

South Coast Purse Seine Managed Fishery

Management Summary

This fishery is based on the capture of pilchards (*Sardinops sagax*) and other small pelagic fish by purse seine nets in the waters off the south coast of Western Australia between Cape Leeuwin and the WA/SA border under the provisions of the South Coast Purse Seine Management Plan 1994. Pilchards have a variety of uses, being sold for human consumption, angling bait, commercial bait, tuna grow-out 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 has had a serious impact on the stock. Understanding of the pathogen has increased significantly since the first outbreak, but there are still important knowledge gaps, such as the source of the virus, and the possibility of a further outbreak represents a real threat to the industry.

Purse seine fishing on the south coast is controlled by the setting of a total allowable catch (TAC) for small pelagic fish including pilchards, scaly mackerel (*Sardinella lemuru*), yellowtail scad (*Trachurus novaezelandiae*), anchovies (*Engraulis australis*), sandy and blue sprat (*Hyperlophus vittatus* and *Spratelloides robustus*) and maray (*Etrumeus teres*). Each zone in the fishery is allocated a set amount of transferable quota units whose values change depending on stock assessment data. There is a total of 890 quota units currently allocated across each of the five zones in the fishery.

The fishing season for the South Coast Purse Seine Managed Fishery runs from 1 July to 30 June each year. Research data indicates that the fishery is recovering well from the pilchard mass mortality events, and it was on this basis that an increase in the small pelagic fish TAC from the previous season was approved. The TAC for Zones 1 and 2 (Albany) was set at 909 t for the 2002/03 fishing season, with 402 t available from July to December 2002 and 507 t available from January to June 2003. The TAC for Zone 3 (Bremer Bay) was set at 1,230 t and for Zone 4 (Esperance) at 1,500 t for the season.

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.

Governing Legislation/Fishing Authority

South Coast Purse Seine Management Plan 1994
South Coast Purse Seine Managed Fishery Licence
Fisheries Notice no. 312 – Purse seine prohibition
Fisheries Notice no. 571 – Pilchard fishing prohibition
Fisheries Notice no. 476 – Net hauling restrictions

Consultative Process

Purse Seine Management Advisory Committee
Agency–industry meetings
Department–industry meetings (as required)

Research Summary

Data for setting quotas is derived from fishery-independent spawning biomass surveys, quota returns and biological monitoring of the commercial catch composition.

Research in 2003 will continue to focus on fishery-independent spawning biomass surveys, part of a five-year FRDC-funded project examining the regrowth of the pilchard stocks in Western Australia. Monitoring of the commercial catches has recommenced with the re-opening of the fishery. Biomass surveys and analysis of catches together allow the annual review of stocks in each major zone and compilation of the following status report.

The need to introduce a new management approach, following the post-mass-mortality period when the fishery was essentially closed in some regions, that was originally presented to the MAC during 2001 was further developed during 2002. This initiative would focus on capping TACs at a level that would enable the fishery to endure severe downturns in recruitment. In addition, annual changes in TACs, whether up or down, would not be allowed to exceed 25%. Under this relatively conservative management approach, TACs could be set for three-year periods with appropriate trigger points, thereby providing a significantly more stable fishery than is presently the case, allowing industry to make better informed business decisions.

The previous two *State of the Fisheries Reports* anticipated a change in the reporting period for this fishery from calendar to quota years, but this was delayed because of the instability in the fishery following the mass mortality event of 1999. The change has been implemented in the current report, resulting in a six-month overlap with the previous report. Thus the South Coast Purse Seine Managed Fishery Status Report in the *State of the Fisheries Report 2001/2002* was for the period January–December 2001, while the current report is for the period July 2001 – June 2002.

South Coast Purse Seine Managed Fishery Status Report

Prepared by D. Gaughan and T. Leary

FISHERY DESCRIPTION

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 zone is a subset of this area and the two zones are reported together. The Bremer Bay zone extends from Cape Knob to longitude 120° E, and the Esperance zone from 120° E to the WA/SA

border. A further zone exists between Cape Leeuwin and Cape D'Entrecasteaux but has not been significantly fished to date.

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

Main fishing method

Purse seine net.

