

## South Coast Purse Seine Managed Fishery

### MANAGEMENT OVERVIEW

This fishery is based on the capture of pilchards (*Sardinops sagax*) by purse seine nets in the waters off the south coast of Western Australia between Cape Leeuwin and the WA/SA border. The product is highly regarded and has accessed numerous markets, being sold for human consumption, angling bait, commercial bait, tuna food and pet food. The recreational angling bait market is currently the main focus.

The spread of a herpesvirus throughout the pilchard population in 1995 and again in 1998/99 is thought to have had a serious impact on the stock. Although our knowledge of the pathogen is increasing every day, there is still much that is not known, and the possibility of a further outbreak represents a real threat to the industry.

Commercial fishing is controlled by the setting of total allowable catches (TACs) that represent the combination of transferable quota units within each of the five zones. With the exception of Zone 4 (Esperance region), seasonal TACs have been declining in recent seasons, and the recent mortality event suggests it may be a number of seasons before any real recovery in fish numbers is observed.

The TAC-setting process is coordinated through the Purse Seine Management Advisory Committee, an expertise-based committee established to advise the Minister on matters relating to the management of purse seine fishing in Western Australia.

### COMPLIANCE AND COMMUNITY EDUCATION OVERVIEW

Compliance activity in the South Coast Purse Seine Managed Fishery is undertaken by officers located at Albany and Esperance. Compliance activities concentrate almost exclusively on auditing the quota monitoring system, from both an administrative and an in-field perspective. At-sea inspections of zone boundaries, particularly in the Albany zone, are also carried out where possible.

Compliance with the quota system during the 1998/99 year was good. A reduced quota level within the fishery and a closure due to disease reduced the requirement for compliance and service levels were significantly lower than in previous years.

### RESEARCH OVERVIEW

Data for setting catch quotas is derived from CAESS returns, quota returns and biological monitoring of the catch composition.

Research during 1999 will continue to focus on detailed monitoring of catches and fishing effort, together with regular fishery-independent spawning biomass surveys. These data together allow the annual review of stocks in each major zone and compilation of the following status report.

Research in 1999 will also focus on assessing the impact to Western Australian pilchard stocks of the mass mortality of pilchards which occurred throughout the species range in Western Australia in late 1998 and early 1999.

### Fishery Status Report

#### Main Features

##### Stock assessment complete:

Yes

##### Exploitation status:

Fully exploited

##### Breeding stock levels:

Adequate (overall)

##### Previous catch projections for year 1998:

Quota

##### Catch current season (1998):

South Coast total	4,933 tonnes
Albany zone	2,085 tonnes
Bremer Bay zone	2,163 tonnes
Esperance zone	685 tonnes

##### Estimated annual value (to fishers) for year 1998:

\$3.4 million

##### Catch projection next year (1999):

Quota levels set prior to the mortality event were:

South coast total	Quota:	5,200 tonnes
Albany zone	Quota:	1,500 tonnes
	Effort:	Not available
Bremer Bay zone	Quota:	1,900 tonnes
	Effort:	Not available
Esperance zone	Quota:	1,800 tonnes
	Effort:	Not available

##### Recreational component:

Nil

### Boundaries and Access

The South Coast Purse Seine Managed Fishery consists of three primary management zones, with separate quota units for each zone. The Albany zone extends from Point D'Entrecasteaux to Cape Knob. The King George Sound (KGS) zone is a subset of this area and

the two zones are reported together. The boundaries of the Bremer Bay zone are Cape Knob and Point Charles. The boundaries of the Esperance zone are Point Charles and the WA/SA border. (A further zone exists, between Cape Leeuwin and Cape D'Entrecasteaux, but has not been fished significantly to date.)

The access to the fishery is under a limited entry system with each vessel having individually transferable quota.

## Annual Production

### Main fishing method

Purse seine net.

