CHAPTER 26

FISHERIES

Further information on subjects dealt with in this chapter is contained in the annual printed bulletin *Non-Rural Primary Industries* and in the annual mimeographed statistical bulletin *Fisheries*, particularly as regards types of fish, etc. caught.

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 macquariensis*), golden perch (*Plectroplites ambiguus*) and eels (*Anguilla australis occidentalis*). Rainbow trout are farmed in Tasmania. Important pelagic fisheries include those for Australian 'salmon' (*Arripis trutta*), southern bluefin tuna (*Thunnus thynnus maccoyii*), snoek (*Leionura atun*), mackerel (*Cybium spp.*) and clupeoids (*Sardinops neopilchardus* and *Engraulis australis*). Demersal fisheries include those for snapper (*Chrysophrys auratus*), whiting (*Sillaginidae*) and the so called 'cods' (*Epinephelus*, etc.) from tropical waters. 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*). There is also an important fishery for edible shark (*Galeorhinus australis* and *Mustelus antarcticus*) in south-eastern Australia. 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 'industrial fishery' in Australia.

Crustaceans

The western and southern rock lobsters (*Jasus lalandei* and *Panulirus cygnus*) 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. This fishery has grown rapidly in recent years, especially in northern Australia. Bay lobsters (*Thenus spp.*) are taken incidentally to prawn trawling operations. Crabs (*Scylla* and *Portunus spp.*) are taken mainly in Queensland, New South Wales and Western Australia.

Molluscs

Naturally occurring oysters are harvested in all States, and in New South Wales edible oysters (*Crassostrea commercialis*) are cultured commercially. There is limited culture of other species in Queensland, Tasmania and, recently, South Australia. Following a serious decline in catches in the scallop (*Pecten alba*) fishery based on stocks in Port Phillip Bay, Victoria, new offshore beds have been located in southern New South Wales, eastern Victoria and south-western Western Australia. Present catches are good. A fishery based on the scallop (*Amusium balloti*) is developing in another area of Western Australia, and there are also smaller fisheries in Queensland and Tasmania. An important abalone fishery has been developed since 1964 in south-east Australia with South Australia, Tasmania and Victoria providing the bulk of the catches. Mussels (*Mytilus planulatus*) are harvested in Victoria, and 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 in the tropical waters of Australia from Exmouth Gulf 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

The Australian whaling industry formerly exploited the baleen (humpback) whales during their winter migrations along the east and west coasts of Australia. However, owing to the total prohibition placed on their capture by the International Whaling Commission in 1963, Australian whaling is now confined to the sperm whale (*Physeter catodon*) which has been taken in the southern waters of Western Australia since 1955.

Marine flora

The only substantial commercial collection of seaweed in Australia is undertaken at Triabunna, Tasmania, where a factory is processing seaweed (*Macrocystis pyrifera*) for its alginate content.

General

A map showing Australia's principal ports and localities of the fishery resources under exploitation appears on plate 46, page 882. 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 power to legislate for fisheries in Australian waters beyond territorial limits, the residual power in respect of waters within territorial limits (including inland waters) resting with the States. The Commonwealth 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 laws regulating the fisheries are the *Fisheries Act* 1952–1970, the *Continental Shelf (Living Natural Resources) Act* 1968 and the *Whaling Act* 1960–1966. Each of these applies in accordance with the Commonwealth's fishery power under the Constitution.

Fisheries Act

This Act requires persons engaging in fishing and boats used for fishing to be licensed and their equipment for taking fish to be registered if the purpose of the fishing is commercial. It also provides for management and conservation of the fisheries. The Act applies to Australian residents and their boats in waters proclaimed under the Act and, since 1968, to foreign boats and their crews in the zone of waters extending 12 miles from the baselines of the territorial sea but excluding waters within territorial limits, where State law applies.

Continental Shelf (Living Natural Resources) Act

This Act implements in Australian law the sovereign rights, conferred on Australia 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, by the Convention on the Continental Shelf, Geneva, 1958. 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 was 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 our 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 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 of the living resources in order to ensure their ability to sustain a maximum yield consistent with economy in their exploitation and the orderly conduct of the fishing industry. Fishery resources are common property and apart from fisheries such as those for rock lobster and abalone, where the numbers of boats and 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 and carrying 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 types 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 of kinds consistent with the purposes of those Acts for the development and management of the fisheries and fishing industry. The former is supported by the proceeds of the sale of the assets of the Australian Whaling Commission. The latter is a matching fund into which is paid each year an appropriation from Commonwealth 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 achieve the greatest sustainable yield of fish and to assist in the development of an efficient industry. To this end much of the biological 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) C.S.I.R.O. Division of Fisheries and Oceanography, with its headquarters and main laboratory at Cronulla, N.S.W. (fisheries science and oceanography);

(ii) C.S.I.R.O. Division of Food Research; main laboratories located at Ryde, N.S.W. (handling, storage, processing and transportation of fish);

(iii) State fisheries departments (new fisheries laboratories have been established in Perth, Hobart, Melbourne and Sydney; new research vessels have been launched by Victoria, New South Wales and Western Australia; the Northern Territory Administration has recently established a Prawn Research Unit in Darwin);

(iv) Fisheries Division, Department of Primary Industry, Canberra (economic and management research, gear technology, extension and education service); and

