain volume estimates

- as an input into broader measures of price change, such as the economy-wide stage of production indexes
- to aid industry analysis.

### 28.10 PRICE INDEX OF THE OUTPUT OF THE BUILDING INDUSTRY

1997–98	97.0
1998–99	100.0
1999–2000	104.9
2000–01	106.5
2001–02	108.5

(a) Reference base year 1998–99 = 100.0.

Source: *Producer Price Indexes, Australia (6427.0)*.

The ABS is in the process of extending the scope of the producer price indexes into the output of ANZSIC Group 412 — Non-building construction, to complete the coverage of ANZSIC Subdivision 41 — General construction. Indexes for additional construction industries will be released in *Producer Price Indexes, Australia (6427.0)* as they are developed.

### Price indexes of materials used in house building

The price index of materials used in house building measures changes in prices of selected materials used in the construction of houses in the Statistical Division containing each state capital city.

The current index series were introduced in December 1995 on a reference base of 1989–90 = 100.0 and were linked to previous series. The items and weights for the current series are based on estimated materials usage in a sample of representative houses constructed in the three years ending 1992–93.

The index was first compiled on a reference base of 1966–67 = 100.0, using a weighting pattern derived from estimated materials usage in 1968–69.

A rebased series of indexes, linked to the previous series, were introduced in October 1986 on a reference base of 1985–86 = 100.0. The items in the rebased series were selected and allocated weights on the basis of the estimated values of each material used in a sample of representative houses constructed in 1985–86.

Table 28.11 shows price index series from 1993–94 to 2001–02, for the weighted average of the six state capital cities and for the individual cities. The movements in the index are discussed in *Chapter 20, Construction*.

### Price indexes of materials used in building other than house building

The price index of materials used in building other than house building measures changes in prices of selected materials used in the construction of buildings other than houses in the Statistical Division containing each state capital city. The types of building directly represented in the index are: flats and other dwellings; hotels, motels and hostels; shops; factories; offices; other business premises; education buildings; health buildings; and other non-residential buildings.

The current index series were introduced in October 1993 on a reference base of 1989–90 = 100.0. The composition of these indexes reflects the usage of materials in the five years ending June 1992.

The index was first compiled on a reference base of 1966–67 = 100.0 using a weighting pattern derived from estimated materials usage in 1966–67. Rebased indexes for the six state capital cities were introduced in February 1981 on a reference base of 1979–80 = 100.0. The composition of these indexes reflected the usage of materials in the three years ending June 1977.

Table 28.12 shows price index series from 1993–94 to 2001–02 for the weighted average of the six state capital cities and for the individual cities. The movements in the index are discussed in *Chapter 20, Construction*.

More detailed information in respect of individual building materials is contained in table 20.20 of that chapter.

#### 28.11 PRICE INDEXES OF MATERIALS USED IN HOUSE BUILDING, Six state capital cities(a)(b)

	Weighted average of six state capital cities	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart
1993–94	112.0	111.3	112.1	113.5	117.1	109.1	112.8
1994–95	115.4	115.0	115.9	115.9	118.8	112.7	117.3
1995–96	115.7	115.9	115.4	115.1	118.2	114.8	120.7
1996–97	116.1	116.3	115.3	115.3	120.6	115.3	120.1
1997–98	118.2	119.7	117.1	117.1	123.3	115.9	121.0
1998–99	119.5	121.6	118.0	118.2	125.0	116.1	122.2
1999–2000	122.8	126.8	121.7	120.8	127.2	117.7	123.8
2000–01	124.4	130.0	123.1	120.6	129.6	118.8	126.0
2001–02	126.0	132.0	125.0	122.0	130.6	119.4	128.4

(a) Reference base year 1989–90 = 100.0. (b) The separate city indexes measure price movement within each city individually. They do not compare price levels between cities.

Source: *Producer Price Indexes, Australia (6427.0)*.

#### 28.12 PRICE INDEXES OF MATERIALS USED IN BUILDING OTHER THAN HOUSE BUILDING(a)(b)

	Weighted average of six state capital cities	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart
1993–94	107.5	107.0	106.7	110.1	107.9	107.1	110.1
1994–95	110.4	110.3	108.9	112.9	110.9	110.1	112.2
1995–96	112.7	112.6	111.1	115.0	112.7	113.2	115.1
1996–97	113.2	113.1	110.9	115.9	114.1	114.6	116.3
1997–98	114.2	114.4	111.4	117.2	115.1	114.6	117.4
1998–99	115.2	115.2	113.2	118.4	115.5	114.1	118.5
1999–2000	116.1	116.0	114.4	119.3	116.1	115.4	119.0
2000–01	116.4	116.1	115.4	119.1	116.8	115.6	119.3
2001–02	118.6	118.2	117.8	120.8	118.8	117.7	121.3

(a) Reference base year 1989–90 = 100.0. (b) The separate city indexes measure price movements within each city individually. They do not compare price levels between cities.

Source: *Producer Price Indexes, Australia (6427.0)*.

## Services output price indexes

In recognition of the increasing contribution of service industries to the Australian economy, the ABS has been undertaking a program to progressively extend the scope of the producer price indexes into the service sectors of the economy. This program is an important part of a broader ABS plan to provide a range of statistics that will improve the measurement of service industries in the Australian economy. Similar initiatives are also being undertaken by statistical agencies in several other countries.

Since April 2000, the ABS has been publishing quarterly producer price indexes for the output of the Transport (freight) and Storage Division, and the Property and Business Services Division of ANZSIC. The Transport (freight) and Storage Division index contains important freight transport industries such as road, rail, sea and air. The Property and Business Services Division index contains services such as real estate agents and the hire and lease of machinery and equipment, and a diverse range of business services including surveying, computer services, accounting services, market research and cleaning services. The index numbers are calculated on the reference base

1998–99 = 100.0. As of the June quarter 2002 the index weighting patterns have been updated to reflect the 1996–97 input-output domestic production tables. From the June quarter 2001 these have been released in the publication *Producer Price Indexes, Australia* (6427.0).

Indexes for additional service industries will be released in that publication as they are developed.

The services price indexes aim to:

- assist in improving the quality of the national accounts by providing a wider range of deflators for deriving real measures of economic growth
- contribute to the development of new measures of inflation by expanding the coverage of the indexes compiled under the economy-wide stage of production price indexes (see the section *Stage of production producer price indexes*)
- be of use in their own right for industry analysis.

Tables 28.13 and 28.14 provide broad level, summary index series.

**28.13 PRODUCER PRICE INDEXES FOR SELECTED SERVICE INDUSTRIES, Transport (freight) and storage(a)**

	Transport (freight) and storage division	Road transport	Rail transport	Water transport	Air and space transport	Other transport	Services to transport	Storage
1996–97	n.a.	n.a.	109.8	n.a.	n.a.	n.a.	n.a.	95.9
1997–98	n.a.	98.8	105.1	n.a.	n.a.	n.a.	n.a.	99.4
1998–99	100.0	100.0	100.0	100.0	100.0	n.a.	100.0	100.0
1999–2000	100.2	101.0	94.4	103.8	99.1	n.a.	97.2	100.9
2000–01	102.3	103.1	95.3	109.8	102.7	101.8	97.2	102.1
2001–02	103.2	105.0	94.9	109.4	103.5	102.9	97.0	102.2

(a) Reference base year 1998–99 = 100.0.

Source: *Producer Price Indexes, Australia* (6427.0).

**28.14 PRODUCER PRICE INDEXES FOR SELECTED SERVICE INDUSTRIES, Property and business services(a)**

	Property and business services	Property services	Business services
1998–99	100.0	100.0	100.0
1999–2000	103.6	103.2	103.8
2000–01	107.5	108.7	106.9
2001–02	110.6	111.5	110.1

(a) Reference base year 1998–99 = 100.0.

Source: *Producer Price Indexes, Australia* (6427.0).

## International trade price indexes

### Import price index

The import price index measures changes in the prices of imports of merchandise landed in Australia using free-on-board prices in the country of origin. The index numbers for each quarter relate to prices of imports landed in Australia during the period.

The first import price index produced by the ABS covered the period from the September quarter 1981 to the June quarter 1991 on a reference base of 1981–82 = 100.0. This index replaced an index previously published by the Reserve Bank of Australia on a reference base of 1966–67 = 100.0. The Reserve Bank's import price index was published from 1928 until September 1982.

A new import price index series was introduced in December 1991 with monthly index numbers compiled from April 1991 until June 1997 when the index moved back to a quarterly cycle. The current index has a reference base of 1989–90 = 100.0 and was reviewed and reweighted in September quarter 2000 using 2000–01 international trade data. The plan is to update the index weights each year using the latest trade data.

To give a broad indication of changes over the whole of the last century, table 28.15 draws on the available international trade indexes. Import price index numbers based on the Standard International Trade Classification Revision 3 (SITC Rev. 3) are contained in table 30.34 of *Chapter 30, International accounts and trade*.

### Export price index

The export price index measures changes in prices of exports of merchandise from Australia. The index numbers for each period relate to prices of exports actually shipped during the period.

The first index of export prices was compiled annually from 1901 to 1916–17 as a current-weighted unit value index.

The method of calculation was changed in 1918 to incorporate fixed weights, applied to the average unit values of each export in successive years. This index was published for the years 1897 to 1929–30.

Two new series of monthly export price indexes were published in 1937, compiled back to 1928. One index used fixed weights and the other used changing weights. The methodology was changed and actual export prices were used instead of unit values. The indexes were compiled until 1962.

In 1962 a fixed weighted index on the reference base of 1959–60 = 100.0 was introduced. In July 1969 a new interim series was linked to this index, still with a reference base of 1959–60 = 100.0, but with updated weights. The interim index was replaced in 1979 by an index on a reference base of 1974–75. The current index, which was changed from a monthly to a quarterly basis after June 1997, has a reference base of 1989–90 = 100.0. It was reviewed and reweighted in September quarter 2001 using 1999–2000 and 2000–01 international trade data. The plan is to update the index weights each year using the latest trade data for the previous two years.

Index numbers based on the Standard International Trade Classification Revision 3 (SITC Rev. 3) are contained in table 30.33 of *Chapter 30, International accounts and trade*. The export price index for all groups is provided for the whole of the last century in table 28.15.

## 28.15 INTERNATIONAL TRADE PRICE INDEXES(a)

	Import price index (All groups)	Export price index (All groups)
1901	..	15
1911	..	17
1921-22	..	25
1931-32	22	18
1936-37	21	29
1941-42	35	27
1946-47	51	53
1951-52	92	123
1956-57	91	115
1960-61	95	93
1961-62	94	94
1962-63	94	99
1963-64	96	112
1964-65	97	103
1965-66	99	105
1966-67	100	103
1967-68	99	98
1968-69	100	100
1969-70	103	101
1970-71	108	99
1971-72	114	102
1972-73	113	131
1973-74	131	157
1974-75	189	177
1975-76	214	193
1976-77	246	216
1977-78	278	227
1978-79	307	256
1979-80	403	309
1980-81	450	328

For footnotes see end of table.

...continued

## 28.15 INTERNATIONAL TRADE PRICE INDEXES(a) — continued

	Import price index (All groups)	Export price index (All groups)
1981-82	458	332
1982-83	506	360
1983-84	524	369
1984-85	580	396
1985-86	659	417
1986-87	731	430
1987-88	742	469
1988-89	694	501
1989-90	729	527
1990-91	752	501
1991-92	749	472
1992-93	817	493
1993-94	843	484
1994-95	837	501
1995-96	838	508
1996-97	791	488
1997-98	841	522
1998-99	874	505
1999-2000	876	517
2000-01	979	606
2001-02	964	615

(a) Reference base year 1968-69 = 100.0.

Source: The sources used for the import price index are the 'Reserve Bank of Australia Bulletin' up to and including 1981-82, and 'Import Price Index, Australia' (6414.0) to 1999-2000. The source used for the export price index to 1999-2000 is 'Export Price Index, Australia' (6405.0). From 2000-01 the source used for both import and export price indexes is 'International Trade Price Indexes, Australia' (6457.0).

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## Introduction

A wide range of economic data is available to analyse the performance of various components of the Australian economy over time. For example, data are regularly published on the number of houses being built, the number of cars produced, whether employment is rising or falling, the composition of exports and imports and so on. While these and other statistical series are important in their own right, none of them in isolation can provide an overall picture of the state of the economy.

National accounts are designed to provide a systematic summary of national economic activity, and have been developed to assist in the practical application of economic theory. The system of national accounts includes national income, expenditure and product accounts, financial accounts, the national balance sheet and input-output tables. At their summary level, the national income, expenditure and product accounts reflect key economic flows: production, the distribution of incomes, consumption, saving and investment. At their more detailed level, they are designed to present a statistical picture of the structure of the economy and the detailed processes that make up domestic production and its distribution. The financial accounts show the financial assets and liabilities of the nation and of each institutional sector, the market for financial instruments and inter-sectoral financial transactions. The balance sheet is a comprehensive statement of produced and non-produced assets, liabilities to the rest of the world and net worth. Input-output tables show which goods and services are produced by each industry and how they are used.

The national accounts include many detailed classifications (e.g. by industry, by purpose, by commodity, by state and territory, and by asset type) relating to major economic aggregates.

The main output from the national accounts is a measure of the overall value of economic production in Australia in a given period, but without any double counting of the goods and services being produced. Many goods and services are bought by businesses for use in their own productive activities (e.g. steel is bought by car manufacturers). If the value of all goods and services produced were simply added together there would be serious duplication because some goods and services would be added in several times at various stages of production. The overall measure of production, excluding double

counting, is called ‘gross domestic product’, which is commonly referred to as GDP. It is formally defined as:

the total market value of goods and services produced in Australia after deducting the cost of goods and services used up (intermediate consumption) in the process of production, but before deducting allowances for the consumption of fixed capital (depreciation).

The performance of the economy is represented in the national accounts by such measures as growth in GDP. While movements in the chain volume measure of GDP (from which the direct effects of price changes have been removed) are an important indicator of economic growth, there is no single measure which can describe all aspects of the wellbeing of a country’s citizens.

There are significant aspects of the quality of life which cannot be reflected in a system of economic accounts, just as there are significant aspects of an individual’s wellbeing which are not measured in the conventional concept (or any other concept) of that individual’s income.

Notwithstanding their limitations, especially in relation to uses for which they were never designed, the national accounts provide important information for a range of purposes. The system of national accounts also provides a framework or structure which can be, and has been, adapted and extended to facilitate the examination of many economic and social policy issues. Examples of the application of such extensions are in the article *Beyond GDP: Towards wider measures of wellbeing* within this chapter, and the article *Accounting for the environment in the national accounts* which follows the chapter.

## Measuring GDP

There are three ways of measuring GDP:

*Income approach* — which measures GDP by summing the incomes accruing from production: compensation of employees (wages and salaries, and employers’ social contributions); gross operating surplus (profits); gross mixed income (income from unincorporated businesses, including a return to the owners of these businesses for their labour); and taxes less subsidies on production and imports.

*Expenditure approach* — which involves summing all final expenditures on goods and services (i.e. those goods and services which are not processed any further), adding on the

contributions of changes in inventories and the value of exports, and deducting the value of imports. Final expenditures consist of final consumption expenditure and gross fixed capital formation. Exports are included in GDP because they are part of Australian production even though they are sold to overseas purchasers. Imports are deducted because, although they are included in final expenditures (e.g. when someone buys an imported video recorder its value is included as part of household final consumption expenditure), they are not part of Australian production.

*Production approach* — which calculates GDP by taking the value of goods and services produced by an industry (its output at basic values, which implicitly includes taxes less subsidies on production) and deducting the cost of goods and services used up by the industry in the productive process (intermediate consumption), which leaves the value added by the industry. GDP is then obtained by summing value added across all industries, and adding taxes less subsidies on products.

While each approach should, conceptually, deliver the same estimate of GDP, if the three measures are compiled independently using different data sources then different estimates of GDP result. However, the Australian national income, expenditure and product estimates have been integrated with annual balanced supply and use tables which are available for 1994–95 to 1999–2000. Integration with balanced supply and use tables ensures that the same estimate of GDP is obtained from the three approaches, and thus annual estimates using the income, expenditure and production approaches are identical for the years for which supply and use tables are available.

Prior to 1994–95, and for the latest financial year, the estimates using each approach are based on independent sources, and there are usually differences between the income, expenditure and production estimates. Nevertheless, for these periods, a single estimate of GDP has been compiled. Table 29.1 shows time series of chain volume measures for GDP, and GDP per capita,

from 1974–75 to 2000–01. (For a discussion of chain volume measures, see the section *Chain volume or 'real' GDP*.)

**29.1 GDP, Chain volume measures(a)**

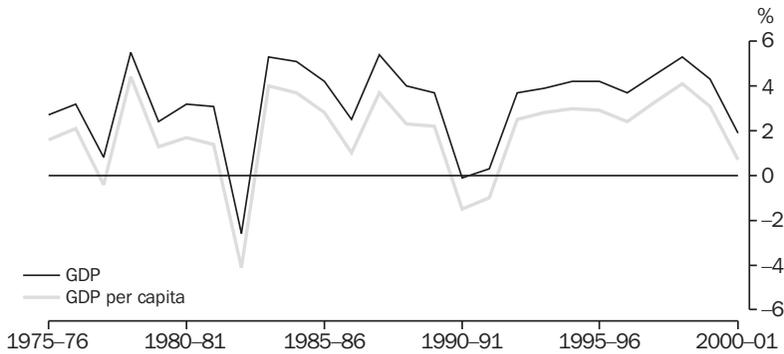
	GDP	GDP
	\$m	per capita \$
1974–75	281 051	20 339
1975–76	288 601	20 665
1976–77	297 869	21 109
1977–78	300 193	21 022
1978–79	316 748	21 941
1979–80	324 484	22 222
1980–81	334 864	22 611
1981–82	345 289	22 935
1982–83	336 256	21 990
1983–84	354 124	22 869
1984–85	372 051	23 725
1985–86	387 722	24 383
1986–87	397 487	24 628
1987–88	418 794	25 538
1988–89	435 725	26 114
1989–90	451 975	26 683
1990–91	451 568	26 289
1991–92	452 773	26 029
1992–93	469 353	26 687
1993–94	487 608	27 446
1994–95	507 945	28 280
1995–96	529 355	29 094
1996–97	548 815	29 795
1997–98	573 244	30 779
1998–99	603 447	32 037
1999–2000	629 212	33 037
2000–01	641 370	33 281

(a) Reference year 1999–2000.

Source: Australian System of National Accounts (5204.0).

The chain volume measure of GDP increased by 1.9% in 2000–01, following an increase of 4.3% in 1999–2000. For some analytical purposes, it is important to allow for the impact of population growth on movements in GDP. Annual growth in GDP per capita has been about one to two percentage points lower than that for GDP since the mid 1970s and was negative in 1977–78, 1982–83, 1990–91 and 1991–92 (graph 29.2). In 2000–01 GDP per capita increased by 0.7%.

## 29.2 GDP AND GDP PER CAPITA



Source: Australian System of National Accounts (5204.0).

## Beyond GDP: Towards wider measures of wellbeing

### Introduction

For many years growth in the volume estimates of real gross domestic product (GDP) and real GDP per capita have been used as benchmarks in the determination of changes in individuals' and countries' standards of living and wellbeing. Changes in real GDP are generally accompanied by broadly similar rates of change in consumption and income, and therefore making the link between changes in GDP and changes in the standard of living is appropriate. However, national accountants who compile GDP have long recognised that GDP is an imperfect measure of changes in economic wellbeing due, in part, to particular decisions that have been taken to define its scope, the fact that it is a gross measure and not a net measure (i.e. depreciation is not deducted), but mostly because it is simply a measure of production. For example, for reasons of practicality, the scope of GDP excludes the production of services produced and consumed within the household, and by definition GDP does not reflect the income flows between a country and the rest of the world. For these reasons, real net national disposable income (RNNDI) and RNNDI per capita are considered better measures of economic welfare. RNNDI goes part of the way to addressing some of the shortcomings of real GDP as a measure of economic welfare by deducting depreciation of produced assets and taking account of flows of income and current transfers between a country and the rest of the world.

At the same time, it is also being recognised that the measurement of welfare must encompass more than only economic concerns. This broadening of the measurement agenda has moved in concert with the increasing focus in public and corporate policy on the need to consider the environmental, social and economic aspects of life together. Responding to the measurement issues posed by the integration of economic, social and environmental aspects represents a significant challenge. This article provides a guide to the relevant issues and an introduction to work being undertaken both within Australia and overseas.

### Measurement frameworks

The integration of three diverse areas of statistics requires a statistical framework of some kind. Frameworks are required:

- to place indicators in context and to organise available information
- to assess trade-offs and reinforcements between different dimensions of sustainable development
- to help set priorities across different policy areas
- to develop summary or aggregated indicators.

The development of appropriate frameworks is difficult, but much work has been done and is continuing:

- the statistical framework for economic statistics is well developed and it is this framework that is used to derive GDP (*System of National Accounts 1993* (SNA93))
- the statistical links between the economy and the environment are being increasingly well defined (*System of Integrated Environmental and Economic Accounting (SEEA)* (United Nations 2002))
- frameworks on the social side are less well established particularly with regard to linkages between society and the environment; recent contributions include the development of social accounting matrices and the measurement of human and social capital (SNA93)
- the genuine savings framework extends the traditional economic statistics boundaries to allow for environmental factors and human capital (see <<http://www.worldbank.org>>)
- the wealth accounting focus developed by the World Bank looks specifically at the composition and changes in countries' wealth as the determinant of sustainability (see <<http://www.worldbank.org>>)
- some frameworks focus purely on physical relationships between resources, one example being the total material flows framework developed by the World Resources Institute (see <<http://www.wri.org>>).

Further development and discussion of measurement frameworks is essential to progress in this area.

### Aggregate indicators

In the same way that GDP is a single measure of economic growth, many people have desired and developed single measures of sustainable development and welfare. These single indicators require the aggregation of a variety of economic, social and environmental variables in much the same way that GDP requires the aggregation of specific economic variables.

A number of aggregate indicators have been developed that focus on environmental variables. For example:

- Ecological Footprints developed by the World Wildlife Fund, the United Nations Environmental Program and others (see <<http://www.unep.org>>)
- the Environmental Sustainability Index developed by the World Economic Forum (see <<http://www.weforum.org>>)
- the Total Material Requirement developed by the World Resources Institute (see <<http://www.wri.org>>).

An aggregate indicator with a more social focus is the Human Development Index developed by the United Nations Development Program (see <<http://www.undp.org>>). This measure combines indicators of health, education and income.

Finally, there are some aggregate indicators that combine information on a much broader range of variables which are either aggregated in monetary terms or weighted together to form a composite index. Important examples include:

- Genuine Progress Indicators (GPI) and Indicators of Sustainable Economic Welfare originally developed by Nordhaus and Tobin (1972) in the early 1970s (see the Australia Institute's web site <<http://www.gpionline.net>> which gives a GPI for Australia)
- the Index of Economic Wellbeing developed by Osberg and Sharpe (1998)
- Genuine Savings developed by Pearce and Atkinson (1993) (see <<http://www.worldbank.org>>).

Although aggregate indicators provide a simplicity of message, there remain concerns over their conceptual and statistical validity and they are seldom measured officially. The lack of widely accepted frameworks, the difficulties in valuing environmental and social factors and hence allowing direct aggregation, and the subjectivity of selecting and weighting variables to include in composite indices are real and significant concerns. Despite these limitations, so long as the underlying logic of the indicator's construction can be understood, there will be instances where aggregate indicators can assist in drawing attention to, summarising and understanding cross-cutting changes.

## Indicator sets

In order to present an integrated message on developments in economic, social and environmental areas of life, many groups and agencies, including the ABS, have turned to the use of indicator sets to bring together relevant information. Commonly, a compact set of high level (headline) indicators is selected to reflect changes in relevant economic, social and environmental concerns. Although there are significant difficulties in limiting the range of available indicators to a manageable number, many initiatives also present a broader range of indicators that provide detail below the headline level. Importantly, there is usually less scope to question the statistical validity of each of the indicators, which in turn gives an important element of confidence in the indicator set as a whole. As well, often there is no specific interpretive framework underlying the indicators and explaining how they are linked, and so users must form their own opinion about relative significance of change in an area such as health, say, against change in GDP or biodiversity.

There are now many examples of indicator sets. The most topical in Australia is the indicator set presented in *Measuring Australia's Progress, 2002* (1370.0) released in April 2002. Table 29.3 lists the headline dimensions and associated headline indicators from this release.

Other examples of indicator sets that may be of interest include:

- the Commonwealth of Australia's headline indicators of sustainable development (see <<http://www.ea.gov.au>>)
- *Growing Victoria Together* (see <<http://www.growingvictoria.vic.gov.au>>)
- *Tasmania Together* (see <<http://www.tasmaniattogether.tas.gov.au>>)
- *Indicators of Sustainable Development* developed by the United Kingdom government (see <<http://www.sustainable-development.gov.uk>>)
- *International Benchmarking of Denmark* released by the Danish government (see <<http://www.fm.dk/sideforloebbeholder.asp?artikeIID=4503>>)
- the preliminary set of sustainable development indicators developed by the Organisation for Economic and Co-operation and Development (OECD) (see OECD 2001, *Sustainable Development: Critical Issues*, at (<<http://www.oecd.org>>))
- the OECD/United Nations/World Bank core set of development indicators (see <<http://www.oecd.org/dac/indicators>>)
- the *Human Development Report* published by the United Nations Development Programme (see <<http://www.undp.org>>)
- the *World Development Indicators* published by the World Bank (see <<http://www.worldbank.org>>).

## Conclusion

As society seeks to answer the broad economic, social and environmental questions that confront it, the provision of information to help answer these questions is essential. Importantly, the information needs to be presented in a coordinated way that assists rather than hinders possible interpretation. This article has presented a number of ways in which measurement has moved beyond the use of GDP as the indicator for all occasions. Although much work remains to be done there is a range of promising measurement approaches that can be developed.

## 29.3 HEADLINE INDICATORS — 2002

Headline dimension	Headline indicator
Health	Life expectancy at birth
Education and training	People aged 25–64 years with a vocational or higher education qualification
Work	Unemployment rate
Biodiversity	Number of extinct, endangered and vulnerable birds and mammals
Land clearance	Annual area of land cleared
Land degradation	Assets at risk in areas affected by salinity or in areas with a high potential to develop salinity
Inland waters	Proportion of water management areas where use exceeds 70% of sustainable yield
Air quality	Days in which health standards for fine particle concentrations are exceeded in selected capital cities
Greenhouse gases	Net greenhouse gas emissions
National wealth	Real national net worth per capita
National income	Real net national disposable income per capita
Economic disadvantage and inequality	Real equalised average weekly disposable income of households in the second and third deciles of the income distribution
Housing	No headline indicator (although two indicators consider housing affordability and overcrowding)
Crime	Unlawful entry with intent and assault (victimisation rates)
Social attachment	No headline indicator (various indicators cover aspects, including people living alone, marriage and divorce, attendance at cultural venues and suicide rates)

Source: ABS 2002.

## References

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- Pearce DW & Atkinson G 1993, 'Capital theory and the measurement of sustainable development: an indicator of weak sustainability', *Ecological Economics*, 8, 103–8.
- SNA93 (United Nations, International Monetary fund, Organisation for Economic Co-operation and Development, World Bank and Commission of the European Communities) 1993, *System of National Accounts 1993*, Brussels/Luxembourg, New York, Paris, Washington DC.
- United Nations 2002, *System of Integrated Environmental and Economic Accounting*, (Draft SEEA 2002), draft report of the London Group on Environmental Accounting.

## Chain volume or 'real' GDP

Chain volume measures were introduced into the Australian national accounts in 1998. They were first presented as experimental measures for the expenditure components of GDP in the December quarter 1997 issue of *Australian National Accounts: National Income, Expenditure and Product* (5206.0), and were an addition to the longstanding constant price estimates which were still the 'official' volume estimates. Subsequently, in the September quarter 1998 issue of 5206.0, the constant price estimates of both the expenditure and production components of GDP were replaced with chain volume measures and they became the ABS 'official' volume estimates.

The reason for having either chain volume or constant price estimates in the national accounts is to provide time series of expenditure and production aggregates which are free of the direct effects of price change. All the current price aggregates of expenditure and production appearing in the national accounts are estimates of the sums of the values of individual transactions. Each of these transactions has two components: a price and a quantity. From one period to another the quantities and prices comprising the transactions change. This means that when the current price value of an aggregate, such as GDP, in one period is compared with the current price value in another period, the difference between them usually reflects both

changes in quantity and changes in price of the constituent transactions. In order to estimate by how much the 'volume' of GDP has changed between the two periods we need to measure the value of GDP in each period using the same unit prices.

For many years the ABS derived constant price estimates as a means of measuring changes in the volumes of aggregates. Constant price estimates are derived by fixing the unit prices of goods and services to those of some base year. These base year unit prices are effectively the weights used to combine the quantities of the different goods and services purchased or produced. The unit prices of different goods and services tend to grow at different rates — some at dramatically different rates, for example, the prices of computer equipment are estimated to have declined by about 85% between 1989–90 and 1999–2000, while the prices of most other goods and services have increased. Therefore, over time, the price relativities of some goods and services change appreciably. This adversely affects the usefulness of constant price estimates for periods distant from the base year, and implies that the base year used to derive constant price estimates needs to be changed from time to time. It was ABS practice, in common with many other national statistical agencies, to change the base year every five years. However, it has been found that rebasing every five years is commonly insufficient, and hence the latest international standards recommend rebasing every year and linking the resulting indexes to form annually reweighted chain volume measures.

Chain volume estimates are not generally additive. In other words, component chain volume estimates do not usually sum to a total in the way original current price components do. In order to minimise the impact of this characteristic, the ABS is using the latest base year as the reference year (i.e. the year when the annual chain volume estimate equals the current price value). Re-referencing changes the level of the chain volume estimates, but does not of itself change the growth rates. By adopting this approach, non-additivity does not apply to the reference year or the following year.

