

## CHAPTER FOURTEEN

# FORESTRY AND FISHING

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## 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 upon specific forest environments for survival.

Native and plantation forests contribute substantially to the Australian economy and 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 A.C.T. 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

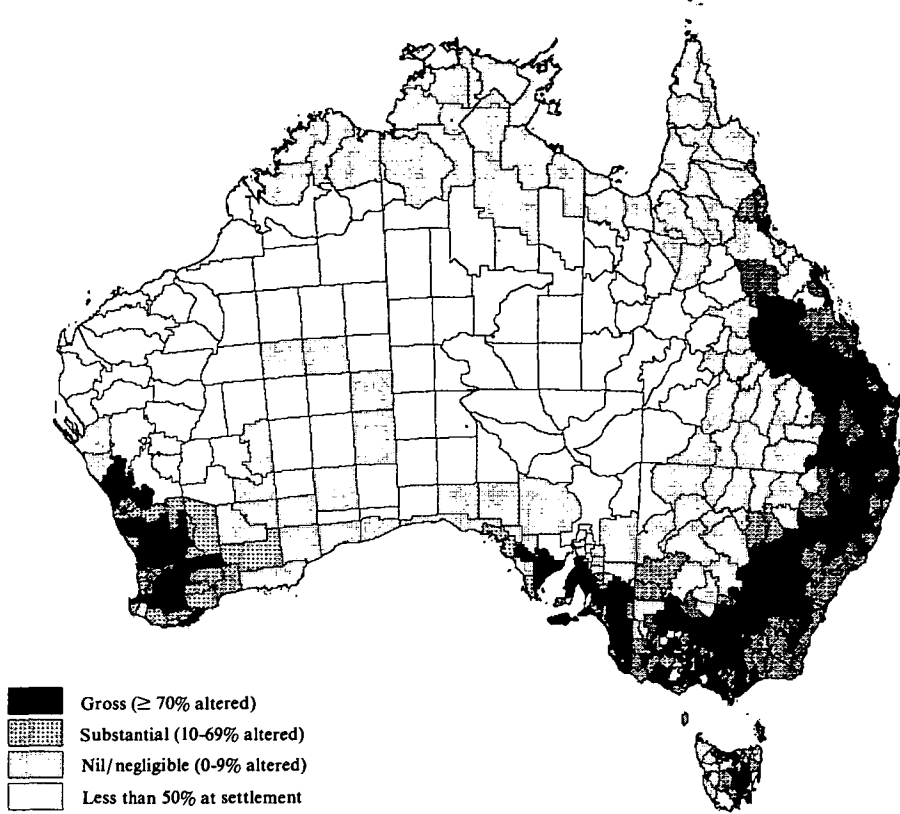
Native forest is defined as land dominated by trees with an existing or potential mature height of twenty metres or more, including native stands of cypress pine in commercial use regardless of height. The total area of native forest was estimated at 41.3 million hectares as at 30 June 1986.

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.

### 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:*

Cocks, 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.

**NATIVE FOREST AREAS CLASSIFIED BY FOREST TYPE, 30 JUNE 1986**  
(<sup>'000</sup> hectares)

<i>Forest type group</i>	<i>N.S.W.</i>	<i>Vic.</i>	<i>Qld</i>	<i>S.A.</i>	<i>W.A.</i>	<i>Tas.</i>	<i>N.T.</i>	<i>A.C.T.</i>	<i>Aust.</i>
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
<b>Total . . . . .</b>	<b>14,959</b>	<b>5,278</b>	<b>11,796</b>	<b>—</b>	<b>2,970</b>	<b>2,962</b>	<b>3,266</b>	<b>51</b>	<b>41,282</b>

