

CHAPTER 14

FORESTRY AND FISHERIES

FORESTRY

(Source: Forestry Branch, Department of Primary Industry)

Forestry in the States

Under the Australian Constitution land management is the sole responsibility of State Governments. Each State has a forest service responsible for the management and control of publicly-owned forests, in accordance with Forestry Acts and Regulations. Forest management aims to satisfy all reasonable demands by the community on the forest estate including timber production, provision of minor forest products, grazing, protection of native flora and fauna, recreation and watershed protection.

Forestry in the Territories

The Department of the Capital Territory 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.

Commonwealth Forestry Administration

The Department of Primary Industry 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, provision of the Secretariat for the Australian Forestry Council and compilation of national statistics on the forest industries.

Existing Forest Estate

Native Forests

The total area of native forest, 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, was estimated at 40.9 million hectares as at 30 June 1981. Thirty-five million hectares of the natural forests are dominated by eucalypts. For a more detailed examination of Australian native forests, see Yearbook No. 61, Chapter 24.

The following tables show classifications of native forest areas in Australia by forest type and ownership. Plantation areas are dealt with separately.

NATIVE FOREST AREAS CLASSIFIED BY FOREST TYPE, 30 JUNE 1981
(*000 hectares)

Forest type group	N.S.W.(a)	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Rainforest	253	-	1,074	-	-	472	38	-	1,837
Eucalypt									
Productivity—Class I(b)	1,220	631	204	-	185	502	-	-	2,742
Class II(c)	3,649	3,981	1,290	-	2,795	1,845	-	51	13,611
Class III(d)	8,320	293	3,140	-	19	-	-	-	11,772
Tropical eucalypt and paperbark	-	-	4,078	-	-	-	2,450	-	6,528
Cypress pine	1,908	6	1,685	-	-	-	778	-	4,377
Total	15,350	4,911	11,471	-	2,999	2,819	3,266	51	40,867

(a) Details last revised 30 June 1976; adjustment made to rainforest following 1981 re-inventory of this forest type. (b) Relatively high productivity. (c) Moderate productivity. (d) Relatively low productivity.

NATIVE FOREST AREAS CLASSIFIED BY OWNERSHIP, 30 JUNE 1981

('000 hectares)

Ownership category	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
State forestry (a)	2,866	1,916	3,126	-	1,922	1,272	312	-	11,414
Other public (b)	6,208	1,536	5,672	-	425	399	2,639	51	16,930
National parks (c)	993	853	1,394	-	105	122	315	-	3,782
Private (d)	5,283	606	1,279	-	547	1,026	-	-	8,741
Total	15,350	4,911	11,471	-	2,999	2,819	3,266	51	40,867

(a) Publicly owned land, permanently reserved or dedicated primarily for timber production. (b) Publicly owned land, vacant or occupied under lease, not specifically reserved for timber production, but on which control of timber rests with the Crown. (c) Publicly owned land, permanently reserved for purposes other than timber production. Some wood production is allowed in certain national and forest parks in Victoria. (d) Privately owned land, and leasehold where the Crown has no control over timber rights.

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, authorised financial assistance over the five year period terminating 30 June 1982 for the maintenance of the area of plantations established previously with Commonwealth funds.

Privately owned plantations amount to approximately two-fifths the area under State ownership. New plantations (including replanting) are currently being established at the rate of 30,000 hectares per annum, of which almost one-third is by private enterprise. A detailed account of the history and development of coniferous plantations and of the characteristics of individual species is included in Yearbook No. 59, page 880. The following table shows total area of plantations in Australia classified by species.

