

# Chapter 15

## FISHING

	<i>Page No.</i>
15.1 <b>Fish Species</b> . . . . .	184
15.1.1 Southern Rock Lobster . . . . .	184
15.1.2 Scallops . . . . .	185
15.1.3 Abalone . . . . .	186
15.1.4 Oysters . . . . .	187
15.1.5 Sea Urchins . . . . .	188
15.1.6 Jack Mackerel . . . . .	188
15.1.7 Orange Roughy . . . . .	189
15.1.8 Eels . . . . .	191
15.2 <b>Licensing</b> . . . . .	191
15.2.1 Review of Licensing Provisions . . . . .	191
15.3 <b>Management and Research</b> . . . . .	192
15.3.1 Marine Farming . . . . .	192
15.3.2 Sea Management . . . . .	193
15.3.3 Poaching . . . . .	194
15.4 <b>References</b> . . . . .	194

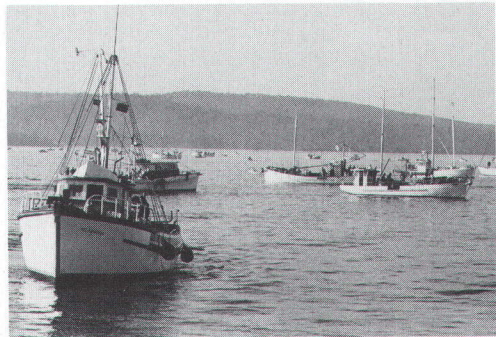
# Chapter 15

## FISHING

The Tasmanian fishing industry has been diversifying rapidly over the past 20 years. The advent of the aquaculture industry, particularly for Atlantic salmon and sea trout, has opened up new export markets. The 1980s also saw several major Tasmanian fisheries (jack mackerel, scallops and orange roughy) subjected to dramatic changes in their stocking levels which could affect their long-term viability as a fishing resource.

The estimated value of fish landed in Tasmania in 1987-88 was \$91.8 million. (This figure excludes the value of Atlantic salmon, trout and oyster farming.) This value of production ranks with other major primary industry sectors: for the same period the gross value of crops was \$188.2 million and livestock slaughtering was \$112.6 million.

The bulk of the value of Tasmania's fish catch in 1987-88 came from molluscan shellfish and crustaceans, with abalone (50.4 per cent of



Opening of the scallop season.

Photo: Mercury

### 15.1 EMPLOYMENT IN THE FISHING INDUSTRY, JANUARY 1990

ASIC	Description	No. of establishments	No. of persons employed
0431	Rock lobster fishing	17	49
0432	Prawn fishing		
0433	Ocean and coastal fishing	444	1 465
0434	Inland fishing/fish farming	63	297
2174	Fish and seafood processing	27	465
	Total	551	2 276

value) and rock lobster (31.8 per cent) being the major contributors.

In January 1990 there were 551 establishments in the fishing and fish processing industries. The majority of these (81 per cent) were involved in ocean and coastal fishing. Other major areas were inland fishing and fish farming (10.5 per cent) and fish and seafood processing (6.2 per cent). Sixty-six per cent of establishments employed between one and four persons. The majority of these 'establishments' would have been small fishing vessels.

## 15.1 FISH SPECIES

### 15.1.1 Southern Rock Lobster

Three species of marine crayfish are of commercial importance in Australian waters. Of these, only the southern rock lobster (*Jasus novaehollandiae*) is caught commercially in Tasmanian waters.

Southern rock lobster has been a traditional mainstay of Tasmania's fishery. Landed weight has been, for recent years, around 1.5 million to 1.8 million tonnes. In terms of value of catch it is second only to abalone.

Crayfish are processed live, most being exported either cooked or chilled.

### 15.2 SOUTHERN ROCK LOBSTER

Year	Landed weight (tonnes)	Value	
		\$m	Proportion of total(a) (%)
1983-84	1 805.1	12.6	33.9
1984-85	1 916.5	18.7	41.2
1985-86	1 456.0	16.2	29.1
1986-87	1 582.0	21.1	24.7
1987-88	1 803.3	29.2	31.8

(a) Proportion of value of general sea fisheries; excludes value of trout, salmon and oyster farming.

The rock lobsters are caught in baited traps which are usually lifted, rebaited and reset each morning. The catching of rock lobster is controlled by the Division of Sea Fisheries, Department of Primary Industry. (The Division was until July 1989 the Department of Sea Fisheries - DOSF). The Division issues commercial and amateur cray pot licences. The number of cray pots allocated to a commercial licensee is determined by the length of the fishing vessel. In June 1988 there were 344 commercial cray pot entitlements and 7195 amateur licences.