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

Collection and presentation of fisheries statistics

Source and basis of statistics

Statistics presented in this 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

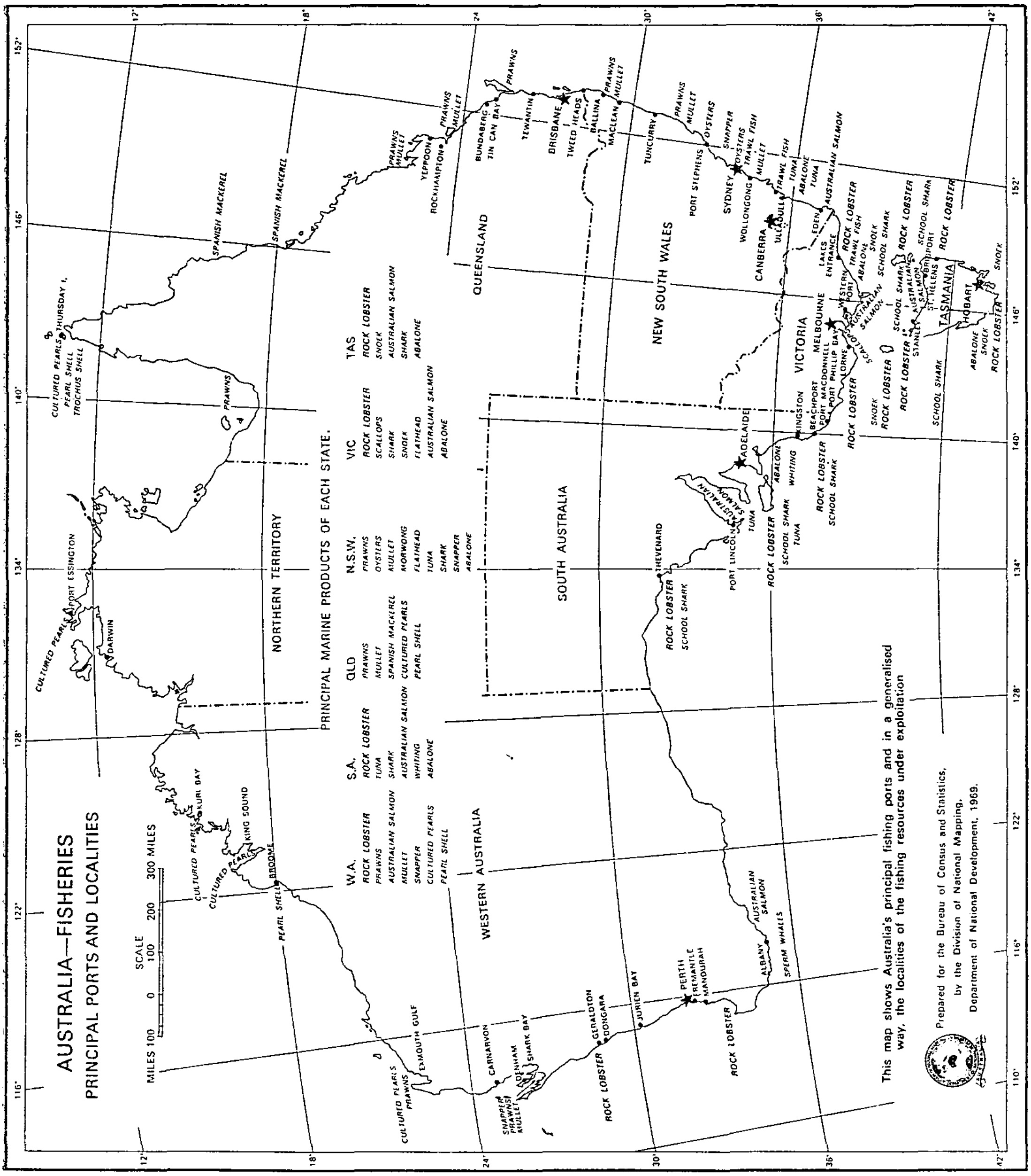
AUSTRALIA—FISHERIES
PRINCIPAL PORTS AND LOCALITIES
SCALE
MILES 100 0 100 200 300 MILES
PRINCIPAL MARINE PRODUCTS OF EACH STATE.
W.A.
ROCK LOBSTER
PRAWNS
AUSTRALIAN SALMON
MULLET
SNAPPER
CULTURED PEARLS
PEARL SHELL
S.A.
ROCK LOBSTER
TUNA
SHARK
AUSTRALIAN SALMON
WHITING
ABALONE
QLD
PRAWNS
MULLET
SPANISH MACKEREL
CULTURED PEARLS
PEARL SHELL
N.S.W.
PRAWNS
OYSTERS
MULLET
MORWONG
FLATHEAD
TUNA
SHARK
SNAPPER
ABALONE
VIC
ROCK LOBSTER
SCALLOPS
SHARK
SNOEK
FLATHEAD
AUSTRALIAN SALMON
ABALONE
TAS
ROCK LOBSTER
SNOEK
AUSTRALIAN SALMON
SHARK
ABALONE
WESTERN AUSTRALIA
NORTHERN TERRITORY
SOUTH AUSTRALIA
QUEENSLAND
NEW SOUTH WALES
VICTORIA
TASMANIA
This map shows Australia's principal fishing ports and in a generalised way, the localities of the fishing resources under exploitation
Prepared for the Bureau of Census and Statistics, by the Division of National Mapping, Department of National Development, 1969.

