

GASCOYNE COAST BIOREGION

REGIONAL MANAGEMENT OVERVIEW

Recreational fishing activity in the Gascoyne has increased significantly since the early 1980s. The estimate of recreational fishing participation in the region is 5% of the State's fishers or 30,000 fishers a year (Baharthah and Sumner 2003).

Fishing activity tends to peak between April and August each year. Most fishers stay an average of less than two weeks and intend to fish every day (Sumner and Steckis 1999). A survey conducted between April 1998 and March 1999 (Sumner et al. 2002) has confirmed that the Gascoyne is a major focus of recreational fishing, with 243,000 fisher days being recorded over the survey period. Of these, 89,000 fisher days were recorded within the Shark Bay Marine Park and 85,000 in the Ningaloo Marine Park. The majority of fishers came from Perth (44%) or rural Western Australia (34%), with 13% being based locally and the remainder (9%) from the Eastern States.

Charter activity, although not covered in the 1998/99 survey, is also significant, with 72 fishing tour licences and 12 ecotour licences valid for the Gascoyne bioregion in 2003.

A review of recreational fisheries management arrangements for the Gascoyne bioregion has been completed and new management arrangements are due to be implemented in October 2003.

REGIONAL COMPLIANCE AND COMMUNITY EDUCATION OVERVIEW

The Gascoyne coast bioregion has eight Fisheries Officers working out of three District Offices located at Denham, Carnarvon and Exmouth. During 2003, these officers were supplemented by the seasonal deployment of a mobile recreational fisheries patrol of two additional Fisheries Officers. Collectively, the officers deal with a wide range of recreational fisheries within the region, encompassing boat and shore angling, rock lobster (including diving), netting, crabbing (mud crabs and blue swimmer crabs), and creek fishing.

Officers at Denham make extensive use of a 9 m patrol vessel (PV *John Brockman*) to conduct at-sea inspections throughout Shark Bay, while those at Exmouth use an 8 m vessel (PV *Gnulli*) to conduct at-sea operations and inspections within Exmouth Gulf and along the western side of the North West Cape. Additionally, several smaller boats are used to service protected waters and creek fishing activities. Carnarvon staff utilise small dinghies for inshore coastal and creek patrols, and a quad-bike is used to access certain mangrove creeks and beaches to monitor illegal netting.

Recreational fishery compliance involves 'hands-on' checks of catches for compliance with bag, size and possession limits; observation and inspection of the gear and methods used and the areas accessed by anglers to take their fish; and extensive liaison with anglers regarding local rules and regulations.

As well as high-profile patrol activities aimed at maximising personal contacts with anglers, covert observation also plays an important role in ensuring high levels of compliance. While most recreational fishers are aware of and comply with the rules, some unscrupulous fishers are very careful to hide their illegal activities. Officers often covertly observe fishers, particularly in response to information provided to them through the toll-free Fishwatch service.

Activities during 2001/02

During 2001/02, Fisheries Officers delivered 6,848 hours of compliance work to recreational fisheries in the Gascoyne coast bioregion (Gascoyne Recreational Compliance Table 1), concentrating mainly on checking shore-based and boat-based anglers. A total of 11,138 'field' contacts were made and, as a result of these compliance activities, 16 infringement warnings and 22 infringement notices were issued, while 6 prosecutions were initiated for more serious offences.

During the same period (2001/02) the statewide 24-hour 'Fishwatch' telephone hotline, which is utilised by members of the public who wish to report instances of observed illegal fishing activity, generated a total of 26 investigations. In general, the complaints received by the Gascoyne bioregion tended to focus on the taking of fish in excess of bag or boat limits, the taking of under-size or totally protected fish, and some cases of people fishing in closed waters.

The Gascoyne's VFLO program also supplemented compliance activities conducted by Fisheries Officers in the bioregion throughout the year. The VFLOs focus solely on the education of recreational fishers and are generally very keen anglers committed to protecting the aquatic environment and promoting the 'Fish for the Future' ethic.

In 2001/02, the Gascoyne Region VFLO program recorded 83 contacts for the year through local patrols and attendance at the Gascoyne Expo and the Exmouth Aquafest. They also delivered a variety of other community education activities, both independently and in the company of Fisheries Officers, at primary schools, high schools and community group meetings.