Fishermen's catch returns for 1987-88 showed that the rock lobster catch had increased by 228 tonnes to a total of 1803 tonnes with an estimated value of \$29.2 million, \$7.3 million higher than the previous maximum value for the fishery. This increase in value is due mainly to increases in prices for the rock lobsters.

### 15.3 TASMANIAN CATCH OF PRINCIPAL FISH SPECIES, (a) 1987-88

Species	Landed weight (tonnes)	Value (\$'000)
<b>Inshore fin fish -</b>		
Australian salmon	945.5	731
Sand flathead	118.5	106
Conger eel	70.7	229
Greenback flounder	42.9	134
<b>Total (b)</b>	<b>1 311.5</b>	<b>1 348</b>
<b>Near shore demersal fin fish -</b>		
Gummy shark	794.9	3 434
School shark	648.3	2 750
Perch morwong	240.2	432
Saw shark	183.9	331
Unspecified shark	207.6	565
Gemfish	99.1	303
Bastard trumpeter	41.9	115
Spotted trevalla	33.6	101
Striped trumpeter	33.4	113
<b>Total (b)</b>	<b>2 491.1</b>	<b>8 441</b>
<b>Near shore pelagic fin fish -</b>		
Jack mackerel	37 681.9	2 261
Red bait	1 278.0	126
Blue mackerel	1 182.9	73
Trevally	201.1	242
<b>Total (b)</b>	<b>40 456.5</b>	<b>2 854</b>
<b>Offshore fin fish -</b>		
Blue grenadier	596.8	846
Orange roughy	322.3	618
Deep sea trevalla	143.0	625
Warehou	122.4	267
<b>Total (b)</b>	<b>1 204.6</b>	<b>2 394</b>
<b>Crustaceans-</b>		
Southern rock lobster	1 803.3	29 185
<b>Total (b)</b>	<b>1 804.6</b>	<b>29 189</b>
<b>Molluscs-</b>		
Abalone	3 213.9	46 235
Commercial scallops (meat weight)	78.3	943
<b>Total (b)</b>	<b>3 409.5</b>	<b>47 353</b>
<b>Sea urchins (gonad weight)</b>		
	10.3	130
<b>Total</b>	<b>50 797.1</b>	<b>91 796</b>

(a) Landed weights are a mixture of gutted, headed, gutted and gilled, etc.

(b) Includes species not separately specified.

Research into recruitment and growth rates for the rock lobster began in 1987. The data will be used to develop models which will enable better management of rock lobster stocks. Catch sampling data provides information on catch rates, exploitation rates, size distributions, spawning stocks, and abundance of recruitment and pre-recruitment stocks.

Preliminary results from the research have shown that rock lobsters in northern Tasmanian waters have a relatively fast growth rate. Over 50 per cent of them reach the legal catch size before they reproduce and therefore this fishery receives relatively little protection from the imposition of the current minimum size limit. Rock lobsters in eastern, southern and south-western waters, however, receive good protection from the limit. Further research is needed into larval recruitment, and mortality rates for undersize crayfish which are caught and then released.

Regulations were amended in 1989 to alter the rock lobster fishing season. Taking of female crayfish would be prohibited between 1 May and 30 October, and the season for taking of male crayfish would be closed between 1 May and 30 June and again between 1 September and 31 October. These closures would apply to all Tasmanian waters and would be reviewed after a two-year period.

### 15.1.2 Scallops

The major species of scallop dredged commercially in Tasmanian waters is the commercial scallop *Pecten fumata*. It is fished in southern Australia from Western Australia to southern Queensland. The doughboy scallop, also fairly abundant in Tasmanian waters, is not harvested commercially as it does not grow to the minimum legal catch size.

In 1987-88 the total scallop catch in Tasmania was 489 tonnes (live weight), valued at about \$1.0 million. This was the lowest catch since 1977-78. Of the 175 vessels licensed to catch scallops, only 75 landed scallops in 1987-88.

The 1987-88 scallop season opened on 14 June 1987 and by July the last known established adult scallop beds in the northern Tasmanian fishery had been fished out. A minimum size limit of eight centimetres (widest diameter) was introduced in July after large quantities of juvenile scallops were landed.

The Tasmanian zone of the Bass Strait scallop fishery was closed prematurely on 3 September

1987. The closure was intended to allow any remaining juvenile beds to develop to the adult spawning stage and replace those adults which had been taken by continued commercial fishing. The closure of the fishery for the 1988-89 season was recommended by the DOSF.

Annual scallop surveys in the Tasmanian zone began in 1987. The purpose of the surveys is to locate and map the distribution of commercial scallop beds, estimate scallop abundance and find those areas where significant numbers of juvenile scallops are settling.



Scallop splitting.