The decision to replace all of the ABS constant price estimates with chain volume measures was announced in March 1998 in *Information Paper: Introduction of Chain Volume Measures in the Australian National Accounts* (5248.0). That paper describes what chain volume measures are, their advantages and disadvantages with respect

to constant price estimates, the advantages and disadvantages of different chain volume formulae, and the results of an empirical analysis.

## Chain price indexes and implicit price deflators

A by-product of the calculation of chain volume measures is the Implicit Price Deflator (IPD). An IPD is the price index obtained when a current price estimate is divided by the corresponding chain volume measure. The ABS publishes a time series of IPDs for each of the expenditure components of GDP (excluding the changes in inventories).

Chain price indexes are also published for the major expenditure aggregates. They are the prices analogue of chain volume estimates. Quarterly chain price indexes are generally superior to IPDs for measuring price change, because the quarter-to-quarter growth rates calculated from the IPDs reflect changes in composition of the expenditure aggregate as well as pure price change. For example, it is possible for an IPD to increase or decrease from one quarter to another without there being any change in price. Changes in chain price indexes, on the other hand, only reflect pure price change.

## National income, expenditure and product accounts

The Australian national income, expenditure and product accounts are compiled and published in some detail every quarter, in *Australian National Accounts: National Income, Expenditure and Product* (5206.0), and in greater detail once a year, in *Australian System of National Accounts* (5204.0).

### GDP account

The GDP account indicates changes in Australian production over time. Tables 29.4 and 29.5 show the GDP account in current prices for a number of years between 1965–66 and 2000–01; table 29.4 shows a series of snapshots at five-yearly intervals to 1990–91, while table 29.5 shows annual time series from 1993–94 to 2000–01. Table 29.6 shows expenditure on GDP in real or chain volume terms.

## 29.4 GDP ACCOUNT, Current prices — Five-yearly intervals

	1965-66	1970-71	1975-76	1980-81	1985-86	1990-91
	\$m	\$m	\$m	\$m	\$m	\$m
Final consumption expenditure						
General government	3 146	5 547	14 715	27 123	49 760	74 663
Households	13 746	21 515	45 459	84 097	144 502	233 726
<i>Total</i>	16 892	27 062	60 174	111 220	194 262	308 389
Gross fixed capital formation						
Private	5 082	8 388	13 328	29 256	45 959	67 027
Public	2 040	2 896	6 582	9 926	19 182	23 238
<i>Total</i>	7 122	11 284	19 910	39 182	65 141	90 267
Changes in inventories	84	586	180	446	870	-1 366
<i>Gross national expenditure</i>	24 098	38 932	80 264	150 848	260 273	397 290
Exports of goods and services	3 136	5 086	11 225	22 604	38 948	66 259
less Imports of goods and services	3 683	5 214	11 163	25 530	47 199	66 948
Statistical discrepancy (expenditure-based)	-571	-940	-1 065	-2 264	-4 081	786
<b>Gross domestic product</b>	<b>22 980</b>	<b>37 864</b>	<b>79 262</b>	<b>145 659</b>	<b>247 942</b>	<b>397 387</b>
Compensation of employees	11 329	19 320	43 919	75 044	123 434	192 723
Gross operating surplus	5 096	9 175	17 299	36 169	68 337	118 690
Gross mixed income	4 638	6 343	10 704	19 904	28 738	42 545
<i>Total factor income</i>	21 063	34 838	71 922	131 117	220 509	353 958
Taxes less subsidies on production and imports	2 079	3 151	7 895	14 753	27 805	43 407
Statistical discrepancy (income-based)	-162	-125	-555	-211	-372	22
<b>Gross domestic product</b>	<b>22 980</b>	<b>37 864</b>	<b>79 262</b>	<b>145 659</b>	<b>247 942</b>	<b>397 387</b>

Source: Australian System of National Accounts (5204.0).

## 29.5 GDP ACCOUNT, Current prices — Annual intervals

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999- 2000	2000-01
	\$m	$m	$m	$m	$m	$m	$m	$m
Final consumption expenditure								
General government	84 441	87 736	92 955	96 176	101 332	108 215	118 038	125 189
Households	265 897	282 870	301 069	314 565	335 101	354 951	374 712	402 685
<i>Total</i>	350 338	370 606	394 024	410 741	436 433	463 166	492 750	527 874
Gross fixed capital formation								
Private	76 755	84 993	88 029	95 040	108 722	112 831	123 896	115 431
Public	21 706	24 357	23 570	22 551	20 748	24 875	25 155	25 819
<i>Total</i>	98 461	109 349	111 599	117 589	129 472	137 703	149 055	141 247
Changes in inventories	1 294	1 393	-813	-10	62	5 152	1 761	366
<i>Gross national expenditure</i>	450 093	481 348	504 810	528 320	565 967	606 021	643 566	669 487
Exports of goods and services	83 015	87 654	99 095	105 160	113 744	112 025	125 972	153 131
less Imports of goods and services	85 396	97 654	101 078	103 590	118 482	126 453	140 323	152 424
Statistical discrepancy (expenditure-based)	-1 231	—	—	—	—	—	—	-165
<b>Gross domestic product</b>	<b>446 480</b>	<b>471 348</b>	<b>502 828</b>	<b>529 886</b>	<b>561 229</b>	<b>591 592</b>	<b>629 212</b>	<b>670 029</b>
Compensation of employees	211 802	224 450	241 100	257 968	268 912	287 086	302 312	322 638
Gross operating surplus	141 384	146 011	153 623	161 658	176 833	181 186	196 137	206 349
Gross mixed income	44 465	46 138	49 064	48 500	50 929	53 590	57 666	58 292
<i>Total factor income</i>	397 651	416 599	443 787	468 126	496 674	521 862	556 115	587 279
Taxes less subsidies on production and imports	49 363	54 749	59 041	61 760	64 555	69 730	73 097	82 788
Statistical discrepancy (income-based)	-534	—	—	—	—	—	—	-38
<b>Gross domestic product</b>	<b>446 480</b>	<b>471 348</b>	<b>502 828</b>	<b>529 886</b>	<b>561 229</b>	<b>591 592</b>	<b>629 212</b>	<b>670 029</b>

Source: Australian System of National Accounts (5204.0).

## 29.6 EXPENDITURE ON GDP, Chain volume measures(a)

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
	\$m	$m	$m	$m	$m	$m	$m	$m
Final consumption expenditure								
General government	95 000	98 092	102 065	103 536	107 445	112 233	118 037	121 470
Households	291 581	305 881	317 505	326 712	342 374	359 900	374 712	384 933
Total	386 492	403 911	419 499	430 220	449 819	472 152	492 749	506 403
Gross fixed capital formation								
Private	76 647	85 061	87 820	97 006	110 159	113 628	123 899	111 421
Public	21 306	24 054	23 146	22 573	20 717	24 574	25 154	25 675
Total	97 296	108 379	110 486	119 141	130 524	138 225	149 053	137 096
Domestic final demand	483 446	512 546	530 053	549 654	580 599	610 301	641 802	643 499
Changes in inventories	1 105	3 312	-291	-765	-62	4 462	1 760	1 528
Gross national expenditure	483 640	514 654	530 526	550 187	581 206	615 417	643 563	645 027
Exports of goods and services	85 288	89 441	98 591	108 925	112 949	115 255	125 972	134 863
less Imports of goods and services	81 391	94 842	98 667	108 465	119 010	124 752	140 323	138 358
Statistical discrepancy (expenditure-based)	-1 355	—	—	—	—	—	—	-162
<b>Gross domestic product</b>	<b>487 608</b>	<b>507 945</b>	<b>529 355</b>	<b>548 815</b>	<b>573 244</b>	<b>603 447</b>	<b>629 212</b>	<b>641 370</b>

(a) Reference year for chain volume measures is 1999-2000.

Source: Australian System of National Accounts (5204.0).

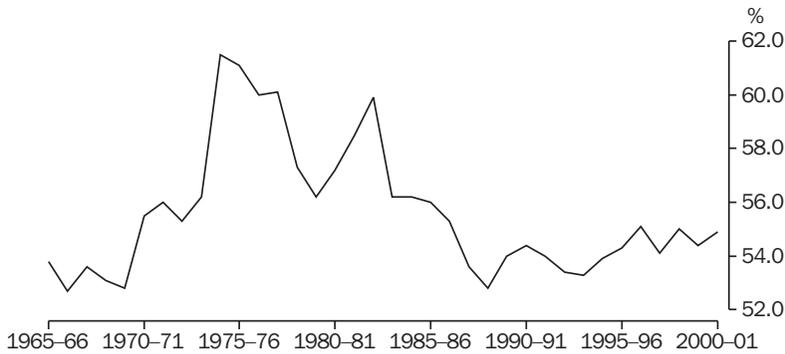
In real terms (i.e. after the effects of price change are removed from the dollar value of Australia's production), there was a fall in production during the 1990-91 financial year. However, the nine years since the recession in 1990-91 have all shown growth in GDP. Although growth in 1991-92 was relatively low (0.3%), by 1994-95 it had accelerated to 4.2%, a growth rate which has generally been maintained since, except for a slight slowing in 1996-97 and moderate growth in 2000-01 of 1.9%.

The GDP account can also be used to show changes in the share of income accruing to labour (i.e. compensation of employees) compared with the share accruing to capital (i.e. profits, defined as the gross operating surplus of non-financial

and financial corporations). Graphs 29.7 and 29.8 show how the shares of total factor income accruing to wages and to profits have changed since 1965-66. (Total factor income is equal to the sum of compensation of employees, gross operating surplus and gross mixed income.)

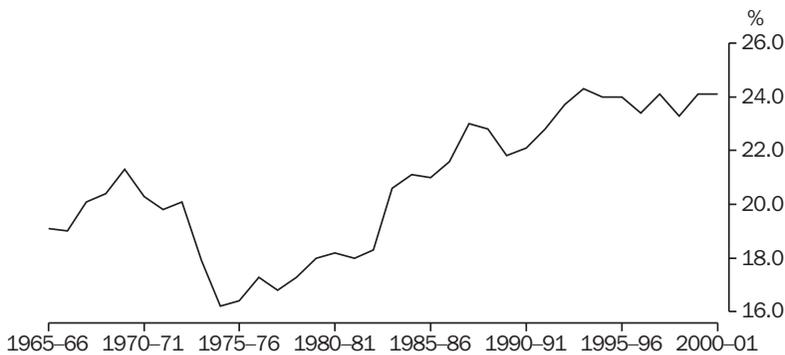
The highest recorded value of the wages share of total factor income was 61.5% in 1974-75. The wages share has recovered somewhat from its low value of 52.8% in 1988-89, but remains below the level recorded for most of the 1970s and early 1980s. In 2000-01, the profits share of total factor income of 23.3% was slightly lower than its highest share of 23.9%, recorded in 1993-94, but remains at a relatively high level compared with earlier periods.

## 29.7 WAGES SHARE OF TOTAL FACTOR INCOME



Source: Australian System of National Accounts (5204.0).

## 29.8 PROFITS SHARE OF TOTAL FACTOR INCOME



Source: Australian System of National Accounts (5204.0).

### National income account

The national income account shows the sources of national income and how much of this income is spent on final consumption. That part of income which is not spent in this way is saving. Tables 29.9 and 29.10 show the income account

for a number of years between 1965-66 and 2000-01; table 29.9 shows a series of snapshots at five-yearly intervals to 1990-91, while table 29.10 shows annual time series from 1993-94 to 2000-01.

## 29.9 NATIONAL INCOME ACCOUNT, Current prices — Five-yearly intervals

	1965-66	1970-71	1975-76	1980-81	1985-86	1990-91
	\$m	\$m	\$m	\$m	\$m	\$m
INCOME						
Compensation of employees	11 329	19 320	43 919	75 044	123 434	192 723
Gross operating surplus	5 096	9 175	17 299	36 169	68 337	118 690
Gross mixed income	4 638	6 343	10 704	19 904	28 738	42 545
Taxes less subsidies on production and imports	2 079	3 151	7 895	14 753	27 805	43 407
Net primary income from non-residents	-308	-600	-1 202	-2 397	-6 853	-17 224
<i>Gross national income</i>	22 834	37 389	78 615	143 473	241 461	380 141
Net secondary income from non-residents	-90	-110	-287	-441	-384	453
<b>Gross disposable income</b>	<b>22 744</b>	<b>37 279</b>	<b>78 328</b>	<b>143 032</b>	<b>241 077</b>	<b>380 594</b>
USE OF DISPOSABLE INCOME						
Final consumption expenditure						
General government	3 146	5 547	14 715	27 123	49 760	74 663
Households	13 746	21 515	45 459	84 097	144 502	233 726
<i>Total</i>	16 892	27 062	60 174	111 220	194 262	308 389
Net saving(a)	1 916	3 752	5 979	9 691	7 379	7 827
Consumption of fixed capital	3 936	6 465	12 174	22 120	39 435	64 378
<b>Total use of gross disposable income</b>	<b>22 744</b>	<b>37 279</b>	<b>78 328</b>	<b>143 032</b>	<b>241 077</b>	<b>380 594</b>

(a) Net saving is derived as a balancing item.

Source: Australian System of National Accounts (5204.0).

## 29.10 NATIONAL INCOME ACCOUNT, Current prices — Annual intervals

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
	\$m	$m	$m	$m	$m	$m	$m	$m
INCOME								
Compensation of employees	211 802	224 450	241 100	257 968	268 912	287 086	302 312	322 638
Gross operating surplus	141 384	146 011	153 623	161 658	176 833	181 186	196 137	206 349
Gross mixed income	44 465	46 138	49 064	48 500	50 929	53 590	57 666	58 292
Taxes less subsidies on production and imports	49 363	54 749	59 041	61 760	64 555	69 730	73 097	82 788
Net primary income from non-residents	-13 534	-18 117	-19 533	-19 151	-18 091	-18 189	-19 346	-19 571
<i>Gross national income</i>	433 480	453 231	483 295	510 735	543 138	573 403	609 866	650 496
Net secondary income from non-residents	-132	-323	64	-21	22	-749	218	178
<b>Gross disposable income</b>	<b>433 348</b>	<b>452 908</b>	<b>483 359</b>	<b>510 714</b>	<b>543 160</b>	<b>572 654</b>	<b>610 084</b>	<b>650 674</b>
USE OF DISPOSABLE INCOME								
Final consumption expenditure								
General government	84 441	87 736	92 955	96 176	101 332	108 215	118 038	125 189
Households	265 897	282 870	301 069	314 565	335 101	354 951	374 712	402 685
<i>Total</i>	350 338	370 606	394 024	410 741	436 433	463 166	492 750	527 874
Net saving(a)	9 238	6 038	10 717	19 600	20 567	18 173	19 672	18 508
Consumption of fixed capital	73 773	76 264	78 617	80 376	86 160	91 316	97 663	104 292
<b>Total use of gross disposable income</b>	<b>433 348</b>	<b>452 908</b>	<b>483 359</b>	<b>510 714</b>	<b>543 160</b>	<b>572 654</b>	<b>610 084</b>	<b>650 674</b>

(a) Net saving is derived as a balancing item.

Source: Australian System of National Accounts (5204.0).

Graph 29.11 shows net saving by institutional sector as a proportion of GDP for the years 1965–66 to 2000–01. Household net saving as a percentage of GDP generally rose between 1965–66 and 1974–75, but has fallen subsequently from its high of 11.1% in 1974–75 to just 2.5% in 2000–01 (\$16.9b). General government net saving was negative from 1974–75 to 1996–97 (except for 1988–89 and 1989–90). In 2000–01 it was just positive at \$0.2b. In 2000–01 net saving of non-financial corporations was –1.1% of GDP (–\$7.4b). Net saving of financial corporations was negative from 1982–83 to 1986–87, the only period for which this sector has recorded negative net saving. In 2000–01 net saving of financial corporations was 1.3% of GDP (\$8.8b).

### National capital account

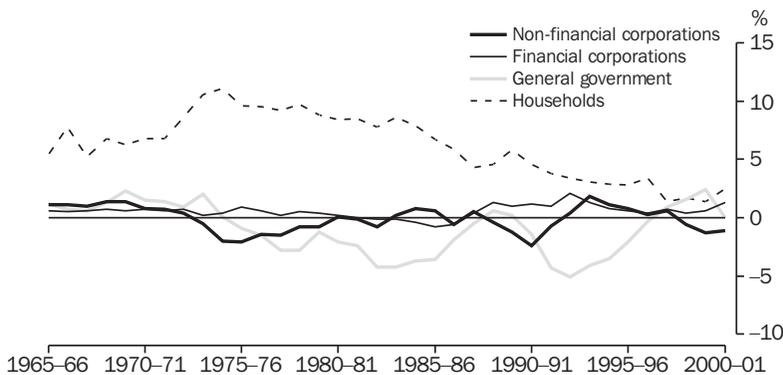
The national capital account shows how the saving from the national income account and consumption of fixed capital (depreciation) are used to finance gross fixed capital formation. If, as is currently the case for Australia, the nation's saving and consumption of fixed capital are not sufficient to pay for all the fixed capital needed for Australian

production, the shortfall must be borrowed from overseas. The amount borrowed from overseas is shown in the national capital account as a negative entry for net lending to non-residents.

Tables 29.12 and 29.13 show the national capital account for a number of years between 1965–66 and 2000–01; table 29.12 shows a series of snapshots at five-yearly intervals to 1990–91, while table 29.13 shows annual time series from 1993–94 to 2000–01.

Graph 29.14 shows gross fixed capital formation (investment) by institutional sector as a proportion of GDP. For non-financial corporations this proportion generally fell during the 1970s, then rose to a peak of 13.2% in 1981–82. It has subsequently been above 10% except for the years 1991–92 to 1993–94, and 2000–01 (9.4%). Household investment as a proportion of GDP was 8.2% in 2000–01. General government investment as a proportion of GDP peaked at 4.8% in 1975–76. It has generally fallen since then and was 2.4% of GDP in 2000–01. Financial corporations investment peaked in 1988–89 and 1989–90 at 1.9% of GDP. It has generally fallen since then and was 1.0% of GDP in 2000–01.

29.11 NET SAVING, By sector — Share of GDP



Source: Australian System of National Accounts (5204.0).

## 29.12 NATIONAL CAPITAL ACCOUNT, Current prices — Five-yearly intervals

	1965-66	1970-71	1975-76	1980-81	1985-86	1990-91
	\$m	\$m	\$m	\$m	\$m	\$m
Net saving						
Non-financial corporations	259	320	-1 629	102	1 427	-9 382
Financial corporations	131	278	733	308	-1 868	4 587
General government	277	567	-701	-3 006	-8 826	-5 584
Households	1 249	2 587	7 576	12 287	16 646	18 206
<i>Total</i>	1 916	3 752	5 979	9 691	7 379	7 827
Consumption of fixed capital	3 936	6 465	12 174	22 120	39 435	64 378
Net capital transfers receivable from non-residents	46	56	-27	167	830	2 071
<b>Gross saving and capital transfers</b>	<b>5 898</b>	<b>10 273</b>	<b>18 126</b>	<b>31 978</b>	<b>47 644</b>	<b>74 276</b>
Gross fixed capital formation						
Private	5 082	8 388	13 328	29 256	45 959	67 027
Public corporations	951	1 371	2 790	5 584	10 664	12 271
General government	1 089	1 525	3 792	4 342	8 518	10 966
<i>Total</i>	7 122	11 284	19 910	39 182	65 141	90 267
Changes in inventories						
Private non-farm	147	366	91	115	882	-1 125
Farm and public authorities	-63	220	89	331	-12	-241
<i>Total</i>	84	586	180	446	870	-1 366
Acquisitions less disposals of non-produced non-financial assets	—	—	—	—	—	-7
Statistical discrepancy(a)	-409	-815	-510	-2 053	-3 709	764
Net lending to non-residents	-899	-782	-1 454	-5 597	-14 658	-15 382
<b>Total capital accumulation and net lending</b>	<b>5 898</b>	<b>10 273</b>	<b>18 126</b>	<b>31 978</b>	<b>47 644</b>	<b>74 276</b>

(a) Statistical discrepancy (expenditure-based) less statistical discrepancy (income-based).

Source: Australian System of National Accounts (5204.0).

## 29.13 NATIONAL CAPITAL ACCOUNT, Current prices — Annual intervals

	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–2000	2000–01
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>Net saving</b>								
Non-financial corporations	8 036	5 015	4 030	1 521	3 537	-3 734	-8 297	-7 447
Financial corporations	5 615	3 801	3 065	2 098	4 065	2 276	3 862	8 827
General government	-18 228	-16 331	-10 689	-1 847	5 082	9 582	15 351	207
Households	13 815	13 553	14 311	17 828	7 883	10 049	8 756	16 921
Total	9 238	6 038	10 717	19 600	20 567	18 173	19 672	18 508
Consumption of fixed capital	73 773	76 264	78 617	80 376	86 160	91 316	97 663	104 292
Net capital transfers receivable from non-residents	300	540	1 045	1 323	1 097	1 186	1 136	1 182
<b>Gross saving and capital transfers</b>	<b>83 311</b>	<b>82 842</b>	<b>90 379</b>	<b>101 299</b>	<b>107 824</b>	<b>110 675</b>	<b>118 471</b>	<b>123 982</b>
<b>Gross fixed capital formation</b>								
Private	76 755	84 993	88 029	95 040	108 722	112 831	123 896	115 431
Public corporations	9 957	11 864	11 322	9 525	8 013	11 468	9 277	9 418
General government	11 748	12 492	12 247	13 025	12 735	13 407	15 878	16 401
Total	98 461	109 349	111 599	117 589	129 472	137 703	149 055	141 247
<b>Changes in inventories</b>								
Private non-farm	1 316	659	-487	2 402	-418	5 165	1 837	918
Farm and public authorities	-22	734	-326	-2 412	480	-13	-76	-552
Total	1 294	1 393	-813	-10	62	5 152	1 761	366
Acquisitions less disposals of non-produced non-financial assets	-17	-32	-25	6	-30	19	83	107
Statistical discrepancy(a)	-697	—	—	—	—	—	—	-127
Net lending to non-residents	-15 730	-27 868	-20 382	-16 286	-21 680	-32 199	-32 427	-17 611
<b>Total capital accumulation and net lending</b>	<b>83 311</b>	<b>82 842</b>	<b>90 379</b>	<b>101 299</b>	<b>107 824</b>	<b>110 675</b>	<b>118 471</b>	<b>123 982</b>

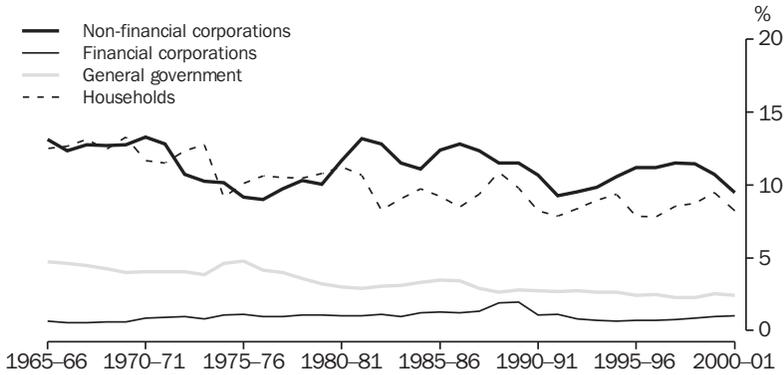
(a) Statistical discrepancy (expenditure-based) less statistical discrepancy (income-based).

Source: Australian System of National Accounts (5204.0).

Graph 29.15 shows net lending by institutional sector as a proportion of GDP. A positive percentage for a sector indicates that it is a net lender to other sectors; a negative percentage indicates that it is a net borrower. The household sector has been a net lender for most years. As a proportion of GDP, net lending by households peaked in 1974–75 at 8.4%. Since then it has trended downwards, and in four of the last seven years the household sector has been a net borrower. Non-financial corporations have been net borrowers over the whole period from 1965–66 to 1999–2000, and the amounts borrowed

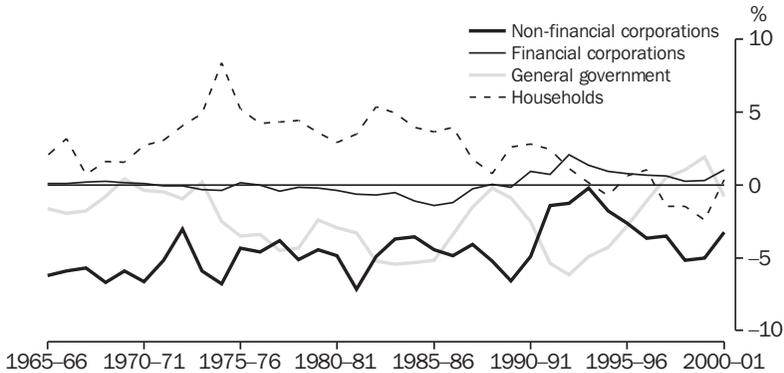
have fluctuated significantly from year to year. As a proportion of GDP, their net borrowing was 3.2% in 2000–01. After being a net borrower throughout the 1980s, the financial corporations sector returned to being a net lender in 1990–91 and has remained so since then. In 2000–01 financial corporations net lending represented 1.0% of GDP. After recording a record level of borrowing in 1992–93 as a proportion of GDP (6.2%), general government borrowing steadily declined. In 1997–98 the sector became a net lender until 2000–01 when it became a net borrower again. In 2000–01 general government net borrowing represented 0.8% of GDP.

**29.14 GROSS FIXED CAPITAL FORMATION, By sector — Share of GDP**



Source: Australian System of National Accounts (5204.0).

**29.15 NET LENDING, By sector — Share of GDP**



Source: Australian System of National Accounts (5204.0).

**External account**

The external account is derived from the detailed balance of payments current and capital accounts (see *Chapter 30, International accounts and trade*). It shows Australia's exports and imports, incomes and transfers received by Australian residents from non-residents, and incomes and transfers payable to non-residents by Australian

residents. The balance on the external account is net lending to non-residents. This is the same as the balance in the national capital account.

Tables 29.16 and 29.17 show the external account for a number of years between 1965-66 and 2000-01; table 29.16 shows a series of snapshots at five-yearly intervals to 1990-91, while table 29.17 shows annual time series from 1993-94 to 2000-01.

**29.16 EXTERNAL ACCOUNT, Current prices — Five-yearly intervals**

	1965-66	1970-71	1975-76	1980-81	1985-86	1990-91
	\$m	\$m	\$m	\$m	\$m	\$m
Imports of goods and services	3 683	5 214	11 163	25 530	47 199	66 948
Primary income receivable						
Compensation of employees	11	17	44	110	164	429
Property income	400	760	1 587	3 147	8 879	20 552
Total	411	777	1 631	3 257	9 043	20 981
Secondary income	169	358	773	1 264	1 797	2 422
Capital transfers to non-residents	40	78	203	320	486	653
Acquisitions less disposals of non-produced non-financial assets	—	—	—	—	—	-7
Net lending	-899	-782	-1 454	-5 597	-14 658	-15 382
<b>Resources provided by non-residents</b>	<b>3 404</b>	<b>5 645</b>	<b>12 316</b>	<b>24 774</b>	<b>43 867</b>	<b>75 615</b>
Exports of goods and services	3 136	5 086	11 225	22 604	38 948	66 259
Primary income payable						
Compensation of employees	10	13	59	119	165	432
Property income	93	164	370	741	2 025	3 325
Total	103	177	429	860	2 190	3 757
Secondary income payable	79	248	486	823	1 413	2 875
Capital transfers from non-residents	86	134	176	487	1 316	2 724
<b>Resources provided to non-residents</b>	<b>3 404</b>	<b>5 645</b>	<b>12 316</b>	<b>24 774</b>	<b>43 867</b>	<b>75 615</b>

Source: Australian System of National Accounts (5204.0).

**29.17 EXTERNAL ACCOUNT, Current prices — Annual intervals**

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Imports of goods and services	85 396	97 654	101 078	103 590	118 482	126 453	140 323	152 424
Primary income receivable								
Compensation of employees	283	389	458	539	792	854	963	1 065
Property income	19 031	24 669	26 215	27 175	27 683	27 598	31 185	33 975
Total	19 314	25 058	26 673	27 714	28 475	28 452	32 148	35 040
Secondary income	3 241	3 347	3 228	3 561	3 971	5 247	4 407	4 387
Capital transfers to non-residents	758	843	907	877	971	1 011	1 199	1 260
Acquisitions less disposals of non-produced non-financial assets	-17	-32	-25	6	-30	19	83	107
Net lending	-15 730	-27 868	-20 382	-16 286	-21 680	-32 199	-32 427	-17 611
<b>Resources provided by non-residents</b>	<b>92 962</b>	<b>99 002</b>	<b>111 479</b>	<b>119 463</b>	<b>130 189</b>	<b>128 983</b>	<b>145 734</b>	<b>175 607</b>
Exports of goods and services	83 015	87 654	99 095	105 160	113 744	112 025	125 972	153 131
Primary income payable								
Compensation of employees	511	551	610	678	747	797	826	901
Property income	5 269	6 390	6 530	7 885	9 637	9 466	11 976	14 568
Total	5 780	6 941	7 140	8 563	10 384	10 263	12 802	15 469
Secondary income payable	3 109	3 024	3 292	3 540	3 993	4 498	4 625	4 565
Capital transfers from non-residents	1 058	1 383	1 952	2 200	2 068	2 197	2 335	2 442
<b>Resources provided to non-residents</b>	<b>92 962</b>	<b>99 002</b>	<b>111 479</b>	<b>119 463</b>	<b>130 189</b>	<b>128 983</b>	<b>145 734</b>	<b>175 607</b>

Source: Australian System of National Accounts (5204.0).

Australia has generally been a net borrower of funds from overseas. In the national accounts, this situation is reflected by a negative value for net lending to non-residents. The only exception to this pattern was in 1972–73 when Australia was a net lender to non-residents. Net borrowing from non-residents (i.e. negative net lending to non-residents), expressed as a proportion of GDP, increased significantly during the early 1980s and has remained at relatively high levels since then. Graph 29.18 shows net lending to non-residents as a proportion of GDP since 1965–66.

