

# Forestry and fishing

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# Forestry and fishing

## Forestry

**F**orests are an important sustainable natural resource providing a wide range of indispensable products and benefits to the community.

Forest vegetation cover protects the soil from water and wind erosion, reduces flooding and siltation of water bodies and maintains water quality. Forests provide habitats for a wide variety of native animals and plants. They also act as a sink to absorb greenhouse gases.

The forests and wood products industries based on native and plantation forests contribute substantially to Australia's economy, especially to employment in regional areas. Forests are also valuable ecosystems providing a gene pool of great diversity for scientific investigation; a source of honey, oils, gums, resins and medicines; and a resource base for education, tourism

and recreation and other purposes. Forests cannot necessarily provide for all uses at the same time, but careful management will ensure that forests provide multiple benefits in the long term for the Australian community.

## Forest estate

### Native forest

Native forest is defined in this chapter as land dominated by trees with an existing or potential mature height of twenty metres or more, including native stands of cypress pine in commercial use regardless of height. Based on this definition, the total area of native forest was estimated at 41 million hectares at 30 June 1993 (about 5% of Australia's land area).

### 16.1 Native forest areas, by forest type and ownership, at 30 June 1993

	NSW	Vic.	Qld	SA	WA(a)	Tas.(b)	NT	ACT	Total
Classified by Forest Type Group									
Rainforest	260	16	1 237	—	6	565	203	—	2 287
Eucalypt productivity(c)									
Class I	1 171	544	205	—	186	468	—	—	2 574
Class II	3 658	4 328	1 290	—	2 160	1 901	—	—	13 337
Class III	7 937	538	3 300	—	—	—	—	51	11 826
Tropical eucalypt & paperbark	—	—	4 078	—	—	—	2 450	—	6 528
Cypress pine	1 696	7	1 686	—	—	—	778	—	4 167
<b>Total</b>	<b>14 722</b>	<b>5 433</b>	<b>11 796</b>	<b>—</b>	<b>2 352</b>	<b>2 934</b>	<b>3 431</b>	<b>51</b>	<b>40 719</b>
Classified by ownership									
Public ownership(d)									
Category 1	3 257	3 132	3 071	—	1 358	1 306	—	—	12 124
Category 2	3 699	—	6 412	—	2	85	511	—	10 709
Category 3	2 574	1 641	(e)821	—	502	685	339	51	6 613
Total public ownership	9 530	4 773	10 304	—	1 862	2 076	850	51	29 446
Private ownership	5 192	660	1 492	—	490	858	2 581	—	11 273
<b>Total</b>	<b>14 722</b>	<b>5 433</b>	<b>11 796</b>	<b>—</b>	<b>2 352</b>	<b>2 934</b>	<b>3 431</b>	<b>51</b>	<b>40 719</b>

(a) Data previously published for Western Australia's forest were stated as gross forest areas: the areas have now been converted to net areas. All other States and Territories are gross areas. (b) Remapping of the Antarctic beech forests (*Nothofagus cunninghamii*) has resulted in a shift of area figures for the different Tasmanian forest types. (c) Eucalypt forests are grouped into productivity classes in descending order of productivity. No specific indexes of productivity have been developed for these classes and there can be some overlap, especially between States, in the relative productivity levels used to assign particular forest types to productivity classes. (d) Category 1: Forest land managed for multiple use including wood production. Category 2: Crown land either vacant or occupied under lease on which wood harvesting is carried out under government control but is not reserved and managed for that purpose. Category 3: Land on which wood production is excluded (National Parks etc.). (e) Includes 101 500 hectares in World Heritage Area previously included in Category 1.

Source: National Forest Inventory, and State and Territory forest agencies.

The National Forest Policy Statement defines a forest as an area dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding five metres, and with existing or potential projective cover of overstory strata about equal to or greater than 30%. The National Forest Inventory is presently revising the estimate of the total area of native forest according to the definition in the National Forest Policy Statement.

Of the 41 million hectares of native forest, 29.4 million hectares (72%) are publicly owned and 11.3 million hectares (28%) are private land. Of the publicly owned forests, 6.6 million hectares (16%) are in National Parks or in World Heritage areas, 12.1 million hectares (30%) are managed by State forest authorities for various uses, including wood production, and 10.7 million hectares (27%) are vacant or leasehold Crown land. A small but increasing area is covered by plantations. Australia has around 1.1 million hectares of plantations — 959,000 hectares of softwood

(mostly radiata pine) and 146,000 hectares of hardwood. Plantations are expanding at approximately 23,000 hectares a year.

### Plantations

The Commonwealth Government has supported the expansion of Australia's plantation resource base for many years. For instance, the National Afforestation Program (NAP) was established in 1987–88 as a three year grants program to stimulate an expansion in the commercial hardwood timber resource and to assist in land rehabilitation through broadacre commercial plantations (including farm forestry). The Government has continued to support and stimulate commercial plantation development on cleared agricultural land through the Farm Forestry Program and the Community Rainforest Reforestation Program. The National Forest Policy Statement issued in December 1995 on Plantations and Farm Forestry continues the commitment to the ecologically sustainable development of Australia's forest and land resources.

