Chapter Fourteen

# Environment

## Contents

**Contents** **Page**

## BIODIVERSITY

Australia has been geographically isolated from other continents since its final severance from Antarctica 35 million years ago and a unique animal and plant life has evolved. Australia's biodiversity, that is the number and diversity of all life forms, is significant in the world context. It is not a fixed entity, but a constantly changing pool that is augmented by new genetic variation and diminished by extinctions.

Seven families of mammals, including the platypus and the koala, four of birds and twelve of flowering plants are endemic to Australia — far more endemic families than any other country. It is estimated that 88 per cent of Australia's reptiles, 70 per cent of birds and 94 per cent of frogs occur nowhere else in the world.

Australia has the planet's second highest number of reptile species (686), is fifth in flowering plants (23,000) and tenth in amphibians (197).

Over the past 200 years since white settlement, activities such as agriculture, urbanisation, clearing, draining of wetlands, the introduction of exotic species and pollution have had profound changes on Australian ecosystems. It is estimated that about half of Australia's forests have been cleared, and almost all other parts of Australia have been grazed to some extent by domestic stock or introduced feral animals. This has resulted in structural changes in vegetation communities and the loss of native species. It is estimated that 2.9 per cent of Australia's vascular plants which include trees, shrubs, grasses and ferns and 7 per cent of marsupials have been lost.

With a coastline of some 37,000 kilometres, Australia has a diverse marine environment ranging from the tropical mangrove and coral reef habitats of the far north, and Coral, Arafura and Timor Seas, to the subantarctic and antarctic habitats of the southern external territories. The fauna of the coastal water surrounding the Australian continent has a high diversity of species.

Although Australia covers a land area cf 768 million hectares, nearly 75 per cent of the population lives within 50 kilometres of Australia's coastal cities. About 35 per cent of the total population lives in Sydney and Melbourne.

### 14.1 AUSTRALIA'S BIODIVERSITY

| *Flora* | *Number of species* |
|---|---|
| Vascular plants | 22,000 species, more than 90% occur naturally in Australia<br>83 species are presumed extinct and further 840 species are threatened with extinction within 10–15 years |
| Non-vascular plants | About 28,000 species of algae<br>About 3,500 species of mosses, liverworts and lichens<br>About 10,000–20,000 species of large fungi<br>About 250,000 species of microfungi |
| *Fauna* | *Number of species* |
| Birds | 850 species of which 70% occur naturally only in Australia<br>16 species are extinct, 15 species endangered or vulnerable |
| Reptiles | 700 species, 88% occur only in Australia |
| Insects | 54,000 known insects with at least as many to be identified |
| Mammals | 276 native land mammals. 20 species extinct. 38 species endangered or vulnerable |
| Amphibians | About 180 species, all of which are frogs. 94% of frog species occur nowhere else |
| Fish/Molluscs | 3,600 species of fish and tens of thousands of species of molluscs |

*Source: Australian National Report to UNCED, December 1991.*

## Introduced species

One impact which is recognised as having a great influence on native flora and fauna is the increasing number of introduced species present in native bushlands. These include plants such as mission grass and animals such as foxes and rabbits.

At least 10 per cent of Australia's flora now consists of introduced species. The following table gives details of the number and percentage of introduced plant species which have become naturalised in various places. It can be noted that of all the States, Tasmania has the highest proportion of naturalised introduced species, comprising almost one-third of its total flora.

**14.2 NUMBER AND PER CENT OF INTRODUCED PLANT SPECIES**

| *Place* | *Number* | *Percentage* |
|---|---|---|
| Australia | 1,500–2,000 | 10–15 |
| New South Wales | 980 | 16 |
| Victoria | 825 | 24 |
| Queensland | 950 | 13 |
| South Australia | 904 | 25 |
| Western Australia | 838 | 11 |
| Tasmania | 700 | 31 |
| Northern Territory | 201 | 5 |
| Australian Capital Territory | 289 | 28 |
| Bents Basin, New South Wales | 36 | 40 |
| Kakadu National Park, Northern Territory | 87 | 6 |
| Uluru National Park, Northern Territory | 34 | 6 |
| Kosciusko Alpine Region | 27 | 7 |
| Kimberley Region, Western Australia | 90 | 5 |
| Norfolk Island | 266 | 60 |
| Lord Howe Island | 173 | 48 |

*Source: 'Plant Invasions of Australian Ecosystems', Humphries, Groves and Mitchell, 1992.*

Not all introduced species invade and threaten native plant communities. For example, an introduced plant may become established on land which is devoid of native vegetation. Of the 825 introduced species in Victoria, 412 are established amongst native vegetation. Out of these, 69 (8%) are considered a very serious threat, 15 per cent a serious threat, 8 per cent a potential threat and the remainder are considered as non-threatening.

The impact of introduced animals is quite large and includes competition with native species for shelter, food and water; changes to habitats; increases in soil erosion; unnatural predation on smaller native species; and the spread of disease.

Regardless of why mammals were introduced, where they have become established and are thriving they pose a threat to the flora and fauna which originally inhabited the environment. Introduced animals now comprise about 10 per cent of Australia's land mammal species.

### 14.3 IMPACTS CAUSED BY SOME OF AUSTRALIA'S INTRODUCED MAMMALS

| *Feral animal* | *Impact* |
|---|---|
| Horse/brumby | Extended area of impact of introduced herbivores; damage to farm property; grazing on native wildlife food supplies |
| Donkey | Extended area of impact of introduced herbivores; prevention of other animals from using waterholes; grazing on a wide variety of native wildlife food supplies |
| Camel | Eating selectively on fresh growth desert trees; damage to farm property |
| Goat | Compete for shelter with native fauna; compete with domestic stock for pasture; carry the footrot disease |
| Cat | Prey on a wide range of native species for food |
| Dog | Prey on native species for food; attack stock |
| Fox | Prey on native ground-dwelling wildlife |
| Cattle | Carry diseases such as brucellosis and tuberculosis; feed on native vegetation to the point of overfeeding |
| Pig | Eat and damage crops and pastures; prey on lambs and native animals; damage to farm property; potential to carry exotic diseases; destroy native mangrove and swamp vegetation; destruction of native animal food and nesting sites; destroy vegetation which prevents erosion |
| Water buffalo | Overgraze areas near waterholes; near elimination of the water couch plant from swamps (provides food and areas for nesting); erosion increased; creation of unnatural canals through walking paths which causes entry of salt water into fresh water area; carry major cattle diseases |

*Source: Bureau of Rural Resources and Australian National Parks and Wildlife Service, 1990.*

## ENVIRONMENTAL INDICATORS

Environmental indicators are increasingly seen as a necessary tool for helping to set the course towards a sustainable future. The OECD has been undertaking work on indicators as part of its program on environmental economics that would integrate environment and economic decision-making. Indicators need to be viewed in a dynamic context, so the set of indicators can change to reflect the changing nature of policy and the seriousness of different environmental problems.

The following data are indicators reflecting economic and population changes of environmental significance. The indicators have been prepared by the OECD and show a comparison of Australia with some selected countries. Developments are proceeding in Australia on further environmental statistics and indicators for Australia, States or specified regions.

