Chapter 15

FISHING

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As the world's economic climate remains depressed, while costs continue to rise, Tasmanian fishers have had to contend with declining fish populations and unrewarding returns for some species. The fishing industry has diversified in response to these changes. Some fishers have decided that fish culture may assure a better future, either as a supplementary activity to sea fishing or as a full-time venture.

The estimated value of fish landed in Tasmania in 1990 from local and Commonwealth wild fisheries was $115.6 million, a 27 per cent increase on the value recorded for 1988-89. For the same period the value of aquaculture leapt by 45 per cent from $26 million in 1988-89 to $37.9 million in 1990.

The total quantity of fish production doubled from 28 545 tonnes in 1988-89 to 58 428 tonnes in 1990 whilst there was a 31 per cent increase in the estimated value of the industry for the same period to $153.5 million in 1990.

15.1 FISHING INDUSTRY EMPLOYMENT, TASMANIA

Period (a)	*Males*	*Females*	*Total*
1987	587	120	707
1988	806	—	806
1989	1 411	196	1 607
1990	1 267	399	1 666
1991	1 421	403	1 824

(a) Estimates for August of each year

15.1 THE FISHING INDUSTRY

15.1.1 Employment

Fishing and dependent industries are labour-intensive activities. It has been estimated that primary industries and people dependent on those industries provide about 34 per cent of all employment in Tasmania. Although many agricultural processes have been automated, fishing still needs people, thereby helping to counter increasing unemployment.

Technology in fishing supplements existing resources rather than replacing people. For example, much of the electronic equipment on a boat is essential for safe and effective fishing.

15.1.2 Concerns in the fishing industry

Costs for fishing continue to rise, as do fishing licences and levies. Those under-capitalised fishers who wish to install expensive equipment to operate effectively are finding it difficult to arrange affordable loans. Over-capitalised fishers have to maintain boats which are often under-utilised and which produce an insufficient return to allow a reasonable profit.

However, proposals to encourage some industry members to leave sea-fishing, perhaps for aquaculture, are expensive.

Lack of biological knowledge about certain vital species impedes the exploitation of not only standard commercial species but of potentially valuable and populous species.

Fishing by non-Tasmanian fishers around Tasmania has an adverse impact on fish populations resulting in a call for the imposition of greater limits. There are claims that a return to hook fishing for taking many species is essential if threatened fisheries are to survive.

Radio communication with the fleet, essential for efficiency and safety, may become less effective with the basing of the transmitter in Victoria, far from the more remote fisheries to the south of Tasmania. The local representative industry body and State Government are negotiating with the Commonwealth to minimise the effects of the change.

15.2 FISHERIES - PRODUCTION AND VALUE

	1988-89		*1990*	
	Production (a)(tonnes)	*Value ($m)*	*Production (a)(tonnes)*	*Value ($m)*
Wild fisheries -				
South East Trawl	7 848	14.7	31 300	36.6
Abalone	2 421	39.3	2 099	35.6
Southern Rock Lobster	1 850	27.2	1 566	27.5
Inshore (inc. Shark)	4 229	8.4	5 962	13.2
Jack Mackerel	8 342	1.2	13 698	2.4
Commercial dive	31	0.2	31	0.3
Total	24 721	91.0	54 656	115.6
Aquaculture -				
Atlantic Salmon	376	5.6	2 079	24.9
Rainbow Trout	1 113	11.1	662	6.6
Pacific Oysters	2 303	9.2	975	6.2
Mussels	32	0.1	56	0.1
Total	3 824	26.0	3 772	37.8
Total	28 545	117.1	58 428	153.5

(a) Landed weight of fish in Tasmania.

(Source: The Sea Fisheries Division of the Tasmanian Department of Primary Industry).

15.1.3 Major species

There are some interesting comparisons for the different species that made up the Tasmanian fishing catch in 1990.

Whilst the production of Atlantic Salmon was only four per cent of the total landed weight, it was worth 16 per cent of the total value. However, while 50 per cent of the total catch weight came from Orange Roughy, it comprised only 23 per cent of the total value. Fin fish, as a total, made up 92 per cent of the total weight of 1990 production but comprised 55 per cent of the total value. Southern Rock Lobster and Abalone are highly valued fish which is reflected in their relative contribution to the total value of production, 18 and 23 per cent respectively.

