



Department of  
Primary Industries and  
Regional Development

Digital Library

---

Fisheries management papers

Fishing & aquaculture

---

1988

## Economics and marketing of Western Australian pilchards.

SCP Fisheries Consultants Pty Ltd

Follow this and additional works at: [https://library.dpird.wa.gov.au/fr\\_fmp](https://library.dpird.wa.gov.au/fr_fmp)



Part of the [Aquaculture and Fisheries Commons](#), [Business Administration, Management, and Operations Commons](#), [Economics Commons](#), [Marketing Commons](#), and the [Population Biology Commons](#)

---

### Recommended Citation

SCP Fisheries Consultants Pty Ltd. (1988), *Economics and marketing of Western Australian pilchards..*  
Fisheries Department Western Australia, Perth. Report No. 22.

This report is brought to you for free and open access by the Fishing & aquaculture at Digital Library. It has been accepted for inclusion in Fisheries management papers by an authorized administrator of Digital Library. For more information, please contact [library@dpird.wa.gov.au](mailto:library@dpird.wa.gov.au).

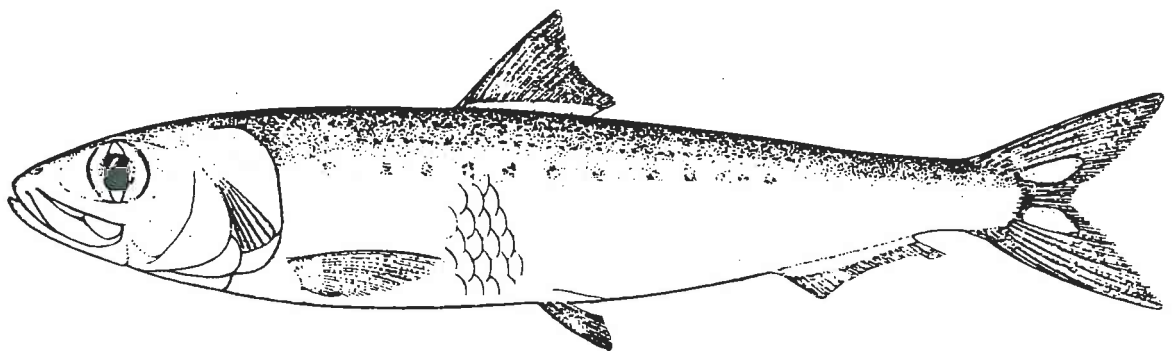
---

Fisheries Consultant's Report

---

# Economics and marketing of Western Australian pilchards

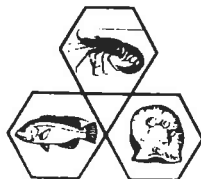
Report by  
SCP Fisheries Consultants Pty Ltd



---

Fisheries management paper No. 22

---



Fisheries Department of Western Australia

June 1988

---

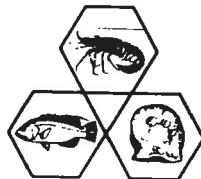
Fisheries Consultant's Report

# Economics and marketing of Western Australian pilchards

Report by

SCP Fisheries Consultants Pty Ltd

Fisheries management paper No. 22



Fisheries Department of Western Australia

June 1988

# Contents

	Page
1. Executive summary . . . . .	1
2. Introduction . . . . .	2
2.1 Background to the study . . . . .	2
2.2 Terms of reference . . . . .	2
2.3 Acknowledgements . . . . .	3
3. Size and extent of resource . . . . .	3
3.1 The Australian resource . . . . .	3
3.2 Western Australia . . . . .	4
3.3 Eastern and southern waters . . . . .	5
4. Level of production of pilchards . . . . .	6
4.1 Australian production . . . . .	6
4.2 Western Australia . . . . .	7
4.3 Victoria . . . . .	9
4.4 New South Wales . . . . .	10
4.5 Queensland . . . . .	11
4.6 South Australia . . . . .	11
4.7 Tasmania . . . . .	11
5. The Australian market . . . . .	12
5.1 Bait . . . . .	12
5.2 Petfood . . . . .	13
5.3 Fresh/frozen fish consumption . . . . .	15
5.4 Speciality and value added products . . . . .	15
5.5 Fish oil, fertiliser and meal . . . . .	16
5.6 Canned pilchard products . . . . .	16

6. Feasibility of pilchard/sardine canning . . . . .	19
6.1 Economics of canning pilchards . . . . .	19
6.2 Economic benefits from a pilchard canning industry . . . . .	21
7. Impact of falling catches and prices . . . . .	23
Appendix 1 Bibliography . . . . .	24
Fisheries management papers . . . . .	25

## Tables

1. Recorded landings of pilchards – Australia 1982/83 – 1986/87 . . .	7
2. Landings of pilchards by location of catch – Western Australia 1975–1986/87 . . . . .	8
3. Lakes entrance pilchard and anchovy catch 1968–84 . . . . .	10
4. Pilchards, anchovies, and whitebait sold in the Sydney fish market 1970/71–1985/86 by quantity and price . . .	11
5. Production of canned pet food in Australia 1979/80–1983/84 . . .	13
6. Imports of fish heads and other fish waste – Australia 1984/85–1986/87 . . . . .	14
7. Imports of fish meals and flour – Australia 1984/85–1986/87 . . .	16
8. Imports of pilchards, anchovies, and herrings to Australia 1982/83–1986/87 by volume and value . . . . .	17
9. Sardines – Analysis of source of Australian imports by unit value of product 1984/85–1986/87 . . . . .	17
10. Estimate of cannery production costs and returns for pilchard (425 g) and sardine (100 g) packs . . . . .	20
11. Indicative costing of sardine canning . . . . .	21
12. Estimated economic return from the establishment of a pilchard/sardine cannery in Western Australia . . . . .	22

## Maps

1. Distribution of pilchards in Australia . . . . .	5
---	---

## 1. Executive summary

---

**A**lthough no official estimate has been made of the size of the pilchard stocks in Australian waters, it is generally considered that the resource is under-exploited.

The 1986/87 Australian catch was about 8,300 tonnes. At present levels of fishing, it has been suggested that this could be substantially increased. The fishery is not in danger of over-exploitation. Rather, the problem could be that there is more fish available than existing markets could absorb. However, there are prospects for increasing the present volume of fish sold domestically and for developing new products and markets in Australia and overseas.

No significant growth is forecast for the bait market which currently absorbs about 3,000 tonnes of Australian pilchards annually and is the second largest market sector after petfood at 5,000 tonnes a year. The latter market is projected to increase by 50 per cent over the next three years, most of the growth being in the export sector. This does not necessarily mean that Australian fishermen will supply all the pilchards required to meet the expanding export market for fish-based petfood. Manufacturers could prefer cheaper priced imported pilchards.

There are also growth prospects for pilchards in products for human consumption - canned, fresh and value added - and possibly for industrial use for fishmeal and oil.

Growth in demand for pilchards for human consumption, whether for local sale, import replacement or export, will require time and capital to develop and will be steady rather than rapid. The products most likely to succeed are frozen whole and canned pilchards.

Canning of Australian pilchards is technically and financially feasible. While a stand-alone venture is unlikely to show high returns, a pilchard canning line added to an existing fish processing or canning operation has the potential to be viable. The main determinant of profitability would be the price received for canned product, itself a function of the market sector in which the product can be placed. The domestic market for canned pilchards currently exceeds 3,000 tonnes annually, all imported. Prospects for replacing a proportion of these imports with Australian product are favourable.

Western Australia is the major supplier of pilchards to Australian markets, the catch in 1986/87 being estimated to be 7,000 tonnes worth about \$2.5 million to fishermen.

Insufficient data are available to estimate the potential Western Australian pilchard catch. However there are encouraging prospects for expansion of the purse seine fishery in inshore waters adjacent to Albany, in Esperance Bay and to the east in the Cape Arid region. Indicative analysis of vessel operating economics suggests that the fishery is currently economically viable for efficient operators, and in the absence of a marked price decline resulting from increased production, the annual catch has the potential to double in the next few years.

## 2. Introduction

---

### 2.1 Background to the study

**W**estern Australia is currently the Australian state with the largest commercial catch of pilchards. Production has been increasing steadily since 1978/79 and in 1986/87 was estimated at 7,000 tonnes. Most of the catch was sold for petfood manufacture or fish bait.

Prospects for further increasing production without endangering the resource are considered favourable. The extent of expansion will depend on the ability of existing and possible new markets for human consumption to absorb greater quantities of pilchards at price levels which are attractive to fishermen.

Most of the Western Australian pilchard catch comes from King George Sound and from the southern coast off Albany where the number of vessels allowed to catch has been controlled. Prospects for increasing production in this area are limited. However, there are indications that considerable quantities of pilchards could be caught in waters to the east and west of Albany, in the inshore declared purse seine development zone.

