

## Abalone Managed Fishery

### Management Summary

The Abalone Managed Fishery targets three abalone species: greenlip abalone (*Haliotis laevis*), brownlip abalone (*Haliotis conicopora*) and Roe's abalone (*Haliotis roei*). In Western Australia the large greenlip and brownlip abalone are confined to the lower south-west and south coasts of the State, while Roe's abalone are found in commercial quantities from the South Australian border to Shark Bay, although they are not uniformly distributed throughout this range.

The fishery is divided into eight management areas, with separate total allowable catches (TACs) being set for each species taken in each area on an annual basis. The quota year and licensing period runs from 1 April to 31 March of the following year. However, TACs may be adjusted during the year under certain circumstances.

In terms of allocation of quota to individual operators, each Abalone Managed Fishery Licence has associated with it transferable units of entitlement. Each unit is ascribed a value by dividing the TAC for a given area and species by the total number of units allocated for that area and species.

A minimum unit holding applies to licences in the fishery, though there are some licences which are permitted to operate below this minimum in recognition of historical fishing practices.

Abalone divers are required to provide daily catch information in the form of a catch and disposal record. Details including the weight of abalone collected, the number of abalone (for greenlip/brownlip only), the date and location of collection and the name of the diver are all recorded and used to assist in research, compliance and management matters.

A final application has been submitted to Environment Australia for the abalone fishery as part of EA's ecological sustainability reporting process under the *Environment Protection and Biodiversity Conservation Act 1999*. A public comment period was conducted during early 2003 and a formal assessment is currently being undertaken by EA.

#### **Governing Legislation/Fishing Authority**

Abalone Management Plan 1992  
Ministerial Policy Guideline no. 10  
Abalone Managed Fishery Licence

#### **Consultation Process**

Abalone Management Advisory Committee  
Department–industry meetings

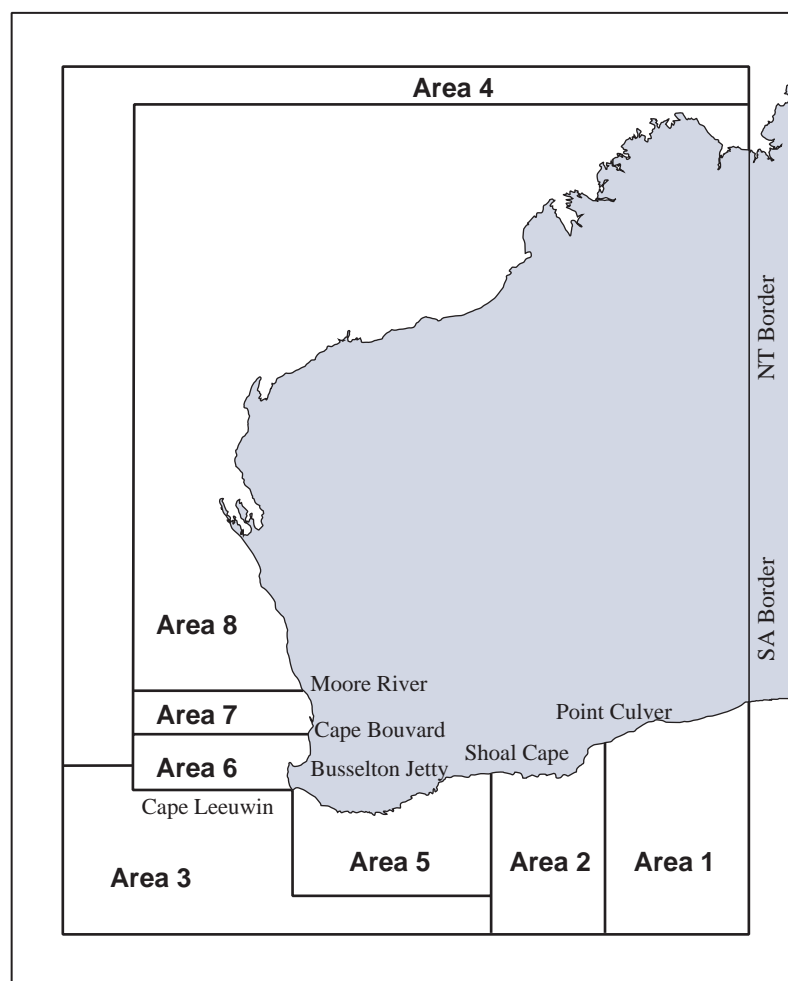
### Research Summary

The 2002 quota period (1 April 2002 to 31 March 2003) represents the fourth full season of abalone fishing under current management arrangements. Prior to 1999 the Abalone Managed Fishery was divided into three zones. Since then, fishing has been separated by species into a greenlip abalone fishery, brownlip abalone fishery and Roe's abalone fishery, with transferable units of quota allocated over eight areas throughout the State (Abalone Figure 1).