Photo: Mercury

For the survey in 1989 the Tasmanian zone was split into six regions, each of which was surveyed by a local commercial fisherman who was familiar with the area. The survey showed limited settlement of juvenile scallops from the 1988-89 spawnings, mainly in the east and north-east. Commercial beds in the Tasmanian zone are very limited and it is likely that the zone will remain closed to commercial fishing until adult populations have increased to a density which can provide a large spawning population for scallop recruitment.

### Scallop Enhancement Research Program (SERP)

In August 1987 the Japanese Overseas Fisheries Cooperation Foundation signed an agreement with the Tasmanian Government which would involve the sharing of Japanese expertise in scallop culture and the funding of the Scallop Enhancement Research Program (SERP) for \$2 million over 3 years. The Tasmanian Government, through the DOSF, would contribute an additional \$1 million.

The project involved re-seeding the seabed with scallop spat collected in the wild and in

culture. The site chosen for the project was the Great Oyster Bay/Mercury Passage area between Marion Bay and Coles Bay. The original aim of the project, to collect half-a-million spat in 1987-88 (and 5 million in 1988-89 and 10 million in 1989-90) was unsuccessful when only a small number were collected in the 1987-88 spawning period. These low levels could be attributed to very low broodstock numbers and unseasonably high winter water temperatures which would upset the normal spawning cycle.

A major revision of the project plan, using hatchery produced spat, was introduced. As well, research into a number of spawning indicators, such as water temperature and gonad indices, was undertaken. Studies were begun into predation and growth rates of spat in hanging culture.

In 1988-89, close monitoring of the reproductive cycle and calendar of spawning adults will be necessary to ensure optimum collection of spat in collection bags. The estimated 500 000 spat collected in this way will be supplemented by 4.2 million hatchery spat. The spat removed from collection bags are reared in small net baskets (pearl nets) until they are about three centimetres in shell length, then they are either re-seeded onto the sea bed or placed in larger hanging baskets (lantern cages) up to two metres long and half-a-metre wide.

In June 1989 the DOSF began re-seeding the Great Oyster Bay area with one million juvenile scallops measuring four to five centimetres in diameter. These juveniles had been raised in hanging culture cages and will be left to develop on the seabed for two and a half years, enabling them to spawn three times before any attempt is made to harvest them. One hundred thousand spat collecting bags were placed in waters near Triabunna on the east coast. Three million spat were collected and grown in cages in 1989 and in 1990 five million spat are planned for release onto the re-seeding areas.

Alternative methods of harvesting are also needed in order to reduce the damage to scallop beds. Two versions of a modified Japanese Keta-ami dredge and a Siebenhausen scallop net are being tested as possible replacements for the traditional toothed mud dredge.

### 15.1.3 Abalone

Seven species of abalone occur on the southern coast of Australia. Three species, the greenlip abalone (*Haliotis laevis*), blacklip

abalone (*H. ruber*) and Roe's abalone (*H. roei*) are harvested commercially, with the first two species forming the basis of the Tasmanian industry. Tasmania produces the greatest abalone yield of all the Australian states, supplying half the nation's abalone. The bulk of the catch is exported to Japan.

Abalone contributes the most to the value of Tasmanian fisheries. Although in recent years the landed catch has shown fairly consistent decline, high unit values have pushed up the value of the catch.

### 15.4 ABALONE

Year	Landed weight (tonnes)	Value	
		(\$m)	Proportion of total (a) (%)
1983-84	4 769.2	15.2	41.5
1984-85	4 215.1	19.6	43.2
1985-86	3 558.0	30.8	55.2
1986-87	3 245.0	44.7	52.4
1987-88	3 213.9	46.2	50.4

(a) Proportion of value of general sea fisheries; excludes value of trout, salmon and oyster farming.

The DOSF undertook research in 1987-88 to determine population profiles for the blacklip abalone. The species shows different growth rates in different areas of the State, with maximum size and growth rates increasing from northern to southern waters. The species tends to breed at a given age rather than at a given size. The fastest growing specimens, which occur in the south west, reach breeding maturity at a size which is larger than the legal catch-size limit and, like rock lobster in the north of the State, can reach the legal size limit before they are able to reproduce. Abalone in the north of the State are slower growing and, while capable of reproducing, may never reach the legal size limit.

While there are no precise data on the state of current abalone stocks, their apparent decline in numbers prompted the State government, as a conservation measure, to promote a 30 per cent reduction in the 1989 abalone quota. In return for compliance with the quota cut, the government agreed to the introduction of a month-long exploratory harvest of stocks of 'stunted' black-

lip abalone on the north coast. These slow growing stocks, which rarely reach the legal size limit of 132 mm, had been safe from commercial harvesting.