Before allowing fishermen to catch more pilchards in these waters, the Western Australian Government decided that an investigation should be undertaken of the Australian pilchard resources, the domestic and export market situation and the economics of the industry, including the possible establishment of sardine canning. In March 1988 the Minister of Fisheries commissioned SCP Fisheries Consultants Australia Pty Ltd to undertake the study.

### 2.2 Terms of reference

- i) Assess the level of production of pilchards from WA, SA, Victoria and the other States.
- ii) Report on the extent and size of the resource, as known.
- iii) Examine the capacity for and likelihood of increased production from each of the States in the short to long term
- iv) Report on the size of the Australian bait market for pilchard, the capacity for absorbing increased production and the likely price effects.
- v) Report on the size of the Australian petfood market for pilchard and the capacity for absorbing increased Australian production.
- vi) Report on the export potential for frozen pilchards.
- vii) Report on the availability of pilchard substitutes in the petfood market, especially in relation to pricing structure for imports into Australia as an alternative to local supplies.
- viii) Report on the likely costs and pricing structures for the establishment of a fish cannery on pilchards in WA or within Australia. This assessment would need to provide an indication of the possible size of the industry, cost of raw materials for viability, the amount of product required and market potential as an import substitute for sardines within Australia and as an export product.

- ix) If feasible, to report on the other economic benefits that could flow to Western Australia should a cannery be located in Perth or Albany.
- x) Report on other alternative products and their markets available for pilchards.

## 2.3 Acknowledgements

The consultants received considerable help from a number of people associated with production, administration and marketing of pilchards in Australia. Their assistance is gratefully acknowledged.

Close cooperation was received from the fisheries authorities in all States in providing statistical and background data on their local pilchard fisheries. Companies involved in the marketing of various pilchard products for bait, petfood and for human consumption all provided data and were willing to discuss the potential development of current and potential markets. The licensed pilchard fishermen of Western Australia met with the consultancy team both collectively and individually to provide a perspective on problems in the catching sector.

Particular mention should be made of the support provided by Mr Peter Millington and the staff of the Fisheries Department of Western Australia who promptly met any request by the consultants for assistance and who provided the required backup services to ensure that the work of the team could proceed in good time.

## 3. Size and extent of resource

Pilchards are found in coastal waters from Queensland to Western Australia. Current exploitation is light, except in Western Australia. Proposals to increase catches need to be treated cautiously because of fluctuations in abundance and doubts about the existing markets to absorb significantly greater quantities of product. More will need to be known about the extent of the resource so measures can be taken to guard against over-exploitation.

### 3.1 The Australian resource

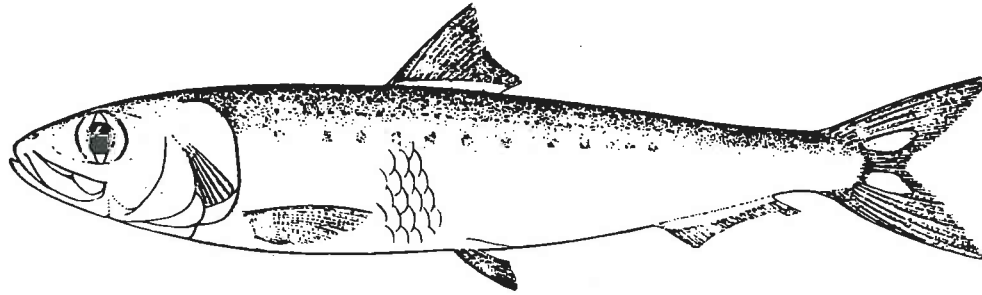
Pilchards (*Sardinops neopilchardus*) are found in bays, inlets and coastal waters from southern Queensland around the south coast of Australia to Shark Bay in Western Australia. They also extend southwards off eastern Tasmania. The distribution of the pilchard populations is shown on Map 1.

Recent information on the extent and population size of pilchard stocks in Australian waters, outside Western Australia, is not extensive. However, clupeoid stocks (of which pilchards make up the bulk) in southern Australia were the subject of sporadic biological research, resource survey and experimental fishing between 1937 and 1970.

The most intensive work was done by the CSIRO scientist, Dr M Blackburn, who indicated that there were three distinct races of pilchards in eastern, south-eastern and south-western waters and that the average size of fish sampled in Western Australia far exceeded that of any other Australian region, except Tasmania.



**Figure 1** Southern Pilchard (*Sardinops neopilchardus*).  
Maximum length: 30 cm



CSIRO research cruises in 1953, exploratory fishing by Soviet research vessels during the mid 1960s, catches made by Southern Ocean Processors' trawlers in the late 1970s and aerial surveys in 1946, 1978 and 1980 reported the presence of considerable quantities of pilchards in the Great Australian Bight.

### 3.2 Western Australia

Information on the extent of the Western Australia pilchard resource was reviewed by Maxwell (1979). He concluded that insufficient data were available to estimate potential yield for a fishery based off the south coast of Western Australia.

Data reviewed suggested that in the region between Albany and the Recherche Archipelago, surface schools were mostly distributed in bays and inlets. The use of large purse seine nets in shelf areas further offshore was judged to be difficult due to factors such as bad weather, rough bottom profile, confused ocean currents and an apparent "wildness" of pilchard shoals. The densest concentrations of pilchards appeared to be east of the Recherche Archipelago around Cape Arid and in the northern waters of the Great Australian Bight.

Robins (1985) suggested that there could be a population of pilchards of sufficient magnitude for tonnages ranging from 7,000 to 15,000 to be taken on a sustained basis in an area extending 80 miles either side of Albany.

In the early 1970s he made a rough estimate of what the population of pilchards might be along the coast of Western Australia between the Western Australian/South Australian border and Geraldton. Sustainable yield was estimated at 50,000 tonnes.

Robins described this estimate as tenuous, saying that it was deduced from a comparison of the nutrient levels and plankton volumes on which pilchards feed between the south-west coast of South Africa, where there is a large pilchard fishery and the Western Australian coast. The levels of plankton off Western Australia were about one-sixth of those off South Africa.

In Western Australian waters, the peak of the onshore season was between March and October. This applied to waters off Esperance, Albany, Fremantle and Geraldton, and supported the belief that the main migration was offshore-onshore-offshore.

The main part of the population's offshore distribution along the south coast and determined from aerial surveys, appeared to be bounded by the 100 metre isobath. However, there were reports of catches of pilchards by bottom trawls along the edge of the continental shelf on the south and west coasts.

Robins concluded from an examination of available information and the history of the King George Sound fishery that further development along other parts of the south coast of Western Australia could be considered.

In a recent report, Robins (1987) reduced several of the previously derived yield estimates.

### 3.3 Eastern and southern waters

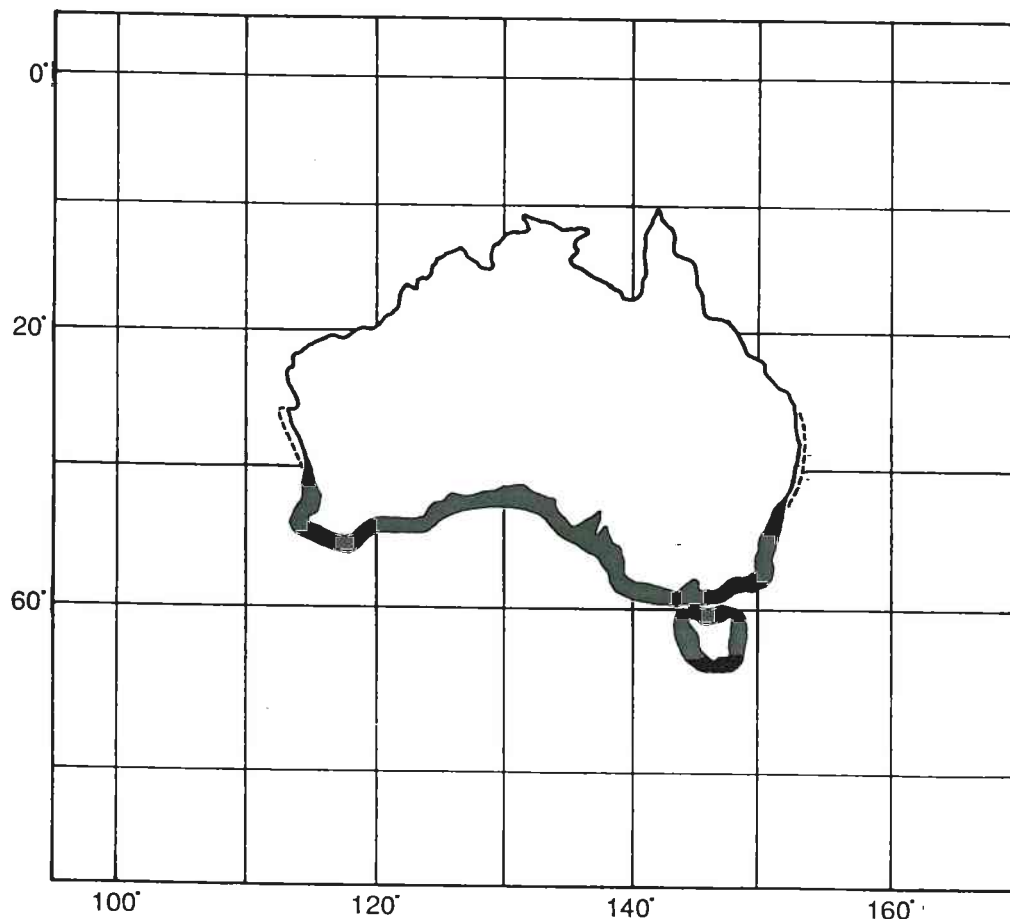
Southern pilchards are found in bays, inshore and offshore waters of South Australia, Victoria, Tasmania and southern New South Wales and are closely related to the species found in northern New South Wales and southern Queensland waters (Blackburn 1950).

