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FORESTRY AND FISHING

FORESTRY

Forests are an important national resource, renewable over time and providing a wide range of indispensable products and benefits to the community.

The cover of forest vegetation protects the soil from water and wind erosion, reduces flash flooding and siltation of water storages, and maintains the quality of water. Forests provide habitat for a variety of native animals and plants, many of which depend on specific forest environments for survival.

Native and plantation forests contribute substantially to the Australian economy, especially to employment in rural areas. Forests also represent ecosystems of value for education, scientific research, tourism, recreation and other purposes. Not all forests are necessarily suitable for all types of uses at the same time. Yet careful management will ensure that the forests provide multiple benefits in the long-term, for the Australian community.

Forestry in the States and Territories

In the Commonwealth framework, State governments are primarily responsible for land management. Each State has a forest service responsible for the management and control of publicly-owned forests, in accordance with Forestry Acts and Regulations. The Office of the ACT Administration, housed within the Department of the Arts, Sport, the Environment, Tourism and Territories, is responsible for the management and control of forests in the Australian Capital Territory. Forestry in the Northern Territory is the responsibility of the Northern Territory Conservation Commission. In Victoria and Western Australia the former independent forest services have been amalgamated with conservation and land management authorities.

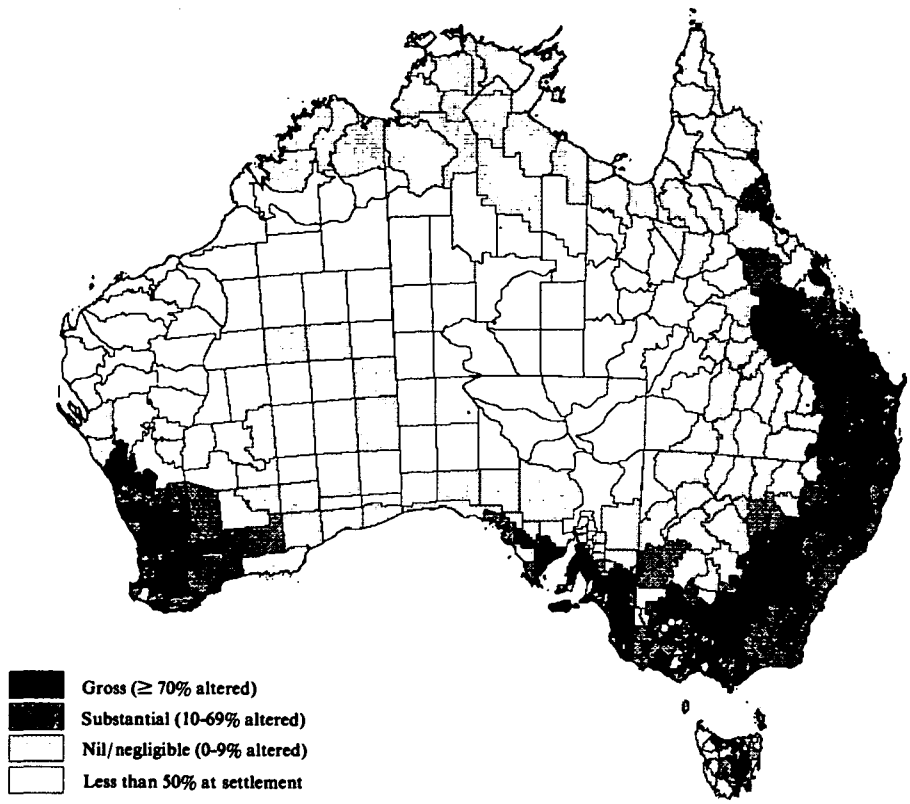
Commonwealth forestry administration

The Department of Primary Industries and Energy is responsible for forestry matters at the national level. Its primary responsibilities are the administration of a control on the export of unprocessed timber; liaison with State, national and international organisations concerned with forestry; and provision of the Secretariat for the Australian Forestry Council.

Existing forest estate

Native forest is defined 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. The total area of native forest was estimated at 41.3 million hectares as at 30 June 1986.

DISTURBANCE TO AUSTRALIAN FORESTS AND WOODLANDS SINCE EUROPEAN SETTLEMENT



This map, produced by CSIRO using the Australian Resources Information System (Cocks et al., 1987) shows the extent to which Australian natural forests and woodlands have been disturbed (usually meaning cleared) since European settlement.

For this map, forests and woodlands are defined as including:

- tree communities with at least 10 per cent projected foliage cover;
- tall (>2 m) Eucalypt shrub communities with at least 10 per cent projected foliage cover (e.g. Mallee);
- mangroves.