### Landings

Using data from the quota returns, the catch of pilchards (*Sardinops sagax*) on the south coast in 1998 was 4,933 tonnes, with 2,085 tonnes from the Albany zone, 2,163 tonnes from the Bremer Bay zone and 685 tonnes from the Esperance zone (South Coast Purse Seine Figure 1). This is the lowest total catch of pilchards from the south coast for many years. Noting that Albany's TAC for 1998 was 3,000 tonnes, only 70% of this was achieved, which the Purse Seine Management Advisory Committee agreed was cause for serious concern over the status of the stock in this region. The Esperance catch was also much less than expected, having decreased from nearly 1,500 tonnes in 1997. Part of this decrease for Esperance was due to the need to close the fishery as a result of the mortality event which passed through the region during the peak catching period.

### Fishing effort

Due to differences in fishing operations, effort will be reported separately for each zone.

*Albany zone:* Fifteen vessels recorded catches in the Albany zone in 1998, a decrease from 21 vessels in 1997. This represents a necessary step towards rationalisation of the size of the fleet, a process which needs to continue. The number of days fished (1,565 CAESS days) was accordingly lower than in 1997 (2,110 CAESS days). The amount of fuel used (182,300 litres), however, did not decrease but increased marginally.

*Bremer Bay zone:* There were six full-time fishing vessels again working this area. The number of boat days fished was 1,006, about 10% less than in 1997. Fuel use in 1998, however, increased to 72,840 litres, a rise of 19%.

*Esperance zone:* Six vessels fished in Esperance in 1998, but as in 1997, some landed pilchards in fewer than three months. The recorded number of CAESS days was about 543, similar to the 528 days used in 1997. Accurate figures for fuel used were not available for this region.

### Catch rate

*Albany zone:* The catch rate using fuel consumption was 11.4 kg/L, a 33% decrease from 17.1 kg/L in 1997. The CAESS data indicated an 8% decrease to 1,332 kg/day from 1,443 kg/day in 1997, continuing the downward trend from 1,653 kg/day in 1996.

*Bremer Bay zone:* The catch rate for 1998 using fuel figures was 29.7 kg/L, a small decline from 35 kg/L in 1997. The CAESS data indicated that the catch rate was 2,150 kg/day, similar to that for 1997 (1,949 kg/day).

*Esperance zone:* Using only the two vessels which supplied fuel data on a regular basis, the catch rates in Esperance fell dramatically from around 23 kg/L to only 5.7 kg/L. Likewise, the CAESS data showed a decrease in catch rate from around 2,500 kg/day in recent years to only 1,261 kg/day.

## Stock Assessment

The south coast population of pilchards is considered to consist of a single breeding stock, but with functionally distinct adult stocks at Albany, Bremer Bay and Esperance. Stock assessments for each zone are presented here, but a model which attempts to combine the biological and fishery data for each zone into a single stock assessment is still being developed. As a preliminary step towards this integrated model, detailed age-structured models have been developed for each of the three south coast zones. The results of these preliminary models, as presented to the Purse Seine MAC in late 1998 and early 1999, are presented for each zone. Furthermore, while the stock assessments presented for each zone are for 1998, in each case the substantial losses due to the herpesvirus may cause serious declines in catches. The expected impact is not yet fully known and research into this issue will continue throughout much of 1999. As investigations indicate that the mortality due to the herpesvirus may be considerably greater than in the last mortality event (1995), severe cuts in TACs may be required in 2000/2001.

*Albany zone:* The assessment model indicated that the biomass at Albany has been declining since 1994 and is at its lowest recorded level. This result indicates that the Albany/KGS section of the south coast pilchard stock was still depleted at the end of 1998. The annual catch only amounted to about 70% of the TAC. While catches in a fishery could decrease substantially if there was a large shift in the distribution of a stock in response to anomalous environmental effects (e.g. elevated temperatures), the fact that the new model independently estimated that the pilchard biomass at Albany is in decline and is the lowest it has ever been supports the notion that a depressed stock contributed to the failure to achieve the TAC in this zone during 1998. Failure to achieve the TAC at Albany was therefore cause for serious concern

regarding the status of the stock, particularly since the model indicates that the stock is at its lowest level since the start of the fishery. Considering these results, a TAC of 0 tonnes was suggested for 1999/2000 as a low-risk option for the Albany stock. However, in an attempt to maintain the purse seine industry at Albany, intensive meetings were held between industry, management and research. A TAC of 1,500 tonnes was decided upon, recognising that this represented a moderately high risk to the stock. The recommended TAC was the lowest set thus far for this fishery, and may need to be revised further in the light of the virus mortality event.