In east coast waters, pilchards are found throughout the year in offshore waters as far north as Sandy Cape (Queensland) and at times entering bays and estuaries in New South Wales. Some surface shoaling of immature fish occurs in spring and summer, but the main spawning and associated mass surface shoaling activities occur through autumn and winter.

In Victorian waters, the spawning and surface shoaling season is spring and summer and in South Australia, summer and autumn. Shoaling is restricted to bay and inshore waters. In Port Phillip Bay (Victoria), pilchard shoals are most abundant during the period August to May, varying in extent and duration from year to year. Pilchards are found in deeper waters outside the Bay during winter months. Off eastern Victoria, pilchards occur in coastal waters throughout the year.

In eastern Bass Strait and northern and eastern Tasmanian coastal waters, pilchards are present from spring to autumn, occasionally entering bays and estuaries.

**Map 1:** Distribution of pilchard resources in Australia



The pilchard-spawns in the open sea and after several months the juveniles move inshore to the bays and estuaries where they spend a year before moving out to join adult stocks. In southern New South Wales this offshore movement occurs from September to December and constitutes the first run of shoaling pilchards. Juveniles and adults frequently are found together in Victorian waters.

The main south-eastern fishing localities for pilchards, which are associated with anchovies in many areas, are open waters off Lakes Entrance and in Port Phillip Bay. They are also caught in the Gippsland Lakes. Quantities of pilchards have been taken along the southern New South Wales coast and off South Australia by tuna fishermen for use as live bait. Small incidental catches of pilchards have been reported from southern Queensland and on the eastern coast of Tasmania.

There is concern, particularly in South Australia, over the possible impact that the catching of greater quantities of pilchards could have on southern bluefin tuna stocks. However, Robins (1987) concluded that it was unlikely that any changes in southern bluefin tuna abundance could be linked to changes in pilchard abundance, due to fishing, especially given environmental variations. It was likely that tuna would switch prey preferences to other species that should become more abundant in the face of declining competition from pilchards.

No accurate assessment is available of the size of the pilchard resource in eastern and southern Australian waters, which is surprising in view of the extent of biological research undertaken on clupeoid stocks in the area in the 1950s.

Winstanley (1979) noted that there was potential for a far greater degree of exploitation of clupeoid fish (the group including pilchards) in south-eastern and southern Australian waters. Kesteven's 1967 estimate of 100,000 tonnes for the prospective catch off south-eastern and southern Australia remained unsubstantiated. Observations by Blackburn and Tubb (1950) and fishing experience showed the abundance of clupeoids varied from year to year.

## **4. Level of production of pilchards**

Production of pilchards in Australia in 1986/87 was about 8,300 tonnes. Of this quantity, some 7,000 tonnes was landed in Western Australia, 900 tonnes in Victoria and 146 tonnes in New South Wales. A further 200 tonnes was caught in Queensland, Tasmania and South Australia. Indications are that present Australian production could be increased substantially without endangering the resource, providing additional markets can be found. Western Australia is capable of doubling its annual catch to 14,000 tonnes over a three year period. The Victorian catch could be expanded to about 3,000 tonnes and New South Wales, South Australia and Tasmania collectively to 1,000 tonnes.

### **4.1 Australian production**

The quantities of pilchards landed in Australia for commercial purposes bear little relationship to the apparent resource. Recorded catches in the past five years have varied between 4,300 tonnes and just over 8,000 tonnes in 1986/87. Details of recent annual catches are given in Table 1.

**Table 1:** Recorded landings of Pilchards — Australia 1982/83–1986/87

	Western Aust		Victoria		New South Wales		Total
	tonne	%	tonne	%	tonne	%	tonne
1982/83	2008	35.9	3330	59.5	257	4.6	5595
1983/84	2774	37.7	4337	59.0	238	3.2	7349
1984/85	4166	96.6	0	0.0	148	3.4	4314
1985/86	5333	87.6	554	9.1	202	3.3	6089
1986/87	7000	86.8	914	11.3	146	1.8	8060

**Notes:**

1. W.A. catch for 1986/87 estimate only.
  2. Victorian catch 1982/83 – 1983/84 Lakes entrance only, 1985/86–1986/87 Port Phillip Bay only
  3. N.S.W. Fish Marketing Authority changed date of statistical year from 30 September to 31 March between 1985/86 and 1986/87.
- Source: As shown for individual State catches in Tables 2 – 4.

The annual Australian totals mask some major shifts between States in the pilchard catch. In the late 1970's Victoria was the major producing State, though with the catch going into fishmeal, the value was low. This industry closed down in 1984. By contrast Western Australia has been showing a steady increase in catches over the past seven years with the bulk of the catch being sold at relatively high prices due to the generally high quality.

## 4.2 Western Australia

The major fishing area for pilchards (known locally as mulies) is off the south coast of Western Australia where landings have increased rapidly in the past three years. The main catching area is in King George Sound and Princess Royal Harbour off Albany. There are small scale operations off Esperance to the east, in Geographie Bay off Busselton on the west coast, Cockburn Sound and Fremantle. Fisheries are developing along the south coast off Cheynes Beach, Bremer Bay and Torbay.

Between 1975/76 and 1982/83 the annual catch of pilchards from Western Australian waters varied between 632 and 1,656 tonnes (Table 2). During the three years since then catches have increased rapidly to 5,334 tonnes in 1985/86. Preliminary catch estimates for 1986/87 of approximately 7,000 tonnes indicate that the growth rate of more recent years has been sustained.

Commercial purse seining for pilchards in King George Sound started in 1951 by a single vessel but it was shortlived. Fishing recommenced in 1963 in a small way by fishermen using drop nets from the main wharf at Princess Royal Harbour. Catches were sold to sport fishermen for bait.

In 1984/85, production of pilchards in King George Sound and Princess Royal Harbour was 3,544 tonnes. By 1986/87, it had increased to an estimated 5,800 tonnes in the Albany region. Nearly all the catch was sold for canned petfood (4,000 tonnes) and fish bait (1,900 tonnes). The Cockburn Sound fishery produced about 766 tonnes of pilchards and Esperance under 10 tonnes.

In addition to the 25 boat limited entry purse seine fleet, there are 11 endorsements for fishermen to fish by the drop net method off the Albany wharves but the number who regularly operate is three. In peak years they catch more than 500 tonnes of pilchards.

There is a possibility of a fishery in the Recherche Archipelago off Esperance, similar in size to that in King George Sound, but its development would require larger vessels and slightly different catching techniques.

**Table 2:** Landings of Pilchards — Western Australia by location of catch 1975 to 1986/87

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	
Total Qty	985628	632055	1105487	889761	826286	1488736		1656868	875891	2694095	4166497	5333602
Albany Area Only												
Purse Seine	10390		4900	14771	80888	955730	1088265	486809	1491623	3509402	4695154	
Drop Nets	164643	264635	658767	707296	381536	237882	206751	44445	101840	24443	28453	
Total	175033	264635	676432	722317	475914	1217622	1295666	531256	1594553	3543980	4759228	
Zone 1 Northern	125	90	216	200	28	140	114	1				3527
Zone 2 Metropolitan	539356	145437	181807	16959	95665	202563	309567	273031	843930	474070	375791	
Zone 3 Geographie	271111	220748	238584	139782	225142	62417	48286	71083	153687	118960	155325	
Zone 4 Augusta			30		19		150		8000			
Zone 5	175036	265780	677089	722770	476175	1217868	1296504	531776	1689478	3543980	4759228	
(Albany)	-175033	-264635	-676432	-722317	-475914	-1217622	-1295666	-531256	-1594553	-3543980	-4759228	
Zone 6 Eastern			4420	10050	29157	5848	2243			6535	39731	
Other			3341		100					21000		
<hr/>												
Zone 1:	Northern - North of Lancelin											
Zone 2:	Metropolitan - Lancelin to Cape Vovard											
Zone 3:	Geographie Bay - Cape Vovard to Cape Hamelin											
Zone 4:	Augusta - Cape Hamelin to Windy Harbour											
Zone 5:	Windy Harbour to Doubtful Island (not including Albany)											
Zone 6:	Doubtful Island to Eastern Group											

Source: Various W.A. Fisheries Department publications.