RETAINED SPECIES

Commercial production (season 2001-02): 1,169 tonnes

Landings

TACs for Albany and Bremer Bay were set at 300 and 500 t respectively. In the Esperance zone a TAC of 1,130 t was set for the quota year.

The catch of pilchards (*Sardinops sagax*) achieved in Albany, Bremer Bay and Esperance in 2001/02 was 279, 490 and 401 t respectively (South Coast Purse Seine Figure 1).

The annual catches were quite close to the TACs for both Albany and Bremer Bay, thus providing an indication that the recommendations were appropriate during this phase of recovery for the fishery. However, the annual catch for Esperance was only 25% of the recommended TAC. Rather than reflecting a mismatch between stock levels and expectations for the fishery, this low catch is attributed to the very large numbers of juvenile pilchards that have essentially swamped the traditional fishing grounds of the Esperance fleet. These juveniles have predominantly been below a marketable size, resulting in fishers avoiding them. However, besides consisting of individuals too small for traditional markets, the schools of juvenile pilchards have also made detection of large fish difficult. Thus, the low catch is due to low availability and/or catchability in the fishing grounds, with the pilchard biomass survey for Esperance (see below) having shown a widespread distribution of mature age fish offshore from the inshore fishing grounds.

Catches of other small pelagic species in the 2001/02 quota period were insignificant (< 2 t).

Fishing effort

Albany zone: The recorded number of CAES days in 2001/02 was 314.

Bremer Bay zone: The recorded number of CAES days in 2001/02 was 431.

Esperance zone: The recorded number of CAES days in 2001/02 was 320.

Catch rate

Albany zone: The 2001/02 catch rate for the Albany zone was 886 kg/day.

Bremer Bay zone: The 2001/02 catch rate for the Bremer Bay zone was 1,138 kg/day.

Esperance zone: The 2001/02 catch rate for the Esperance zone was 1,253 kg/day.

Recreational component:

Nil

Stock assessment completed:

Yes

The south coast population of pilchards is considered to consist of a single breeding stock, but with functionally distinct adult assemblages at Albany, Bremer Bay and Esperance. During 2001/02, there was strong recruitment across the south coast. This was particularly evident at Esperance where fish less than three years old dominated the traditional fishing grounds.

The strong recovery in pilchard biomass at Albany and Bremer Bay as revealed using the daily egg production method (DEPM) has now been supported by the age-structure data when fed into the simulation model. At the end of 2002 the model has indicated spawning biomasses of 11,363–24,225 t for Albany and 7,691–21,393 t for Bremer Bay. A DEPM survey was completed for Esperance in January 2002 and confirmed that the pilchard spawning stock in this region appears to not have recovered as quickly as has been the case in Albany and Bremer Bay. Thus, while the spawning biomass at Albany and Bremer Bay is high by historical standards, the estimated 11,651–29,409 t for Esperance is about half of the historical level.

The high abundance of juvenile pilchards in Esperance was again accompanied by low availability of older fish. The reasons for this remain unclear. As mentioned in the last report, there is a possibility that in contrast to the documented spatial dynamics of the 1990s, the low numbers of adult pilchards near Esperance could be related to the strong influx of pilchards into Albany in 2001. Movement of adult pilchards from Esperance towards Albany and Bremer Bay could still be happening consistently but at a level that the current catch-sampling and stock assessment cannot detect.

Exploitation status:

**Albany and Bremer Bay zones under-exploited
Esperance zone fully exploited**

Breeding stock levels:

Adequate

Estimates of vulnerable biomass (which closely reflects spawning biomass) at the end of 2002 have been updated from the previous report using additional catch-at-age data and DEPM estimates of spawning biomass. These are provided above for the individual south coast regions.

The total estimated spawning biomass across the south coast was 52,900 t (30,705–75,027 t), which represents 69% of the virgin biomass. This is less than the previous estimate of 87% of virgin spawning biomass. The prime cause for this reduction is the reduced estimate from Esperance. However, the change from the previous estimate is within normal levels of variability for estimates of breeding stock of pilchards. In terms of the management of the fishery, 69% of virgin biomass is still considered healthy for stocks, such as pilchards, which undergo large fluctuations in recruitment, and need to be maintained well above the average acceptable level (in the order of 40%).