PLANTATION AREAS(a), CLASSIFIED BY SPECIES, 31 MARCH 1981

(Hectares)

Species group	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Coniferous—									
<i>Pinus radiata</i>	163,177	163,166	3,719	88,755	37,106	54,036	—	13,233	523,192
<i>Pinus elliotii</i>	4,749	—	93,823	—	124	—	—	—	98,696
<i>Pinus pinaster</i>	—	1,505	—	5,321	24,673	—	—	—	31,499
<i>Pinus caribaea</i>	1,285	—	18,924	—	—	—	1,604	—	21,813
<i>Araucaria</i>	1,550	—	42,250	—	—	—	1	—	43,801
Other coniferous (b)	8,868	3,290	5,553	504	154	405	2,500	851	22,125
Total coniferous	179,629	167,961	164,269	94,580	62,057	54,441	4,105	14,084	741,126
Broadleaved—									
<i>Eucalyptus</i>	16,483	13,118	2,851	861	8,300	5,166	—	—	46,779
<i>Populus</i>	2,402	350	—	—	—	—	—	—	2,752
Other broadleaved	—	21	517	—	—	124	—	—	662
Total broadleaved	18,885	13,489	3,368	861	8,300	5,290	—	—	50,193
Total	198,514	181,450	167,637	95,441	70,357	59,731	4,105	14,084	791,319

(a) Public and private ownership. (b) Includes all species other than *P. radiata* in private ownership.

Australian Forestry Council

Membership of the council comprises the State and Northern Territory Ministers responsible for forestry and the Commonwealth Minister for Primary Industry. Councils major functions are to make recommendations to the Commonwealth Government on national forestry matters and research coordination. It is serviced by a Standing Committee and specialist sub-committees.

Research

Commonwealth Scientific and Industrial Research Organization (CSIRO)

The Division of Forest Research in the Institute of Biological Resources conducts research in the four core areas of forest ecology and biology, silviculture, tree breeding and genetics, and harvesting.

The Division also conducts research into taxonomy, forest protection, forest assessment, and seed resource conservation and distribution. The Division maintains close liaison with relevant State authorities and, on occasion, collaborates with private companies. It operates seven regional stations in the States and the Northern Territory.

Within the Institute of Biological Resources (Divisions of Plant Industry, Entomology, Soils, Water and Land Resources and Wildlife Research) and the Institute of Energy and Earth Resources (Division of Groundwater Research) research is undertaken on forestry problems relevant to the disciplines pursued in these Divisions.

Within the Institute of Industrial Technology, the Division of Chemical Technology carries out a wide range of investigations relating to the properties of wood, the processing and uses of wood and wood products. The research programs of the Division are directed towards developing ways whereby Australia's forest resources can be more effectively utilised. 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 liquid fuels from wood and other plant materials is also being investigated.

The Divisions provide assistance to individuals and industry, provide training and experience for overseas technologists and maintain co-operative aid projects with developing countries.

Education

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

Timber and timber products

The selected details shown below have been compiled from the annual census of manufacturing establishments. For further details see Chapter 17, Manufacturing and Internal Trade.

MANUFACTURING ESTABLISHMENTS(a)—SUMMARY OF OPERATIONS, 1980-81

1978 ASIC code(b)	Industry description	Establish- ments at 30 June	Persons employed (c)	Turnover	Value added	Fixed capital expenditure less disposals
		No.	No.	\$'000	\$'000	\$'000
2531	Log sawmilling	751	13,461	542,857	302,337	19,964
2533	Veneers and manufactured boards of wood	80	6,020	352,798	142,496	14,266
2537	Hardboard woodchips	9	752	168,816	71,354	3,717

(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 PRODUCED (a)

Item		1978-79	1979-80	1980-81
Undressed sawn timber—				
Recovered from sawn logs—				
Australian grown—				
Broadleaved	'000 cu m	2,128	2,143	2,217
Coniferous	"	982	1,136	1,190
Total	"	3,110	3,279	3,407
Woodchips (green weight)—				
Hardwood (broad leaved)	'000 tonnes	3,800	4,798	4,410
Plywood—				
Commercial—(surface measure)	'000 sq m	7,696	4,611	5,275
(1 mm basis)	"	38,517	38,619	42,494
Waterproof—(surface measure)	"	3,723	3,843	4,032
(1 mm basis)	"	42,975	46,591	48,680
Particle board (resin bonded)	'000 cu m	564	667	686
Wood pulp—				
Chemical	tonne	198,253	174,223	168,555
Mechanical	"	473,291	513,347	396,230
Other	"			
Paper—				
Newsprint	tonne	208,143	221,198	214,447
Printings	"	79,229	91,559	102,514
Writing (incl. cartridge)	"	(b)	(b)	(b)
Wrapping	"	321,309	382,032	411,322
Blotting	"	(c)	(c)	(c)
Duplicating	"	(d)107,640	(d)119,052	(d)118,526
Other paper	"	(e)27,490	(e)29,426	(e)23,680
Tissue and sanitary papers	"	97,701	104,559	108,343
Paperboard (incl. strawboard)	"	429,626	482,466	485,995