## 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**  
(<sup>'000</sup> hectares)

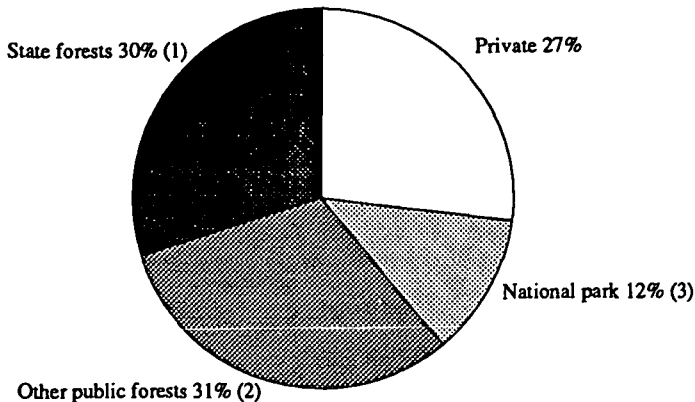
<i>Ownership category</i>	<i>N.S.W.</i>	<i>Vic.</i>	<i>Qld</i>	<i>S.A.</i>	<i>W.A.</i>	<i>Tas.</i>	<i>N.T.</i>	<i>A.C.T.</i>	<i>Aust.</i>
Public—	9,738	4,673	10,408	—	2,240	2,294	839	51	30,243
1 . . . . .	3,179	2,699	3,283	—	1,946	1,242	—	—	12,349
2 . . . . .	4,783	500	6,257	—	125	677	524	9	12,875
3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

## 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 of Australian native forest, see *Year Book* No. 61.

**NATIVE FOREST AREA OWNERSHIP/USE**



## 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

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

## Australian Forestry Council

The Commonwealth and the State Governments formed the Australian Forestry Council in 1964 to co-ordinate 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 sub-committees.

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 co-ordination 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;
- co-ordinate 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 Organisation—CSIRO

The Board of CSIRO has decided to combine research on forest production and on the processing of forest products into a Division of Forestry and Forest Products. The Division will continue to be concerned with both native and plantation forests, and with the broad ranges of forest uses including wood production, water supply, ecosystem conservation and scientific reference. The core areas of forestry research are forest ecology, forest diseases, forest physiology, forest operations, fire behaviour and soils nutrition. Work is also carried out on mathematical modelling and seed research.

It will also continue investigations on the properties of wood, and the processing and uses of wood and wood products, to assist in the effective use of Australian wood resources. The programs include processing of wood and timber, technology of fibre separation, wood and fibre properties, composite wood and paper products, assessment of cellulosic resources and conservation of wood-based materials. Technology for the production of high value chemicals from wood and other plant materials is also being investigated.

Tropical rainforest research will be carried out in the Division of Wildlife and Ecology. Other aspects of forestry-related research are carried out in the Divisions of Plant Industry, Entomology, Soils and Water Resources.

### 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, 1984-85**

1983 ASIC(b) code	Industry description	Establish- ments at 30 June	Persons employed (c)	Turnover	Fixed capital expenditure	
					Value added	less disposals
		No.	No.	\$'000	\$'000	\$'000
2531	Log sawmilling . . . . .	632	11,134	681,190	377,294	19,744
2533	Veneers and manufactured boards of wood . . . . .	76	5,264	540,891	198,556	20,956
2537	Hardwood woodchips . . . . .	10	746	203,594	83,295	2,929

(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) Average over whole year includes working proprietors.

**TIMBER AND SELECTED TIMBER PRODUCTS (a)**

Item		1982-82	1983-84	1984-85
Undressed sawn timber—				
Recovered from sawn logs—				
Australian grown—				
Broadleaved . . . . .	'000 cu m	1,788	1,829	1,932
Coniferous . . . . .	"	1,196	973	1,055
<b>Total</b> . . . . .	"	<b>2,984</b>	<b>2,802</b>	<b>2,987</b>
Woodchips (green weight)—				
Hardwood (broad leaved) . . . . .	'000 tonnes	4,031	4,551	4,817
Plywood—				
Commercial—(surface measure) . . . . .	'000 sq m	4,239	5,662	5,774
(1 mm basis) . . . . .	"	37,750	48,119	55,379
Waterproof—(surface measure) . . . . .	"	1,829	2,407	1,846
(1 mm basis) . . . . .	"	18,938	19,646	15,446
Particle board (resin bonded) . . . . .	'000 cu m	572	673	696
Wood pulp—				
Chemical . . . . .	tonne	155,675	180,406	240,874
Mechanical . . . . .	"	470,207	601,196	612,837
Other . . . . .	"			
Paper—				
Newsprint . . . . .	tonne	365,802	365,363	364,685
Printings . . . . .	"	94,662	131,137	128,839
Wrapping (incl. kraft) . . . . .	"	302,372	352,230	335,668
Writing and duplicating (b) . . . . .	"	84,326	91,572	92,788
Other paper (incl. blotting) . . . . .	"	38,456	32,246	38,271
Tissue and sanitary papers . . . . .	"	114,249	119,740	116,416
Paperboard (incl. strawboard) . . . . .	"	429,336	450,525	501,793