### 16.2 Plantation areas classified by species, 31 March 1993

Species group	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
<i>Coniferous</i>									
Pinus radiata	250 060	212 103	3 381	104 128	60 670	76 130	—	14 136	720 608
Pinus elliotii	4 785	3	70 029	—	210	—	—	—	75 027
Pinus pinaster	71	1 218	—	2 479	27 080	5	—	—	30 853
Pinus caribaea	60	3	52 747	—	10	—	2 602	—	55 422
Araucaria species	1 647	—	45 479	—	—	—	—	—	47 126
Other	9 407	2 017	16 995	341	660	297	—	408	30 125
Total	266 030	215 344	188 631	106 948	88 630	76 432	2 602	14 544	959 161
<i>Broadleaved</i>									
Eucalyptus species	27 565	18 074	1 402	1 622	39 160	52 083	—	—	139 906
Populus species	982	151	—	—	—	3	—	—	1 136
Other	107	126	217	—	—	2 835	1 590	—	4 875
Total	28 654	18 351	1 619	1 622	39 160	54 921	1 590	—	145 917
<b>Total</b>	<b>294 684</b>	<b>233 695</b>	<b>190 250</b>	<b>108 570</b>	<b>127 790</b>	<b>131 353</b>	<b>4 192</b>	<b>14 544</b>	<b>1 105 078</b>

Source: State and Territory forest services.

### Tropical forests

Over half of the world's known plant and animal species are found in rainforests. Rainforests are the traditional home of many tribal peoples and also play an important role in contributing to global climatic stability. However, destruction of tropical forests in developing countries is occurring because of activities largely associated with population pressures and poverty.

Australia has only a relatively small area of tropical forest (an estimated 1.4 million hectares out of a total forested area of 41 million hectares), confined to northern and eastern Queensland, the Northern Territory and Western Australia. Much of this forest is already under various forms of protection. For example, the Queensland Wet Tropics World Heritage Area covers almost 890,000 hectares, including most of the tropical forest in North Queensland.

As a developed country with considerable experience and expertise in sustainable forest management, Australia can make a positive contribution to the improvement of forest management practices in developing countries, by providing education, training and technical expertise.

### Wood and wood products

Australia's wood and wood products industries are important components of Australia's primary and secondary industries. They are particularly important in providing economic development and employment in many regions of rural Australia. The industries include the hardwood and softwood sawmilling, plywood and panels manufacturing, woodchip export and the pulp and paper industries. Over 59,000 people are directly employed in growing and harvesting of wood and the manufacture and processing of wood and paper products. The wood and wood products industries contribute about 1% to gross domestic product.

In 1992–93, turnover in the value added wood and paper products industry was \$5.3 billion. In 1993–94, exports of forest products totalled \$802 million, of which 53% were woodchips and 25% paper and paperboard products. In the same year, imports were \$2,642 million, of which 48% was paper and 41% sawnwood. This indicates a trade deficit in forest products of \$1,840 million. Australia produces 76% of its sawn timber needs, of which native forests provide approximately 48%, with the balance coming from softwood plantations. Imported sawn timber is mostly Douglas Fir from North America, and Radiata Pine from New Zealand.

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 of a larger scale and more highly integrated with other wood processing facilities. Australia's production of sawn timber increased by 10.7% in 1993–94 to 3,443,000 cubic metres, of which 45% was hardwood and 55% 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. Australia has 20 panelboard mills, 11 producing particleboard, 6 producing medium density fibreboard, 2 producing hardboard and 1 producing softboard.

Australia has 22 pulp and paper mills, which utilise roundwood thinnings, low quality logs, harvesting residues and sawmill waste and recycled paper and paperboard to produce a broad range of pulp and paper products. Around a third 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.

The woodchip export industry uses sawmill residues and timber which is unsuitable for sawmilling and not required by the Australian pulp, paper and reconstituted board 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. Until recently, at least 95% of woodchips exported from Australia have been eucalypt but increasing quantities of softwood woodchips are now becoming available from pine plantations.

### 16.3 Summary of operations of wood processing establishments, 1992–93

Species group	Establishments at 30 June (No.)	Employment at 30 June(a) ('000)	Wages & salaries(b) (\$m)	Turnover (\$m)
Log sawmilling	530	10	254.0	1 271.0
Veneers & manufactured boards of wood	80	5	148.8	959.3
Hardwood wood chips	23	1	24.4	312.6

(a) Includes working proprietors. (b) Excludes the drawings of working proprietors.

Source: *Manufacturing Industry, Australia* (8221.0).

### 16.4 Production of wood and selected wood products(a)

Commodity	Quantity	1990-91	1991-92	1992-93	1993-94
Sawn Australian grown timber	'000 cu m	2 774	2 941	3 100	3 431
Woodchips					
Hardwood	'000 tonnes	4 841	4 454	4 536	4 612
Softwood	'000 tonnes	619	1 026	999	955
Particle board(b)	'000 cu m	625	643	660	752
Wood pulp					
Mechanical	'000 cu m	459 078	459 477	436 026	425 261
Other	'000 cu m	562 760	559 687	560 467	570 901
Paper & paperboard					
Newsprint	tonnes	394 990	403 728	433 476	410 931
Tissue & sanitary papers	tonnes	133 800	n.p.	n.p.	n.p.
Graphic	tonnes	n.p.	231 541	(c)1 392 661	n.p.
Other paper & paperboard	tonnes	963 574	n.p.	(c)	n.p.