## 14.4 OECD ENVIRONMENTAL INDICATORS, 1991

| *Indicator* | | *Australia* | *Canada* | *USA* | *Nether-lands* | *Sweden* | *UK* | *Total OECD* | *Total world* |
|---|---|---|---|---|---|---|---|---|---|
| Carbon dioxide ($CO_2$) emissions from energy use (million tonnes of carbon) | | | | | | | | | |
| | 1971 | 48 | 94 | 1,209 | 44 | 27 | 187 | 2,427 | 4,380 |
| | 1975 | 56 | 109 | 1,240 | 46 | 26 | 170 | 2,522 | 4,811 |
| | 1980 | 63 | 124 | 1,369 | 50 | 24 | 167 | 2,756 | 5,528 |
| | 1985 | 66 | 115 | 1,339 | 48 | 22 | 159 | 2,648 | 5,802 |
| | 1988 | 71 | 124 | 1,433 | 51 | 21 | 163 | 2,793 | 6,256 |
| Per unit of GDP (kg/$US '000) | 1988 | 404 | 316 | 324 | 380 | 194 | 317 | 286 | 635 |
| Per capita (tonnes) | 1988 | 4.3 | 4.8 | 5.8 | 3.4 | 2.5 | 2.9 | 3.4 | 1.2 |
| Greenhouse gas emissions (million tonnes of carbon) | Late 1980s | | | | | | | | |
| $CO_2$ | | 72 | 126 | 1,443 | 51 | 21 | 166 | 2,840 | 6,400 |
| Methane | | 90 | 79 | 692 | 26 | 5 | 75 | 1,290 | 5,100 |
| CFC | | 20 | 34 | 332 | 17 | 6 | 67 | 901 | 1,300 |
| Total | | 182 | 239 | 2,468 | 94 | 32 | 307 | 5,030 | 12,800 |
| Per unit of GDP (kg/$US '000) | | 1,035 | 608 | 558 | 705 | 295 | 599 | 516 | 662 |
| Per capita (tonnes) | | 11.0 | 9.2 | 10.0 | 6.4 | 3.8 | 5.4 | 6.1 | 2.5 |
| Protected areas ('000 sq. km) | 1970 | 108.6 | 148.2 | 234.5 | 0.9 | 5.0 | 13.0 | 586.3 | 1,597.1 |
| | 1980 | 250.7 | 214.6 | 473.9 | 1.1 | 10.6 | 13.2 | 1,107.7 | 3,566.2 |
| | 1985 | 354.1 | 229.5 | 649.5 | 1.6 | 15.9 | 15.5 | 1,437.4 | 4,237.7 |
| | 1989 | 364.8 | 718.6 | 790.4 | 1.5 | 17.1 | 25.7 | 2,180.5 | 5,290.8 |
| Per cent of land area | 1989 | 4.8 | 7.8 | 8.6 | 4.4 | 4.2 | 10.6 | 7.1 | 4.0 |
| Use of nitrogen fertilisers applied to arable land (tonnes/sq. km) | 1970 | 0.4 | 0.7 | 3.9 | 46.1 | 7.4 | 12.4 | 3.9 | 2.2 |
| | 1975 | 0.4 | 1.3 | 5.0 | 53.3 | 8.6 | 15.0 | 4.8 | 3.1 |
| | 1980 | 0.6 | 2.1 | 5.7 | 56.2 | 8.2 | 17.7 | 5.6 | 4.2 |
| | 1985 | 0.7 | 2.8 | 5.0 | 55.6 | 8.2 | 22.2 | 5.6 | 4.8 |
| | 1988 | 0.8 | 2.6 | 5.1 | 46.7 | 7.6 | 20.9 | 5.7 | 5.4 |
| Threatened species (per cent of species known) | Late 1980s | | | | | | | | |
| Mammals | | 13.4 | 7.3 | 10.5 | 48.3 | 15.4 | 31.2 | n.a. | n.a. |
| Birds | | 3.3 | 3.8 | 7.2 | 33.1 | 6.8 | 15.0 | n.a. | n.a. |
| Fish | | . . | 1.2 | 2.4 | 22.4 | 4.6 | 3.4 | n.a. | n.a. |
| Reptiles | | 1.6 | 2.4 | 7.1 | 85.7 | 0.0 | 45.5 | n.a. | n.a. |
| Amphibian | | 4.0 | 2.4 | 3.6 | 66.7 | 38.5 | 33.3 | n.a. | n.a. |
| Vascular plants | | 12.3 | 0.8 | 0.5 | . . | 8.2 | 9.6 | n.a. | n.a. |
| Waste generation | Late 1980s | | | | | | | | |
| Municipal waste | | | | | | | | | |
| Total ('000 tonnes) | | 10,000 | 16,400 | 208,800 | 6,900 | 2,650 | 17,700 | 420,000 | n.a. |
| Per capita (kg) | | 681 | 632 | 864 | 467 | 317 | 353 | 513 | n.a. |
| Industrial waste | Late 1980s | | | | | | | | |
| Total ('000 tonnes) | | 20,000 | 61,000 | 760,000 | 6,690 | 4,000 | 50,000 | 1,430,000 | n.a. |
| Per unit GDP (tonnes/$US mill.) | | 146 | 155 | 186 | 50 | 37 | 97 | 146 | n.a. |
| Hazardous ('000 tonnes) | | 300 | 3,300 | 275,000 | 1,500 | 500 | 4,500 | 303,000 | n.a. |
| Growth of economic activity | | | | | | | | | |
| GDP @ 1985 prices and exchange rates (Index 1970 = 100) | 1975 | 121 | 129 | 112 | 117 | 114 | 110 | 115 | n.a. |
| | 1980 | 139 | 156 | 131 | 133 | 121 | 121 | 136 | n.a. |
| | 1985 | 162 | 180 | 151 | 140 | 133 | 133 | 155 | n.a. |
| | 1989 | 187 | 208 | 173 | 154 | 146 | 155 | 177 | n.a. |
| GDP ($US billion) | 1989 | 184 | 401 | 4,544 | 138 | 111 | 530 | 10,070 | n.a. |
| Per capita ($US '000) | 1989 | 11.1 | 15.5 | 18.4 | 9.4 | 13.1 | 9.3 | 12.2 | n.a. |

... *continued*

## 14.4 OECD ENVIRONMENTAL INDICATORS, 1991 — *continued*

| *Indicator* | | *Australia* | *Canada* | *USA* | *Nether-lands* | *Sweden* | *UK* | *Total OECD* | *Total world* |
|---|---|---|---|---|---|---|---|---|---|
| Private final consumption expenditure @ 1985 prices and exchange rates (Index 1970 = 100) | 1975 | 124 | 136 | 116 | 119 | 113 | 113 | 120 | n.a. |
| | 1980 | 142 | 162 | 135 | 141 | 117 | 125 | 140 | n.a. |
| | 1985 | 166 | 184 | 160 | 141 | 120 | 139 | 159 | n.a. |
| | 1989 | 187 | 217 | 180 | 157 | 136 | 173 | 182 | n.a. |
| Total ($US billion) | 1989 | 107 | 235 | 2,944 | 83 | 59 | 346 | 6,254 | n.a. |
| Per capita ($US '000) | 1989 | 6.5 | 9.0 | 12.0 | 5.6 | 7.0 | 6.1 | 7.6 | n.a. |
| Energy intensity<br>Total primary energy requirements/unit GDP (tonnes of oil equivalent (TOE) per $US '000) | 1970 | 0.54 | 0.80 | 0.60 | 0.55 | 0.58 | 0.61 | 0.54 | n.a. |
| | 1975 | 0.53 | 0.76 | 0.57 | 0.57 | 0.55 | 0.53 | 0.52 | n.a. |
| | 1980 | 0.53 | 0.74 | 0.53 | 0.55 | 0.52 | 0.49 | 0.48 | n.a. |
| | 1985 | 0.48 | 0.66 | 0.45 | 0.49 | 0.55 | 0.44 | 0.43 | n.a. |
| | 1988 | 0.47 | 0.64 | 0.44 | 0.48 | 0.52 | 0.41 | 0.41 | n.a. |
| Energy requirements (TOE) per capita | 1988 | 5.0 | 9.6 | 7.8 | 4.4 | 6.7 | 3.7 | 4.8 | n.a. |
| Total TOE (mill. tonnes) | 1988 | 82.7 | 249.5 | 1,928.4 | 64.5 | 56.2 | 208.5 | 4,002.9 | n.a. |
| Transport trends<br>Road traffic $10^9$ veh. km | 1970 | 79 | 126 | 1,787 | 48 | 35 | 179 | 3,288 | n.a. |
| | 1989 | 153 | 225 | 3,307 | 89 | 61 | 357 | 6,343 | n.a. |
| Change (%) | | 94 | 79 | 85 | 85 | 73 | 99 | 93 | n.a. |
| Motorways (km) | 1970 | 1,030 | 2,760 | 53,700 | 980 | 400 | 1,060 | 72,800 | n.a. |
| | 1989 | 1,100 | 7,450 | 83,960 | 2,070 | 1,000 | 2,990 | 133,300 | n.a. |
| Change (%) | | 7 | 170 | 56 | 113 | 148 | 183 | 83 | n.a. |
| Passenger vehicles in use ('000 vehicles) | 1970 | 3,800 | 6,600 | 89,200 | 2,500 | 2,300 | 11,800 | 173,200 | n.a. |
| | 1989 | 7,600 | 12,100 | 143,700 | 5,400 | 3,600 | 21,600 | 339,800 | n.a. |
| Change (%) | | 98 | 84 | 61 | 118 | 56 | 83 | 96 | n.a. |
| Population ('000 inhabitants) | 1970 | 12,800 | 21,300 | 205,100 | 13,000 | 8,000 | 55,600 | 715,100 | 3,694,300 |
| | 1975 | 13,900 | 22,700 | 216,000 | 13,700 | 8,200 | 56,200 | 750,300 | 4,076,900 |
| | 1980 | 14,700 | 24,000 | 227,800 | 14,200 | 8,300 | 56,300 | 779,900 | 4,449,500 |
| | 1985 | 15,800 | 25,400 | 239,300 | 14,500 | 8,400 | 56,600 | 807,500 | 4,837,300 |
| | 1990 | 16,700 | 26,500 | 249,200 | 14,800 | 8,300 | 56,900 | 831,100 | 5,292,000 |
| Change from 1970 (%) | | 30.3 | 24.4 | 21.5 | 13.5 | 3.2 | 2.3 | 16.2 | 43.3 |
| Population density (inhabitants/sq. km) | 1990 | 2.2 | 2.7 | 26.6 | 362.7 | 18.4 | 232.4 | 25.9 | 39.0 |