GASCOYNE COAST BIOREGION

GASCOYNE RECREATIONAL COMPLIANCE TABLE I

Summary of compliance and educative contacts and infringement types in recreational fisheries within the Gascoyne coast bioregion during the 2001/02 financial year.

CONTACT WITH THE RECREATIONAL FISHING COMMUNITY	NUMBER
Hours delivered in bioregion	6,848
Fisher field contacts by Fisheries Officers	11,138
District Office contacts by Fisheries Officers	4,916
Fisher field contacts by VFLOs	83
Fishwatch reports *	26
OFFENCES DETECTED	
Infringement warnings	16
Infringement notices	22
Prosecutions	6

* This represents the total number of Fishwatch reports, both commercial and recreational, since the service provider reporting mechanism cannot currently differentiate between sectors.

Initiatives in 2002/03

During 2002/03, Fisheries Officers at the Carnarvon District Office completed a number of coastal patrols accompanied by Perth-based management staff. This exercise was designed to provide Perth-based staff with exposure to practical compliance issues, with benefits expected to arise in the form of more practical management decisions being taken in relation to fieldwork/regional compliance services and associated activities. Given the success of these patrols it is expected they will be continued in coming years.

Given ongoing concern over the status of the Shark Bay snapper stocks, Fisheries Officers at Denham continued to conduct a mix of high-profile at-sea and on-land patrols to remind locals and visitors of the need to protect local pink snapper stocks in both the western and eastern gulfs of Shark Bay. Further changes to the management arrangements for these inner gulf snapper stocks introduced in March 2003 have required significant effort to be directed to developing and implementing the associated community education programs.

Exmouth Fisheries Officers again combined efforts with VFLOs to deliver an extensive workshop at Coral Bay during school holidays, providing education about minimum legal sizes, bag limits, possession limits and areas closed to certain fishing activities, as well as promoting the important 'Catch Care' message.

The implementation of the outcomes of the Gascoyne Review process is anticipated later in 2003, and planning for the development of appropriate educational material, signage and communications strategies is already under way. This will require educational and compliance patrols to be conducted throughout the bioregion utilising both Fisheries Officers and VFLOs.

REGIONAL RESEARCH OVERVIEW

Scientific information to underpin management of recreationally important fish stocks in this bioregion in the past has been provided primarily from Department of Fisheries biological research conducted on commercial fisheries. This research has covered pink snapper (*Pagrus auratus*), emperors (Lethrinid species) and whiting (Sillaginidae), and more recently tailor (*Pomatomus saltatrix*) and Spanish mackerel (*Scomberomorus commerson*).

In addition, two dedicated studies are being carried out to provide specific information on the status of the inner Shark Bay stocks of pink snapper and black snapper (*Lethrinus laticaudis*). An individual stock status report has been prepared for each of these two snapper species.

Data on recreational catches have been collected previously in the Gascoyne region (Sumner and Steckis 1999), in Shark Bay (Moran 1983, unpub.) and at Ningaloo (Moran et al. 1996). The first full recreational creel survey for the Gascoyne bioregion, of recreational boat- and shore-based fishing from Steep Point to Exmouth Gulf, was undertaken in 1998/99 (Sumner et al. 2002). This survey estimated the recreational catch and fishing effort for the region. The total recreational catch of all finfish species for the region in 1998/99 was estimated at 350 t, excluding charter vessel catches. This was approximately one-third of the commercial catch of 1,082 t at the time.

Important recreational species, in order of weight caught, were spangled emperor (*Lethrinus nebulosus*) (30,000 fish kept, or 79 t); pink snapper (*Pagrus auratus*) (28,000 fish or 79 t); mackerel (*Scomberomorus* spp.) (Spanish mackerel 8,000 fish or 47 t, other mackerel 8 t); black snapper or grass emperor (*Lethrinus laticaudis*) (33,000 fish or 34 t); golden trevally (*Gnathanodon speciosus*) (6,000 fish or 20 t); sweetlip emperor (*Lethrinus miniatus*) (13,000 fish or 16 t); Chinaman cod (*Epinephelus rivulatus*) (23,000 fish or 10 t gilled and gutted); western yellowfin bream (*Acanthopagrus latus*) (10,000 fish or 5 t); tailor (*Pomatomus saltatrix*) (7,000 fish or 5 t); and whiting (Sillaginidae) (34,000 fish or 5 t).