Basic research monitoring for the eight abalone catch areas is undertaken annually utilising industry data from daily catch records, information from processors, fishers' monthly returns and data collected during specific research projects. In each of the eight areas, the fishing days required to achieve the catch are monitored annually to ensure that the stock levels are being maintained. For the greenlip and brownlip fishery, examining the number of abalone caught for each consignment enables estimation of the mean size of abalone taken. For the Roe's abalone fishery, where divers do not record the number of individual abalone, a similar measure is being developed using information from the abalone processors.

In addition to monitoring the principal stocks, the Department is preparing a draft report on research into the harvesting of stunted greenlip populations (those that rarely reach legal minimum length), with a view to recommending harvesting regimes for these populations. A second research initiative using research and industry divers to test the efficacy of underwater video for monitoring density and size structure of abalone stocks has also commenced, using funding from the FRDC. In the coming season (2003/04), investigations into the use of targets, triggers and decision rules for managing TAC will also be undertaken.





ABALONE FIGURE 1

General map showing management areas used to set quotas for the commercial abalone fisheries of Western Australia.

## Greenlip and Brownlip Abalone Status Report

Prepared by A. Hart and F. Fabris

### FISHERY DESCRIPTION

#### Boundaries and access

The greenlip/brownlip abalone fisheries include Areas 1, 2 and 3, which extend from the SA/WA border to Busselton Jetty.

For historical reasons, greenlip and brownlip abalone quotas in Western Australia are managed in meat weight, whereas the remainder of Australia's abalone fisheries operate on whole weight. For comparative purposes, therefore, this status report notes both whole and meat weights. Standard conversion factors for meat weight to whole weight are currently 2.667 for greenlip abalone and 2.5 for brownlip abalone.

The quota period for all areas was 1 April 2002 to 31 March 2003.

#### Main fishing method

Diving. Abalone divers operate from small fishing vessels (generally < 9 m).

#### RETAINED SPECIES

##### Commercial production (season 2002):

**Greenlip 166.72 tonnes whole weight**  
**Brownlip 27.45 tonnes whole weight**

#### Landings

Catches are controlled by quotas, which were initially set at 194.7 t whole weight (73 t meat weight) for greenlip and 34.9 t whole weight (14 t meat weight) for brownlip for the 2002 season. However, a revised determination mid-season by the Executive Director raised the TAC by 4% to 202.5 t whole weight (75.9 t meat weight) for greenlip abalone and 35.89 t whole weight (14.35 t meat weight) for brownlip abalone. This does not represent an increase in real terms, but was raised in accordance with changes in estimates of weight due to time of measurement.

# SOUTH COAST BIOREGION

The greenlip catch was estimated to be 166.7 t whole weight (62.5 t meat weight) for the 2002 season (Abalone Table 1). This was 11% lower than in 2001 and 18% below quota. Historically, the full quota is never taken in Area 1 (the Nullarbor fishery) as fishing conditions are quite difficult. In Area 2, low catch rates (induced by a high target meat weight as a result of an industry–Government agreement) and a conservative approach to fishing by industry resulted in a voluntary reduction in total greenlip catch to 19.7 t (from 24 t) meat weight in the main stocks and 4.6 t from stunted stocks. In Area 3, only 91% of the greenlip quota was taken.

The brownlip catch was 27.5 t whole weight (11 t meat weight) for the 2002 season (Abalone Table 1). This was 12% lower than in 2001 and 24% below quota. In Area 2, an industry decision to conserve stock capped the brownlip take at 63% of the quota, while in Area 3, 97% of the original 6 t quota (prior to the mid-season review) was taken.

