CHAPTER 14

FORESTRY AND FISHERIES

FORESTRY

Source of statistics

Statistics relating to forested areas have been compiled by the Forestry Branch, Department of Primary Industry from data supplied by State and Territory Forest Services and by private forestry companies. Statistics of timber and by-products have been compiled from the annual factory collections undertaken by the Statisticians in the several States. Figures of production of gums, resins and tanning barks have been provided by the State forestry authorities. Data of imports and exports of forest products and timber products have been compiled by the Australian Statistician as part of the statistics of overseas trade. The figures shown relate, in general, to years ended 30 June.

Objects of forestry

The main object of forestry authorities is to manage the forests of the country in a manner that will provide maximum benefits, both direct and indirect, for the community. The authorities aim to promote the multiple use concept in management under which forests remain in perpetuity as sources of valuable raw material, areas of natural beauty, sanctuaries for fauna and flora, and areas for scientific investigation and watershed protection. The provision of special protected areas such as forest parks for recreational use and for the conservation of plants and animals is an objective. Forestry also aims at improving existing forests and woodlands by properly controlled harvesting, by protection from such destructive agencies as fire, insects and diseases, and by inducing regeneration. The provision of a partial tree cover on denuded lands where this cover is necessary for protective purposes, and a complete cover when the land is more suited under forest than under other land use, are further aims of forestry.

General account of forests and timbers

The area of land in Australia suitable for the production of commercial timber as the principal objective is very small in comparison with the size of the continent. Productive or potentially productive forests cover 43 million hectares, and of these 99 per cent are natural forests. Thirty-five million hectares of the natural forests are dominated by eucalypts. For a description of the types of timber grown in Australia *see* Year Book No. 61, Chapter 24.

Extent of forested areas

The total area of forest, 43.0 million hectares, is based on a definition of forest which includes plantations, native forest with an existing or potential mature height of 20 metres or more, and cypress pine forest in commercial use regardless of height. The following tables show classifications of total forest area in Australia by forest type and by ownership. Because areas at State level are subject to frequent change, totals have been rounded.

FOREST AREAS CLASSIFIED BY FOREST TYPE, 30 JUNE 1977

(*Source:* Forestry Branch, Department of Primary Industry)

('000 hectares)

Forest type	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*A.C.T.*	*Aust.*
Rainforest	300	–	1,068	–	3	464	37	–	1,872
Eucalypt–									
Productivity–Class I	1,618	648	212	–	176	460	–	–	3,114
Class II	3,196	4,752	1,381	–	2,915	1,804	–	53	14,101
Class III	8,362	635	3,347	–	68	–	–	–	12,412
Tropical eucalypt and paperbark	–	–	4,078	–	7	–	2,450	–	6,535
Cypress pine	1,908	3	1,683	–	2	–	777	–	4,373
Plantations	166	154	134	90	59	40	4	13	660
Total forest area	**15,550**	**6,192**	**11,903**	**90**	**3,230**	**2,768**	**3,268**	**66**	**43,067**

FOREST AREAS CLASSIFIED BY OWNERSHIP, 30 JUNE 1977

(*Source:* Forestry Branch, Department of Primary Industry)

('000 hectares)

Ownership	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*A.C.T.*	*Aust.*
State forestry(*a*)	3,034	2,415	3,345	76	1,987	1,219	312	14	12,402
Other public(*b*)	6,409	3,039	6,607	–	494	363	2,640	51	19,603
National parks	775	138	521	–	124	181	316	1	2,056
Private(*c*)	5,332	600	1,430	14	625	1,005	–	–	9,006
Total	**215,550**	**6,192**	**11,903**	**90**	**3,230**	**2,768**	**3,268**	**66**	**43,067**

(*a*) Publicly owned land, permanently reserved or dedicated primarily to timber production. (*b*) Publicly owned land, vacant or occupied under lease; not specifically secured for permanent timber production, but on which control of timber rests with the Crown. (*c*) Privately owned land, and leasehold land, where the Crown has no control over timber rights.

Plantations

The indigenous forest of Australia does not contain adequate supplies of coniferous timber, and Australia's requirements have had to be met largely by imports. As a result of the planned policy of the forest services and of several private commercial organisations, the area of coniferous plantations, mainly of exotic species, is steadily increasing. It was natural that this aspect of forestry should receive earliest attention in South Australia, as this is the State most poorly endowed with natural forest. South Australia now has a large area of planted conifers, and for some years has been obtaining considerable quantities of timber from these plantations. Production is also increasing in other States, and the thinnings from their plantations are already supplying a significant volume of timber. At 31 March 1977 the total area of coniferous plantations was about 618,000 hectares.

The total production of roundwood from Australia's coniferous plantations is now about 3.0 million cubic metres per annum and is expected to increase substantially during the next decade.

A special article giving 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, page 880.

Broadleaved plantations (mainly *Eucalyptus* and *populus ssp*) comprise about 42,000 hectares, a much smaller area than for the coniferous plantations. Plantations of ash eucalypts (including *E. delegatensis* and *E. regnans*) for pulpwood in Victoria, and populus plantations in the Eastern States make up a substantial proportion of the total broadleaved plantation area. The following tables show total area of plantations in Australia classified by species and by ownership.

PLANTATION AREAS CLASSIFIED BY SPECIES, 31 MARCH 1977

(*Source:* Forestry Branch, Department of Primary Industry)

(Hectares)

	N.S.W.	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*A.C.T.*	*Aust.*
Coniferous–									
Pinus radiata	131,568	134,788	2,487	82,912	29,072	38,828	–	12,121	431,776
Pinus pinaster	–	–	–	6,016	22,072	–	–	–	28,088
Pinus elliottii	(*a*)3,874	–	73,917	–	–	–	–	–	77,791
Pinus caribaea	–	–	9,013	–	–	–	1,200	–	10,213
Araucaria species	1,459	–	38,434	–	–	–	–	–	39,893
Other coniferous species	13,489	5,761	6,774	411	–	–	(*b*)2,650	1,048	30,133
Total	*150,390*	*140,549*	*130,625*	*89,339*	*51,144*	*38,828*	*3,850*	*13,169*	*617,894*
Broadleaved–									
Eucalyptus species	13,617	12,666	2,859	906	8,298	796	–	–	39,142
Populus species	1,882	445	–	–	–	–	–	–	2,327
Other broadleaved species	–	180	384	–	–	–	75	–	639
Total	*15,499*	*13,291*	*3,243*	*906*	*8,298*	*796*	*75*	–	*42,108*
Grand total	**165,889**	**153,840**	**133,868**	**90,245**	**59,442**	**39,624**	**3,925**	**13,169**	**660,002**

(*a*) Includes some pinus caribaea. (*b*) Callitris intratropica.