The 1998/99 survey also provided extremely useful estimates of the recreational catch of key recreational species from within the inner gulfs of Shark Bay; the recreational catch of pink snapper from the western gulf was estimated at approximately 40 t. Further surveys to monitor the recreational catch of pink snapper and other species in Shark Bay have been conducted since 2000.

Inner Shark Bay Recreational Fishery

Management Summary

As a result of excessive fishing pressure on the inner Shark Bay pink snapper (*Pagrus auratus*) stocks, new management arrangements were introduced in March 2003.

As part of the new management arrangements, for the first time in the history of fisheries management in Western Australia a total allowable catch (TAC) has been set for a fishery which includes explicit catch allocations for the commercial and recreational sectors.

The following TAC has been set for each area of the fishery:

- Eastern gulf – 15 t (about 5,000 fish)
- Denham Sound – 10 t (about 3,300 fish)
- Freycinet Estuary – 5 t (about 1,200 fish)

The recreational sector will be allocated 75% and the commercial sector will be allocated 25% of the available catch.

To manage the recreational share of the catch the following recreational fishing regulations were introduced for Shark Bay pink snapper in March 2003:

- Bag limit 1
- Minimum size 50 cm
- Maximum size 70 cm
- Closed season 1 April – 31 July (Eastern gulf)
- Closed season 15 August – 30 September (Freycinet Estuary)
- To limit the take of pink snapper in Freycinet Estuary a limited number of 'snapper tags' were made available to recreational and commercial fishers. Only tagged snapper can be landed in Freycinet Estuary.

The latest package is designed to manage the total catch in each area of the fishery and allow stocks to rebuild to at least 40% of the estimated unfished biomass.

The recreational catch of black snapper or grass emperor (*Lethrinus laticaudis*) comprises a significant part of the recreational catch in Shark Bay and other areas of the Gascoyne, and community concerns have been regularly expressed about transfer of effort to this species in the wake of tighter management of the pink snapper catch.

To provide additional protection for species such as black snapper and others which are considered to have a high risk of over-exploitation, reduced individual bag limits and mixed species bag limits will be introduced as part of the Gascoyne Recreational Fishing Strategy in 2003/04.

Research Summary

Research to support the management of Shark Bay pink snapper undertaken during the 1980s identified separate stocks

in the inner gulfs. Concerns about increasing recreational fishing pressure on these stocks during the early 1990s, and the outcome of research surveys for juvenile snapper in November 1996 and February 1997, resulted in a comprehensive research project commencing in June 1997. This research has provided scientific assessments of the status of inner gulf stocks each year since 1998. In late 2002, a review of the research and results of model-based stock assessments was provided to a Ministerial Working Group considering management options for this key recreational species for the 2003 season onwards.

Research to support the management of black snapper or grass emperor, the second most commonly taken recreational species in the inner gulfs of Shark Bay, commenced in July 1999, with results due by the end of 2003. The specific objectives of this research were to examine stock delineation using stable isotope analysis of otolith carbonate, determine age structure, growth rate and reproductive biology, and develop a stock assessment model for black snapper in the inner gulfs of Shark Bay. For this year's first full status report on black snapper, the catches and effort for 2001 are reported. Data for the 2002 season being incorporated in the final project report will be given in next year's *State of the Fisheries Report*, when black snapper will be included in a broader status report for inner Shark Bay angling.

Estimates of recreational catch and effort inside Shark Bay have been derived from creel surveys undertaken initially during the 1998 season as part of a broader survey of the whole Gascoyne region (Sumner et al. 2002), and since then at key boat ramps inside Shark Bay during the 2000 (Sumner and Malseed 2001), 2001 (Sumner and Malseed 2002) and 2002 seasons.

Inner Shark Bay Pink Snapper Stocks Status Report

Prepared by G. Jackson and N. Sumner

FISHERY DESCRIPTION

Boundaries and access

Evidence from stock identification studies conducted since the 1980s suggests that several reproductively isolated populations of snapper (*Pagrus auratus*) inhabit the inner gulfs of Shark Bay. Because there is little or no apparent mixing between these, management recognises three separate fishable 'stocks' in gulf waters. An eastern 'stock' is found in the eastern gulf, i.e. in waters approximately to the east of the Peron Peninsula and to the south of Cape Peron (Inner Shark Bay Figure 1). In the western gulf, separate 'stocks' are found approximately to the north (Denham Sound) and south (Freycinet Estuary) of a line running west from Goulet Bluff to Heirisson Prong. Research advice is provided on the basis of these divisions.