## 4.2.1 Management

In Western Australia, under the Offshore Constitutional Settlement, the Government has jurisdiction over the catching of pilchards and certain other small pelagic fish in a defined area off its coast. South Australia has yet to reach agreement with the Commonwealth over the management of surface swimming species other than tuna.

In 1988, when a limited entry management plan was introduced, there were 25 vessels licensed to purse seine for pilchards in King George Sound. Of these vessels, 15 were also licensed to fish in Princess Royal Harbour. The maximum net length allowable is 250 metres.

There has been a gradual increase in the catch per unit of effort by purse seiners in King George Sound (Robins, 1987). In 1981 it was 0.49 tonnes per boat day. In 1986 it had risen to one tonne per boat day. The average number of days fished was 20 per month.

## 4.2.2 Vessels and catching method

In King George Sound, many of the purse seiners previously operated as southern bluefin tuna pole and live bait boats but the owners sold their quotas when individual catch quotas were introduced. The vessels are all under 12 metres in length, many with fibreglass hulls. The wheelhouse is forward, leaving a clear working space aft for the stowage of plastic fish boxes, in which the catch is held, and the purse seine net. They carry a crew of two or three.



Pilchards are "chummed" to the surface with pollard. The purse seine net is then run around the school from a catcher vessel using an aluminium outboard-powered dinghy on the other end of the net. The net is hauled by a hydraulic-powered block hung from the davit on the stern of the catcher vessel.

Pilchards are present all year round in King George Sound but the most productive period is from March to September, the peak being in the winter months of May, June and July. In Princess Royal Harbour there are two peaks, in April and May and in September.

Purse seiners working in King George Sound usually fish in the morning and evening. Fish is taken in plastic boxes to the Kailis & France depot and freezer on the Albany foreshore or to private processing plants in the town.

A purse seine fishery has also operated in Cockburn Sound and in waters off Fremantle for a number of years. Currently this fishery is composed of nine full-time purse seine fishermen who use power blocks to haul their nets. A number of other fishermen use hand hauled purse seine nets seasonally. The Government has recently released details of a proposal to control the development of this fishery in waters bounded by Lancelin in the north and Cape Bouvard in the south.

These fishermen target bait species, pilchards, scaly mackerel, and occasionally Perth herring and yellowtail scad. Between 1,100 and 1,200 tonnes of fish per year are caught, of which 500 tonnes are pilchards. Vessels are equipped with echo sounders and sonar, which allow bait schools to be accurately located.

Most of the pilchard catch is sold as angling bait. To maintain product quality, operators work mostly in relatively nearshore waters so that their relatively small nets can be operated efficiently. This also allows them to deliver catches quickly to shore-based processing plants.

Scaley mackerel are a preferred bait for the rock lobster fishery operating in deep waters because it does not break-up in the pot. The annual catch is between 500 tonnes and 1,000 tonnes from the west coast.

#### 4.2.3 Development strategy

In November 1987, the WA Minister for Fisheries announced a development strategy for inshore purse seine fisheries other than those in King George Sound. Six development areas were defined. They were: Lancelin north, Lancelin to Cape Bouvard (near Mandurah), Cape Bouvard to Cape Hamelin, Cape Hamelin to Point D'Entrecasteaux, Point d'Entrecasteaux (Windly Harbour) to Doubtful Island and Doubtful Island to 125 degrees E longitude.

There is at present no fishing north of Lancelin. South of Cape Bouvard there are about four purse seiners that have been operating in the area for a number of years but the lack of shore based processing facilities has constrained further development. There is also small-scale fishing in Esperance Bay which is situated within the Doubtful Island to 125 degree E longitude area.

### 4.3 Victoria

Pilchards, anchovies and sprats have been taken commercially in Victorian estuaries, bays and open waters for many years.

For most of the past 20 years, the Victorian pilchard/anchovy industry was based on Lakes Entrance where Mitchelson Bros started a semi-industrial fishery in 1969 catching anchovy with most of the catch going into fishmeal. The fishery petered out in the late 1970's for various reasons including accessibility of the resource and loss

of profitability. In 1983 the plant was purchased by another venture but this folded after two seasons fishing. Catch data is set out in Table 3.

**Table 3:** Lakes Entrance Pilchard and Anchovy catch 1968-1984.

	Pilchards tonnes	Anchovies tonnes
1968/69		3447
1969/70		4988
1970/71		6463
1971/72		5918
1972/73		3233
1973/74		2059
1974/75		840
1975/76		813
1976/77		2954
1977/78		22
1978/79		2585
1979/80		442
1980/81		0
1981/82		0
1982/83	3330	0
1983/84	4337	2

Source: Lakes Entrance Processors Pty Ltd  
Fishermen's monthly returns.

Currently there is a small but significant pilchard/anchovy fishery in Port Phillip Bay where pilchards are most abundant between August and May.

Catches in the last two years have been:

	Pilchards	Anchovy
1985/86	554.5	64.7
1986/87	913.8	125.7

There is some concern among fishery administrators in Victoria that the Bay resource is being overutilised and that there will be effects on other fisheries and the penguin population. There are therefore plans to limit the Bay catch and to encourage the fishermen to go offshore.

The Bay fishery is based on small boats, 10 to 18 metres. There are eight or nine fishermen landing the current catch of which half are exclusively working pilchards and the other half are seasonal scallop fishermen working the pilchards in the off season. Two to three tonnes/day are put on the Melbourne fresh market, some goes for bait, depending on the season, and the bulk goes to the petfood market. Most of the current Bay catch is purchased by Trawl Industries of Geelong at \$250/tonne.

Trawl Industries have plans to expand their pilchard catching operations off the southern Victorian coast. They have three purse seine vessels with a total capacity of 180 tonnes and the potential to catch up to 10,000 tonnes/year. They are currently working mackerel in December-June and will work pilchards in the smaller season August-November as the main season January-June clashes with the mackerel season. They are foreshadowing pilchard catches up to 3,000 to 4,000 tonnes/year.

#### 4.4 New South Wales

Between 140 and 300 tonnes of pilchards are caught annually in New South Wales. Pilchard catches come mostly from southern waters in Jervis Bay and Twofold Bay (Eden). Since the collapse of the bluefin tuna in NSW the only catch is for the fresh market in Sydney. Details of fresh market throughput are given in Table 4. The NSW pilchard fishery is seasonal and fishermen tend to operate on an opportunistic basis. If prices are attractive and they can find suitable markets, they could expand their operations considerably and catch between 500 and 1,000 tonnes annually.

**Table 4:** Pilchards, anchovies, and whitebait sold in the Sydney Fish Market 1970/71 — 1985/86 by quantity and price.

Year	Pilchard			Anchovy			Whitebait		
	Qty Sold tonnes	Unit \$/kg	Value	Qty Sold tonnes	Unit \$/kg	Value	Qty Sold tonnes	Unit \$/kg	Value
1970-71	133.453	0.31		25.625	0.29		Not separately recorded until 1980-81		
1971-72	118.325	0.24		12.831	0.40				
1972-73	94.950	0.49		29.597	0.29				
1973-74	103.975	0.68		9.148	0.67				
1974-75	109.412	0.71		46.066	0.54				
1975-76	191.852	0.67		11.118	0.90				
1976-77	231.823	0.64		21.393	0.77				
1977-78	264.951	0.52		23.611	0.86				
1978-79	170.794	0.86		14.864	0.66				
1979-80	112.049	1.24		15.503	0.54				
1980-81	112.147	0.82		12.709	0.79		23.322	1.09	
1981-82	188.862	0.86		16.288	0.69		22.039	1.64	
1982-83	257.036	0.86		13.943	0.88		26.440	1.52	
1983-84	237.683	0.76		10.726	1.11		54.218	1.43	
1984-85	148.190	1.29		5.523	1.05		29.999	1.92	
1985-86	201.861	1.03		13.281	0.74		17.888	2.04	

Source: NSW Fish Marketing Authority Annual Reports

## 4.5 Queensland

Pilchards are not a commercially targeted species in Queensland. There is some production and sale from net recoveries mainly from the ocean beach netting aimed at other species. There is said to be some catching for bait in the Kingscliff-Tweed Heads region if there is a shortage. The species caught is the white or yellow pilchard which is considered inferior to the WA blue pilchard.