PLANTATION AREAS CLASSIFIED BY OWNERSHIP, 31 MARCH 1977

(*Source:* Forestry Branch, Department of Primary Industry)

(Hectares)

Ownership	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*A.C.T.*	*Aust.*
Coniferous–									
State forestry	119,929	71,935	104,625	74,665	41,722	30,037	3,850	13,169	459,932
Other public	–	3,535	–	–	–	–	–	–	3,535
National park	592	–	–	–	–	–	–	–	592
Private	29,869	65,079	26,000	14,674	9,422	8,791	–	–	153,835
Total	*150,390*	*140,549*	*130,625*	*89,339*	*51,144*	*38,828*	*3,850*	*13,169*	*617,894*
Broadleaved–									
State forestry	6,659	5,747	2,043	906	*(a)*8,298	–	75	–	23,728
Other public	500	1,404	–	–	–	–	–	–	1,904
National park	–	–	–	–	–	–	–	–	–
Private	8,340	6,140	1,200	–	–	796	–	–	16,476
Total	*15,499*	*13,291*	*3,243*	*906*	*(a)8,298*	*796*	*75*	–	*42,108*
Grand total	**165,889**	**153,840**	**133,868**	**90,245**	**59,442**	**39,624**	**3,925**	**13,169**	**660,002**

(*a*) Of minor economic significance

Australian Government assistance for State softwood forestry operations

In February 1965 the Australian Forestry Council recommended that the rate of expansion of softwood timber plantings in Australia should be increased from their existing level of about 16,000 hectares a year to 30,000 hectares a year for the next thirty-five years. The recommendations envisaged a phased increase in the annual rate of Government plantings by the various State Governments and Territorial Administrators up to a total of some 26,000 hectares per annum, and an average of at least 4,000 hectares per annum by private forest owners. The Council considered that such a program would make a major contribution towards meeting Australia's future requirements for softwood products.

In February 1966 the Commonwealth Government endorsed the Council's recommendation, and until 30 June 1977 there were three Acts authorising softwood planting agreements between the Commonwealth and each State. These were: the *the Softwood Forestry Agreements Act* of 1967 which marked the commencement on 1 July 1966, of the expanded softwood planting program in the States, the 1972 Act which terminated on 30 June 1976 and the 1976 Act which covered the one year period to 30 June 1977. In the eleven year period covered by the three Acts, total loan payments of approximately $54 million were made to the States. This enabled purchases of land as well as the establishment and tending of an additional 100,000 hectares (approximately) of new softwood plantations. Loans are repayable over a 25 year period with repayments of principal and interest commencing ten years after the date of each advance.

Under the *Softwood Forestry Agreements Act* 1978 the Commonwealth Government will provide to the States financial assistance for the period 1977–78 to 1981–82 to cover the cost of maintaining those softwood forestry plantations previously established with Commonwealth assistance under the *Softwood Forestry Agreements Acts* of 1967, 1972 and 1976. The assistance for the maintenance program will be provided by way of loans repayable over 20 years with repayments commencing 15 years after the date of each advance. Interest will either be capitalised over the deferment period, or paid as it falls due, depending upon State preferences. Payments under the 1978 Act are limited to the provision of $4.2 million for the financial year 1977–78, but thereafter the amounts provided will depend on State requirements for the maintenance program.

The Commonwealth Government has agreed to provide financial assistance to Tasmania over the next five years towards the cost of establishing some small plantations and certain silviculture projects involving native trees.

The assistance, by way of loans on a $1 for $1 matching basis, is intended to commence in 1978–79 with a payment of $136,500. The loans are to be repayable over 40 years commencing 20 years after each advance is made. During the 20 years in which repayments are deferred, interest is to be capitalised.

Forest administration and research

Forestry Branch, Department of Primary Industry

Following the transfer of research functions of the Forestry and Timber Bureau to the Commonwealth Scientific and Industrial Research Organization, Division of Forest Research in 1975, the remaining functions were subjected to a reorganization which led to the establishment of a Forestry

Branch within the Department of Primary Industry. The functions of the Forestry Branch include the formulation of policies on aspects of forestry which concern the Commonwealth Government, to collate and publish statistics relevant to forestry and to the end use of the produce of forests, to service the Australian Forestry Council and attendant bodies and to deal with international organizations on matters predominantly of a forestry nature.

Commonwealth Scientific and Industrial Research Organization

The Division of Forest Research covers a wide range of forest studies including the following: harvesting, genetics, plant physiology, nutrition, botany, tree seeds, ecology, entomology and pathology, hydrology and resource assessment. The Division maintains six regional stations in the States. These research stations are run in liaison with State forest services, other Government instrumentalities and private forest companies. The Divisions of Building Research and Chemical Technology carry out a wide range of investigations relating to the properties of wood and the uses of wood and wood products. Research on processing logs and timber, solid and composite wood products, timber engineering and the applications of wood in building is undertaken by the Division of Building Research. The research programs of the Division of Chemical Technology are directed towards developing ways whereby Australia's forest resources can be more effectively utilised. The programs include the technology of fibre separation, cellulosic composite materials, lignin technology, the assessment and development of cellulosic resources, fibre properties and problems relating to the pulp and paper industry. 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.

Forestry in the Territories

The management of forests in the Australian Capital Territory is the responsibility of the Forests Section of the Department of the Capital Territory. Forests in the Northern Territory are under the control of the Northern Territory Parks and Wildlife Commission.

Forestry in the States

The objectives of the State Forest Services are primarily the development of permanent forest reserves in each State and to manage these reserves on a multiple use basis. These uses include timber production, provision of minor forest products, grazing, protection of native flora and fauna, recreation and watershed protection. The powers and functions of the State forestry authorities are laid down under forestry Acts and Regulations, and are limited to public lands, in particular to lands set aside for forestry purposes. The functions include the introduction and implementation of proper measures for management and protection of forest land, harvesting, conversion and marketing of forest products. All State forest services are actively engaged in research programs aimed at improving the growth and yield of forest products and in some cases (New South Wales and Queensland) research aimed at improving the utilization of forest products. All State forestry authorities publish annual reports.