Production and value

There was a dramatic increase in the catch of Orange Roughy between 1988-89 and 1990, when it increased from 6997 tonnes to 29 332 tonnes. In the same period the value increased from $13.6 million to $34.8 million.

The quantity of shark caught from State and Commonwealth fisheries and landed in Tasmania in 1990 was 2119 tonnes, one and a half times as much as reported for the 1988-89 season. The value of the catch more than doubled to $7.2 million in 1990.

In 1990 fishers landed 1208 tonnes of Trevally worth $1.5 million, more than three times the size of the 1988-89 catch.

Average return to producers

The average price paid for Jack Mackerel increased in 1990 by 20 per cent to 18 cents per kilogram whilst Orange Roughy decreased by 39 per cent to $1.18 per kilogram.

In 1990 the average price of Atlantic Salmon fell by 20 per cent to $12 per kilogram.

The average price paid for Southern Rock Lobster increased by 19 per cent to $17.54 per kilogram.

The average price of Pacific Oysters rose to $6.34 per kilogram in 1990, an increase of 59 per cent.

Minor species recording significant price increases in 1990 were Flathead, which rose by

15. 3 PRIMARY INDUSTRY PRODUCTION BY SECTOR

	1988-89		*1989-90*	
Sector	*($m)*	*(%)*	*($m)*	*(%)*
Agriculture	603.1	54.2	623.7	49.4
Fishing	117.1	10.5	(a) 153.5	12.2
Mining	393.4	35.3	484.8	38.4
Total	1 113.6	100.0	1 262.0	100.0

(a) Calendar year 1990.

30 per cent to $1.38 per kilogram and Tuna, which rose by 40 per cent to $3.49 per kilogram.

Relative value of fishing

Compared to agriculture and mining, fishing has slightly increased its relative importance (in terms of value of production) from 10.5 per cent in 1988-89 to 12.2 percent in 1990.

15.2 MOLLUSCS

15.2.1 Abalone

Of the seven species of abalone found on the southern coast of Australia, three are harvested commercially: the Greenlip Abalone (*Haliotis laevigata)*, the Blacklip Abalone (*H. ruber)* and Roe's Abalone *(H. roei)*. The Greenlip and Blacklip varieties constitute the bulk of Tasmania's abalone.

The abalone catch declined by 13 per cent from 2400 tonnes in 1988-89, valued at $39.3 million to 2100 tonnes worth $35.6 million in 1990.

Until 1990, when it was supplanted by Orange Roughy, abalone was the single most significant contributor to the total value of the State's sea fisheries. Tasmania supplies the single largest portion of the Australian catch.

Yields of abalone have been diminishing steadily and significantly for some years. However, the value of production has continued to increase due to rising prices.

Management and conservation of fisheries

Because of the problems of variation in growth rate between regions, the setting of a uniform, minimum-size limit for all Tasmania is unsatisfactory. In applying a uniform limit, some fast-developing immature fish will be taken while other slow-growing mature fish may never attain the minimum legal size or be harvested when they are past their optimum condition.

Over-fishing is difficult to establish since abalone populations remain undetermined. However, declining annual catches indicate that numbers are dropping.

Research may overcome this re-stocking problem; re-seeding of declining colonies is a possible solution, for instance.

The number of legal divers is regulated by licensing, though such a valuable catch attracts poachers and so limitations on numbers to be taken may be exceeded because of illicit fishing. Reduced quotas may be introduced, as necessary, to halt proven over-fishing.

Research

A three-year study into abalone numbers, financed by the Fishing Industry Research and Development Trust Fund, is being conducted to assess the accuracy with which adult and juvenile abalone can be counted.

Rates of larval settlement and reasons for different rates will be determined experimentally; two sites have been chosen, at which all abalone exceeding 80 millimetres will be tagged.

Length at age, age at maturity, age/fecundity relationships, yield per recruit, egg per recruit and mortality rates will be determined after the data has been examined. Variations in growing rate at different latitudes and the setting of legal size limits according to region are matters being studied.

Stunted abalone season

A four-week season for mid-1991 was gazetted, allowing the taking of Blacklip Abalone in the stunted abalone fishery of Bass Strait. A profitable dive resulted, repeating the success of the previous year when the fishery was opened for the first time to commercial and recreational divers.

Export

The Federal government is being lobbied by NFIC at the instigation of the Australasian Abalone Producers Association to seek reduction of high import duties imposed in some South-East Asian countries.