Two factors, original vegetation and recent land cover, have been combined to estimate the changes to forests and woodlands since European settlement (Wells et al., 1984).

The percentages shown on this map are conservative, i.e. at *least* these percentages of the original forests and woodlands have been disturbed. Estimates of the percentage of forests and woodlands disturbed in each State are:

> New South Wales, 49%; Victoria, 68%; Queensland, 35%; South Australia, 40%; Western Australia, 31%; Tasmania, 36%; Northern Territory, 0%; Australian Capital Territory, 60%.

Sources:

Cooks, K.D., Walker, P.A. and Parvey, C.A. *Evolution of a Continental Scale Geographic Information System.* Submitted to the International Journal of Geographic Information Systems

Wells, K.F., Wood, N.H. and Laut, P. (1984) *Loss of Forests and Woodlands in Australia: A Summary by State, Based on Rural Local Government Areas.* CSIRO Division of Water and Land Research Technical Memorandum 84/4.

Of the 41.3 million hectares, 30.2 million hectares are in public ownership. The bulk of the 11.0 million hectares of private native forest are not actively managed for wood production and now include 2.4 million hectares of forest in the Northern Territory which were transferred from public to Aboriginal ownership.Of the 30.2 million hectares of public forests, 5.0 million hectares have national park status and 12.9 million hectares are Crown forests, vacant or occupied under lease on which wood harvesting is carried out under government control but are not reserved and actively managed for wood production. Crown forests include 4.3 million hectares of tropical eucalypt and paperbark forests in northern Australia.

Of the 12.3 million hectares of State forests, 0.6 million hectares are special reserves managed for other than wood production purposes and on 4.4 million hectares, wood harvesting is restricted partly because of management priorities for other values and partly due to present economic inaccessibility. This leaves 7.3 million hectares or 17.7 per cent of a total 41.3 million hectares actively managed for wood production.

NATIVE FOREST AREAS CLASSIFIED BY FOREST TYPE, 30 JUNE 1986

('000 hectares)

Forest type group	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Aust.*
Rainforest	265	13	1,237	—	—	499	38	—	2,052
Eucalypt 1	1,207	474	205	—	188	473	—	—	2,547
Eucalypt 2	3,659	4,207	1,290	—	2,764	1,990	—	51	13,961
Eucalypt 3	8,009	577	3,300	—	18	—	—	—	11,904
Tropical eucalypt and paperbark	—	—	4,078	—	—	—	2,450	—	6,528
Cypress	1,819	7	1,686	—	—	—	778	—	4,290
Total	**14,959**	**5,278**	**11,796**	**—**	**2,970**	**2,962**	**3,266**	**51**	**41,282**

NOTES:

1. Eucalypt forests are grouped into productivity classes in descending order of productivity. No specific indices 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.
2. Tropical eucalypt/paperbark not in commercial use.

NATIVE FOREST AREAS CLASSIFIED BY OWNERSHIP, 30 JUNE 1986

('000 hectares)

Ownership category	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Aust.*
Public—	9,738	4,673	10,408	—	2,240	2,294	839	51	30,243
1	3,179	2,699	3,283	—	1,946	1,242	—	—	12,349
2	4,783	500	6,257	—	125	677	524	9	12,875
3	1,776	1,474	868	—	169	375	315	42	5,019
Private	5,221	605	1,388	—	730	668	2,427	—	11,039
Total	**14,959**	**5,278**	**11,796**	**—**	**2,970**	**2,962**	**3,266**	**51**	**41,282**

NOTES:

1. Forest land managed for multiple use including wood production.
2. Crown land vacant or occupied under lease on which wood harvesting is carried out under Government control but not reserved for that purpose.
3. Land on which wood production is excluded (National Parks etc.).

For more details on Australian native forests *see Year Book* No. 61.

Plantations

Tree plantations of a few coniferous species now provide a large part of Australian-grown wood supplies. The large scale establishment of these plantations was commenced by State Forest Services early this century, and in the case of South Australia, last century, to overcome the shortage of native coniferous timber. In an eleven year period covered by the *Softwood Forestry Agreements Acts 1967, 1972* and *1976*, the Commonwealth provided financial assistance to the States in the order of $55 million for an extended program of softwood plantation development. A further Act in 1978 provided funds for a five year period to 30 June 1981 for the maintenance of the area of plantations established previously with Commonwealth funds.

Privately owned plantations amount to almost one-third the area under State ownership. New plantations (including replanting) are currently being established at the rate of 30,000 hectares per annum. A detailed account of the history and development of coniferous plantations and of the characteristics of individual species is included in *Year Book* No. 59. The following table shows total area of plantations in Australia classified by species.