Each diver involved in the exploratory harvest would be allowed to take 2.4 tonnes of these abalone in addition to the individual Tasmanian quota of 16.8 tonnes. A minimum size limit of 110 mm for these 'stunted' abalone was set for the one-month trial. A total of 207 tonnes was harvested in April 1989. In order to provide further protection for the abalone fishery, a minimum size limit of 140 mm is planned for introduction on the west coast for the 1989-90 season.



An abalone diver inspects his catch.  
Photo: Mercury

#### 15.1.4 Oysters

In 1988 Tasmanian oyster farmers reported their production as 2.6 million dozen with an estimated value of \$9 million. Production in 1989 and 1990 was expected to increase to 4.75 million dozen with an estimated value of \$16.6 million.

The most common oyster cultivated in Tasmania is the Pacific oyster (*Crassostrea gigas*) which is related to the Sydney rock oyster. Cultivation and export of the native Tasmanian flat oyster (*Ostrea angasi*), also known as the Port Lincoln oyster, has been undertaken in recent years. The Tasmanian oyster is similar to the European flat oyster (*O. edulis*) which is considered a gourmet delicacy and the Tasmanian species is expected to bring good prices on the export market. This should provide some compensation for the fact that the Tasmanian oyster

is more expensive to produce than the Pacific oyster: it takes twice as long to grow as the Pacific oyster which can grow to marketable size in 12 to 18 months.

Cultivated oysters are generally grown from commercially produced spawn. The majority of oyster farmers in the State are supplied by Shellfish Culture Pty Ltd of Bicheno which produces between 100 and 200 million spawn each setting. The company also supplies interstate and overseas markets.

In June 1988 there were 79 farms licensed to cultivate Pacific oysters, 31 to cultivate flat oysters and 20 licensed to cultivate mussels.

Since 1983, live mature oysters have been exported to such Asian countries as Hong Kong, Singapore, Malaysia and Japan. In June and July 1989 frozen oysters shipments to the USA began. This follows the signing of a memorandum of understanding with the United States Food and Drug Administration (USFDA) in November 1986 which allowed for the export of frozen Tasmanian oysters and molluscan shellfish to the American market. Frozen oysters are sent by sea and live oysters are exported by air, utilising international flights from Hobart Airport.

In 1988 the memorandum of understanding was temporarily suspended following deficiencies in the Tasmanian Shellfish Sanitation Program brought about by staffing problems at the DOSF. This prevented export of shellfish from Tasmania to the USA.

In January 1990 the prolonged effect of the national pilots' dispute was claimed to be a contributing factor which led to the closure of the State's major oyster processing company, Oystas Pty Ltd. The company, which usually processed 3.6 million oysters a year, experienced a 90 per cent drop in sales during the dispute. The company relied on air freight to transport its processed oysters to interstate and overseas markets. Oystas was the only processor in Australia licensed by the USFDA to process oysters for sale to the USA.

#### Shellfish Sanitation Program

Oysters are filter feeders and, as a consequence of their indiscriminate feeding habits, are prone to contamination by water-borne pollutants and toxic organisms such as faecal coliforms and biotoxins. They are particularly susceptible to contamination after periods of rain

when chemicals and bacteria are flushed into the marine environment from septic tanks, sewage treatment works and areas of agricultural activity.

All commercially harvested oysters in Tasmania come from leases where monitoring for microbiological contamination is undertaken on a regular basis by Department of Primary Industry (DPI) officers. The level of monitoring in an area is increased following periods of heavy or continuous rainfall, with all leases closed for harvesting until on-site and laboratory tests have cleared them of any contamination.

Any contamination problems that are detected in oysters which have been harvested can be traced back to their original lease via a tag system that operates for all harvested oysters. The lease where the contamination occurred can be shut down without having to shut down other leases in the industry.

Mussels, oysters and scallops are all susceptible to biotoxins, potentially lethal chemicals produced by certain species of marine algae. These toxins can accumulate in the tissues of the shellfish. The Sanitation Program regularly monitors shellfish for the presence of these toxins, particularly in the Huon and D'Entrecasteaux Channel areas.

### 15.1.5 Sea Urchins

In 1987 the DOSF started a research and monitoring program for the developing sea urchin industry. The major species harvested is *Heliocidaris erythrogramma*, the most commonly found species on the Australian coast.

Total urchin catch in 1987-88 was 285 tonnes valued at \$130 000 to the commercial diver and \$825 000 to the export market.

The size, colour and texture of the urchin roe (gonad), a major soft tissue component of the animal, determines its quality and price. The roe can contribute between four and five per cent by weight of the landed catch. In 1988 top quality roe was selling for up to \$200 a kilogram in Japan. The processed roe are air freighted as they must arrive at the Japanese market within 48 hours of being harvested from the sea.

The DOSF is conducting laboratory and field research into the effects of alternative feeding regimes and population densities on roe quality.