Pink snapper in these waters are mostly caught by recreational fishers. Although a limited number of licensed charter vessels operate out of Monkey Mia and Denham, these seldom target inner gulf pink snapper. Commercial snapper fishing in gulf waters is limited to the 11 licensed fishing units of the Shark Bay Beach Seine and Mesh Net Managed Fishery.

GASCOYNE COAST BIOREGION

The eastern gulf snapper fishery was closed in June 1998 to allow the recovery of the spawning stock and remained closed during 2002. Bag/size limits and a seasonal spawning closure (Freycinet Estuary only) applied in the western gulf.

Main fishing method

Recreational: Rod and line, handline.
Commercial: Handline, beach seine, haul net.

RETAINED SPECIES

Recreational catch estimates (season 2002):

Eastern gulf closed
Western gulf:
Freycinet Estuary 19 tonnes
Denham Sound 15 tonnes

Although a survey of recreational fishing within this region was undertaken in 1983, annual estimates of recreational effort, and the retained catch of key species, have only been available since 1998. During 2002, the recreational pink snapper landed catch was estimated at 15 t in Denham Sound and 19 t (Nanga 15 t, Tamala 4 t) in the Freycinet Estuary (Pink Snapper Table 1). There was no catch of pink snapper in the eastern gulf, which has been closed since June 1998. The Denham Sound catch in 2002 was the largest since recreational fishing surveys commenced in 1998 and represents almost twice that caught in 2001. In comparison, the catch in Freycinet in 2002 was similar to that in 2001.

In 2002, the proportion of the snapper captured by recreational fishers that were subsequently released was 93% in Denham Sound, and slightly lower in the Freycinet Estuary (79% at Nanga, 89% at Tamala).

Fishing effort

In 2002, approximately 44,000 fisher days were expended in the inner gulfs by boat fishers launching from public ramps, with approximately 76% of the effort in the western gulf and 24% in the eastern gulf (Pink Snapper Table 1). Compared with 2001, effort in 2002 had increased by approximately 55% in Denham Sound and 46% in the eastern gulf but had decreased by 5% in Freycinet.

Commercial share: **Eastern gulf closed**
Western gulf 5% (approx.)

In 2002, the commercial catch taken in the western gulf was approximately 2 t, similar to the low level reported in recent years, again with no catch in the eastern gulf (fishery closed).

Stock assessment completed: **Yes**

The daily egg production method has been used to directly estimate the sizes of the snapper spawning stocks in the eastern gulf, Denham Sound and the Freycinet Estuary each year since 1997. Research trawl (since 1996) and trap surveys (1998–2000) have provided information on the abundance of 0+ age snapper in both gulfs that has been used to measure recruitment. Results indicate that snapper recruitment is highly variable in the inner gulfs as is the case in oceanic waters outside Shark Bay.

Between 1998 and 2001 these data, combined with estimates of commercial (from CAES) and recreational catches (from boat ramp surveys), were used to independently determine the status of each inner gulf 'stock'. In 2002 the available biological and fishery information was incorporated into quantitative age-structured models to independently assess the status of each snapper 'stock'.

Exploitation status: **Eastern gulf closed**
Western gulf:
Freycinet Estuary over-exploited
Denham Sound fully exploited

Breeding stock levels:
Eastern gulf inadequate but increasing
Western gulf:
Freycinet Estuary inadequate (locally depleted)
Denham Sound adequate

In late 2002, following the move to model-based stock assessments, a limit reference point of 40% of the virgin mature (spawning) biomass (defined as the 1983 level), reflecting the level of uncertainty of some inputs, was adopted for each 'stock'.

The mature biomass of the eastern 'stock' has recovered steadily since the fishery was closed in 1998 and is currently estimated to be just above the reference level (using a virgin biomass of approximately 250 t).

In Denham Sound, the most recent assessment is more optimistic than previously calculated and indicates that the mature biomass, although having declined steadily since the early 1980s, has been slowly rebuilding since the late 1990s and is currently estimated to be above the reference level (using a virgin biomass of approximately 300 t).

In Freycinet however, the mature biomass remains critically low relative to the reference level (virgin biomass approximately 300 t). Nonetheless, the high proportion of under-sized snapper (i.e. fish less than 500 mm) released by recreational fishers in both Denham Sound (99% in 2000) and Freycinet (98% in 2000) indicates encouraging levels of good recruitment in both areas in recent years.