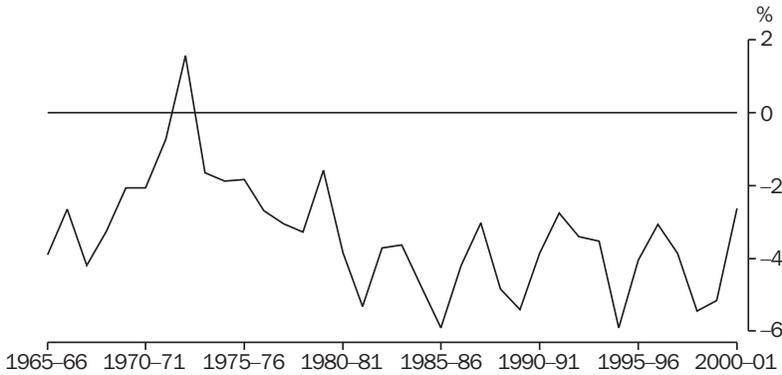
The importance of foreign trade to the Australian economy is illustrated by graph 29.19, which shows the ratios of exports and imports of goods

and services to GDP for the financial years 1965–66 to 2000–01. In 2000–01 the import ratio was 22.75% and the export ratio was 22.85%.

### State accounts

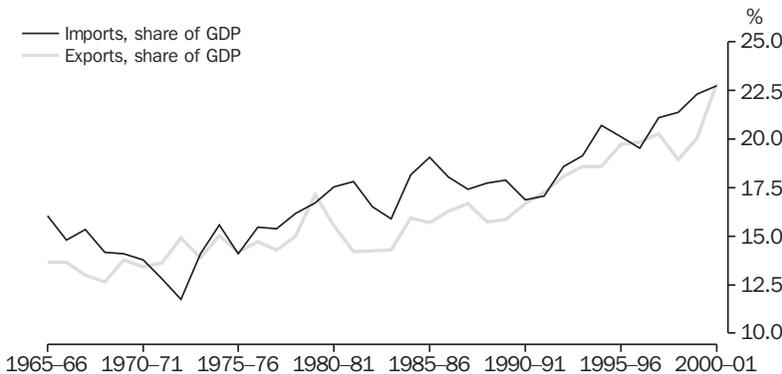
As well as Australia’s national accounts, the ABS produces annual accounts for each of Australia’s states and territories. These provide estimates of gross state product (GSP) and state final demand. GSP is produced by summing the incomes generated in the production process (the income approach to measuring total production). State final demand is equal to the sum of government and household final consumption expenditure and public and private gross fixed capital formation. Estimates of state final demand and GSP are available in both current price and chain volume terms. The chain volume GSP estimates are experimental.

**29.18 NET LENDING TO NON-RESIDENTS, Share of GDP**



Source: Australian System of National Accounts (5204.0).

**29.19 EXPORTS AND IMPORTS, Share of GDP**



Source: Australian System of National Accounts (5204.0).

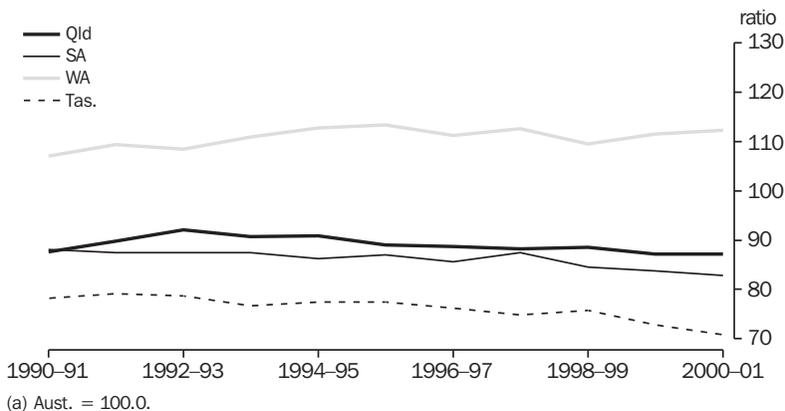
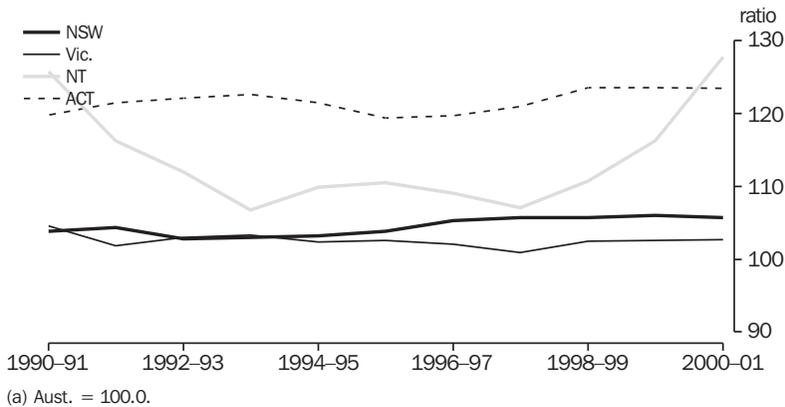
An important use of state accounts is to compare the performance of each state and territory. Graph 29.20 shows the ratio of GSP, in current prices, per head of mean population for each state and territory to the Australian value (GDP per head of mean population) since 1990–91. For New South Wales, Victoria, Western Australia, Northern Territory and Australian Capital Territory, GSP per head of mean population has been above the national average. For Queensland, South Australia and Tasmania, GSP per head of mean population has been below the national average.

## Input-output tables

### Basic structure

Input-output (I-O) tables show the structure of a country's entire production system for a particular period, usually one year. They show which goods and services are produced by each industry and how they are used (e.g. some goods, such as cars, are sold to final consumers while others, such as steel, are used as inputs by other industries in producing more goods and services). The tables are based on the principle that the value of the output of each industry can be expressed as the sum of the values of all the inputs to that industry. These inputs include the use of the outputs of other industries; any profits made from production; compensation of employees; and any taxes on production paid less

29.20 GSP PER HEAD OF MEAN POPULATION(a)



Source: Australian National Accounts: State Accounts (5220.0).

any subsidies received. All the goods and services produced in a period are identified as being used as inputs by industries in their production process, being sold to final users of the goods and services (either in Australia, or overseas as exports), or contributing to the changes in inventories (an increase in inventories if more goods are produced than purchased, or a run-down in inventories if purchases exceed production). The net increase in inventories includes any timing difference between supply and use.

### Relationship to the national income and expenditure accounts

I-O tables are directly related to the GDP. The income side of the GDP account shows the amount of income generated in the economy accruing to labour (in the form of compensation of employees) and to capital (as profits or, in national accounting terms, gross operating surplus and gross mixed income — the latter including some return to owners of businesses for their labour). The expenditure side of the account shows the value of goods and services entering into the various categories of final uses.

The I-O tables provide a much more detailed disaggregation of the GDP account than is available in the national income, expenditure and product accounts. The latter only shows details of the end results of economic activity, whereas the I-O tables show the flows of goods and services through the production process. The extra detail provided by the I-O tables is essential for many analyses.

### I-O table for seven industry sectors

Table 29.21 and diagram 29.22 show the flows of goods and services in respect of 1996–97.

The links between the table and the diagram are explained by working through the following formulae.

*Total intermediate use* — (\$482,483m) in the diagram is derived by summing from column 8 of the table: intermediate use (\$412,134m); taxes on products, net (\$13,378m); competing imports (\$56,890m); and complementary imports (\$81m).

*Domestic final use* — (\$530,600m) in the diagram is derived from the table by subtracting total exports (\$105,160m), column 12, from total final uses (\$635,760m), column 13.

*Imports* — (\$103,590m) is derived by summing from column 14 of the table: competing imports (\$103,257m); and complementary imports (\$333m). In the diagram it is dissected into imports for intermediate uses (\$56,971m); and imports for final uses (\$46,619m).

*Exports* — (\$105,160m) in the diagram is total exports, column 12 in the table.

*Total use* — (\$1,118,243m), which equals total supply, is the sum of domestic final use (\$530,600m); total intermediate use (\$482,483m); and exports (\$105,160m).

*Gross value added* — (\$493,377m) in the diagram is derived by summing from column 14 of the table: compensation of employees (\$257,193m); gross operating surplus and mixed income (\$213,534m); and other taxes on production (net) (\$22,650m).

*GDP (income measure)* — (\$532,170m) in the diagram is derived by summing from column 14 of the table: compensation of employees (\$257,193m); gross operating surplus and mixed income (\$213,534m); taxes on products (net) (\$38,793m); and other taxes on production (net) (\$22,650m).

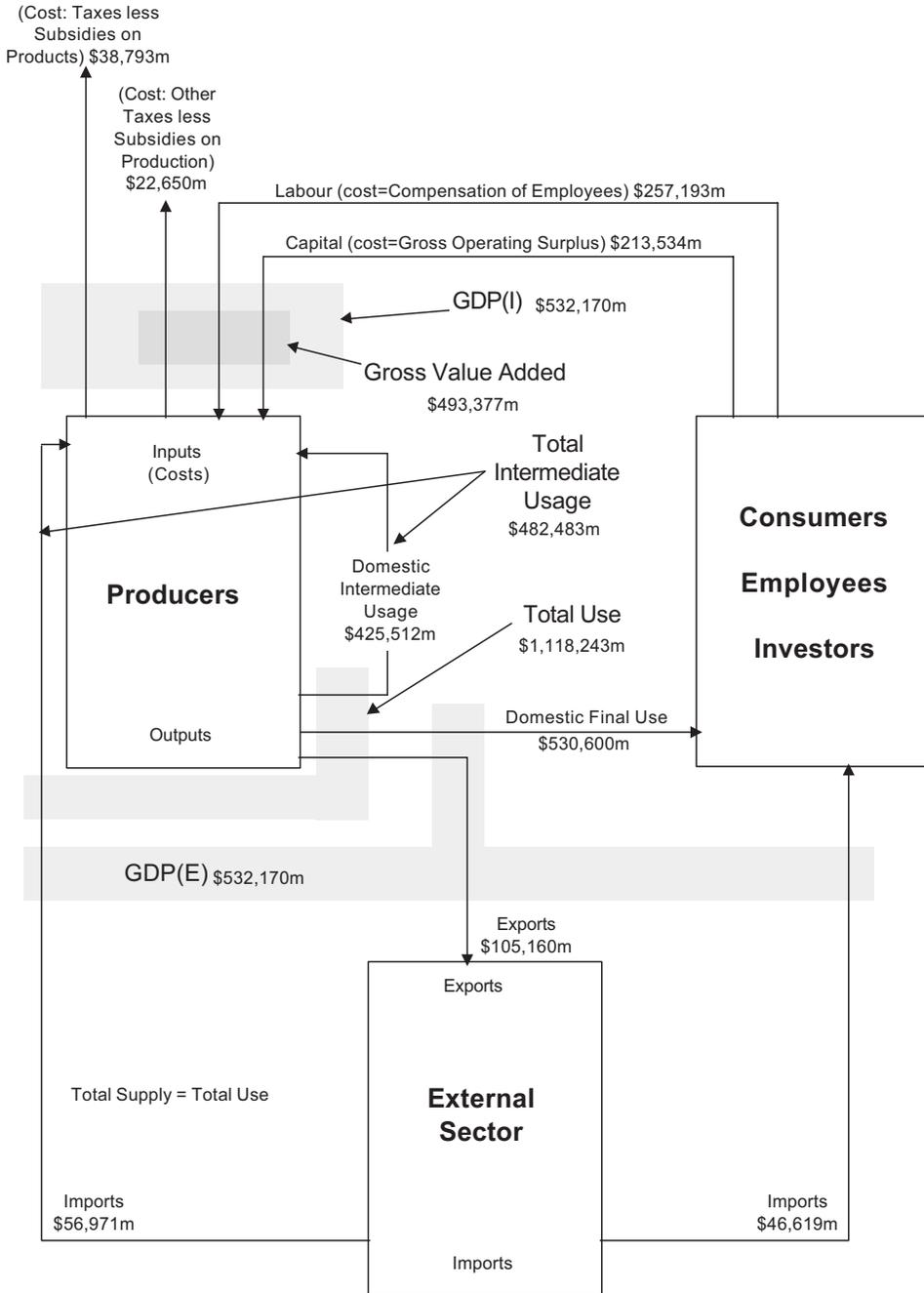
*GDP (expenditure measure)* — (\$532,170m) in the diagram is derived by summing domestic final use (\$530,600m); and exports (\$105,160m); and subtracting imports (\$103,590m).

## 29.21 INDUSTRY BY INDUSTRY FLOW TABLE, Basic values — 1996–97

	1	2	3	4	5	6	7
	Agriculture	Mining	Manufacturing	Construction	Trade and transport	Service industries	Public admin. and defence
Supply	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Agriculture	4 071	16	13 710	123	283	1 304	52
Mining	42	3 851	9 719	651	238	2 897	96
Manufacturing	4 369	4 043	49 326	16 658	16 182	20 627	3 497
Construction	177	224	48	70	439	1 948	675
Trade and transportation	2 819	3 020	21 356	4 084	18 559	15 873	1 818
Service industries	3 192	4 991	22 429	7 994	45 697	91 487	7 637
Government admin. and defence	53	226	578	120	1 260	1 100	2 505
<i>Intermediate use</i>	14 722	16 371	117 166	29 699	82 658	135 237	16 280
Compensation of employees	3 967	5 887	36 147	13 812	51 263	127 132	18 985
Gross operating surplus and gross mixed income	12 699	16 788	27 262	15 351	19 715	118 860	2 859
Taxes on products (net)	464	207	1 752	715	4 347	5 643	250
Other taxes on production (net)	588	499	2 505	700	4 053	11 054	29
Competing imports	1 641	2 015	28 646	3 406	5 793	13 548	1 842
Complementary imports	—	—	81	—	—	—	—
	8	9	10	11	12	13	14
	Intermediate usage = Sum (1 to 7)	Final consumption expenditure	Gross fixed capital formation	Changes in inventories	Exports	Final uses = Sum (9 to 12)	Total supply = Sum (8+13)
Supply	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Agriculture	19 560	4 719	1 024	369	8 409	14 522	34 081
Mining	17 493	598	2 268	-2 428	23 835	24 274	41 767
Manufacturing	114 702	47 087	14 046	-495	38 219	98 856	213 558
Construction	3 581	2 964	57 048	-5	96	60 102	63 683
Trade and transportation	67 530	70 463	11 901	40	17 896	100 299	167 829
Service industries	183 427	207 096	9 399	67	11 484	228 047	411 474
Government admin. and defence	5 842	33 847	405	—	151	34 403	40 245
<i>Intermediate use</i>	412 134	366 774	96 091	-2 452	100 090	560 503	972 637
Compensation of employees	257 193	—	—	—	—	—	257 193
Gross operating surplus and gross mixed income	213 534	—	—	—	—	—	213 534
Taxes on products (net)	13 378	20 262	3 352	158	1 643	25 415	38 793
Other taxes on production (net)	19 428	—	3 222	—	—	3 222	22 650
Competing imports	56 890	24 314	17 303	1 323	3 427	46 367	103 257
Complementary imports	81	111	151	-9	—	252	333
<b>Australian production</b>	<b>972 637</b>	<b>411 461</b>	<b>120 119</b>	<b>-980</b>	<b>105 160</b>	<b>635 760</b>	<b>1 608 397</b>
Gross value added	490 155	—	3 222	—	—	3 222	493 377
<b>Gross domestic product</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>532 170</b>

Source: Derived from Australian National Accounts: Input-Output Tables, 1996–97 (5209.0).

29.22 THE AUSTRALIAN ECONOMY, Flow of goods and services — 1996–97



Notes:

- (1) Flows are based on 1996–97 input-output tables.
- (2) This diagram shows the flows between producers and the rest of the economy. In this context a producer can also be a consumer (e.g. own account capital expenditure) or an investor.
- (3) The shaded areas identify the components that make up the main aggregates. Flows passing through the shaded areas are included in the calculation.

Source: Derived from 'Australian National Accounts: Input-Output Tables, 1996–97' (5209.0).

## Financial accounts

In addition to the national accounts, the ABS produces quarterly information on the levels of financial assets and liabilities of each institutional sector of the economy, the market for financial instruments, and inter-sectoral transactions in financial assets and liabilities classified by financial instrument (see *Chapter 26, Financial system*). National and sectoral financial accounts, which show major financial aggregates, are published annually in *Australian System of National Accounts* (5204.0) and quarterly in *Australian National Accounts: Financial Accounts* (5232.0).

## National balance sheet

The national balance sheet provides estimates of the value of Australia's produced, non-produced and financial assets, its liabilities to the rest of the world, and the net worth (defined as the difference between total assets and liabilities, including the value of equity in Australian enterprises owned by non-residents) of the total economy. The major national and sectoral balance sheet tables are published in *Australian System of National Accounts* (5204.0). Balance sheets are provided for each of the four domestic sectors: non-financial corporations, financial corporations, general government and households (including unincorporated enterprises and non-profit institutions serving households).

The non-produced assets included in the balance sheet cover experimental estimates of the value of some of Australia's natural resources: subsoil assets, timber available for log production and land. The monetary estimates of natural resources contained in the balance sheet are underpinned by physical estimates of particular natural resources. Further, since valuation of natural resources is a difficult and contentious undertaking, the monetary estimates of these natural resources should be considered in conjunction with the physical estimates.

The natural resource estimates are used to monitor the availability and exploitation of these resources and to assist in the formulation of environmental policies. More generally, data on the level, composition and change in assets and liabilities shown in the balance sheet indicate the extent of economic resources available to and claims on a nation and each of its institutional sectors.

Sectoral balance sheets provide information necessary for analysing a number of topics; for example, the estimation of household liquidity; and the computation of widely used ratios, such as assets to liabilities, net worth to total liabilities, non-financial to financial assets, and debt to income. In a period of concern about the level of saving in Australia, national and sector balance sheets provide additional information on the relationships between consumption, saving and wealth accumulation.

## Real/volume balance sheets

An article introducing experimental real/volume balance sheets for Australia was published in the March quarter 2001 issue of *Australian National Accounts: National Income, Expenditure and Product* (5206.0). Subsequently, estimates up to 2000–01 have been published in *Australian System of National Accounts* (5204.0) as released in November 2001 to complement the current price balance sheets already included in that publication. The real/volume balance sheet is designed to remove the effect of price changes, in much the same way as for other real and volume estimates, and allow for comparisons of changes in the value of Australia's assets and liabilities over time, free of the direct effects of inflation.

Volume estimates for the major categories of fixed asset stocks described as 'produced assets' — such as dwellings, other buildings and structures, and machinery and equipment — have been available for many years in the Australian national accounts. However, volume estimates for stocks of non-produced, non-financial assets (land and other natural resources, etc.) and real estimates of financial assets, liabilities and net worth (wealth) have not been available previously. The calculation of volume and real estimates for some of these components is subject to some practical and conceptual difficulties, and therefore the term 'experimental' has been attached to these initial estimates.

The values of non-financial assets, such as dwellings, equipment and standing timber, can be decomposed into prices and volumes. Volume indexes, which measure the volume change of an aggregate between one period and another, can thus be derived by holding prices the same in the two periods. The ABS calculates an annual volume index of an aggregate by dividing its value in one year with its value in the previous year, using the prices of the earlier of the two years — termed the base year — to derive the values for

both years. Chain volume indexes are then derived by multiplying successive annual volume indexes from a reference year to the current year. For example, starting with a year one reference year the chain volume index in year three is derived by multiplying the volume index for year one to year two by the volume index for year two to year three. ABS practice is to re-reference the chain indexes to the current price value of the aggregate in the year of the latest base year.

Financial assets and liabilities cannot be decomposed into prices and volumes, and so it is impossible to derive volume indexes for them. The same is true of gross operating surplus and other income flows, and is the reason why chain volume estimates of GDP cannot be derived by aggregating volume indexes of its income components. However, it is possible to deflate income flows, financial assets and liabilities by a price index in order to measure the purchasing power of the aggregate in question over a designated numeraire set of goods and services. Such measures are called 'real' estimates.

Real net worth has been derived by aggregating the chain volume estimates of the non-financial assets with the real estimates of financial assets less liabilities using the standard method of chain aggregation.

The ABS will continue to develop estimates of the value and volume of Australia's assets for inclusion in national balance sheets as additional data become available. Estimation techniques will

be refined as research in Australia and abroad explores issues relating to the valuation of natural resources.

**Current price balance sheet estimates**

Australia's net worth at 30 June 2001 is estimated at \$2,625.2b, an increase of \$143.0b (5.8%) since 30 June 2000. Of the increase, \$22.1b was due to transactions (both capital and financial), and \$121.0b was due to revaluations and other flows (including discoveries of subsoil assets). The average annual rise over the period 30 June 1992 to 30 June 2001 was 5.5%. Net worth relative to annual GDP has risen slightly from 3.8:1 at the end of June 1992 to 3.9:1 at the end of June 2001. Graph 29.23 shows that the net worth series exhibited the strongest growth during the years 1996-97 to 1999-2000 when an average annual rate of about 7% was achieved.

Total produced assets at 30 June 2001 are estimated at \$1,861.6b, an increase of 5.3% from the level at end of June 2000 (see table 29.24). The estimated value of produced assets rose at an average annual rate of 4.5% between 30 June 1992 and 30 June 2001, and consistently accounted for over 70% of net worth. Dwellings, other buildings and structures, and machinery and equipment, represent about 90% of total produced assets. While computer software has consistently accounted for only about 1% of total produced assets over the period, the series has exhibited by far the strongest growth of produced assets, with an average annual growth over the last nine years of 11.1%.

29.23 CHANGE IN TOTAL NET WORTH — As at 30 June



Source: Australian National Accounts: National Balance Sheet (5241.0.40.001).

## 29.24 NATIONAL BALANCE SHEET, Current prices — As at 30 June

	1993	1994	1995	1996	1997	1998	1999	2000	2001
	$b	$b	$b	$b	$b	$b	$b	$b	\$b
<b>Total assets</b>	<b>2 057.0</b>	<b>2 176.1</b>	<b>2 301.1</b>	<b>2 368.3</b>	<b>2 532.6</b>	<b>2 742.2</b>	<b>2 936.7</b>	<b>3 220.5</b>	<b>3 459.3</b>
<i>Non-financial assets</i>	1 912.0	2 007.4	2 116.4	2 174.9	2 302.9	2 442.7	2 620.8	2 824.4	3 019.3
<i>Produced assets</i>	1 286.2	1 337.5	1 401.4	1 444.7	1 493.8	1 568.0	1 662.7	1 767.8	1 861.6
<i>Fixed assets</i>	1 204.9	1 252.2	1 312.0	1 356.3	1 403.6	1 476.2	1 565.8	1 663.6	1 753.5
Dwellings	403.5	426.9	452.2	469.6	484.1	506.5	544.2	590.6	654.7
Other buildings and structures	530.0	546.3	571.8	596.9	622.7	652.9	691.9	727.8	744.0
Machinery and equipment	251.4	257.1	264.8	268.4	274.3	290.5	300.6	312.0	316.9
Livestock — fixed assets	9.9	10.9	11.8	9.5	9.7	12.0	12.4	13.0	14.7
Computer software	9.9	10.7	11.2	11.4	12.3	13.8	16.2	19.6	22.6
Entertainment, literary or artistic originals	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6
<i>Inventories</i>	81.3	85.3	89.4	88.4	90.2	91.8	96.9	104.2	108.1
Private non-farm(a)	63.8	66.4	69.9	68.7	70.4	70.6	75.1	81.6	85.6
Farm	5.7	5.7	6.4	6.8	6.8	7.0	6.7	6.8	7.1
Public authorities(b)	3.8	3.8	4.1	4.1	3.6	4.0	4.3	4.1	3.3
Livestock — inventories	2.7	3.1	3.1	2.7	2.5	2.7	3.1	3.6	4.0
Plantation standing timber	5.3	6.2	5.9	6.1	6.8	7.6	7.8	8.0	8.1
<i>Non-produced assets</i>	625.8	669.9	715.0	730.2	809.1	874.7	958.1	1 056.6	1 157.7
Land	557.5	597.5	625.3	643.3	710.2	769.0	835.4	907.1	976.0
Subsoil assets(c)	66.6	70.5	87.5	84.7	96.7	103.4	120.4	143.9	172.9
Native standing timber(c)	1.7	1.9	2.2	2.2	2.2	2.3	2.3	2.5	2.6
<i>Financial assets with the rest of the world(d)</i>	145.0	168.7	184.8	193.4	229.8	299.5	315.9	396.1	440.0
Monetary gold and SDRs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.4	1.6
Currency and deposits	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	18.2	23.4
Securities other than shares	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	63.4	81.1
Loans and placements	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	42.6	49.0
Shares and other equity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	258.3	270.3
Other accounts receivable	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12.1	14.6
<b>Liabilities to the rest of the world(d)</b>	<b>366.1</b>	<b>404.8</b>	<b>440.3</b>	<b>468.7</b>	<b>519.9</b>	<b>596.5</b>	<b>641.3</b>	<b>738.3</b>	<b>834.1</b>
Currency and deposits	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	39.3	55.8
Securities other than shares	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	277.1	324.6
Loans and placements	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	84.5	87.6
Shares and other equity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	328.4	353.5
Other accounts payable	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	9.0	12.6
<b>Net worth</b>	<b>1 690.9</b>	<b>1 771.3</b>	<b>1 860.8</b>	<b>1 899.6</b>	<b>2 012.7</b>	<b>2 145.8</b>	<b>2 295.4</b>	<b>2 482.2</b>	<b>2 625.2</b>
<b>Memorandum items</b>									
Consumer durables	102.5	105.9	110.0	112.9	111.5	114.6	116.1	118.2	123.5
Direct investment									
Foreign investment in Australia	116.6	121.3	128.7	140.0	150.8	162.4	177.8	199.4	213.8
Australian investment abroad	56.3	60.2	70.8	74.2	89.0	125.6	126.0	174.1	179.5
Non-rateable land	25.4	30.6	35.6	38.7	40.8	43.6	48.8	53.3	65.5

(a) Includes for all periods the marketing authorities privatised in July 1999. (b) Includes for all periods the remaining public marketing authorities. (c) These estimates are regarded as experimental. (d) Series break at 30 June 1995. See 'Information Paper: Upgraded Australian National Accounts: Financial Accounts' (5254.0).

Source: Australian System of National Accounts (5204.0).

## Real/volume balance sheet estimates

Table 29.25 presents real/volume balance sheet data for Australia. The data show that Australia's real net worth (total assets less total liabilities to the rest of the world) grew by 20.9% between

30 June 1992 and 30 June 2001, compared with an increase of 61.7% in current prices. This represents a real average annual growth rate of 2.1%.

Total assets, in real terms, grew by 35.2% during this period, driven mainly by increased volumes of dwellings (33.8%), machinery and equipment (29.0%), subsoil assets (44.4%), and real total

financial assets with the rest of the world (200%). Real financial liabilities to the rest of the world increased by about 114.8% between 30 June 1992 and 30 June 2001.

### 29.25 REAL/VOLUME BALANCE SHEET — As at 30 June

	1993	1994	1995	1996	1997	1998	1999	2000	2001
	$b	$b	$b	$b	$b	$b	$b	$b	\$b
<b>Total assets</b>	<b>2 466.7</b>	<b>2 541.2</b>	<b>2 640.3</b>	<b>2 681.6</b>	<b>2 774.4</b>	<b>2 906.5</b>	<b>2 980.0</b>	<b>3 162.8</b>	<b>3 257.5</b>
<i>Non-financial assets</i>	2 320.0	2 369.1	2 453.4	2 488.2	2 542.7	2 602.4	2 662.5	2 774.8	2 841.4
<i>Produced assets</i>	1 426.4	1 455.2	1 501.4	1 553.9	1 581.6	1 622.8	1 664.5	1 746.1	1 782.0
<i>Fixed assets</i>	1 341.1	1 367.0	1 406.1	1 457.4	1 484.1	1 525.4	1 565.2	1 642.6	1 677.1
<i>Tangible fixed assets</i>	1 336.3	1 360.5	1 398.6	1 449.0	1 473.8	1 512.7	1 548.6	1 621.8	1 651.8
Dwellings	461.0	477.9	495.8	509.5	522.5	539.7	558.8	582.2	597.2
Other buildings and structures	630.3	638.2	648.0	660.0	674.0	689.2	705.9	720.5	727.7
Machinery and equipment	246.9	248.8	256.1	264.6	275.3	287.1	297.2	308.1	317.3
Livestock — fixed assets(a)	12.3	13.1	17.3	17.9	13.6	13.8	13.1	11.0	9.6
<i>Intangible fixed assets</i>	7.3	8.3	9.2	9.9	11.4	13.4	16.8	20.8	25.3
Computer software	6.7	7.7	8.6	9.3	10.6	12.6	15.7	20.2	24.7
Entertainment, literary or artistic originals	0.4	0.5	0.4	0.4	0.5	0.5	0.6	0.6	0.6
<i>Inventories</i>	85.6	88.4	95.3	96.6	97.6	97.4	99.3	103.5	104.9
Private non-farm(b)	70.0	71.4	73.8	73.8	75.8	75.1	79.5	81.2	83.2
Farm	4.1	3.8	5.1	6.2	5.9	6.5	6.3	6.8	7.3
Public authorities	3.5	3.1	3.2	3.6	3.1	3.1	3.7	3.9	3.1
Livestock — inventories	4.3	5.1	7.4	8.7	7.2	5.2	3.8	3.5	3.1
Plantation standing timber	6.1	7.0	6.9	7.0	7.4	7.9	7.9	8.1	8.2
<i>Non-produced assets</i>	895.9	916.8	956.4	932.2	960.9	979.5	997.9	1 028.8	1 059.3
<i>Tangible non-produced assets</i>	895.9	916.8	956.4	932.2	960.9	979.5	997.9	1 027.4	1 056.6
Land	781.1	804.6	824.4	804.9	824.3	839.2	859.6	886.3	908.1
Subsoil assets(c)	111.0	107.8	129.0	124.4	134.7	138.5	135.9	136.9	142.7
Native standing timber(c)	2.6	2.7	2.9	2.6	2.5	2.6	2.4	2.4	2.4
Spectrum	—	—	—	—	—	—	—	1.7	3.4
<i>Intangible non-produced assets</i>	—	—	—	—	—	—	—	1.4	2.7
Spectrum licences	—	—	—	—	—	—	—	1.4	2.7
<i>Financial assets with the rest of the world(d)</i>	158.1	181.7	196.1	202.2	237.5	306.0	318.5	388.0	416.2
Monetary gold and SDRs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.3	1.5
Currency and deposits	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	17.9	22.1
Securities other than shares	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	62.1	76.7
Loans and placements	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	41.8	46.3
Shares and other equity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	253.0	255.7
Other accounts receivable	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11.9	13.8
<b>Liabilities to the rest of the world(d)</b>	<b>399.2</b>	<b>436.0</b>	<b>467.2</b>	<b>490.0</b>	<b>537.4</b>	<b>609.4</b>	<b>646.5</b>	<b>723.1</b>	<b>789.0</b>
Currency and deposits	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	38.5	52.8
Securities other than shares	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	271.4	307.0
Loans and placements	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	82.8	82.9
Shares and other equity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	321.6	334.4
Other accounts payable	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	8.8	11.9
<b>Net worth</b>	<b>2 083.4</b>	<b>2 118.1</b>	<b>2 184.9</b>	<b>2 201.4</b>	<b>2 243.4</b>	<b>2 299.9</b>	<b>2 334.4</b>	<b>2 439.7</b>	<b>2 468.5</b>

(a) Livestock — fixed assets included in the balance sheet include all animals and not just sheep and cattle as shown in the capital stock tables. (b) Includes for all periods the privatised marketing authorities. (c) Experimental, see Appendix 1, 'Conceptual Framework' in 'Australian System of National Accounts, 2000-01' (5204.0). (d) Owing to the introduction of new international standards from 30 June 1995, estimates of financial assets and liabilities are not fully consistent with the estimates shown prior to this period. For more information on these changes see the 'Information Paper: Upgraded Australian National Accounts: Financial Accounts, June 1998' (5254.0).