(a) Excludes production of small single establishment management units with fewer than four persons employed and establishments engaged in non-manufacturing activities but which may carry on, in a minor way, some manufacturing. (b) Particle boards and similar boards of wood or other ligneous material. Excludes laminated. (c) Data for Graphic and Other paper & paperboard have been combined for 1992-93.

Source: *Manufacturing Production, Australia: Building Materials and Fittings (8361.0) and Manufacturing Production, Australia: Wood and Wood Products (8369.0)*. Australian Bureau of Agricultural and Resource Economics.

## Government administration

Land and forests management is primarily the 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 Forestry Acts and Regulations of the State or Territory concerned.

The Department of Primary Industries and Energy (DPIE) and the Department of the Environment, Sport and Territories (DEST) are the two key agencies which have responsibilities relating to forest management at the national level. Close liaison is maintained between the two agencies on relevant issues. DPIE's main responsibilities are the development of a national approach to forest management; providing advice to the Commonwealth Minister responsible for forest matters; administration of export licensing responsibilities in relation to unprocessed timber; liaison with state, national and international organisations concerned with forestry; provision of a Secretariat for the Ministerial Council on Forestry, Fisheries and Aquaculture (MCFFA); and management of policy and program initiatives.

DEST has responsibilities for environmental matters relating to forests. DEST provides policy advice to its Minister and the Government on conservation and environmental matters pertaining to Australia's forests, including biological

diversity and climate change. The Australian Heritage Commission, the Australian Nature Conservation Agency and the Commonwealth Environment Protection Agency within the Environment Portfolio have assessment, management and monitoring roles in respect of the national estate, endangered species and environmental impacts in Australia's forests.

DPIE and DEST, in close cooperation with the States, Territories and Ministerial Councils, were extensively involved in the development of the National Forest Policy Statement and in the development of the National Forest Inventory.

The MCFFA consists of State, Territory and Commonwealth, and New Zealand Ministers responsible for forests. The Commonwealth Minister for Resources is the chairman of the Council. MCFFA, the successor of the Australian Forestry Council formed in 1964, works to provide leadership and facilitate cooperation at the national level.

Initiatives fostered by the MCFFA are aimed at promoting the enhanced management of the nation's forest resources in the general interest of the community. Most recently it has been involved in the development and implementation of initiatives under the National Forest Policy Statement in cooperation with the Australian and New Zealand Environment and Conservation Council.

## 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. In 1995 Tasmania also became a signatory.

The Statement provides a policy framework for the future management of Australia's public and private forests and outlines a vision for the ecologically sustainable management of Australia's forests comprising eleven broad national goals in the following areas:

- Conservation — to maintain an extensive and permanent native forest estate in Australia and to manage that estate in an ecologically sustainable manner so as to conserve all values including biological diversity, heritage and Aboriginal and other cultural values.
- Wood production and industry development — to develop internationally competitive and ecologically sustainable wood production and wood products industries.
- Integrated and coordinated decision making and management — to reduce fragmentation and duplication in the land use decision-making process between the States and the Commonwealth.
- Private native forests — to ensure that private native forests are maintained and managed in an ecologically sustainable manner, as part of the permanent native forest estate.
- Plantations — to expand Australia's commercial plantations of softwoods and hardwoods so as to provide an additional, economically viable, reliable and high-quality wood resource for industry and to meet other environmental and economic objectives, in particular the rehabilitation of cleared agricultural land and to improve water quality.
- Water supply and catchment management — to ensure the availability of reliable, high-quality water supplies from forested land and to protect catchment values.
- Tourism and other economic and social opportunities — to manage Australia's forests in an ecologically sustainable manner for a range of uses, including tourism, recreation and production of non-wood products.
- Employment, work force education and training — to expand employment opportunities and the skills base of people working in forest management and forest-based industries.
- Public awareness, education and involvement — to foster community understanding of, and support for, ecologically sustainable forest management.
- Research and development — to increase Australia's national forest research and development effort and to ensure that it is well coordinated, efficiently undertaken and effectively applied.
- International responsibilities — to promote nature conservation and sustainable use of forests outside Australia and to ensure that Australia fulfills its obligations under relevant international agreements.

### Plantation initiatives under the NFPS

In 1993 under the NFPS the Commonwealth established two plantation initiatives: the Farm Forestry Program (FFP) and the North Queensland Community Rainforest Reforestation Program (CRRP).

Commonwealth funding of \$3.7 million has been allocated to FFP projects and \$4.2 million to the CRRP for 1992–93 to 1995–96. The CRRP funding is being matched by the Queensland Government while grantee contributions are substantial in the case of the FFP projects. As part of the 1995 budget, the Government agreed to provide an additional \$2 million under the FFP to help continue the industry's transition to regrowth forests and plantations.

An objective of both the FFP and the CRRP is to promote commercial wood production on cleared agricultural land so as to provide an additional, reliable, high-quality wood resource for sustainable regional industries, as well as diversify farm incomes. The programs aim to encourage the integration of farm forestry with agricultural activities and promote appropriate linkages between tree growers and wood processing industries. Other objectives of the programs are to address problems of land degradation and provide for improved water quality, and, in the case of the CRRP, to train a work force and landowners to support the long-term practice of rainforest plantation establishment and management.

The National Forest Policy Statement identified the following National plantation goals:

- to expand Australia's commercial plantations of softwoods and hardwoods so as to provide an additional, economically viable, reliable and high quality wood resource for industry; and
- to increase plantings to rehabilitate cleared agricultural land, to improve water quality, and to meet other environmental, economic or aesthetic objectives.

