

Shark Bay Beach Seine and Mesh Net Managed Fishery

Management Summary

The Shark Bay Beach Seine and Mesh Net Managed Fishery operates in the waters of Shark Bay and takes a mixed catch of whiting (*Sillago schomburgkii* and *S. analis*), sea mullet (*Mugil cephalus*), tailor (*Pomatomus saltatrix*) and yellowfin bream (*Acanthopagrus latus*). Entry into the fishery is limited, with restricted, family-only transfers and gear limitations. A unit in the fishery comprises one primary vessel, a maximum of three netting dinghies and a maximum team size of three fishers. Most of the catch is marketed through the fish processing factory in Denham which sets weekly delivery quotas and commercially acceptable size limits which are frequently above the legal minimum size for the species concerned.

Governing Legislation/Fishing Authority

Shark Bay Beach Seine and Mesh Net Management Plan 1994
Shark Bay Beach Seine and Mesh Net Managed Fishery
Licence

Consultation Process

Department–industry meeting

Research Summary

Research monitoring of the status of the stocks taken in this fishery is undertaken annually using industry-based data coupled with the extensive scientific knowledge gained from previous research. Overall the fishery has remained relatively stable over the past decade with the main target species being fished at sustainable levels. The fishery, although relatively small-scale, makes a significant contribution to the Denham economy and community. A comprehensive ESD report on this fishery has been completed as the basis of an application to meet the requirements of the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*. This process determined performance indicators based on catch and catch rates for each of the four main species in the fishery (whiting, tailor, sea mullet and yellowfin bream). The following status report summarises the research findings for this fishery.

Shark Bay Beach Seine and Mesh Net Managed Fishery Status Report

Prepared by S. Ayzajian and G. Nowara

FISHERY DESCRIPTION

Boundaries and access

The boundaries of this fishery are 'the waters of Shark Bay from high water mark lying -

(a) south of a line drawn from the northernmost point of Cape Inscription on Dirk Hartog Island due east to the mainland; and

(b) east of a line drawn from Surf Point on Dirk Hartog Island to Steep Point on the mainland; but excluding the waters of Shark Bay due south of a line drawn west of the highwater mark of Kopke Point on the mainland to the highwater mark on the mainland south of Petit Point on Peron Peninsula'.

At May 2002, 11 fishing-unit licence holders were registered in the beach seine and mesh net fishery and were based at Denham. The fishery is also subject to net length and mesh size controls. The legislation indicates that:

- the mesh not be less than 48 mm for taking whiting;
- the mesh not be less than 86 mm for taking mullet; and
- the mesh not be greater than 38 mm and not less than 26 mm throughout and the net shall not be more than 200 m in total length and have a pocket no more than 30 m in length when used to take garfish.

Main fishing method

Beach seine and haul net.

RETAINED SPECIES

Commercial production (season 2002):

All finfish 300 tonnes
Key target species 280 tonnes

Landings

The 2002 total catch for the Shark Bay beach seine and haul net fishery of 300 t represents an increase of 41 t compared to the 2001 reported catch (Shark Bay Beach Seine Figure 1). There is no long-term trend in the pattern of total landings from this fishery over the past 12 years with catches averaging 280 t per year (Shark Bay Beach Seine Figure 1). The total landings during 2002 included 99.7 t of whiting, together with a substantial catch of sea mullet (135.8 t), 26.9 t of tailor and 17.4 t of yellowfin bream. The remaining reported landings of 20.5 t comprised over 20 different species of finfish.

Whiting, which is the main target species in Shark Bay, comprises nearly one-third of the total catch and includes both *Sillago schomburgkii* and *S. analis*. Assessments of the fishery have previously been based only on the total whiting catch and effort data (Shark Bay Beach Seine Figure 2) but this has now expanded to include analyses of three additional target species – sea mullet, tailor and yellowfin bream (Shark Bay Beach Seine Table 1).

Fishing effort

During 2002, there was an average of seven boats fishing per month, expending a total of 1,253 days of fishing effort for the year (Shark Bay Beach Seine Figure 2). The overall trend in fishing effort in the Shark Bay beach seine and haul net fishery has been a decline to a low point in 1995, followed by a slight increase from 1995 to 2002.

Catch rate

The CPUE (based on nominal effort) for the overall Shark Bay beach seine and haul net fishery increased steadily between

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1990 and 1995. Following the 1995 peak there has been a slight downward trend in the CPUE values. The 2002 season catch rate was 239.7 kg/boat day (all species) (Shark Bay Beach Seine Figure 1).