Public land permanently reserved or dedicated primarily for timber production in Australia amounts to 12 million hectares. State forestry authorities also have control over the timber on approximately 20 million hectares of crown land not specifically reserved for permanent timber production.

Private forestry

Privately owned land carrying productive or potentially productive native forests constitute an important part of Australia's forest resource. However, with the exception of forested land owned or managed by industrial forestry companies these forests are largely unmanaged for timber production. The area of privately owned coniferous plantations continues to increase. The activities of the industrial forestry companies predominate but the small private tree plantation holdings play an important role in the total supply of timber from these plantations.

Government assisted loan schemes for the establishment of private woodlots exist in New South Wales and Victoria. In Tasmania, a new Division of Private Forestry has been established within the State Forestry Commission with the objective of encouraging private forestry, other State Forest Services provide advice and suitable planting stock for private landowners interested in forestry.

The Australian Forest Development Institute is an active association of private forest growers with chapters covering all States of the Commonwealth.

Forestry education

The Australian National University's Department of Forestry in Canberra and the School of Forestry of the University of Melbourne offer undergraduate courses leading to a Bachelor of Science degree in forestry. Universities in all States have facilities for post-graduate studies for forestry

graduates. Foresters for the Forests Commission of Victoria are trained at a departmental Forestry School at Creswick, Victoria. Some of the Creswick graduates are sent by the Forest Commission of Victoria to the University of Melbourne for further training. States other than Victoria offer traineeships tenable at the A.N.U. to students selected for university training in forestry. These traineeships support the students and meet their expenses throughout the four year university course. Successful graduates are appointed as forestry officers in the State Forest Services. A limited number of post-graduate forestry scholarships are offered by the Commonwealth Government.

The Australian Forestry Council

The Australian Forestry Council comprises the Ministers responsible for forestry in the six State Governments and the Commonwealth Government.

The Council is intended to provide the means for the mutual exchange between the State and Commonwealth Governments of information and views on forestry. It co-ordinates research into problems affecting the establishment, development, management, and fire protection of all forests, and the utilisation of forest products. It assists in co-ordinating the work of State and Commonwealth Governments and also private enterprise in the development of Australian forestry.

The Council is supported by a Standing Committee consisting of the Assistant Secretary, Forest Branch, Department of Primary Industry, the heads of each of the six State Forest Services, the Chief of the Division of Forest Research, CSIRO, and the Secretary of the Northern Territory Parks and Wildlife Commission.

Employment in forestry

In the following table details are shown of the number of persons employed by State forestry departments, the Department of the Capital Territory, the Northern Territory Parks and Wildlife Commission, the Forestry and Timber Bureau in the relevant States and Territories, and the private sector of the forestry industry at 30 June 1977. The table excludes staff of forestry training establishments.

PERSONS EMPLOYED IN FORESTRY(*a*), 30 JUNE 1977

Occupational group	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*A.C.T.*	*Aust.*
Professional staff–									
Foresters	213	255	130	54	75	85	12	43	867
Others	86	75	110	32	1	40	–	32	376
Field and other technical staff	117	297	120	58	318	170	45	81	1,206
Clerical staff	400	301	278	139	89	144	23	44	1,418
Labour(*b*)	1,176	1,240	1,334	308	569	573	84	75	5,359
Extraction(*c*)	3,163	413	2,270	145	767	2,333	12	61	9,164
Total	**5,155**	**2,581**	**4,242**	**736**	**1,819**	**3,345**	**176**	**336**	**18,390**

(*a*) The Forestry and Timber Bureau has provided figures for employment within its own organisation. (*b*) Staff engaged in silvicultural forest works, etc. (*c*) Staff engaged in felling, carting, etc. Includes direct employees only.

Forest production

FOREST PRODUCTION(*a*) 1976-77

		N.S.W.	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*A.C.T.*	*Aust.*
Production of logs for sawing, peeling, slicing or pulping–										
Broadleaved–										
Eucalypt and related species	'000m³	1,974	1,588	501	4	1,415	3,763	–	–	9,245
Rain forest species	,,	93	–	158	–	–	–	–	–	252
Coniferous–										
Indigenous forest conifers–										
Cypress	,,	534	–	184	–	–	–	1	–	2,929
Other	,,		–	46	–	–	10	–	–	
Plantation grown conifers	,,		565	244	951	121	122	–	150	
Total	,,	**2,602**	**2,153**	**1,133**	**955**	**1,536**	**3,894**	**1**	**150**	**12,426**
Gross value of forest products(*b*)										
Logs(*c*)	$'000	43,356	37,308	22,839	18,178	16,858	50,129	16	2,562	191,246
Other forest products(*d*)	,,	21,853	4,220	8,625	2,459	9,491	5,299	16	143	52,105
Total	,,	**65,209**	**41,528**	**31,463**	**20,637**	**26,349**	**55,428**	**32**	**2,705**	**243,351**
Local value of forest products(*e*)–										
Total	,,	**65,169**	**40,701**	**20,878**	**20,614**	**24,557**	**47,900**	**32**	**2,705**	**222,556**

(*a*) Excludes some production from private land thought to be relatively small, details of which are not available. (*b*) Gross production is valued at principal markets. (*c*) *See* footnote (*c*) to the table Forest Production: Australia, below. (*d*) Includes firewood, sleepers, transomes, girders, bridge timbers, mining timber, poles, piles, charcoal (forest production only), tanning bark, essential oils, eucalyptus leaves, crude rutin. (*e*) Gross production valued at place of production. *See* footnote (*b*) above.

FOREST PRODUCTION(*a*): AUSTRALIA

		1974–75	*1975–76*	*1976–77*
Production of logs for sawing, peeling, slicing or pulping–				
Broadleaved–				
Eucalypt and related species	'000 m³	9,653	8,695	9,245
Rain forest species	"	328	255	252
Coniferous–				
Indigenous forest conifers–				
Cypress	"	321		
Other	"	58	2,705	2,929
Plantation grown conifers	"	2487		
Total	"	**12,847**	**11,655**	**12,426**
Gross value of forest products(*b*)–				
Logs(*c*)	$'000	172,833	167,891	191,246
Other forest products(*d*)	"	39,806	45,111	52,105
Total	"	**212,639**	**213,002**	**243,351**
Local value of forest products(*e*)–				
Total	"	**195,445**	**194,796**	**222,556**

(*a*) Excludes some production from private land, thought to be relatively small, details of which are not available. (*b*) *See* footnote (*b*) to the table Forest Production, 1976–77, above. (*c*) Included in this category are amounts attributable to sawmillers who carry out their own logging activities as a secondary part of their operations. As such, the values are attributable to the sawmilling industry which is part of manufacturing industry. However, the amount has been included in this table so that the overall value of forest products might be shown. The amount in question was estimated to be $29.5 million in 1969–70 or 30.5 per cent of the total of $96.6 million. An estimate of the amount for subsequent years is not available. (*d*) Includes firewood, sleepers, transomes, girders, bridge timbers, mining timber, poles, piles, charcoal (forest production only), tanning bark, essential oils, eucalyptus leaves, crude rutin. (*e*) Gross production valued at place of production. *See* footnote (*b*) to the table Forest Production, 1976–77, above.