PLATE 45

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 Commonwealth Bureau of Census and Statistics.

The statistics refer, in general, to financial years. However, pearl and shell fishing data refer to the season ended in the financial year shown. Whaling statistics are shown by calendar years, and refer to the season in the calendar year. All overseas trade information refers to financial years.

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 of pearl-shell and trochus-shell refer to the actual quantities of dry shell for sale and exclude the weight of the fish.

Two weaknesses of fisheries statistical collections in Australia to date have been the lack of uniformity, which makes it difficult to compile statistics on an Australia-wide basis, and the lack of data on the effort involved in taking fish (time spent fishing, gear used, etc.). Recognising these weaknesses, the Commonwealth-States Fisheries Conference in 1960 appointed a Statistics Committee 'to examine all aspects of fisheries statistics and fully document a proposed system for submission to the States and Commonwealth for approval'.

Model system of catch and effort statistics, 1962

The model system of catch and effort statistics designed by the Committee was adopted by the Commonwealth-States Fisheries Conference in 1962. The new system was introduced in Tasmania in 1963, in Victoria and Western Australia in 1964 and in South Australia in 1969. The system was introduced in Queensland for the otter trawl fishery early in 1965, but there are no definite plans at present to extend it to other fisheries.

Under the new system fishermen are asked to report monthly the various fishing methods used, catch of each species taken and the locality where the greatest proportion of the catch is taken. Fishermen record catch in terms of landed weight, and appropriate conversion factors are used to obtain live weight where this is required. A grid system of 1° rectangles (relating to latitude and longitude) is used for recording location of catches at sea, and estuaries and inland waters are recorded where appropriate. Other data obtained include details of fishing effort, ports at which catch is landed, and employment details.

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 120 feet 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. About 25 per cent of the vessels registered in Australia for commercial fishing are over 30 feet in length. Recently, a number of well equipped, double rigged, prawn trawlers of 60 feet to 75 feet in length have been built for the rapidly developing northern prawn fisheries.

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, 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.

Pearls, pearl-shell and trochus-shell

Ketch-rigged luggers about fifty-five feet 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 100 to 125 feet in length, and tow boats.

Boats and equipment employed by industry

The following two tables show details of boats and equipment employed in the taking of fish, crustaceans and edible molluscs, pearl-shell and trochus-shell, and the number of chasers and stations engaged in whaling operations. The reservations mentioned below regarding the use of employment information are also applicable to these tables. Boats employed in more than one industry are classified to their main activity.

FISHERIES: BOATS AND EQUIPMENT EMPLOYED AND WHALING STATIONS OPERATING, STATES AND NORTHERN TERRITORY, 1969-70

		N.S.W.	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*Aust.*
General fisheries—									
Boats employed	No.	2,659	795	1,534	(*a*)1,784	1,450	553	82	8,857
Value of boats and equipment	$'000	9,862	5,910	15,644	9,707	18,243	6,624	5,386	71,376
Edible oyster fisheries—									
Boats employed	No.	1,699	..	106	..	..	n.a.	..	1,805
Value of boats and equipment	$'000	1,663	..	78	..	..	n.a.	..	1,741
Pearl-shell and trochus-shell, boats employed(*b*)	No.	..	..	15	..	12	..	2	29
Whaling(*b*)—									
Chasers	No.	..	..	..	..	3	..	..	3
Stations operating	„	..	..	..	..	1	..	..	1

(*a*) Not comparable with previous years because of changes in basis of counting. (*b*) *Source:* Department of Primary Industry.

FISHERIES: BOATS AND EQUIPMENT EMPLOYED AND WHALING STATIONS OPERATING, AUSTRALIA, 1965-66 TO 1969-70

		1965–66	*1966–67*	*1967–68*	*1968–69*	*1969–70*
General fisheries—						
Boats employed	No.	8,983	8,991	9,354	9,244	(*a*)8,857
Value of boats and equipment	$'000	40,602	46,102	51,456	(*b*)64,072	71,376
Edible oyster fisheries—						
Boats employed	No.	1,415	1,549	1,599	1,788	1,805
Value of boats and equipment	$'000	1,161	1,127	1,444	1,744	1,741
Pearl-shell and trochus-shell, boats employed(*c*)	No.	42	42	49	33	29
Whaling(*c*)—						
Chasers	No.	3	3	3	3	3
Stations operating	„	1	1	1	1	1

(*a*) Not comparable with previous years because of changes in basis of counting in South Australia. (*b*) Not comparable with previous years because of changes in methods of valuation in Western Australia. (*c*) *Source:* Department of Primary Industry.

Employment in fisheries

Persons engaged in fishing activities, 1966 census

The number of persons whose industry statements were classified to 'fishing' at the 1966 census was 8,021 out of a total of 512,994 in all primary industries and 4,856,455 in the total work force. The census classification 'fishing' includes such activities as fishing, whaling, pearl-shell fishing, oyster-farming, etc. For further information *see* the chapter Employment and Unemployment, also 1966 Census Bulletin No. 9.6, *Population: By Industry and Occupational Status, Australia.*

Classification of registered commercial fishermen by industry

The following two tables are derived mainly from the licensing records of the various State fisheries authorities. Because the definitions and licensing procedures used by these authorities are not uniform the statistics should not be used to compare the relative productivities of fishing industries in the several States. 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.