*Source: OECD, Environmental Indicators, 1991.*

# ENVIRONMENTAL LAW

The Australian Constitution does not include a reference to environment or conservation. Commonwealth powers in environmental protection, nature conservation and related fields arise from, or are incidental to, other specified powers. These specific Commonwealth powers include the power to legislate with respect to Territories of the Commonwealth, overseas and interstate trade and commerce, external affairs, corporations, taxation, defence, quarantine and granting financial assistance to States. A common example of Commonwealth legislation relying on the foreign affairs power (International Treaty Obligations) is the *World Heritage Properties Conservation Act 1983*. This implements the International Convention for the Protection of the World Cultural and Natural Heritage Areas into Australian domestic law. Effectively the powers relating to environment and conservation are divided among the Commonwealth Government and the State and local governments. In practical terms, however, most decisions on environmental protection, nature conservation,

land use and land management in the States are the responsibility of the State Governments.

The *Environment Protection (Impact of Proposals) Act 1974* was the first piece of Commonwealth legislation to specifically address environmental issues. The Act defined environment as comprising 'all aspects of the surroundings of human beings, whether affecting them as individuals or in social groupings', and set up procedures to review the environmental impact of development proposals which involved Commonwealth Government decisions.

Other legislation currently administered by the Commonwealth portfolio relevant to environment protection includes:

- *Environment Protection (Alligator Rivers) Act 1978*;
- *Environment Protection (Nuclear Codes) Act 1978*;
- *Environment Protection (Sea Dumping) Act 1981*;
- *Hazardous Waste (Regulation of Exports and Imports) Act 1989;* and
- *Ozone Protection Act 1989.*

In New South Wales, a number of State agencies have responsibility for environmental matters. These include the Department of Planning, the National Parks and Wildlife Service, and the Environment Protection Authority. Some of the relevant legislation includes:

- *Environmental Planning and Assessment Act 1979*;
- *Heritage Act 1977;*
- *Coastal Protection Act 1979;*
- *Clean Air Act 1961*;
- *Clean Waters Act 1970*;
- *Environmentally Hazardous Chemicals Act 1985*;
- *Ozone Protection Act 1989;* and
- *Environmental Offences and Penalties Act 1989.*

In Victoria, the Department of Conservation and Natural Resources is responsible for wildlife, fisheries, national parks, land protection, water resources, flora and fauna. The Environment Protection Authority is responsible for protecting and improving the air, land and water environments through management of wastes, control of noise and control of pollution. Some of the legislation includes:

- *Environment Protection Act 1970;*
- *National Parks Act 1975;*
- *Water Act 1989;*
- *Wildlife Act 1975;*
- *Groundwater Act 1969;* and
- *Flora and Fauna Guarantee Act 1988.*

The Queensland Department of Environment and Heritage is responsible for environment protection, nature conservation and the management of national parks. Responsibilities for planning and development are divided between a number of other departments. A proposal to form an Environmental Protection Agency is being investigated. Relevant Queensland legislation includes:

- *Beach Protection Act 1968–1990*;
- *Clean Air Act 1963–1988*;
- *Clean Waters Act 1971–1988*;
- *Heritage Buildings Protection Act 1990*; and
- *Noise Abatement Act 1978–1988.*

In South Australia, the Department of Environment and Planning is responsible for conservation and land management, national parks, planning and environment management. Several statutory bodies such as the Coast Protection Board, Environmental Protection Council, Native Vegetation Authority and the South Australian Planning Commission report to the Minister for Environment and Planning. Relevant legislation includes:

- *Clean Air Act 1984;*
- *Noise Control Act 1976–77;*
- *Marine Environment Protection Act 1990*; and
- *Water Resources Act 1976.*

The Environment Protection Authority in Western Australia is an independent body with the dual role of providing independent advice to the Government and the public on environmental protection, and for the implementation of government powers on pollution control. Other government departments have responsibility for environmental management, but these must be exercised within the policies and advice of the EPA. Some of the relevant legislation includes:

- *Environment Protection Act 1986;*

- *Conservation and Land Management Act 1984;*
- *Country Areas Water Supply Act 1947–1982;* and
- *Land Drainage Act 1925–1983.*

Environmental management in Tasmania is the responsibility of the Department of Environment and Planning. An independent body, the Environmental Protection Advisory Council, which has a majority of members from outside government, also advises the Minister. Some of the legislation includes:

- *Environment Protection Act 1973;*
- *Pollution of Waters by Oil and Noxious Substances Act 1987;* and
- *Environmental Protection (Sea Dumping) Act 1987.*

## NATIONAL ACTIVITIES

### Intergovernmental Agreement on the Environment

In February 1992 the Commonwealth Government, and State, Territory and local governments signed the Intergovernmental Agreement on the Environment (IGAE) which provides for interaction on environmental issues and sets out cooperative arrangements on a wide range of specific issues. The Agreement provides for:

- the endorsement of a common set of principles for the conduct of environmental impact assessment; and
- the establishment of a mechanism for developing nationally enforceable environmental measures for the protection and management of the Australian environment.

To achieve its objectives, the IGAE has set up a ministerial council with representatives from each of the States and Territories, and the Commonwealth to direct the National Environment Protection Authority (NEPA) on the implementation of national environment protection measures.

NEPA will have responsibility for:

- establishing nationally applied measures for environment protection matters;
- agreeing national environmental quality standards, such as standards for air quality;
- providing a reviewed environmental impact assessment process, which will better recognise industry and government needs and simplify the application of legislation;
- providing a vital link between businesses in Australia and overseas and establish a clearing house for the dissemination of general information, research and industry contacts and information on technology; and
- coordinating information about the state of the environment and ensure that this information is easily accessible to the general community.

Other issues covered in the schedules of the IGAE are:

- data collection and handling is to be coordinated by the Australia and New Zealand Land Information Council;
- resource assessment, land use details and approval processes;
- environmental impact assessment;
- climate change;
- biological diversity;
- National Estate — Australian Heritage Commission;
- World Heritage; and
- nature conservation.

### Australian and New Zealand Environment and Conservation Council (ANZECC)

ANZECC was formed, in 1991, by combining the Australian and New Zealand Environment Council (ANZEC) and the Council of Nature Conservation Ministers (CONCOM).

The Council provides a forum for consultation, cooperation and liaison on matters concerning environmental management and pollution control, and conservation and management of Australia's flora and fauna. These matters have included the control of emissions and noise from motor vehicles, the use and disposal of hazardous chemicals, noise control, water quality, air pollution, solid-waste management, the economics of pollution abatement policies and environmental impact assessment, coastal management, land use policy, biotechnology and climate changes induced by human activities.

## Ecologically sustainable development (ESD)

The Commonwealth Government's ESD strategy reflects growing community recognition that, in pursuing material welfare, insufficient value has often been placed on the environmental factors that also contribute to quality of life. It also reflects a recognition that economic growth and a well-managed environment are fundamentally linked. ESD provides a conceptual framework for integrating economic and environmental objectives, so that products, production processes and services can be developed that are both internationally competitive and more environmentally compatible.

The Commonwealth Government established ESD working groups for each of the main industry sectors of the economy that use natural resources — agriculture, forestry, fisheries, mining — or have a significant impact on those resources — manufacturing, energy production, energy use, transport and tourism. Membership of the working groups was drawn from the Federal Government, State Governments, industry, unions, conservation, consumer and social welfare organisations. Some of these groups included the Australian Consumers Association (ACA), the Australian Council of Social Service (ACOSS), the Australian Conservation Foundation (ACF), and the World Wide Fund for Nature (WWF).

