

FISHERY SITUATION REPORT 8. SCALLOPS

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SOUTH EASTERN FISHERIES COMMITTEE

The South Eastern Fisheries Committee, a committee of the Standing Committee of the Australian Fisheries Council, was set up in 1969 as one of three regional management and research committees.

The South Eastern Fisheries Committee co-ordinates interstate fisheries management and research activities in waters adjacent to New South Wales, Victoria, Tasmania and also provides a forum for discussion in fisheries science and management, and advises management authorities on problems referred to it by member organisations.

The Committee is comprised of representatives of the Commonwealth Department of Primary Industry, CSIRO Division of Fisheries Research, New South Wales, Victoria, Tasmania and South Australia.

A number of fisheries in the area are of such importance as to warrant special attention by a group of experts. These Research Groups constantly monitor the state of the fisheries and discuss current research.

FISHERY SITUATION REPORTS

To assist the Committee in its management role, the Research Groups prepare and maintain situation reports for these fisheries for which they are responsible. The reports outline the present state of the fishery, its history and management. In addition, the current state of knowledge on the biology of the species and the population dynamics of the exploitable stocks is outlined.

This report was prepared under the auspices of the Demersal Mollusc Research Group.

To broaden public knowledge of the fisheries of south eastern Australia, these situation reports are published as a series by the Committee.

A. J. HARRISON
Chairman
South Eastern Fisheries Committee

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SOUTH EASTERN AUSTRALIA SCALLOP FISHERYSummary

Annual catch (tonnes - live weight)	2,000 - 14,000
Annual value to fishermen (up to 1978/79)	Maximum nearly \$5 million.
Markets	Exported frozen, roe-on or roe-off. Significant domestic market for fresh and frozen scallops.
Number of boats	Variable; up to 30 New South Wales, 94 Victoria and 71 Tasmania, South Australia nil.
Number of men in fishery (generally 2-3 per vessel)	Variable; up to 50 New South Wales, 200 Victoria and 150 Tasmania.
Value of boats and gear	Not known.
Present status of fishery	Almost fully exploited.

Introduction

Australia is a significant world producer of scallops along with Japan, Canada, USA, UK and France.

In the south east of Australia, where the majority of the catch is taken, scallop fishing became established in Tasmania early this century. During the late 1950's the fishery shifted its main activity from D'Entrecasteaux Channel to the east coast of Tasmania (Harrison 1965) and not long afterwards the Channel fishery collapsed.

The Victorian fishery began in Port Phillip Bay in 1963 and in 1970 commercial beds of scallops were located in Bass Strait off Lakes Entrance (Sanders 1970). Tasmanians began fishing other Bass Strait beds in 1973.

Whilst Victoria and Tasmania have been the main south eastern producers, fishing occurs irregularly in New South Wales and South Australia. Scallops are fished also in Western Australia but in that State the predominant catch is of saucer scallops (Amusium); Queensland catches are exclusively saucer scallops.

The present report is largely confined to the fishery of south eastern Australia where production in recent years has varied from 1,939 tonnes (1969/70) to 13,393 tonnes (1976/77).

Species and Distribution

Almost the entire south eastern Australian catch is of the genus Pecten, which is found in the northern and southern hemispheres and characterised by having a flat left (upper) shell and a strongly convex right shell. Other scallops of minor commercial importance are the doughboy scallop (Mimachlamys asperimus) and the queen scallop (Equichlamys bifrons).

Pecten is found from northern New South Wales around Tasmania to south western Australia. It was once believed that three species were represented (P. alba, P. fumata and P. meridionalis). Current opinion suggests that the minor variations found in the sculpturing of the shells represent clinal trends within a single species, Pecten fumata.

Biology

Scallops are bivalve (two shelled) molluscs related to oysters and mussels. With the exception of the doughboy scallop, which sometimes remains attached to the seabed, the adult scallops lie free and are capable of active swimming by jetting water from within the mantle cavity. The mantle or frill of scallops has well developed eyes which can detect movement or changes in light intensity.