## Fishing effort

This year, effort was divided into the main and stunted stocks, as fishing of stunted stocks is becoming a significant proportion of the quota, and needs to be treated separately (see Stock Assessment section). Total effort for the main stocks in 2002 was 1,035 days fished for greenlip and brownlip abalone. This was greater than the effort in 2001 (992 days) but similar to the effort of 2000 (1,028 days).

For the 2002 catch of 164.2 t (from the main stocks), the effort of 1,035 diver days was lower than the acceptable effort range. However, the catch from the main stocks was 74.2 t (31%) less than the TAC (238.4 t), and is the reason why effort is lower than the acceptable range.

## Catch rate

In 2002, the catch rate for the main greenlip stocks was 132 kg whole weight (50 kg meat weight) per diver day. This was an overall 20% reduction from 167 kg whole weight (62 kg meat weight) per diver day in 2001 and is caused by a 22% reduction in Area 2 (60 to 47 kg meat weight per diver day), and a 20% reduction in Area 3 (64 to 51 kg meat weight per diver day). It is the lowest catch rate in eight years, since the targeting of larger-sized animals in both Area 2 and Area 3. There has been a three-year declining trend in catch rates from 1999 to 2002 in both Area 2 and Area 3, and catch rates are at the lower end of the historically acceptable range. These declines are only partially related to stock abundance; they are also correlated with effective increases in minimum length fished in both areas, and thus represent a lower exploitation rate. However, special note needs to be made of the Hopetoun region in Area 3, where catch rates have dropped from 87 kg meat weight per day in 1999 to 40 kg meat weight per day in 2002.

## Recreational component (2002): 20% approx. (under review)

Based on telephone surveys of recreational licence holders, preliminary estimates have been made that approximately 15% and 25% respectively of the total greenlip and brownlip

abalone catches may be taken recreationally. These estimates, particularly for the cryptic, low-catchability brownlip species, have very wide confidence limits and require additional validation. Noting that these estimates may change with further review, they should not be quoted or used as precise measures of catch.

## Stock assessment completed:

Yes

Greenlip and brownlip abalone stocks are assessed by analysing industry data from daily catch records, information from processors, and data collected during specific research projects.

In recent years industry has collaborated with the Department of Fisheries to develop strategies for the sustainable harvesting of 'stunted' populations of abalone. This has resulted in significant catches of greenlip abalone in recent years (30 t whole weight in 2002; Abalone Table 1). In 2002, catches from stunted greenlip stocks accounted for 18% of the entire commercial catch, compared to 11% in 2001 and 3% in 2000 (Abalone Table 1). A report summarising the findings and recommendations of this research will be published in 2003. It will recommend harvest protocols in terms of spatial extent of target populations, catch, catch rate and size targets for assessment, and rotational harvesting periodicity.

In Area 2, average meat weight for greenlip stocks in 2002 (198 g) was the highest recorded in 10 years. The Area 2 greenlip catch rate was 46 kg meat weight per day in 2002, a decrease from 60 kg meat weight per day in 2001. The increasing meat weight and decreasing catch rate arise from a decision to set a high meat weight target as a stock conservation measure. This measure will be removed in the 2003 season, and research effort directed towards establishing the best combination of stock conservation targets (i.e. catch, catch rate and meat weight considered together).

The average meat weight of brownlip abalone in Area 2 increased from 249 g in 2001 to 285 g in 2002. Again, this was the result of a high meat weight target, rather than reflecting the state of the stock.

In Area 3, the average meat weight of greenlip abalone taken in 2002 was 223 g, similar to the 2001 average (226 g). The high weights are being maintained by a more conservative fishing regime (increased minimum sizes). The quota for brownlip abalone in Area 3 was increased by 5 t whole weight (2 t meat weight) prior to the 2000 season to allow divers to target new areas for brownlip abalone. This increase was retained for the 2001 and 2002 seasons, and average meat weights have been maintained (274 g in 2000 and 2001; 279 g in 2002).

## Exploitation status:

Fully exploited

## Breeding stock levels:

Adequate

Research has shown that greenlip abalone mature at between 80 and 100 mm shell length, and brownlip abalone mature at between 90 and 130 mm shell length, which are both well below the legal minimum size limits set across the fishery (140 mm shell length in Area 1 and 2; 145 mm in Area 3). The breeding stock for both species is further protected, as industry sets self-imposed length limits in excess of the minimum legal

limits in areas of fast-growing stocks. For example, in Area 2 there is a general 145 mm minimum length across the fishing grounds. In Area 3, fishers have an imposed minimum size limit of 153 mm shell length for the faster-growing portions of the fishing grounds, and 150 mm for the remainder.