### **Regional Forest Agreements**

The National Forest Policy Statement outlines a process for the development of Regional Forest Agreements, which are a mechanism by which the Commonwealth and a State Government can reach agreement on the management of forests in a region. A central objective is to remove uncertainty and duplication in government decision making by producing a durable agreement on forest management. An agreement should protect environment and heritage values and provide industry with secure access to resources.

### **Wood and Paper Industries Strategy**

The Commonwealth has outlined new plantation initiatives in the Wood and Paper Industries Strategy released in December 1995. The Wood and Paper Industries Strategy is intended to build upon the Regional Forest Agreement process, and provide for restructuring of the wood and paper industries and facilitate a positive environment for investment in downstream processing based on resources from

sustainably managed native forests and plantations. The strategy will address specific measures to enhance the development of a vibrant value adding forests products industry by removing impediments and disincentives to investment.

### **National Forest Policy Advisory Forum (NFPAF)**

The NFPAF was established as part of the NFPS and met for the first time on 10 May 1995. It comprises representatives from conservation, industry, unions and scientific bodies, and provides co-ordinated input to the Commonwealth on forest and related conservation issues. Issues it has considered to date include advice to Ministers on the Commonwealth's criteria for a national forest conservation reserve system and the Wood and Paper Industries Strategy Discussion paper.

### **National Forests Inventory**

In many of the debates over forest management, the information base on forest attributes, such as timber, fauna and flora, has been found to be incomplete. Accordingly, in late 1988, the Commonwealth Government initiated a National Forest Inventory (NFI).

A comprehensive information base will lead to more informed discussion and decision making about the future of Australia's forests by identifying and describing forest communities and their current conservation status, and information to enable the planning of efficient sustainable forest utilisation.

### **Tropical timber**

In June 1992 the Commonwealth Government announced its policy on international trade in tropical timber. A key aspect of the policy is a commitment to the year 2000 target set by the International Tropical Timber Organisation (ITTO), by which date all tropical timber products entering international trade should be derived from sustainably managed forests.

Other aspects of the policy include support for the conservation of biodiversity, reforestation through agroforestry and plantations, and the provision of technical and scientific assistance to other countries — largely in the Asia-Pacific region — to promote better forest management practices. These policy measures complement initiatives arising from the Rio Earth Summit including the Conventions on



Climate Change and Biodiversity, Agenda 21 and The Statement of Principles on Forests.

The Agreement under which the ITTO was established, the International Tropical Timber Agreement 1983, is to be replaced by a successor Agreement, which was successfully negotiated in early 1994. The new Agreement was ratified by Australia in December 1995.

### **Pulp mill guidelines**

In December 1989 the Commonwealth established environmental guidelines for the development of new bleached eucalypt kraft pulp mills. To ensure the effective implementation of the Commonwealth guidelines and to streamline approval processes, the Commonwealth concluded agreements with Tasmania, Western Australia and Victoria.

To ensure that the Commonwealth guidelines remain current with international developments in pulping and bleaching technologies, the Government also announced in December 1989 the establishment of a National Pulp Mills Research Program (NPMRP). The NPMRP is a cooperative venture involving the Commonwealth Government and State Governments, community interest groups, industry and the CSIRO. The Program's principal objectives are the expansion of basic knowledge in pulping of eucalypt woods and bleaching of the pulps; improving the currently available technology; and developing more relevant and superior biological monitoring systems for the receiving waters.

The Commonwealth has released a set of guidelines based on recent international research under the Pulp and Paper Research Program and recent international developments in the wood pulping industry.

### **Forest and Wood Products Research and Development Corporation**

A Forest and Wood Products Research and Development Corporation was established 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. Its charter is to identify priorities and to commission, administer and subsequently evaluate research into a broad range of issues relating to wood production, extraction,

processing, economics and marketing. The Corporation is jointly funded by industry and the Commonwealth.

### **Commonwealth Scientific and Industrial Research Organisation (CSIRO)**

Forestry research is conducted primarily within the Division of Forestry and the Division of Forest Products. The emphasis is on strategic research concerned with commercial production and processing of wood from native eucalypt forests and plantations of eucalypts and softwoods.

The Division of Forestry has its headquarters in Canberra with other laboratories in Hobart, Mount Gambier and Perth. The Cooperative Research Centre for Temperate Hardwood Forestry is co-located with the Division on the campus of the University of Tasmania. The Division of Forest Products is based at Clayton, Melbourne. The Cooperative Research Centre for Hardwood Fibre and Paper Science operates from the CSIRO-Monash University site at Clayton. Several Divisions undertake forest research from the Tropical Research Centre at Atherton.

The research undertaken is closely aligned to major forest resources and industries: softwood plantations, hardwood plantations, native forests, wood technology, biodeterioration, wood composites, and pulp and paper. Prominent disciplines are tree physiology, nutrition, genetics, chemistry, wood science and engineering. An example of a current major project is a study at Wagga Wagga of design and management of plantations irrigated with sewage effluent, a practice which is being used increasingly by inland towns and cities. The use of former agricultural land for forestry is also increasing; another study aims to assess the role of trees and where appropriate expand their use in land management and industry in the Murray-Darling Basin.