### 15.1.6 Jack Mackerel

The jack mackerel, *Trachurus declivis*, is a member of the trevally family and a close relative of the yellow-tail. Adults reach a length of half a metre and are most common in the open sea. The jack mackerel fishery has developed rapidly since its beginnings in 1985 and is now the single largest fishery (by tonnage) in Australia with landings of 42 000 tonnes in 1986-87 and 38 000 tonnes in 1987-88. The catches are limited to Tasmanian waters with most fish caught off the east coast. The mackerel are an important feed source for the Tasmanian salmon farming industry and as bait for rock lobster fishing.

Between October and May the mackerel congregate in large schools near Maria Island off Tasmania's east coast. Early in the fishing season the schools are located sub-surface and fishing vessels use sonar to detect them. As the season progresses the schools appear more often on the surface and are located by spotter aircraft. The schooling behaviour of the fish makes them particularly suitable for capture by the purse seine method.

Seven large purse seine vessels and two carrier vessels were licensed to operate in the fishery in 1987-88. Six of the vessels operated from Triabunna and the seventh mainly out of Hobart. The catch is landed at the Industrial Fish Tasmania factory (previously Spring Bay Fisheries) at Triabunna.

A research project on the purse seine fishery began in 1985-86. It was jointly funded by the DOSF and the Fishing Industry Research Trust Account (FIRTA). A three-year FIRTA grant to study the jack mackerel fishery was provided to the DOSF. The value of the grant in 1986-87 was \$84 000, with the State contributing on a dollar-for-dollar basis.

A freeze was placed on the issue of Tasmanian purse seine licences in May 1987 to allow for the development and implementation of a management plan for the fishery. The plan was to be introduced before the beginning of the 1988-89 season.

The fishing fleet would be divided into two classes of vessel; larger specialist purse seine vessels and smaller multi-purpose vessels. The fishery was divided into two sectors with the smaller vessels (under 20 metres) having open access to 5000 tonnes of the resource and the

larger vessels (over 20 metres) limited to a portion of a total allowable catch (TAC) which is set annually. The TAC is divided between vessels with open access and those with quota limits.

The majority of the TAC will be limited to quota vessels. If the total catch of the smaller vessels in the open access sector exceeded 5000 tonnes annually then restrictions on the sector would be reviewed.

The fishery experienced problems in the first operational season of the management plan as many of the vessels that were allocated a quota found very few fish to catch until the season was almost over. At the end of 1988 the numbers of jack mackerel caught dropped dramatically. The mackerel, which feed on near-surface populations of krill, become available when the krill are abundant and form into dense feeding schools. The krill were not abundant in late 1988 and hence the mackerel did not appear in large surface schools, preferring instead to feed on other fish species (such as lanternfish) in deeper water where they are not accessible to the purse seine vessels.

The absence of krill may be the result of changes in nutrient levels brought about by changes in ocean currents and sea temperatures. Water on the continental shelf was not replenished by surrounding oceanic nutrient-rich waters and hence there was no foodstock for the krill. A similar foodchain relationship exists between the *El Nino* current and the anchovy fishery off the South American coast.

### 15.1.7 Orange Roughy

In December 1981 the DOSF vessel *Challenger* discovered orange roughy off the west coast of Tasmania. It was not until 1986, when a dense aggregation of fish was discovered off Sandy Cape, that large scale commercial exploitation of the fishery occurred. This aggregation failed to re-occur in November-December 1987 and orange roughy landings for 1987-88 dropped to 322 tonnes compared with 1300 tonnes in 1986-87. The DOSF commenced a three-year research project to assess the extent of the orange roughy fishery.

In autumn 1989 large aggregations of the fish reappeared in Tasmanian waters. Major aggregations were located off southern Tasmania and off St Helens on the east coast. The St Helens 'hot spot' was identified as a spawning aggregation. Experience with the New Zealand orange

roughy fishery indicates that these spawning aggregations tend to re-occur from year to year. The Tasmanian aggregations are associated with rough-bottomed seabeds (undersea hills and pinacles) and are harder to trawl than sandy or muddy bottoms.

The Australian orange roughy fishery appears to be divided into two types, each requiring different management practices. Non-spawning aggregations tend to occur in the warmer months and tend to disperse when they have been fished by a few vessels. The spawning aggregations tend to form in the winter months and, because they do not disperse with continued fishing effort, are more vulnerable to over-harvesting and depletion of breeding stocks.

In 1989 a proposal to implement a total allowable catch (TAC) on the south-east trawl fishery was put forward by the Australian Fisheries Service. The fishery would be divided into six zones, each with an annual limit of 1500 tonnes. The proposed TAC would be most appropriate for the non-spawning aggregations rather than the spawning aggregations which would require more careful management.

