

FISHERY SITUATION REPORT 10. ABALONE

Demersal Mollusc Research Group
South Eastern Fisheries Committee

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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 South Australia. In addition to its co-ordinating role, it also provides a forum for discussion in fisheries science and management, and advises management authorities on problems referred to it by member organizations.

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.

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

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Introduction

The abalone fishery has developed rapidly from the early 1960s to produce in 1980/81 approximately 6,700 tonnes worth around \$37 million in export earnings.

An early review of the abalone industry is given by Harrison (1969).

Species and Distribution

There are seven species of abalone in southern waters generally referred to the genus Haliotis and three of these are of commercial significance.

The blacklip abalone H. ruber is the basis of the fishery in New South Wales, Victoria and Tasmania and comprises about 45% of the catch in South Australia. The greenlip abalone H. laevigata comprises 55% of the catch in South Australia and about 10% of the Victorian and Tasmanian catches and is also fished on the southern coast of Western Australia. Roe's abalone H. roei is the major species of the fishery in Western Australia. The distribution of southern Australian abalone is given by Shepherd (1973b) and outlined in the section titled 'Fishing Localities' (page 4).

Biology of Abalone

The following account, beginning with the settling larval stage (nothing being known of earlier larval stages), is taken from the papers of Shepherd (1973 a, b, 1975, 1976), Shepherd and Laws (1974) and unpublished data of Beinssen.

Settling abalone larvae appear to seek encrusting lithothamnia (micro-algae) often associated with reduced light conditions in narrow crevices. Upon settlement the young abalone feeds on diatoms for the first few weeks. Its diet then changes to macro-algae and with increasing size the abalone changes its habitat from crevices to caves or vertical faces (for H. ruber) (Witherspoon 1975) and open rock (for H. laevigata).

Young abalone are mobile, actively moving about at night to feed, but tend to become sedentary at an age of 3 years or more.

The food of adult abalone varies according to the habitat. H. laevigata seems to feed mostly on red algae and H. ruber largely on the kelp Phyllospora comosa as well as red algae. H. laevigata mostly traps drift algae, whereas H. ruber either traps drift algae or grazes.

There are many predators of abalone, the most important being the stingray for H. laevigata and various fishes and the sea star Coscinasterias calamaria for H. ruber.

H. laevigata, H. ruber and H. scalaris exhibit an escape response in the presence of predatory gastropods and sea stars (Parsons 1979, Parsons and Macmillan 1979).

Spawning of H. laevigata occurs in spring and early summer in South Australia and in summer in Victoria. With H. ruber the timing and duration of spawning varies with locality. In many places in South Australia it spawns in spring and autumn, but in Spencer Gulf spawning has been observed in autumn and winter. In Tasmania spawning occurs in spring (Harrison and Grant 1971).

Both species attain sexual maturity at an age of 3 years although a population of H. ruber examined by Shepherd (1973b) at Tipara Reef (SA) became sexually mature only at 4 years.

Growth studies on H. laevigata and H. ruber in South Australia (Shepherd and Hearn, in press) show that both species have considerable seasonal differences in growth associated with differences in food supply and in water movement. H. laevigata also shows differential growth rates between the sexes with females growing 25% faster than males at one site studied. The K and L_{∞} values in Table 1 for abalone in South Australia are extracted from this paper. Growth and population studies are unpublished for other States, except for a preliminary report for Tasmania by Harrison and Grant (1971), and the data in Table 1 from these States are provisional.

From mark/recapture experiments in NSW, eastern Victoria and SA, natural mortality has been estimated between 0.2 and 0.38 (Beinssen and Powell 1976, Shepherd et al. 1982).

The Fishery

Fishing Localities

H. ruber is exploited commercially from Port Stephens, NSW, around the southern coast of Australia (including the east, south and west coasts of Tasmania) to the islands of Nuyts Archipelago, in the eastern Great Australian Bight. In addition small quantities of redlip abalone, H. conicopora (possibly a geographic race of H. ruber) are taken along the south coast of Western Australia.

H. laevigata is taken from Flinders Island, Tasmania along the southern coast of Australia to Cape Naturaliste, WA. The geographic extent of the fishery is summarised by Shepherd (1973 b).