Timber and timber products

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

MANUFACTURING ESTABLISHMENTS(*a*)–SUMMARY OF OPERATIONS, 1976–77

Industry class	*ASIC code(b)*	*Number of establishments operating at end of June*	*Persons employed (c)*	*Turnover*	*Value added*	*Fixed capital expenditure (outlay on fixed tangible assets less disposals)*
		No.	No.	$'000	$'000	$'000
Log sawmilling	2511	861	13,723	355,276	217,749	13,969
Plywood and manufactured boards	2513	79	6,259	224,691	101,451	22,837

(*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

Item		*1974–75(a)*	*1975–76(a)*	*1976–77(a)*
Undressed sawn timber–				
Recovered from sawn logs–				
Australian grown–				
Broadleaved	'000 cu m	2,407	2,372	2,312
Coniferous	"	823	856	1,945
Total	"	**3,230**	**3,228**	**4,257**
Woodchips (green weight)–				
Hardwood (broad leaved)	'000 tonnes	3,009	2,603	3,623
Plywood–				
Commercial–(surface measure)	'000 sq m	6,347	5,967	6,550
(1 mm basis)	"	30,413	35,221	35,298
Waterproof–(surface measure)	"	4,430	4,643	4,097
(1 mm basis)	"	35,716	35,715	41,219
Particle board (resin bonded)	cu m	389	460	496
Wood pulp–				
Chemical	tonne	172,274	162,342	182,775
Mechanical	" }	404,684	392,675	416,905
Other	" }			
Paper–				
Newsprint	tonne	196,346	206,228	206,590
Printings	"	58,864	46,510	55,329
Writing (incl. cartridge)	"	100,351	69,943	87,896
Wrapping	"	284,535	301,524	321,571
Blotting	" }			
Duplicating	" }	37,313	29,381	30,286
Other paper	" }			
Tissue and sanitary papers	"	92,457	88,716	91,405
Paperboard (incl. strawboard)	"	378,324	379,942	430,711

(*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.

Woodchips

On 24 April 1976, under direction of the Australian Government, the Standing Committee on Science and the Environment announced the start of an inquiry into the environmental impact of the woodchip industry. The scope of the inquiry covered all woodchip programs in Australia engaged in production for export or for the domestic market and their immediate environmental impact, i.e. the impact on soil, air and water and on forest fauna and flora. The findings of the Standing Committee on Science and the Environment are shown in the Committee's report *Woodchips and the Environment* issued in 1977 by the Australian Government Publishing Service. This report includes considerable statistical and descriptive material.

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 1976–77 the production of hardwood chips in Australia amounted to 3,623,000 tonnes.

Imports

IMPORTS OF CRUDE WOOD AND TIMBER

		Quantity			Value ($'000 f.o.b.)		
		1975–76	1976–77	1977–78	1975–76	1976–77	1977–78
Crude wood, and timber–							
Wood waste and charcoal	'000 cu m	n.a.	n.a.	n.a.	9	9	8
Wood in the rough or roughly squared	"	156	36	33	2,221	1,923	2,146
Wood shaped or simply worked–							
Railway or tramway sleepers	"	22	–	17	3,458	–	3,048
Timber, sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm–							
Conifer–							
Douglas fir	"	427	445	336	36,773	47,880	42,006
Hemlock and balsam	"	65	73	79	3,992	5,626	6,332
Radiata pine	"	31	38	63	2,123	2,673	2,604
Redwood	"	9	8	3	1,577	1,675	612
Western red cedar	"	80	99	86	10,252	15,418	13,864
Other	"	22	24	6	(*a*)2,059	(*c*)2,682	(*e*)878
Total conifer	"	*634*	*687*	*573*	*56,776*	*75,954*	*66,296*
Non-conifer(*b*)	"	275	352	236	27,494	(*d*)44,639	29,813
Timber (including blocks, strips, etc.), planed, tongued, grooved, rebated, etc., but not further manufactured–							
Conifer	'000 cu m	41	56	61	4,684	6,786	8,539
Non-conifer	"	50	71	65	7,322	14,033	13,921

(*a*) Includes a value of $11,000 for which no quantity has been included. (*b*) Total value for this item for 1975–76 includes value of $134,000 for which no quantity has been included. (*c*) Includes a value of $16,000 for which no quantity has been included. (*d*) Includes a value of $180,000 for which no quantity has been included. (*e*) Includes a value of $3,182 for which no quantity has been included.

Exports

EXPORTS OF CRUDE WOOD AND TIMBER(*a*)

		Quantity			Value ($'000 f.o.b.)		
		1975–76	1976–77	1977–78	1975–76	1976–77	1977–78
Crude wood, and timber–							
Wood waste and charcoal (including shell and nut charcoal)	'000m³	n.a.	n.a.	n.a.	12	7	62
Pulpwood	"	54	–	–	1,078	–	–
Wood in the rough or roughly squared	"	2	2	4	225	115	258
Wood, shaped or simply worked–							
Railway or tramway sleepers	"	44	30	23	4,902	4,204	3,797
Timber, sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5 mm–							
Conifer	"	1	–	9	92	42	41
Non-conifer–Jarrah	"	1	2	1	159	317	294
Other	"	33	23	28	2,856	4,567	4,834
Timber (including blocks, strips and friezes for parquet or wood block flooring, not assembled), planed, tongued, etc.–							
Conifer	"	–	–	1	82	36	493
Non-conifer	"	1	1	32	184	228	303

(*a*) Excludes re-exports.