As an interim measure to protect the St Helens spawning aggregation, a ban was placed on the fishery from August 1989 to April 1990. A TAC of 15 000 tonnes was set for the east coast unit stock for the fishing year ended 30 April 1990. In the 1989 fishing season almost 30 vessels landed around 13 000 tonnes of



Unloading  
orange  
roughy.  
Photo:  
Mercury



### Atlantic Salmon Farming\*

Atlantic salmon were re-introduced into Tasmania in July 1984 when the Sea Fisheries Department took delivery of 100 000 Atlantic salmon ova. They were subsequently hatched in a specially designed quarantine station at the Tarooma research laboratory. These were the first steps towards establishing a thriving Atlantic salmon farming industry in Tasmania which is now yielding in excess of 2000 tonnes of Atlantic salmon annually.

The largest producer in this new primary industry is Tassal Ltd which is based at Dover in southern Tasmania. In addition to the Dover site, Tassal operates two sites in the Huon and a coastal site at Stringer Cove. The enterprise operates four farming sites and controls production from the smolt stage (when juvenile fish are released into salt water) to harvest and marketing.

Tassal has benefited from transfer of technology from its Norwegian parent (Noraqual). This, combined with intensive care and attention to detail, enables Tassal to get 85 to 90 per cent of salmon from smolt to harvest.

A harvesting rate objective of 85 per cent to 90 per cent of stock is obtainable with the following procedure:

- attention to the feeding program to set the right daily food intake and close observation of feeding behaviour as feeding behaviour changes can be an early warning of problems;
- daily temperature, oxygen and salination checks and maintenance of records for matching of fish performance;
- frequent changes of fish pen nets due to algal growth - weekly in summer, monthly in winter;
- daily removal of dead fish;
- maintenance of predator nets to keep seals away from the pens;
- fish grading by weight to maintain fish size uniformity in pens so that all fish get equal food amounts; and
- frequent monitoring of weight gain and general health.

All of these measures are designed to prevent disease outbreak and to provide an early warning of problems. The salmon are harvested at about 3½ years and have a whole fish weight of 3.5 kilograms.

Tassal salmon is air-freighted fresh, gutted on ice, to markets in Japan, South East Asia and mainland cities during the harvest season with similarly presented frozen salmon available the year round. Approximately 25 per cent

of Tassal's harvest is further processed to produce a range of 'value-added' products which have year round availability, such as frozen-portion controlled salmon cutlets and fillets, traditional cold smoked sides of salmon, portion-controlled sliced smoked salmon packs and Atlantic salmon caviar.

#### Life Cycle of a Tassal Atlantic Salmon

##### Year 1:

*May-June* - at the Saltas Salmon hatchery at Wayatinnah fertilised eggs from broodstock are washed and put into incubators. *June-July* - eggs grow to egg-eyed stage in fresh filtered water. They are then moved to hatchery troughs to hatch as sac fry and develop to the swim-up stage. August - swim-up fry transferred to constant temperature interior tanks for feeding and growth. *November-December* - fish are weight checked and graded by size. Smaller fish are placed back into interior tanks, the larger fish are placed in unheated, intermediate tanks outside. *February-March* - after reaching a weight of four grams, they are moved into outside tanks six metres in diameter.

##### Year 2:

*September-October* - at a weight of approximately 65 grams, the juvenile fish go through a natural physical change to become smolt, enabling fish to move from freshwater to salt-water. Smolt are transferred to fish cages at a brackish water farm site at Brabazon Point in the Huon estuary, where they are acclimatised to seawater. *April-May* - fish cages are slowly towed to Tassal's Dover site, and the fish transferred to large ocean pens, 20 metres in diameter and six to eight metres deep. Fish are graded according to size, with fish of the same size class being grown in the same pen.

##### Year 3:

*August* - another grading by size. *September-February* - harvesting of fish, which begins at a whole fish weight of 3.5 kilograms, or head-on gutted weight of three kilograms.

*\*This article is based on information provided by Tassal Ltd.*

orange roughly in the State. A total of 24 000 tonnes was taken in waters around the State; 6000 tonnes from southern aggregations and the remainder from the east coast, primarily the St Helens aggregation. Overall value of the catch was estimated at \$45 million.

### 15.1.8 Eels

Harvesting of freshwater eels has only recently commenced in Australia with operations in Tasmania beginning in the north-east of the State in 1987. The Tasmanian operation is centred around Rushy Lagoon, a 25 000 ha sheep and cattle-grazing property near Scottsdale. Wild eels are harvested in the marshes, lagoons and dams around the property.