Fishing Methods

Abalone are harvested by skindivers in neoprene wet suits using standard fins and masks. Self-contained underwater breathing apparatus (SCUBA) tanks were used in earlier years but now all divers breathe compressed filtered air supplied through a long plastic hose from a boat-mounted compressor. This apparatus is commonly known as hookah gear.

Abalone are prised from the rock using a screwdriver or chisel-shaped abalone iron and then placed in a nylon mesh collecting bag. When this bag is partly full a "parachute" (an inverted canvas or nylon bag) is attached to give it neutral buoyancy so that the diver can drag it around easily. When full, the bag is carried to the surface by the parachute, which is inflated from the diver's mouthpiece.

In South Australia self-propelled cages, designed to give protection from sharks, are now used by a few divers.

Fishing Effort

Length frequency studies in Tasmania indicate a trend towards knife edge selection in the south eastern areas. "Knife edge selection" is the term used where the most abundant year class in the catch is the one immediately above the legal minimum length. This situation is in contrast to the less intensively fished west coast area where commercial catch samples continue to show modes above the legal minimum length (Witherspoon 1975).

In New South Wales, high fishing pressures have led to knife edge selection being evident in most catches over the last six years.

Beinssen (1976 a, b) has described experiments to measure the fishing power of abalone divers from which the fishing mortality of abalone can be calculated.

Medical Problems

The high incidence of occupational diseases among abalone divers, such as aseptic bone necrosis, deafness and arthritis, is a matter for concern. In addition, there have been many cases of decompression sickness, occasioned through inadequate decompression procedures.

Articles on the medical and psychological aspects of diving were published by Fowler and Shepherd (1974), Macfarlane (1974) and Shepherd and Gilligan (1974).

Regulations have been introduced in Tasmania and South Australia requiring comprehensive annual medical examinations for divers. A satisfactory medical report is necessary for licence renewal in these States, unless special circumstances exist. However the medical examinations have been used more as a means of informing divers about their state of health than as a means of depriving them of their licence.

In New South Wales self-employed divers are not compelled to follow any code of safe diving practice or to undergo medical examinations. Regulations exist for salaried commercial divers but abalone divers follow these regulations or otherwise according to their own decisions on profitability.

Production

The Australian abalone catch currently contributes about a third of the total world production of around 18,000 tonnes.

Production in 1980/81 was about 6,700 tonnes, a rise of around 10% over the previous year, with a record catch in Tasmania and rises in the Victorian and South Australian catches.

The annual production for each State since 1965 is given in Table 2 and summaries of data on catch, effort, price and value are given for Victoria (Table 3), South Australia (Table 4), Tasmania (Table 5) and New South Wales (Table 6).

Processing

Nearly all Australian abalone is processed and sold on export markets. There is practically no Australian market for abalone.

Abalone are delivered live to land-based processing plants registered under the Exports (Fish) Regulations. In Victoria and Tasmania some premises are registered solely for the purpose of shucking abalone and holding of the meats in chilled condition. Meat yield after shucking and removal of the shell and viscera is 30-40% by weight.

After shucking, the meat is washed, the radula excised and the black epithelial membrane scrubbed away. The cleaned meat is drained free of natural juices and either frozen or canned in brine. The Exports (Fish) Regulations put limits on the thawed and drained weight of frozen abalone and drained maximum weight of canned abalone.

Frozen Abalone

Most abalone is bulk frozen in 10 kg cartons with an inner polythene liner; this is marketed simply as frozen abalone. In Tasmania there is some production of frozen abalone in natural juices, marketed as frozen unbled abalone. Some abalone is frozen whole on-the-shell. Abalone meats are usually size-graded.

Canned Abalone

The epipodium is trimmed from the meat which is then pre-cooked in brine prior to being packed whole in brine and retorted. Typically 450 g cans are used, containing 2 or 3 pieces per can.

Live Abalone

There is a small volume of trade in live abalone, particularly from New South Wales to Japan. The abalone are airfreighted in special polystyrene boxes.

Shell

There is an erratic market for abalone shell in Asia, where it is used as a substitute for mother-of-pearl.