Source: Australian System of National Accounts (5204.0).

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 Reserve Bank of Australia, <<http://www.rba.gov.au>>

# Accounting for the environment in the national accounts

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## Introduction

The economy has a complex relationship with the environment. The environment provides the raw materials and energy for the production of goods and services that support our lifestyles, but it also sustains damage through the activities of households and businesses. The national accounts are sometimes criticised for including the value of goods and services produced and the income generated through the use of environmental assets, but not reflecting the economic cost of depleting those assets or the damage that arises from economic activity. This anomaly is well recognised by national accountants, as are a number of other deficiencies relating to the use of national accounts as a comprehensive measure of the 'wellbeing' of society (e.g. the value of unpaid housework is excluded from gross domestic product (GDP)).

This article discusses how the environment is currently treated in the national accounts, and gives a broad overview of the work being done by the ABS to extend the core national accounts in what could be called a satellite account for the environment.

## International standards

The national accounts are a macroeconomic data set revolving around the central economic concepts of production, income, expenditure and wealth. They also comprise a monetary system, and therefore rely substantially on being able to measure the money transactions taking place between the various economic agents in a market economy. The Australian system of national accounts (ASNA) is based on the latest international standard, *System of National Accounts 1993* (SNA93).

While the environment clearly provides services to the economy, these are often provided at no cost or are implicit in the value of goods and services rather than in explicit transactions. Environmental assets are often not controlled by

economic agents because of their physical nature, or in some cases are so plentiful that they have a zero price. For this reason, the valuation of environmental flows and stocks is fraught with conceptual and practical difficulties. Nevertheless, international research has been proceeding over a number of years and substantial progress has been made in sorting out the issues and concepts, although there is still limited experience in practical measurement.

The United Nations Statistical Division published an interim handbook *Integrated Environmental and Economic Accounting* in 1993. Over the last few years it has been redeveloped and extended by an international expert working group consisting of national accountants and environmental accountants. The revised handbook, titled the *System of Integrated Environmental and Economic Accounting* (SEEA), is currently in final draft stage and has recently been endorsed by the United Nations Statistical Commission for publication. It will provide a detailed conceptual and classification framework for environmental accounting and should provide an impetus for the advancement of environmental accounting internationally. Some of the material in the handbook relates to a clarification of the measurement of environmental assets in the traditional system of national accounts, but much of it concerns material that could be developed in a satellite account separate to the traditional accounts. Satellite accounts provide the freedom to develop alternative concepts, classifications and measurement techniques which are different, but at the same time retain a connection back to the national accounts based on SNA93.

The environmental accounting work being done by the ABS is consistent with the recommendations in SEEA.

## Natural resources in the ASNA

### Stocks

The national and sector balance sheets record the value of environmental assets that are defined as being within the scope of the system of national accounts — known as the asset boundary. For an asset to be included within the asset boundary of the national accounts it must have an identifiable owner, and the owner must be able to derive an economic benefit from the use of the asset. Assets included are those termed economic environmental assets, such as subsoil assets, land, forests, water, and fish stocks in open seas, that are under the control of an economic agent (often the government).

Environmental assets such as atmospheric and terrestrial ecosystems are outside the scope of economic assets as they do not have an identifiable owner who can derive an economic benefit from their use. This is not to suggest that these assets are of no value. On the contrary, many of them are essential to life itself. However, even if they fell within the definition of an economic asset, the valuation techniques available to measure such assets tend to be arbitrary and controversial.

The environmental assets on the Australian national and sector balance sheets are land, subsoil assets and native standing timber. Land valuations are available through administrative sources, and net present value (NPV) techniques

(which take into account current production rates, prices, costs, and discount rates) are used to value both subsoil and native forest assets. Plantation standing timber could also be considered an environmental asset, and plantations are included in the balance sheet as inventories because timber growth is controlled. Water and fish stocks have not been included on the Australian national balance sheet due to a lack of available data.

The Australian national balance sheet recorded \$3,459b worth of assets as at 30 June 2001, of which \$1,160b (33%) were economic environmental assets (table S29.1).

While land accounts for 84% of the value of Australia's economic environmental assets, the value of rural land accounts for only 12% of the total value of land. Subsoil assets account for 15% and timber (native and plantation) accounts for 1% of Australia's economic environmental assets (based on table S29.2). No values are included for water or fish stocks, or other environmental assets outside the SNA 93 asset boundary.

The value of environmental assets in current prices grew strongly during the 1990s, increasing by 84% between 30 June 1993 and June 30 2001. Much of this growth was due to rising prices. Environmental assets grew in volume terms by 18% during the same period (based on table S29.3).

**S29.1 AUSTRALIA'S TOTAL ASSETS, Current prices — As at 30 June**

	1993	1994	1995	1996	1997	1998	1999	2000	2001
	$b	$b	$b	$b	$b	$b	$b	$b	\$b
Financial	145	169	185	193	230	300	316	396	440
Buildings and structures	934	973	1 024	1 067	1 107	1 159	1 236	1 318	1 399
Machinery and equipment	251	257	265	268	274	291	301	312	317
Other produced	96	101	107	104	106	111	118	129	138
Other non-produced	—	—	—	—	—	—	—	3	6
Environmental	631	676	721	736	816	882	966	1 062	1 160
<b>Total assets</b>	<b>2 057</b>	<b>2 176</b>	<b>2 301</b>	<b>2 368</b>	<b>2 533</b>	<b>2 742</b>	<b>2 937</b>	<b>3 221</b>	<b>3 459</b>

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

**S29.2 AUSTRALIA'S ENVIRONMENTAL ASSETS, Current prices — As at 30 June**

	1993	1994	1995	1996	1997	1998	1999	2000	2001
	$b	$b	$b	$b	$b	$b	$b	\$b	\$b
Rural land	60	65	68	86	91	101	105	110	115
Other land	498	532	557	557	619	669	730	797	861
Oil and gas	38	43	49	49	51	48	51	61	76
Other subsoil	28	28	38	35	46	55	69	83	97
Native standing timber	2	2	2	2	2	2	2	3	3
Plantation standing timber	5	6	6	6	7	8	8	8	8
<b>Total assets</b>	<b>631</b>	<b>676</b>	<b>721</b>	<b>736</b>	<b>816</b>	<b>882</b>	<b>966</b>	<b>1 062</b>	<b>1 160</b>

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

**S29.3 AUSTRALIA'S ENVIRONMENTAL ASSETS, Chain volume measures(a) — As at 30 June**

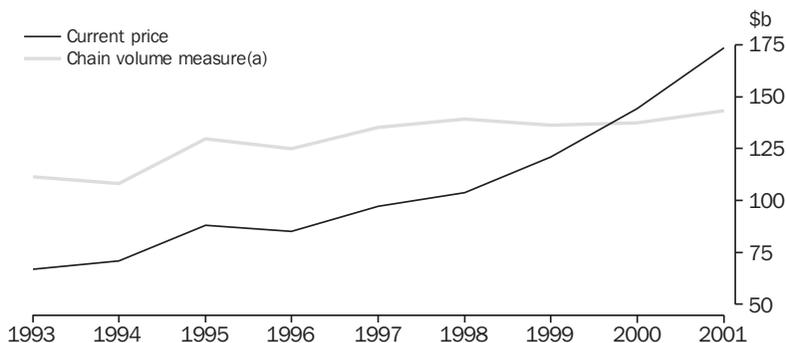
	1993	1994	1995	1996	1997	1998	1999	2000	2001
	$b	$b	$b	$b	$b	$b	\$b	\$b	\$b
Land	781	805	824	805	824	839	860	886	908
Subsoil assets	110	108	129	124	135	139	136	137	143
Native standing timber	3	3	3	3	3	3	2	2	2
Plantation standing timber	6	7	7	7	7	8	8	8	8
<b>Total assets</b>	<b>900</b>	<b>922</b>	<b>963</b>	<b>939</b>	<b>969</b>	<b>988</b>	<b>1 006</b>	<b>1 034</b>	<b>1 061</b>

(a) Reference year for chain volume measures is 1999–2000.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

Chain volume estimates of subsoil assets increased by 29% between 30 June 1993 and 30 June 2001, compared with growth of over 160% in current prices (graph S29.4). The strong volume growth has been due to new discoveries exceeding extractions during this period. The current price growth has been driven by

increasing prices in significant minerals such as iron ore, magnesite, crude oil, condensate, and LPG, and falling real discount rates. Minerals deposits cannot be extracted all at once, but are extracted over a long time period, and a discount rate is needed to calculate the NPV of future extractions.

**S29.4 SUBSOIL ASSETS — As at 30 June**

(a) Reference year for chain volume measures is 1999–2000.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

The volume estimates of native standing timber fell by 8% over the same period, while the current price estimates were increasing (graph S29.5). Volume estimates have fallen due to logging of native forests and the protection of some forests, resulting in their removal from the economic production boundary of the national accounts.

While the area of land is unlikely to change very much during the normal course of events, volume change also includes changes in quality due to natural processes, soil conservation and other land improvement measures, land degradation due to human activity, and the rezoning of land so that it is available for higher value uses. The practical task of splitting value changes into their price and volume components is a difficult one. As an interim approach, the ABS has calculated the growth in volume of urban land at half the rate of growth in the volume of overlying construction. Zero volume growth is assumed for rural land. This assumes that land degradation, reclassification and land improvement net to zero for rural land.

### Transactions — the national income, expenditure and production accounts

The transaction accounts of the ASNA measure production, incomes, consumption, capital and financial flows during the accounting period. GDP is the most readily identifiable statistic from the national accounts. Of most interest in the context of environmental accounting is the way environmental assets are used in the production process to produce goods and services for

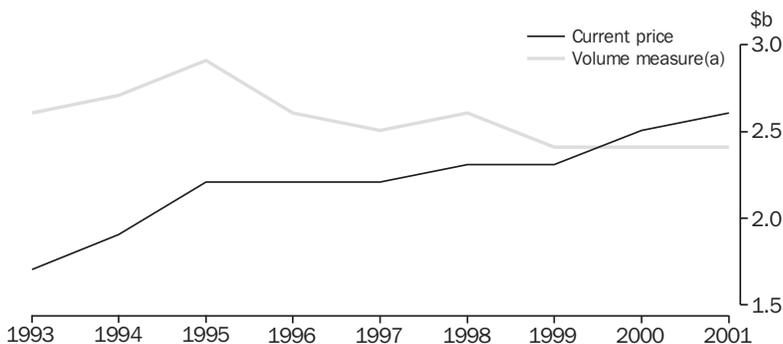
consumption, capital investment or export. However, the services provided by the environment are often either implicit in the values for other items or they are excluded as they are costed at zero price.

Where there are explicit rents for the use of natural assets, they are shown in the item 'rent on natural assets' in the sector income accounts. The general government sector received \$2.6b in resource rents in 2000–01 (mainly from petroleum, mining and forestry royalties). Many environmental assets (e.g. land) are used by their owners for which there is no money transaction.

In terms of GDP, the value of the services provided by the environment are implicit in the value of the output of the products produced and the incomes derived from their sale. In 2000–01, the current price industry gross value added of the agriculture, forestry and fishing industry accounted for 3.5% of total gross value added, while the mining industry accounted for 5.2%. The value added also reflects the input of labour and produced capital, as well as natural capital.

The value of new additions to environmental assets, such as discoveries of subsoil assets or natural growth in native standing timber, are not included as income or GDP. However, the cost of mineral exploration is regarded as fixed capital formation, and is reflected in GDP as the creation of an asset.

**S29.5 NATIVE FOREST ASSETS — As at 30 June**



(a) Reference year for volume measure is 1999–2000.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

As mentioned, no deduction is made from income for the depletion or degradation of the natural environment. Thus, '...a country could exhaust its mineral resources, cut down its forests, erode its soil, pollute its aquifers, and hunt its wildlife to extinction, but measured income would not be affected as these assets disappeared' (Repetto et al. 1989).

### A satellite account for the environment

The national accounts have a wide range of potential uses for policy making and economic and social research, and thus it is unlikely that the core accounts will be able to meet all possible objectives. In recognition of this, satellite accounts allow for a more flexible approach by providing frameworks that are linked to the national accounts, but focusing on a certain aspect of social or economic life. Satellite accounts also allow for standard concepts to be varied to suit particular studies within the context of the national accounts.

An environmental satellite account could take a number of forms and have a number of layers of detail. The ABS work program has focused on compiling asset accounts and accounts which decompose the changes in the value of assets during a period. The latter accounts can be used for adjusting the national accounts for the depletion of and additions to specific environmental assets in a satellite account framework.

### Measuring depletion

Depletion is defined in the SNA93 (12.29 and 12.30) as the:

...reduction in the value of deposits of subsoil assets as a result of the physical removal and using up of the assets, ... the depletion of water resources, and the depletion of natural forests, fish stocks in the open seas and other non-cultivated biological resources as a result of harvesting, forest clearance, or other use.

Depletion in an economic sense results because the value of the resource stock has been lowered through its use in a productive activity, and the use has reduced the asset's ability to produce an income stream in the future. In this sense depletion is analogous to depreciation of produced assets whereby the current value of the stock of fixed assets declines from normal use.

Physical depletion may not necessarily equate to economic depletion in cases where asset values are low or the resource life is long. While the physical dimension of depletion can be fairly readily observed in practice, its value cannot. This is because the mineral or other natural resource product is not what is being valued — rather it is the decline in the value of the mineral asset below the ground or of the standing timber in the forest. Generally, one has to resort to capital theory to undertake this valuation. In capital theory the value of depletion is a derivative of the amount of the resource extracted and the resource rent.

The resource rent is the value of the flow of capital services provided by a natural asset. It is calculated as the value of the output of the natural resource production (e.g. coal, oil) after the intermediate expenses, returns to labour (wages), returns to produced capital (profits accruing from the use of produced capital), and return to government (taxes) have been removed. Algebraically, the resource rent is represented as:

$$RR = (p - c) * Q$$

where RR = resource rent, p = unit price, c = unit cost (includes wages, intermediate costs, normal return to produced capital, and taxes), Q = quantity extracted.

The resource rent in each period is discounted to derive the NPV of the natural asset:

$$V_t = \sum_{t=1}^n \frac{RR}{(1+r)^t}$$

where V = NPV, r = discount rate, n = asset life.

Depletion can be shown to be equal to the resource rent in the year minus a return (income) on the natural resource asset.

$$d_t = V_{t-1} - V_t = RR_t - rV_t$$

where d = depletion.

Where the total stocks of an asset are unknown, discoveries of new stocks of subsoil assets or growth in biological assets may increase the stock of a resource so that the level of currently exploitable reserves from which the economic valuation is

derived is rising rather than falling. How to account for additions is a vexed issue. In the national accounts, the value of mineral exploration is included as a separate produced asset and is therefore in income and GDP. It could be argued that this should be replaced with the actual value of discoveries.

The following sections focus on subsoil, land and forest assets respectively.

### Subsoil assets

Subsoil assets are considered to be economic when they have a high geological assurance, extraction is expected to be profitable at the prevailing price and technology, and they are owned by an economic entity (usually the government). In the Australian balance sheets economic demonstrated resources include both proven and probable reserves.

Although SNA93 recommends that assets should be valued at their current market price, for many natural assets it is not possible to observe the market price directly as there is little trading of undeveloped stocks in the marketplace. The next best method is to value assets as the NPV of the future expected earnings, which is theoretically equivalent to the market value. This is the approach adopted in the national balance sheet and in deriving estimates of the value of depletion and additions to subsoil assets presented in table S29.6.

Year-to-year changes in the value of subsoil assets for Australia can be decomposed into revaluations, depletion and discoveries. Revaluations capture the change in prices of the existing stock.

The depletion in any one year is the change in the value of the asset between the beginning and end of the year arising purely from the extraction of minerals. As can be seen from graph S29.7, the depletion of crude oil accounts for a high proportion of the total depletion estimate. This is a reflection of crude oil's relative scarcity and high value.

A discovery occurs when previously unknown stocks of minerals are found and delineated. It is valued using the same NPV techniques described earlier. In the national accounts the value of a new discovery in itself is not considered as production or income because it is a gift of nature. However, the cost of mineral exploration is considered as production and included in income and GDP.

One approach that could be considered in a satellite account is to include the value of a discovery as production and income and to treat the exploration cost as intermediate input to the production of discoveries. As shown in graph S29.8, the value of discoveries shows an erratic pattern which, under such an approach, would flow through to income. A possible variation on the concept could be to record the value of discoveries as an accrual over the average period of exploration in order to smooth the income flow.

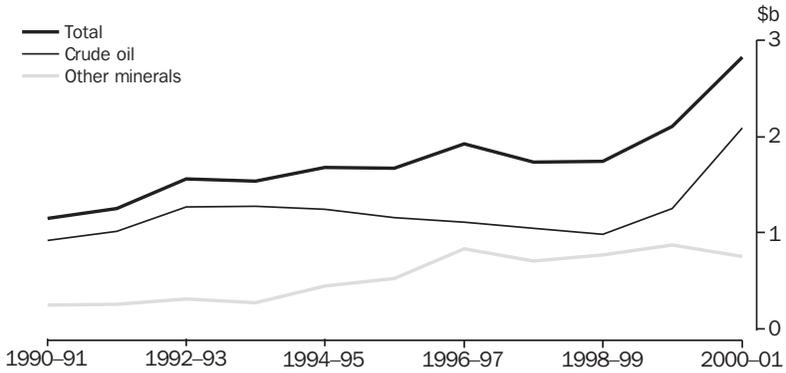
As long as the value of discoveries continues to outpace or equal the value of depletion the activity can be seen to be sustainable. This is illustrated in graph S29.9.

### S29.6 RECONCILIATION OF OPENING AND CLOSING VALUES FOR SUBSOIL ASSETS, Current prices

	Opening stock	Revaluation	Volume changes		Closing stock
			Depletion	Discoveries	
	\$m	\$m	\$m	\$m	\$m
1990–91	52 020	4 653	-1 126	841	56 388
1991–92	56 388	-27	-1 228	634	55 768
1992–93	55 768	9 586	-1 531	2 737	66 559
1993–94	66 559	1 946	-1 509	3 470	70 466
1994–95	70 466	17 185	-1 650	1 542	87 543
1995–96	87 543	-2 846	-1 640	1 664	84 721
1996–97	84 721	13 332	-1 892	583	96 743
1997–98	96 743	6 558	-1 703	1 762	103 361
1998–99	103 361	15 716	-1 710	3 050	120 416
1999–2000	120 416	23 203	-2 073	2 383	143 929
2000–01	143 929	28 944	-2 785	2 785	172 873

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

**S29.7 SUBSOIL DEPLETION**



Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

**S29.8 SUBSOIL DISCOVERIES**



Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

**S29.9 SUBSOIL DEPLETION AND DISCOVERIES**



Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

### Land/soil assets

Where land is used sustainably, it has an infinite life and therefore no adjustment for depletion is required — the whole value of the resource rent would rightly be considered as income. However, where land is being degraded due to economic activity, an adjustment to income for land degradation is applicable. As for subsoil assets discussed above, any economic costs should be offset against the benefits (income) derived from agricultural land use.

In the context of economic depletion used here, land degradation represents the year-to-year decline in the capital value of land resulting from economic activity (after deducting price rises due to inflation). Looked at another way it is equivalent to the year-to-year change in the NPV of the lost resource rent resulting from the declining productive capacity of the land. As such, it stops well short of a full measure of the cost of land degradation such as the cost to environmental systems and public infrastructure. The latter would, however, be captured in the national accounts estimates for consumption of fixed capital.

Changes in the value of agricultural land can be ascertained from data on market values or land rates data. However, data for land values are affected by a host of factors other than changes in productive capacity from the impact of land degradation, including inflation, technological advances and changes in land use due to rezoning, subdivision and 'lifestyle' considerations (Roberts 1997).

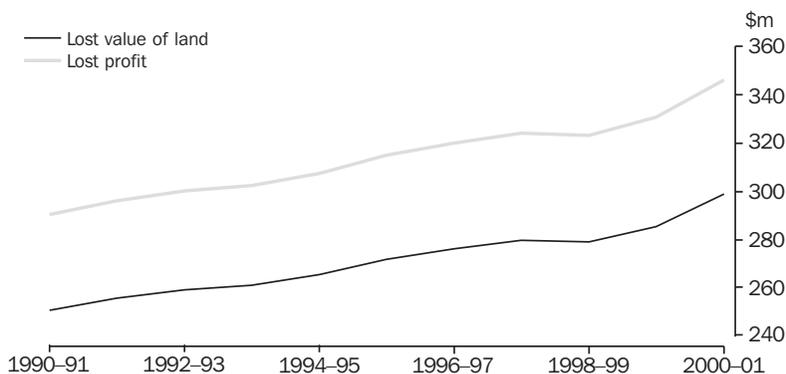
Two recent national studies used different approaches to measuring economic losses due to land degradation:

- Kemp and Connell (2001) used a farm survey to ascertain the extent of land degradation on farms. Combining data from the survey with land value data, regression techniques were used to estimate that the difference in the capital value of farms with and without degradation was approximately \$14.2b in 1999. This represents the accumulated value of losses in land value due to degradation.
- The National Land and Water Resources Audit (2002) used models to estimate the 'yield gap', that is, the difference between profits with and without soil degradation. Lost profit at full equity due to salinity, sodicity and acidity was estimated as \$2.6b in 1996–97.

To compare the results, either the former estimate has to be converted to a lost profit stream or the latter has to be capitalised. Profit at full equity is a measure of the net returns to land and water resources used for agriculture, and the managerial skill of land managers. Adjusting this concept to resource rent by removing the returns to the manager's labour and produced capital, and using a real discount rate of 5.8%, the capitalised value of the lost resource rent due to all past degradation is \$16.4b in 1996–97. The results using this method are sensitive to the discount rate. The real discount rate has been derived as the long-term government bond rate adjusted by the consumer price index in 1996–97.

While the estimates mentioned above represent the accumulated value of losses in land value due to all past degradation since European settlement, it is the year-to-year increment in the value of degradation that should be deducted from farm income in each period (consistent with the treatment of depreciation of produced assets). There are a number of issues to consider, including whether to deduct degradation from income in the periods when the effect becomes evident, or in the periods in which it was caused (sometimes decades or even a century earlier). The latter would seem appropriate in economic accounting. For the purpose of the indicative estimates contained in this article, it has been assumed that degradation accumulated evenly over a period of 50 years. Using the \$14.2b figure for lost land value, the annual increment (in 1999 dollar terms) is \$284m per year. Using the alternative estimate of \$16.4b, degradation is \$329m per year (in 1997 dollar terms). The annual losses are adjusted using the chain price index for GDP to arrive at degradation in current prices. The higher value has been taken into the summary estimates provided in table S29.11. For estimates post-1999 it has been assumed that degradation will accrue at the same rate. No adjustments have been made to account for land improvements that might reduce the future loss of resource rent. The resulting series are shown in graph S29.10.

## S29.10 LAND DEGRADATION



Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

### Forest assets

Forests are renewable biological resources. There are two types of forest: old-growth native forests (95% of the area of all Australian forests) and plantations. Broadleaved and coniferous plantation standing timber are treated as categories of produced assets in the national accounts, as the growth is under the direct control, responsibility and management of the owner. They are classified as inventories. Native forests are treated as non-produced assets as, although they may be owned and available for use, their growth is not the result of an economic process. As for other non-produced assets, the depletion of native forest assets due to harvesting is not charged against income in the national accounts.

The valuation of the depletion of renewable assets presents a different set of issues to non-renewable assets, as it may be possible to replace (over time) the part of the asset that is used in the current period. Where a forest is harvested sustainably, no depletion adjustment is required. SEEA suggests that either depletion and additions can be calculated separately, or that just the net depletion could be calculated. Where old-growth will not be replaced, only a depletion adjustment will apply. In some areas, however, old-growth forest will become second-growth forest. Where extractions (i.e. timber harvesting) still exceed growth, depletion should exceed additions. Once the transition period from old-growth forest to second-growth forest is complete, growth may exceed harvest. In this case yield can be considered economically sustainable.

In principle, the best approach would be to calculate both depletion and addition adjustments as this allows for the two impacts to be explicitly identified. Depletion is calculated as the change in the NPV of the forest arising from the harvesting of timber (similar to subsoil assets). The value of additions is the NPV of the growth in any one year. The compilation of this series requires data on the annual increase in forest cover.

It is also possible that forests will come into or out of scope of the balance sheet due to land-use management decisions or catastrophic events (e.g. bushfires) that affect the volumes of standing timber. Such changes should not be recorded as depletion because they are not regular economic events. Rather, they should be included as either positive or negative additions to assets in the balance sheet and recorded in the 'other change in assets account'.

Estimates are not yet available for depletion of native forests. However, given that the value of native forests on the national balance sheet is \$2.6b compared with \$172.9b for subsoil assets, it is expected that depletion of the former will be relatively insignificant. This of course is taking an economic view only, and does not account for damage to intrinsic non-monetary values such as ecosystem services, biodiversity and aesthetic/recreational values.

### Adjusting the national accounts

It was stated earlier in this article that there is an asymmetry in the national accounts between the treatment of produced assets such as buildings, and plant and natural (non-produced) assets. Depreciation of produced assets (termed consumption of fixed capital in the national accounts) is deducted to derive the various 'net' income measures in the national accounts such as net domestic product (NDP), net operating surplus (NOS), net national income and net saving. No such deduction is made for natural assets when they are used up or degraded as a result of economic activity. The net measures thus fall short of being sustainable concepts of income, although they are superior to the various 'gross' measures in the national accounts in this respect.

The experimental estimates derived for the value of depletions and discoveries of subsoil assets and the degradation of agricultural land are indicative of adjustments that could be made to the national accounts in the context of a satellite account, and are illustrated in table S29.11. Depletion adjustments unambiguously lower the net values. If the value of discoveries is included in income in place of the value of mineral exploration, the net effect of that adjustment can be positive or negative.

The net saving levels are changed by the same amount as for NOS, but the nation's net lending position is left unchanged.

Adjusting the national accounts for depletion and additions of subsoil assets also affects growth rates, which may increase or decrease. As table S29.12 shows, the adjustments have the biggest impact on both NDP and NOS in 1994–95, due to the low value of subsoil asset additions in that year compared to the previous one.

### Energy and greenhouse gas emissions

A satellite account for energy and greenhouse gas emissions using the input-output framework was published by the ABS in *Energy and Greenhouse Gas Emissions Accounts, Australia* (4604.0) in 2001. It presented information on the supply, use and stock of primary energy resources, supply and use of secondary energy products, and greenhouse gas emissions associated with the use of these energy resources. Energy use and emissions of greenhouse gases were linked with economic data and tracked through the economy so that emissions were allocated to final end users of products, rather than to the producers of products.

Of the total net energy supply (13,397 PJ), 66% was exported, 7% was consumed by households and 18% consumed by industry. Together household electricity use and motor vehicle use by households accounted for over 30% of Australia's energy-related greenhouse gas emissions.

### Future work and further information

The work program on environmental satellite accounting is continuing. The ABS hopes to extend the depletion adjustment to include native forests. Other areas of work will be to highlight environmental protection expenditures and to look at extending the economic asset boundary to include the value of water and possibly fish. Work on the valuation of environmental damage (externalities associated with human and economic activity) is an undeveloped field of research and it is unlikely that the ABS will have the capacity to make advances in this area in the foreseeable future.