Sustained high value production has long been a major goal of forest managers and research workers. Australia has endorsed the criteria and indicators for the management of native forests agreed through the UN backed Montreal process. The National Forest Policy Statement provides the framework for cooperative research which will address national aspects of this question.

## Fishing

### Fisheries resources

Australia's fisheries stocks are extremely diverse but, by world standards, its marine ecosystem is relatively unproductive. The Australian Fishing Zone covers an area 16% larger than the Australian land mass and is the third largest fishing zone in the world. However, Australia's fish production is insignificant by world standards. This reflects low productivity of the oceans rather than under-exploitation of the resource.

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. Despite this, less than 100 of these are commercially exploited.

Australia's major commercially exploited species are prawns, rock lobster, abalone, tuna, other fin fish, scallops, oysters and pearls. Australian fishing operators concentrate their efforts on estuarine, coastal, pelagic (surface) species and demersal (bottom living) species that occur on the continental shelf.

In 1992-93, Australians consumed 3.4 kg of edible weight fresh and frozen fish per person, sourced from Australian waters, and 1.9 kg of imported fish. The consumption per person of crustaceans and molluscs (such as prawns, lobsters, crabs and oysters) was 1.4 kg. A further 3.0 kg per head was consumed in the form of prepared seafood products.

The level of fishing effort exerted by the fishing fleet has increased rapidly over the last decade to the point where almost all the major known fish, crustacean and mollusc resources are fully exploited. Some major fisheries such as southern bluefin tuna, gemfish and shark have suffered serious biological depletion.

Australia has enjoyed a relatively long history of success in the farming of the Sydney rock oyster. Pearl culture operations and ornamental fish farming are well established. The production of juveniles of several species of fin fish, molluscs and crustaceans has been undertaken for some years, initially for restocking wild populations and subsequently for grow-out operations. As in many other developed countries, there has been a surge

of interest and investment in many types of aquatic farms over the last decade. Notable successes are the salmon industry in Tasmania and commercial cultivation of the Pacific oyster, blue mussel and rainbow trout.

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. Aquaculture industries are established in all States, with species involved ranging from pearl oysters, to freshwater trout, to crocodiles. Aquaculture has experienced rapid growth during the past four years with the value of production rising from \$188 million in 1989-90 to \$303 million in 1993-94.

Developmental work is taking place in a number of areas including barramundi, freshwater crayfish (yabbies and marron), prawns, mussels and algae. Research is continuing into the hatchery rearing of species such as abalone, scallops, giant clams, flat and pearl oysters. Over half of the established aquaculture output by value goes to markets other than for direct consumption. However, the newer emerging industries are producing mainly food. A strategy for the development of Australian aquaculture is being formulated by a Working Group of Commonwealth and State fisheries agencies.

### Production, processing and exports and imports of fisheries products

#### Value of fisheries production

Table 16.5 shows the gross value of the Australian commercial fishing industry. As the value of materials used in the course of production is not available, it is not possible to show net values. 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, although, 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 fisheries production in 1993–94 is estimated to have been \$1,607 million, a 7% rise in value over the previous year, mainly as a result of higher export returns for Australian seafood. The increase in value was achieved despite lower volume of production in many fisheries, with the fish catch down 8% and the prawn catch down 17% on 1992–93.

### 16.5 Gross value of fisheries production (\$ million)

	Value
1976–77	206
1977–78	233
1978–79	279
1979–80	326
1980–81	330
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	1 501
1993–94p	1 607

Source: Australian Bureau of Agricultural and Resource Economics and the Australian Fisheries Service.

### 16.6 Gross value of selected major fisheries categories (\$ million)(a)

	1991–92	1992–93	1993–94p
Prawns	244	282	278
Rock lobster	369	348	422
Tuna	76	119	116
Other fin fish	301	325	325
Abalone	95	122	177
Scallops	83	96	68
Oysters	45	47	49
Pearls	126	120	124
Other(a)	37	42	48
<b>Total</b>	<b>1 376</b>	<b>1 501</b>	<b>1 607</b>

(a) Other fisheries production not elsewhere included.

Source: Australian Bureau of Agricultural and Resource Economics.

In 1993–94 the value of pearl oysters at \$124 million remained the most important single aquaculture industry with the potential to continue to increase in value. Aquaculture industries to significantly increase in value between 1992–93 and 1993–94 included salmon, increasing by 20% to \$ 58.8 million; tuna, increasing by 137% to \$24.2 million and prawns increasing by 43% to \$21.1 million.

### 16.7 Gross value of aquaculture production(a) (\$ million)

	1991–92	1992–93	1993–94p
<b>Fish</b>			
Salmon	39.6	49.0	58.8
Tuna	1.8	10.2	24.2
Trout	14.2	11.9	13.7
Other(b)	4.8	4.8	6.3
<b>Total</b>	<b>60.4</b>	<b>75.9</b>	<b>103.1</b>
<b>Crustaceans</b>			
Prawn	10.7	14.8	21.1
Other(c)	2.5	2.8	4.7
<b>Total</b>	<b>13.3</b>	<b>17.6</b>	<b>25.8</b>
<b>Molluscs</b>			
Pearl oyster	126.0	119.6	124.0
Edible oysters	44.8	47.2	48.6
Other(d)	2.1	1.3	1.4
<b>Total</b>	<b>173.0</b>	<b>168.1</b>	<b>174.0</b>
<b>Total</b>	<b>246.7</b>	<b>261.5</b>	<b>302.9</b>

(a) Excludes aquarium fish, hatcheries production, crocodiles, microalgae, and aquarium worms. (b) Includes eels and other native fish. (c) Includes crabs and brine shrimp. (d) Includes mussels, scallops and giant clams.

