

Exmouth Gulf Prawn Managed Fishery Status Report

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FISHERY DESCRIPTION

The Exmouth Gulf Prawn Managed Fishery targets western king prawns (*Penaeus latissulcatus*), brown tiger prawns (*Penaeus esculentus*), endeavour prawns (*Metapenaeus* spp.) and banana prawns (*Penaeus merguensis*). Fishing is undertaken using otter trawls.

Governing legislation/fishing authority

Exmouth Gulf Prawn Management Plan 1989
Exmouth Gulf Prawn Managed Fishery Licence

Consultation process

Joint Trawl Management Advisory Committee
Department–industry meetings

Boundaries

The boundaries of the Exmouth Gulf Prawn Managed Fishery are *'the waters of the Indian Ocean and Exmouth Gulf below high water mark lying south of a line starting at Point Murat and extending northeasterly to the southern extremity of South Muiron Island; thence generally northeasterly along the southeastern shore of that island to its easternmost extremity; thence northeasterly to the southern extremity of North Muiron Island; thence northeasterly and northerly along the southeastern and eastern shores of that island to its northern extremity; thence easterly to the northern extremity of Serrurier Island; thence generally southerly along the western shores of that island to its southern extremity; thence southeasterly to the southern extremity of Locker Island and then due south to the mainland'* (Exmouth Gulf Prawn Figure 1).

Management arrangements

This is principally an input-controlled fishery based on limited entry, closed seasons and areas, gear restrictions and controls on vessel size and power. The main purpose of the management controls is to maintain exploitation rates at a level which ensures the spawning biomass of prawns (particularly tiger prawns) remains above the level that causes recruitment variation.

The yearly cycle of operation for the fishery is dynamic and multi-faceted. Opening and closing dates vary each year depending on environmental conditions, moon phase and the results of surveys which predict recruitment dynamics. Management arrangements in recent seasons have provided for 200 fishing nights with a minimum of 28 non-fishing nights for moon closures (i.e. four nights each full moon). For the 2003 season, official opening and closing dates were set at 1 April and 15 November 2003 respectively; however, this is a flexible arrangement and the season actually commenced on 6 April. There are also spatio-temporal closures during the early part of the season (April–July).

Stringent measures are in place to ensure that spawning stock levels are adequate and that the prospect of both recruit and growth over-fishing is avoided. These measures will continue to be applied while incorporating a flexible fishing regime to optimise size and value of tiger prawns. There is a consultative process in operation whereby the Research Division and industry jointly decide on the timing and extent of areas to be fished. This process allows industry to undertake supervised research surveys to determine changes in prawn distribution, abundance and size composition during the season, thus enabling a rapid response to resource fluctuations to maximise tiger and king prawn size (and hence market value) while still providing a sustainable approach to stock management.

Management guidelines first introduced for the 2002 season prescribe a mandatory closure of the tiger prawn spawning area when the tiger prawn catch rate falls to 19kg/hr (quad gear rate) or on 1 August, whichever is the sooner. From 1 November, after the main spawning period, the catch rate threshold level is reduced from 19 kg/hr to 14 kg/hr.

The vessel monitoring system continues to be a part of the fishery's management strategy and provides the mechanism to give effect to the various spatial closures in the fishery.

The fishery as a whole is subject to a maximum headrope allocation. However, the gear configurations permitted within this total allocation are under review, with vessels operating for the past few seasons under an exemption allowing the use of 'quad gear' (four smaller nets) rather than the standard twin 7.5 fathom nets.

Bycatch reduction devices (specifically grids) are implemented in this fishery, with all vessels required by way of a condition on the managed fishery licence to fish with a grid in each net. Secondary bycatch reduction devices or fish escapement devices (for example, square mesh panels) were trialled during the 2003 season. These will be compulsory in nets on one side in 2004 and compulsory in all nets in 2005.

Industry, in association with the Department, has successfully applied to the Australian Government Department of Agriculture, Forestry and Fisheries Australia to gain certification from the US Department of State that the fishery is BRD-compliant in terms of potential turtle captures. This allows licensees to export product to the US market. Industry has also installed additional 'hopper' in-water sorting systems on boats with seven boats currently using hoppers. This provides an improved quality of prawns and reduces bycatch mortality for some species.

During 2002/03, the Australian Government Department of Environment and Heritage certified the fishery as environmentally sustainable under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999*. While subject to a number of conditions, certification allows product from the fishery to be exported from Australia for a period of five years before reassessment.

Research summary

Research activities continue to focus on stock assessment and surveys to monitor both annual recruitment of tiger prawns and the residual spawning stock levels. All boats complete detailed research log books, which together with survey data and factory records, provide the information sources for managing the fishery. A pre-season survey of the king prawn stocks commenced in 2003 in collaboration with industry to assist with developing harvesting strategies.

The Department and industry continued the monitoring of juvenile tiger prawn habitats (seagrass/algal communities) and their regeneration after being depleted by the effects of Cyclone Vance in 1999 (which resulted in a very poor recruitment in 2000).

A collaborative three-year project with industry to review the impact of trawling on non-target species, funded by the FRDC, is due for completion in late 2004. The joint evaluation and implementation of gear modifications to reduce bycatch and improve product quality is ongoing. A further FRDC project is examining the biodiversity of bycatch in trawled and untrawled areas of Exmouth Gulf.