WA pilchards are popular bait among Queensland commercial and sport fishermen. Distributors in that State also supply bait to popular tourist resorts in northern New South Wales. Sales are estimated at more than 1500 tonnes annually.

## 4.6 South Australia

The main catches of pilchards in South Australia are for southern bluefin tuna bait. They are thought to total under 50 tonnes annually. The official annual catch recorded is under one tonne and is sold on local markets. On information available from past surveys referred to earlier, it should be possible to considerably increase pilchard production in waters westward to the Western Australian border.

However, the South Australian Fisheries Department is discouraging owners of purse seiners capable of freezing catches at sea from taking pilchards until more is known about the resource and the impact on the Southern bluefin tuna fishery can be assessed.

## 4.7 Tasmania

Pilchards occur along the northern and eastern Tasmanian coasts from Spring to Autumn and there have been reports of incidental catches but nothing of significance.



## 5. The Australian market

---

*The total market for pilchards in Australia is estimated at about 20,000 tonnes of whole fish equivalent, sold as petfood, fishing bait, fresh and canned for human consumption and sundry uses. Canned imports are equivalent to 10,000 tonnes of fresh fish of which half is for petfood. There is potential for petfood manufacturers to increase their purchases, mainly for export markets, particularly in Japan. There are also prospects for increased sales for import replacement, export for human consumption and canning, specialty smoked and salted products. Australian landed prices for pilchards are high by world standards and prices may have to fall from present levels to make new markets economically possible. There is evidence that fishermen can withstand some fall in price.*

Of the 20,000 tonnes of pilchards sold in Australia, less than half is supplied by Australian production with the balance being imported in various forms. The largest single sector of the market for the Australian catch is petfood with some 5,000 tonnes, of which Western Australia accounts for 80 per cent. Bait used by sport and commercial fishermen in all states of Australia is the next largest sector at 2,500 tonnes. Less than 500 tonnes is sold for human consumption.

A significant sector of the market is canned pilchards or sardines for human consumption. This is wholly supplied by imports which in 1986/87 were 3,015 tonnes of finished product, equivalent to 5,500 tonnes of raw fish and with a landed value of \$12 million. There is no canning of Australian pilchards at present, although pilot-scale canning has been undertaken by West Ocean Canning in Perth.

Describing the market for pilchards has some problems in terminology. The terms pilchard, sardine and anchovy are used differently in various parts of the world and in respect of various products. The same species may appear under all the names above, depending on the size of the fish and the manner in which it is prepared for sale. For industrial uses such as bait and pet food, the market is segmented between pilchards and other fish. However, there are cross overs or substitutions, depending on relative prices. Development for this market in the pilchard fishery cannot be seen in isolation from other related fisheries.

### 5.1 Bait

Pilchards are used for bait by commercial and sport fishermen. They are particularly popular among anglers throughout Australia as preferred bait for tailor, snapper, bream and flathead. In the commercial fishing industry pilchards are used live and frozen to catch southern bluefin, bigeye and yellowfin tuna by pole and line and long-line methods. They are considered excellent bait by trap fishermen and in some sectors of the rock lobster fishery.

The market for fish bait for the Western rock lobster fishery is 10,000 tonnes a season, or about one kilogram for every rock lobster caught. Imported New Zealand kahawai (Australian salmon) heads are the most popular bait (2,500 tonnes per season) followed by Tasmanian jack mackerel (2,000 tonnes), scaley and blue mackerel (1,000 tonnes), mullet (800 tonnes), tuna heads (800 tonnes), pilchards (600 tonnes) and Australian salmon heads (400 tonnes).

Substantial quantities of fish heads, fish waste and offal are imported into Australia. (see Table 6) However the statistics do not define where the product goes.

It is believed that most is purchased by petfood manufacturers with some sold as bait, mainly to the rock lobster fisheries.

Sports fishermen are the major buyers of Western Australian pilchard bait, with some 2,500 tonnes purchased annually. The product is frozen in 2.5 kg blocks and packed in cartons of 8 blocks (20 kg). Most are sold through wholesalers to anglers supply shops, either in whole blocks or repacked into smaller retail packs. WA pilchards have a particular market segment in this trade and are seen as a premium product.

The bait market is seen as having only limited growth prospects. While there may be some growth available in the long-line tuna fishery, other fisheries such as the Port Phillip Bay snapper fishery is under threat from overfishing and long term catches may fall. The advent of an industrial scale jack mackerel fishery in Tasmania and proposed increases in the Victorian jack mackerel and pilchard catch will maintain pressure on the market share for WA pilchards, though their position as a recognised premium quality product should help to maintain current market volumes.

The price for pilchards supplied to the bait market has dropped from between \$600 to \$650 in 1978 to between \$450 and \$600 in 1988. Prices are lower during the peak of the catching season in the winter and are higher in summer. Estimated demand for pilchards for bait is between 3,500 and 4,000 tonnes a year. About 80 per cent of supplies are sold in eastern states, the main customers being in northern New South Wales and Queensland.

The overall market for bait fish is likely to be inelastic and not subject to major price effects. In commercial fisheries, such as rock lobster, the cost of bait is only a small proportion of the price received for the catch. However, variation in demand can occur if there are seasonal changes in demand, due to weather for example, and decreased fishing effort. The same applies to the sports fishing sector.

The decline in prices received for pilchards for bait between 1978 and 1988 is believed to be largely due to increased domestic catches and the availability of low cost imports. The low price levels in 1988 were exacerbated, in part, by floods in eastern Australia which restricted sports fishing in the summer and autumn.

## 5.2 Petfood

Pilchards comprise a significant part of the fish based petfoods sold in Australia. The market is significant with Australia's domestic cat population estimated at two million. The total market for canned petfood in Australia is of the order of 200,000 tonnes/year and would appear to fluctuate by as much as 12.5 per cent from year to year. Detailed statistics were last published by the ABS in 1983/84. The most recent

**Table 5:** Production of canned petfood in Australia 1983/84 — 1979/80

Year	Production tonnes	Sales and Transfers	
		Quantity tonnes	Value \$
1983/84	199078	na	na
1982/83	189975	181232	155256
1981/82	174079	183503	149591
1980/81	194602	194176	146195
1979/80	199578	207275	133320

Source: ABS Bulletin 8303.0 Item 159.01

five year figures are given in Table 5. No official figures are published on the composition of the ingredients used in petfood.

The amount of fish used in petfood manufacture is estimated to be 18,000 tonnes raw fish equivalent. It is important to distinguish between fish used in petfood produced in Australia and that which is imported in wholly made up form.

A major buyer of pilchards for petfood uses about 13,000 tonnes of raw fish per year comprising 5,000 tonnes Australian pilchards, 4,000 tonnes imported pilchards (from Thailand), 1,000 tonnes headed and gutted jack mackerel from south eastern Australia, 3,000 tonnes fish heads and frames from the Sydney and Melbourne fish markets and 1500 tonnes New Zealand kahawai (Australian salmon). Data on the imports of fish heads and other waste are given in Table 6.

**Table 6:** Imports of fish heads and other fish waste — Australia 1984/85 to 1986/87

Year	Fish Heads		Fish Waste		All Fish Offal	
	291.94.01		291.94.09		Total	Total
	Quantity	Value	Quantity	Value	Quantity	Value
	tonnes	\$'000	tonnes	\$'000	tonnes	\$'000
1984/85	2194.25	844.67	1428.48	834.50	3622.73	1679.17
1985/86	2928.97	1396.00	954.78	1079.00	3883.75	2475.00
1986/87	2861.04	1710.00	891.52	1616.00	3752.56	3326.00

Source: ABS Foreign Trade Statistics

Another marketer of fish based cat food imports 10,000 tonnes of prepared canned fish-based petfood, equivalent to 5,000 tonnes of raw fish product. All the product comes from Thailand where SAFCOL has six canneries.

The cost of raw material in Thailand is between \$250 and \$300/tonne landed at the factory. The price being paid for Western Australian pilchards is \$470/tonne at the factory which translates into a price to fishermen of \$320 per tonne in the current (1988) season, down from \$350 in 1987.

Future expansion of pilchard production for petfood will depend in the first instance on price. Imports currently represent 9,000 tonnes of fish equivalent so that import replacement would have the potential to increase local catches by 150 per cent. However, the imported fish is landed at less than the price of the Australian fish. To land fish at a competitive price would imply lower unit costs which in turn might imply some shift in catching method to an industrial scale.

Apart from price, the colour of Australian pilchards may affect their capacity to fully replace imported fish. It is said that they are grayer in colour than the imported fish which are added to the mix to make a product that is whiter and more attractive to pets. There may therefore be a technical limit to expansion available in the petfood market.