There are five general principles for ESD:

- integrating economic and environmental goals in policies and activities;
- ensuring that environmental assets are appropriately valued;
- providing for equity within and between generations;
- dealing cautiously with risk and irreversibility; and
- recognising the global dimension.

Final reports were released in December 1991. Two additional reports from the chairs of the working groups, *Intersectoral Issues* and *Greenhouse*, were published early in 1992.

In December 1992, the heads of government agreed to a strategy set out in the document *Strategic Directions for ESD in Australia*. This document sets out the broad strategic and policy framework under which governments will cooperatively make decisions. It will be used to guide policy and decision making, particularly in those key industry sectors which rely on the utilisation of natural resources.

Details of actions, priorities and responsible agencies are contained in a companion document *Compendium of ESD-related Actions*. It addresses the Government's response to the over 500 recommendations from the ESD Working Group process.

## Australian Biological Resources Study (ABRS)

The ABRS was established in 1973 to stimulate taxonomic and ecological studies of Australian flora and fauna through the provision of grants for research and publication. Its responsibilities include provision of advice on national taxonomic collections and establishment and maintenance of a national taxonomic database. Much of the work of the study is done in State museums, botanic gardens and herbaria which were established during the last century. CSIRO also carries out important research relating to flora and fauna.

Current major projects of ABRS include preparation of a 60 volume *Flora of Australia*, a 10 volume *Fauna of Australia*, compilation of a 70 volume *Zoological Catalogue of Australia* and establishment of database exchange systems for museums and herbaria for biogeographic and taxonomic information. The ABRS is managed by a small unit of professional scientists within the Australian National Parks and Wildlife Service.

The ABRS Participatory Program is a goal-directed grants program supporting the documentation of Australia's biodiversity. In summary, only 100,000 of the estimated 300,000 species of Australian animals have been collected and described. In the plants, 18,000 species of higher plants have been described out of an estimated 24,000. The number of lower plant species (fungi, mosses, algae, etc.) is unknown. To-date more than 750 books and scientific papers have been published with ABRS support. The grant funds for 1991–92 are about $2 million.

## Prime Ministerial statement on the environment

On 21 December 1992, the Prime Minister announced additional expenditure on the environment, amounting to a proposed $156 million over four years. A particular focus of the statement, *Australia's Environment: A National Asset*, is Australia's water quality and management. Some of the initiatives are included below.

### A cleaner Australia

- improve catchment management and improve water quality through abatement of nutrient pollution;
- increase funding through the Save the Bush program to protect remnant vegetation;
- establish a National Corridor of Green along the Murray River;
- a national Waterwatch program to encourage community involvement in monitoring waterways;
- establish a legislated National Pollutant Inventory;
- assist selected companies identify opportunities for cleaner production;
- examine emission performance of the nation's current motor vehicle fleet; and
- develop a National Environment Industry database.

### Protecting the natural environment

- ratify the International Convention on Biological Diversity;
- maintain and expand protected areas;
- boost funding of Ocean Resource 2000 marine conservation program;
- expand research into the effect of nutrients and fishing on the Great Barrier Reef;
- additional funding for the control of weeds and feral animals;
- conservation of sites of national tourism significance; and
- nomination of Riversleigh fossil site in Queensland and the Naracoorte Caves in South Australia for World Heritage Listing.

### The atmosphere

- ratification of the Framework Convention on Climate Change;
- development of a greenhouse gas inventory;
- funding for studies on ethanol technology;
- establishment of a Halon Bank storage and recycling facility; and
- introduction of a policy for energy efficiency labelling of appliances.

# STATUTORY AUTHORITIES

## Australian National Parks and Wildlife Service (ANPWS)

The ANPWS was established under the *National Parks and Wildlife Conservation Act 1975*. The ANPWS is the principal nature conservation agency of the Commonwealth Government. It works in close cooperation with other Commonwealth authorities and with relevant State and Territory agencies.

The ANPWS is responsible for management of parks and reserves declared under the Act. Most significant of these are Kakadu National Park and Uluru (Ayers Rock–Mount Olga) National Park in the Northern Territory. National parks are also declared on Norfolk Island and Christmas Island and four national nature reserves have been declared in Australian waters. Ningaloo Marine Park is declared jointly under the National Parks and Wildlife Conservation Act and Western Australian legislation.

Wildlife conservation and management programs include the regulation and control of trade in wildlife and wildlife products through the administration of the *Wildlife Protection (Regulation of Exports and Imports) Act 1982*; administration of the *Whale Protection Act 1980*; administration of certain international agreements; and cooperative programs with the States with an emphasis on rare and endangered species. The Endangered Species Program and the Save the Bush Program are now managed by the ANPWS.

The ANPWS is also charged with the delivery of programs to enhance Aboriginal employment and development opportunities in nature conservation and land management related fields.

In addition the ANPWS carries out and supports research relevant to its charter and delivers public information and education programs on nature conservation issues.

The Australian National Botanic Gardens, the Australian Biological Resources Study and the

Environmental Resources Information Network were integrated into the ANPWS in 1990.

## Great Barrier Reef Marine Park Authority

This Authority was established by the *Great Barrier Reef Marine Park Act 1975*. The Authority's goal is to provide for the protection, wise use, understanding and enjoyment of the Great Barrier Reef in perpetuity through the development and care of the Great Barrier Reef Marine Park.

The Marine Park covers an area of 344,000 square kilometres representing 98.5 per cent of the region inscribed on the World Heritage List. The value of economic activity in the Marine Park has been estimated at $1,000 million per annum.

Management of the Marine Park is a cooperative venture with Queensland Government agencies. The main strategy used in management of the Park is 'zoning'. Zoning provides for separate, potentially conflicting activities while allowing all reasonable uses and ensuring the long-term conservation of the Reef's ecosystem.

The Authority ensures that it achieves competence and fairness in the care and development of the Marine Park by obtaining and interpreting information relevant to the understanding of the Great Barrier Reef. Most of this research is contracted to agencies such as universities although Authority staff may also undertake some research.

A major objective of the Authority is to enhance community understanding, appreciation, experience of and support for the Great Barrier Reef and the Marine Park.

The Authority also operates the Great Barrier Reef Aquarium which features a living coral reef system. The Aquarium aims to enhance community understanding of the Great Barrier Reef and support for management of the Marine Park by providing a readily accessible coral reef and environment onshore.

# WORLD HERITAGE AREAS

The World Heritage Convention was adopted by the UNESCO General Conference at its 17th session in Paris on 16 November 1972 and came into force in 1975. Australia was one of the first countries to ratify the Convention in August 1974. As at 1 January 1993 there were 10 Australian properties on the World Heritage List. The Australian Government has recently been involved in a process to identify geological, including fossil, sites of potential World Heritage value. Twenty-eight sites in Australia and its territories have been identified.

Australia's 10 listed World Heritage sites are described below. The World Heritage Committee has, so far, listed 358 sites around the world.

## Willandra Lakes Region of New South Wales

The site was inscribed on the World Heritage List in 1981. The approximate area of the site is 600,000 hectares. The semi-arid environment holds outstanding evidence of the antiquity of the human race, of the life and culture of early Aboriginal societies, and an unrivalled record of past environments and landscapes. The region is one of the earliest known sites for Homo sapiens in the world and contains the earliest known cremation site.

## Great Barrier Reef

This site is situated on the north-east coast of Queensland and covers 34.8 million hectares. It became part of the World Heritage List in 1981. The Great Barrier Reef is the world's most extensive coral reef and one of the richest in terms of faunal diversity. The area is also of cultural importance, containing many middens (that is, refuse from a prehistoric dwelling place or cooking area), and other archaeological sites of Aboriginal or Torres Strait Islander origin.

## Lord Howe Island Group

This site is situated off the east coast of New South Wales and was entered into the heritage list in 1982. The island group of approximately 145,000 hectares, was inscribed on the List for its unique landforms and biota, its diverse and largely intact ecosystems, natural beauty and habitats for rare and endangered species. The waters surrounding Lord Howe Island provide an unusual mixture of temperate and tropical organisms. The area includes the most southerly coral reef in the

world, which provides a rare example of the transition between coral and algal reefs.

## Australian East Coast Temperate and Subtropical Rainforest Parks

This site in New South Wales covers an area of approximately 204,000 hectares and was entered on the World Heritage List in 1986. The area includes the largest stand of littoral rainforest (a type of rainforest found next to and influenced by the sea) in New South Wales, one of the largest erosion calderas in the world (Mt Warning), and a range of primitive plant species.