Scallops all spawn eggs and sperm into the sea where fertilisation occurs. However, Pecten species are hermaphrodites whilst Mimachlamys and Equichlamys have individual males and females. After the scallop eggs are fertilised a minute larval stage develops. This remains in the plankton for two to several weeks, depending on the species, and then settles onto weed or shell (Dix and Sjardin 1975, Dix 1976, 1977).

Natural events affecting the intensity of spawning and juveniles prior to attainment of fishable size result in marked yearly variations in scallop abundance. This feature is characteristic of most scallops and causes fluctuations in catches.

Scallops begin to mature when one year old but first spawn in their second year. Growth rates have been determined by tagging, interpretation of rings on the shell and measurements of the size of scallops, either in natural beds or in cages (Fairbridge 1953, Sanders 1970, Dix 1981). Such studies show that growth rates vary within the fishery but an average, fishable size is reached in under two and a half years. Bass Strait scallops do not grow as large as those elsewhere in the fishery.

Mortality from natural causes (predation, disease, ageing, etc) is probably above 30% per year. Fishing mortality varies but most scallops in south eastern Australia are caught within 1 to 2 years of reaching fishable size.

The Fishery

Fishing Localities (refer to Fig. 1)

Major Victorian scallop fishing areas are in Port Phillip Bay and off Lakes Entrance. Tasmanian grounds extend along the east coast, into Bass Strait around the Furneaux Group and a small ground is located in western Bass Strait. Limited fishing takes place in southern New South Wales (Jervis Bay, Bermagui) and past fisheries have occurred adjacent to Coffin Bay and Boston Bay in central South Australia.

The Tasmanian fishery is mainly seasonal (winter months) although fishing occurs throughout the year in Victoria.

Vessel numbers in the fishery vary from year to year and seasonally. During 1979/80 approximately 183 boats fished scallops during the year in the south east; 94 in Victoria, 71 in Tasmania and 18 in New South Wales.