FISHERIES

Collection and presentation of fisheries statistics

Source and basis of statistics

Statistics presented in this section of the chapter have been collected by a number of authorities. The various State fisheries authorities have supplied, through the Deputy Commonwealth Statisticians in the States, the details of employment, boats, equipment, and production of the general fisheries. The Fisheries division of the Department of Primary Industry has supplied particulars of the whaling industry and pearl-shell fishery. Statistics of the processing of general fisheries products and of overseas trade in the products of fishing and whaling have been compiled in the Australian Bureau of Statistics.

In the preparation of Australian fisheries production statistics, the quantities of individual products 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.

Fisheries resources and their commercial exploitation

Fish

Approximately 2,000 species of marine and freshwater fish occur in and around Australia, about forty of which support substantial commercial fisheries. Most fishing is confined to waters over the continental shelf on the populous eastern and south-eastern seaboard, including Tasmania and South Australia, and off the south-western corner of the continent. As in other countries, fisheries in Australia may be divided into estuarine fisheries, located in the tidal waters of rivers and coastal lakes, beaches and bays; pelagic fisheries, which exploit species inhabiting the surface layers of the open ocean; and demersal fisheries, which fish the bottom layers of the sea. Estuarine fisheries produce considerable quantities of mullet (mainly *Mugil cephalus*), bream (*Acanthopagrus spp*) and, in northern Australia, the valuable giant perch (*Lates calcarifer*). Important freshwater fisheries in New South Wales, Victoria and South Australia include those for Murray cod (*Maccullochella spp*), golden perch (*Plectroplites ambiguus*) and eels (*Arguilla australis*). Trout are farmed in New South Wales, Victoria and Tasmania. Important pelagic fisheries include those for Australian 'salmon' (*Arripis trutta*), southern bluefin tuna (*Thunnus maccoyii*), snoek (*Leionura atun*), spanish mackerel (*Scomberomerus commersoni spp*), and clupeoids (*Sardinops neopilchardus* and *Engraulis australis*). Demersal fisheries include those for snapper (*Chrysophrys auratus*), whiting (*Sillaginidae*) and from tropical waters the so called 'cods' (*Epinephelus*, etc.). Trawl fisheries off New South Wales and Victoria yield species such as flathead (*Neoplatycephalus* and *Trudis spp.*), morwong (*Nemadactylus spp.*) and John Dory (*Zeus faber*). Expansion of trawling onto the continental slope off central New South Wales and in Western Bass Strait has established a fishery for gem fish (*Rexea solandri*). There has been a renewal of interest in the Great Australian Bight, several grounds resulting in the establishment of a joint venture operation employing three large modern freezer trawlers. The previously valuable fishery for edible school and gummy shark (*Galeorhinus australis* and *Mustelus antarcticus*) in south-eastern Australia declined significantly in the year 1972–73 because of the discovery of a high mercury content in large school shark, but production and prices have since risen as the fishery for gummy sharks has expanded, although production has not attained its former level. A fishery for clupeoids in the Bass Strait which supplies the raw material for a fish meal plant at Lakes Entrance, Victoria, is the only established 'industrial fishery' in Australia.

Crustaceans

The western and southern rock lobsters (*Panulirus longipes cygnus* and *Jasus novaehollandiae*), which are taken on rocky reefs around the southern half of Australia, provide the most valuable fishery in Australia. Prawns (*Penaeus* and *Metapenaeus spp.*) are taken in estuarine, coastal and offshore waters of all States except Tasmania. Over the last decade, important fisheries have been established in northern Australia and South Australia. Interest in deep water prawn stocks off New South Wales is growing. 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 and only the Victorian and Tasmanian beds are currently producing. 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 (*Haliotusspp*) 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 and New South Wales. Other small quantities of cephalopods, mainly squid, are produced in many localities.

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 from Broome in Western Australia to 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

Since 1955 sperm whale (*Physeter catodon*) has been taken in southern waters of Western Australia. However the numbers of shore stations responsible for carrying out processing operations have decreased and an announcement was made late in 1978 that the last of these, located at Albany, Western Australia, would also be closing.

General

Detailed information on the history of the development of fisheries industries in Australia is given in Year Book No. 55, pages 976–7.

Fisheries administration and research

The Constitution of the Commonwealth (Section 51 (x)) assigns to the Commonwealth Government power to legislate for fisheries in Australian waters beyond territorial limits, the residual power in respect to waters within territorial limits (including inland waters) resting with the States. The Commonwealth Government has made similar arrangements for each of its Territories. Each State and Territory has legislation regulating fisheries in waters within its jurisdiction. Persons taking fish for sale, and their boats, are required to be licensed, and provision is made for management of the fisheries.

The Commonwealth Government laws regulating the fisheries are the *Fisheries Act* 1952, the *Continental Shelf (Living Natural Resources) Act* 1968 and the *Whaling Act* 1960. Each of these applies in accordance with the Commonwealth Government's fishery power under the Constitution.

Fisheries Act

This Act, as amended in 1978, establishes a 200 mile Australian fishing zone around Australia and its external Territories. It requires Australians and foreigners engaged in fishing and boats used for fishing to be licensed if the purpose of the fishing is commercial. As well as giving effect to Australia's sovereign rights over the living resources of the 200 mile zone, the Act, in accordance with International Law, imposes an obligation on Australia to manage the resources so that they are conserved for optimum utilisation by mankind, both now and in the future.

Continental Shelf (Living Natural Resources) Act

This Act implements in Australian law the sovereign rights conferred on Australia by the Convention on the Continental Shelf, Geneva, 1958 in respect of the organisms belonging to sedentary species (that is, organisms which, at the harvestable stage, either are immobile on or under the seabed, or are unable to move except in constant physical contact with the seabed or the subsoil) on the continental shelf. The continental shelf comprises the seabed and subsoil of the submarine areas adjacent to the coast but outside the territorial sea to a depth of 200 metres, or beyond that depth where the depth of the superjacent waters admits of the exploitation of the natural resources of the area. The Act requires the licensing of persons searching for and taking sedentary organisms, of boats used to search for and take sedentary organisms, and of persons employing divers, trial divers and divers' tenders in taking sedentary organisms if such activities are carried out in controlled areas of the continental shelf of Australia or the Territories for a commercial purpose. Provision is made for proclamation of sedentary organisms to which the Act applies, for the establishment of controlled areas of continental shelf in respect of specified sedentary organisms, and for the management and conservation of sedentary organisms in controlled areas (the last of these applying to all persons whether the purpose of the taking of the sedentary organism is commercial or not). The Act applies to all persons including foreigners, and to all boats including foreign boats.