One suggestion is that access to the Australian Fishing Zone (AFZ) and our markets should be conditional on more favourable treatment of our exports; representations to Japan some years ago about excessive import duties proved successful.

15.4 ABALONE CATCH - TASMANIA AND AUSTRALIA

Item	*1986-87*	*1987-88*	*1988-89*
Landed weight (tonnes) —			
Tasmania	3 245	3 214	2 421
Australia	6 700	6 800	5 500
Value ($m) —			
Tasmania	44.7	46.2	39.3
Australia	84.0	96.0	87.3
Unit value ($/kg) —			
Tasmania	13.77	14.39	16.96
Australia	12.54	14.12	15.87

15.2.2 Oysters

Oysters still continue to contribute a significant amount to the total value of all Tasmanian fisheries, though production, returns and unit value have fluctuated considerably in recent years.

The quantity of Pacific Oysters produced fell by 58 per cent to 975 tonnes in 1990. The value of production also declined by 33 per cent from $9.2 million in 1988-89 to $6.2 million in 1990.

Consumption of Tasmanian oysters

Over recent years most of our exports have gone to Melbourne, which usually imports only about 10 to 15 per cent of its very large requirements from elsewhere.

Ensuring clean oysters

The Shellfish Sanitation Program, administered and enforced by the Division of Sea Fisheries ensures that an unpolluted product is available for export or domestic consumption.

This program has proved its value, since oyster growers constantly receive large orders from interstate and overseas merchants aware of Tasmania's reputation as a supplier of clean, healthy oysters.

Two recent developments

One Tasmanian aquaculturist is cultivating the Tasmanian Flat (or Mud) Oyster (*Ostrea angasi*), similar to the European Flat Oyster (*O. edulis*), a gourmet's delight with a strong, meaty taste. It is hoped that the European market will accept them readily and be willing to pay well enough to enable the venture to succeed and flourish.

Cultivating the Tasmanian Flat Oyster is expensive since they mature at about half the rate of the Pacific Oyster, a fast-growing species.

Two methods of cultivation have been tried, the first using baskets in which the oysters are stacked on different levels. In the second method oysters are placed in submerged mesh envelopes on metal frames. In both methods the oysters are held well above the sea bed away from predators.

Another recent development is the establishment at St Helens of a research facility, hatchery and nursery to farm both oysters and scallops.

By developing the larvae to full adult size in controlled-temperature tanks of purified sea water containing selected species and proven strains of algae, year-round production is possible, and the condition of the crop can be monitored at any time.

Moreover, the hazards associated with rearing young of any species by open farming on the coast are eliminated or the effects are easily remedied. Adverse variations in temperature and salinity, silting, pollution, predation, poaching, overcrowding, uncertain or inappropriate food supply, and diseases are the most important problems.

Careful attention is given to cleanliness in every stage of the operation. Healthy oysters are selected as parents, the tanks are filled with sea water taken from deep in Georges Bay, filtered through a one-micron filter then heated to the optimum temperature for ideal development of the crop, which is introduced along with the quantity of algae appropriate for development.

Research continues in the laboratory into breeding of oysters and scallops, selection of even better strains of algae and even the development of a uniform shape for oysters, something which cannot happen in the wild.

Hazards of oyster-farming

Although oysters are hardy creatures, both high temperatures and excess fresh water can kill them. Development in deep-water sites away from river mouths will eliminate both of these problems. Oysters can tolerate fresh water for some days, as happens when prolonged rain causes extensive runoff into estuaries where they flourish.

The importance of water to oysters is clear when we find that they pump about 400 litres a day through their systems in search of food and oxygen. The Shellfish Sanitation Program ensures that pollution is monitored carefully in Tasmania. Because they are filter-feeders oysters cannot select their food and accept whatever comes. This may be faecal matter, oil, noxious chemicals or heavy metals.

Zoning of oyster-growing areas

In Tasmania, though oysters may be harvested all year round from approved areas with no pollution, other areas are subject to restriction. Approved conditional leases are subjected to a closure notice whenever some form of pollution is likely; after heavy rain or algae growth, for example.

The Shellfish Sanitation Program, by monitoring all operations important to production of clean, healthy oysters, ensures that an unpolluted product results.

Tasmanian Aquaculture Co-operative Society (TACS)

Since over 70 leaseholders are members of TACS, oyster growers are able to present their views convincingly in all matters of concern to the industry and to pool resources. This enables them to engage in activities such as funding market research and commissioning scientific research.