Research

Research into abalone processing, including canning, freezing and drying, has been carried out by the CSIRO Division of Food Research, Hobart (Montgomery 1966, James and Olley 1970, 1971 a, b, Doe *et al.* 1973, Young *et al.* 1973, Young and Olley 1974). A code of practice for the handling and processing of abalone was published by the Department of Primary Industry (Anon. 1972), based on this research. Studies on the use of abalone viscera as silage have also been carried out by the Division of Food Research, Hobart (Olley 1976).

A comprehensive review of the chemical composition, processing technology and quality aspects of abalone is given by Olley and Thrower (1977). The problem of blue spot in canned abalone is discussed by Thrower (1977).

Markets

Japan and Hong Kong are the principal markets for abalone (see Table 7) and Australian fishermen and exporters had a good year in 1981 in terms of both production and prices.

Australian exports of frozen abalone in 1980/81 were 1,877 tonnes product weight, just under the record 1979/80 level. Japanese demand for Australian abalone during most of 1981 was strong and this was reflected in higher prices and a significant increase in the quantity sold there. Total Japanese imports of fresh and frozen abalone for the nine months ended September 1981 were about 2% up on the same period in 1980. Imports of Australian abalone rose by 10% but there was a further sharp decline of 80% in imports of Chilean loco (sea snail Concholepas concholepas).

Exports of canned abalone in 1980/81 were also up by 21%, with significant increases in shipments to Japan, Hong Kong, Singapore and the USA.

The unit value of exports of frozen and canned abalone to all markets rose substantially. The average unit value for frozen abalone was \$9.00/kg in the ten months to October 1981, up 10% over the corresponding period in 1980. For canned abalone the respective figures were \$12.89/kg and 39%.

Economics

The economic situation in the fishery in the period 1970/71 to 1972/73 was surveyed by the Department of Primary Industry (Anon. 1979). The fishery has not been subject to economic study since that date, except in New South Wales (Waugh 1980, 1981; Waugh and Hamer, in press).

Economic performance by divers is influenced mainly by increases in costs and by fluctuations in prices received. Fuel costs are a major expense item because of the high speed, planing-hull boats used in this fishery.

Prices to fishermen rose sharply during 1981. In November 1981, Tasmanian divers were receiving \$4.10/kg (shell weight) for abalone, up 24% on a year earlier. Divers in South Australia received an average price of \$3.50/kg (shell weight) for abalone in 1981, up about 30% on the previous year. Prices paid to divers in Victoria and New South Wales during 1981 were also about 25% higher than a year earlier. The average price paid for whole abalone in Victoria during 1981 was about \$3.50/kg.

Management

In all States entry to the fishery is strictly controlled and, except in New South Wales, relatively high annual licence fees are imposed. Licences are personal and non-transferable in New South Wales and Victoria, but saleable in South Australia and Tasmania. In the last named States the current price for goodwill is from 100 to 150% of the annual gross income.

In Victoria a Fisheries Management Committee consisting of Government and industry representatives has been established. Meetings in early 1977 to consider the abalone fishery resulted in a draft policy statement which was circulated to the industry in July 1977 for consideration. The major resolutions were as follows:

- (i) Two objectives for the fishery were identified as most desirable; to obtain a high level of production, defined as 90% of the maximum sustainable yield, and to obtain a high economic return on labour and capital for the fishery;
- (ii) The number of licences is to be chosen to achieve the best compromise between these two objectives, the present numbers being close to optimum in each zone;
- (iii) Divers who were not actively and substantially engaged in the fishery over a three year period may be asked to show cause why the renewal of their licence should not be refused;
- (iv) Divers should not be allowed to sell their licences and future licence holders should be chosen on the basis of a points system relating to fishing industry experience, age, residence, time on the waiting list and filial relationship to a fisherman.

In South Australia a licensed diver is permitted (with the prior approval of the local Inspector of Fisheries) to employ a relief diver to dive in his stead for a maximum of 21 diver days per annum.

In New South Wales licence limitation was introduced in 1980 following substantial amendments to the Fisheries and Oyster Farms Act in 1979. Only 59 permits are available for abalone/sea urchin/turban snail fishing. Initial permit holders will virtually have their permits for life, pending continued production. Additional permits, when issued, will probably be valid for only 3 or 4 years.