Source: Australian Bureau of Agricultural and Resource Economics.

### 16.8 Australian fisheries production by category(a) (tonnes)

	1991–92	1992–93	1993–94p
<b>Fish</b>			
Tuna	13 183	10 261	7 209
Other	139 792	132 962	123 863
<b>Total</b>	<b>152 975</b>	<b>143 223</b>	<b>131 071</b>
<b>Crustaceans</b>			
Prawns	24 546	24 440	20 251
Rock lobster	18 473	18 390	16 979
Other	4 103	5 531	6 908
<b>Total</b>	<b>47 122</b>	<b>48 361</b>	<b>44 138</b>
<b>Molluscs</b>			
Abalone	5 029	4 659	4 723
Scallops	29 802	33 363	21 820
Oysters	8 902	9 710	2 879
Other	4 603	4 888	4 631
<b>Total</b>	<b>48 335</b>	<b>52 620</b>	<b>34 053</b>
<b>Total</b>	<b>248 432</b>	<b>244 204</b>	<b>209 263</b>

(a) Includes an estimated value for aquaculture production but excludes production from inland commercial fisheries.

Source: Australian Bureau of Agricultural and Resource Economics.

### 16.9 Commonwealth fisheries production by fishery and category (tonnes)

	1991-92	1992-93	1993-94p
<b>Northern prawn</b>			
Prawn			
Tiger	4 142	2 891	2 689
Banana	2 508	4 058	2 269
Endeavour	1 054	813	794
King	78	49	36
Total	7 781	7 811	5 789
<b>Torres Strait</b>			
Prawn			
Tiger	764	586	334
Endeavour	989	988	659
King	58	44	27
Other	6	5	3
Total	1 816	1 622	1 023
Tropical rock lobster	147	174	185
Spanish mackerel	100	102	102
Total	2 064	1 898	1 310
<b>South East</b>			
Trawl			
Orange roughy	18 160	12 023	10 125
Morwong	893	848	786
Tiger flathead	2 207	1 549	1 492
Gemfish	383	717	408
Blue grenadier	3 526	3 039	3 111
Ocean perch	196	262	287
School whiting	1 001	900	1 183
Ling	649	805	961
Redfish	1 406	839	627
Mirror dory	241	260	302
Blue warehou	1 352	968	872
Other	7 244	7 333	5 738
Total	37 258	29 543	25 892
Non-trawl	2 574	1 551	1 440
<b>Great Australian Bight</b>			
Orange roughy	627	432	668
King flathead	621	504	448
Gemfish	32	5	15
Bight redfish	274	128	107
Jackass morwong	50	40	40
Boarfish	63	24	28
Leatherjacket	131	44	38
Angel shark	81	64	47
Knifejaw	33	15	10
Squid	46	20	23
Other	178	284	173
Total	2 136	1 560	1 597

For footnotes see end of table.

...continued

### 16.9 Commonwealth fisheries production by fishery and category — continued (tonnes)

	1991-92	1992-93	1993-94p
<b>Southern shark</b>			
School & gummy	4 469	5 253	4 623
Other shark	837	858	812
Total	5 306	6 111	5 434
<b>East coast tuna</b>			
Yellowfin	702	752	524
Albacore	203	156	123
Bigeye	37	23	10
Billfish	94	52	16
Skipjack	208	397	327
Total	1 244	1 381	999
<b>East coast purse seine</b>			
Yellowfin	—	6	—
Skipjack	6 633	3 855	1 308
Total	6 633	3 861	1 308
<b>Southern bluefin tuna</b>			
Domestic	2 262	1 774	2 141
Joint venture	2 073	2 511	2 394
Other	800	650	270
Total	5 135	4 935	4 805
<b>Other fisheries(a)</b>	292	329	234
<b>Total production</b>	<b>70 422</b>	<b>58 979</b>	<b>48 808</b>

(a) Includes North West Slope and Kimberley Coast prawn fisheries.

Source: Australian Bureau of Agricultural and Resource Economics.

### Processing of fish, crustaceans and molluscs

There is very little value added processing of fish products in Australia. Processing establishments vary in size, scope of operations and sophistication of technologies employed. The majority of establishments undertake only the most basic cleaning, filleting, packing and freezing processes, but others have the capacity for significant product transformation.

Fish, crustaceans and molluscs intended for export are processed in establishments registered under the Export (Fish) Regulations. Edible fish for local consumption is mainly dispatched fresh-chilled to markets.

## Exports and imports

Exports of fisheries products comes under Commonwealth jurisdiction, while domestic market activity comes under that of the States and Territories.

A significant proportion of Australian fisheries production (edible and non-edible) is exported. In 1993–94 the value of exports was \$1,241 million, which amounted to

approximately 77% of the total value of Australian production. The Australian fisheries export industry depends on a limited range of products sold on a few major markets and in 1993–94 exports to Japan and Taiwan accounted for about 60% of the value of all exports. In 1993–94 the most valuable exports included rock lobster (\$468 million), prawns (\$197 million) and abalone (\$187 million).