However, the quality of Western Australian pilchards is generally regarded highly by petfood manufacturers. This gives them a competitive edge over imported pilchards and other species of fish caught by large purse seiners supplying "industrial" fish to eastern states buyers.

### 5.3 Fresh/frozen fish consumption

There is a small but significant market for fresh pilchards in capital city fish markets. For instance, the Sydney Fish Market handles between 150 tonnes and 250 tonnes of fresh pilchards per year at prices between \$0.86 and \$1.29/kg (Table 4, Section 5.4). It is said that Sydney would be able to take more fresh pilchards if they were available. However in terms of the whole industry, the amount represented by actual or potential fresh market sales will not have a major long-term influence on the industry.

The market for frozen whole pilchards may be more significant. The first step in this chain would be the licensed fish processors. Under the Western Australian Fisheries Act, the licensing of fish processing establishment is controlled. There are currently 19 processors licensed for receiving and handling pilchards in Western Australia. Of these, three licenses belong to one company but are at separate locations and there is one licensee not operating. The licensed processors are distributed as:

Albany: 9

Esperance: 5

Other locations: 5

Total: 19

On the south coast (Albany), it is unlikely that more "full" pilchard processing licences will be issued except for the production of value added, smoked or otherwise processed pilchards. Individual fishermen processing (freezing) their own catch would still be eligible to receive a licence.

The most promising development in the frozen pilchard market is export to the Middle East. Experimental shipments of frozen whole pilchards (40 tonnes) have been made and prospects for increasing supplies are currently strong with indications at present for a market potential of up to several thousand tonnes per year. Much however will depend on freight rates, currency rates and prices offered as well as the quality of presentation. Selected pilchards, graded to size, in 25 kilo independently quick frozen packs were sold for as much as A\$1.18/kg, though at a time when A\$1 was worth US\$0.68. A much stronger Australian dollar will put this trade at risk.

### 5.4 Speciality and value added products

Apart from freezing fresh pilchards, there are a number of value added products which have the potential to generate additional sales opportunities for the pilchard industry. European markets offer prospects for value added products, particularly salted and canned pilchards and anchovies.

There are promising developments in the salted and canned product produced in Western Australia. With assistance from the Rural Innovation Centre, Mendolia Fisheries of Fremantle have established a factory to produce anchovies and salted sardines and pilchards. The initial aim is an annual production of 250 tonnes of processed product per year. Domestic markets will be targeted initially using attractively labelled European style cans. Whole and filleted products will be produced. Prices of \$5 a kilogram for sardines and \$11 per kilogram for anchovies are being offered by wholesalers. Expected retail prices are between \$12 and \$15 a kilogram for sardines and between \$15 and \$22 a kilogram for anchovies.

Other value added pilchard products being considered are anchovy pastes, bottled preserved anchovies, dried anchovies and sardines.

It is considered likely that upwards of 1,000 tonnes of pilchards a year could be needed in future for value added products.

Pilchards (marketed as sardines in many countries) contain Omega 3, a unique class of unsaturated fat found exclusively in marine animals and plant life which is being hailed by medical researchers as having potential for combatting heart disease in humans. Omega 3 also holds promise in the treatment or prevention of rheumatoid arthritis, migraine headaches, kidney disease and breast cancer. Pilchards caught in southern Australia are claimed to be as high in Omega 3 as those from Northern Hemisphere waters.

In Europe, canned sardines have become so popular because of their health properties that suppliers are finding it difficult to cope with demand. This has resulted in retail prices climbing by more than 40 per cent in the past year. There has been a corresponding flow-on to Australia.

### 5.5 Fish oil, fertiliser and meal

Other possible uses for pilchards are for fish oil, fertiliser and meal and for making high protein pellets for fish and prawn farms. Raw material production for these products is difficult to forecast but could amount to several thousand tonnes annually.

Imports of fishmeal amount to some 12,000 tonnes/year. Much of this is from northern Europe and South America and is from industrial scale fisheries. The figures for the most recent three years are given in Table 7. The development of the industrial fishery based on jack mackerel in southern Tasmania must currently be seen as imposing stiff competition for any Australian fishmeal based on pilchards. Current catch of Australian Fisheries Development Ltd is 40,000 tonnes and the company is projecting catches up to 60,000 tonnes/year in the near future. Price paid for jack mackerel is \$65/tonne.

**Table 7:** Imports of fishmeals and flour — Australia 1984/85 to 1986/87

Year	Fishmeal/Flour Pelletised		Fishmeal/Flour Bulk		Fishmeal/Flour All Forms	
	081.42.01		081.42.09		Total	Total
	Quantity tonnes	Value \$'000	Quantity tonnes	Value \$'000	Quantity tonnes	Value \$'000
1984/85	1462.63	607.39	11271.56	5193.26	12734.19	5800.65
1985/86	2004.78	812.00	7966.41	3370.00	9971.19	4182.00
1986/87	1499.08	793.00	10784.29	4674.00	12283.37	5467.00

Source: ABS Foreign Trade Statistics

### 5.6 Canned pilchard products

The market for canned pilchards/sardines in Australia is wholly supplied by imports. These amounted to 3,015 tonnes in 1986/87 worth some \$12 million landed value.

The supply was drawn from 17 countries in 1986/87. With such a wide range of suppliers there is a wide range of quality and landed value. The data in Table 9 below would show that some of the largest quantities imported are high value products indicating that the market is selective for quality. In fact there are two classes of product, those from cold water fisheries such as Norway and Scotland and the warm water fisheries such as Thailand, Portugal and Korea.



**Table 8:** Imports of pilchards, anchovies, and herrings to Australia, 1982/83 to 1986/87 by volume (tonnes) and value (\$A).

Year	Pilchards			Anchovies			Herrings		
	Volume tonnes	Value \$	Unit Value \$/kg	Volume tonnes	Value \$	Unit Value \$/kg	Volume tonnes	Value \$	Unit Value \$/kg
1982/83	2432.6	7014.3	2.88	175.9	970.7	5.52	847.9	1890.5	2.23
1983/84	2575.0	7771.3	3.02	216.2	1158.1	5.36	899.1	1961.3	2.18
1984/85	3111.1	9755.6	3.14	381.3	2213.2	5.80	982.4	2460.1	2.50
1985/86	2549.9	9202.5	3.61	299.1	2179.8	7.29	803.3	2192.8	2.73
1986/87	3015.5	12024.5	3.99	389.6	3863.5	9.92	510.6	1788.7	3.50

Source ABS Foreign Trade Statistics - various years

Another perspective of the market can be given by an analysis of the market shares of various well known brands. Such an analysis confirms the premium position of the major cold water sardine fisheries. King Oscar (Norway) and Brunswick (Canada) have just over half the volume market between them and yet these are among the most expensive of the available brands with nearly 65 per cent of total sales value. At the cheaper end of the market, house brands and generics have 10 per cent to 12 per cent of the volume but only around 6 per cent of the value of retail sales.

**Table 9:** Sardines - Analysis of source of Australian imports by unit value of product 1984/85 to 1986/87.

Year Country of Origin	1986/87			1985/86			1984/85		
	Volume tonnes	Value \$	Unit Value \$/kg	Volume tonnes	Value \$	Unit Value \$/kg	Volume tonnes	Value \$	Unit Value \$/kg
Imports Above Average Price:									
Canada	476.3	2282.4	4.79	277.9	1163.2	4.19	535.2	1926.2	3.60
Germany	3.1	22.5	7.26	11.6	46.2	3.98	2.6	9.3	3.58
Norway	769.0	4544.3	5.91	799.8	3988.9	4.99	739.3	3489.2	4.72
UK	227.0	1153.4	5.08	334.5	1538.8	4.60	389.9	1462.6	3.75
USA	32.8	235.6	7.18	0.3	2.4	8.00			
All Others (7)	18.7	135.6	7.25	16.0	81.0	5.06	43.4	110.8	2.55
s/total	1526.9	8373.8	5.48	1440.1	6820.5	4.74	1710.4	6998.1	4.09
Distribution %	50.6	69.6		56.8	74.4		54.8	71.8	
Imports Below Average Price:									
Korea	103.3	268.3	2.60	69.2	105.2	1.52	1.3	1.7	1.31
Portugal	177.7	521.0	2.93	197.5	431.8	2.19	128.4	272.3	2.12
Spain	91.5	295.1	3.23	27.7	77.0	2.78	85.9	177.9	2.07
Thailand	898.3	1995.7	2.22	606.5	1267.3	2.09	811.4	1587.2	1.96
Yugoslavia	72.9	153.5	2.11	61.9	125.6	2.03	72.2	144.3	2.00
All Others (8)	144.7	417.2	2.88	131.2	334.7	2.55	314.1	566.5	1.80
s/total	1488.4	3650.8	2.45	1094.0	2341.6	2.14	1413.3	2749.9	1.95
Distribution %	49.4	30.4		43.2	25.6		45.2	28.2	
Total	3015.3	12024.6	3.99	2534.1	9162.1	3.62	3123.7	9748.0	3.12

Source: ABS Foreign Trade Statistics

The whole market is 3,000 tonnes of product or 5,500 tonnes of fish. This is equivalent to 70 per cent of the estimated 1986/87 WA landings of 7,000 tonnes. A share of this market would be attractive for the Australian industry, however there would be a number of hurdles to overcome before any significant Australian canned sardine product could be launched. The key problems would be establishing an economically viable cannery line dedicated to producing sardines and capturing a market share for the resultant product.