A summary of the regulations applying to the abalone fisheries of the south eastern States is given in Table 8.

Statistical Data

New South Wales

Divers are requested to lodge monthly returns kept on a daily basis. Buyers and handlers of abalone are also required to supply monthly returns. Analysis is carried out manually and commercial catch sampling is also carried out.

Victoria

A new abalone return form was introduced for the daily entry of catch and effort data during 1978. This was part of an overall revision of procedures for the collection of catch and effort data for Victorian commercial fisheries. The system enables more efficient processing, tabulation and summarising of the data; improved feedback of personal, zone and total fishery summaries to individual fishermen and faster provision of data summaries for use by fisheries managers.

South Australia

New maps of abalone fishing areas within the State, identifying 250 reefs over 1,000 km of coast are issued to divers who use them to provide catch data on statistical forms to the Department for individual reef areas. The data are processed by computer and provide summaries according to zone, area and diver. A commercial catch sampling study of H. laevigata was commenced in 1978 and is in operation for specified fishing areas in the State.

Tasmania

A commercial catch sampling program has operated for some time. Results to date indicate differences in the four statistical zones, probably attributable to fishing pressure and availability of abalone. Fishing in the western zone is limited by weather and whilst catches and catch rates are high, total effort is low. In contrast, eastern zone data indicate a higher total mortality rate, presumably because of heavier fishing effort in this more accessible zone. The southern zone is intermediate and catch rates are stable and total mortality remains unchanged around 0.5. Mixed fisheries are characteristic of the northern zone and interpretation of the statistics is difficult as there is only sporadic abalone fishing in this area.

Research and Development

New South Wales

Both the catch and effort and catch size distributions are being monitored. Tagging to determine growth rates has been carried out. Further research into reef area estimation, recruitment, competition and natural mortalities was to terminate in January 1982. This work was partly funded from the Commonwealth Fishing Industry Research Trust Account (FIRTA).

Victoria

Research on the population dynamics of H. ruber is completed. Initial estimates of population parameters (see Table 1) have been calculated and stock assessments for the three Victorian zones have been made (Beinssen, unpublished data).

South Australia

Current research involves the measurement of recruitment rates of H. laevigata at different sites from year to year, by measuring densities of younger age classes.

A mathematical model based on depletion studies of specific reefs has been developed and will be tested in a program involving the identification of all fished reefs and then using divers' catch returns to estimate the productivity of each reef.

Tasmania

Field work on a tagging program in one of Tasmania's most intensively fished areas (Actaeon Island) has been completed. Preliminary estimates of the population dynamics of the resource have been calculated (see Table 1) and tag return analysis is continuing.

Selectivity experiments (Witherspoon 1975) confirmed earlier suggestions by Shepherd (1973 b) relating to the changes in micro-habitat preferences with increasing size of H. ruber. The results clearly indicate that young animals are cryptic, moving to more exposed sites as they grow larger. Sample size distributions of abalone indicate that samples of legal sized abalone from the same area however, showed no differences from the combined samples of abalone (above legal minimum length) from all habitats, indicating that the partially cryptic nature of these animals is not sufficient to prevent exploitation.

Prospects

While 1981 was a good year for the Australian abalone industry, there were signs in Japan towards the end of the year that consumers were unwilling to pay high prices for abalone and there was a build up of stocks. It was expected that prices would level off or decline in 1982.

Current economic conditions in the US are not conducive to high demand for seafoods generally but the Hong Kong and Singapore markets are expected to remain strong.

Overall the long term market outlook for the abalone industry appears favourable, and considering the level of research and management, current production levels are likely to be maintained.