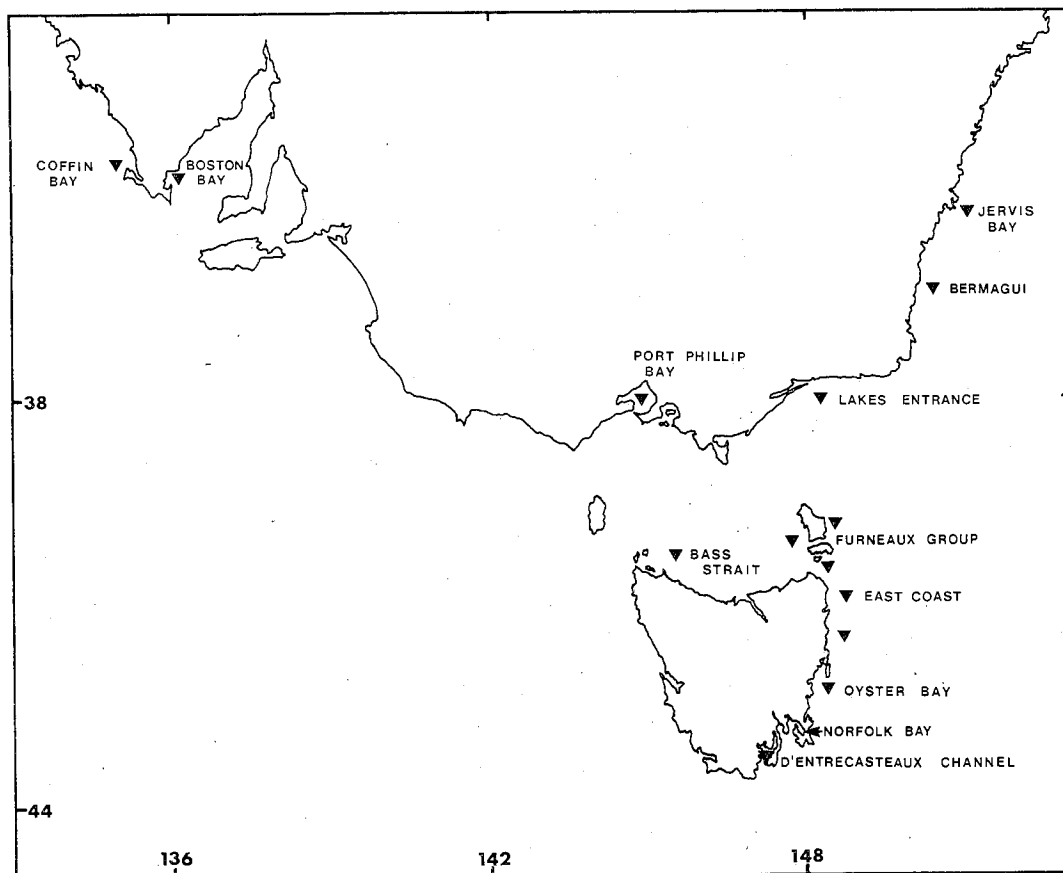


Fig. 1 The south eastern Australia scallop fishery.

Fishing Methods

Except for a small quantity taken by divers in Tasmania's Oyster Bay and in Jervis Bay, New South Wales, commercial fishing for scallops is by dredging. The dredge is towed from the stern of the vessel with wire rope and is recovered by use of a winch. The duration of each haul ranges between five and fifteen minutes, and the direction of the boat is usually reversed after each haul (Hughes 1972, 1973).

Fishing trips are usually of a single day's duration and it is common for vessels to operate within close proximity to each other.

The majority of scallop boats are in the 10 to 20 metre length class and are equipped with a single large dredge and self-tipping gear. The dredge is a modification of the Baird dredge and features wide runners, a relatively small depressor plate and is often operated without teeth. The width of dredges ranges between about 2 and 3.5 metres.

Catches are stored on deck in bags and scallops are landed live in shell.

Production and Value

Annual Australian scallop production trends (Table 1) show that with few exceptions the majority of the catch is of Pecten taken in south eastern Australia. Western Australia and Queensland produce the saucer scallop although Western Australian production between 1970 and 1974 contained a diminishing proportion of Pecten.

Extreme variations in Pecten production are evident in the south eastern states. The most consistent producer, Victoria, shows peak production of nearly seven times the lowest level.

Such variations are reflected in the value of the fishery (Table 2) which generally represents a significant component of overall State production only in Victoria and Tasmania. In 1976/77 for example, scallops ranked as the fourth most valuable fishery in these States behind abalone, rock lobster and shark. Scallops ranked third in Tasmania in the record year 1979/80.

Markets

Three broad market categories exist for scallops: (i) export, roe-off; (ii) export, roe-on and (iii) domestic. The size of each market varies depending on the extent of Australian production (including roe-off saucer scallops). The fisheries of the main overseas producers vary considerably and this, together with economic conditions in importing countries, also contributes to ever-changing market circumstances.

The major export markets are France (roe-on), United States, Hong Kong and New Zealand (roe-off) (Anon. 1980).

France was the major overseas outlet in the late 1960's and in 1970/71 took 612 tonnes worth \$1.4 million, 62% by volume and value of Australia's scallop exports. In 1972/73 France took 551 tonnes, worth 28% of the total value, but the US market had grown rapidly to take 901 tonnes valued at \$2.9 million (59% by value). Most of the US market was supplied at this time by saucer scallops from Queensland.

The years 1974/75 - 1979/80 saw considerable variations in catch and export levels.

In 1980/81 Australia exported 1,930 tonnes of scallops valued at \$12.6 million. Exports to France accounted for about 30% of the total value, the US market (24%) had dropped considerably but New Zealand (20%) and Hong Kong (15%) markets had developed.