(a) Excludes production of small single establishment enterprises with less 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.

The value of imports of forest products in 1985-86 was in the order of \$1,441 million while the value of exports of timber products was \$347 million of which \$238 million was from woodchips.

**SAWN TIMBER AND MAJOR TIMBER PRODUCTS 1985-86**

(Source: Bureau of Agricultural Economics and Australian Bureau of Statistics)

Item		Production (1)	Imports (2)	Exports (3)	Domestic
					Consumption (1 + 2 - 3)
Sawn timber . . . . .	cu m	2,998,010	1,255,564	31,119	4,222,455
Plywood . . . . .	cu m	95,895	82,586	91	178,390
Railway sleepers . . . . .	cu m	216,642	3	2,540	214,105
Particleboard . . . . .	cu m	688,253	8,190	7,638	688,805
Hardboard . . . . .	cu m	97,000	4,285	6,512	94,773
Newsprint . . . . .	tonne	362,954	256,604	4,080	615,478
Printing and writing . . . . .	tonne	255,034	210,052	20,977	444,109
Other paper . . . . .	tonne	504,698	197,190	56,787	645,101
Paperboard . . . . .	tonne	472,612	50,649	4,995	518,266

In addition to the products listed above, exports for 1985-86 of pulpwood (virtually all in the form of woodchips) were 4,729,892 tonnes (green).

## FISHING

### Source and basis of statistics

Statistics presented in this section are obtained from the collections of State Fisheries Authorities. In all States except Queensland and Tasmania, the information is derived from returns collected from licensed fisherpersons. In Queensland the statistics have, to date, been based mainly on Fish Board receipts, but a new collection from fishermen, fish wholesalers and processors is now being developed. Tasmanian data are obtained from buyers and processors. Additionally, details of New South Wales tuna production are supplied by CSIRO and particulars of Australian pearl culture have been collected and supplied by the Australian Fisheries Service, Department of Primary Industries and Energy.

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 fish.

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

#### Fish

Over 3,000 species of marine and freshwater fish occur in and around Australia. Australian fisherpersons concentrate their efforts on estuarine, coastal, pelagic (surface and mid-water swimming) and demersal (bottom living) fish that occur off the north-east, south-east and south-west coasts. 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 Spanish mackerel (*Scomberomorus commersoni*) off north Australia, and southern bluefin tuna (*Thunnus maccoyii*), jack mackerel (*Trachurus declivis*) snoek (*Leionura atun*), pilchards (*Sardinops neopilchardus*) and anchovies (*Engraulis australis*) off south-east Australia. Southern bluefin tuna are also fished off south-west 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.

Establishment of the 200 nautical mile Australian Fishing Zone (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. Foreign fishing operations in the pelagic gill-net fishery off the north coast catch sharks (mainly *Carcharhinus* spp.), tuna (*Thunnus tonggol*) and Spanish mackerel; while in the demersal pair trawl fishery off the north-west coast, a tropical multispecies fauna, that includes threadfin bream (*Nemipteridae*), tropical snappers (*Lutjanidae*), emperors (*Lethrinidae*), goatfish (*Mullidae*) and hair tails (*Trichiuridae*) is taken. Following the introduction of controls on the length of gill-nets which can be used, foreign pelagic gill-net operations have ceased.