SOCIAL EFFECTS

Shark Bay is a very popular destination for anglers, especially during the winter months and in school holiday periods.

ECONOMIC EFFECTS

Not available.

FISHERY GOVERNANCE

In late 2002, following extensive community consultation through a ministerial working group, a TAC was set for each pink snapper 'stock' for the 2003 fishing season with an allocation between sectors made on the basis of 75% recreational and 25% commercial.

In 2003, the eastern gulf fishery will partly re-open and be managed to a notional TAC of 15 t (commercial 3 t,

recreational 12 t) using a combination of a spawning season closure (April–July inclusive), a daily bag limit of one, and minimum (500 mm) and maximum (700 mm) legal sizes.

In the western gulf in 2003, the Denham Sound fishery will be managed to a notional TAC of 10 t (commercial 2 t, recreational 8 t) using a combination of a daily bag limit of one and minimum (500 mm) and maximum (700 mm) legal sizes.

In Freycinet, where the spawning stock has been shown to be at a very low level, the fishery will be managed to a TAC of 5 t (commercial 1 t, recreational 4 t), using a combination of ‘management tags’ (only 1,200 available for 2003), minimum (500 mm) and maximum (700 mm) legal sizes, and a six-week spawning season closure (mid-August to the end of September).

EXTERNAL FACTORS

A comprehensive investigation into the potential impact of prawn trawling in Denham Sound on juvenile snapper

recruitment and the consequences for the recreational snapper fishery in this area has recently been completed (Moran and Kangas, in prep.). The study utilised historical snapper trawl data and new information from a series of trawl experiments conducted in 2000/2001 and snapper trap surveys conducted during 1998–2000. The study estimated the number of one-year-old snapper remaining at end of a prawn fishing season to be 75% of the numbers expected to be present if no prawn trawling had occurred in the area. Put in other terms, the mortality of juvenile snapper as a direct consequence of the trawl fishery was estimated to result in a loss in yield of 2–4 t of adult snapper per year in Denham Sound (assuming they had not been caught as one-year-olds by the trawl fishery). It was also determined that the impact of the prawn fishery (on juvenile snapper mortality) could be reduced by some changes to the trawl fishery boundaries (moving fishing activity away from areas of highest juvenile snapper abundances). Discussion between the local community, the prawn trawl industry and the Department of Fisheries will take place in late 2003.

PINK SNAPPER TABLE I

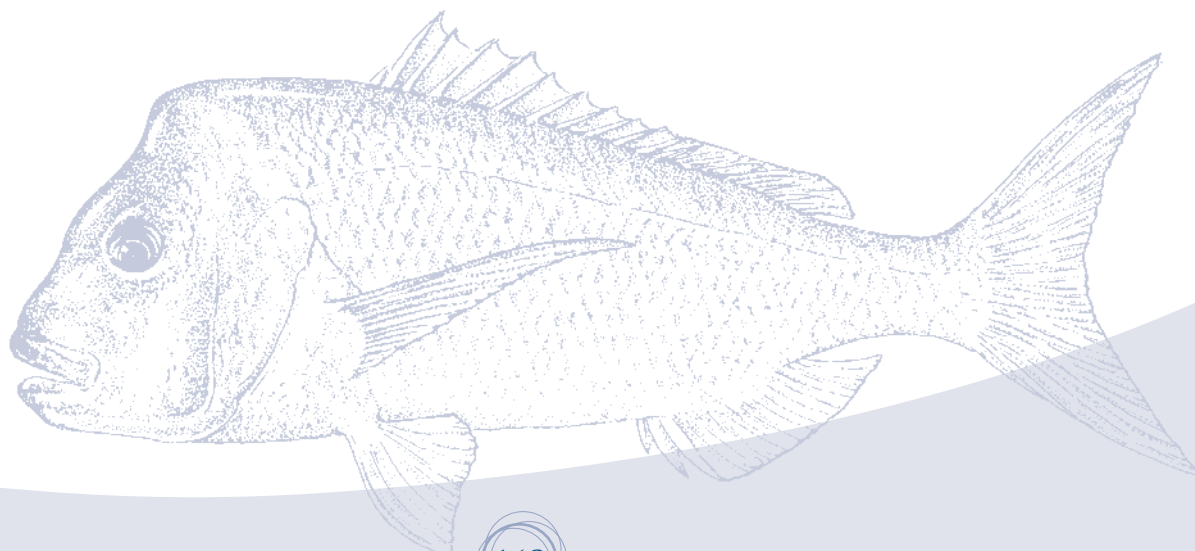
Estimates of total recreational boat fishing effort (fisher days) and retained pink snapper catch (t) in inner Shark Bay 1998–2002 (no data available for 1999).