Two species of eel are caught, the longfin eel (*Anguilla rheinhardtii*) which average four to five kilograms in weight and the more common shortfin eel (*A. australis*) which average two to three kilograms. The longfin eels are exported live to Taiwan and are worth \$2.25 per kilogram. The shortfin eels which are smoked and processed in Melbourne, are exported to Germany and are worth \$3.50 per kilogram.

In 1987-88, 1.5 tonnes of eels were harvested. This increased to 3.5 tonnes in 1988-89.

## 15.2 LICENSING

All commercial licences to operate in Tasmanian fisheries are issued or transferred through the Division of Sea Fisheries. An agency service is also provided for the Australian Fisheries Service in relation to licensing in Commonwealth waters.

### 15.5 COMMERCIAL LICENCES AT 30 JUNE 1988

Licence type	Number
Fishing boat	949
Purse seine	35
Pelagic trawl	13
Commercial craypot	322
General commercial scallop	55
Commercial abalone	125
Commercial diving	261
Fisherman's licence	1 016
Commonwealth fishing boat	373
Commonwealth master fisherman	415

Revenue received from licences (other than the two Commonwealth licences) was \$2.76 million in 1987-88 and \$1.88 million in 1986-87. Just over 80 per cent of the revenue related to commercial abalone licences.

### 15.2.1 Review of Licensing Provisions

Successful fishery management depends upon a licensing system that gives effect to fishery management decisions. The Tasmanian licensing system at the time of review was an ad hoc mixture of rules and decisions made to meet issues as they came up. The licensing system and the *Sea Fisheries Act* did not reflect a coherent fishery management policy nor set out policy parameters for Tasmanian fisheries.

To overcome these shortcomings, a licensing review panel was established in 1988. This was a major event for the fishing industry.

On the panel was a professional fisherman (representing fishermen), a representative of the Tasmanian Fishing Industry Council (TFIC) and a representative of the Sea Fisheries Department. The panel was chaired by the Government's special legal counsel.

The panel had to come up with a licensing system appropriate to Tasmania's fishery. Its brief was to:

- simplify and improve the licensing system;
- provide a system giving greater certainty to commercial fishermen; and
- ensure an appropriate return to the community.

The last criterion mentioned targeted the survival of commercial fisherman rather than achieving an optimum return from the Tasmanian fishery. Input from commercial fishermen was encouraged. Fishermen wanted:

- the Tasmanian fishery jurisdiction to extend to latitude 39°12'S;
- the establishment of a multi-purpose diversified fishery;
- equal opportunity for all participants;
- the Tasmanian fishery as a whole to be strictly controlled;
- total limited entry; and

- recognition that the Tasmanian fishery is traditionally a owner-operated industry and this should be maintained.

The panel's report was presented in early 1989.

The main findings were:

- Except for jack mackerel the major fisheries (including abalone and rock lobster) should be managed as a component of a single entry diversified fishery.
- Licences should be issued to individuals, rather than boats or companies. (This was in support of the owner-operator principle.)
- Licence holders should have the option of renewal for up to five years at a time.
- The Sea Fisheries Department should be made responsible for licensing rather than as at present having the Minister involved in day-to-day licensing administrative matters.
- A simplified review and appeals panel system should be established to which fishermen could take complaints.
- The jumble of regulations and legislation should be rewritten into a document that reflects management policies and philosophies.

It was the panel's view that these points would improve the management of fisheries, improve data needed for research, and give fishermen an asset in the form of their licence which could be used in financial dealings.

## 15.3 MANAGEMENT AND RESEARCH

**Research forms an integral part of effective management of fisheries. In the past, lack of research has resulted in poor understanding of fisheries, inadequate management and consequent stock depletions.**

Research programs into scallops, rock lobsters, orange roughy and jack mackerel have resulted in the Division of Sea Fisheries reviewing its management policies in order to preserve these fisheries. The Division is also actively in-

involved in research projects associated with marine farming and sea management. Poachers can jeopardise the future of the abalone and rock lobster fisheries in particular, so they have been targeted in a reviewing of regulations.

### 15.3.1 Marine Farming

*(This is taken from an article in the Mercury.)*

Tasmania has entered a new era of fishing, an era in which aquaculture looks ready to surpass wild fisheries in export profits.

The marine farming division of the Department of Primary Industry anticipates that within the next five years the value of aquaculture products in Tasmania will exceed the State's total catch of wild fish and shellfish.

During the next 10 years aquaculture is expected to supply the world with 50 per cent of its fish, and Tasmania will be among the world's respected suppliers.

Despite an oversupply of Atlantic salmon and a drop in prices on the interstate and international market, Tasmanian exports are still receiving premium price.

In 1985 there were no salmon farms in Tasmania, but by the end of 1989 there were 35 salmon farms that together employed 450 people, and the industry was producing 1800 tonnes of Atlantic salmon and 1000 tonnes of ocean trout with a combined value of \$44 million.