Whaling Act

This Act implements in Australian law the obligations imposed on Australia by virtue of its adherence to the International Convention for the Regulation of Whaling, Washington, 1946. The Act requires the licensing of factories engaged in treating whales, and of ships (and aircraft) used for taking whales. It also provides for the management and conservation of whale stocks.

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 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. Fishery resources are common property and, apart from fisheries such as those for rock lobster, abalone, southern bluefin tuna and prawns in northern Australia where the number of boats are controlled, and the rock lobster fisheries where the quantities of fishing gear are controlled, the only other restrictions on the entry of boats into the Australian fishing industry are those relating to foreigners and to processing boats in the northern prawn fishery. Management measures have been introduced in several fisheries to provide controls such as minimum sizes, closed areas, closed seasons and regulation of the type of fishing gear that may be used.

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 was replenished from Consolidated Revenue in 1976–77. 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 expended by the States for the same purposes.

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 is also carried out which 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 and Oceanography, which has its headquarters and main laboratory at Cronulla, N.S.W. and regional laboratories in Perth and Brisbane (fisheries science and oceanography);
(ii) CSIRO Divsion of Food Research, conducts research into handling storage, processing and transportation of fish at its laboratory in Hobart, Tasmania;
(iii) State fisheries departments (fisheries laboratories have been established in Perth, Hobart, Melbourne, Sydney, Brisbane and Cairns; research vessels are operated by New South Wales, Victoria, Western Australia, Tasmania and South Australia; and the Department of the Northern Territory has a small scientific section at Darwin);
(iv) Fisheries Division, Department of Primary Industry, Canberra (economic and management research, fishing technology, extension and education service); and
(v) 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, hand-line; *morwong*, Danish seine, otter trawl, traps; *whiting*, handlines, Danish seine, beach seine, gill net; *garfish*, beach seine; *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.

Whaling

The whaling industry is highly mechanised. Standard equipment includes aircraft to locate whales, diesel-powered catchers of about 30 to 40 metres in length, and tow boats.

Boats and equipment employed by industry

The following table shows details of boats and equipment engaged in the taking of fish, crustaceans and edible molluscs, and pearl-shell and trochus-shell; and the number of chasers and stations engaged in whaling operations. Boats engaged in more than one industry are classified to their main activity.

FISHERIES: BOATS AND EQUIPMENT

		1974-75	*1975-76*	*1976-77*
General fisheries–				
Boats	No.	9,830	9,110	9,515
Value of boats and equipment	$'000	191,482	225,901	247,502
Edible oyster fisheries–				
Boats	No.	(*a*)1,818	(*a*)1,926	(*a*)(*b*)1,747
Value of boats and equipment	$'000	(*a*)4,476	(*a*)5,607	(*a*)(*b*)5,742
Pearl-shell and trochus-shell–				
Boats(*c*)	No.	20	15	17
Whaling(*c*)–				
Chasers	No.	3	3	3
Stations operating	No.	1	1	1

(*a*) Incomplete; excludes Queensland and Tasmania. (*b*) Incomplete; excludes South Australia.
(*c*) *Source:* Department of Primary Industry.

Employment in fisheries

Classification of registered commercial fishermen by industry

The following table has been derived mainly from the licensing records of the various State fisheries authorities. Persons engaged in more than one industry are classified according to their main activity, and so may be classified differently from one year to the next.

PERSONS EMPLOYED ON FISHING BOATS

Industry	*1974-75*	*1975-76*	*1976-77*
General fisheries(*a*)	18,403	17,037	17,613
Edible oyster fisheries	(*b*)1,444	(*b*)1,390	(*b*)(*c*)1,434
Pearl-shell and trochus-shell(*d*)	242	194	162
Whaling(*d*)–			
At sea	51	51	51

(*a*) Figures for general fisheries refer to number of persons (including skippers) reported as usually employed on boats. Persons reported as usually employed on more than one boat for a particular year are counted more than once for that year. Includes the number of licenced commercial fishermen in Western Australia. (*b*) Incomplete: excludes Queensland and Tasmania. (*c*) Incomplete: excludes South Australia. (*d*) *Source:* Department of Primary Industry.

Production, processing and domestic marketing of fisheries products

Value of fisheries production

The following table shows the gross value and local value of fishing and whaling production 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

($'000)

Year	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	Aust.
				GROSS VALUE				
1971-72	18,970	9,507	11,382	12,380	30,817	5,929	3,164	92,148
1972-73	(a)21,165	11,471	13,375	15,759	28,158	5,739	5,068	(a)100,732
1973-74	(a)20,974	10,895	15,196	17,442	30,494	7,014	7,295	(a)109,310
1974-75	(a)24,609	8,686	12,606	(b)14,083	35,130	6,928	5,667	(a)(b) 107,709
1975-76	31,599	10,601	17,137	(b)22,474	51,079	8,511	5,188	(b)146,589
1976-77	36,059	16,014	34,814	(b)27,179	68,276	11,713	11,352	(b)205,407
				LOCAL VALUE(c)				
1971-72	16,323	8,855	10,764	11,027	30,625	5,929	3,164	86,687
1972-73	16,898	10,646	12,686	13,969	28,000	5,739	5,068	93,004
1973-74	16,568	8,682	14,387	15,433	30,313	7,014	7,295	99,692
1974-75	21,569	6,949	11,732	12,496	34,785	6,928	5,667	100,127
1975-76	25,334	8,481	16,152	20,022	50,870	8,511	5,188	134,558
1976-77	30,352	13,917	33,714	24,186	68,099	11,713	11,352	193,333

(a) Incomplete; excludes octupus, squid and cuttlefish in New South Wales. (b) Incomplete; excludes oysters in South Australia.
(c) Local value is gross value less marketing costs.

Production of selected fisheries

SELECTED FISHERIES PRODUCTS: PRODUCTION AND GROSS VALUE

1976-77

Product	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	Aust.
				QUANTITY				
Fish(a) tonnes	18,254	10,089	(b)5,425	14,065	7,575	2,363	1,483	59,255
Crustaceans(a) ,,	2,969	316	12,187	4,788	12,277	1,178	2,929	36,643
Molluscs (edible)(a) ,,	11,194	5,868	(c)576	(c)820	1,051	3,021	12	(d)22,542
				GROSS VALUE ($'000)				
Fish	12,509	9,312	(b)5,298	9,113	4,226	1,672	1,664	43,794
Crustaceans	9,704	1,675	28,091	16,406	55,850	4,702	8,710	125,139
Molluscs (edible)	13,846	5,027	(c)307	(c)1,660	864	5,339	8	(d)27,050

(a) Estimated live weight. (b) Excludes freshwater fish, particulars of which are not available. (c) Incomplete; excludes oysters.
(d) Incomplete *see* individual States.