YEAR	EASTERN GULF		DENHAM SOUND		FREYCINET	
	EFFORT (days)	CATCH (tonnes)	EFFORT (days)	CATCH (tonnes)	EFFORT (days)	CATCH (tonnes)
1998	11,100	2.9*	21,000	12.2	17,200**	25.7**
1999	n/a	n/a	n/a	n/a	n/a	n/a
2000	9,400	0	15,800	9.5	9,600**	15.8**
2001	7,300	0	12,000	7.5	15,400***	21.8***
2002	10,600	0	18,500	14.5	14,700***	19.3***

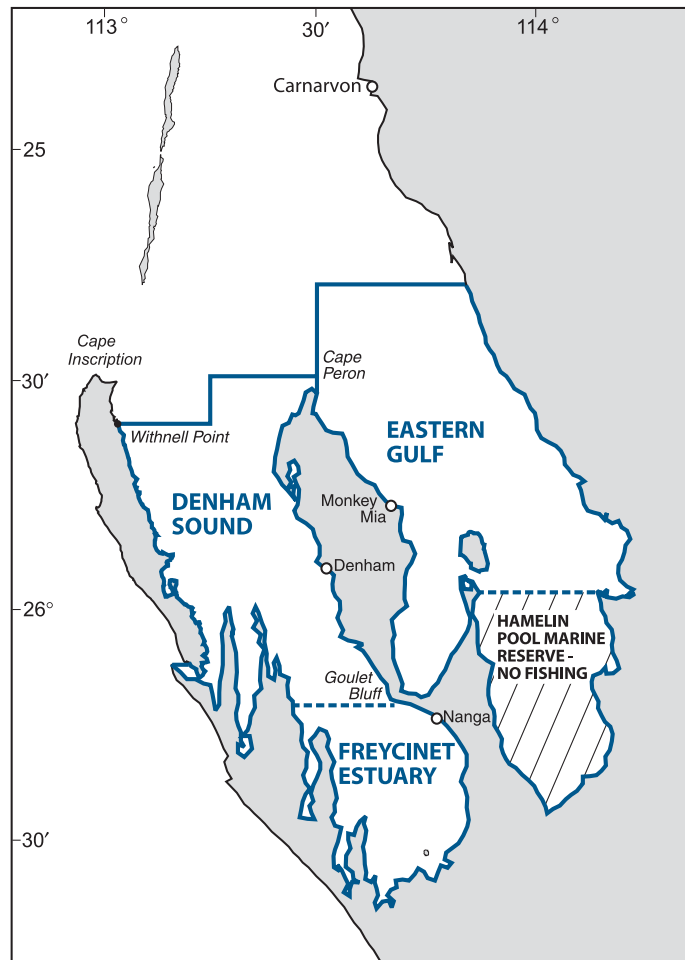
* For period April–June only (fishery closed June 1998).

**Estimates for Nanga boat ramp only, does not include Tamala.

***Estimates for all Freycinet, including Tamala.



GASCOYNE COAST BIOREGION



INNER SHARK BAY FIGURE 1

The recreational fishing areas of inner Shark Bay.

Inner Shark Bay Black Snapper Stock Status Report

Prepared by S. Ayvazian and G. Nowara

FISHERY DESCRIPTION

Boundaries and access

A stock discrimination study has used stable isotope analysis of otolith carbonate to determine the level of stock separation of black snapper or grass emperor (*Lethrinus laticaudis*) in the gulfs of Shark Bay. This indicated that samples of black snapper from waters of different salinity can be distinguished by their O^{18} values. Initial results of a tagging study indicate that movement of the species within Shark Bay is localised (within 10 km of the original tag site). These results suggest that this species is not wide-ranging within the bay.

Black snapper are taken primarily by recreational fishers in Shark Bay. Although the fishers in the Shark Bay Beach Seine and Mesh Net Managed Fishery take a small quantity of black snapper, it is not a target species for this fishery.

Main fishing method

Recreational: Rod and line.
Commercial: Beach seine, haul net and mesh net.