REGISTERED COMMERCIAL FISHERMEN: STATES AND NORTHERN TERRITORY
1969-70

Industry	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*Aust.*
General fisheries	3,930	1,429	3,035	(*a*)2,675	3,000	1,123	437	15,629
Edible oyster fisheries	1,371	..	341	..	5	n.a.	..	1,717
Pearl-shell and trochus-shell(*b*)	..	..	274	..	115	..	33	422
Whaling(*b*)—								
At sea	..	..	..	..	51	..	..	51
Ashore	..	..	..	..	48	..	..	48

(*a*) Not comparable with previous years because of changes in basis of counting. (*b*) *Source:* Department of Primary Industry.

REGISTERED COMMERCIAL FISHERMEN: AUSTRALIA, 1965-66 TO 1969-70

Industry	*1965–66*	*1966–67*	*1967–68*	*1968–69*	*1969–70*
General fisheries	12,256	12,657	14,965	16,460	(*a*)15,629
Edible oyster fisheries	1,072	1,249	1,319	1,425	1,717
Pearl-shell and trochus-shell(*b*)	544	571	538	473	422
Whaling(*b*)—					
At sea	44	45	45	48	51
Ashore	42	43	40	32	48

(*a*) Not comparable with previous years because of changes in basis of counting in South Australia. (*b*) *Source:* Department of Primary Industry.

Production, processing and domestic marketing of fisheries products

The tables on pages 886–8 show details of the production of the main types of fish, crustaceans, and molluscs caught in each State and the Northern Territory in 1969–70 and throughout Australia for the years 1965–66 to 1969–70.

Production of selected fisheries

SELECTED FISHERIES PRODUCTS: PRODUCTION, STATES AND NORTHERN TERRITORY
1969-70

Product		*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*Aust.*
Fish(*a*)	'000 lb	39,911	35,235	9,289	18,813	12,592	5,878	275	121,993
Crustaceans(*b*)	,,	4,785	1,791	9,085	7,452	20,896	3,065	8,688	55,761
Molluscs (edible) (*c*)	,,	20,969	10,139	5,651	2,469	2,938	5,930	1	48,098
Pearl-shell(*d*)	ton	..	..	119.5	..	137.7	..	7.0	(*e*)525.9

(*a*) Estimated live weight. (*b*) Gross weight. (*c*) Gross (in shell) weight. (*d*) *Source:* Department of Primary Industry. (*e*) Includes manufacturing shell produced from pearl culture operations for which State details are not available for publication.

SELECTED FISHERIES PRODUCTS: PRODUCTION, AUSTRALIA, 1965–66 TO 1969–70

Product		*1965–66*	*1966–67*	*1967–68*	*1968–69*	*1969–70*
Fish(*a*)	'000 lb	103,976	98,533	102,603	108,134	121,993
Crustaceans(*b*)	,,	43,270	46,215	54,017	51,158	55,761
Molluscs (edible)(*c*)	,,	48,262	57,502	64,908	42,999	48,098
Pearl-shell(*d*)(*e*)	ton	455.0	459.5	494.9	468.3	525.9
Trochus-shell(*d*)	,,	10.8	2.6	1.0	5.8	0.2

(*a*) Estimated live weight. (*b*) Gross weight. (*c*) Gross (in shell) weight. (*d*) *Source:* Department of Primary Industry. (*e*) Includes manufacturing shell produced from pearl culture.

Fish

FISH: PRODUCTION, BY TYPE, STATES AND NORTHERN TERRITORY, 1969-70

('000 lb estimated live weight)

Type	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*Aust.*
Freshwater types—	266	340	n.a.	863	..	23	..	(*a*)1,494
Marine types—								
Tuna	(*b*)12,974	555	60	3,909	1,122	11	..	18,630
Mackerel	73	..	1,460	..	133	11	4	1,682
Snoek	54	5,558	..	..	..	3,480	..	9,092
Mullet	6,109	630	2,924	364	1,546	31	18	11,622
Tailor	257	55	718	..	112	..	..	1,142
Bream (including Tarwhine)	559	1,060	369	38	37	..	..	2,063
Australian salmon	1,405	1,142	..	3,096	4,713	148	..	10,503
Ruff	..	59	..	494	1,353	..	..	1,907
Snapper	1,370	487	152	1,065	455	..	..	3,528
Morwong	1,715	152	..	..	9	3	..	1,879
Whiting	358	733	623	2,294	556	..	..	4,564
Luderick	1,349	152	149	..	..	..	..	1,650
Flathead	3,536	2,447	136	..	15	24	..	6,158
Shark	2,309	7,444	22	4,700	826	1,767	1	17,070
Leatherjacket	1,616	41	..	..	23	..	..	1,679
Garfish	296	490	127	958	44	51	..	1,966
Other	5,664	13,890	2,549	1,032	1,648	329	252	25,365
Total marine	*39,644*	*34,895*	*9,289*	*17,950*	*12,592*	*5,855*	*275*	*120,500*
Grand total	**39,911**	**35,235**	**9,289**	**18,813**	**12,592**	**5,878**	**275**	**121,993**

(*a*) Incomplete, excludes Queensland. (*b*) *Source:* C.S.I.R.O.