PLANTATION AREAS CLASSIFIED BY SPECIES, 31 MARCH 1986

(hectares)

Species group	*NSW*	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*ACT*	*Aust.*
Coniferous—									
Pinus radiata	205,582	186,023	3,181	82,585	46,387	62,011	—	13,707	599,476
Pinus elliottii	5,302	3	90,825	—	262	—	—	—	96,392
Pinus pinaster	—	1,414	—	3,540	27,657	—	—	—	32,611
Pinus caribaea	2,428	3	35,833	—	—	—	2,463	—	40,727
Araucaria	1,561	—	44,143	—	—	—	—	—	45,704
Other	5,293	3,009	4,619	385	303	372	2,701	580	17,262
Total	*220,166*	*190,452*	*178,601*	*86,510*	*74,609*	*62,383*	*5,164*	*14,287*	*832,172*
Broadleaved—									
Eucalptus	—	13,646	1,120	1,182	9,160	11,127	30	—	36,265
Populus	1,965	297	—	—	—	—	—	—	2,262
Other	—	134	637	—	—	1,242	1	—	2,013
Total	*1,965*	*14,077*	*1,757*	*1,182*	*9,160*	*12,369*	*30*	—	*40,540*
Total	**222,131**	**204,529**	**180,358**	**87,692**	**83,769**	**74,752**	**5,194**	**14,287**	**872,712**

Australian Forestry Council

The Commonwealth and the State Governments formed the Australian Forestry Council in 1964 to coordinate the development of the nation's forest resource in the general interest of the community. Membership of the Council comprises the State and Northern Territory Ministers responsible for forestry and the Commonwealth Minister for Primary Industries and Energy. The New Zealand Minister for Forestry has observer status on Council. The Council is serviced by a Standing Committee and specialist subcommittees.

The Australian Forestry Council's current terms of reference are to:

- promote the management of Australian forests for the benefit of the people of Australia;
- advance the welfare and development of the industries based upon these forests;

- facilitate the exchange of information between parties interested in all the uses and the protection of the forests;
- facilitate consultation and coordination between the Commonwealth, State and Territory Governments on forestry matters, especially matters having interstate or national implications;
- formulate and recommend national forest policy for Australia;
- coordinate research into all aspects of forestry including the uses of forests and forest products;
- consider matters submitted to the Council by its Standing Committee.

The Council's National Forests Strategy, which outlines important basic principles and goals associated with the management of Australia's forests as well as providing a framework for the general development of programs and ongoing administration, was tabled in Federal Parliament in November 1986.

In recognition of the need to prepare shorter term statements of forestry management objectives, in 1986 the Council initiated the preparation of a draft Public Land Fire Management statement. Its Standing Committee prepared a position paper on Australian Bushfire Research in 1987.

Research

Commonwealth Scientific and Industrial Research Organization—CSIRO

CSIRO research on forests is mainly undertaken in the Division of Forestry and Forest Products which was formed on 1 January 1988, integrating research on land use and the production and processing of wood. The research s of two main types: longer-term strategic research that will help shape the future of the industry, and collaborative and contract research with individual companies and States. The aims of the Division are to:

- enhance understanding of the ecology and the basis for sustained productivity of forests;
- develop strategies and techniques for management of forests for multiple uses including wood production, water supply and ecosystem conservation;
- develop technologies for increasing the profitability of forest-based industries through efficient use of wood resources and development of new products.

The Division has major laboratories in Melbourne and Canberra, and smaller research groups in Brisbane, Hobart, Mt Gambier and Perth. Work is organised in eight programs, and is normally undertaken in collaboration with State forest services, private companies or universities.

Education

The Australian National University and the University of Melbourne offer undergraduate courses leading to a Bachelor of Science degree in Forestry. Most States provide for sub-professional forestry training.

Each year, the Department of Primary Industries and Energy makes available postgraduate awards for full-time research, leading to the degree of Master and/or Ph.D at an Australian university. The Department also administers an award funded from a private bequest for postgraduate study at Oxford University for one year.

Timber and Timber Products

The selected details shown below have been compiled from the annual census of manufacturing establishments.

The woodchip export industry uses timber which is unsuitable for sawmilling and is 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 standing in the forest after logging, where it inhibited regeneration. After several cycles of selective logging since European settlement, many forests contained large volumes of over-mature and defective timber for which there was no market. The woodchip export industry, by making it economic to remove this poor quality timber, has enabled degraded forests to be regenerated into faster growing, more productive ones. Considerable quantities of sawmill waste material, which would otherwise be burnt, are also chipped for local pulpwood-using industries and for export.