Prior to the mortality, catch-at-age data for Albany indicated that the older age classes continued to dominate the catch (South Coast Purse Seine Figure 2). The pattern of flow-through of age classes was still evident and indicated that the age data continued to provide a good means of assessing trends in the adult stock at Albany. Furthermore, the data indicated that the age structure of the Albany adult stock was essentially still the same as that which was there in previous years, but with the addition of variable quantities of recruits. The level of recruitment of two-year-olds in 1998 was not as strong as in 1997, but was still reasonable. However, it should be noted that high levels of recruitment would have been required if the Albany stock of adults were to stop declining in size and increase, even without the advent of the virus mortality.

*Bremer Bay zone:* Bremer Bay has again had relatively poor recruitment compared to earlier years in the fishery. The decrease in the contribution to the catch at this region by four-year-olds which was seen in 1996 and 1997 was again evident in 1998. The increases in average length, weight and age (otolith weight) of pilchards from Bremer Bay recorded in 1997 was again evident in 1998 and indicates that the fishery in this region has continued to become more reliant on older age classes as a result of poor recruitment in recent years. However, there was a greater contribution of three-year-olds in 1998 which would have been expected to flow through as four-year-olds in 1999.

In assessing the Bremer Bay stock, an unexpected relationship between average weight, length and otolith weight has been noted during the mid-1990s. That is, weight and length were decreasing as otolith weight increased. This unusual relationship should not be used as a reason to ignore the overall evidence for a stock which is progressively becoming older. An older stock is indeed expected due to several years of poor recruitment, a very similar situation to that of the Albany region in recent years.

The model likewise indicated that the Bremer Bay stock was declining. The history of lower exploitation rates in this region than in Albany suggests that the stock decline at Bremer Bay was unlikely to be as

severe as that which occurred at Albany. However, because the model indicated that the Bremer Bay biomass was in decline, the maintenance of current catch levels would have resulted in progressively larger exploitation rates, at least in the short term. That is, decreasing biomass automatically results in increasing exploitation rates. This suggested that maintaining catches at current levels (i.e. around 2,000 tonnes) represented a moderate to high risk for the Bremer Bay stock, prior to the virus mortality event. Noting the possible impact of the virus mortality, a full revision of the status of the stock will be needed during 1999.

*Esperance zone:* Esperance had a high level of recruitment in 1998. The proportion of two-year-olds in the catch was the highest recorded since 1992 and, prior to the mortality event, was indicative that the biomass should not decrease in size from 1998 to 1999. The relatively stable nature of the biomass at Esperance can be attributed to fewer years of poor recruitment than in the other south coast regions, and to a history of much lower exploitation rates. Although Esperance is similar to Albany in that catches in 1998 were much lower than expected, this had not yet given cause for concern because of the history of lower exploitation and because this fishery was not reliant on older age classes of fish. Exploitation rates based on the new model had yet to exceed 7% and appeared to be sustainable prior to the virus event. While the estimated biomass decreased during the period from 1994 to 1998, the good recruitment in 1998, along with the relatively consistent recruitment over the period of the fishery, had been enough to keep the biomass at a level similar to that prior to exploitation. Although no significant change to the TAC was planned for 1999, the virus impact has yet to be taken into account.

### Breeding Stock Levels

Breeding stock for the entire south coast pilchard population was considered adequate during 1998, but with the acknowledgment that a localised depletion was evident at Albany and a similar situation was developing at Bremer Bay. Prior to the mortality event, the exploitable biomass for the Albany region in 1999 was estimated at 10,750 tonnes ( $\pm 50\%$ ), with the lower estimate more likely. The poor levels of recruitment at Bremer Bay in 1995-1997 continued in 1998, indicating that the breeding stock had been further reduced due to insufficient recruits to fully replace losses from natural and fishing mortality. The model estimates that the 1999 pre-mortality-event biomass of pilchards for the Bremer Bay zone would have been in the order of 16,080 tonnes ( $\pm 50\%$ ).