**S29.11 PRODUCTION AND CAPITAL INCOMES ADJUSTED FOR DEPLETION AND ADDITIONS,  
Current prices**

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
	$m	$m	$m	$m	$m	$m	$m	\$m
<i>plus</i>								
Subsoil depletion	1 509	1 650	1 640	1 892	1 703	1 710	2 073	2 785
Land degradation	301	306	313	318	322	322	329	344
<i>less</i>								
Subsoil additions	3 470	1 542	1 664	583	1 762	3 050	2 383	2 785
<i>plus</i>								
Cost of mineral exploration	1 471	1 791	1 905	2 257	2 300	1 916	1 562	1 563
<i>less</i>								
COFC(a) on mineral exploration	1 109	1 147	1 199	1 248	1 316	1 364	1 448	1 517
<i>equals</i>								
<b>Net depletion adjustment</b>	<b>-1 298</b>	<b>1 058</b>	<b>995</b>	<b>2 636</b>	<b>1 247</b>	<b>-466</b>	<b>133</b>	<b>390</b>
GDP(b)	446 480	471 348	502 828	529 886	561 229	591 592	629 212	670 029
<i>less</i>								
Consumption of fixed capital	73 773	76 264	78 617	80 376	86 160	91 316	97 663	104 292
<i>equals</i>								
NDP(c)	372 707	395 084	424 211	449 510	475 069	500 276	531 549	565 737
<i>less</i>								
Net depletion adjustment	-1 298	1 058	995	2 636	1 247	-466	133	390
<i>equals</i>								
<b>Depletion adjusted NDP(c)</b>	<b>374 005</b>	<b>394 026</b>	<b>423 216</b>	<b>446 874</b>	<b>473 822</b>	<b>500 742</b>	<b>531 416</b>	<b>565 347</b>
GOS and GMI(d)	185 849	192 149	202 687	210 158	227 762	234 776	253 803	264 641
<i>less</i>								
Consumption of fixed capital	73 773	76 264	78 617	80 376	86 160	91 316	97 663	104 292
<i>equals</i>								
NOS(e)	112 076	115 885	124 070	129 782	141 602	143 460	156 140	160 349
<i>less</i>								
Net depletion adjustment	-1 298	1 058	995	2 636	1 247	-466	133	390
<i>equals</i>								
<b>Depletion adjusted NOS(e)</b>	<b>113 374</b>	<b>114 827</b>	<b>123 075</b>	<b>127 146</b>	<b>140 355</b>	<b>143 926</b>	<b>156 007</b>	<b>159 959</b>
Net saving	9 238	6 038	10 717	19 600	20 567	18 173	19 672	18 508
<i>less</i>								
Net depletion adjustment	-1 298	1 058	995	2 636	1 247	-466	133	390
<b>Depletion adjusted saving</b>	<b>10 536</b>	<b>4 980</b>	<b>9 722</b>	<b>16 964</b>	<b>19 320</b>	<b>18 639</b>	<b>19 539</b>	<b>18 118</b>

(a) Consumption of fixed capital. (b) Gross domestic product. (c) Net domestic product. (d) Gross operating surplus and gross mixed income. (e) Net operating surplus.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0).

**S29.12 PRODUCTION AND CAPITAL INCOMES ADJUSTED FOR DEPLETION AND ADDITIONS,  
Percentage changes**

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
	%	%	%	%	%	%	%	%
GDP(a)	4.9	5.6	6.7	5.4	5.9	5.4	6.4	6.5
NDP(b)	4.7	6.0	7.4	6.0	5.7	5.3	6.3	6.4
Depletion adjusted NDP(b)	4.9	5.4	7.4	5.6	6.0	5.7	6.1	6.4
<b>Net change in NDP(b) growth</b>	<b>0.2</b>	<b>-0.7</b>	<b>—</b>	<b>-0.4</b>	<b>0.3</b>	<b>0.4</b>	<b>-0.1</b>	<b>—</b>
GOS and GMI(c)	4.7	3.4	5.5	3.7	8.4	3.1	8.1	4.3
NOS(d)	4.0	3.4	7.1	4.6	9.1	1.3	8.8	2.7
Depletion adjusted NOS(d)	4.7	1.3	7.2	3.3	10.4	2.5	8.4	2.5
<b>Net change in NOS(d) growth</b>	<b>0.6</b>	<b>-2.1</b>	<b>0.1</b>	<b>-1.3</b>	<b>1.3</b>	<b>1.2</b>	<b>-0.4</b>	<b>-0.2</b>

(a) Gross domestic product. (b) Net domestic product. (c) Gross operating surplus and gross mixed income. (d) Net operating surplus.

Source: *Australian National Accounts: National Income, Expenditure and Product (5206.0)*.

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## Introduction

This chapter presents statistics on Australia's international accounts, covering exports and imports of goods, international trade in services, international investment transactions, and the levels of Australia's foreign financial assets and liabilities.

These statistics are used by economic analysts and policy advisers to monitor, evaluate and forecast developments in Australia's external trade and external sector accounts for the purposes of domestic and international macroeconomic analysis and policy determination. They are also used by governments, government agencies, businesses, industry associations, research institutions and others to analyse patterns of trade and assess particular types of transactions and financial claims and liabilities between Australian residents and non-residents, for purposes such as trade promotion and negotiations, and market and industry performance studies.

## International accounts

International accounts cover the closely related and integrated balance of payments and international investment position statistics. Diagram 30.1 presents the broad structure and relationship of these statistics.

Australia's balance of payments provides a statistical statement that systematically summarises the economic transactions between residents of Australia and residents of other countries. Residents, who may be people or businesses, need not be Australian nationals. Transactions cover the provision (changes in ownership) of goods, services, income, financial claims on and liabilities to the rest of the world, and transfers (such as gifts) without anything provided in exchange.

Australia's international investment position is a balance sheet of the stock of foreign financial assets and liabilities of Australian residents. International investment statistics integrate the balance sheet positions at two points in time with information on increases and decreases in the levels of these assets and liabilities as a result of the changes due to transactions (investment flows, including reinvestment of earnings) as shown in the financial account of the balance of

payments, together with the other changes that affect either the value of the stock (price, exchange rate) or the volume (other adjustments) of the stock of financial assets and liabilities.

## Foreign ownership in Australia

Statistics of foreign ownership in Australia presented in this chapter use levels data from Australia's international investment position to estimate the foreign ownership of equity in Australian enterprises.

## International merchandise trade

International merchandise trade statistics cover all movable goods which add to (imports) or subtract from (exports) Australia's stock of material resources. The statistics are compiled from information submitted by importers and exporters to the Australian Customs Service. Some goods are excluded for conceptual or practical reasons, for example, those goods temporarily brought to Australia for subsequent forwarding to foreign destinations, and low-value imports and exports in the parcel post system.

The data about merchandise exports and imports are used in the compilation of the balance of payments. However, various adjustments relating to coverage, timing, classification and (for imports only) valuation are necessary before international merchandise trade statistics can be put on a balance of payments basis. Therefore, the merchandise exports and imports statistics, and the excess of exports (+) or imports (-), shown in the *International merchandise trade* section will differ from those shown in the *International accounts* section.

## International accounts

### Conceptual framework

Australia's international accounts statistics, which cover both the balance of payments and the international investment position, are compiled in accordance with international statistical standards. In this edition of Year Book Australia the data are compiled in accordance with the Fifth Edition of the International Monetary Fund's *Balance of Payments Manual (BPM5)*. The concepts of residency, transactions, valuation and time of recording are common to the balance of payments and international investment position statistics.

30.1 RELATIONSHIP BETWEEN THE BALANCE OF PAYMENTS AND INTERNATIONAL INVESTMENT POSITION STATEMENTS

		<i>Balance of Payments</i>					
		<p><b>CURRENT ACCOUNT</b>  <b>Goods</b>                      Credits                      Debits  <b>Services</b>                      Credits                      Debits  <b>Income</b>                      Credits                      Debits  <b>Current transfers</b>                      Credits                      Debits  <b>Balance on Current Account</b></p>	Investment income from International Investment 				
		<p><b>CAPITAL ACCOUNT</b>                      Capital transfers                      Acquisition/disposal of non-produced, non-financial assets  <b>Balance on Capital Account</b></p>					
<b>International Investment Position</b>	<b>Position at Beginning of Period</b>	<p><b>FINANCIAL ACCOUNT</b>  <b>Transaction Changes</b>  <b>Direct Investment</b>                      Abroad                      In Australia  <b>Portfolio Investment</b>                      Assets                      Liabilities  <b>Financial Derivatives</b>                      Assets                      Liabilities  <b>Other Investment</b>                      Assets                      Liabilities  <b>Reserve Assets</b>  <b>Balance on Financial Account</b></p>	<b>Other Changes in Position Reflecting:</b>			<p><b>Position at End of Period</b>  <b>Australian Investment Abroad</b>                      Direct investment                      Portfolio investment                      Financial derivatives                      Other investment                      Reserve assets  <b>Foreign Investment in Australia</b>                      Direct investment                      Portfolio investment                      Financial derivatives                      Other investment</p>	
	<p><b>Australian Investment Abroad</b>                      Direct investment                      Portfolio investment                      Financial derivatives                      Other investment                      Reserve assets  <b>Foreign Investment in Australia</b>                      Direct investment                      Portfolio investment                      Financial derivatives                      Other investment  <b>Net International Investment Position</b></p>	Price Changes	Exchange Rate Changes	Other Adjustments		<p><b>Australian Investment Abroad</b>                      Direct investment                      Portfolio investment                      Financial derivatives                      Other investment                      Reserve assets  <b>Foreign Investment in Australia</b>                      Direct investment                      Portfolio investment                      Financial derivatives                      Other investment  <b>Net International Investment Position</b></p>	
			<p><b>Net errors and omissions</b>                      (the sum, with sign reversed, of the balances on the current, capital and financial accounts)</p>				

Source: Balance of Payments and International Investment Position, Australia: Concepts, Sources and Methods (5331.0).

The balance of payments accounts, which present systematically the economic transactions between Australia and the rest of the world, incorporate four types of economic transactions. The first involves the provision of real resources, that is, transactions in goods, services and income. The second involves the provision of financial resources, that is, foreign financial assets and liabilities. The third covers those one-sided transactions of a current nature (described as current transfers) that are offsets to transactions in current real or financial resources undertaken without an exchange. Current resources are not associated with, nor finance, fixed assets. For example, famine relief, whether in cash or in kind, would have its offset in current transfers. The fourth type is capital transfers that offset transactions undertaken, without exchange, in fixed assets or in their financing (such as development aid). For example, migrants' funds represent the shift of the migrants' net worth to or from Australia, and are classified as capital transfers.

The first and third of these types of transactions comprise the current account, while the second type comprises the financial account. The fourth type (capital transfers), together with a minor item for the acquisition and disposal of non-produced, non-financial assets (such as patents), comprises the capital account.

The double entry accounting system is used for recording balance of payments transactions. Under this system, credit entries, which are shown with no arithmetic sign, are used to record the provision of real or financial resources. Credit entries are therefore required for exports of goods and services, and for income earned by residents (a return for providing the use of financial capital to non-residents, or for providing the labour of Australian residents). Credit entries are also required for providing financial resources to the rest of the world, either as new liabilities (such as issuing bonds), or through returning existing foreign assets (such as selling foreign equity securities to non-residents). Therefore, any credit entry in the financial account will reflect either an increase in Australia's foreign liabilities (more foreign debt or foreign ownership), or a decrease in Australia's foreign financial assets (such as a run-down in foreign exchange reserves).

Conversely, debit entries, which are identified by a minus sign (-), are used to record the provision by the rest of the world of real or financial resources to Australia, and are shown against imports of goods and services, income earned from Australia by non-residents, and financial

transactions involving either an increase in foreign financial assets or a decrease in foreign liabilities.

Transactions in a double entry accounting system are reflected in pairs of equal credit and debit entries. For example, an export transaction for which payment is received through the banking system involves a credit entry for providing the good to a non-resident and a debit entry for being provided with foreign exchange assets due as payment for the export. Any entries that are not automatically paired in a transaction, that is, for which there is no 'quid pro quo', are matched by special offsetting entries. Such offsetting entries are made in the categories 'current transfers' (when offsetting the provision of current resources such as food for famine relief) and 'capital transfers' (when offsetting the provision of capital resources such as development aid to build a new dam).

In principle, the net sum of all credit and debit entries is zero. In practice, some transactions are not measured accurately (errors), while others are not measured at all (omissions). Equality between the sums of the credit and debit entries is then brought about by the inclusion of a 'net errors and omissions' item which balances the accounts.

Transactions and other changes should be valued in the balance of payments at market prices. However, for practical reasons, transactions are generally valued in the statistics at transaction prices as this basis provides the closest practical approximation to the market price principle.

Transactions and other changes recorded in the balance of payments should be recorded at the time of change of ownership (either actual or imputed). For current account transactions, this occurs when ownership of goods changes, or services are provided. Investment income is recorded on a full accrual basis, that is, when it is earned. Reinvested earnings are calculated for the earnings of the period of account, using current replacement cost estimates of depreciation and excluding holding gains and losses. Current and capital transfers should be recorded when the goods, services, cash, etc., to which they are offsets, change ownership. Those transfers, such as taxes and fines, which are imposed by one party on another, should ideally be recorded at the time of occurrence of the underlying transactions or other flows or events that give rise to the liability to pay. For financial account transactions, the time of recording is at the change of ownership of the financial claims,

which by convention is the time at which transactions are entered in the books of the transactors.

In practice, the nature of the available data sources is such that the time of recording of transactions will often differ from the time of change of ownership. Where practical, timing adjustments are made for transactions to ensure that they are recorded in the time period in which change of ownership occurs.

International investment position statistics provide information on the levels (stock) of Australia's foreign financial assets and liabilities. The investment position at the end of a period reflects the foreign financial asset and liability positions at the start of the period, and the financial transactions (investment flows) from the balance of payments which increase or decrease these assets and liabilities, together with the non-transaction changes due to exchange rate effects, other price effects and changes in the volume of these assets and liabilities that are not due to transactions (such as debt write-off).

While the international investment position statistics form an integral part of Australia's balance of payments (see diagram 30.1), they are also useful in their own right, for example, in determining the impact of foreign investment policies and the level of Australia's foreign assets and liabilities, including foreign debt. They are also useful when analysing the behaviour of financial markets.

As with the balance of payments, market price is the principal method of valuation in international investment position statistics, and financial assets and liabilities are recognised on a change of ownership basis, that is, at the time when the foreign financial asset or liability is acquired, sold, repaid or otherwise disposed of. By convention, this is generally taken to be the time at which the event is recorded in the books.

## Classifications

In the following tables, estimates are presented of the current, capital and financial accounts of Australia's balance of payments. Current and capital account transactions are generally recorded gross. This means that, for each item in the current and capital accounts, the credit entries are recorded separately from the debit entries. For example, goods credits are shown separately from goods debits. For each item in the financial account, however, debit and credit

transactions are combined to produce a single result for the item which may be either a net credit or a net debit. For example, in a given period, non-resident purchases of shares issued by companies in Australia (credit) are netted against sales of Australian shares to residents by non-residents (debit) and the net result is recorded in the financial account as either a net credit or a net debit.

The current account records transactions between Australian residents and non-residents in goods, services, income and current transfers. Goods are classified into five main components: general merchandise; goods for processing; goods procured in ports by carriers; repairs on goods; and non-monetary gold. Changes of ownership from residents to non-residents are recorded as credits (also referred to as exports), and changes from non-residents to residents are recorded as debits (also referred to as imports). Services, comprising 11 primary components, cover services provided by Australian residents to non-residents (credits) and by non-residents to residents (debits), together with transactions in a few types of goods (e.g. goods purchased by travellers). Income, comprising investment income (e.g. dividends and interest) and compensation of employees (e.g. wages), covers income earned by Australian residents from non-residents (credits) or earned by non-residents from residents (debits). Current transfers cover the offsetting entries required when resources are provided, without something of economic value being received in return. When non-residents provide something to Australian residents, offsetting credits are required; when residents provide resources to non-residents, offsetting debits are required. General government transfers (e.g. official foreign aid) are distinguished from transfers by other sectors.

The capital account covers capital transfers (such as migrants' funds), distinguished between general government and other sectors, and the acquisition/disposal of non-produced, non-financial assets.

The financial account shows transactions in foreign financial assets and liabilities. The primary split is by functional type of capital (direct investment, portfolio investment, financial derivatives, other investment and reserve assets) further split into assets and liabilities (where appropriate). Within the asset and liability categories, details are presented of instruments of investment and resident sectors (for other than direct investment), and in some cases the contractual maturity of the instruments used.

The primary distinction used in international investment position statistics is between assets and liabilities. Assets primarily represent Australian investment abroad, and liabilities primarily represent foreign investment in Australia. The difference between the two represents the net international investment position (see graph 30.11 and table 30.12). Australian investment abroad refers to the stock of foreign financial assets owned by Australian residents, after netting off any liabilities of Australian direct investors to their direct investment enterprises abroad. Conversely, foreign investment in Australia refers to the stock of financial assets in Australia owned by non-residents, after netting off any claims of Australian direct investment enterprises on their foreign direct investors. The first breakdown below this asset/liability dichotomy is by functional type of capital, with details of the instruments of investment (table 30.14), the resident sectors and contractual maturities involved.

While many types of instruments of investment can be identified, similar instruments are combined for analytical reasons and ease of reporting. Some of those instruments are:

*Equity capital* — which includes ordinary and participating preference shares, units in trusts and net equity in branches.

*Reinvestment of earnings of direct investors* — which refers to income retained within the enterprise from after-tax profits that is attributable to direct investors.

*Debt securities* — which include longer term, generally tradable security instruments such as bonds and debentures, with a contractual maturity of more than one year after issue, together with money market instruments (e.g. bills, commercial finance paper, negotiable certificates of deposit) with a contractual maturity of one year or less.

*Trade credits* — which cover the direct extension by suppliers and buyers for goods and services, including advances for work in progress or to be undertaken.

*Loans* — which cover the direct lending of funds either without a security evidencing the transaction, or with non-negotiable documentation. They include financial leases.

*Deposits* — which comprise both transferable and other deposits.

*Other assets and liabilities* — which consist of miscellaneous accounts in respect of interest, dividends, etc.

## Statistical overview

As shown in table 30.2, the balance on current account for 2001–02 was a deficit of \$22.2b, an increase of \$4.0b (22%) on the previous year. The deficit on goods and services was \$2.0b, a turnaround of \$2.9b on the 2000–01 surplus of \$0.9b. The main contributing factor was the decrease in services credits of \$2.2b, down from \$33.2b in 2000–01 to \$31.0b in 2001–02, returning to historic levels following the effects of the Sydney Olympic Games during 2000–01. The net goods deficit rose \$0.7b and the net income deficit rose \$1.1b on the previous year.

The surplus on capital account decreased by \$0.1b (6%) to \$1.0b in 2001–02.

The balance on financial account recorded a net inflow of \$20.3b, up \$6.0b (42%) on the previous year. Direct investment recorded a net outflow of \$0.9b, a turnaround from the net inflow of \$4.4b in 2000–01. A rise in the net outflow on Australian direct investment abroad of \$13.3b was partly offset by the rise of \$8.0b in the inflow of direct investment into Australia. The net inflow on portfolio investment fell \$2.8b and reserve assets fell \$9.7b. Partly offsetting these movements was a rise of \$3.5b in the net inflow on other investment.

Graph 30.3 illustrates the differing influences of the trade balance and the net income deficit on the balance on current account. The net income deficit rose from \$7b in 1985–86 to \$18–\$20b each year from 1994–95 onwards. The underlying level of net income will continue to drive the level and direction of the current account deficit, as Australia continues to service its external liabilities. However, the trade deficit has fluctuated quite significantly over the past 16 years. While the deficit has averaged about \$4b per year, it has moved from surpluses of \$2b to deficits of \$15b.

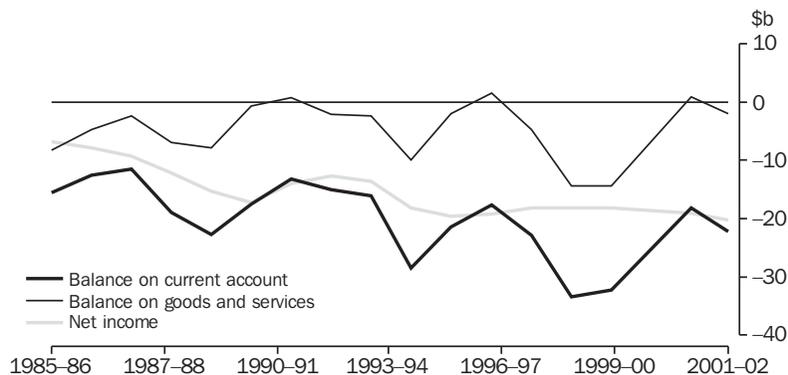
Table 30.4 shows the annual levels of Australia's official reserve assets and both the end of year and period average exchange rates for the major currencies, special drawing rights, and the trade weighted index.

## 30.2 BALANCE OF PAYMENTS, Summary

	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
	\$m	\$m	\$m	\$m	\$m	\$m
<b>Current account</b>	<b>-17 602</b>	<b>-22 807</b>	<b>-33 607</b>	<b>-32 283</b>	<b>-18 170</b>	<b>-22 212</b>
<i>Goods and services</i>	1 570	-4 738	-14 428	-14 351	875	-1 975
Credits	105 160	113 744	112 025	125 972	153 511	152 219
Debits	-103 590	-118 482	-126 453	-140 323	-152 636	-154 194
<i>Goods</i>	1 496	-3 546	-12 644	-12 955	-30	-757
Credits	80 934	88 538	85 783	97 655	120 307	121 180
Debits	-79 438	-92 084	-98 427	-110 610	-120 337	-121 937
<i>Services</i>	74	-1 192	-1 784	-1 396	905	-1 218
Credits	24 226	25 206	26 242	28 317	33 204	31 039
Debits	-24 152	-26 398	-28 026	-29 713	-32 299	-32 257
<i>Income</i>	-19 151	-18 091	-18 430	-18 150	-19 077	-20 220
Credits	8 563	10 384	10 288	13 773	16 179	14 913
Debits	-27 714	-28 475	-28 718	-31 923	-35 256	-35 133
<i>Current transfers</i>	-21	22	-749	218	32	-17
Credits	3 540	3 993	4 498	4 625	4 453	4 280
Debits	-3 561	-3 971	-5 247	-4 407	-4 421	-4 297
<b>Capital and financial account</b>	<b>18 870</b>	<b>25 769</b>	<b>31 281</b>	<b>31 973</b>	<b>15 444</b>	<b>21 324</b>
<i>Capital account</i>	1 317	1 127	1 167	1 053	1 109	1 038
<i>Capital transfers</i>	1 323	1 097	1 186	1 136	1 182	1 120
Credits	2 200	2 068	2 197	2 335	2 442	2 513
Debits	-877	-971	-1 011	-1 199	-1 260	-1 393
Net acquisition/disposal of non-produced, non-financial assets	-6	30	-19	-83	-73	-82
<i>Financial account</i>	17 553	24 642	30 114	30 920	14 335	20 286
<i>Direct investment</i>	4 895	2 852	4 747	9 641	4 368	-917
Abroad	-6 437	-7 435	-3 253	-2 927	-7 088	-20 346
In Australia	11 332	10 287	8 000	12 568	11 456	19 429
Portfolio investment	15 192	21 164	6 455	9 330	15 710	12 921
Financial derivatives	2 089	-2 828	2 748	431	-484	403
Other investment	580	2 996	16 558	14 140	3 621	7 102
Reserve assets	-5 203	458	-394	-2 622	-8 880	777
<b>Net errors and omissions</b>	<b>-1 268</b>	<b>-2 962</b>	<b>2 326</b>	<b>310</b>	<b>2 726</b>	<b>888</b>

Source: Balance of Payments and International Investment Position, Australia (5302.0).

## 30.3 BALANCE ON CURRENT ACCOUNT COMPARED TO NET INCOME



Source: Balance of Payments and International Investment Position, Australia (5302.0).

## 30.4 RESERVE ASSETS AND EXCHANGE RATES

	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
RESERVE ASSETS(a) (\$m)						
<b>Total reserve assets</b>	<b>-22 791</b>	<b>-24 260</b>	<b>-23 954</b>	<b>-27 948</b>	<b>-37 951</b>	<b>-37 435</b>
Monetary gold	-1 757	-1 236	-1 013	-1 233	-1 367	-1 445
Special drawing rights	-37	-25	-88	-141	-197	-216
Reserve position in IMF	-627	-1 449	-2 338	-2 225	-2 412	-2 992
<i>Foreign exchange</i>	<i>-20 370</i>	<i>-21 550</i>	<i>-20 515</i>	<i>-24 349</i>	<i>-33 975</i>	<i>-32 782</i>
Currency and deposits	-4 572	-11 675	-7 971	-9 148	-11 340	-11 761
Securities	-15 798	-9 875	-12 544	-15 143	-22 562	-21 137
Financial derivatives (net)	n.a.	n.a.	n.a.	-58	-73	116
EXCHANGE RATES						
End of period						
United States dollar	0.7455	0.6135	0.6596	0.5986	0.5075	0.5248
United Kingdom pound	0.4482	0.3681	0.4188	0.3941	0.3603	0.3537
Euro	..	..	0.6379	0.6282	0.6002	0.5737
Japanese yen	85.20	86.16	79.66	63.19	62.94	65.94
Special drawing right	0.5347	0.4617	0.4932	0.4481	0.4076	0.4105
Period average(b)						
United States dollar	0.7828	0.6808	0.6276	0.6289	0.5379	0.5239
United Kingdom pound	0.4851	0.4138	0.3824	0.3948	0.3704	0.3632
Euro	..	..	..	0.6278	0.6023	0.5850
Japanese yen	90.51	86.02	77.81	67.90	61.49	66.10
Special drawing right	0.5521	0.5026	0.4589	0.4642	0.4177	0.4135
TRADE-WEIGHTED INDEX OF VALUE OF THE AUSTRALIAN DOLLAR(c)						
End of period	56.7	57.9	58.4	53.3	49.7	50.4
Period average(b)	58.7	58.3	56.0	55.2	50.3	50.8

(a) As at 30 June. (b) These period average exchange rates and index numbers are derived by averaging figures for each trading day. (c) May 1970 = 100.0. The trade weighted index is reweighted annually and on special occasions as required.

Source: Reserve Bank of Australia for reserve assets, daily exchange rates and the trade-weighted index.

## International trade in goods and services (balance of payments basis)

Australia's international trade in goods and services for the six years to 2001-02 is shown in tables 30.5 (exports or credits) and 30.6 (imports or debits). The tables provide both current price and chain volume measures.

The components of merchandise goods shown in tables 30.5 and 30.6 are defined in terms of groupings of items in the United Nations (UN) *Standard International Trade Classification Revision 3 (SITC Rev. 3)* for credits, and the UN's *Classification of Broad Economic Categories* for debits.

Chain volume measures of exports and imports remove the effects of inflation. They provide measures, in dollar values, which indicate changes in the actual volume of exports and imports.

The current price value of a transaction may be expressed conceptually as the product of a price and quantity. The value of the transaction in chain volume measures may then be thought of as being derived by substituting, for the current price, the corresponding price in the chosen reference year.

There are, however, many transactions recorded in statistics of international trade in goods and services for which it is not possible to apply such an approach. In such cases it is necessary to make assumptions and approximations (e.g. revaluing by means of the price index which is considered to be most closely related to the commodity involved). The published chain volume measures should be viewed in this light. For more information on chain volume measures refer to *Information Paper: Introduction of Chain Volume Measures in the Australian National Accounts* (5248.0).

The balance on goods and services recorded a deficit of \$2.0b in 2001–02, a turnaround on the \$0.9b surplus recorded in 2000–01. Goods credits rose \$0.9b (0.7%) to \$121.2b, with the largest increases recorded in coal, coke and briquettes (up \$2.6b) and other non-rural (up \$1.1b).

Goods debits increased \$1.6b (1%) to \$121.9b. The most significant increase occurred in consumption goods (up \$1.7b) and capital goods (up \$1.7b). Intermediate and other merchandise goods fell 5% to \$52.1b, with decreases recorded in fuels and lubricants (down \$1.5b) and other parts for capital goods (down \$0.8).

Exports and imports of goods, on a merchandise trade basis without adjustment for balance of payments purposes, are shown by country in table 30.29.

Table 30.7 presents various price indexes for Australia's trade in goods and services. The implicit price deflators (IPDs) are derived by dividing the current price measures by the corresponding chain volume measures. These IPDs reflect not only price change, but compositional effects from year to year.

Unlike IPDs, chain price indexes measure only the impact of a price change. The chain Laspeyres price index for goods and services credits rose 1.3% in 2001–02 to 101.3. The rise resulted from increasing commodity prices in 2001–02 and a weaker Australian dollar. The chain Laspeyres price index for goods and services debits fell 1.0% in 2001–02 to 99.0.

Australia's terms of trade IPD (derived by dividing the IPD for credits by the IPD for debits) rose by 2.6% in 2001–02, resulting from a 1.2% rise in the IPD for goods and services credits, offset by a 1.4% fall in the IPD for goods and services debits (table 30.7).