About 4.5 million tonnes of woodchips worth $260 million were exported from Australia in 1986. Over 95 per cent of Australia's woodchip exports go to Japan where they are used to produce high quality printing and writing papers. The remainder goes to Korea and Taiwan.

MANUFACTURING ESTABLISHMENTS (a)—SUMMARY OF OPERATIONS,1986–87

1983 ASIC (b) code	*Industry description*	*Establishments at 30 June*	*Employment at 30 June (c)*	*Wages and salaries (d)*	*Turnover*
		No.	'000	$m	$m
2531	Log sawmilling	628	11.2	179.7	737.9
2533	Veneers and manufactured boards of wood	78	5.2	108.1	604.6
2537	Hardwood wood chips	9	0.8	23.3	298.1

(a) All manufacturing establishments owned by multi-establishment enterprises and single establishment enterprises with four or more persons employed. *(b)* Australian Standard Industrial Classification. *(c)* Includes working proprietors. *(d)* Excludes the drawings of working proprietors.

TIMBER AND SELECTED TIMBER PRODUCTS (a)

Item		*1984–85*	*1985–86*	*1986–87*
Undressed sawn timber—				
Recovered from sawn logs—				
Australian grown—				
Broadleaved	'000 cu m	1,932	n.a.	2,020
Coniferous	"	1,055	n.a.	1,068
Total	"	**2,987**	**n.a.**	**3,088**
Woodchips (green weight)—				
Hardwood (broad leaved)	'000 tonnes	4,817	n.a.	5,299
Plywood—				
Commercial – (surface measure)	'000 sq m	5,774	n.a.	6,728
(1 mm basis)	"	55,379	n.a.	69,792
Waterproof – (surface measure)	"	1,846	n.a.	1,547
(1 mm basis)	"	15,446	n.a.	12,137
Particle board (resin bonded)	'000 cu m	696	n.a.	745
Wood pulp—				
Mechanical	"	368,050	n.a.	381,567
Other	"	n.a.	n.a.	489,560
Paper—				
Newsprint	tonne	364,685	n.a.	388,066
Printing	"	128,839	n.a.	n.y.a.
Tissue and sanitary papers	"	116,416	n.a.	137,748
Wrapping (incl. kraft)	"	335,668	n.a.	378,737
Writing and duplicating *(b)*	"	92,788	n.a.	79,087
Other paper (incl. blotting)	"	38,271	n.a.	n.y.a.
Paperboard (incl. strawboard)	"	501,793	n.a.	n.y.a.

(a) Excludes production of small single establishment enterprises 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)* Includes cartridge.

FISHING

Source and basis of statistics

Statistics presented in this section are obtained from the Australian Bureau of Agricultural and Resource Economics (ABARE) and the Australian Fisheries Service, Department of Primary Industries and Energy. The Australian Bureau of Statistics (ABS) has reduced its involvement in the collection of fisheries statistics. The ABS no longer publishes statistics on the Australian fishing industry.

Australian fisheries production statistics are generally in terms of the form in which the products are taken from the water. For example, the statistics of fish production published in this chapter are in terms of 'estimated live weights' which are calculated from landed weights by using conversion factors for each species in each State. These conversion factors allow for the fact that the quantities of fish reported are frequently in a gutted, headed and gutted, or otherwise reduced condition. Crustaceans are reported on an 'estimated live weight' basis and molluscs (edible) on a 'gross (in-shell) weight' basis. The figures for pearl shell and trochus shell refer to the actual quantities of dry shell for sale and exclude the weight of the animal.

For more details of employment and boats and equipment for general fisheries and particulars of the whaling industry *see* earlier *Year Books*.

Fisheries Resources and their Commercial Exploitation

Over 3,000 species of marine and freshwater fish occur in and around Australia and at least an equal number of crustacean and mollusc species. 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.

Fin fish

Off north Australia, barramundi (*Lates calcarifer*) constitutes the most important estuarine and coastal species, while in the south-east and south-west regions, mullet (mainly *Mugil cephalus*), bream (*Acanthopagrus* spp.), Australian salmon (*Arripus trutta*) and Australian herring (*Arripus georgianus*) are important catch components.

Major pelagic fisheries are southern bluefin tuna (*Thunnus maccoyii*) off southern Australia, jack mackerel (*Trachurus declivis*), snoek (*Leionura atun*), pilchards (*Sardinops neopilchardus*) and anchovies (*Engraulis australis*) off south-east Australia and Spanish mackerel (*Scomberomorus commersoni*) off north Australia. A long line fishery for yellow fin tuna (*Thunnus albacares*), big eye tuna (*Thunnus obesus*) and other tunas has developed substantially in recent years off the east coast of Australia.