## 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 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. Bay lobsters (*Thenus* spp. and *Ibacus* spp.) are taken incidentally to prawn trawling operations. Crabs (*Scylla* spp. and *Portunus* spp.) are taken mainly in Queensland, New South Wales and Western Australia.

## 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 and South Australia has provided a limited supply in those States. 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-western Western Australia. However, substantial fluctuations in abundance have resulted in erratic production from year to year. A fishery based on the saucer scallop (*Amusium balloti*) is located off south and central Queensland and there is a small fishery for the same species in Shark Bay, Western Australia. An important abalone (*Haliotis* spp.) fishery has been developed since 1964 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 Australia. Mussels (*Mytilus planulatus*) are harvested in Victoria, Western Australia and New South Wales. Prior to 1978 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.

## Whales

Whales are now a protected species in the AFZ.

## 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 States and the Northern Territory apply to all kinds of fishing within the territorial sea and in 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 Government 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 the external territories excluding the territorial sea of another country, and by foreign boats in the 200 nautical miles AFZ. The AFZ comprises waters which extend 200 nautical miles seaward of Australia's territorial sea baselines but does not include territorial seas within the accepted fishing zones of adjacent countries or waters adjacent to Australia's Antarctic Territory.



*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.

These three Acts require the holding of licences and empower the Minister to prohibit fishing activities as necessary for the conservation of resources and the management of the fisheries. The *Fisheries Act 1952* authorises the publication of management plans having the force of law in relation to particular fisheries.

*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.

**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 Parliaments, as well as the Northern Territory House of Assembly, have enacted amendments to fishery laws for the purpose of implementing the fisheries elements of the offshore constitutional settlement 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.

The Offshore Constitutional Settlement (OCS) is now in place for fisheries in waters off five states; Queensland, South Australia, Western Australia, Tasmania and Victoria. OCS arrangements simply rationalise jurisdiction and do not specify new rules for management of the fisheries concerned. This rationalisation of responsibilities will not only reduce administration costs but will mean that many fisherpersons will only require one fishing licence in future.

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.

The Fisheries Development Trust Account (established under the *Fishing Industry Act 1956*) and the Fishing Industry Research Trust Account (established under the *Fishing Industry Research Act 1969*) 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.

## 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.

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) State fisheries departments with laboratories have been established in Sydney, Melbourne, Brisbane, Perth, Hobart, Darwin and Cairns; research vessels are operated by New South Wales, Victoria, Queensland, Western Australia, South Australia and Tasmania;
- (v) Bureau of Rural Research, Department of Primary Industries and Energy, Canberra;
- (vi) Bureau of Agricultural Economics, Canberra (economic and marketing research); and
- (vii) private fishing companies (surveys of fisheries resources, research into handling, processing and marketing).

## Boats and equipment used in fisheries

### Fish, crustaceans and molluscs (edible)

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, gill-net; *shark (edible)*—long-lines, gill-net; *Australian salmon*—beach seine; *snoek*—trolling lines; *flathead*—Danish seine, otter trawl; *snapper*—long-lines, traps, gill-net, handline; *morwong*—Danish seine, otter trawl, traps; *whiting*—handline, otter trawl, Danish seine, beach seine, gill-net; *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; and *pilchards, anchovies, jack mackerel and striped tuna*—purse seine.

## Pearls, pearl shell and trochus shell

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 fishing by States. As the value of materials used in the course of production is not available for all States, 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.

Australian totals are not available beyond 1980-81, due to estimates for various States not being available.