### 16.10 Destination of exports of Australian fisheries products

Country	1991–92		1992–93		1993–94p	
	\$m	%	\$m	%	\$m	%
Japan	452	46.1	491	45.0	523	42.1
USA	170	17.3	151	13.9	109	8.8
Taiwan	141	14.4	160	14.7	208	16.8
Hong Kong	111	11.3	162	14.9	215	17.3
Spain	21	2.1	13	1.2	6	0.5
Singapore	23	2.3	28	2.6	32	2.6
France	10	1.0	22	2.0	19	1.5
Thailand	6	0.6	7	0.6	9	0.7
Saudi Arabia	6	0.6	2	0.2	1	0.1
Other	40	4.1	54	5.0	119	9.6
<b>Total</b>	<b>980</b>	<b>100.0</b>	<b>1 090</b>	<b>100.0</b>	<b>1 241</b>	<b>100.0</b>

Source: ABS Foreign Trade Statistics.

In the same period, Australia imported \$522 million of seafood, 22% of which came from Thailand and 18% from New Zealand. The most valuable categories of seafood imported included prawns from Thailand

(\$64 million), canned fish from Thailand (\$38 million) and from the United States (\$26 million), and frozen fish fillets from New Zealand (\$36 million).

### 16.11 Source of Australian imports of fisheries products

Country	1991–92		1992–93		1993–94p	
	\$m	%	\$m	%	\$m	%
Thailand	92	18.1	104	19.7	131	22.4
New Zealand	84	16.5	94	17.8	104	17.7
Canada	36	7.1	36	6.8	25	4.3
Malaysia	33	6.5	36	6.8	39	6.7
USA	26	5.1	29	5.5	31	5.3
Peru	9	1.8	10	1.9	26	4.4
Japan	32	6.3	24	4.6	22	3.8
Chile	20	3.9	16	3.0	15	2.6
Singapore	12	2.4	12	2.3	14	2.4
Korea, Republic of	14	2.8	14	2.7	10	1.7
Indonesia	13	2.6	8	1.5	7	1.2
Other	138	27.1	144	27.3	162	27.6
<b>Total</b>	<b>509</b>	<b>100.0</b>	<b>527</b>	<b>100.0</b>	<b>586</b>	<b>100.0</b>

Source: ABS Foreign Trade Statistics.

## **Fisheries legislation and territorial arrangements**

The Commonwealth Parliament has enacted a number of laws dealing with fisheries in Australian waters beyond territorial limits, and has fishing agreements and arrangements with a number of other countries.

The fisheries laws of the States and the Northern Territory apply to all kinds of fishing within the territorial sea and inland waters. These laws require the licensing of persons and boats in the commercial fisheries and provide a range of other regulatory powers.

### **Fisheries Management Act 1991 and the Australian Fishing Zone**

The Commonwealth Fisheries Management Act 1991 applies to commercial fishing for swimming and sedentary species in the Australian Fishing Zone (AFZ), excluding any waters that have been declared excepted waters. The AFZ is the area of waters generally between 3 and 200 nautical miles seaward of the territorial sea baseline of Australia and its external territories, excluding waters falling within the exclusive economic zone of another country and covers a total of 8.9 million sq km. The establishment of the AFZ in 1979 brought portions of oceanic tuna stocks, and demersal and pelagic fish stocks previously exploited by foreign fishing vessels under Australian control.

Fishery management plans are central to the Act and are to 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 (ITQ) are used as the preferred tool 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 resources within the AFZ that are surplus to

domestic fisheries requirements and 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 another country under which foreign fishing licences will be granted to boats from that country.

In 1995, Japan was the only country maintaining a licensed foreign fishing presence in the AFZ. Japanese vessels fished certain areas of the AFZ under two separate arrangements: an annually renewable bilateral access agreement between the Japanese Government and the Australian Government, and a joint venture between the Australian and Japanese tuna industries. Up to 250 foreign fishing licences were available under the bilateral access arrangement. The main species caught by Japanese vessels in the AFZ are yellowfin, southern bluefin, bigeye and albacore tunas.

Australia, Japan and New Zealand are parties to the Convention for the Conservation of Southern Bluefin Tuna (CCSBT), which came into force in 1994. As part of its conservation management responsibilities for the global southern bluefin tuna industry, the CCSBT Commission annually determines a total allowable catch for the fishery and allocates this between the three CCSBT parties in the form of national quotas.

In 1995, Australia had maritime delimitation agreements with Papua New Guinea, the Solomon Islands and France. In addition, a maritime delimitation agreement was being negotiated with Indonesia (a Provisional Fisheries Surveillance and Enforcement Line having been agreed in 1981). Australia has yet to enter into a maritime delimitation agreement with New Zealand.

The Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America forms the Schedule to the Act. The effect of this is that US tuna boats are given treaty licences in accordance with the provisions of the Treaty.

Whales are a protected species in the Australian Fishing Zone.

## Australian Fisheries Management Authority

The *Fisheries Administration Act 1991* establishes the Australian Fisheries Management Authority (AFMA) and proscribes its objectives. These are:

- implementing efficient and cost-effective fisheries management on behalf of the Commonwealth;
- ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development, in particular the need to have regard to the impact of fishing activities on non-target species and the marine environment;
- maximising economic efficiency in the exploitation of fisheries resources;
- ensuring accountability to the fishing industry and to the Australian community in AFMA's management of fisheries resources; and
- achieving government targets in relation to the recovery of the cost of AFMA.