November 1981

TABLE 1.
ABALONE POPULATION PARAMETERS

	H. ruber										H. laevisgata		
	NSW	TASMANIA			VICTORIA			SOUTH AUSTRALIA			SOUTH AUSTRALIA		
		Western Zone	Central Zone	Eastern Zone	Western Zone	Central Zone	Eastern Zone	Western Zone	Central Zone	Eastern Zone	Western Zone	Central Zone	Southern Zone
K*	0.3	0.24-0.28	0.25	0.20	0.25	0.41	0.32-0.37	0.42	0.40	-	-	-	-
L _∞ *	160	174-194	155	145	155	144	137-143	144	134	-	-	-	-
Maturity: size at first maturity (mm) (50% maturity)	90	80	90	80	90	-	-	100	75	-	-	-	-
Legal minimum length (LML) (mm)	108	127	120	100-120 (see table 8)	120	102 **	102 **	102 **	102 **	102 **	102 **	102 **	102 **
Natural mortality (M)	0.2	0.2	0.2	0.2	0.2	-	0.21-0.38	-	0.22-0.26	-	-	-	-
Fishing mortality (F)	0.8	0.2-0.4	0.42	0.45	0.58	-	-	-	-	-	-	-	-
Optimum size at first capture (LC) (mm)	110	100-120	105	100	100	-	-	-	-	-	-	-	-

* These are growth parameters of the von Bertalanffy equation, K being a measure of the rate of growth and L_∞ the average maximum size reached. These have to be refined further and are derived by different methods in different States.

** Lesser diameter, equivalent to 125 mm greater diameter.

TABLE 2

AUSTRALIAN ABALONE PRODUCTION BY STATE

(tonnes - live weight)

YEAR	NSW	VIC	SA	WA	TAS	TOTAL
1963/64	48	21	1	-	49	119
1964/65	76	178	10	-	225	489
1965/66	429	376	25	-	753	1,583
1966/67	169	1,591	286	5	1,722	3,773
1967/68	466	3,384	622	4	2,354	6,830
1968/69	225	2,608	1,609	-	2,139	6,581
1969/70	280	2,162	1,055	17	2,613	6,127
1970/71	940	2,046	1,108	121	3,488	7,703
1971/72	1,362	2,209	1,158	245	2,971	7,945
1972/73	1,057	2,022	916	326	2,174	6,495
1973/74	862	1,992	676	245	2,106	5,881
1974/75	622	1,386	608	256	2,108	4,980
1975/76	450	1,404	597	355	2,429	5,235
1976/77	379	1,394	674	300	2,368	5,115
1977/78	383	1,143	778	247	2,524	5,075
1978/79	549	1,370	843	190	3,100	6,052
1979/80	641	1,200	795	311	3,204	6,151
1980/81	543	1,400 (a)	938 (b)	300 (a)	3,621	6,802 (a)

(a) Commonwealth Department of Primary Industry preliminary estimate.

(b) Provisional - South Australian Department of Fisheries.

Sources: Australian Bureau of Statistics, New South Wales State Fisheries, Victorian Fisheries and Wildlife Division, South Australian Department of Fisheries, Western Australian Department of Fisheries and Wildlife and Tasmanian Fisheries Development Authority.

TABLE 3

SUMMARY OF STATISTICS - VICTORIA

YEAR	NUMBER OF DIVERS	DIVER DAYS	DIVER HOURS	CATCH - BLACKLIP	TONNES GREENLIP	SHELL WEIGHT TOTAL	KG PER HOUR	KG PER DAY	AVERAGE PRICE IN SHELL \$ PER KG (BLACKLIP)	APPROX VALUE \$ '000
1965/66	22	na	6,816	373	3	376	55	na	0.20	75
1966/67	87	na	27,285	1,554	27	1,591	58	na	0.25	398
1967/68	165	na	51,765	3,242	142	3,384	65	na	0.29	981
1968/69	98	na	39,208	2,347	261	2,603	67	na	0.27	704
1969/70	79	7,207	32,456	2,066	96	2,162	67	300	0.32	692
1970/71	83	6,818	32,338	2,002	44	2,046	63	300	0.52	1,064
1971/72	90	6,875	36,077	2,107	102	2,209	61	321	0.65	1,436
1972/73	87	7,004	32,796	1,944	78	2,022	62	289	0.69	1,395
1973/74	90	6,472	32,229	nyc	nyc	1,992	62	308	0.81	1,614
1974/75	71	4,822	24,051	nyc	nyc	1,386	58	287	0.91	1,261
1975/76	71	4,962	25,057	nyc	nyc	1,404	56	283	1.19	1,671
1976/77	78	4,938	25,492	nyc	nyc	1,394	55	282	2.10	2,927
1977/78	64	3,756	19,801	nyc	nyc	1,143	58	304	1.82	2,080
1978/79	nyc	nyc	nyc	nyc	nyc	1,370	nyc	nyc	1.99	2,726

Note: Number of divers is the average of the number operating during each month.