SOUTH COAST BIOREGION

NON-RETAINED SPECIES

Bycatch species impact: **Low**

This fishery targets specific schools of small pelagic fish, particularly pilchards, so bycatch is insignificant. Other species of small pelagic fish sometimes caught in small quantities, which are occasionally retained as by-product but mostly released from the net or later discarded, include yellowtail scad (*Trachurus novaezelandiae*), maray (*Etrumeus teres*) and blue mackerel (*Scomber australasicus*).

Protected species interaction: **Low**

A number of protected species, including seabirds, seals, dolphins and sharks, are attracted to pilchard fishing operations to feed on the fish. Occasionally, seabirds or dolphins become entangled in the nets and may die. The impact of these incidental captures on their respective populations is unlikely to be significant.

ECOSYSTEM EFFECTS

Food chain effects: **Moderate**

Small pelagic fish, typically pilchards or anchovies, occupy a pivotal position of energy transfer in food webs in which they occur and are often the main link between primary (phytoplankton) and secondary (zooplankton) production and larger predators. The quota for pilchards is generally set at 5–10% of the spawning biomass, thus leaving 90–95% available to natural predators.

The concept of managing ecosystems, rather than single species, has been presented to the Purse Seine MAC during 2001 and again during 2002. Small pelagic fish represent a conceptually easy group for which to begin implementing ecosystem-based fisheries management. For example, various seabirds will predate on a variety of species of small pelagics and therefore the whole suite of small pelagic fish must be considered during management deliberations, not simply the primary target species. This is particularly the case in pelagic ecosystems (a) characterised by low productivity, as is the case in southern Western Australia, and (b) in which the dominant species can change in abundance inter-annually (e.g. due to environmental conditions). This issue represents a complex shift in the management philosophy for purse seine fisheries in Western Australia and continues to undergo further development.

Habitat effects: **Negligible**

Purse seining appears to have very little effect on the habitat. Although the purse seine gear used in Western Australia can contact the sea floor in some areas, the relatively light construction of the gear suggests that there is no significant impact occurring to, for example, seagrass beds.

SOCIAL EFFECTS

The reopening of the pilchard fishery in Albany and Bremer Bay in July 2001 following the 1998/99 mass mortality has seen an upturn in the number of people employed in this industry. This includes those directly employed on boats

and those in the processing and transport sectors. Currently there are 6 vessels fishing in Albany, providing income for about 15 people. Local factories employ about 15 casual and full-time staff to process and package pilchards. There have been 3 vessels fishing in the Bremer Bay zone for the season, employing 9–10 crew. The processors in Bremer Bay provide work for between 15 and 18 casual and full-time workers. The number of people employed in the Albany and Bremer Bay pilchard fisheries is expected to increase further following the recommendations for quota increases in 2002/03. In Esperance, where an economically significant TAC has remained, there was an aggregate of 3 vessels working in the 2001/02 season, employing approximately 10–11 staff (skippers and crew). The catch from these was directed through two factories, which in turn employed approximately 15–20 casual staff as well as 4 full-time staff, including the owners.

ECONOMIC EFFECTS

Estimated annual value (to fishers) for year (2001): **\$1.17 million**

The higher-value angling blocks/trays and individually quick frozen (IQF) fish continue to represent almost the entire catch processed. The different product types for each zone are shown in South Coast Purse Seine Table 1. At an average price of \$1000/t, the total catch value for 2001/02 was \$1.17 million, significantly more than last year's \$870,000.

FISHERY GOVERNANCE

Acceptable catch (or effort) range: **Effort not available**

The south coast purse seine fishery is still being managed conservatively to ensure the regrowth of the pilchard stock following the 1998/99 virus epidemic. Quotas and stock modelling based on biomass estimates from surveys conducted in each zone currently provide the only means to forecast catch. Given the significant changes to the fleet that have occurred recently, historical figures may no longer be valid for comparisons, therefore the expected effort range to land the TAC in each region is not yet available.