In 1990 some Atlantic salmon farms were forced to amalgamate and in the future it is predicted that there will be fewer farms but they will be bigger and more efficient.

A big reason for the success of Tasmania's salmon industry is the State's freedom from the serious diseases that have devastated salmon farmers elsewhere in the world.

Meanwhile the marine farming division is working on developing the farming of stripey trumpeter as an alternative to Atlantic salmon.

If the project is successful, Tasmania could earn \$50 million a year from the export of stripey trumpeter. The large white-fleshed fish would give consumers an alternative to the pink-fleshed Atlantic salmon.

The stripey trumpeter program started in 1988 and already the Japanese market has offered as

much as \$18 a kilogram for a consistent supply of top quality fish.

Stripy trumpeter is said to be ideal for farming. Despite being taken out of its usual depth of 50 to 100 metres, this docile native is not susceptible to the many diseases that affect salmon.

After 10 years Tasmania's oyster industry is moving ahead strongly. While Sydney oyster farmers are suffering because of the latest poison scare, demand for Tasmania's Pacific oyster has trebled.

Tasmania's oyster industry is overwhelmed with interstate and international demand. Its biggest market, Melbourne, eats as much as 80 per cent of the production, or \$10 million worth.

The marine farming industry has confidence in its future. There is a high demand for the products, the industry is now an industry of businesspeople backed by researchers, and Tasmania is free from serious fish diseases and has relatively pollution-free waters

The Division of Sea Fisheries has responsibility for oversighting marine farming. It licenses marine farms and is actively involved in research projects associated with marine farming.

### 15.3.2 Sea Management

Since white settlement Tasmania has been regarded as providing bountiful natural resources often with little regard for the future.

However, in recent years the opinion that our resources are inexhaustible has changed, especially in wilderness areas.

#### 15.6 NUMBER OF MARINE FARMS, 30 JUNE 1988

Type	Number (a)
Abalone	5
Atlantic salmon	35
Rainbow trout	33
Flat oysters	31
Pacific oysters	79
Mussels	20
Scallops	2
Stripy trumpeter	2
Seaweed	1

(a) Farms can be licensed to grow more than one species.

Approximately 20 per cent of the State's land area is protected by World Heritage but little attention has been given to protecting our marine environment.

### Marine Reserves

In 1990 the State Government announced a draft proposal for four marine reserves on the east and south coasts with plans to create more in the future. The first proposed marine reserves will be at Bicheno (maximum size 220 hectares), Maria Island (2000 hectares), Tinderbox (60 hectares) and Ninepin Point (45 hectares) in the D'Entrecasteaux Channel. They cover less than two per cent of Tasmania's coast line. The aim is to establish reserves representative of each of the four Tasmanian marine provinces as well as smaller specific reserves for scientific - recreational purposes.

Marine Reserves offer the hope of ensuing that the marine eco-system and the resource industries based on it, such as fishing, will survive.

If marine reserves are to be successful firstly they must be of sufficient size to support and protect the eco-system and secondly there must be a ban on killing, removing and disturbing the life in the reserve. Recreational activities such as swimming or yachting would be permitted within the reserves as long as marine life is not taken or disturbed.

### 15.3.3 Poaching

A major problem confronting the Tasmanian fishing industry is poaching. Two species, both high unit value and vital to the viability of the fishing industry, are particular targets of the poacher. The species are abalone and southern rock lobster (crayfish). Poaching activities can jeopardise the future of the fisheries.

To curb poaching, new regulations were introduced in late 1988. Key elements of the regulations were:

- daily catch limits;
- possession limits; and
- a fish sale receipt system.

The regulations were aimed at helping fisheries police to detect and successfully prosecute poachers. Regulations were not targeted at the genuine amateur recreational fishers. However, in November the Legislative Council disallowed

the regulations to the dismay of the fishing industry.

The Legislative Council was lobbied by fishermen and the Tasmanian Fishing Industry Council (TFIC). The Minister for Sea Fisheries and Sea Fisheries Department put cases to the Council for re-instatement of the regulations. The representations were successful and in December the Legislative Council restored the regulations with minor amendment.

Some of the main provisions of the regulations are:

- a daily catch limit of five crayfish per licence holder;
- a possession limit of 10 crayfish and 20 abalone per person; and

- a fish sale receipt system for all vendors who have fish of any species for resale; the receipts must be available for inspection and are to be kept for two years.

The fish sales receipt system will enable the prosecution of vendors who buy poached fish. This is a major step in combating poachers as it helps cut out the market for poached species.

## 15.4 REFERENCES

Department of Sea Fisheries, *Annual Report*, Government Printer, Hobart

Tasmanian Fishing Industry Council, *Fishing Today*, Turtle Press Pty Ltd, Sandy Bay