SELECTED FISHERIES PRODUCTS: PRODUCTION, AND GROSS VALUE AUSTRALIA

Product		*1974–75*	*1975–76*	*1976–77*
QUANTITY				
Fish(*a*)(*b*)	tonnes	57,423	54,973	59,255
Crustaceans(*a*)	,,	29,488	(*c*)33,173	36,643
Molluscs (edible)(*a*)	,,	(*d*)(*e*)21,386	(*e*)21,820	(*e*)22,542
Pearl-shell(*f*)(*g*)	,,	246.7	291.2	190.2
Trochus-shell(*f*)	,,	21.4	—	—
GROSS VALUE ($'000)				
Fish(*b*)		29,983	35,549	43,794
Crustaceans		55,955	(*c*)83,685	125,139
Molluscs (edible)		(*d*)(*e*)13,337	(*e*)20,080	(*e*)27,050
Pearl-shell(*f*)(*g*)		218	260	182
Trochus-shell(*f*)		8	—	—

(*a*) Estimated live weight. (*b*) Excludes freshwater fish caught in Queensland. (*c*) Excludes rock lobster in Queensland. (*d*) Incomplete; excludes octupus, squid and cuttlefish in New South Wales. (*e*) Incomplete; excludes oysters in Queensland and South Australia. (*f*) *Source:* Department of Primary Industry. (*g*) Excludes manufacturing shell produced from pearl culture operations.

FISH: PRODUCTION, BY PRINCIPAL TYPES

Type	*Tonnes estimated live weight*			*Gross value* ($'000)		
	1974–75	*1975–76*	*1976–77*	*1974–75*	*1975–76*	*1976–77*
Tuna(*a*)	11,082	10,674	9,941	3,349	3,244	4,404
Mackerel	1,315	1,289	1,279	941	1,128	1,299
Snoek	2,005	359	416	452	128	303
Mullet	5,999	6,255	5,776	2,076	2,791	2,798
Bream (including Tarwhine)	1,112	904	877	749	860	1,034
Australian salmon	5,178	3,510	4,028	1,065	1,020	1,232
Ruff	1,019	895	735	154	191	238
Snapper	2,190	1,842	2,123	2,860	2,669	3,425
Morwong	1,415	1,815	1,599	941	1,416	1,380
Whiting	2,268	2,853	2,720	(*b*)3,190	(*b*)4,385	(*b*)4,367
Flathead	2,848	2,117	2,018	1,630	1,584	1,547
Shark	4,773	6,320	6,718	2,640	3,820	6,447
Leatherjacket	528	413	354	333	261	237
Other	15,690	15,726	20,671	9,605	12,051	15,082
Total	**57,423**	**54,973**	**59,255**	**29,983**	**35,549**	**43,794**

(*a*) Includes estimates by CSIRO for New South Wales. (*b*) Value of whiting in Tasmania is not available for publication and has been included in 'Other'.

Crustaceans

CRUSTACEANS: PRODUCTION, BY TYPE

(tonnes live weight)

Type	*1971–72*	*1972–73*	*1973–74*	*1974–75*	*1975–76*	*1976–77*
Murray crayfish	136	(*a*)113	(*a*)295	23	23	83
Yabbies				184	131	
Rock lobster	13,085	13,005	(*b*)11,830	12,265	(*a*)12,865	12,700
Bay lobster						
Prawns	17,915	16,757	24,491	16,327	19,478	23,039
Crabs	573	(*a*)647	(*a*)702	712	700	821
Total	**31,709**	(*c*)**30,521**	(*c*)**37,318**	**29,488**	(*c*)**33,173**	**36,643**

(*a*) Excludes Victorian figure, which is not available for publication. (*b*) Excludes rock lobster in Queensland. (*c*) Incomplete; *see* footnotes to figures for individual species.

Molluscs (edible)

MOLLUSCS: PRODUCTION, BY TYPE

(tonnes estimated live weight)

Type	*1971-72*	*1972-73*	*1973-74*	*1974-75*	*1975-76*	*1976-77*
Octopus	65	(*a*)40	(*a*)158	(*b*)20	(*c*)59	78
Squid	209	(*a*)314		(*b*)212	253	279
Cuttlefish	2	(*a*)-	(*a*)1	(*b*)-	19	(*c*)19
Oysters	10,434	(*d*)9,202	(*d*)10,479	(*c*)(*d*)8,908	(*c*)(*d*)10,273	(*c*)(*d*)10,793
Mussels	577	(*a*)23	(*a*)63	1,019	1,123	542
Pipi	86	117	203	193	195	80
Scallops	10,148	16,953	12,425	6,062	4,642	4,431
Abalone	7,958	6,439	6,032	4,971	5,256	6,320
Total	**29,479**	(*e*)**33,089**	(*e*)**29,362**	(*e*)**21,386**	(*e*)**21,820**	(*e*)**22,542**

(*a*) Excludes Victorian figure, which is not available for publication. (*b*) Excludes New South Wales figure which is not available. (*c*) Excludes South Australia figure, which is not available. (*d*) Excludes Queensland figure which is not available. (*e*) 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*)

		1974	*1975*	*1976*
QUANTITY				
Pearl and Trochus shell fishing operations–				
Production of–				
Pearl shell(*b*)	tonne	246.7	291.2	190.2
Trochus shell	tonne	21.4	–	–
Pearl culture operations–				
Live shell introduced	No.	558,465	578,437	464,327
	tonne	249.3	201.2	116.9
Production–				
Round and baroque pearls	No.	86,757	57,638	82,275
	momme(*c*)	63,722	42,334	64,173
Half pearls	No.	224,966	229,655	302,264
Manufacturing shell	tonne	66.1	105.2	82.4
VALUE ($'000)				
Pearl and Trochus shell fishing operations–				
Production of–				
Pearl shell		218	260	182
Trochus shell		8	–	–
Pearl culture operations–				
Production of–				
Round and baroque pearls		n.a.	7,641	5,752
Half pearls		457	392	1,063
Manufacturing shell		24	49	48

(*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.