## NON-RETAINED SPECIES

### Bycatch species impact: **Negligible**

Divers have the ability to target abalone of choice (species, sizes and quality of abalone) and do not inadvertently harvest bycatch in their normal fishing activities.

### Protected species interaction: **Negligible**

The only protected species interaction occurring in this fishery is with the great white shark (*Carcharodon carcharias*), which has been known to attack divers. Most divers now use diving cages or electronic shark deterrent devices for their personal protection, which has the secondary effect of reducing the incentive to harm this protected species.

## ECOSYSTEM EFFECTS

### Food chain effects: **Negligible**

Commercial abalone diving occurs over a small proportion of the total abalone habitat of the Western Australian coastline. In view of the relatively low exploitation rates and consequent maintenance of a high proportion of the natural biomass of abalone, it is considered unlikely that the fishery has any significant effect on the food chain in the region.

### Habitat effects: **Negligible**

The fishing activity makes minimal contact with the habitat, which typically consists of hard rock surfaces in a high wave energy environment. As abalone are drift algae feeders, their removal is unlikely to result in any changes to the algal growth cover in areas fished.

## SOCIAL EFFECTS

There are close to 30 vessels in the Western Australian abalone industry. Of these, 14 vessels fish greenlip and brownlip abalone, employing approximately 35 divers and deckhands. The dispersed nature of the greenlip and brownlip abalone fishery means that small coastal towns from Busselton to the South Australian border receive income from the activity of divers.

## ECONOMIC EFFECTS

### Estimated annual value (to fishers) for year (2002): **\$10.4 million**

The estimated average price received by fishers was \$146/kg meat weight for greenlip and \$119/kg meat weight for brownlip abalone. On the basis of the average prices, the greenlip and brownlip abalone fishery was valued at approximately \$10.4 million. These prices were the same as 2001, but significantly lower than the 2000 values of \$163/kg meat weight for greenlip and \$132.50/kg meat weight for brownlip abalone.

## FISHERY GOVERNANCE

### Acceptable effort range: **1,095–1,511 diver days for 238.4 tonnes whole weight**

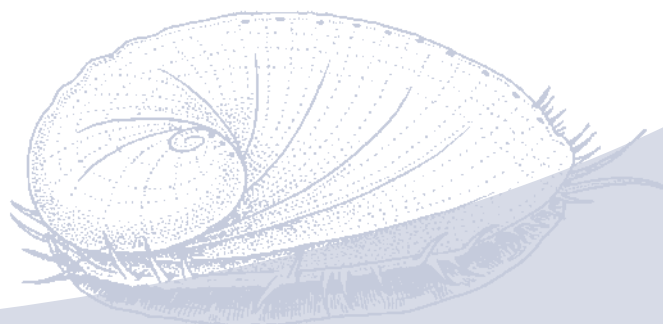
For fishing to remain at a historically sustainable level, the effort to take the 2003 quota from the main stocks should fall within the five-year (1994–1998) effort range (1,095–1,511 diver days) that reflects the acceptable variation in the main stocks.

The Area 2 greenlip quota will remain at 80 t whole weight (30 t meat weight) in 2003. However, fishing of stunted stocks has resulted in only one year (2000) since 1997 in which the TAC has been taken entirely from the main stocks. In light of this, the Department (in consultation with stakeholders) will be developing formal indicators of stock status against which the stock can be evaluated during next season's review.

The Area 2 brownlip quota was voluntarily reduced in 2002 from 19.8 to 18 t whole weight (7.92 to 7.2 t meat weight) in response to the recent downward trends in meat weights. Fishing in Area 2 during the season (including the western sector) operated under a Memorandum of Understanding between the Department of Fisheries and industry. The MOU provided in-season evaluations of sector performance in terms of average meat weight against pre-determined historical means. This resulted in elevated meat weights and reduced catch rates as industry divers targeted larger animals to stay above the target size. Hence for the 2002 season, CPUE and meat weight in Area 2 were more indicative of fishing behaviour than stock status. The MOU will not be continued for the 2003 season.