Management

A summary of scallop regulations for south eastern Australia (Table 3) shows that licences or permits are required to commercially fish scallops in all States. In addition, a Commonwealth fishing licence (\$21) and boat licence (\$40-\$60) are required to fish in proclaimed waters. Dredge width provisions apply off New South Wales and Victoria in proclaimed waters.

Victoria is the only State with a licence limitation policy. Some licences are valid for Port Phillip Bay, some for the Lakes Entrance area and others for both areas.

Although minimum size regulations have in the past been applied in all States except New South Wales, only Tasmania retains such a policy. Victoria now has a seasonal closure (December-April) and restrictions on the number of fishing days per week in Port Phillip Bay. These measures, together with compulsory bag limits, restraints on gear size and licence limitation, seek to control effort in the fishery.

While catch limits are not subject to regulation in Tasmania, the processing sector sometimes imposes bag limits on vessels. Seasons, closures and gear restrictions apply in inshore areas of Tasmania and all are subject to regular review in the light of survey data and industry requests.

Bag limits and dredge width restrictions apply in New South Wales.

Research and Development

Pecten in south eastern Australia has been well studied although much of the information remains unpublished.

Early work on Tasmanian stocks involved A. Tubb, W.S. Fairbridge and A.M. Olsen who conducted field studies, commercial catch sampling, tagging, transplantation and underwater studies (Fairbridge 1953, Olsen 1955). Harrison (1961) studied reproduction and more recently Dix (1976, 1977, 1981) investigated culture methods. K. Harris of the Tasmanian Fisheries Development Authority is studying age determination and population assessment.

Scallop dredge surveys have been and are a major topic of investigation not only in Tasmania (Grant and Alexander 1973, Harris 1980, 1981a) but also in Victoria (Anon. 1981) and New South Wales (Gorman and Johnson 1971, Butcher et al 1981).

Such surveys have assisted the development of fishing in particular areas. Coupled with information on the biology of the scallop, they are also used as a guide to management decisions. Victorian and Tasmanian workers are determining if analyses of this kind can be used to predict future catches.

Operational studies on scallop vessels and gear were done by Hughes (1973) and an economic survey of the Victorian fishery was conducted recently by Belin (1978).

Prospects

Apart from predicting yields on a short term (one to two years) basis there can be no clear prognosis on the future of the south eastern Pecten fishery. Fluctuating catches from the main fishery areas are likely, particularly those offshore.

Two inshore beds in Tasmania - D'Entrecasteaux Channel and Norfolk Bay - have remained unfished since the 1960's and Pecten has not re-established in either area. The doughboy scallop has built up a sizeable population in D'Entrecasteaux Channel (Harris 1981b). These instances suggest that localised, inshore beds may be vulnerable to over-exploitation, although there is no evidence to suggest this of more extensive offshore areas. Cultivation of scallops offers possibilities for replenishment of inshore beds although the economics of scallop farming are yet to be proven in Australia.

Given variability in catches both in Australia and overseas, domestic and overseas scallop markets are likely to change rapidly.

October 1981.

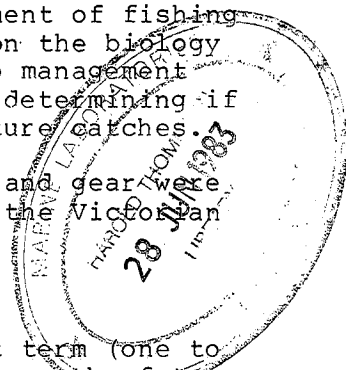


TABLE 1 Australian scallop production 1965/66-1980/81
(tonnes - live weight (a))