Approximate value is obtained by multiplying the total production by the average price paid for the dominant species.

na : Not available.

nyc: Not yet computed.

Source: Victorian Fisheries and Wildlife Division.

TABLE 4

SUMMARY OF STATISTICS - SOUTH AUSTRALIA

YEAR	NUMBER OF DIVERS	DIVER DAYS	DIVER HOURS	CATCH - TONNES SHELL WEIGHT		KG PER HOUR	KG PER DAY	AVERAGE PRICE \$ PER KG IN SHELL	APPROX VALUE \$'000
				BLACKLIP	GREENLIP				
1965/66	na	na	na	na	na	na	na	0.16	4
1966/67	na	na	na	na	na	na	na	0.22	63
1967/68	110	2,060	10,570	9	31	59	302	0.32	199
1968/69	68	5,029	24,369	379	1,008	66	319	0.26	418
1969/70	49	3,564	16,370	249	776	64	296	0.37	390
1970/71	42	3,584	16,823	471	637	66	309	0.59	654
1971/72	42	3,549	18,954	440	718	61	326	0.70	811
1972/73	42	2,815	14,580	448	468	63	325	0.73	669
1973/74	45	2,253	10,964	370	306	62	300	0.99	669
1974/75	34	1,896	9,186	237	371	66	321	1.02	620
1975/76	30	1,699	8,518	190	407	70	351	1.37	818
1976/77	35	2,179	11,848	231	443	57	309	2.27	1,530
1977/78	35	2,359	12,743	231	546	61	330	1.74	1,353
1978/79	35	2,508	13,417	263	580	63	336	1.59	1,462
1979/80	35	2,414	12,843	287	507	61	329	2.70	2,148
1980/81	35	2,550	14,040	415	513	66	367	3.50	3,285

(a) Includes unspecified catch.

(b) Provisional.

Note: Number of divers is the number licensed in the State.

The approximate value is obtained by multiplying the total production of each species by the average price paid for that species.

na : Not available.

Source: South Australian Department of Fisheries.

TABLE 5
SUMMARY OF STATISTICS - TASMANIA

YEAR	NUMBER OF DIVERS	DIVER DAYS	DIVER HOURS	CATCH - TONNES SHELL WEIGHT		TOTAL FROM PROCESSORS	KG PER HOUR	KG PER DAY	AVERAGE PRICE \$ PER KG IN SHELL (BLACKLIP)	APPROX VALUE \$'000
				BLACKLIP	GREENLIP					
1965/66	21	na	4,828	na	na	412	85	na	0.20	151
1966/67	56	na	15,684	na	na	1,050	67	na	0.24	413
1967/68	117	na	33,585	na	na	1,966	59	na	0.28	659
1968/69	69	7,366	27,658	1,892	2	1,894	68	257	0.27	578
1969/70	62	6,561	27,471	2,170	127	2,297	84	350	0.28	732
1970/71	81	6,444	29,163	2,406	98	2,504	86	389	0.49	1,570
1971/72	93	6,912	31,734	2,099	188	2,287	72	331	0.62	1,842
1972/73	91	6,017	26,773	1,412	291	1,703	64	283	0.75	1,631
1973/74	94	6,565	31,144	1,692	191	1,883	60	287	0.91	1,916
1974/75	92	7,449	31,157	1,530	140	1,670	53.6	224	0.97	2,041
1975/76	108	8,876	37,984	2,040	182	2,222	58.5	250	1.36	3,303
1976/77	109	9,019	36,709	1,892	277	2,169	59.1	240	2.07	4,902
1977/78	113	10,088	41,661	2,315	180	2,495	59.9	247	1.87	4,721
1978/79	114	11,057	47,505	2,611	214	2,825	59.5	255	1.70	5,270
1979/80	110	10,296	46,080	2,932	116	3,048	66.1	296	2.58	8,287

Note: Number of divers is the average of the number operating during each month.