## EXTERNAL FACTORS

In the last few years there have been a number of changes which impact on fishery governance, and particularly on catch rates. Lease divers are becoming more common, industry size limits have been increased, and the effect on catch rates of technology changes such as the introduction of GPS and motorised underwater scooters and shark protection cages is yet to be quantified. The anecdotal observation is that divers are able to cover much larger distances in a day if they choose to do so, hence the area searched becomes larger and impacts on the calculation of fishing effort. All these effects, as well as the impact of illegal fishing in some areas, need to be quantified in the future to improve the stock assessment.



# SOUTH COAST BIOREGION

## ABALONE TABLE 1

Greenlip and brownlip abalone catch and effort<sup>1</sup> by quota period.

QUOTA PERIOD <sup>2</sup>	GREENLIP TAC kg whole weight	GREENLIP CAUGHT kg whole weight (all stocks)	GREENLIP CAUGHT kg whole weight (stunted stocks)	BROWNLIP TAC kg whole weight	BROWNLIP CAUGHT kg whole weight	COMBINED CATCH kg whole weight	DIVER DAYS (main stocks only) <sup>3</sup>	GREENLIP kg whole (meat) wt <sup>4</sup> per diver day (main stocks only)
1989	-	236,145	22,058	-	36,943	273,088	1,319	157 (59)
1990	126,500	114,414		-	18,768	133,182	670	162 (60)
1991	148,500	131,266		-	14,660	145,926	800	148 (56)
1992	192,500	175,054		-	30,285	205,339	1,110	152 (57)
1993	197,450	178,794		-	31,155	209,949	1,216	139 (52)
1994	200,750	177,166		-	32,223	209,389	1,328	129 (48)
1995	187,264	151,863		-	27,263	179,126	1,082	134 (50)
1996	189,750	176,668	11,517	-	21,933	198,601	896	178 (67)
1997	207,350	187,993		-	26,298	214,291	1,052	173 (65)
1998	200,750	187,644	7,884	-	22,198	209,842	1,040	167 (63)
1999	189,750	180,620	8,024	28,000 <sup>5</sup>	27,673	208,293	920	182 (68)
2000	194,669	189,846	4,307	34,875	33,531	223,377	1,028	178 (67)
2001	194,669	187,459	21,243	34,875	31,089	218,548	992	167 (62)
<b>2002</b>	<b>202,521<sup>6</sup></b>	<b>166,721</b>	<b>29,931</b>	<b>35,893</b>	<b>27,451</b>	<b>194,172</b>	<b>1,035</b>	<b>132 (50)</b>

### Notes

1. Data source: quota returns.
2. The length of quota period has varied with management changes, and for simplicity has been recorded against the nearest calendar years.
3. Effort (diver days): this year, database improvements allowed a better estimate for the main stocks, and they are separated from stunted stocks, which are subject to controlled fishing regimes and not directly comparable. The new data differs from previous years and impacts on the effort range provided in the Fishery Governance section
4. In prior years, conversion factors for meat weight to whole weight for greenlip abalone were 2.75 prior to 2000 and 2.667 for 2000+. To standardise comparison, we used one conversion factor of 2.667 across all years. The brownlip abalone conversion factor for meat weight to whole weight is 2.5.
5. Brownlip allocations not fixed across Areas 2 and 3 (ex-Zone 1 and 2) prior to 1999. Brownlip TAC fixed for the first year in 1999.
6. 2002 Greenlip/brownlip TAC raised by 4% mid-season in accordance with changes in weight processing, but does not represent an increase in actual allowed catch.

## Roe's Abalone Status Report

Prepared by A. Hart and F. Fabris

### FISHERY DESCRIPTION

#### Boundaries and access

The Roe's abalone fishery includes Areas 1, 2, 5, 6, 7 and 8 and extends from Steep Point (Shark Bay) in the north to the SA/WA border.

#### Main fishing method

Diving. Roe's abalone divers operate from small fishing vessels (generally < 9 m), although on occasion they can approach stocks from the shore.