A detailed analysis of the costs of establishing a sardine cannery in Australia is set out in Appendix 3 and is discussed in Section 7. The first decision would need to be the size of the pack to be canned. The general options are a pilchard in tomato sauce in a 425 g pack which would compete at the lower price end of the market or a sardine in oil in 100 g pack aiming at the upper end of the market.

The indications are that such a venture could be economically viable. There is a problem with the cost of cans. The most popular pack for sardines is approximately 100 grams in a "dingle" can. Such cans are not made in Australia and present indications are that the price of locally made cans would be very high, certainly much higher than the prices paid in competing countries. Imports are possible, or pressing the can bodies locally and importing the key opening or ring pull lids. It is understood that local manufacturers would probably seek protective duty against imported cans.

Other long term options would be a retortable plastic can or a frozen retail pack. At this stage these have not been investigated.

Gaining a market share would be a slow and expensive business. Currently it is necessary to pay the major retailers a listing fee of \$250,000 to get a new product onto the supermarket shelves. A three week product launch on television would cost at least \$300,000 and trade promotions another \$300,000. In all, a new product would need virtually \$1 million to launch for a share of a market with a total wholesale value of \$12 million.

Existing brands would seem to have considerable loyalty in the marketplace. This is attested to by the fact that the highest volume selling brands are among the most expensive on the market.

A 10 per cent share by volume of the existing sardine market would represent some 550 tonnes of fish. To utilise 1,000 tonnes of fish would require the new product to capture sales equivalent to 18 per cent of the existing market as represented by imports. Such a level may take several years to achieve.



## 6. Feasibility of pilchard/sardine canning

### 6.1 Economics of canning pilchards

The feasibility of establishing a canning line for processing pilchards or sardines was examined by the consultants.

In looking at canning it is important to specify the raw fish utilised as well as the product name. "Sardine" is in fact the popular name for pilchard in many countries but can also include other small surface swimming fish such as sardines, herrings, and sprats all of which are members of the family Clupeidae.

Canned sardines in oil or pilchards in tomato sauce are popular throughout the world. There have been attempts in the past to can sardines in Australia. The quality of the Australian fish, which are caught mainly in colder southern waters, is considered to be excellent. However, Australian labour costs are high by world standards as is the cost of fish. Modern technology has changed canning techniques and improved prospects for establishing a sardine cannery in Australia. Machines are now available to head, gut and fillet (nob) pilchards/sardines and so reduce labour costs.

More sophisticated nobbing machines are equipped with automatic head/length controls that position each fish according to its size for a wasteless head cut and to remove the entrails mechanically. In addition the machines can be equipped to trim tail fins and cut headless fish into portions to fit various sized cans. They can be incorporated into a packing line.

In examining the feasibility of establishing a canning line dedicated to processing pilchards and/or sardines, the basic parameter set was a throughput of 4,000 tonnes/year of raw fish. Two product possibilities were examined: pilchards in tomato sauce in a 425 g (12 oz) vertical round can or an oval flat pack and a sardines in oil pack of 100 g (3 oz) in a dingle can with key open or ring pull top.

The costings were done on the basis of a "stand alone" line which was not used for any other purpose. It may well be possible and more economic to process a smaller annual throughput on a canning line which is used for a number of purposes. Such a line could be established by installing special fillers and can closers alongside an established canning line used for other canned fish products, though such an option is not examined in this study. The sardine line used in this feasibility study is designed at a higher level of technology than that for the pilchard pack to introduce the greatest opportunity for labour saving and hence cost minimisation.

The estimated investment for a complete pilchard line as described, including boiler room, laboratory, cold room, workshop, electrical installations for all equipment and erection is \$2.25 million. The line designed for sardine production costs more than that for the pilchard line because of the higher automation required to control labour costs. The estimated cost for the sardine line is \$2.5 million.

The basic economic assessment of the costs and returns of the cannery operation is summarised in Table 10.



**Table 10:** Estimate of cannery production costs and returns for pilchard (425 g) and sardine (100 g) packs.

Item	Unit	Pilchards				Sardines			
		Qty	Unit Price	Total Amount	% of Cost	Qty	Unit Price	Total Amount	% of Cost
			\$	\$			\$	\$	
Fish	tonnes	4000	550	2200000	43.8	4000	550	2200000	21.9
Oil	tonnes	700	810	567000	11.3	505	810	409050	4.1
Cans	'000	5000	110	550000	11.0	20200	260	5252000	52.2
Labels	'000	5100	7	35700	0.7				0.0
Cartons	'000	105	400	42000	0.8	202	780	157560	1.6
Electricity	'000kw	263	140	36820	0.7	311	140	43540	0.4
Diesel Oil	tonnes	100	500	50000	1.0	120	500	60000	0.6
Water				1000	0.0			1000	
Labour				995000	19.8			1075000	10.7
Freight		105	3000	315000	6.3	202	3000	606000	6.0
Total Operating Costs				4792520				9804150	
Depreciation	\$'000	.1	2250	225000	4.5	.1	2500	250000	2.5
Total Costs				5017520				10054150	
No of Cartons Produced				104250				202000	
Cost/carton				48.13				49.77	
Cans/carton				48				100	
Cost/can				1.004				0.498	
Retail Value/can				1.90				0.95	
Retail Value/Carton				91.20				95.00	
less retail markup/delivery 40%				36.48				38.00	
Nominal ex factory value				54.72				57.00	
Cost of production				48.13				49.77	
Notional Profit/carton				6.59				7.23	
Notional Annual Profit				687040				1459850	
Retail Value/can				1.65				0.75	
Retail Value/Carton				79.20				75.00	
less retail markup/delivery 40%				31.68				30.00	
Nominal ex factory value				47.52				45.00	
Cost of production				48.13				49.77	
Notional Profit/carton				-0.61				-4.77	
Notional Annual Profit				-63560				-964150	

The "profitability" estimates must be seen as giving only a general order of potential performance. The results are more a "marginal" profit than a "business" profit. There is no allowance for product marketing or promotion costs nor the ancillary expenditures which would apply to a stand alone venture. At the same time if it were located within an existing fish cannery operation and operated on a smaller scale as an adjunct to an existing production line and marketing operation, it could well be a significant profit contributor.

The estimates in Table 10 would indicate that the production of canned pilchards or sardines in Australia is potentially profitable. However the profitability is heavily dependent on the retail price obtained. Direct comparisons should be treated with some care given the different quality comparisons between imported packs.

If the sardine product can compete directly with the Norwegian, Scottish or Canadian sardines retailing at around \$1.00/can, the result should be satisfactory. However, if they are forced to compete with the Thai or Korean products at around \$0.75/can retail, then the operation would run at a significant loss. The pilchard product would also need to be near the top of its price range to be financially rewarding given the risks associated with launching a new product.

Another assessment of sardine canning prospects is available from a study of fish processing possibilities carried out for the Victorian Department of Industry, Technology and Resources (ACIL Aust Ltd 1986). This found that sardine canning was

potentially profitable. The study gave an indicative costing based on an eight hour shift producing 40 cans/minute (19200 units/day) using a standard easy-open 1/4 club sardine can. The can contents weighed 125 g with 95 g fish content and 30 g oil. Yield of 50 per cent fresh fish weight was assumed with a fish price of \$200/tonne. Both aluminium and tinplate cans were costed at 15 cents and 6.5 cents each respectively.

**Table 11:** Indicative costing of sardine canning (cents)

Item	Qty	Unit	Cost per Unit	
			Al'min Can	Tinplt Can
Fish	125	gram	3.8	3.8
Oil	30	gram	3.8	3.8
Salt	6	gram	0.1	0.1
Cans	1		15.0	6.5
Total Ingredient Cost			22.7	14.2
Manufacturing Cost			9.7	9.7
Total Production Cost			32.4	23.9
Gross Profit Allowance			8.1	6.0
Total Unit Cost			40.5	29.9

Source: ACIL Australia Pty Ltd 1986

ACIL concluded that at \$200/tonne for fish and at 1985 manufacturing prices, sardines could be canned locally for between 30 and 40 cents per can. They saw this product as being competitive with sardines manufactured in Thailand and retailed by G J Coles at between \$0.45 and \$0.50/can. They assumed a retail margin of 15 per cent to give a product price of \$0.39 to \$0.43 for a local producer to be competitive.