Year	NSW	Vic	Tas	SA	Qld	WA	South Eastern States	Australia (b)
1965/66	-	12,667	409	-	318	-	13,076	13,394
1966/67	-	13,030	363	-	182	-	13,393	13,575
1967/68	-	12,667	227	-	136	45	12,894	13,075
1968/69	-	4,484	125	-	281	121	4,609	5,012
1969/70	-	1,889	50	-	2,312	1,298	1,939	5,550
1970/71	1,417	4,350	-	-	1,758	1,768	5,767	9,293
1971/72	324	7,565	52	-	2,158	50	7,941	10,148
1972/73	114	11,807	515	151	4,082	83	12,587	16,953
1973/74	8	7,110	1,158	736	3,349	64	9,012	12,425
1974/75	92	3,010	1,261	143	1,497	151	4,506	6,154
1975/76	-	2,792	690	-	912	248	3,482	4,642
1976/77	-	2,888	498	-	494	510	3,386	4,396
1977/78	-	5,107	400	-	2,737	876	5,507	9,121
1978/79	2	5,841	1,077	-	3,232	396	6,920	10,548
1979/80	104	6,942(c)	3,829	-	1,394	260	10,875(c)	12,536(c)
1980/81	626	9,010(c)	3,359	-	2,596	665	12,995(c)	16,271(c)

(a) Live weight = 7 x flesh weight for Victoria and 6 x flesh weight for Queensland (Sanders 1970). Tasmanian statistics use a figure of 16% recovery of flesh weight and in NSW recovery varies from 11-15%. In future a factor of 6.5 is to be applied in all south eastern States.

(b) Includes NT.

(c) Commonwealth Department of Primary Industry estimate.

Source: Australian Bureau of Statistics, Fisheries (various issues)

TABLE 2 Australian scallop value 1969/70-1980/81
(\$'000)

Year	NSW	Vic	Tas	SA	Qld	WA	South Eastern States	Australia (a)
1969/70	-	209	20	-	404	200	229	833
1970/71	383	959	-	-	320	214	1,342	1,876
1971/72	95	2,527	23	-	444	7	2,645	3,096
1972/73	47	4,552	212	19	850	49	4,830	5,728
1973/74	3	2,144	430	101	560	7	2,678	3,245
1974/75	59	903	580	26	358	17	1,568	1,884
1975/76	-	1,005	379	-	366	42	1,384	1,792
1976/77	-	1,350	343	-	219	75	1,693	1,988
1977/78	-	2,364	316	-	1,502	235	2,680	4,417
1978/79	8	2,673	797	-	1,827	112	3,478	5,381
1979/80	480	nya	2,010	-	1,800	82	nya	nya
1980/81	2,850	nya	1,762	-	3,385	174	nya	nya

(a) Includes NT.

nya: not yet available.

Source: Australian Bureau of Statistics, Fisheries (various issues)

TABLE 3 Summary of scallop regulations in south eastern Australia

	Tasmania	Victoria	South Australia	New South Wales
Licence limitation	No	Yes - 23 for Port Phillip Bay, 34 for east of 146°E, and 56 for all Victorian waters.	No	No
Licences or permits needed	Boat licence (\$25-100) Scallop licence (\$50)	Boat licence (\$10) Scallop licence (\$6.25 for each 10 cm dredge width)	Permit (\$20)	Fishing Licence (\$2)*
Size limits (maximum diameter)	90 mm Pecten 90 mm <u>Equichlamys</u> 70 mm <u>Mimachlamys</u>	None	None	None
Seasons and closures	Inshore, east coast only, by notice. Total closure of D'Entrecasteaux Channel	Dredging prohibited between 1700-0500 hours in Port Phillip Bay.	None	None
Bag limits	None, except for non-commercial fishermen.	Port Phillip Bay 20/boat/day, elsewhere 40/boat/day.	None	None
Dredge limits	Maximum of 2 dredges towed independently. Mesh size not less than 60 mm square.	Maximum width 3.36 m	None	Maximum width 3.5 m for single dredge or combinations

* to be increased substantially

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