The CPUE for the whiting fishery showed a rising trend during the 1990s to levels greater than 110 kg/day, but has declined since 2000 to its current level of 79.5 kg/boat day (Shark Bay Beach Seine Figure 2). The catch rates for the other three species have also been assessed and are all within acceptable levels (Shark Bay Beach Seine Table 1).

Recreational component: < 1%

A 12-month survey of boat-based recreational fishing in Shark Bay between May 2000 and April 2001 (Sumner and Malseed 2001) estimated a total recreational catch of finfish of 50 t, taken in 35,000 fisher days. The estimated catch consisted of pink snapper (25.3 t), black snapper (11.6 t), baldchin groper (3.2 t), mulloway (3.2 t), Queensland school mackerel (1.4 t), tailor (0.8 t), whiting (0.4 t), mullets (0.4 t) and 3.7 t of other species. When the boat-based recreational catch of those species that are targeted by the commercial fishery (whiting, tailor, sea mullet, yellowfin bream) is compared with the commercial catch of those same species from the closest calendar year (2000), it is seen to make up approximately 0.6% of the combined commercial and recreational landings.

A further survey carried out during the following 12 months, between May 2001 and April 2002 (Sumner and Malseed 2002), estimated a total boat-based recreational catch of 50 t, taken in 34,000 fisher days. Of those species taken by the recreational fishers which are targeted by the commercial sector, an estimated catch of 1.1 t of tailor, 0.8 t of whiting and 0.3 t of sea mullet were taken recreationally. The recreational component of the combined commercial and recreational catch for these species was 0.9%.

The proportion of catch taken by the recreational sector is therefore assessed to be less than 1%, although this does not include shore-based catches and is consequently a minimum estimate.

Stock assessment completed: Yes

The current level of whiting exploitation by the fishery (100 t at 79 kg/day) is within the acceptable catch range and above the catch rate threshold of 70 kg/day, both of which are based on 50 years of data.

The catch levels (27 t) and the catch rate (20.4 kg/day) of tailor by the fishery in 2002 were both within the long-term acceptable catch range (25–40 t) and above the catch rate trigger point (18 kg/day). Whilst the catch and catch rate were relatively low compared with the past few years, they were still high compared with historical levels.

The 2002 catch of 136 t of sea mullet is within the acceptable catch range (85–155 t) and the current catch rate of 79 kg/day is well above the trigger level (50 kg/day). The continuation of the stable catch levels and catch rates in recent years indicates that the level of sea mullet exploitation by the fishery is sustainable.

Catches of western yellowfin bream have been relatively stable since 1968 at an average of 8.7 t per year. Over the last 15 years, from 1988 to 2002, catch has ranged from 5.6 t (in 1995) to 17.4 t (in 2002) with an overall stable trend. Such stability over a relatively long period suggests that this catch range is sustainable.

In summary, the catches and catch rates in 2002 for the four main species have each remained within their acceptable range. It is therefore concluded that this fishery is currently harvesting these species in a sustainable fashion.

Exploitation status: Fully exploited

Breeding stock levels: Adequate

As the legal minimum length for Shark Bay whiting is equivalent to the 50% selection point of the 48 mm mesh used in this fishery, virtually all of the catch is made up of mature fish. Consistent levels of catch of all four target species over recent years provide a good indication that the breeding stocks are being maintained.

NON-RETAINED SPECIES

Bycatch species impact: Low

The fishery operates throughout its entire licence area but with a very low level of effort as it specifically targets schools of fish. Bycatch is likely to be minimal because seine netting is a highly selective method of fishing. Fishers can determine the species and size of the school, and the size of individual fish within the school, before shooting the net. Fish are easily observed in the very clear waters of Shark Bay. Therefore, schools of non-target species and under-sized fish can usually be avoided.

Protected species interaction: Negligible

As nets are actively set and hauled, if any protected species such as dugongs, dolphins or marine turtles are caught they are immediately released.

ECOSYSTEM EFFECTS

Food chain effects: Low

The overall catch levels of scalefish by the fishery have been relatively stable over several decades, which suggests that total scalefish recruitment to Shark Bay has not been affected by removals. Also, predatory species (e.g. dolphins, larger scalefish) are abundant in the Bay, which suggests that the fishery has not reduced prey levels for these species. Therefore, the total biomass of key species in the region is probably being maintained at a level sufficient to maintain trophic function.