A large multispecies demersal fishery that targets on flathead (*Neoplatycephalus* and *Platycephalus* spp.), morwong (*Nemadactylus* spp.), redfish (*Centroberyx affinis*), gemfish (*Rexea solandri*), orange roughy (*Hoplostethus atlanticus*), trevally (*Pseudocaranx dentex*) and blue grenadier (*Macruronus novaezelandiae*), exists off south-east Australia. Demersal inshore snapper (*Chrysophrys auratus*) fisheries exist off south-west and south-east Australia; in the latter region, stocks of whiting (*Sillaginidae*) are also fished. In the northern tropical region, reef fish such as cods (*Epinephelus* spp.) are exploited. A large demersal fishery for school and gummy sharks (*Galeorhinus australis* and *Mustelus antarcticus*, respectively) is centred in Bass Strait.

Crustaceans

Prawns (*Penaeus* and *Metapenaeus* spp.) provide the most valuable fishery in Australia and are taken in estuarine, coastal and offshore waters of all States except Tasmania. The largest prawn fishery, the northern prawn fishery, is located in northern Australia from Cape York (Queensland) to Cape Londonderry (Western Australia). The western and southern rock lobsters (*Panulirus longipes cygnus* and *Jasus novaehollandiae*), also a valuable resource, are taken on rocky reefs around the southern half of Australia. Deep water fisheries are developing off the north-west shelf for prawns, scampi and lobsters, and off Western Australia where prawns, scampi, lobsters, crabs, squid and fin fish are taken. Bay lobsters (*Thenus* spp. and *Ibacus* spp.) are taken incidentally toprawn trawling operations. Crabs (*Scylla* spp. and *Portunus* spp.) are taken mainly in Queensland, New South Wales and Western Australia. Tropical rock lobsters are taken in the Torres Strait fishery along with prawns and fin fish.

Molluscs (edible)

Naturally-occurring oysters are harvested in all States; in New South Wales and Queensland the Sydney rock oyster (*Crassostrea commercialis*) is cultured commercially. The introduction of the Pacific oyster (*Crassostrea gigas*) to Tasmania, Victoria, and South Australia has proven successful. Production is planned to increase significantly and presently accounts for over 12 per cent of total oyster production. Following a serious decline in catches in the scallop (*Pecten meridionalis*) fishery based on stocks in Port Phillip Bay in Victoria, new offshore beds were located in southern New South Wales, eastern Victoria, northern Tasmania and south-west Western Australia. However, substantial fluctuations in abundance have resulted in erratic production from year to year. Fisheries based on the saucer scallop (*Amusium balloti*) are centered on Harvey Bay, Queensland and in Shark Bay, Western Australia. An important abalone (*Haliotus* spp.) fishery exists in south-east Australia with Tasmania, Victoria and South Australia providing the bulk of the catch. There is also a small abalone fishery in south-west Western Australia. Mussels (*Mytilus planulatus*) are harvested in Victoria, Western Australia and New South Wales. Small quantities of cephalopods, mainly squid, were produced in many localities. Feasibility fishing located promising squid resources (*Nototodarus gouldi*) in the south-east. Squid (*Loligo* spp.) form an important component to the trawl catch in the Arafura Sea.

Pearl shell and trochus shell

The shell of the Australian species of pearl oyster (*Pinctada maxima*) is taken from various localities in the tropical waters of Australia, between Broome in Western Australia and Cairns in Queensland, for the manufacture of buttons, knife handles, etc. Live pearl shell is used for pearl culture, *Pinctada maxima* being capable of producing pearls which are the largest in the world and which command top market prices. Trochus shell is found mainly on coral reefs off the Queensland coast, although small quantities occur in Western Australia.

Aquaculture

Australia has enjoyed a relatively long history of success in the farming of the Sydney rock oyster. Pearl culture operations and goldfish 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 salmonid industry in Tasmania, consisting of about 25 farms, and commercial cultivation of the Pacific oyster, blue mussel and rainbow trout.

Developmental work is active in a number of areas such as 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.

Whales

Whales are now a protected species in the Australian Fishing Zone (AFZ).

Foreign fishing

Establishment of the 200 nautical mile AFZ in 1979 covering a total of 8.9 million square kilometres, brought portions of oceanic tuna stocks, and demersal and pelagic fish stocks previously exploited by foreign fishing vessels, under Australian control.

Australia has an international obligation under the Law of the Sea Convention, to allow foreign nations access to resources within the Australian Fishing Zone, that are surplus to domestic fisheries requirements and where such access does not conflict with Australian management and development objectives.