(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) Combined with 'Duplicating' paper. (c) Combined with 'Other paper'. (d) Includes 'Writing (incl. cartridge)' paper. (e) Includes 'Blotting' paper.

Woodchips

The woodchip industry entails the procurement of wood and its mechanical reduction to chips about the size of an Australian 50 cent piece. These chips are either exported for pulping or retained for use in domestic pulping operations. In 1980-81 the production of hardwood chips in Australia amounted to 4,410,000 tonnes.

Timber and timber products

The major forest industries include the sawmilling, ply and veneer, reconstituted board (particleboard, fibreboard) and pulp and paper industries. The sawmilling industry is the largest single user of logs harvested from Australian forests (52 per cent), followed by the pulp and paper industry (37 per cent). Currently about 72 per cent of total volume of logs harvested are obtained from natural forests and the remainder mainly from coniferous plantations. This proportion will change over time so

that towards the end of this century about half the supply of logs may be from coniferous plantations. Total removals at that time are estimated at 23 million cubic metres compared to current log removal of 16 million cubic metres.

The value of imports of forest products in 1980-81 was in the order of \$1,035 million while the value of exports of timber products was \$238 million.

The following table shows the production, imports, exports and domestic consumption of sawn timber and major timber products

SAWN TIMBER AND MAJOR TIMBER PRODUCTS, 1980-81

(Source: Forestry Branch, Department of Primary Industry and Australian Bureau of Statistics)

Item		Production (1)	Imports (2)	Exports (3)	Domestic Consumption (1 + 2 - 3)
Sawn timber	cu m	3,332,836	1,060,045	35,032	4,357,849
Plywood	cu m	88,775	70,980	865	158,890
Railway sleepers	cu m	219,648	628	25,194	195,082
Particleboard	cu m	634,886	541	10,474	624,953
Hardboard	cu m	96,700	899	4,603	92,996
Newsprint	tonne	214,447	277,479	224	491,702
Printing and writing	tonne	216,231	234,048	14,362	435,917
Other paper	tonne	546,019	134,000	87,813	592,206
Paperboard	tonne	472,913	57,975	8,522	522,366

In addition to the products listed above, exports for 1980-81 of pulpwood (virtually all in the form of woodchips) was 4,142,880 tonnes (green).

FISHERIES

Collection and presentation of fisheries statistics

Source and basis of statistics

Statistics presented in this section of the chapter have been obtained principally from State Fisheries Authorities and Australian Bureau of Statistics collections. In New South Wales, South Australia, Western Australia and the Northern Territory the information is derived from returns collected from licensed fishermen. In Queensland the statistics have been based mainly on Fish Board receipts. Data for Victoria were obtained by the ABS from buyers and processors up to the end of 1978-79. However for subsequent years the Victorian State Fisheries Authority has introduced its own collection based on returns collected from licensed fishermen. Tasmania data are obtained mainly by the ABS 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 Fisheries Division of the Department of Primary Industry.

Australian fisheries production statistics are generally in terms of the form in which they 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 issues of this publication.

Fisheries resources and their commercial exploitation

(Source: Fisheries Division, Department of Primary Industry)

Fish

Over 3,000 species of marine and freshwater fish occur in and around Australia. Australian fishermen 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 where the

majority of the human population is located. 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 commerson*) off north Australia, and southern bluefin tuna (*Thunnus maccoyii*), snoek (*Leionura atun*), pilchards (*Sardinops neopilchardus*) and anchovies (*Engraulis australis*) off south-east Australia. Southern bluefin tuna are also fished off south-west Australia. Significant stocks of jack mackerel off southern Australia are as yet lightly fished.