## 6.2 Economic benefits from a pilchard canning industry

The economic benefits from canning pilchards (sardines) in Western Australia can, in the simplest terms, be valued on the basis of the direct cash input to the community. For an industry processing 4000 tonnes per year this could be valued on the basis that the purchase price of fish, local freight and local wages would flow directly into the community where the cannery was located. Certain other items would represent additional benefits to State activities such as the sale of public services (electricity and water) and from other economic activity including sale of cartons and from freight services.

Using the data from Table 10 the economic consequences would be an additional input of around \$2.6 million to the local community and an additional \$400,000 to \$800,000 depending on which canning activity was undertaken. In all an economic benefit of the order of \$3.0 million to \$3.5 million would be anticipated from a cannery line processing 4000 tonnes of pilchards per year.

**Table 12:** Estimated economic return from the establishment of a pilchard/sardine cannery in Western Australia.

Item	Unit	Qty	Val	Total Amount	Qty	Val	Total Amount
			\$/unit	\$		\$/unit	\$
Return to Local Community							
- Cash to Fishermen	tonnes	4000	300	1200000	4000	300	1200000
- Local freight/handling	\$/year	4000	100	400000	4000	100	400000
- Wages to local workers	\$/year			995000			1075000
s/tot local cash input				<u>2595000</u>			<u>2675000</u>
Return to State							
- Sale of cartons	'000	105	400	42000	202	780	157560
- sale of Electricity	'000kw	263	140	36820	311	140	43540
- Sale of Water	\$/year			1000			1000
- freight paid	\$/year			315000			606000
subtotal State benefits				<u>394820</u>			<u>808100</u>
Total benefits				<u>2989820</u>			<u>3483100</u>

If the cannery is established and contracts individual fishermen to supply raw material, there could be a risk that it would reduce prices to fishermen once they had invested in boats and gear. This situation could perhaps be avoided by fishermen negotiating long-term supply contracts.



## 7. Impact of falling catches and prices

To assess the form and direction the Western Australia pilchard fishery is likely to take in future, it is necessary to examine the economic position of fishermen. This information is important in assessing the potential impact of a possible fall in fish catches or prices.

The possible impact on a "typical" King George Sound pilchard purse seine boat of a fall in catch and price was analysed. It was concluded that, given the current high rates of return to invested capital, fishermen could withstand some price fall without being seriously at risk. They could also withstand some fall in the volume of catch.

However, the fishermen's position could deteriorate significantly if both average catch and price fall. Pilchard stocks are known to fluctuate. There seems little likelihood at this juncture that individual boat catches in the King George Sound area will fall sharply. However, such an eventuality should always be kept in mind.

The possibility that there could be a decline in the current relatively high prices being paid for Western Australian pilchards, particularly for petfood, must be faced. It could come about through the market being over-supplied due to increased local catches, cheaper imports and competition from eastern states fishermen.

There are also indications that processors buying pilchards for human consumption - canned sardines, value added products, frozen whole fish - may not have the capacity to pay higher prices without their operations becoming uneconomic.

Because pilchards are sold to a range of end users, there is unlikely to be great scope for monopolistic pricing. The development of a cannery to supply canned sardines and pilchards for human consumption could tend to stabilise prices by providing another market for fishermen to sell their catches to.

Some Western Australian fishermen have vertically integrated their operations to include processing, packaging and marketing pilchards for bait. Upwards integration by fishermen into fish canning seems unlikely, given the past performance of the catching sector of the fishing industry in industrial enterprises. Consideration could be given, however, to fishermen acquiring equity in a pilchard/sardine cannery.



## APPENDIX 1

### Bibliography

- ACIL Australia Pty Ltd** "The Victorian Seafood Processing Industry - Prospects Pty Ltd for Growth" Department of Industry, Technology and Resources, Melbourne, Victoria. April 1986.
- Baker Alan N.** "Reproduction, Early Life History and Age Growth Relationships of the New Zealand Pilchard, *Sardinops neopilchardus*" Fisheries Research Division New Zealand Marine Department - Fisheries Research Bulletin No 5. Wellington 1972
- Blackburn M and Rayner G W** Pelagic Fishing Experiments in Australian Waters", CSIRO Division of Fisheries Technical Paper No 1. Melbourne 1951
- Blackburn M and Downie R** The Occurrence of Oily Pilchards in New South Wales Waters. CSIRO Division of Fisheries Technical Paper No 3. Melbourne 1955
- Blackburn M.** The Pilchard in Australia. *Aust J. Mar.Freshwater Res.* (2) 179-192 1950
- Blackburn M and J.A. Tubb** Measures of abundance of pelagic fish in some south-eastern Australian waters" *Bull.Coun. Scient.Ind. Res*, Melb No 151. 1950.
- Bowen B K.** Arrangements for Entry to all Fisheries off and along the Western Australian Coast", Fisheries Department, Perth WA. July 1985.
- Brown R S.** The King George Sound Purse Seine Fishery Working Group" (Chairman), Fisheries Department Perth WA. November 1986.
- Fisheries Dept.** "The State of the Fisheries" Annual Report of the Fisheries Department of Western Australia. Fisheries Department Perth WA. 1984, 1985 and 1986.
- Maxwell J.G** "Assessment of fish resources for a fish meal factory at Albany, Western Australia" Unpublished CSIRO mamnuscript, 15 pp. 1979.
- Millington P J.** "The Metropolitan Purse Seine Fishery", Fisheries Management Paper No.14., Fisheries Department of Western Australia March 1988.
- Peat Marwick** "The Relocation of the West Ocean Cannery" Mitchell Department of Industrial Development Perth WA. 1985 Services Pty Ltd
- Robins J.** "Report on the Pilchard Population on the South Coast of Western Australia with reference to the Fishery and its Development.", Fisheries Department Perth WA. September 1987.
- Robins J.** "Situation Report on Pilchards for the Seasons 1981/82, 1982/83, 1983/84". Manuscript, Fisheries Department File 2/42 1985.
- Winstanley R H** "Pilchard and Anchovy", Fishery Situation Report No 3. South Eastern Fisheries Committee of the Standing Committee on Fisheries. CSIRO Division of Fisheries and Oceanography, Cronulla NSW. August 1979.

## Fisheries management papers

---

- No.1**      The Report of the Southern Western Australian Shark Working Group. (1986) (Chairman P. Millington.)
- No.2**      The report of the Fish Farming Legislative Review Committee. (1986) (Chairman P. Rogers)
- No.3**      Management Measures for the Shark Bay Snapper 1987 Season. (1986) (P. Millington)
- No.4**      The Esperance Rock Lobster Working Group. (1986) (Chairman A. Pallot)
- No.5**      The Windy Harbour - Augusta Rock Lobster Working Group. (1986) (Interim Report by the Chairman A. Pallot)
- No.6**      The King George Sound Purse Seine Fishery Working Group. (1986) (Chairman R. Brown)
- No.7**      Management Measures for the Cockburn Sound Mussel Fishery. (1986) (H. Brayford)
- No.8**      Report of the Rock Lobster Industry Advisory meeting of 27 January 1987. (1987) (Chairman B. Bowen)
- No.9**      Western Rock Lobster Industry Compensation Study. (1987) (Arthur Young Services)
- No.10**     Further Options for Management of the Shark Bay Snapper Fishery. (1987) (P. Millington)
- No.11**     The Shark Bay Scallop Fishery. (1987) (L Joll)
- No.12**     Report of the Rock Lobster Industry Advisory Committee to the Hon Minister for Fisheries 24 September 1987. (1987)
- No.13**     A Development Plan for the South Coast Inshore Trawl Fishery. (1987)
- No.14**     Draft Management Plan for the Perth Metropolitan Purse Seine Fishery. (1987) (P Millington)
- No.15**     Draft management plan, Control of barramundi gillnet fishing in the Kimberley. (1988) (R. S. Brown)
- No.16**     The South West Trawl Fishery Draft Management Plan. (1988) (P. Millington)
- No.17**     Final report of the Pearling Industry Review Committee (1988). (F.J. Malone, D.A. Hancock, B. Jeffriess).
- No.18**     Policy for Freshwater Aquaculture in Western Australia. (1988)
- No.19**     Sport Fishing for Marron in Western Australia - Management for the Future. (1988)

**No.20**    The Offshore Constitutional Settlement, Western Australia 1988

**No.21**    Commercial fishing licensing in Western Australia (1988).