FISH: PRODUCTION, BY TYPE, AUSTRALIA, 1965-66 TO 1969-70

('000 lb estimated live weight)

Type	*1965–66*	*1966–67*	*1967–68*	*1968–69*	*1969–70*
Freshwater types(*a*)	1,060	1,184	1,082	1,694	1,494
Marine types—					
Tuna(*b*)	18,595	12,455	14,998	19,657	18,630
Mackerel	2,298	2,153	2,221	1,755	1,682
Snoek	8,539	5,146	7,307	8,587	9,092
Mullet	14,152	12,460	11,719	11,184	11,622
Tailor	1,357	799	1,362	973	1,142
Bream (including Tarwhine)	1,508	1,692	2,065	1,986	2,063
Australian salmon	11,184	14,898	15,658	9,464	10,503
Ruff	1,442	1,636	1,313	1,812	1,907
Snapper	3,344	3,668	3,548	2,908	3,528
Morwong	3,021	3,772	2,980	2,629	1,879
Whiting	3,600	3,619	3,679	3,838	4,564
Luderick	1,698	1,455	1,486	1,410	1,650
Flathead	5,824	5,848	5,370	6,076	6,158
Shark	11,597	13,322	13,281	15,818	17,070
Leatherjacket	1,494	986	854	814	1,679
Garfish	1,471	1,780	1,659	1,904	1,966
Other	11,792	11,660	12,023	15,625	25,365
Total marine	*102,916*	*97,349*	*101,522*	*106,440*	*120,500*
Grand total	**103,976**	**98,533**	**102,603**	**108,134**	**121,993**

(*a*) Excludes freshwater fish caught in Queensland, particulars of which are not available. (*b*) Includes estimate by C.S.I.R.O. for New South Wales.

Crustaceans

CRUSTACEANS: PRODUCTION, BY TYPE, STATES AND NORTHERN TERRITORY, 1969-70
('000 lb gross weight)

Type	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*Aust.*
Rock lobster(*a*)	339	1,788	158	4,578	15,335	3,065	..	25,264
Prawns	4,202	2	8,217	2,872	5,492	..	8,682	29,467
Crabs	244	..	710	3	68	..	6	1,031
Total	**4,785**	**1,791**	**9,085**	**7,452**	**20,896**	**3,065**	**8,688**	**55,761**

(*a*) Includes freshwater crayfish caught in New South Wales and Victoria, and bay lobster taken in New South Wales, Queensland and Western Australia.

CRUSTACEANS: PRODUCTION, BY TYPE, AUSTRALIA, 1965-66 TO 1969-70
('000 lb gross weight)

Type	*1965–66*	*1966–67*	*1967–68*	*1968–69*	*1969–70*
Rock lobster(*a*)	29,908	(*b*)31,625	(*b*)33,107	(*b*)28,883	(*c*)25,264
Prawns	12,547	13,624	20,100	21,414	29,467
Crabs	815	966	809	860	1,031
Total	**43,270**	**46,215**	**54,017**	**51,158**	**55,761**

(*a*) Includes freshwater crayfish caught in New South Wales and bay lobster taken in Queensland. (*b*) Includes also freshwater crayfish caught in Victoria. (*c*) Includes also freshwater crayfish caught in Victoria and bay lobster taken in New South Wales and Western Australia.

Molluscs (edible)

MOLLUSCS: PRODUCTION, BY TYPE, STATES, 1969-70
('000 lb gross [in-shell] weight)

Type	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*Aust.*
Octopus	..	62	..	(*a*)	..	..	..	62
Squid	..	260	195	(*b*)74	31	1	..	561
Cuttlefish	..	5	..	(*a*)	5	..	..	10
Oysters	20,197	..	358	12	3	69	..	20,639
Scallops	..	3,979	5,098	..	2,862	111	1	12,051
Mussels	154	516	..	..	(*c*)	..	..	670
Abalone	618	5,317	..	2,383	38	5,749	..	14,105
Total	**20,969**	**10,139**	**5,651**	**2,469**	**2,938**	**5,930**	**1**	**48,098**

(*a*) Included with squid. (*b*) Includes cuttlefish and octopus. (*c*) Not available for publication; excluded from Australian total.

MOLLUSCS: PRODUCTION, BY TYPE, AUSTRALIA, 1965-66 TO 1969-70

('000 lb gross [in-shell] weight)

Type	*1965–66*	*1966–67*	*1967–68*	*1968–69*	*1969–70*
Octopus	34	(*a*)34	(*b*)18	(*b*)26	(*b*)62
Squid	233	(*c*)369	(*d*)377	(*d*)374	(*d*)561
Cuttlefish	3	(*b*)	(*b*)1	(*b*)7	(*b*)10
Oysters	15,067	16,115	(*e*)16,636	(*f*)16,574	20,639
Scallops	(*f*)29,524	(*f*)29,923	28,757	11,285	12,051
Mussels	425	(*f*)260	(*f*)246	119	(*f*)670
Abalone	2,975	10,825	18,872	(*f*)14,614	14,105
Total(*g*)	**48,262**	**57,527**	**64,908**	**42,999**	**48,098**

(*a*) Excludes production for Queensland and South Australia, which is included with squid. (*b*) Production for South Australia is included with squid. (*c*) Includes octopus for Queensland and cuttlefish and octopus for South Australia. (*d*) Includes cuttlefish and octopus for South Australia. (*e*) Excludes particulars for Western Australia and Tasmania which are not available for publication. (*f*) Excludes particulars for Western Australia which are not available for publication. (*g*) Incomplete, *see* relevant footnotes.