Research and training

Two important areas for research are oyster health and market intelligence. Although money for research has become more difficult to obtain, TACS and the Division of Sea Fisheries were successful in obtaining a grant under the National Teaching Companies Scheme (NTCS) enabling a graduate to be employed in oyster research. The Tasmanian Oyster Research Council (TORC) contributed the balance of costs.

Certain diseases, parasites and pests affecting the survival and growth of oysters are being investigated in a research project based at the Mt Pleasant Laboratories.

The three principal objectives of research at Mt Pleasant are assessment of the health status of Tasmanian-farmed shellfish, the selling of fresh-farmed shellfish in the US market and the prevention

15.5 MAJOR SPECIES

Species	*1988-89*		*1990*	
	Landed Weight (tonnes)	*Value ($'000)*	*Landed Weight (tonnes)*	*Value ($'000)*
Fin fish —				
Australian Salmon	1 020	791	526	455
Atlantic Salmon	376	5 640	2 079	24 948
Dory	94	90	955	900
Flathead	127	135	152	210
Flounder	52	205	37	166
Grenadier	352	475	549	347
Mackerel	8 342	1 252	13 701	2 405
Morwong	170	164	179	175
Orange Roughy	6 997	13 606	29 332	34 756
Rainbow Trout	1 113	11 130	662	6 620
Shark	821	2 975	2 119	7 157
Snoek (Barracouta)	198	143	366	265
Trevalla	458	2 450	401	1 542
Trevally	366	439	1 208	1 481
Trumpeter	85	256	155	385
Tuna	45	111	198	691
Whiting	92	92	99	116
Other	1 175	1 058	935	1 097
Total	21 883	41 012	53 654	83 716
Crustaceans —				
Southern Rock Lobster	1 850	27 206	1 566	27 462
Other	1	4	1	1
Total	1 851	27 210	1 567	27 463
Molluscs —				
Abalone	2 421	39 308	2 099	35 600
Pacific Oyster	2 303	9 211	975	6 181
Sea Urchins	14	202	18	268
Other	73	145	115	226
Total	4 811	48 866	3 207	42 275
Total	**28 545**	**117 088**	**58 428**	**153 455**

of disease transfer from State to State. In late 1990 and the first part of 1991, a comprehensive survey of farmed shellfish was undertaken; no diseases of Pacific or Flat Oysters were detected.

To enable effective market research, TORC has established a strategic marketing plan for Pacific Oysters, jointly-funded by the industry and a grant from NTCS. Aspects to be researched embrace destinations and quality of exports, prices obtained by producers, product types and packaging, as well as development plans of other States and countries likely to affect Tasmania's prospects overseas.

Phase one covers export destinations, quantities sold, market price, months when sold and method of shipment. Product types, packaging, processing and distribution channels will be the subjects of phase two. The final phase will cover consumer trends, locally and in selected overseas markets.

15.2.3 Mussels

Production of mussels increased from 32 tonnes valued at $75 000 in 1988-89 to 560 tonnes worth $133 000 in 1990. New enterprises for the production of mussels in Tasmania have been developing their sites during recent years as natural stocks have become depleted. Increased tonnages of mussels and greater returns are sure to result from this increased activity.

Mariculture and aquaculture of mussels

Harvesting of mussels from the sea bed, which has depleted numbers seriously, has been supplemented by mariculture on poles and rafts as well as on the sea floor (which is more hazardous because of bottom-dwelling predators). Intensive aquaculture is also being practiced.

Behaviour of mussels in the wild

Unlike oysters, mussels do not anchor themselves permanently but use tough fibres secreted by their byssal glands to moor themselves to temporary resting places, casting off when necessary, then crawling to another location where other fibres for attachment to the substrate are secreted. Small mussels may be carried far by tidal action and currents.

Mussels form large colonies which cause damage in inconvenient places such as intake pipes or over oyster beds, which they destroy by smothering the oysters.

Popularity of the mussel among growers

Mussels follow oysters as molluscs favoured by aquaculturists being prolific, sturdy and fast-growing shellfish which produce more protein per hectare than any other animal and an abundance of vitamins and minerals.

Preparation

Cleanliness of export mussels is ensured by deposition in a weak solution of sodium hypochlorite for 48 hours, this practice is enforced by law. Since mussels will accumulate pathogens and noxious chemicals, suspension in pure water for several days (depuration) is advisable before any processing.