RETAINED SPECIES

Recreational catch (season 2001/02): 7 tonnes (boat only)

Recent recreational boat-based catch estimates for black snapper from Shark Bay indicate a decline in the level of catch between the 1998 and 2001 seasons (Black Snapper Table 1). The Gascoyne Recreational Fishing Survey of 1998 estimated a total recreational catch from shore-based, boat-based and dinghy fishers of 33,400 black snapper retained (approximately 34 t) for the Gascoyne bioregion. The majority of this catch (17,073 fish weighing 15.9 t) was taken by boat-based fishers from public boat ramps in the Shark Bay Marine Park (Sumner and Malseed 2002). The black snapper was the third most popular species caught (in order of estimated number kept) after whiting and pink snapper. Subsequently, a 12-month boat-based survey in Shark Bay that interviewed recreational

anglers at Nanga, Denham and Monkey Mia boat ramps during the 2000 season indicated a decline in the recreational catch to 10,042 black snapper retained (11.6 t) and 18,272 released. A further 12-month boat-based recreational survey in Shark Bay during the 2001 season, also targeting fishers at Nanga, Denham and Monkey Mia, showed a further decline in the catch estimates to 7,302 black snapper retained (7 t) and 15,374 released.

Fishing effort

The recreational fishing effort (as fisher days) has been reported during the recreational boat-based fishing surveys in Shark Bay. The fishing effort reflects the number of fisher days for all species caught. During the comprehensive 1998 creel survey there were approximately 49,000 fisher days reported from boat ramps at Nanga, Denham and Monkey Mia, which declined to 35,000 fisher days during 2000 and 34,000 fisher days during the 2001 creel survey.

Catch rate

The mean catch rates of black snapper for boat-based anglers in Shark Bay in the 1998, 2000 and 2001 surveys were 0.34, 0.29 and 0.24 fish kept per angler day respectively. This indicates a declining catch rate over this period.

Commercial share (season 2001): **Negligible**

Commercial catches of black snapper are taken in small quantities by the 11 licensed fishing units of the Shark Bay Beach Seine and Mesh Net Managed Fishery. The 2001 commercial catch reported from the western and eastern gulfs was almost none.

Stock assessment completed: **Not assessed**

Exploitation status: **Not assessed**

Breeding stock levels: **Not assessed**

A preliminary egg-per-recruit model was developed for the black snapper stock in Shark Bay using biological data for the Shark Bay population derived from research conducted between 1999 and 2001. The length at 50% maturity is 228 mm for females. Because the size at maturity is less than the legal minimum length (280 mm) and assuming a low release mortality of recreationally caught fish, breeding stock levels are believed to be adequate. Black snapper possess different growth rates in different localities within the bay. In all cases, the legal minimum length is set above the length at maturity.

SOCIAL EFFECTS

Shark Bay is a very popular destination for anglers, especially during the winter months and in school holiday periods.

ECONOMIC EFFECTS

Not available.

FISHERY GOVERNANCE

At this time, control of the exploitation rate is managed through a daily bag limit and a legal minimum size limit. The recreational catch limits for black snapper include a legal minimum length of 280 mm and a recreational daily bag limit described under the 'reef fish' category as a mixed bag of 8. The legal minimum length for commercial fishers is 280 mm. Community support for an increase in the minimum legal size for black snapper is being considered under the current review of recreational fishing management arrangements in the region. Under new regulations to be introduced from 1 October 2003, black snapper will be part of the 'finfish category 1' with a mixed bag limit of 7 per day, with a further limit of 4 fish of Lethrinid (emperor) species. The results from the black snapper research program should be available by the end of 2003 to assist with the future sustainable management of this species.

BLACK SNAPPER TABLE I

Recreational catch of black snapper in Shark Bay from three angler surveys (Sumner and Malseed 2002).

SEASON	AREA	FISHING EFFORT (days)	NUMBER KEPT	STANDARD ERROR	NUMBER RELEASED	WEIGHT KEPT (tonnes)
1998	Total	49,321	17,073			15.9
2000	Western Gulf	25,378	5,425	936	11,404	6.0
	Eastern Gulf	9,438	4,617	686	6,868	5.6
	Total	34,816	10,042	1,160	18,272	11.6
2001	Western Gulf	26,783	5,152	905	12,314	4.9
	Eastern Gulf	7,254	2,205	320	3,156	2.1
	Total	34,037	7,357	960	15,470	7.0