The Act specifies AFMA's functions, which 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. AFMA's management responsibilities include arrangements with States and Territories. Under the Fisheries Management Act, AFMA is given additional functions in areas such as keeping a register of statutory fishing rights, surveillance and enforcement.

## Other legislation

The *Fishing Levy Act 1991*, *Foreign Fishing Licences Levy Act 1991* and *Fisheries Agreements (Payments) Act 1991* 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* enables a charge to be levied on the grant of new fishing rights.

The *Torres Strait Fisheries Act 1984* 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 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.

## Fisheries research

The main aim of fisheries research in Australia is to provide a background of biological, technical and economic information which will provide guidance for the efficient and sustainable utilisation of fisheries resources. Much of the research already undertaken has been directed at formulating recommendations for management of various fisheries. Research work, including feasibility fishing projects involving foreign fishing vessels, is also carried out and is expected to lead to the development of new fisheries, the expansion of under-exploited fisheries, greater economy in operations and the use of more efficient equipment and methods.

The Fisheries Research and Development Corporation (FRDC) was established in July 1991 by Regulations under the *Primary Industries and Energy Research and Development Act 1989*. Its objectives include:

- increasing the economic, environmental or social benefits to members of the Australian fishing and aquaculture industry and to the community generally by improving the production, processing, storage, transport or marketing of fish and fish products; and
- achieving the sustainable use and the sustainable management of fisheries resources.

FRDC 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.

FRDC is funded by an annual unmatched grant equal to 0.5% of GVP (the average gross value of fisheries production over the three immediately preceding financial years) and research levies collected from the fishing industry which the Government matches to a maximum of 0.25% of GVP. In 1994–95,

revenue to FRDC totalled some \$12.4 million, of which the Government contributed approximately \$9.2 million.

Organisations in Australia at present engaged in research into fisheries matters are:

- CSIRO Division of Fisheries Research, which has its headquarters and main laboratory at Hobart, Tasmania, and regional laboratories in Western Australia and Queensland (fisheries science);
- CSIRO Division of Oceanography, which has its headquarters and laboratory at Hobart, Tasmania;
- CSIRO Division of Food Research, which conducts research into handling, storage, processing and transportation of fish at its laboratory in Hobart, Tasmania;
- The Australian Fisheries Service, Department of Primary Industries and Energy, Canberra;
- Bureau of Resource Sciences, Department of Primary Industries and Energy, Canberra;
- Australian Bureau of Agricultural and Resource Economics, Department of Primary Industries and Energy, Canberra;
- State and Territory fisheries departments (research vessels are operated by all States);

- Great Barrier Reef Marine Park Authority (GBRMPA) located in Townsville and Canberra universities; and
- private fishing companies (surveys of fisheries resources, research into handling, processing and marketing).

### Recreational fishing

People fishing for recreation and pleasure reported an estimated catch of 23,152 tonnes of fish, 2,800 tonnes of crabs and 1,400 tonnes of yabbies/marron in the year ending April 1992. On average, every Australian household casting a line or net caught 27.1 kg of seafood.

The pastime of recreational fishing was most popular in New South Wales with 296,900 households reporting that a member had caught fish for home consumption, followed by 245,900 households in Queensland and 235,500 households in Victoria.

Queensland anglers had the most success by landing nearly 7,300 tonnes (23.5% of the total fish catch) of seafood, compared with just under 6,600 tonnes (21.3%) caught in New South Wales and 5,200 tonnes (16.8%) in Western Australia.

### 16.12 Recreational fishing catch, year ended April 1992 (tonnes)

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
Abalone	20.8	36.4	0.2	8.1	32.3	25.1	—	3.3	126.0
Crabs	335.8	51.9	869.6	865.6	648.1	10.2	54.5	5.9	2 841.5
Fish	5 046.9	4 164.4	5 732.1	3 184.7	3 371.8	1 014.7	388.2	248.8	23 151.7
Lobster, crayfish	127.4	46.1	50.0	53.3	357.7	56.9	4.3	3.3	698.9
Mussels	9.9	20.5	2.7	15.6	48.1	21.6	3.9	1.6	123.9
Octopus	79.9	18.6	3.4	10.5	56.3	2.3	—	0.6	171.5
Oysters	132.2	4.8	129.7	11.8	29.3	16.5	2.7	3.0	330.0
Prawns	251.6	119.8	316.0	14.4	117.0	0.9	11.0	4.7	835.6
Scallops	—	149.6	19.5	17.3	3.2	7.5	0.4	0.3	197.7
Squid	96.7	148.6	53.0	330.1	142.5	32.1	2.8	5.7	811.4
Yabbies, marron	399.6	339.6	78.6	215.1	351.2	0.2	3.2	11.0	1 398.5
Other seafood	85.5	72.7	29.5	29.0	35.4	3.2	0.5	0.6	256.3
<b>Total seafood</b>	<b>6 586.3</b>	<b>5 173.1</b>	<b>7 284.3</b>	<b>4 755.5</b>	<b>5 192.9</b>	<b>1 191.1</b>	<b>471.4</b>	<b>288.6</b>	<b>30 943.2</b>

Source: Home Production of Selected Foodstuffs, Australia (7110.0).



## Bibliography

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