Licensed vessels from Japan, Korea, Thailand and Taiwan are currently permitted to operate in Australian waters either under bilateral agreements or joint venture arrangements with foreign Governments or fishing companies/organisations.

Foreign fishing operations by Taiwan and Thai interests in the demersal trawl fishery off the north and north-west coast take a wide range of tropical demersal fish species, including threadfin bream (*Nemipteridae*), tropical snappers (*Lutjanidae*), emporers (*Lethrinidae*), goatfish (*Mullidae*) and hair tails (*Trichuiridae*). Following the introduction of controls on the length of gillnets which can be used, foreign pelagic gillnet operations have ceased. Japan is permitted, under agreement, to long line, principally for tunas, off certain areas of Australia. There is also an agreement with the Republic of Korea to allow squid jigging in a designated area off Tasmania, Victoria and South Australia.

Fisheries Administration and Research

The Commonwealth Parliament has enacted a number of laws dealing with fisheries in Australian waters beyond territorial limits. The fisheries laws of the Sates 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. The Commonwealth laws relating to fishing are outlined below.

Fisheries Act 1952

This Act applies to commercial fishing for swimming species, by Australians in waters extending from 3 to 200 nautical miles seaward of the territorial sea baseline of Australia and external territories excluding the territorial sea of another country, and by foreign boats in the 200 nautical mile AFZ. The AFZ comprises waters which extend 200 nautical miles seaward of Australia's territorial sea baselines but does not include waters within exclusive fishing zones of adjacent countries or waters adjacent to Australia's Antarctic Territory.

This Act, together with the following two Acts, requires the holding of licences and empowers the Minister to prohibit fishing activities as necessary for the conservation of resources and the management of the fisheries. The Fisheries Act authorises the publication of management plans having the force of law in relation to particular fisheries.

Continental Shelf (Living Natural Resources) Act 1968

This Act regulates the searching for and taking, from the continental shelf of Australia and the external territories, of living sedentary species by Australians and foreigners. Sedentary species are those that, at the harvestable stage, are either immobile on or beneath the seabed or are unable to move except in constant physical contact with the seabed. The continental shelf is the seabed beyond the territorial sea and adjacent to permanently exposed land masses, extending to a depth of 200 metres or, beyond that depth, to where the exploitation of the seabed is possible.

Torres Strait Fisheries Act 1984
This Act 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 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.

Foreign Fishing Boats Levy Act 1981; *Fisheries Agreements (Payments) Act 1981*
These Acts facilitate the imposition and collection of access fees for foreign boats fishing in the AFZ.

Fisheries Levy Act 1984
This Act imposes a levy on prescribed classes of licences under the *Fisheries Act 1952* or the *Torres Strait Fisheries Act 1984* or on units of fishing capacity created by management plans under the first of those Acts. Levies are applied to recover costs of management and administration.

Administration

Australian fisheries are administered by the authority having jurisdiction over the waters concerned. In inland waters and in waters within territorial limits, administration is the responsibility of the State or Territory fisheries authority. In proclaimed waters, and on the continental shelf beyond territorial limits, administration is the responsibility of the Commonwealth Government which, by agreement, has delegated to State Fisheries Authorities the necessary authorities for day-to-day administration of the Acts.

The Commonwealth and all State and Northern Territory parliaments have enacted amendments to fishery laws for the purpose of implementing the fisheries elements of the Offshore Constitutional Settlement (OCS) adopted by the Premiers' Conference in 1979. Those amendments, which came into force on 14 February 1983, authorise the Commonwealth and one or more States to enter into a formal legal arrangement to apply a single law (Commonwealth or State) to the management of a particular fishery from low water mark and to vest executive power under that law in:

(i) a joint authority, the membership of which would comprise the Commonwealth and the relevant State or States;

(ii) a State alone; or

(iii) the Commonwealth alone.

OCS arrangements are now in force between the Commonwealth and the Northern Territory and all States except New South Wales. OCS arrangements simply rationalise jurisdiction and do not specify new rules for management of the fisheries concerned.

The administration of the fisheries is directed to a number of objectives. The two most important are conservation and management of the living resources of the AFZ to ensure that they are not endangered by over exploitation; and achievement of the optimum utilisation of the living resources by the Australian fishing industry and foreign interests. Consistent with these objectives a number of controls have been introduced to prevent the depletion of the more heavily fished species and to ensure the optimum utilisation of resources. These controls take the form of individual transferable catch quotas, seasonal and area closures, gear limitations, minimum size requirements and limited access rights as well as outright prohibitions on the taking of certain species.