A large multispecies demersal fishery exists off south-east Australia that targets on flathead (*Neoplatycephalus* and *Trudis* spp.) morwong (*Nemadactylus* spp.), redfish (*Centroberyx affinis*) gemfish (*Rexea solandri*) and blue grenadier (*Macruronus novaezelandiae*). 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 edible 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), has brought portions of oceanic tuna stocks, and demersal and pelagic fish stocks presently exploited by foreign fishing vessels, under Australian control. A foreign pelagic gillnet fishery off the north coast catches sharks (mainly *Carcharhinus* spp.), tuna (*Thunnus tonggol*) and Spanish mackerel while a demersal pair trawl fishery off the north-west coast exploits a tropical, multispecies fauna that includes threadfin bream (*Nemipteridae*) tropical snappers (*Lutjanidae*), emperors (*Lethrinidae*) goatfish (*Mullidae*) and hair tails (*Trichiuridae*).

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, 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 (*Notutodarus 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 Australian Fishing Zone.

Fisheries administration and research

(Source: Fisheries Division, Department of Primary Industry)

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 the *Fisheries Act 1952*, the *Continental Shelf (Living Natural Resources) Act 1968*, *Foreign Fishing Boats Levy Act 1981* and the *Fisheries Agreements (Payments) Act 1981*.

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 Australian fishing zone. The Australian fishing zone 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, 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.

Both these 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.

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 Australian fishing zone.

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 were expected to come into force in 1982, 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 administration of the fisheries is directed to a number of objectives of which the two most important are: conservation and management of the living resources of the Australian Fishing Zone 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. These controls take the form of seasonal 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 Cronulla, N.S.W. and regional laboratories in Western Australia and Queensland (fisheries science);
- (ii) CSIRO Division of Oceanography which has its headquarters and laboratory at Cronulla, N.S.W.;
- (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 (fisheries laboratories have been established in Perth, Hobart, Melbourne, Sydney, Brisbane, Darwin and Cairns); research vessels are operated by New South Wales, Victoria, Western Australia, Tasmania and South Australia;
- (v) Fisheries Division, Department of Primary Industry, Canberra (economic and management research, fishing technology, extension and education service); and
- (vi) private fishing companies (surveys of fisheries resources, research into handling, processing and marketing).

Boats and equipment used in fisheries

(Source: Fisheries Division, Department of Primary Industry)

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, hand-line; *morwong*, Danish seine, otter trawl, traps; *whiting*, handlines, 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 and local value of fishing by States. Because 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. *Local value* (i.e. gross value of commodities produced at the place of production) is ascertained by deducting marketing costs from the gross value of commodities produced. Marketing costs include freight, cost of containers, commission, and other charges incurred in marketing. Gross and local values of primary commodities produced involve some duplication as they include certain primary commodities which are consumed as raw materials to produce other primary commodities (e.g. hay consumed by livestock).

FISHERIES: GROSS AND LOCAL VALUE OF PRODUCTION
(S'000)

Year	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	Aust.
GROSS VALUE								
1975-76	31,599	10,601	(a)17,137	(b)22,474	51,079	8,511	5,228	(c)146,629
1976-77	36,059	16,014	(a)34,955	(b)27,199	69,094	11,662	11,357	(c)206,340
1977-78	39,665	17,977	(a)40,808	(d)23,615	88,340	12,609	10,337	(c)233,351
1978-79	42,698	20,025	58,214	(d)29,924	80,233	14,636	19,576	(c)(g)279,258
1979-80	58,661	19,814	(e)62,789	(d)34,950	85,652	20,463	16,806	(c)(g)317,261
1980-81	70,027	n.y.a.	(e)(f)86,292	(d)46,182	82,764	26,514	19,518	(c)(g)349,648
LOCAL VALUE								
1975-76	25,334	8,481	16,152	20,022	50,870	8,511	5,228	134,598
1976-77	30,352	13,917	33,953	24,207	68,864	11,662	11,357	194,312
1977-78	32,993	16,539	39,677	21,034	88,038	12,609	10,337	221,226
1978-79	35,113	18,423	56,720	26,649	79,912	14,636	19,576	(g)264,980
1979-80	48,405	17,377	61,130	31,114	85,015	20,463	16,806	(g)298,435
1980-81	58,147	n.y.a.	84,459	41,140	82,102	26,514	19,518	(g)330,231