## Kakadu National Park (Stages 1, 2 and 3)

The Park was placed on the List in 1981 and added to in 1987. It is situated in the Northern Territory and is approximately 1.31 million hectares in size. The area consists of tidal flats, flood plains, lagoons, major river systems, and the sandstone escarpments of the Arnhem Land plateau. Great cultural significance lies in the ancient Aboriginal sites and the large galleries, with some art sites dating back to the Ice Age.

In 1992 Kakadu Stage 3 was added to the List in recognition of its geological, biological and conservation value. The new listing adds 670,000 hectares to the size of the site.

## Uluru National Park

Also in the Northern Territory, this Park of about 133,000 hectares was placed on the List in 1987. Uluru, which contains Ayers Rock and the Olgas, has been the focus for religious, cultural, territorial and economic interrelations amongst Aboriginal peoples of the western desert for many thousands of years.

## Wet Tropics of Queensland

Entered on the World List in 1988, this area of approximately 900,000 hectares includes very old and also relatively recent geological elements. It is a region of spectacular scenery and includes one of the largest rainforest wilderness areas in Australia. The association of fringing coral reefs and rainforest coastline in the Cape Tribulation region is found nowhere else in Australia and is a rare combination anywhere. The area also contains primitive flowering plants.

## Tasmanian Wilderness

This area became a World Heritage site in 1982, and was added to in 1989. The approximate size is 1.38 million hectares. The Tasmanian Wilderness includes a range of ecosystems, some of the last wild rivers in the world and is Australia's most glacified area. Archaeological sites, including painted caves, provide evidence of human occupation during the last Ice Age.

## Shark Bay

This area was entered on the List in December 1991. It includes 1,500 kilometres of the Western Australian coast, about 700 kilometres north of Perth, and includes a series of peninsulas and islands. The listed area covers 22,000 square kilometres of which about two-thirds are marine. The marine areas include the world's largest area of sea grass. Shark Bay was only the eleventh place in the world to satisfy all criteria for World Heritage listing, namely, being an example of earth's evolutionary history and biological evolution, superlative in its natural phenomena, and having natural habitats where threatened species live. Shark Bay is home to marine fauna such as dolphins, dugongs, manta rays, whales and sharks.

## Fraser Island

Fraser Island, located off the south-east coast of Queensland, is the world's largest sand island and contains the only rainforest growing on coastal sand dunes. It was added to the World Heritage List in December 1992 for its natural value and geological characteristics. The island is about 166,000 hectares, and comprises sand dunes up to 400,000 years old, representing the oldest known continuous sedimentary record in Australia. Rainforests, mangroves, more than 40 freshwater lakes, rare species of flora and fauna, and 300 archeological sites are further features of the site.

Table 14.5, showing how many persons visited a number of well known World Heritage Areas, gives some indication of the numbers of people who experience Australia's flora and fauna.

**14.5 PERSONS VISITING A WORLD HERITAGE AREA(a) IN THE TWELVE MONTHS ENDED APRIL 1986, STATES AND TERRITORIES ('000)**

| *State/Territory of residence* | *The Great Barrier Reef (Qld)* | *Kakadu National Park (NT)* | *The Wilandra Lakes Region (NSW)* | *Western Tasmania Wilderness National Parks* | *Total(b)* |
|---|---|---|---|---|---|
| New South Wales | 134.2 | 31.0 | 12.9 | 53.7 | 215.6 |
| Victoria | 74.5 | 20.9 | 12.5 | 52.6 | 150.9 |
| Queensland | 216.4 | 12.3 | 4.4 | 22.7 | 246.2 |
| South Australia | 22.8 | 13.1 | 1.8 | 13.7 | 48.5 |
| Western Australia | 16.8 | 7.8 | — | 7.5 | 30.9 |
| Tasmania | 7.2 | 1.1 | — | 47.2 | 53.7 |
| Northern Territory | 5.8 | 22.8 | — | — | 28.4 |
| Australian Capital Territory | 8.6 | 2.7 | — | 4.9 | 16.0 |
| **Australia** | **486.2** | **111.8** | **34.7** | **203.5** | **790.0** |

(a) For the purposes of these statistics, World Heritage Areas are those places which have been assessed by the World Heritage Commission as being of outstanding universal value and are inscribed on the UNESCO World Heritage List. Five Australian places had been nominated and accepted by 1986 as World Heritage Areas; the above mentioned areas and The Lord Howe Island Group. For the purposes of this survey data were not collected in respect of The Lord Howe Island Group. (b) Totals may not equal the sum of components as respondents may have visited more than one World Heritage Area.

*Source: Environmental Issues and Usage of National Parks, Australia (4115.0).*

**14.6 NATURE CONSERVATION RESERVES IN AUSTRALIA, 1988**

| | | | | *Parks* | | | *Other Land* | | |
|---|---|---|---|---|---|---|---|---|---|
| *State/Territory* | *No.* | *Total reserves area ('000 ha)* | *Total reserves area as per cent of State* | *No.* | *Area ('000 ha)* | *Per cent of total reserve area* | *No.* | *Area ('000 ha)* | *Per cent of total reserve area* |
| New South Wales | 438 | 3,812 | 4.8 | 68 | 3,104 | 81.4 | 370 | 708 | 18.6 |
| Victoria | 362 | 1,823 | 8.0 | 33 | 1,202 | 65.7 | 329 | 628 | 34.3 |
| Queensland | 574 | 3,664 | 2.1 | 317 | 3,522 | 96.1 | 257 | 142 | 3.9 |
| South Australia | 279 | 11,117 | 11.3 | 12 | 2,648 | 23.8 | 267 | 8,469 | 76.1 |
| Western Australia | 1,247 | 15,252 | 6.0 | 60 | 4,757 | 30.2 | 1,187 | 10,495 | 68.8 |
| Tasmania | 227 | 967 | 14.2 | 13 | 851 | 88.0 | 214 | 116 | 12.0 |
| Northern Territory | 90 | 4,000 | 3.0 | 4 | 141 | 3.5 | 86 | 3,882 | 96.5 |
| Australian Capital Territory | 6 | 112 | 46.8 | 1 | 94 | 83.7 | 5 | 18 | 16.3 |
| External territories/ Commonwealth waters | 2 | 3 | n.a. | 2 | 3 | 100.0 | n.a. | n.a. | n.a. |

*Source: 'Nature Conservation Reserves in Australia', C. J. Mobbs, 1988.*

Conservation areas (table 14.6) have an important role to play in the continuing survival of wildlife. This role includes the provision of areas for: natural predator/prey relationships, scavenging, habitat, and safe migration. These areas also provide the facilities for conducting recreational and educational activities.

## Examples of World Heritage sites outside Australia

For a site to qualify for the World Heritage List, it must meet specific criteria. Of the 358 sites on the List, 260 are cultural, 84 natural and 14 have both natural amd cultural components.

From the cultural heritage viewpoint, they include:

- unique artistic achievement;
- great influence on developments in architecture;
- evidence of a civilisation which has disappeared; and
- be associated with ideas or beliefs of universal significance.

Examples in this category include: Quebec City, Canada; The Great Wall, China;

Pyramids, Egypt; Kremlin and Red Square, Russia; Palace and Park of Versailles, France.

From the natural heritage viewpoint, the criteria include:

- represent ongoing geological or biological processes;
- constitute remarkable natural formation; and
- contain important natural habitats of endangered species.

Examples in this category include Galapagos Islands, Ecuador; Mt Cook National Park, New Zealand; Serengeti National Park, Tanzania; Grand Canyon, Yellowstone, Yosemite national parks, USA; and Victoria Falls, Zambia/Zimbabwe.

## URBAN ENVIRONMENT

Australia is a highly urbanised country, with 85 per cent of its population living in urban areas of more than 1,000 people. By world standards, however, the size of Australian cities is small and population densities low. For example, Australia's total population is smaller than that of the world's largest city (Mexico City) and the population densities of Australia's cities tend to be about half of those of Europe's older established cities.

**14.7 URBAN SETTLEMENTS DISTRIBUTION OF AUSTRALIAN POPULATION (per cent)**

| | *1971* | *1986* |
|---|---|---|
| Six State capitals | 58.9 | 55.2 |
| Other centres ≥ 100,000 population | 5.4 | 7.4 |
| All urban centres | 85.7 | 85.5 |
| Rural | 14.3 | 14.5 |

*Source: Economic Planning Advisory Council, Urban and Regional Trends and Issues.*

The key factors adversely affecting the urban environment are air pollution; water pollution; domestic, commercial and industrial waste; and noise pollution. The major elements causing these problems are high levels of traffic (for example, vehicle emissions); industry emissions (for example, particulates, use of chemicals); and the carrying capacity of the infrastructure (such as sewerage systems, roads and railways, etc).