The model also indicated that the pre-mortality-event biomass of adult pilchards at Esperance in 1999 would have been 26,590 tonnes ( $\pm$  50%). The plankton data and the catch-at-age information had indicated that there was a large breeding stock in the Esperance region. The Esperance component of the south coast breeding stock was thus considered to be relatively stable prior to the virus mortality event.

In order to estimate the size of the breeding stock following the mortality event, it is planned that the spawning biomass of pilchards in each of the south coast zones will be estimated using the daily egg production method during 1999.

**Catch Projection for Year 1999**

Owing to the possibility that the herpesvirus may have killed significant quantities of pilchards in Western Australia – and with evidence from the 1999/2000 season already suggesting that this is in fact the case – it is not possible to provide realistic predictions of catch rates. It appears likely that neither the Albany nor the Bremer Bay zone will catch the allocated quota in 1999. As the main catching season for Esperance is at the end of the calendar year, it is too early to speculate on possible catch levels for this region.

**Product Value for Year 1998**

Due to the lower south coast catch in 1998, the total amount of product consigned to pet food or for other bulk purposes (e.g. rock lobster bait, tuna food)

decreased to about 5%, from a level of around 20% during 1997. The higher value angling blocks/trays and individually quick frozen (IQF) fish represented 95% of the total catch processed. The different product types for each zone are shown in South Coast Purse Seine Table 1.

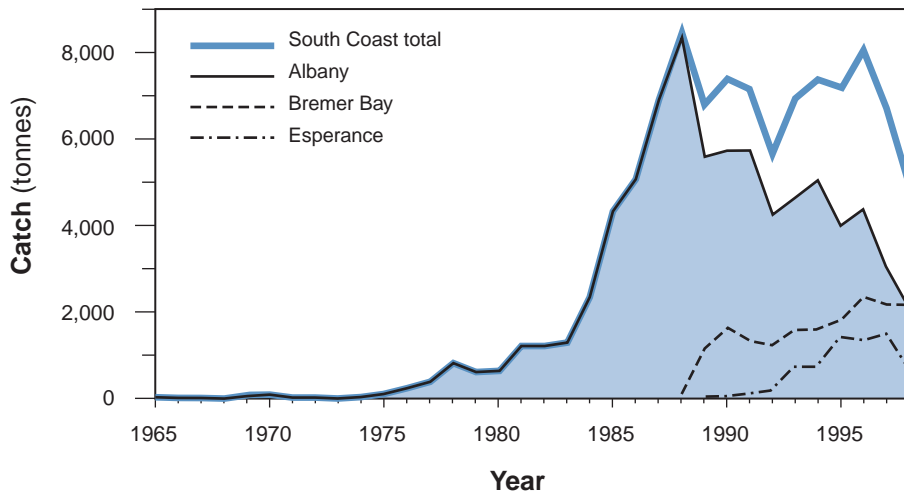
The price differential between pet food and angling bait was maintained. The price of pet/tuna food was \$0.32-0.43/kg, while angling bait was similar to 1997, ranging from \$0.65 to \$0.75/kg in 1998. Total catch value for 1998 was approximately \$3.4 million.