### RETAINED SPECIES

#### Commercial production (season 2002):

**97.7 tonnes whole weight**

### Landings

Quotas control catches, with the TAC for the 2002 quota year being 107.9 t whole weight for Roe's abalone. The catch of 97.7 t whole weight for the 2002 season (Abalone Table 2) was 2% lower than 2001 and lower than the TAC, as some stock in remote locations (primarily Area 1) remained unfished.

### Fishing effort

Total effort for dedicated Roe's abalone divers in 2002 was 655 diver days, which was lower than the acceptable range. However, the lower effort is a reflection of a good catch rate and the fact that the entire quota was not taken.

### Catch rate

The Roe's abalone catch rate for dedicated divers in 2002 was 131 kg/day, which was the second highest catch rate recorded since 1994.

**Recreational component:** 40–45% (approx.)

The recreational catch estimates for 2002 were in the range 40–45% of the total Roe's abalone catch. See Recreational Abalone Fishery Status Report, pp. 151–156.

**Stock assessment completed:** Yes

Stocks of Roe's abalone are assessed by analysing industry data from the daily catch and effort records across the 10 x 10 mile grid reporting system, information from processors, and data collected during specific research projects.

The catch, effort, and catch rate statistics indicate that, overall, Roe's abalone stocks are in an acceptable state. The trend since 1999 is lower effort and increasing catch rates. In particular, Area 2 and Area 5 have shown increasing catch rates, and the Department recommended a 10% TAC increase for Area 2 in the 2003 season. Industry, however, sought to take a conservative approach for the time being, and the recommended increase in Area 2 was not implemented for the 2003 season.

An increase in the legal minimum size limit for Area 1 from 60 mm to 75 mm shell length has addressed the threat of over-fishing in the 10 nautical miles of coast adjacent to the access point at Twilight Cove (Nullarbor cliffs). Although the abundance of Roe's abalone is not of concern at other locations on the south coast, a portion of the quota consistently remains unfished due to the remoteness of the fishing locations and the unpredictable nature of the weather.

In Area 8, the most northerly margin of the fishery, quota was progressively reduced from 30 t in 1998 to 12 t in 2001 and 2002. The abundance of legal-sized Roe's abalone in this area had declined due to a combination of suspected El Niño-induced mortality (hot calm weather and extremely low tides) and inappropriate distribution of fishing effort by less experienced fishers. The quota reductions in this area have worked and catch rates recovered from a low of 109 kg per diver day in 2000 to 132 kg per diver day in 2002. Subsequently, the TAC in Area 8 has been increased from 12 t in 2002 to 15 t for the coming season (2003).

Annual stock surveys of the metropolitan stocks are reported in the Recreational Abalone Fishery Status Report, pp. 151–156.

**Exploitation status:** Fully exploited**Breeding stock levels:** Adequate

Research has shown that the size at sexual maturity (50% of animals mature) of Roe's abalone in the Perth metropolitan area is 40 mm (approximately 2.5 years of age). Preliminary growth data for these same metropolitan Roe's abalone indicate that they have a minimum of one year's spawning before reaching 60 mm, the minimum legal size at which Roe's abalone are harvested anywhere in Western Australia. This is considered to provide adequate protection for the breeding stock, especially since the commercial fishery's legal minimum size in Area 7 (the metropolitan area) is 70 mm, 10 mm larger than that used by the recreational sector. In Area 1, the commercial fishery's legal minimum length is 75 mm.

**NON-RETAINED SPECIES****Bycatch species impact:** Negligible

Divers have the ability to target abalone of choice (species, sizes and quality of abalone) and do not inadvertently harvest bycatch in their normal fishing activities.

**Protected species interaction:** Negligible

The only potential protected species interaction in this fishery would be with the great white shark (*Carcharodon carcharias*) while fishing in some of the more open-water locations. Some Roe's abalone divers are adopting the shark pod technology generally used by greenlip/brownlip divers for their personal protection, which has the secondary effect of reducing the incentive to harm this protected species.

**ECOSYSTEM EFFECTS****Food chain effects:** Negligible

Commercial abalone diving occurs over a small proportion of the total abalone habitat of the Western Australian coastline. As a consequence of the relatively low exploitation rates which leave a significant biomass of abalone on the reef at all times, it is unlikely that the fishery has any significant effect on the food chain in the habitat.

**Habitat effects:** Negligible

The fishing activity makes minimal contact with the habitat, which typically consists of hard rock surfaces in a high wave energy environment. As abalone are drift algae feeders, their removal is unlikely to result in any changes to the algal growth cover in areas fished.