Preparation is usually more involved than that for oysters; after cleaning the shells, removing the byssal threads and steaming, the meat may be preserved by being frozen, smoked, then bottled or canned in oil or brine.

15.2.4 Scallops

Since the disastrous result of scallop-harvesting in the 1987-88 season, which was prematurely closed to protect juveniles and the remnants of adult stocks, only exploratory and very limited commercial and recreational harvesting has been sanctioned. The opening of the 1991 season brought no prospect of a resurgence in the industry.

Surveys conducted by DoSF and CSIRO have revealed the need for supplementary seeding of scallops from commercial sources; in wild fisheries, natural replenishment of stock is variable and commercial viability has been elusive.

The Channel remains closed

Commercial operations were closed in the D'Entrecasteaux Channel in 1991. However, numbers of Doughboy Scallops (*Chlamys asperrimus*) and Queen Scallops (*Equichlamys bifrons*) have increased greatly, showing that the annual limited recreational dive has not depleted numbers.

Bass Strait

Bass Strait has also given few rewards to the few scallop fishers who have ventured there in 1991.

Reasonable catches were being made on newly-discovered beds to the east and west of

15.6 FISHERIES UNIT VALUE, TASMANIA

Species	Unit value 1988-89 ($/kg)	Unit value 1990 ($/kg)
Fin fish —		
Australian Salmon	0.78	0.87
Atlantic Salmon	15.00	12.00
Dory	0.96	0.94
Flathead	1.06	1.38
Flounder	3.94	4.49
Grenadier	1.35	0.63
Jack Mackerel	0.15	0.18
Morwong	0.96	0.98
Orange Roughy	1.94	1.18
Rainbow Trout	10.00	10.00
Shark	3.62	3.38
Snoek (Barracouta)	0.72	0.72
Trevalla	5.35	3.85
Trevally	1.20	1.23
Trumpeter	3.01	2.48
Tuna	2.47	3.49
Whiting	1.00	1.17
Crustaceans —		
Southern Rock Lobster	14.71	17.54
Molluscs —		
Abalone	16.24	16.96
Pacific Oyster	4.00	6.34
Sea Urchins	14.43	14.89

Deal Island, though the continued viability of these fisheries is not assured.

Research activities

Population monitoring, surveys and searches for viable new beds continue. Small beds, limited in population (especially of juveniles and those of brood-stock age), have been found but are of little commercial significance.

Bass Strait and D'Entrecasteaux Channel are still being surveyed to determine what level of fishing will be tolerated by the resources there.

SERP (Scallop Enhancement Research Program), a five-year co-operative venture between Tasmania and the Japanese Overseas Fisheries Cooperation Foundation, continued to yield useful scientific and commercial results. At the outset, Japan helped to fund SERP (to the extent of $2 million) besides providing expertise and personnel. Tasmania contributed $1 million as well as scientific expertise.

An additional $50 000 grant has been received recently from the Commonwealth for extensions to SERP's facility at Triabunna, where culturing of juveniles and cage-culturing to market size of more mature scallops has expanded greatly.

Scallop bed re-seeding with wild and cultured spat was the original aim. The Great Oyster Bay-Mercury Passage region between Marion Bay and Coles Bay was chosen for this purpose. However, collection of spat in 1987-88 was unsuccessful. Consequently, greater use of hatchery-produced spat allowed re-seeding of the sea bed of Great Oyster Bay with one million juveniles from June 1989.

Within five years, this maricultural venture will return $50 million a year, increasing to an estimated $125 million per year if Statewide expansion follows.

In 1990, five million spat were released onto re-seeding areas near Triabunna, three million spat having been grown in cages for this project. In the 1991 season, 50 million scallop spat were caught. In the first three-year term of SERP, 11 million scallops were re-seeded in Great Oyster Bay.

A company representing fishers from St Helens, Bicheno, Triabunna and Hobart are involved in this labour-intensive project, which has created about 60 casual jobs at the Triabunna base and promises to require more personnel at St Helens and Bicheno when expansion takes place.

Private aquaculture

The Tasmanian Fishing Industry Council urged that development be extended with caution; that ventures be Tasmanian-owned and co-operatives on the Japanese model should be rejected.

Formation of a Scallop Husbandry Ministerial Advisory Committee (SHMAC) has been endorsed by the Minister for Primary Industry. Participation by industry groups will be sought as well as input by the Japanese experts and local scientists of SERP.