**General Comments**

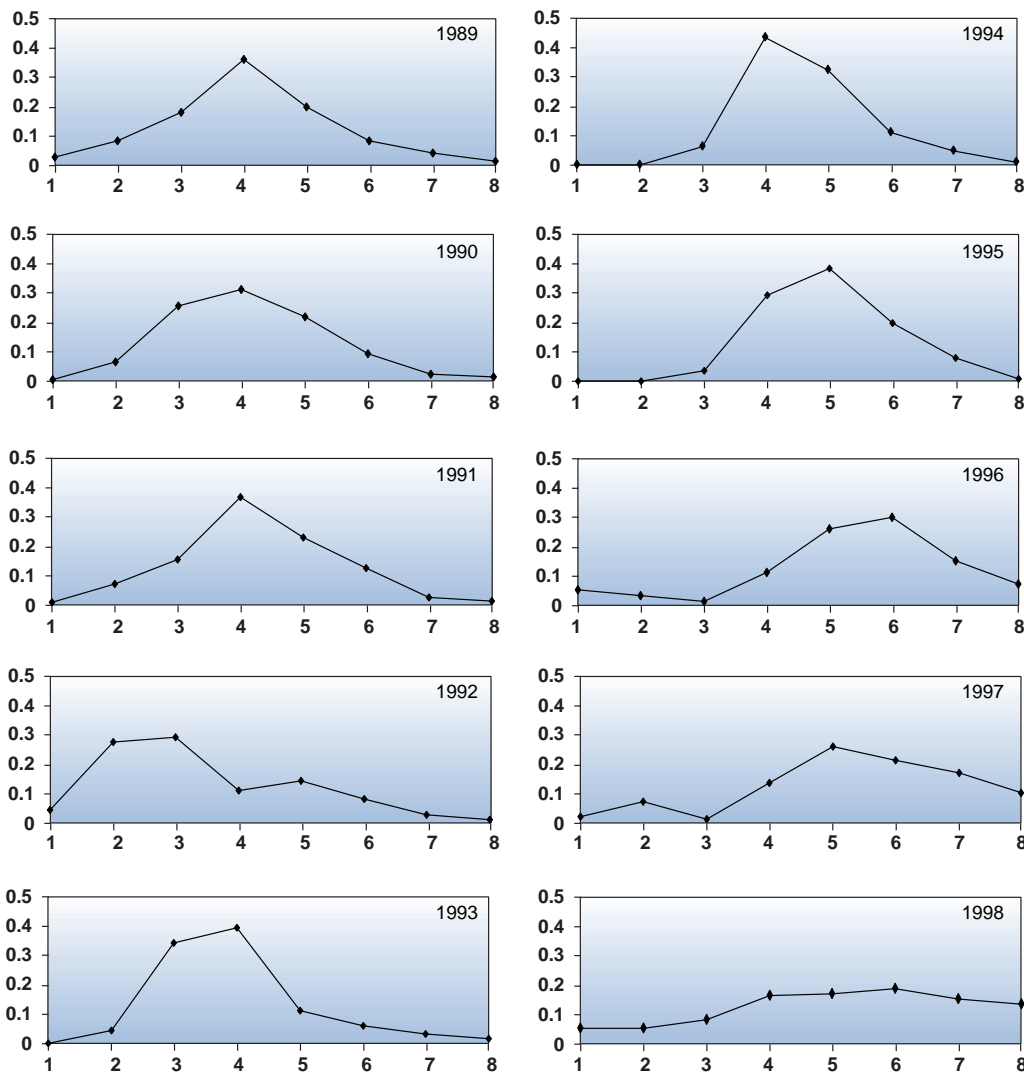
Assessment of the herpesvirus-induced mortality, along with monitoring of biological and fishery parameters, will continue. There is a possibility that the virus has had a significant effect on the entire south coast breeding stock, more than in the 1995 mortality event. This has implications for the short-term viability of the purse seine fisheries off southern Western Australia. Likewise, as there are still significant gaps in our knowledge of the pilchard herpesvirus, it is not known if or when there may be another outbreak of the disease. Although the stock is likely to recover, the rebuilding process is expected to be relatively slow and the future viability of the fleet is in question.

**South Coast Purse Seine Table 1** Processing details from Albany, Bremer Bay and Esperance for 1997.

Product	Albany	Bremer Bay	Esperance	Total south coast
Trays	1,413	1,369	442	3,224
IQF	588	691	180	1,459
Pet/tuna food	84	103	63	250
<b>Total</b>	<b>2,085</b>	<b>2,163</b>	<b>685</b>	<b>4,933</b>



South Coast Purse Seine Figure 1 Annual catch of pilchards on the south coast.



South Coast Purse Seine Figure 2 Annual catch-at-age curve (proportions by age-class) for the Albany zone including King George Sound.