These key factors, individually and combined, can be closely correlated to health risks. Through the National Health and Medical Research Council, health based guidelines and national standards have been developed. A Healthy Cities project is underway which aims to improve the health of the community by collaboration between government and the community in order to address various environmental health and development problems. A national network of Healthy Cities has been established, coordinated by a national office based in Sydney. The Healthy Cities project is jointly administered by the Australian Community Health Association, the Australian Local Government Association and the Commisssion for the Future.

The key issues associated with the urban environment are as follows.

Australia's high urbanisation level is accompanied by continued demand for land in and bordering on urban centres. One of the impacts of urban sprawl (that is, expansion in the area covered by urban centres) is that land with significant agricultural or environmental values may become subsumed in urban centres. Another impact of urban sprawl is the cost of additional infrastructure as the population of an urban centre begins to live or work further from existing infrastructure.

Access to open spaces in urban centres for recreational, environmental, aesthetic and other purposes is a key issue. From an environmental and quality of life point of view, it is important to ensure that access to open space, mainly utilised as parkland, is taken into account in urban development, redevelopment, and planning processes.

Transport, on which Australia is highly dependent because of extensive urban sprawl, is the major source of photochemical smog. Emissions from motor vehicles include carbon monoxide, nitrous oxides and water vapour. A key issue is developing an efficient and cost effective transport system with a minimum of environmental impact.

The management of sewage and waste in urban centres is a significant issue, in terms of the volume to be managed, and the toxicity of the material involved. Wastes may originate from both domestic and industrial sources.

Air, noise and water pollution are important urban environmental issues. Sources of air pollution include vehicle and industrial emissions; sources of noise pollution include

vehicle use; and sources of water pollution include inappropriate sewage and waste disposal which have the potential to severely impact on marine and freshwater resources.

The burgeoning population in Australia's capital cities has also impacted on the quality of life for residents. In a South Australian survey, significantly more people were concerned about and affected by noise than any other neighbourhood problems (table 14.8).

The primary sources of noise identified in the survey, in terms of the number of people affected, were road traffic followed by barking dogs, general neighbourhood and aircraft noise.

Concern about environmental quality is another measure of the perception of the quality of life. Table 14.9 shows the concerns of Australians in 1986. The types of environmental problems that are particularly pertinent to the urban environment include pollution, development/planning issues and preserving buildings. A survey conducted in May 1992 will provide an update about these concerns.

The number of persons registering complaints about environmental problems, a further indicator of the degree of concern, is shown in table 14.10.

**14.8 NEIGHBOURHOOD PROBLEMS IN SOUTH AUSTRALIA, 1988 (per cent)**

| *Problem* | *Concerned about problem* | *Affected by problem* |
|---|---|---|
| Noise disturbance | 31 | 17 |
| Unpleasant odours, smoke and dust | 26 | 14 |
| Lack of cycling tracks | 24 | 15 |
| Poor tasting water | 40 | 32 |
| Spilled garbage or litter | 17 | 8 |
| Lack of trees | 21 | 7 |
| Lack of footpaths | 12 | 8 |
| Lack of parks | 15 | 4 |
| Poor visual appearance | 11 | 3 |
| Other | 4 | 2 |

*Source: South Australian Environment Council, 1988.*

Graph 14.11 shows the environmental concerns of Victorians in October 1990. The top four concerns are of particular importance to the urban environment.

**14.9 PERSONS CONCERNED ABOUT THE ENVIRONMENT: TYPE OF ENVIRONMENTAL PROBLEM, 1986**

| *Environmental problem* | *NSW* | *Vic.* | *Qld* | *SA* | *WA* | *Tas.* | *NT* | *ACT* | *Aust.* |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | — '000 — | | | | |
| Pollution | 1,286.7 | 1,029.5 | 488.4 | 292.9 | 248.0 | 85.8 | 37.3 | 69.6 | 3,538.1 |
| Nature conservation of flora/fauna | 754.8 | 569.2 | 509.4 | 228.8 | 176.6 | 74.7 | 33.3 | 59.6 | 2,406.4 |
| Tree deforestation | 665.1 | 546.7 | 388.6 | 202.4 | 202.2 | 84.2 | 33.5 | 60.7 | 2,183.5 |
| Nuclear issues/uranium | 536.4 | 474.6 | 291.0 | 177.0 | 127.9 | 72.9 | 26.9 | 45.7 | 1,752.3 |
| Development/planning issues | 372.6 | 257.9 | 214.7 | 99.2 | 77.0 | 43.6 | 19.4 | 33.9 | 1,118.4 |
| Soil erosion | 315.0 | 256.0 | 228.3 | 113.7 | 67.5 | 37.9 | 21.2 | 34.6 | 1,074.2 |
| Preserving buildings | 268.2 | 214.1 | 185.4 | 90.7 | 62.8 | 45.0 | 16.1 | 26.2 | 908.4 |
| Water salinity | 225.8 | 256.9 | 111.0 | 135.4 | 70.0 | 27.7 | 13.3 | 25.8 | 865.9 |
| Other | 189.8 | 125.9 | 70.7 | 56.9 | 54.7 | 9.7 | 4.1 | 6.9 | 518.7 |
| | | | | | — per cent(a) — | | | | |
| Pollution | 31.4 | 32.9 | 26.1 | 28.6 | 23.9 | 26.3 | 38.1 | 38.3 | 30.1 |
| Nature conservation of flora/fauna | 18.4 | 18.2 | 27.2 | 22.3 | 17.0 | 22.9 | 34.0 | 32.8 | 20.5 |
| Tree deforestation | 16.2 | 17.5 | 20.7 | 19.7 | 19.5 | 25.8 | 34.2 | 33.4 | 18.6 |
| Nuclear issues/ uranium | 13.1 | 15.2 | 15.5 | 17.3 | 12.3 | 22.4 | 27.5 | 25.2 | 14.9 |
| Development/planning issues | 9.1 | 8.2 | 11.5 | 9.7 | 7.4 | 13.4 | 19.8 | 18.7 | 9.5 |
| Soil erosion | 7.7 | 8.2 | 12.2 | 11.1 | 6.5 | 11.6 | 21.6 | 19.1 | 9.1 |
| Preserving buildings | 6.5 | 6.8 | 9.9 | 8.8 | 6.1 | 13.8 | 16.4 | 14.4 | 7.7 |
| Water salinity | 5.5 | 8.2 | 5.9 | 13.2 | 6.8 | 8.5 | 13.6 | 14.2 | 7.4 |
| Other | 4.6 | 4.0 | 3.8 | 5.5 | 5.3 | 3.0 | 4.2 | 3.8 | 4.4 |

(a) Percentages are expressed as proportions of civilian population 15 years and over, excluding those for whom no answer was obtained.

*Source: Environmental Issues and Usage of National Parks, Australia (4115.0).*

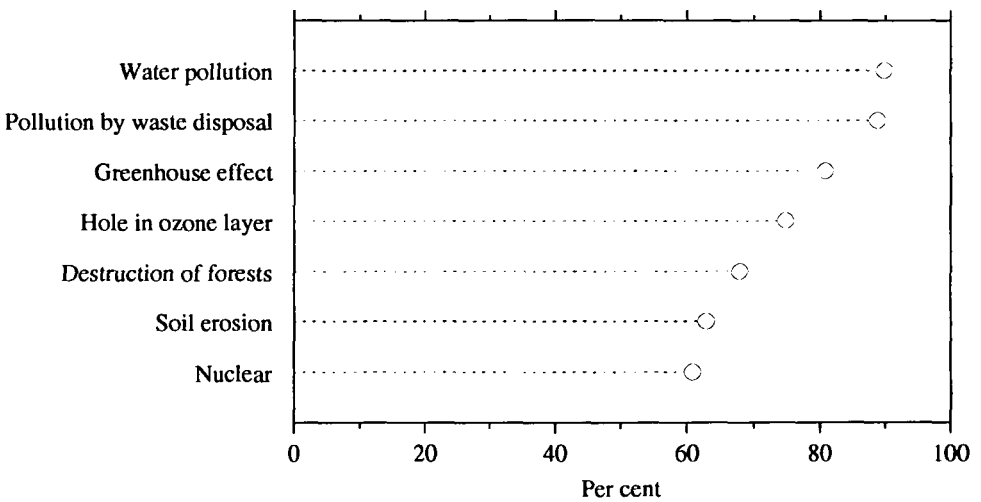
**14.10 PERSONS REGISTERING COMPLAINTS ABOUT POLLUTION AND OTHER ENVIRONMENTAL PROBELMS, TWELVE MONTHS ENDED APRIL 1986**

| | *Pollution* | | *Other environmental problems* | |
|---|---|---|---|---|
| *State/Territory* | *'000* | *%(a)* | *'000* | *%(a)* |
| New South Wales | 158.8 | 3.8 | 179.3 | 4.3 |
| Victoria | 134.3 | 4.3 | 131.9 | 4.2 |
| Queensland | 64.6 | 3.4 | 122.7 | 6.5 |
| South Australia | 35.4 | 3.4 | 41.7 | 4.0 |
| Western Australia | 28.9 | 2.8 | 49.7 | 4.7 |
| Tasmania | 10.0 | 3.0 | 15.1 | 4.6 |
| Northern Territory | 4.1 | 4.1 | 6.1 | 6.1 |
| Australian Capital Territory | 6.2 | 3.4 | 11.3 | 6.2 |
| **Australia** | **442.3** | **3.7** | **557.8** | **4.7** |

(a) Percentages are expressed as proportions of civilian population 15 years and over, excluding those for whom no answer was obtained.