A two-phase program overseen by SHMAC is envisaged, in which five years of spat collection and re-seeding is to be undertaken as phase one by the proposed five regional groups to be constituted: Great Oyster Bay, D'Entrecasteaux Channel, Norfolk Bay, Bicheno and St Helens. Phase two would be commercial in orientation.

15.2.5 Other Molluscs

Octopus and Squid

Octopus-harvesting may be beneficial to the Southern Rock Lobster industry because the octopus, a very energetic predator of shellfish, is known to be partial to crustaceans as well as other molluscs. Squid also share this taste for fellow molluscs and crustaceans.

Sea urchins

Possible aquaculture or mariculture of sea urchins has been investigated. It is known that, given an adequate diet of appropriate seaweeds, sea urchins will tolerate life in tanks for extended periods and even flourish in captivity.

15.3 CRUSTACEANS

15.3.1 Southern Rock Lobster

Production decreased by 15 per cent to 1600 tonnes in 1990. However, the average price paid to fishermen rose during the year which meant that the value of the catch increased marginally from $27.2 million in 1988-89 to $27.5 million in 1990.

Although the catch represents only three per cent of total Tasmanian catch weight, Southern Rock Lobster contributed nearly 18 per cent of the gross value of all fisheries.

15.7 SOUTHERN ROCK LOBSTER, TASMANIA

Item	*1987-88*	*1988-89*	*1990*
Landed Weight (tonnes)	1 803	1 850	1 566
Value ($m)	29.2	27.2	27.5
Unit value ($/kg)	16.19	14.71	17.54

15.3.2 Crabs

While not vital to Tasmania's fishing industry, crabs may be a useful secondary catch. Annual catches have averaged one tonne or less, returning between $3 and $4 per kilogram.

15.4 WILD FINFISH

Three oceans, the Indian, Pacific and Southern, contribute at least 80 species to the 125 or so offshore species and about 230 inshore species common about Tasmania. On the other hand, there are only 17 freshwater species, including indigenous and introduced species.

Tasmanian waters

Tasmania's fishery region is that area south of latitude 39 degrees 12 minutes within 200 nautical miles of the Tasmanian coast.

Despite the dominating contributions of crustaceans and molluscs to Tasmanian fisheries, catch sizes and the economic value of wild finfish are still substantial.

In 1990 the landed weight of wild finfish taken from Tasmanian waters was 19 618 tonnes, nearly 34 percent of the total catch from all fisheries including the South East Trawl. The value of the catch in 1990 was $15.5 million, 10 per cent of the total value of all fisheries.

The Tasmanian Fishing Region's (TFR) fish species can be classified as originating from one of three general areas: inshore, nearshore and offshore.

15.4.1 Inshore Fisheries

Estuarine

Where the sea and rivers meet in estuaries a very specialised environment is formed, unfavourable to most ocean species beyond the point where oncoming fresh water too heavily dilutes the salt water. About a dozen fish species favour estuarine conditions, few of which are sought commercially.

Coastal

The catch landed in Tasmania from the inshore fishery dropped by 17 per cent to 852 tonnes in 1990.

The most valued inshore species are the Australian salmon. Of the two common species of Australian salmon, the Eastern Australian Salmon (*Arripis trutta*) is the only species important to Tasmanian fishers.

The Eastern Australian Salmon, which spawns at sea, forms into huge schools in

January off the New South Wales and Victorian coasts to undertake the annual migration to Western Australia. These massive schools are spotted from the air and are reported to the fleet. The quantity of Australian salmon landed in Tasmania in 1990 was 526 tonnes (16 per cent more than in 1988-89) and was worth $455 000.

The yield of Garfish, another significant inshore species, increased by 73 per cent to 119 tonnes valued at $309 000 in 1990.

15.4.2 Near-Shore Demersal Fisheries

These fisheries regularly produce a significant portion of the total catch from the TFR.

In 1990 Near-Shore Demersal fisheries supplied 18 279 tonnes or 36 per cent of the region's total catch. The catch was valued at $12.8 million, 25 per cent of the total value of fish from the TFR. Important commercial species include Jack Mackerel (*Trachurus declivis*), shark and skate.

Jack Mackerel

The 1990 catch of Jack Mackerel was 13 700 tonnes, 64 per cent more than in 1988-89. The value of production doubled from $1.2 million in 1988-89 to $2.4 million in 1990.