Whale processing

WHALING

(*Source:* Department of Primary Industry)

		1975	*1976*	*1977*
Whales taken (*a*)–				
Male	No.	692	650	508
Females	„	480	345	116
Total	„	**1,172**	**995**	**624**
Quantity of sperm whale oil produced (*b*)	barrels	34,610	35,190	23,586
Value of whale oil produced	$'000	1,218	2,240	2,268
Value of by-products (meal, meat, solubles, etc.)	„	631	751	647
Total value of products	„	**1,849**	**2,991**	**2,915**

(*a*) Sperm whales only were taken. (*b*) 6 barrels = approximately 1.016 tonnes.

Oil from sperm whales is used in the manufacture of soap, plastics and watch lubricants, and in automatic transmission systems in motor cars.

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, the Fish Board sells all production on behalf of fishermen in that State, except fish intended for export and interstate trade. 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.

Consumption of edible fisheries products

Particulars of the apparent consumption of fish, crustaceans and molluscs per head of population, in terms of edible weight, are included in the following table. For the purpose of compiling this table, an allowance has been made for the non-commercial fish catch.

FISHERIES PRODUCTS: APPARENT CONSUMPTION
(Kg edible weight per person per annum)

	1971–72	*1972–73*	*1973–74*	*1974–75*	*1975–76*	*1976–77*
Fresh or frozen–						
Fish–						
Australian origin(*a*)	1.7	1.7	2.0	1.3	1.5	1.5
Imported	1.5	1.5	1.8	1.6	1.6	1.6
Crustaceans and molluscs	0.9	0.8	1.2	0.7	1.0	0.9
Cured seafood(*b*)	0.5	0.8	0.9	0.9	1.0	1.4
Canned seafood–						
Australian origin(*a*)	0.5	0.3	0.6	0.7	0.7	0.5
Imported	0.9	0.9	1.2	1.2	0.7	1.1
Total seafood	**6.0**	**6.1**	**7.8**	**6.4**	**6.6**	**7.0**

(*a*) Estimates have been calculated by subtracting export figures from production figures. In the case of fresh or frozen fish, an allowance of 10 per cent has been added to the commercial production figure to allow for non-commercial catch. (*b*) Includes salted, dried, smoked and otherwise prepared.

Overseas trade in fisheries products

Edible fisheries products

OVERSEAS TRADE IN EDIBLE FISHERIES PRODUCTS

	Quantity (tonnes)			*Value ($'000 f.o.b.)*		
	'1975-76	1976-77	1977-78	1975-76	1976-77	1977-78
IMPORTS						
Fresh, chilled, frozen or boiled(*a*)	21,904	22,033	22,553	26,412	33,718	36,337
Smoked, dried, salted or in brine	4,030	5,257	3,267	5,066	8,933	7,823
Potted or concentrated	142	160	141	390	762	862
Canned—						
Herrings	1,210	1,594	1,178	1,428	1,929	1,966
Salmon	3,279	5,980	6,726	7,726	19,498	22,203
Sardines, sild, brisling, etc.	3,070	2,333	3,244	4,550	4,475	7,382
Tuna	213	655	1,529	343	1,399	3,507
Other fish	781	1,564	1,991	1,043	2,480	3,106
Crustaceans and molluscs	1,430	2,048	2,257	3,153	5,579	7,021
Total canned	*9,983*	*14,174*	*16,925*	*18,243*	*35,360*	*45,185*
Other prepared or preserved fish, crustaceans and molluscs	11,003	14,823	12,132	18,186	29,785	28,508
Grand total	..	..	..	**68,297**	**108,558**	**118,715**
EXPORTS (Australian produce only; excludes re-exports)						
Fresh, chilled or frozen(*b*)—						
Fish	1,487	5,568	4,692	1,191	4,092	2,693
Crustaceans and molluscs—						
Rock lobster tails	4,018	4,982	4,604	35,782	56,580	55,728
Prawns	5,654	7,759	7,489	29,601	52,843	57,217
Other	1,815	1,457	2,636	(*c*)6,091	6,703	12,283
Crustaceans and molluscs boiled in water	383	220	857	1,767	1,418	6,199
Prepared and preserved—						
Fish	385	188	65	380	417	280
Crustaceans and molluscs	1,426	1,870	1,485	5,576	12,959	8,671
Grand total	..	..	..	**80,388**	**135,012**	**143,071**

(*a*) Excludes frozen smoked, which is included in item 'Smoked, dried, etc.' (*b*) Excludes frozen smoked, which is included in item 'Prepared and preserved crustaceans and molluscs'. (*c*) Total value for this item for 1975-76 includes value of $151,000, for which no quantity has been included.

Non-edible fisheries products

OVERSEAS TRADE IN SELECTED NON-EDIBLE FISHERIES PRODUCTS

		Quantity			*Value ($'000 f.o.b.)*		
		1975–76	*1976–77*	*1977–78p*	*1975–76*	*1976–77*	*1977–78p*
IMPORTS							
Fish heads, fresh or frozen	tonnes	766	1,631	1,482	133	352	341
Other fish waste	"	1,434	2,344	497	144	384	105
Fish, live(*a*)	'000	12,148	11,204	11,546	1,187	1,350	1,432
Fish meal	tonnes	12,947	7,629	2,762	2,688	1,956	1,109
Whale oil	'000 litres	32	8	17	21	8	24
Cod-liver oil	"	288	180	170	191	102	123
Other oils (including seal oil)	"	549	123	542	436	275	386
Coral and shells and their waste	tonnes	93	85	102	120	112	145
Tortoise shell (including turtle shell, claws, waste)	"	1	1	–	12	11	5
Pearls		n.a.	n.a.	n.a.	238	578	1,169
Total		..	..	..	**5,170**	**5,128**	**4,839**
EXPORTS (Australian produce only; excludes re-exports)							
Australian produce—							
Whale oil	'000 litres	8,134	6,247	5,219	1,354	2,153	2,399
Other oils	"	20	60	66	77	42	69
Pearl-shell	tonnes	306	385	482	280	327	644
Other shell (including trochus)	"	444	512	1,591	279	355	510
Natural pearls		n.a.	n.a.	n.a.	3	4	62
Cultured pearls—							
Round	No.	11,806	77,703	95,319	330	4,240	4,774
Half round	"	179,080	352,440	264,415	751	1,398	1,261
Other		n.a.	n.a.	n.a.	11	569	902
Total		..	..	..	**3,085**	**9,088**	**10,621**

(*a*) Live fish whether or not fit for human consumption.

Further information on subjects relating to fisheries is contained in the annual statistical bulletins *Fisheries* (7602.0 and 7603.0).