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

Production of selected fisheries

SELECTED FISHERIES PRODUCTS: PRODUCTION AND GROSS VALUE

1980-81

Product	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	Aust.
QUANTITY (tonnes)								
Fish(a)	28,025	n.y.a.	(b)4,864	14,721	11,961	2,527	1,634	(f)63,731
Crustaceans(a)	3,215	n.y.a.	(c)15,294	5,227	13,121	1,553	4,287	(f)42,697
Molluscs (edible)(a)	10,003	n.y.a.	(d)2,800	(e)1,338	1,207	7,314	46	(f)22,707
GROSS VALUE (\$'000)								
Fish	27,893	n.y.a.	(b)7,036	16,311	10,128	3,654	2,267	(f)67,289
Crustaceans	15,608	n.y.a.	(c)75,590	26,183	70,648	8,385	17,195	(f)213,609
Molluscs (edible)	26,526	n.y.a.	(d)3,666	(e)3,688	1,988	14,476	57	(f)50,400

(a) Estimated live weight. (b) Excludes Shark in Queensland. (c) Excludes Rock Lobster in Queensland. (d) Incomplete. Excludes oysters in Queensland. (e) Incomplete. Excludes octopus, cuttlefish, oysters and scallops in South Australia. (f) Incomplete: see individual States.

SELECTED FISHERIES PRODUCTS: PRODUCTION, AND GROSS VALUE, AUSTRALIA

Product	1978-79	1979-80	1980-81
QUANTITY (tonnes)			
Fish(a)(b)	61 444	(c)57,047	(c)63,731
Crustaceans(a)	37,900	(c)37,370	(c)42,697
Molluscs (edible) (a)	25,285	(c)21,378	(c)22,707
Pearl-shell(d)(e)	185.0	309.6	226.0
Trochus-shell(d)(e)	—	n.p.	n.p.
GROSS VALUE (\$'000)			
Fish(b)	56,501	(c)58,007	(c)67,289
Crustaceans	176,451	(c)184,137	(c)213,609
Molluscs (edible)	32,355	(c)37,178	(c)50,400
Pearl-shell(d)(e)	188	905	534
Trochus-shell(d)(e)	—	n.p.	n.p.

(a) Estimated live weight. (b) Excludes freshwater fish caught in Queensland. (c) Incomplete see individual States in table above. (d) Excludes manufacturing shell produced from pearl culture operations. (e) Source: Department of Primary Industry, year ended 31 December.

FISH: PRODUCTION, BY PRINCIPAL TYPES

Type	Tonnes estimated live weight			Gross value (\$'000)		
	1978-79	1979-80(a)	1980-81(a)	1978-79	1979-80(a)	1980-81(a)
Tuna (b)	11,266	13,573	18,164	5,316	11,426	16,138
Mackerel	1,049	1,093	1,225	1,177	1,424	1,746
Snoek	186	121	145	76	58	75
Mullet	5,600	5,930	6,471	3,396	4,154	3,919
Bream (including Tarwhine)	794	809	929	1,481	1,686	1,877
Australian salmon	2,390	2,469	2,398	993	1,164	1,339
Ruff	1,163	1,092	1,077	443	493	458
Snapper	2,042	2,251	2,254	3,932	4,639	5,103
Morwong	1,447	1,288	2,088	1,356	1,642	2,371
Whiting	2,566	2,173	2,337	6,900	5,041	5,794
Flathead	2,169	1,372	1,494	1,896	1,594	1,724
Shark	7,399	5,275	5,708	8,429	4,101	5,295
Leatherjacket	227	356	440	159	254	361
Other	23,146	19,245	19,001	20,947	20,332	21,087
Total	61,444	57,047	63,731	56,501	58,007	67,289

(a) Excludes Victoria. (b) Includes estimates by CSIRO for New South Wales.