Although the dark, oily flesh of the Jack Mackerel is not appreciated here, large quantities are canned, smoked, pickled, or processed into pet food. After large harvests of 37 682 tonnes in 1987-88 only 8150 tonnes were landed in 1988-89.

The failure of the 1988-89 season was attributed to a cyclic environmental phenomenon related to El Nino, which discouraged the formation of large schools of near-surface krill and caused the Jack Mackerel to hunt Lantern Fish at inaccessible depths.

Shark and skate

Shark and skate, although their landed weight does not compare with that for Jack Mackerel, have returned far more financially in recent years than has Jack Mackerel.

While in 1986-87 shark and skate earned barely half the return from Jack Mackerel the situation has now reversed. In 1990 the landed value of shark and skate was $7.2 million, over three times the value of Jack Mackerel. Skates and rays, not regarded as commercial fish until recently, are very popular overseas.

Sharks and rays, unlike Teleosts (bony fish), have skeletons of cartilage, causing them to be classed as Chondrichthyes (cartilaginous fishes). Another distinguishing feature is the array of five to seven uncovered gill slits which on sharks lie at the side of the head. On rays they are situated underneath.

Among the most widely distributed of all marine life, sharks inhabit waters down to at least 2000 metres, from mid-ocean to shallow coastal waters, even penetrating deep inland into fresh water. In size they extend from less than a metre to 15 metres for whale sharks, the largest fish of all.

Although many shark species are voracious carnivores, particularly some of the more active large species, the very largest of all, the basking shark and whale shark, are plankton eaters. Other species favour molluscs or crustaceans, for which their flat grinding teeth are appropriate.

Other near-shore commercial shark species include the Tasmanian Tiger Shark (*Notorynchus cepedianus*), not known to be dangerous to humans, White Pointer Shark (*Carcharodon carcharius*), Blue Pointer Shark (*Isurus oxyrinchus*), School Shark (*Galeohinus australis*), Gummy Shark (*Mustelus antarcticus*), Southern Saw-Shark (*Pristiophorus nudipinnis*), Common Saw-Shark (*P. cirratus*) and Angel Shark (*Squatina australis*).

Silver Trevally (*Pseudocaranx dentex*) has become important in more recent years, catches having increased over five-fold in three seasons. An assured place in the market seems certain because its firm flesh has a sweet, delicate flavour.

Other species fished in this region include cod, some species of dory, trumpeter and flathead, Gemfish, Nannygai, Red Gurnard Perch, School Mackerel, Red Bait, Snoek and Tuna. These species contribute significantly to the industry in good seasons.

15.4.3 Offshore Fisheries

The catch of offshore species in 1990 was 31 341 tonnes valued at $37.8 million, nearly 62 per cent of the total landed weight and 73 per cent of the total value of the three areas.

Important species

There were 29 332 tonnes of Orange Roughy, worth an estimated $34.8 million, landed in Tasmania in 1990. This was almost 58 per cent of the aggregated weight and 67 per cent of the total value of the three areas.

Orange Roughy, or Red Roughy (*Hoplostethus atlanticus*), is widely distributed about the world. It is known in the Atlantic, the Mediterranean, off southern Africa, and locally from New South Wales to Tasmania, thence across to New Zealand.

A moderately large fish, weighing over 3 kilograms and reaching at least 50 centimetres in length, it was found in the early 1980s by the research vessel *Challenger* at depths of about 1000 metres off the West Coast, apparently in huge quantities. Its bland and firm white flesh, which keeps well, made it an acceptable fish in the market place.

Problems with fishing

Schools of Orange Roughy generally occur over rough sea beds, making trawling difficult. Another more serious hazard, relating to conservation of the species, is that the winter spawning schools do not disperse when fishing continues. This allows over-fishing of schools with consequent depletion of breeding stocks.

As conservation measures, a ban was placed on the St Helens spawning schools from August 1989 to April 1990 together with a total allowable catch of 15 000 tonnes for the East Coast during the fishing year ending 30 April 1990. As the fishery yielded almost no fish, this latter precaution seems too late.

Deep-Sea Trevalla (*Hyperoglyphe antarctica*), which may weigh 35 kilograms, has been the only species in this region to maintain any consistency recently for quantity landed and return to fishers. The catch landed in Tasmania in 1990 was 340 tonnes valued at $1.5 million. A dispute between Tasmanian and South-East Trawl (SET) fishers over the taking of this species continued for some time.