Formal management arrangements have been implemented or are being developed for all Australian fisheries which are now under Commonwealth control. The aim is to conserve the resource while promoting development and improving the economic performance of the industry. Special emphasis is being placed on the development of Australia's under-utilised species and the discovery of new resources. The Government has encouraged the fishing industry to participate more fully in fisheries management. Extensive

consultations between government officials, scientific agencies, industry associations and recreational fishermen have become strong features of the decision making process.

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 rational utilisation of fisheries resources. To this end 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 Development Trust Account (established under the *Fishing Industry Act 1956*) and the Fishing Industry Research and Development Trust Account (established under the *Fishing Industry Research and Development Act 1987*) are available to support, financially, projects for the development and management of the fisheries and fishing industry which are consistent with the purposes of those Acts. The former was established with the proceeds of the sale of the assets of the Australian Whaling Commission and is replenished from Consolidated Revenue as necessary. The latter is a matching fund into which is paid each year an appropriation from Commonwealth Government Revenue equal to amounts collected from the fishing industry by the State Fisheries Authorities and paid into appropriate State research accounts for the same purpose.

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

(i) 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)

(ii) CSIRO Division of Oceanography, which has its headquarters and laboratory at Hobart, Tasmania;

(iii) CSIRO Division of Food Research, conducts research into handling, storage, processing and transportation of fish at its laboratory in Hobart, Tasmania;

(iv) The Australian Fisheries Service, Department of Primary Industries and Energy, Canberra;

(v) Bureau of Rural Resources, Department of Primary Industries and Energy, Canberra;

(vi) Australian Bureau of Agricultural and Resource Economics, Department of Primary Industries and Energy, Canberra (economic and marketing research);

(vii) State fisheries departments. Research vessels are operated by New South Wales, Victoria, Queensland, Western Australia, South Australia and Tasmania;

(viii) Great Barrier Reef Marine Park Authority (GBRMPA) located in Townsville and Canberra;

(ix) Universities; and

(x) private fishing companies (surveys of fisheries resources, research into handling, processing and marketing).

Boats and Equipment Used in Fisheries

Fish, crustaceans and molluscs

The boats used for the estuarine fisheries are mostly small vessels propelled by diesel or petrol engines of low power. The offshore vessels range up to 40 metres in length and are almost invariably powered by diesel engines. Most of them have either insulated holds and carry ice, or are equipped with dry or brine refrigeration. Some rock lobster vessels are fitted with wells in which the catch is kept alive.

The following are the types of equipment most commonly used in the main fisheries: *mullet*—beach seine, gillnet; *shark (edible)*— long-lines, gillnet; *Australian salmon*—beach seine; *snoek*—trolling lines; *flathead*—Danish seine, otter trawl; *snapper*—long-lines, traps, gillnet, handline; *morwong*—Danish seine, otter trawl, traps; *whiting*—handline, otter trawl, Danish seine, beach seine, gillnet; *garfish*—beach seine; *Spanish mackerel*—trolling lines; *tuna*—pole and live-bait, purse seine, trolling lines (lampara nets and purse seines are used for taking live bait for tuna); *prawns*—otter trawl, beam trawl, beach seine net; *rock lobster*—pots, traps; *scallops*—dredge, otter trawl; *abalone*—diving using hookah gear; *pilchards, anchovies, jack mackerel and stripped tuna*—purse seine; *pearl shell oysters*—diving; *squid*—jigging, otter trawl; *crabs*—traps, otter trawl; *barramundi*—gillnet; and *orange roughy*—otter trawl.

Ketch-rigged luggers about 15 metres long which carry crews of eight to fourteen members are used for pearl shell fishing in northern Australia.

Production, Processing and Domestic Marketing of Fisheries Products

Value of fisheries production

The following table 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 a comparison of 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 presumed to be the principal markets. Gross value includes marketing costs which were estimated at $18.8 million for Australia for the year 1979–80. Details on marketing costs are not available for 1980–81 and subsequent years.

FISHERIES: GROSS VALUE OF PRODUCTION

($ million)

1970–71	73	1979–80	299
1971–72	86	(a)1980–81	330
1972–73	93	(a)1981–82	344
1973–74	100	(a)1982–83	423
1974–75	100	(a)1983–84	449
1975–76	135	(a)1984–85	524
1976–77	194	(a)1985–86	595
1977–78	218	(a)1986–87	735
1978–79	265	(a)1987–88	850

(a) Estimates provided by the Australian Bureau of Agricultural and Resource Economics and the Australian Fisheries Service.

NOTE: Figures exclude non-edible production, but may include the value of production of fishmeat and petfood.