Approximate value is obtained by multiplying the total production by the average price paid for the dominant species.

na : Not available.

Source: Tasmanian Fisheries Development Authority.

TABLE 6
SUMMARY OF STATISTICS - NEW SOUTH WALES

YEAR	NUMBER OF DIVERS	AVERAGE DIVERS PER MONTH	DIVER MONTHS	DIVER DAYS	DIVER HOURS	CATCH - TONNES (BLACKLIP)	KG PER HOUR	KG PER DAY	KG PER MONTH	AVERAGE PRICE \$ PER KG IN SHELL	APPROX VALUE \$'000
1964/65	41	na	na	na	na	76	na	na	na	na	na
1965/66	135	29	345	na	na	429	na	na	1,244	na	na
1966/67	na	na	na	na	na	169	na	na	na	0.24	40
1967/68	na	38	452	na	na	466	na	na	1,030	0.23	109
1968/69	na	na	na	na	na	225	na	na	na	0.25	56
1969/70	na	24	290	na	na	280	na	na	964	0.33	92
1970/71	na	70	836	na	na	940	na	na	1,124	0.58	545
1971/72	290	177	2,120	na	na	1,362	na	na	642	0.62	844
1972/73	257	174	2,084	na	na	1,057	na	na	507	0.59	624
1973/74	187	106	1,275	na	na	862	na	na	676	0.68	586
1974/75	140	70	865	6,520	20,870	622	29.8	95.4	719	0.72	448
1975/76	139	57	685	4,340	17,510	450	25.7	103.7	657	1.20	540
1976/77	118	68	816	5,648	22,160	379	17.1	67.1	464	1.98	750
1977/78	128	67	806	5,520	23,070	383	16.6	69.4	477	1.45	555
1978/79	107	70	844	6,520	28,300	549	19.4	84.2	650	1.76	966
1979/80	100	68	822	7,006	30,380	641	21.1	91.5	780	2.59	1,684
1980/81	59	na	na	na	na	543	na	na	na	3.39	1,841

Note: na : Not available.

Source: New South Wales State Fisheries

TABLE 7

AUSTRALIAN ABALONE EXPORTS
1979/80 AND 1980/81

<u>Destination</u>		<u>Twelve months ended June</u>			
		<u>1980</u>		<u>1981</u>	
		<u>Quantity</u>		<u>Value</u>	
		<u>(tonnes)</u>		<u>(\$'000)</u>	
Singapore	frozen	15	18	70	218
	canned	201	265	1,730	2,918
Japan	frozen	1,307	1,204	8,258	9,416
	canned	540	607	4,664	6,984
USA	frozen	115	106	1,132	1,095
	canned	136	220	1,128	2,520
Hong Kong	frozen	424	515	4,072	6,312
	canned	451	560	3,833	6,232
Other	frozen	21	34	120	301
	canned	128	115	1,037	1,171
TOTALS	frozen	1,882	1,877	13,652	17,342
	canned	1,456	1,767	12,392	19,825
		3,338	3,644	26,044	37,167

Source: Australian Bureau of Statistics, figures subject to revision.

TABLE 8
SUMMARY OF REGULATIONS

	NSW	VICTORIA	TASMANIA	SA
Licence fee	\$100	\$600	\$1270	2.5% of gross plus 15% of shell (average \$1600)
Limited entry	Yes	Yes	Yes	Yes
Minimum size (greatest diameter)	108 mm	Greenlip: 130 mm in all waters Blacklip: 120 mm east of Lakes Entrance 120 mm west of Lorne 110 mm between Lorne and Lakes Entrance 100 mm Port Phillip Bay	127 mm	102 mm (lesser diameter; equivalent to 125 mm greater diameter)
Shucking at sea	No	No	No	No
Medical examination required	No	No	Yes	Yes
Zoning	1 zone	3 zones	1 zone	3 zones
Transferability of licence	No	No	Yes	Yes
Amateur daily catch limits	15	10	10	5

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