Pearls, pearl-shell and trochus-shell

PEARL CULTURE OPERATIONS: AUSTRALIA, 1965 TO 1969

(*Source:* Department of Primary Industry)

		1965	*1966*	*1967*	*1968*	*1969*
Live shell introduced	No. of shells	635,003	697,443	783,733	838,622	796,831
	tons	311.6	345.5	427.6	440.1	404.3
Production of—						
Cultured pearls—						
Round and baroque pearls	No.	65,735	105,121	56,653	76,337	77,858
	momme(*a*)	40,098	63,073	30,061	42,854	44,334
	$'000	1,760	2,975	1,539	2,499	3,020
Half pearls	No.	278,637	264,012	266,466	522,247	631,476
	$'000	883	621	680	1,165	1,409
Manufacturing shell	tons	155.4	160.1	168.2	213.4	261.7
	$'000	67	70	80	86	120

(*a*) A momme is a pearl weight measurement equivalent to 0.13 oz (avoirdupois).

PEARL-SHELL AND TROCHUS-SHELL: PRODUCTION STATES AND NORTHERN TERRITORY, 1965 TO 1969

(*Source:* Department of Primary Industry)

(Tons)

	1965	*1966*	*1967*	*1968*	*1969*
Pearl-shell(*a*)—					
Queensland	193.3	179.6	189.2	137.9	119.5
Western Australia	97.4	103.2	132.7	117.0	137.7
Northern Territory	8.9	16.6	4.8	..	7.0
Australia	*299.6*	*299.4*	*326.7*	*254.9*	*264.2*
Trochus-shell—					
Queensland	10.8	2.6	1.0	5.8	0.2

(*a*) Excludes manufacturing shell produced from pearl culture operations.

WHALES TAKEN(*a*): AUSTRALIA, 1966 TO 1970

(*Source:* Department of Primary Industry)

(Number)

	1966	*1967*	*1968*	*1969*	*1970*
Male	595	560	585	637	775
Female	11	27	73	42	24
Total	**606**	**587**	**658**	**679**	**799**

(*a*) Sperm whales only were taken.

Processing of fish, crustaceans and molluscs

Ice is extensively used 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. Refrigerated brine tanks are most commonly used.

Processing plants are located strategically throughout Australia close to fishing grounds. In recent years a number of shore-based plants have been established in remote areas of northern Australia to service the expansion of the prawn fishery. Processing vessels receiving prawns from a fleet of trawlers are also operating in this fishery.

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

Edible fish for local consumption is mainly dispatched fresh iced to markets.

FISH PROCESSING (EXCEPT FREEZING): AUSTRALIA 1965-66 TO 1969-70

('000 lb)

	1965–66	*1966–67*	*1967–68*	*1968–69*	*1969–70*
Fish used(*a*)—					
Whole	17,030	18,782	24,146	25,323	24,651
Headed and or gutted	5,866	6,872	7,824	5,181	4,909
Estimated live weight equivalent, fish used	*23,900*	*26,700*	*33,200*	*31,300*	*30,100*
Production(*b*)—					
Canned fish(c)—					
Australian salmon	4,664	6,344	6,736	4,368	5,555
Tuna	4,839	5,639	8,193	8,618	8,111
Other	2,350	1,818	2,469	1,894	1,952
Total, canned fish	*11,853*	*13,801*	*17,398*	*14,880*	*15,619*
Smoked fish	258	241	259	175	221
Fish paste	1,018	1,146	1,310	1,194	1,135
Fish meal(*d*)	1,778	1,805	1,714	2,179	3,989

(*a*) Fish used for canning (including fish loaf), smoking and the manufacture of fish paste, but excluding the weight of oysters, other shellfish and crustaceans used for canning. (*b*) Excludes canned rock lobsters, prawns, oysters, and clams, details of which are not available for publication. (*c*) Includes fish loaf, fish cakes, etc. (*d*) Excludes whale meat.

Whale processing

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

WHALE PROCESSING: AUSTRALIA, 1966 TO 1970
(*Source:* Department of Primary Industry)

		1966	*1967*	*1968*	*1969*	*1970*
Quantity of sperm whale oil produced	barrels(*a*)	24,252	22,428	23,474	26,142	31,686
Value of whale oil produced	$'000	540	423	435	607	1,082
Value of by-products (meal, meat, solubles, etc.)	„	398	282	313	349	481
Total value of products	„	*938*	*705*	*748*	*956*	*1,563*

(*a*) 6 barrels = 1 ton.

Domestic marketing of fisheries products

Although virtually the whole of the tuna and Australian salmon catches and a large proportion of the snoek catch 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 New South Wales Fish Authority, which operates the Metropolitan and Wollongong 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 and North Queensland Fish Board sells all production on behalf of fishermen in that State, exept for fish intended for export and interstate trade. In Victoria, Western Australia, South Australia and Tasmania there is no restriction on market outlets. In South Australia the great majority of fishermen are members of the South Australian Fishermen's Co-operative Ltd, which handles the whole of their production. Other outlets for fish products include retail and catering establishments.