*Source: Environmental Issues and Usage of National Parks, Australia (4115.0).*

**14.11 ENVIRONMENTAL CONCERNS OF HOUSEHOLDS, VICTORIA, 1990**




*Source: Community Participation in Energy Conservation, Victoria (4120.2).*

## MANAGEMENT OF WASTES

The treatment and disposal of the rapidly growing volumes of domestic and industrial waste poses major problems for the urban and surrounding natural environment. For most industries, the production of waste is a part of the manufacturing cycle. The major question facing countries like Australia is how best to minimise waste and how best to store, recycle or dispose of waste in a manner that has the least possible impact on the environment and on the health of the community.

Modern industrial society produces millions of tonnes of waste in the form of plastic and paper litter, bottles, cans and other rubbish. Much of this can be usefully recycled, which would not only reduce the waste disposal problem but would help overcome environmental problems that could arise from the breakdown of these products. Wastepaper recycling has received attention as a means of reducing the pressure on native forests.

According to the Commonwealth Government paper, *A National Waste Minimisation and Recycling Strategy* released in June 1991, about 14 million tonnes of solid, domestic, commercial and industrial waste are disposed of annually through landfills. In addition, some 200,000 tonnes of liquid and solid industrial waste are taken to special landfills and treatment facilities.

An Industry Commission enquiry produced the following information about waste disposal by councils in regions of Australia, remaining landfill capacity and expected life (tables 14.12 and 14.13). The replacement cost of landfill sites was estimated by the Commission in 1989 to be $586 million.

**14.12 METHOD OF WASTE DISPOSAL BY COUNCILS, 1989**

| | *Waste disposal through* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Landfill* | | *Incineration* | | *Recycling* | | *Total waste disposal* | *Total disposal of land per person* | *Total disposal per person* |
| *Region* | *('000 tonnes)* | *(%)* | *('000 tonnes)* | *(%)* | *('000 tonnes)* | *(%)* | *('000 tonnes)* | *(kg)* | *(kg)* |
| Sydney region | 2,796 | 93 | 113 | 4 | 100 | 3 | 3,009 | 778 | 837 |
| Inner New South Wales | 811 | 98 | | | 17 | 2 | 828 | 702 | 717 |
| Outer New South Wales | 813 | 98 | | | 20 | 2 | 833 | 857 | 878 |
| Melbourne region | 1,842 | 95 | 12 | 1 | 92 | 5 | 1,946 | 614 | 649 |
| Inner Victoria | 482 | 97 | 9 | 2 | 5 | 1 | 496 | 550 | 566 |
| Outer Victoria | 353 | 96 | 5 | 1 | 8 | 2 | 366 | 917 | 951 |
| Brisbane region | 1,262 | 95 | | | 71 | 5 | 1,333 | 1,009 | 1,066 |
| Other Queensland | 1,368 | 98 | 4 | . . | 31 | 2 | 1,403 | 916 | 940 |
| Adelaide region | 430 | 100 | | | 2 | . . | 432 | 420 | 422 |
| Other South Australia | 261 | 99 | | | 2 | 1 | 263 | 699 | 705 |
| Perth region | 727 | 99 | | | 8 | 1 | 735 | 650 | 657 |
| Other Western Australia | 395 | 100 | | | | | 395 | 927 | 927 |
| Hobart region | 126 | 100 | | | | | 126 | 671 | 671 |
| Other Tasmania | 189 | 99 | | | 2 | 1 | 191 | 725 | 733 |
| Australian Capital Territory | 314 | 94 | | | 21 | 6 | 335 | 1,152 | 1,229 |
| Northern Territory | 105 | 100 | | | | | 105 | 909 | 909 |
| State capitals and Australian Capital Territory | 7,497 | 95 | 125 | 2 | 294 | 4 | 7,916 | 717 | 758 |
| Other regions | 4,777 | 98 | 18 | . . | 85 | 2 | 4,880 | 792 | 809 |
| **Australia** | **12,274** | **96** | **143** | **1** | **379** | **3** | **12,796** | **745** | **776** |

*Source: Industry Commission, Waste Management and Recycling: Survey of Local Government Practices, 1990.*

## Waste minimisation

Waste minimisation is seen as being a key element in achieving the Commonwealth Government's commitment to ecologically sustainable development. It is expected to lead to improved efficiency in the use of material and energy resources, as well as less pollution.

The National Waste Minimisation and Recycling Strategy covers:

- pollution prevention;
- increased research and development;
- improvements to design and manufacturing processes;
- the development of an environmental management industry and efficient waste management;
- economic and regulatory measures; and
- information and educational activities.

Concurrent with the development of this strategy and as a result of growing public concern for the environmental impact of

packaging, the National Packaging Task Force was established. It has developed guidelines to encourage the most efficient packaging practices that recognise the need to balance the essential role of packaging with minimisation of resource use, litter and pollution. Resource conservation and waste minimisation are the overriding concerns in the development of the guidelines.

Hazardous wastes are controlled under State legislation through either specific hazardous waste legislation or more general pollution control, health or local government laws. Major types of hazardous wastes include: waste acids, waste alkalis and oily wastes, with smaller volumes of more toxic materials. The joint Federal/New South Wales/Victoria Taskforce on Intractable Waste identified intractable wastes in the order of 100,000 tonnes. There is specific regulation of hazardous wastes covering matters such as storage, transport, treatment and disposal, in the major cities, and covering the entire areas of some States. Where there is no specific regulation, prevention of pollution is covered by more general pollution control laws.

**14.13 LANDFILL SITES: AREA, REMAINING CAPACITY AND EXPECTED LIFE, 1989**

| *Region* | *Area(a)* | *Remaining capacity(b)* | *Expected remaining life(c)* |
|---|---|---|---|
| | ha | '000 tonnes | years |
| Sydney region | 850 | 28,289 | 10 |
| Inner New South Wales | 1,395 | 19,569 | 13 |
| Outer New South Wales | 1,717 | 26,071 | 22 |
| Melbourne region | 628 | 8,747 | 5 |
| Inner Victoria | 2,185 | 12,712 | 12 |
| Outer Victoria | 754 | 5,547 | 14 |
| Brisbane region | 627 | 10,448 | 8 |
| Other Queensland | 4,219 | 40,340 | 19 |
| Adelaide region | (d)261 | 6,421 | 13 |
| Other South Australia | 982 | 2,627 | 11 |
| Perth region | 305 | 7,940 | 11 |
| Other West Australia | 1,731 | 12,481 | 33 |
| Hobart region | 124 | 8,014 | 32 |
| Other Tasmania | 395 | 3,727 | 13 |
| Australian Capital Territory | 196 | 2,500 | 8 |
| Northern Territory | 793 | 1,387 | 17 |
| State capitals and Australian Capital Territory | 2,730 | 65,938 | 12 |
| Other regions | 14,172 | 124,461 | 13 |
| **Australia** | **16,902** | **190,399** | **12** |

(a) Refers to total area of sites in use, not to area remaining to be filled. (b) At 31 December 1989. (c) From 31 December 1989. Years are a weighted average based on shares of waste disposal by each Council in the region. (d) Excludes Peddler Creek site: area not available.