## 30.5 GOODS AND SERVICES CREDITS

	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
	\$m	\$m	\$m	\$m	\$m	\$m
AT CURRENT PRICES						
<b>Goods and services credits</b>	<b>105 160</b>	<b>113 744</b>	<b>112 025</b>	<b>125 972</b>	<b>153 511</b>	<b>152 219</b>
<i>Goods credits</i>	80 934	88 538	85 783	97 655	120 307	121 180
<i>General merchandise</i>	73 379	80 571	78 323	90 100	112 897	113 562
<i>Rural goods</i>	21 045	22 130	21 862	23 617	29 061	29 306
Meat and meat preparations	2 957	3 731	4 008	4 467	5 796	6 213
Cereal grains and cereal preparations	5 954	5 094	5 046	4 941	5 834	5 846
Wool and sheepskins	3 744	4 020	2 583	2 963	3 897	3 693
Other rural	8 390	9 285	10 225	11 246	13 534	13 554
<i>Non-rural goods</i>	52 334	58 441	56 461	66 483	83 836	84 256
Metal ores and minerals	9 407	10 835	11 037	11 760	15 205	14 780
Coal, coke and briquettes	8 005	9 586	9 288	8 336	10 844	13 422
Other mineral fuels	5 154	5 309	4 461	9 082	13 464	10 956
Metals (excluding non-monetary gold)	6 054	7 185	6 984	8 810	10 146	9 643
Machinery	7 001	7 549	6 569	7 133	8 797	7 974
Transport equipment	3 649	3 412	3 343	4 597	5 041	5 773
Other manufactures	9 108	9 834	10 273	11 529	13 530	13 775
<i>Other non-rural (including sugar)</i>	3 956	4 731	4 506	5 236	6 809	7 933
Sugar, sugar preparations and honey	1 694	1 939	1 472	1 229	1 330	n.p.
Other	2 262	2 792	3 034	4 007	5 479	n.p.
Other goods	7 555	7 967	7 460	7 555	7 410	7 618
<i>Services credits</i>	24 226	25 206	26 242	28 317	33 204	31 039
CHAIN VOLUME MEASURES(a)(b)						
<b>Goods and services credits</b>	<b>123 707</b>	<b>128 277</b>	<b>130 897</b>	<b>143 193</b>	<b>153 511</b>	<b>150 468</b>
<i>Goods credits</i>	96 903	100 871	102 624	113 478	120 307	120 374
<i>General merchandise</i>	88 304	91 484	94 065	104 866	112 897	113 210
<i>Rural goods</i>	23 870	23 569	25 229	27 792	29 061	27 417
Meat and meat preparations	4 162	4 732	5 023	5 126	5 796	5 492
Cereal grains and cereal preparations	6 405	5 359	6 189	6 177	5 834	5 746
Wool and sheepskins	4 014	3 751	3 181	3 732	3 896	3 397
Other rural	9 172	9 770	10 980	12 806	13 534	12 783
<i>Non-rural goods</i>	64 419	67 997	68 828	77 086	83 837	85 792
Metal ores and minerals	13 065	13 244	13 597	13 905	15 205	15 386
Coal, coke and briquettes	8 227	9 129	9 452	9 895	10 843	11 106
Other mineral fuels	9 916	11 053	10 590	12 520	13 464	13 246
Metals (excluding non-monetary gold)	7 929	8 217	9 159	10 071	10 146	10 644
Machinery	6 561	7 149	6 451	7 294	8 797	8 249
Transport equipment	4 412	3 892	3 751	5 118	5 041	5 564
Other manufactures	9 832	10 286	10 731	12 315	13 529	13 827
<i>Other non-rural (including sugar)</i>	4 527	5 067	4 983	6 074	6 808	7 771
Sugar, sugar preparations and honey	1 735	1 854	1 562	1 685	1 330	n.p.
Other	2 784	3 222	3 480	4 481	5 479	n.p.
Other goods	7 495	8 081	8 362	8 548	7 411	7 165
<i>Services credits</i>	26 790	27 421	28 275	29 715	33 205	30 093

(a) Reference year for chain volume measures is 2000-01. (b) Chain volume measures are not additive for most periods; the component measures do not sum to a total in the same way as the corresponding current price components do.

Source: *Balance of Payments and International Investment Position, Australia (5302.0)*.

## 30.6 GOODS AND SERVICES DEBITS

	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
	\$m	\$m	\$m	\$m	\$m	\$m
AT CURRENT PRICES						
<b>Goods and services debits</b>	<b>-103 590</b>	<b>-118 482</b>	<b>-126 453</b>	<b>-140 323</b>	<b>-152 636</b>	<b>-154 194</b>
<i>Goods debits</i>	-79 438	-92 084	-98 427	-110 610	-120 337	-121 937
<i>General merchandise</i>	-77 205	-87 521	-94 389	-106 549	-115 979	-116 772
<i>Consumption goods</i>	-21 293	-25 899	-28 041	-30 781	-35 775	-37 433
Food and beverages, mainly for consumption	-2 879	-3 282	-3 606	-3 943	-4 483	-4 686
Household electrical items	-1 890	-2 062	-2 245	-2 456	-3 000	-3 174
Non-industrial transport equipment	-5 143	-7 102	-7 231	-7 735	-9 627	-9 931
Textiles, clothing and footwear	-2 880	-3 456	-3 739	-4 232	-4 811	-4 850
Toys, books and leisure goods	-2 567	-2 956	-3 184	-3 238	-3 359	-3 495
Consumption goods n.e.s.	-5 934	-7 041	-8 036	-9 177	-10 495	-11 297
<i>Capital goods</i>	-18 884	-21 168	-23 055	-26 695	-25 552	-27 261
Machinery and industrial equipment	-8 020	-8 862	-9 226	-8 912	-8 876	-9 507
ADP equipment	-3 719	-4 345	-4 496	-4 912	-5 260	-5 054
Telecommunications equipment	-1 748	-2 070	-2 812	-4 150	-4 379	-3 754
Civil aircraft	-784	-464	-649	-1 414	-609	-1 513
Industrial transport equipment n.e.s.	-2 178	-2 560	-2 860	-3 981	-2 753	-3 553
Capital goods n.e.s.	-2 435	-2 867	-3 012	-3 326	-3 675	-3 880
<i>Intermediate and other merchandise goods</i>	-37 028	-40 454	-43 293	-49 073	-54 652	-52 078
Food and beverages, mainly for industry	-641	-746	-758	-731	-592	-576
Primary industrial supplies n.e.s.	-839	-950	-882	-1 117	-1 133	-1 117
Fuels and lubricants	-5 004	-4 276	-4 428	-7 450	-10 358	-8 824
Parts for transport equipment	-4 609	-5 346	-6 085	-6 874	-7 089	-6 889
Parts for ADP equipment	-1 759	-1 993	-1 944	-1 936	-2 255	-2 161
Other parts for capital goods	-6 507	-7 193	-7 692	-8 008	-9 072	-8 233
Organic and inorganic chemicals	-2 743	-2 814	-3 139	-3 572	-3 777	-3 448
Paper and paperboard	-1 713	-1 901	-1 978	-2 207	-2 311	-2 225
Textile yarn and fabrics	-1 817	-2 005	-2 006	-1 987	-1 863	-1 831
Iron and steel	-1 297	-1 623	-1 470	-1 509	-1 437	-1 765
Plastics	-1 577	-1 814	-1 889	-2 037	-2 193	-2 181
Processed industrial supplies n.e.s.	-8 212	-9 431	-10 140	-10 772	-11 252	-11 450
Other merchandise goods	-310	-362	-882	-873	-1 320	-1 378
Other goods	-2 233	-4 563	-4 038	-4 061	-4 358	-5 165
<i>Services debits</i>	-24 152	-26 398	-28 026	-29 713	-32 299	-32 257

For footnotes see end of table.

...continued

30.6 GOODS AND SERVICES DEBITS — *continued*

	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
	\$m	\$m	\$m	\$m	\$m	\$m
CHAIN VOLUME MEASURES(a)(b)						
<b>Goods and services debits</b>	<b>-119 505</b>	<b>-131 124</b>	<b>-137 452</b>	<b>-154 607</b>	<b>-152 636</b>	<b>-156 408</b>
<i>Goods debits</i>	-89 558	-100 604	-106 620	-121 598	-120 337	-124 808
<i>General merchandise</i>	-86 928	-95 368	-102 134	-117 002	-115 979	-119 802
<i>Consumption goods</i>	-24 289	-28 239	-29 204	-32 878	-35 774	-36 936
Food and beverages, mainly for consumption	-3 106	-3 338	-3 670	-4 104	-4 483	-4 684
Household electrical items	-2 065	-2 155	-2 296	-2 592	-3 000	-3 206
Non-industrial transport equipment	-5 898	-7 887	-7 690	-8 178	-9 627	-9 500
Textiles, clothing and footwear	-3 442	-3 859	-3 961	-4 638	-4 811	-4 635
Toys, books and leisure goods	-3 291	-3 469	-3 383	-3 577	-3 358	-3 509
Consumption goods n.e.s.	-6 575	-7 618	-8 250	-9 820	-10 495	-11 405
<i>Capital goods</i>	-18 495	-20 412	-22 771	-28 128	-25 551	-28 102
Machinery and industrial equipment	-10 029	-10 194	-9 757	-9 677	-8 876	-9 386
ADP equipment	-1 961	-2 612	-3 531	-4 923	-5 260	-6 190
Telecommunications equipment	-1 461	-1 821	-2 728	-4 216	-4 379	-3 833
Civil aircraft	-1 193	-599	-718	-1 567	-609	-1 434
Industrial transport equipment n.e.s.	-2 554	-2 856	-3 026	-4 210	-2 752	-3 499
Capital goods n.e.s.	-2 921	-3 273	-3 296	-3 634	-3 675	-3 758
<i>Intermediate and other merchandise goods</i>	-44 592	-47 090	-50 440	-56 021	-54 652	-54 764
Food and beverages, mainly for industry	-517	-486	-511	-633	-592	-572
Primary industrial supplies n.e.s.	-895	-952	-911	-1 220	-1 132	-1 136
Fuels and lubricants	-10 422	-9 635	-11 020	-10 507	-10 358	-11 010
Parts for transport equipment	-5 813	-6 312	-6 621	-7 446	-7 090	-6 714
Parts for ADP equipment	-933	-1 207	-1 526	-1 940	-2 256	-2 639
Other parts for capital goods	-6 968	-7 254	-7 578	-8 567	-9 073	-8 399
Organic and inorganic chemicals	-2 990	-2 937	-3 316	-4 086	-3 778	-3 417
Paper and paperboard	-2 157	-2 304	-2 217	-2 508	-2 311	-2 195
Textile yarn and fabrics	-1 969	-2 085	-2 141	-2 228	-1 863	-1 836
Iron and steel	-1 401	-1 724	-1 523	-1 563	-1 437	-1 755
Plastics	-2 019	-2 188	-2 308	-2 544	-2 192	-2 149
Processed industrial supplies n.e.s.	-9 739	-10 481	-10 933	-11 895	-11 251	-11 561
Other merchandise goods	-357	-393	-926	-959	-1 320	-1 380
Other goods	-2 707	-5 271	-4 441	-4 587	-4 358	-5 007
<b>Services debits</b>	<b>-30 272</b>	<b>-30 614</b>	<b>-30 860</b>	<b>-33 011</b>	<b>-32 300</b>	<b>-31 600</b>

(a) Reference year for chain volume measures is 2000-01. (b) Chain volume measures are not additive for most periods; the component measures do not sum to a total in the same way as the corresponding current price components do.

Source: *Balance of Payments and International Investment Position, Australia (5302.0)*.

## 30.7 IMPLICIT PRICE DEFLATORS AND TERMS OF TRADE(a)

	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
Implicit price deflators(b)							
Goods and services credits	88.5	85.0	88.7	85.6	88.1	100.0	101.2
Goods credits	88.3	83.5	87.8	83.6	86.1	100.0	100.7
Services credits	89.3	90.4	91.9	92.8	95.3	100.0	103.1
Goods and services debits	93.0	86.7	90.4	92.0	90.8	100.0	98.6
Goods debits	96.4	88.7	91.5	92.3	91.0	100.0	97.7
Services debits	81.9	79.8	86.2	90.8	90.0	100.0	102.1
Chain Laspeyres price indexes							
Goods and services credits	87.5	84.6	88.4	85.5	87.6	100.0	101.3
Goods credits	87.2	83.1	87.6	83.6	85.6	100.0	100.8
Services credits	89.0	90.1	91.6	92.6	95.1	100.0	103.2
Goods and services debits	89.5	84.1	88.2	90.6	90.2	100.0	99.0
Goods debits	92.3	85.7	89.0	90.7	90.4	100.0	98.2
Services debits	81.1	78.9	85.6	90.3	89.6	100.0	102.3
Terms of trade(c)							
Goods and services	95.2	98.1	98.1	93.0	97.0	100.0	102.6
Goods	91.6	94.2	95.9	90.5	94.6	100.0	103.0
Services	109.0	113.3	106.6	102.2	105.9	100.0	101.0

(a) Reference year for price and terms of trade indexes is 2000-01. (b) Derived by dividing the estimates at current prices in tables 30.5 and 30.6 by the chain volume measures in those tables. (c) Derived by dividing the IPDs for credits by the IPDs for debits.

Source: *Balance of Payments and International Investment Position, Australia (5302.0)*.

## International trade in services

In current price terms, net services for 2001-02 recorded a deficit of \$1.2b, a reversal of \$2.1b on the surplus recorded in 2000-01. Services credits decreased by \$2.1b (7%) to \$31.0b, mainly due to decreases in personal, cultural and recreational services, and personal travel services. This reflects the one-off impact of the Sydney Olympic Games in 2000-01. Services debits remained stable at \$32.3b. Decreases in transportation, mainly freight, and business travel services were offset by an increase in other business services. Table 30.8 provides details of the international trade in services.

As shown in table 30.9, the main destinations for services exports (credits) in 1999-2000 (the latest year available for regional data) were the United States of America (16%), Japan (12%), the United Kingdom (11%), New Zealand (7%) and Singapore (6%). Significant growth has been recorded since 1994-95 in services exports to each of these markets except Japan. The main source countries for services debits in 1999-2000, as shown in table 30.10, were the United States of America (21%), the United Kingdom (12%), Japan (7%), Singapore (6%), New Zealand (5%) and Hong Kong (4%).

## 30.8 INTERNATIONAL TRADE IN SERVICES

	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
	\$m	\$m	\$m	\$m	\$m	\$m
<b>CREDITS</b>						
<b>Services credits</b>	<b>24 226</b>	<b>25 206</b>	<b>26 242</b>	<b>28 317</b>	<b>33 204</b>	<b>31 039</b>
<i>Transportation services</i>	6 648	6 611	6 803	6 865	8 062	7 625
Passenger	5 697	5 550	5 604	5 848	7 024	6 629
Freight	951	1 061	1 199	1 017	1 038	996
Other	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
<i>Travel services</i>	11 756	11 540	11 944	13 139	15 366	14 530
Business	675	893	1 009	1 040	1 166	1 121
Personal	11 081	10 647	10 935	12 099	14 200	13 409
Communications services	947	1 361	1 239	1 475	1 397	1 017
Construction services	70	31	18	23	68	98
Insurance services	772	840	859	766	709	673
Financial services	634	713	716	747	747	784
Computer and information services	277	532	676	668	797	989
Royalties and licence fees	376	449	488	572	626	508
<i>Other business services</i>	1 882	2 224	2 552	2 852	3 185	3 473
Merchandising and other trade-related	436	481	586	501	489	551
Operational leasing	10	8	8	15	16	28
Miscellaneous business, professional and technical	1 436	1 735	1 958	2 336	2 680	2 894
Personal, cultural and recreational services	304	352	388	475	1 514	569
Government services n.e.i.	560	553	559	735	733	773
<b>DEBITS</b>						
<b>Services debits</b>	<b>-24 152</b>	<b>-26 398</b>	<b>-28 026</b>	<b>-29 713</b>	<b>-32 299</b>	<b>-32 257</b>
<i>Transportation services</i>	-8 439	-9 110	-9 367	-10 018	-11 352	-10 876
Passenger	-3 003	-3 224	-3 485	-3 876	-4 337	-4 276
Freight	-4 373	-5 013	-5 009	-5 257	-5 991	-5 626
Other	-1 063	-873	-873	-885	-1 024	-974
<i>Travel services</i>	-7 769	-8 372	-9 044	-9 836	-11 189	-11 043
Business	-2 286	-2 416	-2 239	-2 536	-2 854	-2 592
Personal	-5 483	-5 956	-6 805	-7 300	-8 335	-8 451
Communications services	-1 066	-1 407	-1 467	-1 664	-1 766	-1 551
Construction services	—	—	—	—	—	—
Insurance services	-1 012	-915	-922	-902	-878	-856
Financial services	-451	-442	-468	-527	-528	-556
Computer and information services	-253	-336	-424	-458	-417	-434
Royalties and license fees	-1 397	-1 519	-1 692	-1 805	-1 706	-1 835
<i>Other business services</i>	-2 699	-3 003	-3 253	-3 046	-3 070	-3 656
Merchandising and other trade-related	-362	-392	-329	-221	-248	-325
Operational leasing	-814	-864	-1 034	-942	-1 011	-952
Miscellaneous business, professional and technical	-1 523	-1 747	-1 890	-1 883	-1 811	-2 379
Personal, cultural and recreational services	-547	-702	-756	-808	-767	-801
Government services n.e.i.	-519	-592	-633	-649	-626	-649

Source: Balance of Payments and International Investment Position, Australia (5302.0).

## 30.9 SERVICES CREDITS, By country and country groups(a)

	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
	\$m	\$m	\$m	\$m	\$m	\$m
COUNTRY						
Belgium and Luxembourg	47	64	105	125	100	79
Brunei Darussalam	23	25	22	21	22	16
Canada	240	281	309	359	373	412
Central America and Caribbean	12	11	15	13	12	12
Chile	5	7	5	5	5	6
China, People's Republic of	375	378	396	485	577	701
Fiji	80	72	62	117	112	155
France	197	169	207	192	224	250
Germany	591	576	665	724	731	769
Greece	42	52	49	47	55	48
Hong Kong (SAR of China)	863	1 072	1 054	1 032	979	984
Indonesia	840	971	1 029	922	836	807
Ireland, Republic of	61	69	77	96	126	165
Italy	177	184	244	250	289	241
Japan	3 425	3 658	3 688	3 489	3 239	3 313
Korea, Republic of	835	1 115	927	609	450	607
Malaysia	684	769	733	773	664	768
Mexico	9	4	4	4	15	7
Netherlands	192	163	211	254	282	300
New Zealand	1 254	1 418	1 666	1 794	1 821	2 041
Papua New Guinea	240	236	279	335	288	371
Philippines	161	182	189	192	144	143
Russian Federation	66	69	63	56	45	52
Singapore	1 277	1 241	1 256	1 197	1 340	1 665
South Africa	152	173	177	168	189	117
Sweden	80	94	99	106	164	184
Switzerland	259	261	261	278	300	323
Taiwan	679	702	570	535	453	421
Thailand	503	523	474	353	310	378
United Kingdom	1 922	2 040	2 171	2 475	2 836	3 109
United States of America	2 403	2 977	3 220	4 097	4 418	4 594
Africa n.e.s.	93	106	103	126	144	195
America n.e.s.	118	131	330	254	381	618
Asia n.e.s.	808	873	994	1 022	1 250	1 273
Europe n.e.s.	652	674	650	719	865	987
Oceania n.e.s.	260	264	274	191	220	247
International institutions	4	4	2	—	—	—
Unallocated	924	1 341	1 646	1 791	1 983	1 959
<b>Total all countries</b>	<b>20 553</b>	<b>22 949</b>	<b>24 226</b>	<b>25 206</b>	<b>26 242</b>	<b>28 317</b>
COUNTRY GROUPS						
APEC(b)	13 816	15 559	15 821	16 202	15 967	17 336
ASEAN(c)	3 529	3 814	3 834	3 580	3 431	3 962
EU(d)	3 606	3 706	4 199	4 704	5 209	5 717
OECD(e)	11 423	12 524	14 432	15 464	15 961	17 097

(a) The ABS is currently unable to produce trade in services data by country for financial years after 1999-2000 due to delays in processing by the Department of Immigration and Multicultural and Indigenous Affairs of international airline passenger cards.

(b) APEC includes Brunei Darussalam, Canada, Chile, People's Republic of China, Hong Kong (SAR of China), Indonesia, Japan, Republic of Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russian Federation, Singapore, Taiwan, Thailand, United States of America and Vietnam. Peru, Russian Federation and Vietnam are included from 1998-99. (c) ASEAN includes Brunei Darussalam, Myanmar, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam. Myanmar and Laos are included from July 1997. Cambodia is included from April 1999. (d) EU includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Republic of Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom. (e) OECD includes Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Japan, Republic of Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States of America. Czech Republic and Hungary are included from January 1996 and Republic of Korea and Poland are included from 1996-97.

Source: Balance of Payments, Australia — Regional Series (5338.0).

## 30.10 SERVICES DEBITS, By country and country groups(a)

	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
	\$m	\$m	\$m	\$m	\$m	\$m
COUNTRY						
Belgium and Luxembourg	-107	-86	-68	-108	-72	-89
Brunei Darussalam	-9	-10	-7	-10	-11	-11
Canada	-301	-318	-319	-298	-319	-389
Central America and Caribbean	-202	-197	-163	-119	-33	-26
Chile	-16	-21	-18	-65	-19	-27
China, People's Republic of	-443	-458	-447	-592	-612	-621
Fiji	-176	-190	-178	-209	-322	-355
France	-270	-272	-290	-404	-348	-386
Germany	-507	-503	-530	-710	-857	-888
Greece	-237	-230	-217	-234	-239	-272
Hong Kong (SAR of China)	-999	-1 090	-1 266	-1 248	-1 185	-1 285
Indonesia	-485	-549	-706	-691	-587	-526
Ireland, Republic of	-97	-110	-142	-174	-152	-182
Italy	-385	-433	-541	-525	-499	-429
Japan	-1 714	-1 508	-1 545	-1 308	-1 690	-2 048
Korea, Republic of	-262	-303	-283	-257	-285	-207
Malaysia	-483	-524	-626	-694	-746	-743
Mexico	-11	-13	-16	-17	-22	-25
Netherlands	-538	-408	-411	-501	-523	-593
New Zealand	-950	-1 063	-1 149	-1 360	-1 451	-1 543
Papua New Guinea	-134	-162	-174	-222	-150	-162
Philippines	-111	-122	-144	-222	-164	-165
Russian Federation	-150	-116	-81	-61	-53	-40
Singapore	-1 196	-1 237	-1 200	-1 207	-1 699	-1 934
South Africa	-103	-118	-155	-193	-195	-168
Sweden	-166	-128	-100	-183	-88	-74
Switzerland	-462	-511	-569	-621	-723	-702
Taiwan	-142	-152	-155	-186	-122	-136
Thailand	-384	-435	-403	-501	-554	-625
United Kingdom	-3 560	-3 826	-3 874	-3 613	-3 249	-3 680
United States of America	-4 332	-4 590	-4 949	-5 521	-5 745	-6 247
Africa n.e.s.	-130	-149	-163	-183	-266	-338
America n.e.s.	-117	-154	-217	-298	-380	-391
Asia n.e.s.	-746	-622	-607	-821	-1 038	-1 122
Europe n.e.s.	-1 089	-1 084	-876	-1 066	-1 097	-921
Oceania n.e.s.	-158	-164	-155	-216	-213	-231
International institutions	—	—	—	—	—	—
Unallocated	-1 165	-1 493	-1 408	-1 760	-2 317	-2 131
<b>Total all countries</b>	<b>-22 337</b>	<b>-23 349</b>	<b>-24 152</b>	<b>-26 398</b>	<b>-28 026</b>	<b>-29 713</b>
COUNTRY GROUPS						
APEC(b)	-11 972	-12 555	-13 407	-14 399	-15 473	-16 748
ASEAN(c)	-2 791	-3 068	-3 293	-3 551	-4 063	-4 237
EU(d)	-6 154	-6 373	-6 448	-6 852	-6 434	-6 971
OECD(e)	-14 430	-14 767	-15 633	-16 634	-17 081	-18 348

(a) The ABS is currently unable to produce trade in services data by country for financial years after 1999-2000 due to delays in processing by the Department of Immigration and Multicultural and Indigenous Affairs of international airline passenger cards.

(b) APEC includes Brunei Darussalam, Canada, Chile, People's Republic of China, Hong Kong (SAR of China), Indonesia, Japan, Republic of Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russian Federation, Singapore, Taiwan, Thailand, United States of America and Vietnam. Peru, Russian Federation and Vietnam are included from 1998-99. (c) ASEAN includes Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Myanmar and Laos are included from July 1997. Cambodia is included from April 1999. (d) EU includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Republic of Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom. (e) OECD includes Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Japan, Republic of Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States of America. Czech Republic and Hungary are included from January 1996 and Republic of Korea and Poland are included from 1996-97.

Source: Balance of Payments, Australia — Regional Series (5338.0).

### International investment position

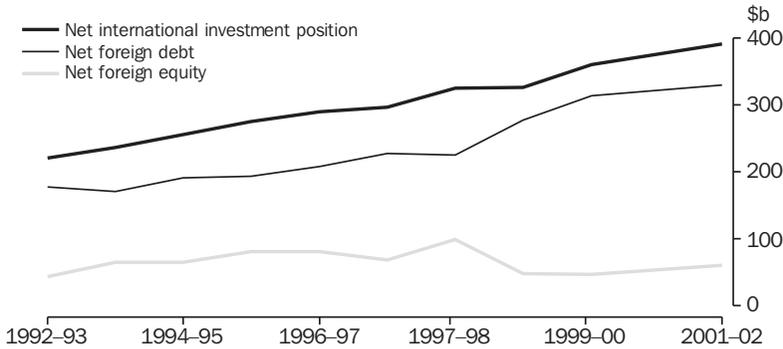
Australia's net international investment position is the difference between the levels of Australia's foreign financial liabilities and the levels of its foreign financial assets. Historically, Australia has had a net liability position with the rest of the world.

Australia's net international investment position at 30 June 2002 was a net foreign financial liability of \$390.5b. This was up \$29.5b (8.2%) on the position a year earlier and resulted from net increases of \$13.2b in the level of foreign equity and \$16.3b in the level of foreign debt.

Graph 30.11 shows the components of Australia's international investment position between 1992-93 and 2001-02. It shows that the increases in net foreign liabilities reflect increases in both net foreign debt liabilities and net foreign equity liabilities in most years.

Table 30.12 shows a reconciliation between opening and closing levels for foreign financial assets, foreign financial liabilities and Australia's net international investment position. Increases or decreases in these assets and liabilities are due to financial transactions (investment flows), price changes, exchange rate changes and other adjustments.

**30.11 NET INTERNATIONAL INVESTMENT POSITION,  
Level at end of period**



Source: *Balance of Payments and International Investment Position, Australia (5302.0)*.

## 30.12 INTERNATIONAL INVESTMENT POSITION

	Position at beginning of period \$m	Changes in position reflecting				Position at end of period \$m
		Transactions \$m	Price changes \$m	Exchange rate changes \$m	Other adjustments \$m	
<b>NET INTERNATIONAL INVESTMENT POSITION</b>						
<b>Total</b>						
1999–2000	321 655	30 919	-16 224	-9 193	-653	326 505
2000–01	326 505	14 339	30 211	-6 238	-3 782	361 034
2001–02	361 034	20 286	10 064	-216	-641	390 527
<b>Equity</b>						
1999–2000	90 967	-8 249	-13 852	-21 189	1 024	48 700
2000–01	48 700	3 048	26 674	-28 313	-2 547	47 562
2001–02	47 562	-15 061	13 833	13 973	456	60 764
<b>Debt</b>						
1999–2000	230 689	39 168	-2 373	11 996	-1 677	277 804
2000–01	277 804	11 289	3 537	22 076	-1 234	313 472
2001–02	313 472	35 345	-3 768	-14 189	-1 097	329 763
<b>FOREIGN ASSETS(a)</b>						
<b>Total</b>						
1999–2000	-325 163	-27 334	-47 638	-27 051	1 162	-426 024
2000–01	-426 024	-49 779	32 718	-39 109	-1 356	-483 551
2001–02	-483 551	-48 421	47 642	13 366	-1 285	-472 251
<b>Equity</b>						
1999–2000	-196 013	-19 611	-46 115	-21 189	872	-282 057
2000–01	-282 057	-18 913	31 804	-28 313	-769	-298 247
2001–02	-298 247	-42 856	48 913	13 973	-143	-278 359
<b>Debt</b>						
1999–2000	-129 150	-7 722	-1 523	-5 860	288	-143 967
2000–01	-143 967	-30 867	913	-10 794	-588	-185 304
2001–02	-185 304	-5 565	-1 272	-608	-1 143	-193 891
<b>FOREIGN LIABILITIES(b)</b>						
<b>Total</b>						
1999–2000	646 818	58 254	31 414	17 857	-1 814	752 528
2000–01	752 528	64 118	-2 507	32 870	-2 426	844 584
2001–02	844 584	68 707	-37 578	-13 582	645	862 778
<b>Equity</b>						
1999–2000	286 979	11 362	32 264	—	152	330 757
2000–01	330 757	21 962	-5 130	—	-1 779	345 809
2001–02	345 809	27 796	-35 081	—	599	339 123
<b>Debt</b>						
1999–2000	359 839	46 890	-850	17 857	-1 965	421 771
2000–01	421 771	42 155	2 624	32 870	-647	498 775
2001–02	498 775	40 910	-2 497	-13 582	47	523 654

(a) Assets include claims of Australian direct investment enterprises on direct investors abroad, which are classified as part of direct investment in Australia. (b) Liabilities include liabilities of Australian direct investors to direct investment enterprises abroad, which are classified as part of direct investment abroad.

Source: *Balance of Payments and International Investment Position, Australia (5302.0)*.

## Foreign debt

Foreign debt is a subset of the financial obligations that comprise a country's international investment position. It includes all the non-equity components of the net international investment position, that is, all recorded assets and liabilities other than equity securities and direct investment equity capital, including reinvested earnings.

The level of borrowing and other non-equity liabilities by Australian residents at a particular date can be equated with Australia's foreign debt liabilities. The level of Australian lending abroad and other non-equity assets at the same date are deducted from the level of borrowing to arrive at Australia's net foreign debt.

The level of net foreign debt at 30 June 2002 was \$329.8b, up \$16.3b (5.2%) on 30 June 2001. The increase during 2001–02 resulted from net financial transactions of \$35.3b, price changes of -\$3.8b, exchange rate changes of -\$14.2b and other adjustments of -\$1.1b (table 30.13).

At 30 June 2002, the net foreign debt of the public sector (general government plus public financial and non-financial corporations) was \$12.1b, which accounted for 3.7% of total net foreign debt. Net foreign debt levels of private financial corporations and private non-financial corporations were \$251.7b (76.3% of total net foreign debt) and \$66b (20.0%) respectively (table 30.13).