Habitat effects: Negligible

Seine nets are set and hauled over shallow sand banks, including intertidal areas. Sand habitats are naturally dynamic environments and resident infauna are adapted to cope with physical disturbances. Combined with the low frequency of fishing in any one location, this indicates that the fishery would have no lasting effect on the habitat.

SOCIAL EFFECTS

During 2002, the average number of fishers in the Shark Bay Beach Seine and Mesh Net Managed Fishery was 20. Fishing and associated local fish processing is one of the major sources of employment for the Denham community.

ECONOMIC EFFECTS

Estimated annual value (to fishers) for year (2002):
All finfish \$817,000
Whiting \$353,000

FISHERY GOVERNANCE

Acceptable catch ranges:
Key target species 210–353 tonnes

Under the current management regime, the acceptable catch range for the key target species in this fishery is 210–353 t. Acceptable catch ranges for individual species are whiting 95–140 t, tailor 25–40 t, sea mullet 85–155 t and yellowfin bream 5–18 t. These ranges were derived by double exponential smoothed forecasting of past annual catches to 1998 and the variation of observations around the predictions. The confidence intervals are set at 80%. If annual catches fall outside these ranges an investigation into the cause will

be triggered which, if required, may lead to changes in the management arrangements.

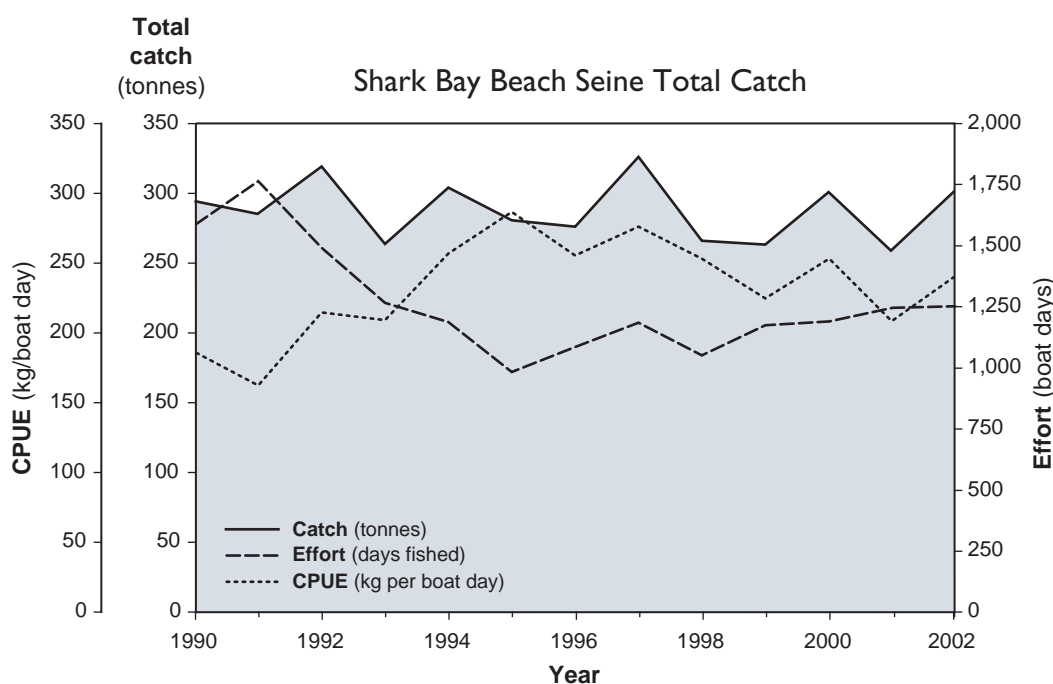
EXTERNAL FACTORS

The inner Shark Bay environment which supports the finfish stocks exploited by this fishery is particularly stable as a result of its low-rainfall desert location. The production from the fishery is therefore mostly a reflection of fishing effort (predominantly commercial) rather than any large environmentally driven variations in recruitment.

SHARK BAY BEACH SEINE TABLE I

The annual catch per unit effort (CPUE, kg/boat day) and the trigger level for key species from Shark Bay over the period 1998–2002.