SELECTED MAJOR FISHERIES CATEGORIES: GROSS VALUE (a)

($ million)

	1984–85 *$ million*	*1985–86* *$ million*	*1986–87 (b)* *$ million*
Prawns	164.0	190.0	220.0
Rock lobster	172.0	166.0	186.0
Tuna *(c)*	14.1	16.5	43.7
Shark	12.4	12.0	15.0
Other fin fish *(d)*	75.6	90.0	122.0
Fish n.e.i. *(e)*	2.5	6.0	7.8
Abalone	35.4	59.7	84.0
Scallops	19.5	24.4	25.1
Oysters	28.5	30.0	31.2
Total	**524.0**	**594.6**	**734.8**

(a) Excludes non edible products. (b) Estimated by the Australian Bureau of Agricultural and Resource Economics. *(c)* Excludes sashimi production prior to 1986–87. *(d)* For human consumption. *(e)* Not for human consumption.

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.

Processing plants are located strategically throughout Australia close to fishing grounds.

Rock lobsters, prawns, abalone, tuna, scallops and some fin fish are frozen for export; tuna, snoek, Australian salmon and abalone are canned; small amounts of fish are smoked; and some molluscs are bottled. Hand labour is still used extensively in processing operations, but mechanisation is being progressively introduced.

Ice is used extensively for the chilling of fish taken in estuarine and inshore fisheries. Refrigeration is used particularly on vessels operating in the tuna and prawn fisheries to chill or freeze the catch. An increasing range of fish products, including fresh-chilled tuna, live rock lobster, abalone and sea urchin roe, are being air-freighted to export markets, particularly Japan.

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.

Pearls, pearl shell and trochus shell

PEARL CULTURE AND PEARL AND TROCHUS SHELL FISHING OPERATIONS (a)

(*Source*: Department of Primary Industries and Energy)

		1985	*1986*	*1987*
	QUANTITY			
Pearl and Trochus shell fishing operations—				
Production of—				
Pearl shell *(b)*	tonnes	117	196	342
Trochus shell	tonnes	n.p.	n.p.	n.p.
Natural pearls	momme *(c)*	n.p.	n.p.	n.p.
Pearl culture operations—				
Live shell introduced	No.	173,577	145,626	96,637
	tonnes	56	51	47
Production—				
Round and baroque pearls	No.	54,040	25,850	3,822
	momme *(c)*	53,761	21,965	2,690
Half pearls	No.	185,083	112,617	60,780
Manufacturing shell	tonnes	53	19	10
	VALUE ($'000)			
Pearl and Trochus shell fishing operations—				
Production of—				
Live pearl shell		1,831	2,507	5,348
Pearl shell		248	82	384
Trochus shell		n.p.	n.p.	n.p.
Natural pearls		n.p.	n.p.	n.p.
Pearl culture operations—				
Production of—				
Round and baroque pearls		13,616	5,794	1,028
Half pearls		1,289	1,099	546
Manufacturing shell		117	38	48

(a) Figures refer to the fishing season commencing in the years shown. *(b)* Excludes manufacturing shell produced from pearl culture operations. *(c)* A pearl weight measurement equivalent to 3.769 grams.

Marketing of fisheries' products

Exports of fisheries products comes under Commonwealth jurisdiction, while domestic market activity comes under that of the corresponding State or Territory.

Although a substantial proportion of the Australian salmon, and to a lesser extent tuna catches are canned, the greater part of Australian fish production is marketed fresh-chilled.

Marketing arrangements for fresh fish vary. In New South Wales, fish marketing is the responsibility of the Fish Marketing Authority which operates the Metropolitan Fish markets. In other coastal centres of New South Wales, fishing cooperatives may become registered as local fish markets. In Queensland, fishermen must sell their catch to a licensed processor or a licensed commercial buyer. Exceptions exist for fish intended for interstate trade. In Victoria, Western Australia, South Australia and Tasmania, there is no restriction on market outlets. In Victoria, Western Australia and South Australia, most fish are sent to metropolitan wholesale fish markets for auctioning; small quantities are processed for sale locally, chiefly by cooperatives. Nearly all fresh fish in Tasmania is consigned direct to processors. The principal outlets for fish products in Australia are retail and catering establishments.

A high proportion of Australian seafood production is exported and domestic prices increasingly reflect the conditions on export markets. The Australian industry exports 40 per

cent of total fish production, but depends on export markets for over 70 per cent of its revenue. The Australian fisheries export industry depends on a limited range of products sold on a few major markets, with Japan and the United States accounting for about 80 per cent of the value of our exports.

Australian fisheries supply domestic markets with fresh and frozen table fish, but do not produce sufficient to meet demand. Over 60 per cent of seafood consumed in Australia is imported, mostly in the form of fresh, chilled or frozen fish. Prawns and canned fish also are significant imported items.

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