### 30.13 LEVELS OF FOREIGN DEBT — At 30 June

	1997	1998	1999	2000	2001	2002
	\$m	\$m	\$m	\$m	\$m	\$m
<b>Foreign debt assets(a)</b>	<b>-94 218</b>	<b>-119 189</b>	<b>-129 150</b>	<b>-143 967</b>	<b>-185 304</b>	<b>-193 891</b>
<i>Public sector</i>	-31 048	-41 329	-40 770	-44 876	-63 350	-56 220
General government	-2 836	-8 095	-9 378	-9 219	-10 338	-10 869
Financial corporations	-26 853	-32 196	-30 470	-35 263	-46 069	-42 851
Reserve Bank	-22 164	-23 998	-22 883	-27 184	-36 958	-35 053
Central borrowing authorities	-8	-179	-385	-1 090	-1 426	-954
Other financial corporations	-4 681	-8 019	-7 203	-6 990	-7 685	-6 845
Non-financial corporations	-1 359	-1 037	-922	-393	-6 943	-2 499
<i>Private sector</i>	-63 170	-77 860	-88 380	-99 091	-121 953	-137 672
Financial corporations	-45 619	-58 762	-66 328	-75 444	-92 788	-107 601
Non-financial corporations	-17 552	-19 098	-22 052	-23 647	-29 166	-30 071
<b>Foreign debt liabilities(a)</b>	<b>302 846</b>	<b>346 971</b>	<b>359 839</b>	<b>421 771</b>	<b>498 775</b>	<b>523 654</b>
<i>Public sector</i>	96 278	86 721	75 279	63 445	68 950	68 366
General government	42 549	38 463	32 373	22 872	24 100	25 066
Financial corporations	48 213	41 392	37 284	34 001	32 343	29 604
Reserve Bank	72	48	40	34	49	43
Central borrowing authorities	40 203	36 571	32 772	29 060	27 622	25 515
Other financial corporations	7 938	4 774	4 473	4 907	4 672	4 046
Non-financial corporations	5 516	6 866	5 622	6 572	12 506	13 696
<i>Private sector</i>	206 568	260 250	284 560	358 326	429 825	455 288
Financial corporations	145 415	187 507	209 734	271 377	328 896	359 259
Non-financial corporations	61 153	72 742	74 825	86 949	100 929	96 030
<b>Net foreign debt</b>	<b>208 628</b>	<b>227 782</b>	<b>230 689</b>	<b>277 804</b>	<b>313 472</b>	<b>329 763</b>
<i>Public sector</i>	65 231	45 392	34 509	18 569	5 599	12 147
General government	39 713	30 368	22 995	13 652	13 762	14 197
Financial corporations	21 360	9 196	6 814	-1 262	-13 726	-13 247
Reserve Bank	-22 092	-23 950	-22 843	-27 150	-36 909	-35 010
Central borrowing authorities	40 195	36 391	32 387	27 970	26 196	24 561
Other financial corporations	3 257	-3 245	-2 730	-2 082	-3 013	-2 798
Non-financial corporations	4 157	5 828	4 700	6 179	5 563	11 197
<i>Private sector</i>	143 398	182 390	196 179	259 235	307 872	317 617
Financial corporations	99 796	128 746	143 406	195 933	236 109	251 658
Non-financial corporations	43 602	53 644	52 773	63 302	71 764	65 959

(a) Foreign debt levels between direct investors and direct investment enterprises are recorded on a gross basis for assets and liabilities.

Source: Balance of Payments and International Investment Position, Australia (5302.0).

## Levels of foreign investment in Australia and Australian investment abroad

In table 30.14, levels of investment are categorised by direction (Australian investment abroad and foreign investment in Australia), type of investment (direct, portfolio, financial derivatives, other and reserve assets) and instrument.

Direct investment is a category of international investment that reflects the objective of obtaining a lasting interest by a resident in one economy in an enterprise in another economy, and implies a significant degree of influence by the investor in the management of the enterprise. A direct investment relationship is established when a direct investor, who is a resident in one economy,

holds 10% or more of the ordinary shares or voting stock of an enterprise (direct investment enterprise) in another economy. The portfolio investment category covers investment in equity and debt securities (other than direct investment and reserve assets).

The items Australian investment abroad and foreign investment in Australia in table 30.14 do not equate with foreign assets and liabilities respectively in table 30.12. The difference is due to netting of assets and liabilities in regard to direct investment, both abroad and in Australia. Claims by direct investment enterprises on their direct investors, separately identified in table 30.14, are netted off in that table against liabilities to direct investors. These items are not netted off in table 30.12.

**30.14 LEVELS OF AUSTRALIAN INVESTMENT ABROAD AND FOREIGN INVESTMENT IN AUSTRALIA**  
— At 30 June

	1997	1998	1999	2000	2001	2002
	\$m	\$m	\$m	\$m	\$m	\$m
<b>Levels of Australian investment abroad</b>	<b>-221 545</b>	<b>-290 293</b>	<b>-313 359</b>	<b>-410 484</b>	<b>-462 154</b>	<b>-453 877</b>
<i>Direct investment abroad(a)</i>	-88 999	-125 580	-129 465	-178 284	-181 788	-153 371
Equity capital and reinvested earnings	-87 860	-124 085	-128 988	-179 786	-179 189	-152 256
Other capital	-1 139	-1 494	-477	1 502	-2 599	-1 115
Claims on affiliated enterprises	-4 620	-5 050	-5 496	-6 496	-12 250	-9 788
Liabilities to affiliated enterprises	3 481	3 555	5 020	7 998	9 651	8 673
<i>Portfolio investment assets</i>	-61 164	-71 962	-87 196	-126 738	-150 041	-159 269
Equity securities	-47 691	-56 254	-67 025	-102 271	-119 058	-126 103
Debt securities	-13 474	-15 708	-20 171	-24 467	-30 983	-33 166
Financial derivative assets	-9 265	-14 357	-15 529	-18 658	-23 802	-30 030
<i>Other investment assets</i>	-39 326	-54 134	-57 215	-58 856	-68 571	-73 772
Trade credits	-8 188	-9 658	-10 106	-9 984	-9 620	-9 924
Loans and other assets	-26 293	-37 427	-39 587	-41 779	-48 538	-52 002
Currency and deposits	-4 844	-7 049	-7 522	-7 093	-10 413	-11 845
Reserve assets	-22 791	-24 260	-23 954	-27 948	-37 951	-37 435
<b>Levels of foreign investment in Australia</b>	<b>511 700</b>	<b>587 231</b>	<b>635 014</b>	<b>736 989</b>	<b>823 187</b>	<b>844 404</b>
<i>Direct investment in Australia(b)</i>	150 827	162 371	174 478	195 679	201 060	210 909
Equity capital and reinvested earnings	130 190	138 943	152 753	171 305	171 009	177 649
Other capital	20 637	23 428	21 725	24 373	30 051	33 260
Claims on direct investors	-4 743	-5 680	-6 785	-7 542	-11 746	-9 701
Liabilities to direct investors	25 380	29 107	28 510	31 916	41 797	42 961
<i>Portfolio investment liabilities</i>	289 182	332 038	348 145	405 857	468 119	465 747
Equity securities	86 888	110 552	134 226	159 452	174 800	161 474
Debt securities	202 294	221 485	213 919	246 405	293 319	304 273
Financial derivative liabilities	10 221	15 040	17 826	21 431	23 591	30 910
<i>Other investment liabilities</i>	61 470	77 783	94 565	114 022	130 418	136 838
Trade credits	5 974	7 221	7 685	7 317	6 921	6 143
Loans	31 632	34 144	41 361	54 311	54 185	62 403
Currency and deposits	21 542	33 356	35 347	39 508	56 172	56 871
Other liabilities	2 322	3 061	10 172	12 886	13 139	11 421

(a) Net direct investment abroad, after deduction of liabilities to direct investment enterprises abroad. (b) Net direct investment in Australia, after deduction of claims of Australian direct investment enterprises on direct investors.

Source: *Balance of Payments and International Investment Position, Australia* (5302.0).

At 30 June 2002, Australian investment abroad totalled \$453.9b, down \$8.3b (1.8%) on the level a year earlier. This drop was the net effect of a \$28.4b decrease in direct investment abroad, a \$9.2b increase in portfolio investment assets, a \$6.2b increase in financial derivative assets, a \$5.2b increase in other investment assets and a \$0.5b decrease in reserve assets.

Foreign investment in Australia totalled \$844.4b at 30 June 2002, up \$21.2b (2.6%) on June 2001. This rise was due to a \$9.8b increase in direct investment in Australia, a \$2.4b decrease in portfolio investment liabilities, a \$7.3b increase in financial derivative liabilities and a \$6.4b increase in other investment liabilities.

## Ratios

Table 30.15 and graph 30.16 show that the ratio of the current account deficit to gross domestic product (GDP) was 3.1% in 2001–02, an increase on the previous year, but below the average for the last 10 years (4.2%).

Graph 30.17 shows that the ratio of Australia's net foreign liabilities (Australia's net international investment position) to GDP has risen for most years since 1988 and reached its highest level of nearly 55.0% at 30 June 2002. The ratio of net foreign debt to GDP was 46.1% at 30 June 2002, slightly down on last year. The ratio of net foreign equity to GDP was 8.5% at 30 June 2002, up on the ratio at 30 June 2001, but below the average for the last 10 years (12.1%).

Table 30.15 shows that the net investment income payable on net foreign debt as a percentage of goods and services credits was 9.2% in 2001–02, down on the previous year. The ratio of net investment income payable on equity to goods and services credits was 4.0% in 2001–02, up from the previous year.

### 30.15 RATIOS

	Units	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02
Value							
GDP(a)	\$m	529 886	561 229	591 592	629 212	672 232	715 973
Ratios to GDP							
Current account	%	-3.3	-4.1	-5.7	-5.1	-2.7	-3.1
Goods and services	%	0.3	-0.8	-2.4	-2.3	0.1	-0.3
Credits	%	19.8	20.3	18.9	20.0	22.8	21.3
Debits	%	-19.5	-21.1	-21.4	-22.3	-22.7	-21.5
Income	%	-3.6	-3.2	-3.1	-2.9	-2.8	-2.8
Net international investment position(b)	%	54.8	52.9	54.4	51.9	53.7	54.5
Net foreign equity	%	15.4	12.3	15.4	7.7	7.1	8.5
Net foreign debt	%	39.4	40.6	39.0	44.2	46.6	46.1
Ratios to good and services credits							
Net investment income	%	-18.3	-15.9	-16.4	-14.3	-12.3	-13.2
Net foreign equity	%	-7.1	-6.2	-7.0	-3.7	-2.7	-4.0
Net foreign debt	%	-11.2	-9.7	-9.4	-10.6	-9.6	-9.2

(a) GDP at current prices. (b) These ratios are derived by expressing net foreign liabilities at end of year as a percentage of GDP at current prices for that year.

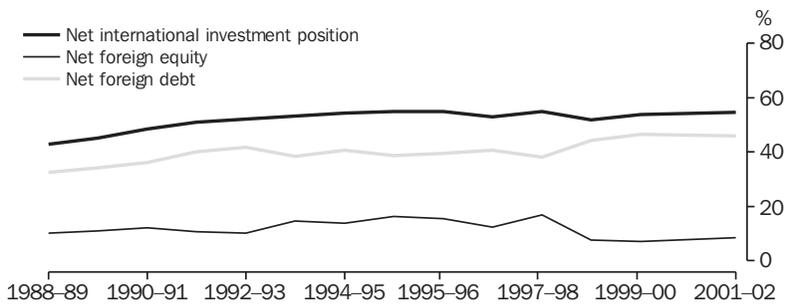
Source: Australian National Accounts: National Income, Expenditure and Product (5206.0); Balance of Payments and International Investment Position, Australia (5302.0).

## 30.16 RATIO OF BALANCE ON CURRENT ACCOUNT TO GDP



Source: Australian National Accounts: National Income, Expenditure and Product (5206.0); Balance of Payments and International Investment Position, Australia (5302.0).

## 30.17 RATIOS(a) OF NET INTERNATIONAL INVESTMENT POSITION TO GDP



(a) These ratios are derived by expressing net foreign liabilities at end of year as a percentage of GDP at current prices for that year.

Source: Australian National Accounts: National Income, Expenditure and Product (5206.0); Balance of Payments and International Investment Position, Australia (5302.0).

## Foreign ownership in Australia

Table 30.18 shows that the value of equity on issue by Australian enterprise groups at 30 June 2002 stood at \$1,181b. Of this total, 65% related to shares or equivalent equity interests issued by corporate trading enterprises. Banks accounted for a further 16% of total equity issued, and the other financial sub-sector, including life offices and superannuation funds (but excluding non-bank deposit taking institutions), also accounted for 16%. Lesser amounts were issued by non-bank deposit taking institutions (2% of the total) and, the central bank (1%).

Of the total equity on issue by Australian enterprise groups at 30 June 2002, non-residents held equity valued at \$339b (29%), while residents held \$842b (71%).

Although the proportion of equity held by non-residents has remained relatively stable, the total value of equity on issue has increased by 33%, from \$887b to \$1,181b, over the period from 30 June 1998 to 30 June 2002.

Analysed by sub-sector, at 30 June 2002 non-residents held 34% of the equity in corporate trading enterprises, which has changed little over recent years. The value of equity on issue by corporate trading enterprises at 30 June 2002 decreased on the previous year by 5%.

The amount issued by banks has increased by 82% over the period from 30 June 1998 to 30 June 2002, while the proportion of non-resident holdings of the total equity issued by banks has risen from 24% to 26% over the same period.

The value of equity issued by life offices, superannuation funds and other financial institutions increased by 39% over the period from 30 June 1998 to 30 June 2002, the foreign ownership of this equity increased from 3% at 30 June 1998 to 15% at 30 June 2002.

Data for equity on issue by unlisted corporations are of lesser quality than the data supplied by the Australian Stock Exchange for listed corporations. Data for unlisted corporations are compiled from

returns supplied in the ABS Survey of Financial Information, ABS Survey of International Investment, selected annual reports, and estimates synthesised from analysing residual items in demand and supply tables for the various share markets.

In terms of the analysis undertaken here, errors in the estimated market value of equity on issue will impact on the accuracy of estimates of the proportion of that equity owned by non-residents.

**30.18 FOREIGN OWNERSHIP OF EQUITY(a) — At 30 June**

	Units	1998	1999	2000	2001	2002
<b>ALL SECTORS COMBINED</b>						
Amount issued	\$b	887.4	991.7	1 118.3	1 206.8	1 181.4
Amount held by rest of world	\$b	249.5	287.0	330.8	345.8	339.1
Percentage of foreign ownership	%	26.6	28.9	29.6	28.7	28.7
<b>SUB-SECTORS</b>						
<b>Corporate trading enterprises(b)</b>						
Amount issued(c)	\$b	615.5	722.4	791.9	810.1	765.6
Amount held by rest of world	\$b	198.0	238.8	278.2	273.3	258.5
Percentage of foreign ownership	%	33.2	33.1	35.1	33.7	33.8
<b>Banks</b>						
Amount issued(c)	\$b	104.0	113.6	138.6	178.3	189.3
Amount held by rest of world	\$b	25.1	28.3	31.1	45.4	48.2
Percentage of foreign ownership	%	24.1	24.9	22.4	25.5	25.5
<b>Non-bank deposit taking institutions</b>						
Amount issued(c)	\$b	17.5	15.0	15.7	20.1	23.6
Amount held by rest of world	\$b	4.3	4.0	3.5	3.9	4.3
Percentage of foreign ownership	%	33.9	26.7	22.3	19.3	18.2
<b>Other financial sub-sectors(d)</b>						
Amount issued(c)	\$b	137.8	129.8	161.7	186.0	191.5
Amount held by rest of world	\$b	22.1	15.8	18.0	23.1	28.2
Percentage of foreign ownership	%	16.0	12.2	11.1	12.4	14.7
<b>Central bank</b>						
Amount issued(e)(f)	\$b	12.6	10.9	10.4	12.3	11.4

(a) Equity includes units in trusts. (b) Includes private non-financial corporations, and Commonwealth, state and local public non-financial corporations. (c) These estimated market values are considered to be of poor quality. They should be used cautiously. (d) Includes life offices and superannuation funds, central borrowing authorities, and other financial institutions. (e) Net asset values. (f) There is no foreign ownership in this sub-sector.

Source: Australian National Accounts: Financial Accounts (5232.0); Balance of Payments and International Investment Position, Australia (5302.0).

## International merchandise trade

### Conceptual framework

Australia's international merchandise trade statistics, relating to the exports and imports of goods, are compiled in broad agreement with the UN recommendations for the compilation of international trade statistics. More information on the concepts, sources and methods used to produce Australia's trade statistics is included in *International Merchandise Trade, Australia: Concepts, Sources and Methods* (5489.0).

The UN recommendations state that merchandise trade covers all movable goods which add to (imports) or subtract from (exports) the stock of material resources of a country as a result of their movement into or out of the country.

The UN definition excludes:

- direct transit trade, that is, goods being trans-shipped or moved through Australia for purposes of transport only
- ships and aircraft moving through Australia while engaged in the transport of passengers or goods between Australia and other countries
- non-merchandise trade, consisting primarily of goods moving on a temporary basis (e.g. mobile equipment, goods under repair and goods for exhibition).

International merchandise trade statistics are compiled by the ABS from information submitted by exporters and importers or their agents to the Australian Customs Service.

### Classification

International merchandise trade is classified by commodity, by country of origin/destination, by Australian state of production/destination, and by industry of origin.

The international standard for export and import classification is the Harmonized System, a World Customs Organization (WCO) classification which groups goods according to their component materials, from raw materials through to processed and manufactured products.

The ABS adopts this as the basis for exports classification using the Australian Harmonised Export Commodity Classification (AHECC) and for imports classification using the Combined

Australian Customs Tariff Nomenclature and Statistical Classification (Customs Tariff). The WCO introduced a revised version of the Harmonized System on 1 January 2002. This version was incorporated into the AHECC and the Customs Tariff.

The ABS also classifies export and import statistics according to:

- the UN Standard International Trade Classification (SITC Rev. 3) which groups goods according to the degree of processing they have undergone, from food and crude raw materials through to highly transformed manufactures
- the UN Classification by Broad Economic Categories (BEC) which classifies international trade for the purposes of general economic analysis according to the main end use of the commodities traded.

Commodity export and import statistics in this section are presented according to SITC Rev. 3.

### Valuation

For exports, the point of valuation adopted is free-on-board (f.o.b.) at the Australian port of shipment, while the basis of valuation is 'transactions value', that is, the actual price at which the goods are sold.

For imports, the point of valuation is the point of containerisation (in most cases), or f.o.b. at the customs frontier of the exporting country or the port of loading, whichever comes first. The basis of valuation is the customs value. For transactions between independent buyers and sellers, this will generally be the price actually payable. Where traders are not independent (e.g. if they are related or affiliated in some way), an appropriate customs value may be determined.

### Total merchandise exports and imports

Following successive deficits in international merchandise trade between 1995–96 and 1999–2000, Australia recorded two years of trade surplus. In 2001–02, increases were recorded for both exports (1.4% to \$121.2b) and imports (1.2% to \$119.7b), resulting in a surplus of \$1.5b. This was the highest financial year surplus recorded since 1991–92 (\$4.0b). Table 30.19 and graph 30.20 show the period since 1995–96.

**30.19 TOTAL MERCHANDISE EXPORTS AND IMPORTS**

	Exports	Imports	Excess of exports or imports(a)
	\$m	\$m	\$m
1995-96	76 005	77 792	-1 787
1996-97	78 932	78 998	-66
1997-98	87 768	90 684	-2 916
1998-99	85 991	97 611	-11 620
1999-2000	97 286	110 078	-12 792
2000-01	119 539	118 317	1 222
2001-02	121 176	119 681	1 495

(a) A negative sign indicates that imports exceed exports.

Source: *International Merchandise Trade, Australia* (5422.0).

**Merchandise exports and imports by commodity**

In 2001-02, exports increased by \$1,637m (1.4%) to \$121,176m. The SITC sections with the largest increases were:

- Commodities and transactions not classified elsewhere, up \$1,079m (10.1%)
- Food and live animals, up \$948m (4.6%)
- Machinery and transport equipment, up \$701m (5.2%)
- Beverages and tobacco, up \$362m (18.2%)
- Chemical and related products n.e.s., up \$208m (4.0%).

These increases were partly offset by decreases in:

- Crude materials, inedible, except fuels, down \$1,100m (4.7%)
- Manufactured goods classified chiefly by material, down \$471m (3.4%).

In 2001-02, imports increased by \$1,364m (1.2%) to \$119,681m. The SITC sections with the largest increases were:

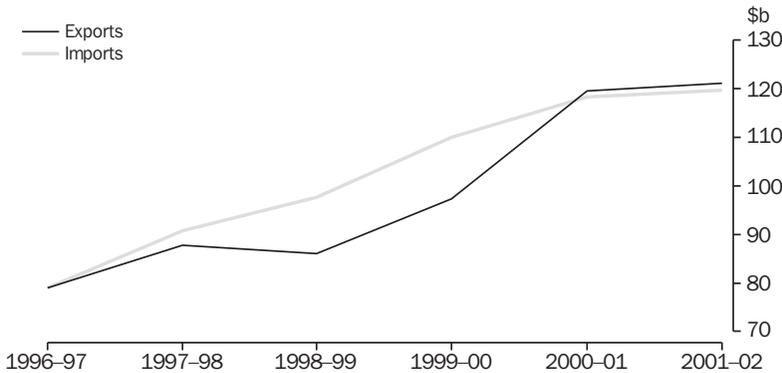
- Manufactured goods classified chiefly by material, up \$770m (5.5%)
- Commodities and transactions not classified elsewhere, up \$685m (36.3%)
- Miscellaneous manufactured articles, up \$623m (3.7%)
- Chemical and related products, up \$440m (3.1%)
- Food and live animals, up \$379m (8.9%).

These increases were partly offset by decreases in:

- Mineral fuels, lubricants and related materials, down \$1,514m (14.4%)
- Crude materials, inedible, except fuels, down \$160m (8.4%).

The value of merchandise exports and imports by commodity for 2000-01 and 2001-02, and their percentage contributions to total merchandise trade for 2001-02, are shown in table 30.21.

**30.20 TOTAL MERCHANDISE EXPORTS AND IMPORTS**



Source: *International Merchandise Trade, Australia* (5422.0).

## 30.21 MERCHANDISE EXPORTS AND IMPORTS, By commodity

	Exports			Imports		
	2000-01	2001-02	% contribution	2000-01	2001-02	% contribution
Standard International Trade Classification (SITC)	\$m	\$m	% contribution	\$m	\$m	% contribution
Food and live animals(a)(b)	20 759	21 707	17.9	4 235	4 614	3.9
Beverages and tobacco	1 993	2 355	1.9	907	864	0.7
Crude materials, inedible, except fuels(a)(b)	23 543	22 443	18.5	1 916	1 756	1.5
Mineral fuels, lubricants and related materials(b)	25 206	25 120	20.7	10 547	9 033	7.5
Animal and vegetable oils, fats and waxes(a)	300	310	0.3	285	289	0.2
Chemical and related products, n.e.s.(a)(b)	5 154	5 362	4.4	14 197	14 637	12.2
Manufactured goods classified chiefly by material(a)(b)	14 028	13 557	11.2	14 051	14 821	12.4
Machinery and transport equipment(a)(b)	13 439	14 140	11.7	53 492	53 672	44.8
Miscellaneous manufactured articles(a)(b)	4 481	4 466	3.7	16 798	17 421	14.6
Commodities and transactions not classified elsewhere in the SITC(c)(d)	10 636	11 715	9.7	1 889	2 574	2.2
<b>Total trade</b>	<b>119 539</b>	<b>121 176</b>	<b>100.0</b>	<b>118 317</b>	<b>119 681</b>	<b>100.0</b>

(a) Excludes export commodities subject to a confidentiality restriction. (b) Excludes import commodities subject to a confidentiality restriction. (c) Includes commodities subject to a confidentiality restriction. (d) Includes small value export entries that cannot yet be allocated by commodity.

Source: *International Merchandise Trade, Australia* (5422.0).

Australia's most valuable commodity exports for 2001-02, and their principal markets, were:

*Coal, \$13,394m* — 11.1% of total exports: Japan (43.8% of total coal exports), the Republic of Korea (9.4%), India (7.9%), and Taiwan (6.4%).

*Crude petroleum products, \$5,971m* — 4.9% of total exports: the Republic of Korea (25.5% of total crude petroleum product exports), Singapore (24.4%), Japan (12.2%), and the United States of America (11.6%).

*Iron ore, \$5,165m* — 4.3% of total exports: Japan (42.2% of total iron ore exports), China (26.7%), the Republic of Korea (16.3%), and Taiwan (7.0%).

*Non-monetary gold, \$5,129m* — 4.2% of total exports: the United Kingdom (23.0% of total non-monetary gold exports), Singapore (18.2%), the Republic of Korea (16.2%), and Hong Kong (SAR of China) (15.3%). This comprises gold produced in Australia and gold previously imported for refining or manufacturing.

Export values in excess of \$4,000m (3% of total exports) were recorded for an additional four commodities. These commodities, and their principal markets, were: Wheat \$4,527m (no country details); Aluminium \$4,414m (Japan 33.0%); Bovine meat \$4,316m (Japan 31.4%); and Aluminium ores \$4,032m (no country details).

Table 30.22 shows a detailed commodity listing of the highest value exports for 2001-02.

## 30.22 MERCHANDISE EXPORTS OF MAJOR COMMODITIES — 2001–02

Commodity (SITC 3-digit code)	\$m	%
Coal, not agglomerated (321)	13 394	11.1
Petroleum oils and oils obtained from bituminous minerals, crude (333)	5 971	4.9
Iron ore and concentrates (281)	5 165	4.3
Gold, non-monetary (excl. gold ores and concentrates) (971)	5 129	4.2
Wheat (incl. spelt) and meslin, unmilled (041)	4 527	3.7
Aluminium (684)	4 414	3.6
Meat of bovine animals, fresh, chilled or frozen (011)	4 316	3.6
Aluminium ores and concentrates (incl. alumina) (285)(a)	4 032	3.3
Wool and other animal hair (incl. wool tops) (268)(a)	3 393	2.8
Motor vehicles principally designed for transport of persons (excl. public-transport type, incl. racing cars) (781)	3 001	2.5
Natural gas (343)	2 606	2.2
Petroleum oils, oils from bituminous minerals (not crude); preparations, with 70% or more by weight of these oils (334)	2 357	1.9
Alcoholic beverages (112)	2 259	1.9
Special transactions and commodities not classified according to kind (931)	2 248	1.9
Medicaments (incl. veterinary medicaments) (542)	1 999	1.6
Meat and edible meat offal (excl. bovine), suitable or fit for human consumption, fresh, chilled or frozen (012)	1 824	1.5
Milk and cream and milk products (excl. butter and cheese) (022)	1 819	1.5
Cotton (263)	1 547	1.3
Copper (682)	1 515	1.3
Nickel (683)	1 410	1.2
Ores and concentrates of base metal (excl. iron, copper, nickel, aluminium, uranium and thorium) (287)(a)	1 404	1.2
Aircraft and associated equipment; spacecraft (incl. satellites and spacecraft launch vehicles; parts thereof) (792)	1 319	1.1
Parts and accessories (excl. covers, cases and the like) for use with office and automatic data processing mach. (759)	1 141	0.9
Live animals (excl. fish, crustaceans, molluscs and aquatic invertebrates) (001)	1 111	0.9
Crustaceans, molluscs, aquatic invertebrates, live, chilled, frozen, dried, salted; crustaceans, cooked (036)	1 054	0.9
Copper ores and concentrates; copper mattes, cement copper (283)	1 043	0.9
Cheese and curd (024)	1 032	0.9
Total major commodities(a)	81 031	66.9
Total of all other commodities(b)	40 145	33.1
<b>Total merchandise exports</b>	<b>121 176</b>	<b>100.0</b>

(a) Excludes commodities subject to a confidentiality restriction. (b) Includes commodities subject to a confidentiality restriction.

Source: *International Merchandise Trade, Australia, June 2002* (5422.0).

Australia's most valuable commodity imports for 2001–02, and their principal sources, were:

*Passenger motor vehicles, \$8,956m* — 7.5% of total imports: Japan (56.9% of total passenger motor vehicle imports), Germany (14.2%), and the Republic of Korea (6.7%).

*Crude petroleum oils, \$6,789m* — 5.7% of total imports: Indonesia (25.1% of total crude petroleum imports), Vietnam (22.4%), the United Arab Emirates (9.8%), Malaysia (8.9%), Papua New Guinea (8.8%) and Saudi Arabia (6.5%).

*Computing equipment, \$5,028m* — 4.2% of total imports: Singapore (16.2% of total computing equipment imports), China (15.0%), the United States of America (14.7%), Malaysia (13.6%), Taiwan (10.8%), and Japan (9.8%).

*Telecommunications equipment, \$4,507m* — 3.8% of total imports: the United States of America (21.3% of total telecommunications equipment imports), the Republic of Korea (17.1%), the United Kingdom (11.5%), China (8.0%) and Japan (4.9%).

*Medicaments, \$4,002m* — 3.3% of total imports: the United Kingdom (23.1% of total medicaments imports), the United States of America (16.1%), Germany (11.5%) and Ireland (10.9%).

Table 30.23 shows a detailed commodity listing of the highest value imports for 2001–02.