EXTERNAL FACTORS

Following the loss of stock due to the mass mortality event of 1998/99, serious concerns were raised about the survival of pilchard stocks in Western Australia, but stocks are now showing positive signs of a recovery. Because 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. The rebuilding process of the industry and the future viability of the fleet appear encouraging. The gap left in the angling bait market following the closing of the pilchard fishery in Albany and Bremer Bay led to an increased volume of *Sardinops sagax* being imported from overseas, which presented a degree of risk to the local pilchard stocks. While the volume of pilchards imported for angling bait has now dwindled, the Western Australian industry is being threatened by the growth of the South Australian pilchard fishery. The South Australian fishery has undergone a period of very strong growth and has been said to be providing competitively priced

pilchards in Western Australia's traditional east-coast bait markets. This is viewed by some industry members as the biggest current threat to the south coast purse seine industry.

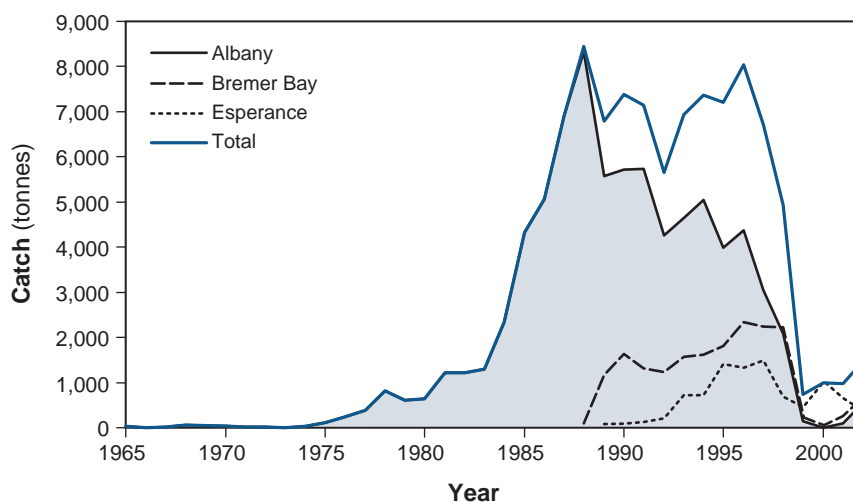
Environmental factors such as variations in the Leeuwin Current flow are likely to be affecting both the distribution and the biology of the species, and will be assessed further as more years of data become available. The possibility that global warming may be causing longer-term changes, on a time scale unrelated to the normal inter-annual environmental variations, cannot be discounted.

SOUTH COAST PURSE SEINE TABLE I

Processing details (t) from Albany, Bremer Bay and Esperance for 2001/02.

PRODUCT	ALBANY	BREMER BAY	ESPERANCE	TOTAL SOUTH COAST
Trays	229.3	367.9	355.1	952.3 (81.4%)
IQF	48.7	116.7	29.8	195.2 (16.7%)
Pet food/ Other	0.2	5.8	15.8	21.8 (1.9%)
Total	278.2	490.4	400.7	1,169.3

South Coast Purse Seine Annual Catch



SOUTH COAST PURSE SEINE FIGURE I

Annual catches of pilchards along the south coast, by fishing zone.

Demersal Gillnet and Demersal Longline Fisheries

Management Summary

The take of finfish, including shark, by demersal gillnet and demersal longline is controlled on the south coast and the west coast (south of Shark Bay) through two similar management plans. Both fisheries are managed using effort controls in the form of limited entry and an individually transferable effort system that regulates both time and gear use into tradeable units of entitlement. One unit permits the use of one net of a particular length, or a demersal longline with a particular number of hooks, for one month.

Management has historically been focused on ensuring the sustainable exploitation of three main species, whiskery shark (*Furgaleus macki*), dusky whaler shark (*Carcharhinus obscurus*) and gummy shark (*Mustelus antarcticus*). On the

west coast, the sandbar or thickskin shark (*Carcharhinus plumbeus*) is also emerging as an important commercial species.

Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery (JASDGDLF): The joint authority arrangement for the JASDGDLF covers the take of sharks, rays and bony fish by 'demersal gillnets and all other lines' (demersal longlines) from 33° S latitude to the WA/SA border and out to the limit of the Australian Fishing Zone.

West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery (WCDGDLF): Extensive research carried out on the commercially important shark species off the Western Australian coast indicates that this fishery shares a series of unit stocks with the JASDGDLF. Because of the commonality of these key stocks, the WCDGDLF is reported under the south coast bioregion. The biomass targets for the three major species in the south coast fishery also apply to the west coast fishery.