Value of fisheries production

The following tables show details of the values of production of edible fisheries products, pearl-shell and trochus-shell for the years 1965–66 to 1969–70. *See also* the chapter Miscellaneous for an explanation of the value terms used.

SELECTED FISHERIES PRODUCTS: GROSS VALUE, STATES AND NORTHERN TERRITORY
1969-70
($'000)

Product	*N.S.W.*	*Vic.*	*Qld*	*S.A.*	*W.A.*	*Tas.*	*N.T.*	*Aust.*
Fish	5,488	3,137	(*a*)2,074	2,874	1,019	592	51	15,235
Crustaceans	3,062	1,502	3,759	4,841	14,829	2,437	3,648	34,077
Molluscs (edible)	4,906	992	506	424	(*b*)214	958	..	8,001
Pearl-shell(*c*)	..	..	(*d*)78	..	(*d*)109	..	(*d*)4	(*e*)310

(*a*) Excludes freshwater fish, particulars of which are not available. (*b*) Excludes mussels and green turtle, particulars of which are not available for publication. (*c*) *Source:* Department of Primary Industry. (*d*) Estimated. (*e*) Includes manufacturing shell produced from pearl culture operations for which details classified by States are not available for publication.

SELECTED FISHERIES PRODUCTS: GROSS VALUE, AUSTRALIA, 1965-66 TO 1969-70
($'000)

Product	*1965–66*	*1966–67*	*1967–68*	*1968–69*	*1969–70*
Fish(*a*)	13,730	12,646	14,179	14,359	15,235
Crustaceans	24,008	24,906	32,755	36,560	34,077
Molluscs (edible)	(*b*)4,159	(*b*)6,580	(*c*)8,036	(*d*)6,624	(*e*)8,001
Pearl-shell(*f*)	291	307	271	237	310
Trochus-shell(*f*)	2	..	..	1	..

(*a*) Excludes freshwater fish caught in Queensland. (*b*) Excludes scallops and mussels in Western Australia. (*c*) Excludes oysters and mussels in Western Australia and oysters in Tasmania. (*d*) Excludes abalone and oysters in Western Australia. (*e*) Excludes mussels in Western Australia. (*f*) *Source:* Department of Primary Industry.

GROSS VALUE OF FISH, BY PRINCIPAL TYPES, 1969-70(a)
($'000)

Type of Fish	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	Aust.
Tuna	1,168	61	3	313	79	1	..	1,624
Snoek	18	270	..	..	..	166	..	454
Mullet	728	57	260	29	139	2	3	1,219
Australian salmon	243	103	..	186	189	11	..	731
Snapper	503	146	57	182	62	..	..	950
Morwong	255	26	..	..	1	..	..	282
Flathead	698	343	25	..	2	3	..	1,069
Shark	229	1,099	1	533	104	282	..	2,249
All other species	1,647	1,032	(b)1,728	1,631	444	128	47	6,657
Total fish	**5,488**	**3,137**	**2,074**	**2,874**	**1,019**	**592**	**51**	**15,235**

(a) A breakdown of value according to species is not available for previous years. (b) Excludes freshwater fish, particulars of which are not available.

In the following table the gross value and local value of fishing and whaling production are shown 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.

FISHERIES: GROSS AND LOCAL VALUE OF PRODUCTION
STATES AND NORTHERN TERRITORY, 1965-66 TO 1969-70
($'000)

Year	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	Aust.
GROSS VALUE								
1965–66	10,163	4,403	6,086	6,048	15,733	3,300	61	45,794
1966–67	10,473	4,980	6,959	6,175	16,525	3,653	82	48,847
1967–68	12,028	5,725	7,309	6,993	21,954	4,473	107	58,589
1968–69	11,517	5,851	8,089	7,683	23,717	4,864	1,191	62,912
1969–70	13,457	5,631	8,034	8,138	19,660	4,043	3,979	62,942
LOCAL VALUE(a)								
1965–66	8,555	3,797	5,588	5,294	15,683	2,747	61	41,725
1966–67	8,836	4,307	6,436	5,420	16,469	3,024	82	44,574
1967–68	10,212	5,153	6,896	6,162	21,805	3,668	107	54,003
1968–69	9,984	5,265	7,679	6,773	23,600	4,100	1,191	58,592
1969–70	11,504	4,961	7,609	7,186	19,536	3,343	3,979	58,118

(a) Local value is gross value less marketing costs.

Consumption of edible fisheries products

Particulars of the estimated supplies of fish, crustaceans and molluscs available for consumption 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: ESTIMATED SUPPLIES AVAILABLE FOR CONSUMPTION AUSTRALIA, 1965-66 TO 1969-70
(lb edible weight per head per annum)

	1965–66	*1966–67*	*1967–68*	*1968–69*	*1969–70*
Fresh or frozen—					
Fish—					
Australian origin(*a*)	3.3	3.1	3.0	3.4	3.9
Imported	3.8	3.3	3.5	3.8	3.6
Crustaceans and molluscs	1.5	1.8	2.1	1.3	1.6
Cured (including smoked and salted)	0.9	0.6	0.7	1.1	0.8
Canned—					
Australian origin	1.1	0.9	0.7	1.1	1.3
Imported	2.4	2.4	2.2	2.1	2.0
Total	**13.0**	**12.1**	**12.2**	**12.8**	**13.2**

(*a*) Includes an allowance for non-commercial catch of fish; excludes fish exported.