Minor species include Blue Grenadier, Flounder and various species of dory. The total weight of offshore dory landed in 1990 was 905 tonnes valued at $865 000.

15.5 AQUACULTURED SPECIES

Although farmers do not depend on wild plants for any significant part of their crops, fishers traditionally harvest the produce of the sea. However, aquaculture in Tasmania is expanding, contributing to the tonnage and value of annual catches, raising export earnings and providing much needed employment.

Production from the Atlantic Salmon fishery climbed in 1990, with a harvest of 2079 tonnes valued at $24.9 million. This compares with production of 376 tonnes in 1988-89 worth $5.6 million.

Production of Rainbow Trout dropped by 41 per cent from 1113 tonnes valued at $11.1 million in 1988-89 to 662 tonnes with an estimated value of $6.6 million in 1990.

Pacific Oysters (currently flourishing) and scallops (reviving as a result of re-seeding) are expected to contribute greatly in the future.

Species considered for aquaculture

Stripey Trumpeter and the Tasmanian Flat Oyster both seem to offer large rewards as potential cultured species but are not yet ready for commercial development.

Division of Sea Fisheries

The Division of Sea Fisheries currently has five objectives with respect to development of aquaculture:

- controlled expansion for economic growth and job creation;
- development of new species;
- development of new technologies;
- development of a scallop industry based on re-seeding; and
- legislative amendments necessary to manage the industry more effectively.

Work necessary to implement these objectives includes reviews of rentals and licence fees; drafting of codes of practice; developing data bases; and developing commercial structures and management plans.

For development and well-being of fisheries, important work continues on assessing resources; determining the viability of certain species for culture; providing advice and technical assistance to farmers; researching the feeding of larvae and juveniles; analysing shellfish toxins; investigating fish diseases; and surveying the use of chemicals.

15.6 COMMONWEALTH FISHERIES

15.6.1 The South-East Trawl (SET)

This fishery provided Tasmania's single largest and most valuable landed catch in 1990. The landed weight of fish increased threefold from a catch of 7848 tonnes in 1988-89 to 31 300 tonnes in 1990, whilst the value of fish landed increased from $14.7 million to $36.6 million over the same period.

Orange Roughy is the most important species currently available from offshore Tasmanian waters. While fishermen have not located any new grounds around Tasmania the existing areas have provided very large harvests in recent seasons.

Valuable minor species include Morwong, Tiger Flathead, Gemfish, School Whiting and Blue Grenadier.

15.6.2 The Southern Shark Fishery

Over-exploitation of this fishery has been blamed for declining catches. Only 2600 tonnes of shark worth $12.4 million were taken in 1990-91, compared with 3700 tonnes valued at $17.7 million in 1989-90.

Because of scientific advice that the fishery was about to collapse biologically, a reduction of about one-third in the number of nets fishers may use was instituted. The current population is said by scientists to be about one-seventh of its initial level, allowing seven years before collapse.

Shark fishers generally agree that fishing levels must diminish but believe that scientific conclusions are too pessimistic.

Official encouragement of over-fishing in order to earn export income, licence fees and revenue, has caused the present desperate situation, according to the National Fishing Industry Council.

15.6.3 Southern Bluefin Tuna

There were 25 tonnes of Bluefin Tuna valued at $200 thousand landed in Tasmania in 1990. Long-lining will be encouraged in 1991 by the introduction of 24 chartered overseas vessels to the tuna fishery. It is envisaged that Australian returns could increase, from about $16 million to an estimated $64 million, with biological and economic benefits for the fishery.

15.7 LICENSING

Seventeen licences permitting the wide range of activities monitored by Department of Sea Fisheries currently exist.

The most common licence, the Fisherman's Licence (fee $240 per annum), permits commercial fishing in general, and the selling of fish caught from a licensed fishing boat.

Other licences include the Fishing Boat Licence, Certificate of Competency, Commercial Diving Licence, Commercial Abalone Diver's Licence, Abalone Quota Licence, Commercial Crayfish Pot Licence, Shark Gillnet Licence, Commonwealth Shark Gillnet endorsement; General Commercial Scallop Licence, Special Commercial Scallop Licence, Purse Seine Fishing Licence, Tasmanian Mackerel Fishing Licence, Processing Premises Licence, Exploratory Licence and the Non-commercial Crayfish Licence.

Photo: Michael Dermoudy

15.8 BIBLIOGRAPHY

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