## 30.23 MERCHANDISE IMPORTS OF MAJOR COMMODITIES — 2001–02

Commodity (SITC 3-digit code)	\$m	%
Motor vehicles principally designed for transport of persons (excl. public-transport type, incl. racing cars) (781)	8 956	7.5
Petroleum oils and oils obtained from bituminous minerals, crude (333)	6 789	5.7
Automatic data processing machines and units thereof, magnetic, optical readers; data transcribers and processors (752)	5 028	4.2
Telecommunications equipment, n.e.s.; parts, and accessories of radio, television, video and similar apparatus, n.e.s. (764)	4 507	3.8
Medicaments (incl. veterinary medicaments) (542)	4 002	3.3
Aircraft and associated equipment; spacecraft (incl. satellites and spacecraft launch vehicles; parts thereof) (792)	3 060	2.6
Motor vehicles for the transport of goods and special purpose motor vehicles (782)	2 545	2.1
Parts and accessories (excl. covers, cases and the like) for use with office and automatic data processing mach (759)	2 493	2.1
Parts, n.e.s. and accessories of the motor vehicles of groups 722, 781, 782 and 783 (784)	2 224	1.9
Gold, non-monetary (excl. gold ores and concentrates) (971)	2 218	1.9
Measuring, checking, analysing and controlling instruments and apparatus, n.e.s. (874)	1 915	1.6
Paper and paperboard (641)	1 868	1.6
Petroleum oils, oils from bituminous minerals (not crude); preparations, containing 70% or more by weight of these oils (334)(a)	1 828	1.5
Electrical machinery and apparatus, n.e.s. (778)	1 749	1.5
Internal combustion piston engines, and parts thereof, n.e.s. (713)	1 510	1.3
Baby carriages, toys, games and sporting goods (894)	1 502	1.3
Heating and cooling equipment, and parts thereof, n.e.s. (741)	1 269	1.1
Civil engineering and contractors' plant and equipment (723)	1 250	1.0
Household type, electrical and non-electrical equipment, n.e.s. (775)	1 230	1.0
Articles, of plastics, n.e.s. (893)	1 228	1.0
Furniture and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings (821)	1 194	1.0
Thermionic, cold cathode or photo cathode valves and tubes, semi conductors, i.e.d., integrated circuits, etc. (776)	1 137	1.0
Pumps for gas (incl. air), compressors, fans; ventilating hoods; centrifuges; purifying apparatus; parts (743)	1 112	0.9
Organo-inorganic compounds, heterocyclic compounds, nucleic acids and their salts (515)	1 083	0.9
Manufactures of base metal, n.e.s. (699)	1 079	0.9
Elec apparatus used in circuits; resistors; printed circuits; boards, panels, etc. with two or more functions (772)	1 057	0.9
Musical instruments, parts and accessories thereof; records, tapes, etc. (excl. goods or groups 763, 882 and 883) (898)	1 055	0.9
Rubber tyres, interchangeable tyre treads, tyre flaps and inner tubes for wheels of all kinds (625)	1 045	0.9
Printed matter (892)	1 037	0.9
Medicinal and pharmaceutical products, (excl. medicaments of group 542) (541)	1 007	0.8
Total major commodities(a)	67 975	56.8
Total of all other commodities(b)	51 705	43.2
<b>Total merchandise imports</b>	<b>119 681</b>	<b>100.0</b>

(a) Excludes commodities subject to a confidentiality restriction. (b) Includes commodities subject to a confidentiality restriction.

Source: *International Merchandise Trade, Australia, June 2002 (5422.0)*.

## Merchandise exports and imports by country

For exports, country refers to the country to which the goods were consigned at the time of export. For imports, country refers to the country of origin of the goods, that is, where the majority of processing of the goods takes place.

Australia's merchandise trade surplus increased from \$1,222m in 2000–01 to \$1,495m in 2001–02, an improvement of \$273m. The main trading partner contributors were:

- a \$1,194m decrease in the deficit with the United States of America. This was due to a \$340m rise in exports, due mainly to increases in Meat and meat preparations, and Transport equipment (excluding road vehicles), and a \$854m decrease in imports, due mainly to decreases in Telecommunications and sound recording and reproducing apparatus and equipment, Office machines and automatic data processing machines, and Organic chemicals.

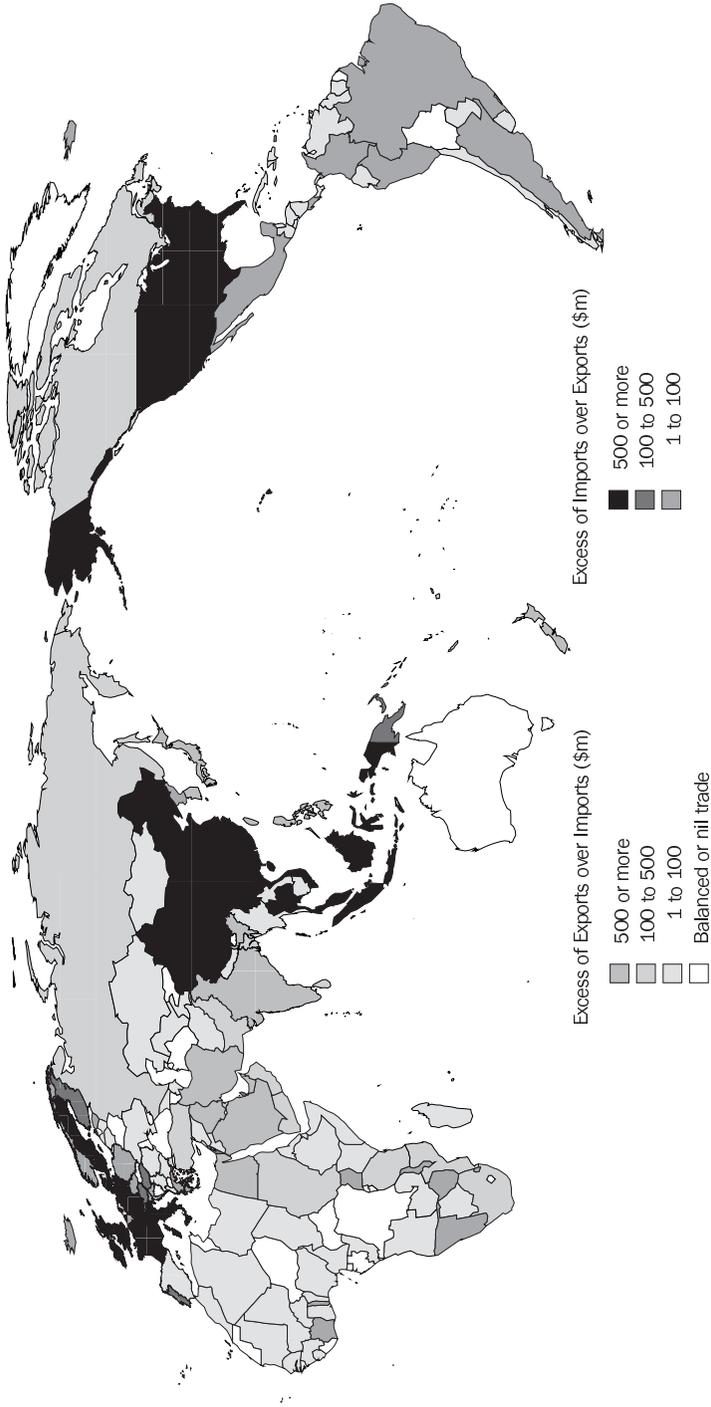
- a \$1,004m increase in the surplus with Saudi Arabia. This was due to a \$400m rise in exports and a \$604m decrease in imports due mainly to a large decrease in Petroleum, petroleum products and related materials.
- a \$646m decrease in the deficit with the United Kingdom. This was due to a \$544m rise in exports and a \$102m decrease in imports.
- a \$638m increase in the surplus with the Republic of South Korea. This was due to a \$650m rise in exports that was partly offset by a \$12m increase in imports.
- a \$580m increase in the surplus with New Zealand. This was due to a \$755m rise in exports, due mainly to increases in Petroleum, petroleum products and related materials, and Road vehicles, partly offset by a \$175m increase in imports.
- a \$575m decrease in the deficit with Vietnam as a result of a \$577m decrease in imports due mainly to a decrease in Petroleum, petroleum products and related materials.
- an \$858m decrease in the surplus with Taiwan. This was due to a \$1,051m decrease in exports due mainly to a decrease in Petroleum, petroleum products and related materials, partly offset by a \$193m decrease in imports.
- a \$827m decrease in the surplus with Japan. This was due to a \$726m decrease in exports due mainly to decreases in Petroleum, petroleum products and related materials, Non-ferrous metals, and Meat and meat preparations and a \$101m increase in imports.
- a \$703m increase in the deficit with Germany. This was the combined result of a \$143m decrease in exports and a \$560m increase in imports.
- a \$595m increase in the deficit with Indonesia. This was the result of an \$82m increase in exports and a \$677m increase in imports due mainly to an increase in Petroleum, petroleum products and related materials.
- a \$458m increase in the deficit with China. This was the result of a \$939m increase in exports and a \$1,397m increase in imports.

These improvements were partly offset by:

- a \$1,148m decrease in the surplus with Singapore, mainly as a result of a \$1,073m decrease in exports.

Map 30.24 shows Australia's net balance of trade with its partner countries in 2001–02.

30.24 NET BALANCE OF TRADE, Partner countries — 2001-02



Source: International Merchandise Trade, Australia, June 2002 (5422.0).

Graphs 30.25 and 30.26 show the percentage share of Australian merchandise exports and imports by value accounted for by Australia's top eight trading partners for exports and imports respectively.

Table 30.27 shows the value of exports to Australia's top eight export countries by commodity (SITC section).

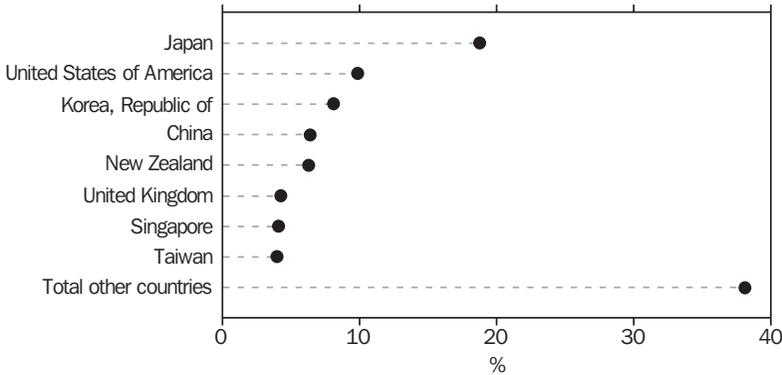
The largest value commodity exported to Japan, the Republic of Korea, Singapore and Taiwan was Mineral fuels, lubricants and related materials. About half the exports to China were Crude materials, inedible, except fuels. The largest value commodity exported to both New Zealand and the United States of America was Machinery and transport equipment. Commodities and transactions not classified elsewhere in the SITC formed the largest commodity export to the United Kingdom.

Table 30.28 shows the value of imports from Australia's top eight import countries by commodity (SITC section).

The largest value commodity imported from Germany, Japan, the Republic of Korea, the United Kingdom and the United States of America was Machinery and transport equipment. From China, the largest value commodity was Miscellaneous manufactured articles, from New Zealand it was Manufactured goods classified chiefly by material, and from Indonesia it was Mineral fuels, lubricants and related materials.

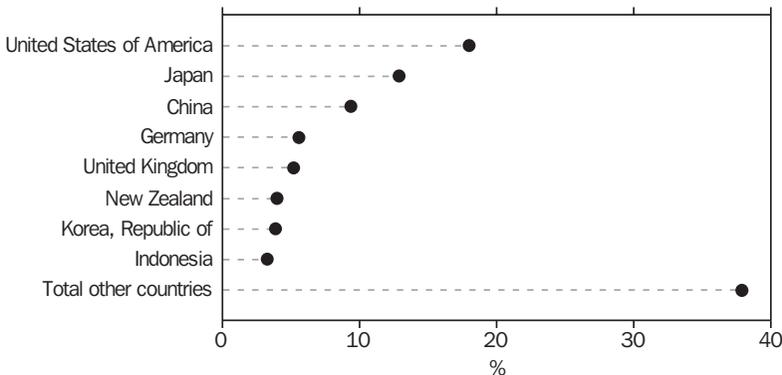
Table 30.29 shows merchandise exports and imports for the last three financial years for the top 50 countries in order of total two-way trade (i.e. merchandise exports plus merchandise imports).

30.25 MERCHANDISE EXPORTS, Selected countries — 2001-02



Source: International Merchandise Trade, Australia, June 2002 (5422.0).

30.26 MERCHANDISE IMPORTS, Selected countries — 2001-02



Source: International Merchandise Trade, Australia, June 2002 (5422.0).

## 30.27 MERCHANDISE EXPORTS, Top eight countries — 2001–02

Commodity (SITC section)	China	Japan	Korea, Republic of	New Zealand	Singapore	Taiwan	United Kingdom	United States of America	Total all countries
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Food and live animals(a)	470	3 903	645	696	619	624	214	2 502	21 707
Beverages and tobacco	3	67	9	147	47	5	867	656	2 355
Crude materials, inedible, except fuels(a)	3 627	4 160	1 838	121	38	674	235	296	22 443
Mineral fuels, lubricants and related materials(a)	561	7 331	2 819	855	1 706	1 371	419	795	25 120
Animal and vegetable oils, fats and waxes(a)	84	38	13	24	5	31	10	5	310
Chemical and related products, n.e.s.(a)	250	283	276	812	151	173	253	863	5 362
Manufactured goods classified chiefly by material(a)	683	1 821	1 007	1 096	256	1 084	379	1 122	13 557
Machinery and transport equipment(a)	271	307	524	2 101	576	106	514	3 072	14 140
Miscellaneous manufactured articles(a)	115	178	109	972	243	53	287	897	4 466
Commodities and transactions not classified elsewhere in the SITC(b)	1 718	4 681	2 616	813	1 296	721	2 019	1 784	11 715
<b>Total merchandise exports</b>	<b>7 781</b>	<b>22 769</b>	<b>9 856</b>	<b>7 637</b>	<b>4 936</b>	<b>4 843</b>	<b>5 197</b>	<b>11 992</b>	<b>121 176</b>

(a) Excludes export commodities subject to a 'No commodity details' restriction. (b) Includes commodities subject to a 'No commodity details' restriction.

Source: *International Merchandise Trade, Australia, June 2002 (5422.0)*.

## 30.28 MERCHANDISE IMPORTS, Top eight countries — 2001–02

Commodity (SITC section)	China	Germany	Indonesia	Japan	Korea, Republic of	New Zealand	United Kingdom	United States of America	Total all countries
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Food and live animals(a)	212	55	107	95	37	884	130	479	4 614
Beverages and tobacco	22	13	1	4	1	120	160	170	864
Crude materials, inedible, except fuels(a)	69	29	107	48	39	409	50	199	1 756
Mineral fuels, lubricants and related materials(a)	127	5	1 866	37	97	323	6	285	9 033
Animal and vegetable oils, fats and waxes(a)	2	10	2	1	1	4	3	9	289
Chemical and related products, n.e.s.(a)	470	1 151	127	542	219	391	1 609	3 367	14 637
Manufactured goods classified chiefly by material(a)	1 830	717	554	1 399	694	1 031	508	1 592	14 821
Machinery and transport equipment(a)	3 249	3 914	318	12 086	2 535	795	2 704	11 792	53 672
Miscellaneous manufactured articles(a)	5 144	658	260	867	167	516	1 018	3 223	17 421
Commodities and transactions not classified elsewhere in the SITC(b)	153	180	664	393	930	265	31	382	2 574
<b>Total merchandise imports</b>	<b>11 278</b>	<b>6 732</b>	<b>4 007</b>	<b>15 471</b>	<b>4 721</b>	<b>4 740</b>	<b>6 219</b>	<b>21 497</b>	<b>119 681</b>

(a) Excludes import commodities subject to a 'No commodity details' restriction. (b) Includes commodities subject to a 'No commodity details' restriction.

Source: *International Merchandise Trade, Australia, June 2002 (5422.0)*.

## 30.29 MERCHANDISE EXPORTS AND IMPORTS, By country

	Exports			Imports		
	1999-2000	2000-01	2001-02	1999-2000	2000-01	2001-02
	\$m	\$m	\$m	\$m	\$m	\$m
Austria	51	56	58	484	542	539
Bangladesh	296	367	347	54	56	42
Belgium-Luxembourg	1 089	1 004	865	737	828	875
Brazil	470	543	462	441	647	470
Brunei Darussalam	40	44	50	211	351	407
Canada	1 175	1 769	1 892	1 848	1 869	1 607
Chile	129	133	154	61	79	97
China	4 966	6 841	7 781	7 515	9 881	11 278
Denmark	140	109	108	542	535	671
Egypt	504	600	754	16	14	20
Fiji	591	642	527	356	254	232
Finland	371	454	359	668	721	727
France	871	1 081	1 344	2 228	2 478	2 691
Germany	1 245	1 487	1 344	5 791	6 172	6 732
Hong Kong (SAR of China)	3 211	3 909	4 004	1 280	1 362	1 410
India	1 588	2 086	2 522	714	754	874
Indonesia	2 408	3 111	3 193	2 701	3 330	4 007
Iran	410	755	784	29	27	39
Iraq	456	733	840	74	96	—
Ireland	134	178	306	937	1 140	1 469
Israel	192	248	291	442	441	526
Italy	1 575	2 099	2 166	3 043	3 257	3 411
Japan	18 822	23 495	22 769	14 110	15 370	15 471
Korea, Republic of	7 615	9 206	9 856	4 311	4 709	4 721
Kuwait	299	403	517	106	163	133
Malaysia	2 141	2 500	2 526	3 765	4 177	3 860
Mexico	254	370	479	382	582	521
Netherlands	1 378	1 737	1 538	990	906	1 094
New Caledonia	200	244	225	48	45	44
New Zealand	6 739	6 882	7 637	4 372	4 565	4 740
Norway	111	124	130	149	214	206
Pakistan	532	404	477	156	203	200
Papua New Guinea	927	1 051	1 007	1 353	1 457	1 124
Philippines	1 304	1 501	1 255	457	512	624
Portugal	41	34	83	168	162	193
Qatar	68	98	107	170	211	353
Saudi Arabia	1 334	2 196	2 596	1 002	1 634	1 030
Singapore	4 855	6 009	4 936	4 359	3 899	3 974
South Africa	1 039	1 301	1 346	749	877	870
Spain	714	713	791	659	710	759
Sri Lanka	221	345	308	76	87	82
Sweden	169	184	220	1 646	1 624	1 627
Switzerland	319	273	226	1 279	1 171	1 302
Taiwan	4 696	5 894	4 843	3 244	3 326	3 133
Thailand	1 703	2 222	2 305	2 422	2 780	2 886
Turkey	231	309	316	134	152	186
United Arab Emirates	872	1 163	1 244	401	1 114	743
United Kingdom	4 158	4 653	5 197	6 350	6 321	6 219
United States of America	9 602	11 652	11 992	23 135	22 351	21 497
Vietnam	385	499	497	1 726	2 432	1 855
<i>Total major countries</i>	<i>92 645</i>	<i>113 709</i>	<i>115 572</i>	<i>107 890</i>	<i>116 588</i>	<i>117 571</i>
Others(a)	4 641	5 830	5 603	2 187	1 729	2 110
<b>Total</b>	<b>97 286</b>	<b>119 539</b>	<b>121 176</b>	<b>110 078</b>	<b>118 317</b>	<b>119 681</b>

(a) Others include: all countries not displayed in table; Zone of Co-op A-Timor Gap; Destination or Origin Unknown; International Waters; No country details; Confidentialised alumina exports; and Ship and aircraft stores.

Source: *International Merchandise Trade, Australia* (5422.0).

## Merchandise exports and imports by industry of origin

Table 30.30 shows Australia's merchandise trade statistics classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC). The statistics are compiled by allocating international trade data for a commodity to an ANZSIC industry of origin category, based upon the industry which predominantly produces that commodity in Australia as defined by the ANZSIC.

The majority of exports in 2001–02 were classified to Manufacturing, \$69,035m (57% of total exports) and Mining, \$32,521m (27% of total exports).

The ANZSIC subdivisions that recorded the largest increases in 2001–02 were Coal mining, up \$2,564m (24%), and Food, beverage and tobacco, up \$821m (5%).

The majority of imports were classified to Manufacturing, \$111,187m (93% of total imports).

Imports showed increases during 2001–02 in Metal products, up \$974m (13%); Petroleum, coal, chemical and associated product manufacturing, up \$750m (4%); and Machinery and equipment manufacturing, up \$501m (1%).

### 30.30 MERCHANDISE EXPORTS AND IMPORTS, By industry of origin

Industry of origin	Exports			Imports		
	1999–2000 \$m	2000–01 \$m	2001–02 \$m	1999–2000 \$m	2000–01 \$m	2001–02 \$m
<b>Agriculture, forestry, fishing and hunting</b>						
Agriculture	8 136	9 741	10 051	706	606	575
Services to agriculture; hunting and trapping	1 540	2 107	1 680	11	6	8
Forestry and logging	80	78	100	5	6	6
Commercial fishing	791	885	984	247	213	163
<b>Total</b>	<b>10 547</b>	<b>12 811</b>	<b>12 815</b>	<b>969</b>	<b>831</b>	<b>752</b>
<b>Mining</b>						
Coal mining	8 326	10 833	13 398	11	7	12
Oil and gas extraction	7 479	11 144	9 299	6 032	8 421	6 909
Metal ore mining	7 536	9 667	9 564	148	198	172
Other mining	237	268	260	153	180	170
<b>Total</b>	<b>23 578</b>	<b>31 912</b>	<b>32 521</b>	<b>6 344</b>	<b>8 807</b>	<b>7 264</b>
<b>Manufacturing</b>						
Food, beverage and tobacco	13 330	16 649	17 471	4 519	5 090	5 387
Textile, clothing, footwear and leather	2 588	2 937	2 732	6 852	7 389	7 421
Wood and paper products	1 401	1 635	1 778	3 546	3 577	3 474
Printing, publishing and recorded media	487	546	575	2 022	1 918	2 020
Petroleum, coal, chemical and associated products	6 881	8 868	8 249	16 806	19 306	20 056
Non-metallic mineral products	315	379	331	1 412	1 402	1 472
Metal products	18 291	21 038	20 277	7 906	7 442	8 415
Machinery and equipment	13 904	16 191	16 679	56 222	58 672	59 174
Other manufacturing	785	886	942	3 097	3 536	3 768
<b>Total</b>	<b>57 982</b>	<b>69 128</b>	<b>69 035</b>	<b>102 382</b>	<b>108 331</b>	<b>111 187</b>
<b>Other(a)(b)</b>	<b>5 179</b>	<b>5 689</b>	<b>6 806</b>	<b>382</b>	<b>349</b>	<b>478</b>
<b>Total</b>	<b>97 286</b>	<b>119 539</b>	<b>121 176</b>	<b>110 078</b>	<b>118 317</b>	<b>119 681</b>

(a) Includes exports which cannot yet be allocated by industry of origin. (b) Includes commodities subject to a confidentiality restriction.

Source: *International Merchandise Trade, Australia* (5422.0).

## Merchandise exports and imports by mode of transport

In 2001–02, the predominant mode of transport for Australia's exports (table 30.31) was sea transport, with \$99,261m or 82% of total exports by value. Air transport accounted for \$21,799m or 18%, and parcel post \$116m or 0.1%. Australia exported 508 million tonnes of merchandise, the vast majority of which by weight was transported by sea (506.2 million tonnes).

The largest contributors to export values by sea transport were Mineral fuels, lubricants and related materials, \$24,475m (25% of total exports by sea); Crude materials, inedible, except fuels, \$22,324m (22%); and Food and live animals, \$20,056m (20%).

The largest contributors to export values by air transport were Commodities and transactions not classified elsewhere in the SITC, \$7,673m (35% of exports by air); and Machinery and transport equipment, \$5,387m (25%).

In 2001–02, the predominant mode of transport for Australia's imports (table 30.32) was also sea transport, with \$84,670m or 71% of total imports by value. Air transport accounted for \$34,932m or 29%, and parcel post \$78m or 0.1%. Australia imported 58 million tonnes of merchandise, considerably less than the tonnage of exports. Sea transport accounted for almost all merchandise imports by weight.

The largest contributors to import values by sea transport were Machinery and transport equipment, \$35,442m (42% of imports by sea); and Manufactured goods classified chiefly by material, \$13,004m (15%).

Over half the value of imports transported by air transport was Machinery and transport equipment, \$18,212m (52% of imports by air).

### 30.31 MERCHANDISE EXPORTS, By mode of transport — 2001–02

Commodity (SITC)	Air		Sea		Parcel post		Total
	\$m	%(a)	\$m	%(a)	\$m	%(a)	\$m
Food and live animals(b)	1 651	7.6	20 056	92.4	—	—	21 707
Beverages and tobacco	22	0.9	2 333	99.0	—	—	2 355
Crude materials, inedible, except fuels(b)	117	0.5	22 324	99.5	1	—	22 443
Mineral fuels, lubricants and related materials	645	2.6	24 475	97.4	—	—	25 120
Animal and vegetable oils, fats and waxes(b)	4	1.2	306	98.8	—	—	310
Chemical and related products, n.e.s.(b)	2 362	44.1	3 000	55.9	—	—	5 362
Manufactured goods classified chiefly by material(b)	1 179	8.7	12 308	90.8	70	0.5	13 557
Machinery and transport equipment(b)	5 387	38.1	8 751	61.9	2	—	14 140
Miscellaneous manufactured articles(b)	2 759	61.8	1 667	37.3	40	0.9	4 466
Commodities and transactions not classified elsewhere in the SITC(c)	7 673	65.5	4 040	34.5	2	—	11 715
<b>Total</b>	<b>21 799</b>	<b>18.0</b>	<b>99 261</b>	<b>81.9</b>	<b>116</b>	<b>0.1</b>	<b>121 176</b>

(a) Proportion of total commodity (SITC section). (b) Excludes export commodities subject to a confidentiality restriction.

(c) Includes export commodities subject to a confidentiality restriction.

Source: *International Merchandise Trade, Australia, June 2002 (5422.0)*.

## 30.32 MERCHANDISE IMPORTS, By mode of transport — 2001-02

Commodity (SITC)	Air		Sea		Parcel post		Total
	\$m	%(a)	\$m	%(a)	\$m	%(a)	\$m
Food and live animals(b)	218	4.7	4 395	95.3	—	—	4 614
Beverages and tobacco	13	1.5	851	98.5	—	—	864
Crude materials, inedible, except fuels(b)	91	5.2	1 664	94.8	1	0.1	1 756
Mineral fuels, lubricants and related materials(b)	2	—	9 031	100.0	—	—	9 033
Animal and vegetable oils, fats and waxes	3	1.1	286	98.9	—	—	289
Chemical and related products, n.e.s.(b)	5 921	40.5	8 714	59.5	2	—	14 637
Manufactured goods classified chiefly by material(b)	1 803	12.2	13 004	87.7	14	0.1	14 821
Machinery and transport equipment(b)	18 212	33.9	35 442	66.0	18	—	53 672
Miscellaneous manufactured articles(b)	6 411	36.8	10 968	63.0	42	0.2	17 421
Commodities and transactions not classified elsewhere in the SITC(c)	2 258	87.7	316	12.3	—	—	2 574
<b>Total</b>	<b>34 932</b>	<b>29.2</b>	<b>84 670</b>	<b>70.7</b>	<b>78</b>	<b>0.1</b>	<b>119 681</b>

(a) Proportion of total commodity (SITC section). (b) Excludes import commodities subject to a confidentiality restriction.

(c) Includes import commodities subject to a confidentiality restriction.

Source: *International Merchandise Trade, Australia, June 2002* (5422.0).

## Export price index

The export price index (all groups) increased by 2% in 2001-02 (table 30.33). The largest increase was from Food and live animals, up 9%, while the decreases were in Manufactured goods classified chiefly by materials, down 10%, and Chemicals and related products, n.e.s., down 6%.

Between 1995-96 and 2001-02 the all groups index increased by 21%. The major contributors were Mineral fuels, lubricants and related materials (53%), Beverages and tobacco (31%), Chemicals and related products, n.e.s. (24%), and Food and live animals (19%).

## 30.33 EXPORT PRICE INDEX(a), Index numbers based on SITC

Commodity (SITC)	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
Food and live animals	100.3	95.6	99.6	96.6	95.7	109.6	118.9
Beverages and tobacco	108.8	112.3	120.2	128.3	131.5	137.8	142.8
Crude materials, inedible, except fuels	83.4	81.8	90.3	84.0	82.6	95.7	99.0
Mineral fuels, lubricants and related materials	108.0	110.8	121.8	119.7	127.1	162.7	164.7
Chemicals and related products, n.e.s.	91.0	88.6	96.0	96.2	102.5	119.9	113.0
Manufactured goods classified chiefly by materials	97.4	86.5	93.7	86.8	101.0	116.7	105.1
Machinery and transport equipment	99.6	93.4	95.9	97.7	98.8	104.1	105.6
Miscellaneous manufactured articles	106.2	103.2	108.2	111.7	112.5	118.4	119.2
<b>All groups</b>	<b>96.1</b>	<b>92.4</b>	<b>98.9</b>	<b>95.7</b>	<b>98.0</b>	<b>114.8</b>	<b>116.7</b>

(a) Reference year 1989-90 = 100.

Source: *International Trade Price Indexes, Australia* (6457.0).

## Import price index

The import price index (all groups) decreased by 1% in 2001–02 (table 30.34), due largely to decreases in the import prices of Mineral fuels, lubricants and other related materials (down 16%); and Crude materials, inedible, except fuels (down 11%).

Between 1995–96 and 2001–02 the all groups index increased by 15%. The major contributors to the increase were Mineral fuels, lubricants and other related materials (76%) and Miscellaneous manufactured articles (25%).

### 30.34 IMPORT PRICE INDEX(a), Index numbers based on SITC

Commodity (SITC)	1995–96	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02
Food and live animals chiefly for food	115.9	112.8	129.0	125.1	116.9	121.4	122.5
Beverages and tobacco	109.8	114.3	126.0	130.5	127.0	128.5	132.9
Crude materials, inedible, except fuels	125.8	110.2	119.1	119.8	124.9	139.9	124.9
Mineral fuels, lubricants and other related materials	89.8	98.1	93.4	84.9	135.4	188.0	158.4
Animal and vegetable oils, fats and waxes	170.1	158.8	156.4	178.2	138.5	122.6	122.1
Chemicals and related products n.e.s.	115.1	107.5	112.9	114.2	111.0	128.1	128.5
Manufactured goods classified chiefly by material	115.7	109.6	116.7	122.6	120.2	131.3	133.9
Machinery and transport equipment	117.4	108.5	115.5	121.9	119.4	129.7	128.2
Miscellaneous manufactured articles	114.2	111.2	120.3	127.9	126.1	140.0	143.0
Commodities and transactions n.e.c.	103.7	93.6	90.5	91.9	89.8	99.6	110.8
<b>All groups</b>	<b>115.0</b>	<b>108.6</b>	<b>115.4</b>	<b>119.9</b>	<b>120.2</b>	<b>134.3</b>	<b>132.3</b>

(a) Reference year 1989–90 = 100.0.

Source: *International Trade Price Indexes, Australia (6457.0)*.

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