*Source: Industry Commission, Waste Management and Recycling: Survey of Local Government Practices, 1990.*

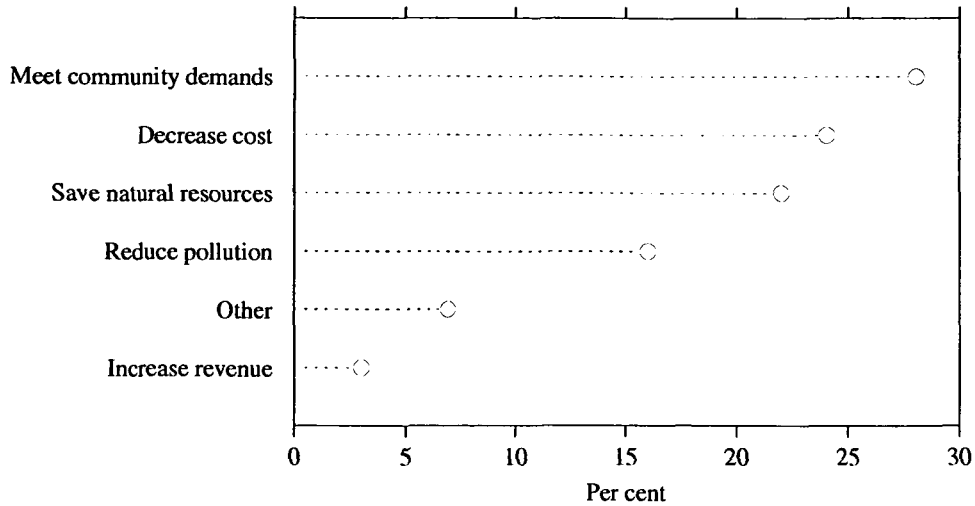
## Recycling

Recycling of solid waste is one of the main ways of reducing the adverse effects of the disposal of solid waste. In 1989, 61 per cent of councils were involved in recycling schemes. This is achieved through kerb–side collection schemes, and drop–off facilities.

The main reasons identified for Council involvement in recycling in 1989 are shown in graph 14.14.

The results of recycling are seen in the recovery rates shown in table 14.15. Recovery rate is the proportion of consumption which is recovered and recycled or reused. Recovery rates of different materials partly reflect the value of the material concerned and the ease of collection for recycling. Hence lead has a recovery rate of 60 per cent. Industrial plastic has a much higher recovery rate than domestic plastic which is diversely distributed.

**14.14 MAIN REASONS FOR COUNCIL INVOLVEMENT IN RECYCLING, 1989**




*Source: Industry Commission, Recycling, 1990.*

**14.15 RECOVERY OF PRODUCTS, 1988–89 (per cent)**

| *Material* | *Recovery rate* |
|---|---|
| Lead | 60 |
| Plastics — industrial | 50 |
| Tin | 37 |
| Aluminium | 31 |
| Paper | 31 |
| Steel | 26 |
| Glass | 25 |
| Tyres — retreaded | 24 |
| Copper | 19 |
| Lubricating oil | 18 |
| Household organic waste | 9 |
| Plastics — from domestic waste | 1 |

*Source: Industry Commission, Recycling, 1990.*

## COSTS OF ENVIRONMENT PROTECTION

Businesses, governments and households spend some of their resources on protection of the environment. For the 1990–91 financial year the ABS collected, for the first time, some information about expenditure by businesses in the mining and manufacturing sectors on pollution abatement and control. The expenditures included are for activities aimed at the prevention, reduction and elimination of pollution arising from production processes. Table 14.16 provides a summary of some of the information obtained.

**14.16 EXPENDITURE BY SOME MINING AND MANUFACTURING INDUSTRIES ON ENVIRONMENT PROTECTION, 1990–91**

| *Item* | *Unit* | *Metallic minerals, coal, oil and gas* | *Selected manufacturing industries* |
|---|---|---|---|
| Capital expenditure | | | |
| Change-in-production processes | $m | 168.7 | n.a. |
| End-of-line-techniques | $m | 351.1 | n.a. |
| *Total* | *$m* | *519.8* | *248.0* |
| Current expenditure | | | |
| Waste management | $m | 68.9 | n.a. |
| Other operational and maintenance costs | $m | 23.0 | n.a. |
| *Total* | *$m* | *91.8* | *232.5* |
| **Total expenditure** | **$m** | **611.6** | **480.5** |
| Expenditure on environment protection compared to total expenditure | | | |
| Capital expenditure on environment | $m | 519.8 | 248.0 |
| Total capital expenditure | $m | 4,014.3 | n.a. |
| Percentage spent on environment | % | 12.9 | n.a. |
| Current expenditure on environment | $m | 91.8 | 232.5 |
| Total current expenditure | $m | 8,523.3 | n.a. |
| Percentage spent on environment | % | 1.1 | n.a. |
| Cost of environmental licences | $m | 5.2 | n.a. |
| Number of establishments operating under licences | no. | 106 | 623 |
| Research expenses | $m | 5.2 | n.a. |

*Source: Manufacturing Industry, Australia (8221.0) and Mining Industry, Australia (8402.0).*

# INTERNATIONAL COOPERATION

## UN Conference on Environment and Development, Rio de Janeiro, 1992

The largest conference to date on environment and development was held in Rio de Janeiro, Brazil from 1–12 June 1992. The United Nations Conference on Environment and Development (UNCED) brought together 178 governments, thousands of delegates and members of non–government organisations and journalists.

Four documents were agreed by many governments at the sessions in Brazil. These were the Rio Declaration (which was originally to be called the Earth Charter), Agenda 21 and two conventions, one on climate change and one on biodiversity. A Declaration of Forest Principles was also agreed upon. Although not strictly binding under international law, Agenda 21 is an action plan to implement the principles found in the Rio Declaration. It is a substantial document containing about 40 chapters on a wide range of issues. Some of the issues include:

- protection of the atmosphere by combating climate change, depletion of the ozone layer and transboundary air pollution;
- protection of the quality and supply of freshwater resources;
- protection of the oceans and coastal areas;
- protection and management of land resources by combating deforestation, desertification and drought;
- conservation of biological diversity;
- environmentally sound management of biotechnology;
- environmentally sound management of wastes, particularly hazardous wastes and toxic chemicals, as well as prevention of illegal international traffic in toxic and dangerous products and wastes;
- improvement of the living and working environment of the poor in urban slums and rural areas; and
- protection of human health conditions and improvement of the quality of life.

The Australian National Report to the Conference contained principles for decisions and actions regarding the environment and

development, as endorsed by the Federal Government in March 1991.

## International treaties and conventions

Some of the international treaties and conventions relating to the environment to which Australia is a party are:

General Environmental

- Antarctic Treaty (signed by Australia 23 June 1961);
- Convention for the Protection of the World Cultural and Natural Heritage (17 December 1975); and
- Convention on the Conservation of Nature in the South Pacific (28 March 1990).

Coastal/Marine Resources

- International Convention for the Regulation of Whaling (10 November 1948);
- UN Convention on the Law of the Sea (10 December 1982); and
- Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (24 November 1989).

Toxic and Hazardous Wastes

- South Pacific Nuclear Free Zone Treaty (11 December 1986);
- Convention on Early Notification of a Nuclear Accident (23 October 1987);
- Treaty Banning Nuclear Weapons Testing in the Atmosphere, in Outer Space and Under Water (12 November 1963);
- International Convention for the Prevention of Pollution from Ships (14 January 1988); and
- International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Dumping Convention) (20 September 1985).

Biological Diversity

- Convention on Wetlands of International Importance (12 December 1975);
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (27 October 1976); and
- International Plant Protection Convention (27 August 1952).

Air Quality

- Vienna Convention for the Protection of the Ozone Layer (17 August 1989); and
- Montreal Protocol on Substances that Deplete the Ozone Layer (22 September 1990).

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*Community Participation in Energy Conservation, Victoria (4120.2)*

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*HUMPHRIES, GROVES and MITCHELL. Plant Invasions of Australian Ecosystems, 1992*

*INDUSTRY COMMISSION. Recycling, 1990*

*INDUSTRY COMMISSION. Waste Management and Recycling: Survey of Local Government Practices, 1990*

*MOBBS, C. J. Nature Conservation Reserves in Australia, 1988*

*OECD. Environmental Indicators, 1991*

**FOR MORE INFORMATION**

The ABS has a far wider range of information on Australia than that contained in the *Year Book*. Information is available in the form of regular publications, electronic data services, special tables and from investigations of published and unpublished data.

For further information contact ABS Information Services at one of the addresses listed on the page facing the Introduction to the *Year Book*.