CRUSTACEANS: PRODUCTION, BY TYPE

(Tonnes live weight)

Type	1975-76	1976-77	1977-78	1978-79	1979-80(a)	1980-81(a)
Murray crayfish						
Yabbies	(a)131	83	38	28	18	13
Rock lobster						
Bay lobster	(a)12,865	(b)12,875	(b)14,485	15,358	14,469	14,794
Prawns	19,478	23,095	19,272	21,724	21,994	26,921
Crabs	700	825	858	790	888	969
Total	(b)33,173	(b)36,878	(b)34,653	37,900	37,370	42,697

(a) Excludes Victoria. (b) Incomplete; see footnotes to figures for individual species.

MOLLUSCS: PRODUCTION, BY TYPE

(Tonnes estimated live weight)

Type	1975-76	1976-77	1977-78	1978-79	1979-80(a)	1980-81(a)
Octopus	(c)59	78	(c)92	(c)147	(c)250	(b)246
Squid	253	280	381	585	719	639
Cuttlefish	(c)19	(c)19	(c)29	(c)93	(c)144	(b)146
Oysters	(b)(c)10,273	(b)(c)10,793	(b)(c)9,786	(b)(c)6,740	(b)(c)8,251	(b)(c)8,277
Mussels	1,123	544	773	689	343	346
Pipi	195	207	303	285	1,108	287
Scallops	4,642	4,396	(b)9,121	(b)10,548	(b)5,594	(b)7,261
Abalone	5,256	6,313	5,057	6,197	4,970	5,505
Total	(d)21,820	(d)22,630	(d)25,543	(d)25,285	(d)21,378	(d)22,707

(a) Excludes Victoria. (b) Excludes South Australia. (c) Excludes Queensland. (d) Incomplete; see individual species.

Pearls, pearl-shell and trochus-shell

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

(Source: Department of Primary Industry)

	1978	1979	1980
QUANTITY			
Pearl and Trochus shell fishing operations—			
Production of—			
Pearl shell(b)	tonne	185.0	309.6
Trochus shell	tonne	—	n.a.
Pearl culture operations—			
Live shell introduced	No.	438,496	358,022
	tonne	130.5	112.6
Production—			
Round and baroque pearls	No.	88,369	77,231
	momme(c)	55,553	54,500
Half pearls	No.	248,360	138,687
Manufacturing shell	tonne	66.7	133.6
			75.1
VALUE (\$'000)			
Pearl and Trochus shell fishing operations—			
Production of—			
Live pearl shell		813	739
Pearl shell		188	905
Trochus shell		—	n.a.
Pearl culture operations—			
Production of—			
Round and baroque pearls		11,768	15,281
Half pearls		1,104	594
Manufacturing shell		58	309
			328

(a) Figures refer to the year ended January for the Northern Territory and Queensland and to the year ended December for Western Australia. (b) Excludes manufacturing shell produced from pearl culture operations. (c) A momme is a pearl weight measurement equivalent to 3.769 grams.

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 remote areas of northern Australia to service the expansion of the northern prawn fishery.

Rock lobsters, prawns, abalone and scallops 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 fishery and prawn fisheries to chill or freeze the catch.

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-iced to markets.

Domestic marketing of fisheries' products

Although virtually the whole of the tuna and Australian salmon catches are canned, the greater part of Australian fish production is marketed fresh or frozen.

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, fishermen's co-operatives may become registered as local fish markets. In Queensland until recently the Fish Board sold all production on behalf of fishermen in that State, except fish intended for export and interstate trade. However, new legislation was passed in March 1982 giving fishermen a choice of selling their catch either through the Fish Board, Fishermens' co-operatives or licensed private processors and wholesalers. In Victoria, South Australia, Western Australia and Tasmania, there is no restriction on market outlets. In Victoria, South Australia and Western 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.