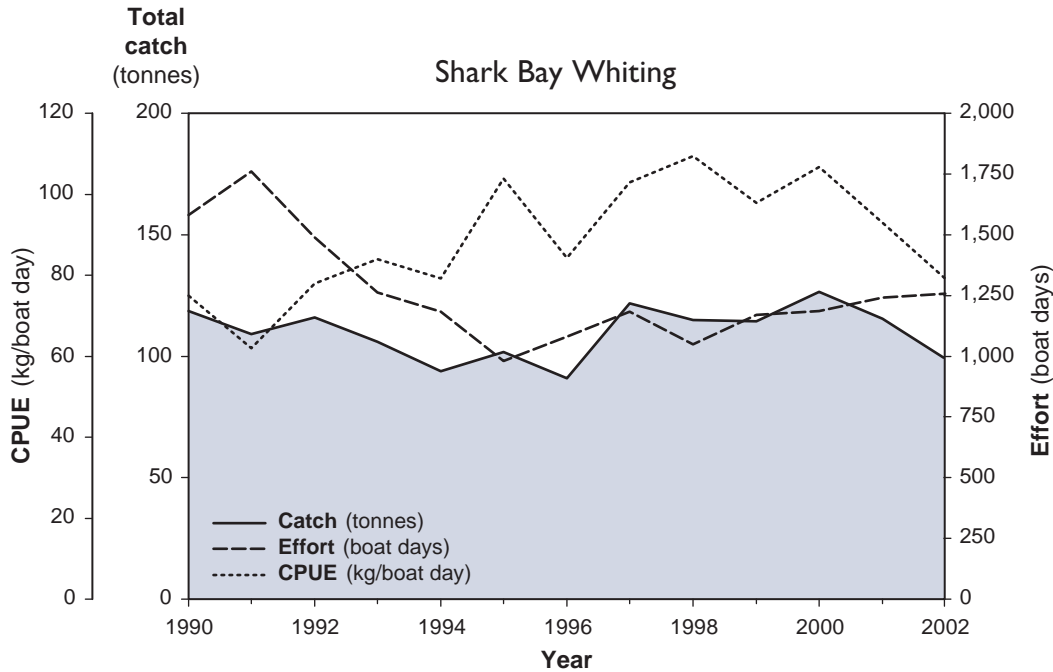
SPECIES	TRIGGER LEVEL (kg/day)	1998	1999	2000	2001	2002
Whiting	70	109	97	106	92	79
Tailor	18	33	32	32	21	21
Mullet	50	109	98	107	93	80
Bream	5	7.6	5.9	7.3	6.2	13



SHARK BAY BEACH SEINE FIGURE I

The annual catch (t), effort (boat days) and catch per unit effort (CPUE, kg/boat day) for the total finfish fishery of Shark Bay over the period 1990–2002.

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SHARK BAY BEACH SEINE FIGURE 2

The annual catch (t), effort (boat days) and catch per unit effort (CPUE, kg/boat day) for whiting from Shark Bay over the period 1990–2002.

Shark Bay Snapper Managed Fishery

Management Summary

The Shark Bay Snapper Managed Fishery has been in operation since the late 1980s and has been managed using a mix of input and output controls. The annual (1 September to 31 August) total allowable catch of pink snapper (*Pagrus auratus*) is currently set at 563,750 kg, which equates to 110 kg for each of the 5,125 units. The ongoing sustainability of the fishery is currently under review and a reduction in TAC is expected in the coming year.

A final application has been submitted to Environment Australia for the 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

Shark Bay Snapper Management Plan 1994
Shark Bay Snapper Managed Fishery Licence

Consultation Process

Shark Bay Snapper Managed Fishery Working Group
Department–industry meeting

Research Summary

Detailed research on the offshore snapper fishery was undertaken during the 1980s and provides the scientific knowledge base for management. An FRDC-funded project which commenced in July 2000 has utilised the age data collected since the 1980s to assess the potential for increased yields from this oceanic snapper stock. The preliminary results from this research are now available.

Catch and effort monitoring data, the ESD report and the preliminary results from the FRDC project have been used to compile this status report.

Shark Bay Snapper Managed Fishery Status Report

Prepared by M. Moran

FISHERY DESCRIPTION

Boundaries and access

The Shark Bay Snapper Managed Fishery operates in the waters of the Indian Ocean between latitudes 23°34' S and 26°30' S and in the waters of Shark Bay north of Cape Inscription. Catches of snapper in the peak fishing season (May–August) were formerly subject to individual quotas, while gear controls applied in the off-peak season. Since 2001, the whole year’s catch has been subject to a single TAC and