### FISHERIES: GROSS VALUE OF PRODUCTION (\$'000)

Year	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	Aust.
GROSS VALUE								
1977-78 . .	39,665	17,997	(a)40,808	(b)23,615	88,340	12,609	10,337	(c)233,351
1978-79 . .	42,698	20,025	58,214	(b)29,924	80,233	14,636	19,576	(c)(d)279,258
1979-80 . .	58,661	27,696	(e)62,789	(b)35,438	85,652	20,463	16,806	(c)(d)325,632
1980-81 . .	73,048	33,440	(e)(f)86,292	(b)46,606	82,764	26,514	19,518	(c)(d)386,533
1981-82 . .	74,983	30,525	n.a.	52,062	99,254	32,896	18,392	n.a.
1982-83 . .	73,896	31,022	n.a.	61,234	126,208	31,140	19,286	n.a.
1983-84 . .	73,235	34,060	n.a.	58,863	141,425	39,133	20,659	n.a.
1984-85 . .	n.a.	45,998	n.a.	67,973	163,347	47,036	17,207	n.a.
1985-86 . .	n.a.	n.a.	n.a.	76,017	138,690	59,292	29,378	n.a.

(a) Incomplete: excludes oysters and rock lobster. (b) Incomplete: excludes octopus, cuttlefish, oysters and scallops.  
(c) Incomplete: see individual States. (d) Includes value of pearling which has been excluded from State totals.  
(e) Incomplete: excludes rock lobster. (f) Incomplete: excludes shark.

### Production of selected fisheries

#### SELECTED FISHERIES PRODUCTS: PRODUCTION AND GROSS VALUE 1985-86

Product	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	Aust.
QUANTITY (tonnes)(a)								
Fish . . . . .	n.a.	n.a.	n.a.	18,602	18,003	25,214	2,523	n.a.
Crustaceans . . . . .	n.a.	n.a.	n.a.	4,322	10,140	1,457	3,439	n.a.
Molluscs (edible) . . . . .	n.a.	n.a.	n.a.	1,709	2,622	7,295	36	n.a.
GROSS VALUE (\$'000)								
Fish . . . . .	n.a.	n.a.	n.a.	24,559	20,502	7,288	3,973	n.a.
Crustaceans . . . . .	n.a.	n.a.	n.a.	42,722	110,829	16,236	25,353	n.a.
Molluscs (edible) . . . . .	n.a.	n.a.	n.a.	8,736	7,359	35,767	51	n.a.

(a) Estimated live weight.

### Processing of fish, crustaceans and molluscs

Processing plants are located strategically throughout Australia close to fishing grounds. A number of shore-based plants have been established in northern Australia to service the northern prawn fishery.

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<sup>(a)</sup>

(Source: Department of Primary Industries and Energy)

		1983	1984	1985
QUANTITY				
Pearl and Trochus shell fishing operations—				
Production of—				
Pearl shell <sup>(b)</sup>	tonnes	171	103	117
Trochus shell	tonnes	n.p.	n.p.	n.p.
Natural pearls	momme <sup>(c)</sup>	n.p.	n.p.	n.p.
Pearl culture operations—				
Live shell introduced	No.	244,695	182,452	173,577
	tonnes	95	74	56
Production—				
Round and baroque pearls	No.	111,035	86,934	54,040
	momme <sup>(c)</sup>	74,532	67,370	53,761
Half pearls	No.	166,754	210,718	185,083
Manufacturing shell	tonnes	42	40	53
VALUE (\$'000)				
Pearl and Trochus shell fishing operations—				
Production of—				
Live pearl shell		2,756	1,656	1,831
Pearl shell		194	73	248
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		12,333	16,988	13,616
Half pearls		1,090	1,323	1,289
Manufacturing shell		58	79	117

(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.

## Domestic marketing of fisheries' products

Although a substantial proportion of the tuna and Australian salmon 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, fisherpersons' co-operatives may become registered as local fish markets. In Queensland until recently the Fish Board sold all production on behalf of fisherpersons in that State, except fish intended for export and interstate trade. However, new legislation was passed in March 1982 giving fisherpersons a choice of selling their catch either through the Fish Board, fisherpersons' co-operatives or licensed private processors and wholesalers. In Victoria, Western Australia, South Australia

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and Tasmania, there is no restriction on market outlets. In Victoria, Western Australia and South Australia, most fish is sent to metropolitan wholesale fish markets for auctioning; small quantities are processed for sale locally, chiefly by co-operatives. Nearly all fresh fish in Tasmania is consigned direct to processors. The principal outlets for fish products in Australia are retail and catering establishments.

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