Overseas trade in fisheries products

Edible fisheries products

OVERSEAS TRADE IN EDIBLE FISHERIES PRODUCTS: AUSTRALIA
1967-68 TO 1969-70

	Quantity ('000 lb)			*Value ($'000 f.o.b.)*		
	1967–68	*1968–69*	*1969–70*	*1967–68*	*1968–69*	*1969–70*
IMPORTS						
Fresh and frozen(*a*)	46,886	52,528	50,270	10,741	13,641	14,274
Smoked, dried and salted	8,975	10,329	6,943	2,018	2,395	2,041
Potted and concentrated	153	143	219	160	137	166
Canned—						
Herrings	4,676	4,429	4,233	1,095	1,136	1,160
Salmon	11,226	10,601	9,857	6,681	6,485	7,387
Sardines and pilchards	6,260	6,101	6,139	2,306	2,411	2,442
Tuna	258	278	403	93	100	151
Other fish	2,241	2,275	2,462	749	785	954
Crustaceans and molluscs	2,085	1,841	1,882	1,764	1,474	1,664
Total, canned	*26,746*	*25,525*	*24,976*	*12,688*	*12,391*	*13,758*
Products not elsewhere included	2,634	2,886	4,013	1,725	1,930	2,892
Grand total	..	..	..	**27,332**	**30,493**	**33,131**
EXPORTS (Australian produce only; excludes re-exports)						
Fresh and frozen(*b*)—						
Fish	296	233	987	116	88	222
Crustaceans and molluscs—						
Rock lobster tails	11,016	9,074	8,539	22,540	22,754	19,686
Prawns	3,290	6,383	10,560	3,476	7,405	12,135
Other	5,648	4,130	3,951	3,740	2,916	3.266
Boiled and frozen crustaceans and molluscs	1,136	904	967	1,111	1,139	1,193
Prepared and preserved—						
Fish	384	348	479	146	152	202
Crustaceans and molluscs	4,259	4,101	3,548	2,376	2,170	1,992
Products not elsewhere included	163	125	159	245	275	280
Grand total	..	..	..	**33,750**	**36,899**	**38,976**

(*a*) Excludes frozen smoked, which is included in item Smoked, dried, etc. (*b*) Excludes frozen smoked, which is included in item Products not elsewhere included.

Pearls

Pearls valued at $436,000 were imported into Australia in 1969–70 ($201,000 from Japan and $199,000 from Papua and New Guinea) compared with imports valued at $720,000 in 1968–69 ($325,000 from Papua and New Guinea, $314,000 from Japan).

Cultured pearls exported from Australia in 1969–70 (excluding re-exports) were valued at $2,589,000 compared with exports valued at $3,281,000 in 1968–69, the bulk of the exports each year being shipped to Japan. The value of natural pearls exported from Australia in 1969–70 (excluding re-exports) was $24,000 compared with $17,000 in 1968–69, the major proportion being shipped to Japan.

Pearl, etc., shell

Of the pearl-shell exported in 1969–70, exports valued at $146,000 were consigned to the Federal Republic of Germany, $120,000 to the United States of America, $105,000 to Papua and New Guinea and $103,000 to Japan.

OVERSEAS TRADE IN SHELLS: AUSTRALIA, 1967-68 TO 1969-70

	Quantity ('000 lb)			*Value ($'000 f.o.b.)*		
	1967–68	*1968–69*	*1969–70*	*1967–68*	*1968–69*	*1969–70*
Imports	92	141	107	38	38	36
Exports(*a*)—						
Pearl-shell	1,204	1,240	1,479	381	456	574
Other shell (including trochus)	79	119	215	15	11	17
Total exports	*1,283*	*1,359*	*1,694*	*396*	*467*	*591*

(*a*) Australian produce only; excludes re-exports.

Marine animal oils

Of the whale oil exported in 1969–70, about 60 per cent was exported to the United Kingdom, the remainder going to the United States of America, Netherlands and Norway.

OVERSEAS TRADE IN MARINE ANIMAL OILS: AUSTRALIA, 1967-68 TO 1969-70

	Quantity ('000 gal)			*Value ($'000 f.o.b.)*		
	1967–68	*1968–69*	*1969–70*	*1967–68*	*1968–69*	*1969–70*
Imports—						
Whale oil from—						
Japan	261	703	292	170	390	193
Norway	607	2	482	433	1	309
South Africa	25	16	43	20	11	37
United Kingdom	61	34	23	73	34	25
Other countries	5	3	3	7	3	4
Total whale oil	959	758	843	702	440	568
Cod liver oil	94	83	68	81	74	83
Unrefined fish oils	73	110	114	54	63	79
Other	17	16	22	20	14	23
Total imports	*1,143*	*967*	*1,047*	*857*	*591*	*753*
Exports(*a*)—						
Whale oil	1,532	1,315	997	640	502	492
Other	1	..	1	2	1	1
Total exports	*1,533*	*1,315*	*998*	*641*	*503*	*493*

(*a*) Australian produce only; excludes re-exports.