**SOCIAL EFFECTS**

There are 26 vessels fishing for Roe's abalone, employing approximately 50 people across Western Australia. The dispersed nature of the Roe's abalone fishery means that small coastal towns from Kalbarri to Eucla receive income from the activity of divers.

**ECONOMIC EFFECTS****Estimated annual value (to fishers) for year (2002):** \$4 million

The estimated average price was about \$41/kg whole weight for Roe's abalone. On the basis of the average price the fishery was worth approximately \$4 million. The price of Roe's abalone in 2002 was the same as last year (2001), but significantly lower than in 2000 (\$55/kg whole weight).

**FISHERY GOVERNANCE****Acceptable effort range:** 679–914 diver days for 107.9 tonnes whole weight

To be fished at a historically sustainable level, the 2003 Roe's abalone catches should be taken within the five-year (1994–1998) range of effort (679–914 diver days) that reflects the acceptable variation in stocks.

# SOUTH COAST BIOREGION

## ABALONE TABLE 2

Roe's abalone catch and effort<sup>1</sup> by quota period.

QUOTA PERIOD <sup>2</sup>	ROE'S TAC kg whole weight <sup>3</sup>	ROE'S CAUGHT kg whole weight	DIVER DAYS <sup>4</sup> (Roe's divers only)	Kg WHOLE WEIGHT per diver day (roe's divers only)
1990	105,000	117,558	881	120
1991	101,000	110,334	758	130
1992	105,000	112,275	644	155
1993	128,000	116,390	735	139
1994	125,960	119,849	804	128
1995	125,960	115,218	975	106
1996	125,960	122,065	950	117
1997	126,790	119,080	750	137
1998	93,960 <sup>5</sup>	86,530	608	123
1999	119,900 <sup>6</sup>	108,278	849	116
2000	115,900 <sup>6</sup>	107,683	759 <sup>7</sup>	120
2001	107,900 <sup>6</sup>	99,173	681	127
<b>2002</b>	<b>107,900</b>	<b>97,660</b>	<b>655</b>	<b>131</b>

### Notes

1. Data source: quota returns.
2. The length of quota period has varied with management changes, and for simplicity has been recorded against the nearest calendar year.
3. Standard conversion factors for meat weight to whole weight for Roe's abalone were 2.5 prior to 2000 and 3.0 from 2000.
4. Effort (diver days) for dedicated roe's divers only. This year, database improvements allowed a better estimate, and consequently, figures vary from last year. A standardisation multiplier (2.3) was applied to 1999–2002 diver days estimates from Area 7, to account for the increase in catch rates arising from the lifting of the daily catch limit of 100 kg.
5. Reduced quota for a six-month season.
6. Industry-instigated voluntary 6 t reduction in quota for 1999 and voluntary 4 t reduction in 2000 and a 2 t reduction in 2001 in response to concerns over the low abundance of legal-sized abalone in Area 8.
7. Prior to 2000, effort estimates (diver days) extracted from days when catch was processed; from 2000 onwards, effort estimates extracted from daily CDR counts.

## South Coast Estuarine (Interim) Managed Fishery

### Management Summary

The South Coast Estuarine Fishery (Interim) Management Plan 2001 was approved by the Minister and published in the Government Gazette on 22 January 2002. The new management arrangements came into force on 1 July 2002 and expire on 30 June 2005.

The new arrangements have better defined permitted fishing methods and times. They have also provided for transferability of authorisations when the number of units in the fishery has been reduced to the optimum level of 15.

#### Governing Legislation/Fishing Authority

South Coast Estuarine Fishery (Interim) Management Plan 2001  
South Coast Estuarine (Interim) Managed Fishery Permit

#### Consultation Process

Department–industry meetings

### Research Summary

Research monitoring of fish stocks in south coast estuaries is primarily based on CAES returns provided by industry. These data are interpreted using the extensive scientific knowledge of the fish stocks in estuaries derived from research by Department of Fisheries and Murdoch University scientists during the 1970s and 1980s. This database from commercial fishermen also provides a valuable and consistent source of information for monitoring recreationally important stocks where they are harvested by both groups.

The following status report summarises the research findings for this fishery.