RETAINED SPECIES

Commercial production (season 2003): **1,089 tonnes**

Landings

The total catch of 1,089 t for all prawn species was within the acceptable range. Tiger prawn landings in 2003 were the highest since 1994. While the tiger prawn catch of 633 t was outside the normal acceptable catch range of 250–550 t, the recruitment survey indices had provided a catch forecast of 540–810 t and so the landings fell within the predicted catch range for the 2003 season.

King prawn landings were only 231 t in 2003, the lowest in over 20 years, and below the acceptable catch range of 350–500 t. Historically, catches of king prawns have been relatively stable compared to tiger prawn catches irrespective of the high fishing levels. However, since Cyclone Vance in 1999, the king prawn annual landings have been below 300 t.

The endeavour prawn landings of 225 t were within the acceptable catch range for this species.

Recorded landings of by-product included 27 t of coral prawns, 21 t of blue swimmer crab (*Portunus pelagicus*), 6 t of squid, 2 t of cuttlefish and 1 t each of bugs (*Thenus orientalis*) and shark.

Fishing effort/access level

There are 16 licences in the fishery, but as a result of changes in gear configuration 13 boats operated during the 2003 season, each towing 4.5 fathom quad gear (four nets).

Total nominal effort for the 2003 season was 27,161 hours. The equivalent effort in twin-gear terms, after adjusting for changes in configuration from twin to quad gear, was 33,428 hours, which was slightly higher than in 2002 (32,440 hours). Of the 200 nights allocated to fishing the entire fleet fished 187 nights during the season, compared to 183 nights in 2002.

Because the catch rates of tiger prawns were higher than the threshold level of 14 kg/hr, the original closing date of the fishery (15 November) was extended until 30 November in 2003. However, fishing ceased voluntarily on 20 November when the catch rate of tiger prawns declined, though it was still above the threshold level.

The effective effort on tiger prawns increased from 31,100 hours in 2002 to 32,411 hours in 2003, coinciding with increased stock levels and implying increased efficiency in the current fleet to target the higher abundance of tiger prawns. Such efficiency increases are made possible by within-season surveys enabling greater targeting of the larger, more valuable prawns, in conjunction with flexible spatial openings and fleet manipulation.

Catch rate

The catch rate in twin-gear terms for king prawns fell from 7.5 kg/hr in 2002 to 6.9 kg/hr in 2003, which is the lowest catch rate recorded for this species since the early 1980s. The catch rates of 18.9 kg/hr for tiger prawns and 6.7 kg/hr for endeavour prawns were higher than those in 2002, which were 12.2 kg/hr and 5.3 kg/hr respectively.

Recreational component:

Nil

STOCK ASSESSMENT

Assessment complete:

Yes

The tiger and king prawn stocks have been fully exploited each year, as regular surveys permit variations to the management arrangements to optimise the catch and size grades.

For tiger prawns, this process involves analysis of survey-based indices of recruitment and spawning stock compared to the accepted spawning stock–recruitment relationship. Endeavour prawns, a secondary target species whose distribution overlaps that of tiger prawns, are exploited to varying levels depending on the abundance of (and hence the fishing effort applied to) the more valuable tiger prawns.

The king prawn catch in 2003 was below the acceptable catch range (350–500 t) for the fourth year running, having fallen back to the levels seen in the 1970s and 1980s. The reasons for this are being investigated. A regular pre-season survey has been developed, with a high level of collaboration from industry, to monitor the king prawn stocks and assess whether the reduced catches are due to a change in fishing strategy (i.e. early targeting of tiger prawns) or possible recruit over-fishing, or whether the effects of Cyclone Vance have had a longer-term adverse impact on the king prawn stocks. Although there has been limited monitoring of king prawn stocks to date, it is intended to increase the research focus on these stocks during 2004 and in the future.

The total landings of endeavour prawns are within the acceptable catch range. However, fleet manipulation and the opening of Area C for a relatively long period allowed additional access to endeavour prawn stocks, providing increased catches of this species compared to 2002.

Exploitation status:

Fully exploited

Breeding stock levels:

Adequate

Tiger prawn breeding stock levels are maintained at adequate levels by within-season management action each year. This strategy maintains the spawning biomass of tiger prawns above the historically determined biological reference point of 8–10 kg/hr. A cut-off threshold catch rate of 19 kg/hr quad gear (16 kg/hr standard twin gear) is used to ensure that this occurs. During 2003, tiger prawn catch rates were closely monitored from May to August and the tiger prawn grounds closed on 1 August with the catch rate still above the threshold level. Three standardised tiger prawn breeding stock surveys carried out from August to October showed an average CPUE of 26.1 kg/hr in the main spawning grounds, well above the threshold level. The August and September surveys showed a CPUE of 22.9 kg/hr and 30 kg/hr respectively, and therefore the tiger prawn spawning area (Area B) was re-opened for fishing on 3 October for the remainder of the season. However, after consultation with industry there were only three limited periods of fishing activity within Area B during October and November, which were monitored to ensure that the catch rate of tiger prawns did not fall below 19 kg/hr. During October, fishing in Area B was carried out for two four-night periods (4–7 and 24–27 October).

From 1 November, the tiger prawn catch threshold level was lowered from 19 kg/hr to 14 kg/hr. This was done to further investigate the effect on recruitment in the following season from having a harvest strategy that maintained relatively high levels of tiger prawns during the spawning season (August–October) but allowed these to be fished to levels below the 19kg/hr after the main spawning period had finished. This strategy was first implemented in the 2002 season and the recruitment of tiger prawns for the 2003 was not affected. The long-term effects of this strategy upon sustainability will be assessed. During the fishing period in November 2003 the daily catch was monitored and showed that the catch rate of tiger prawns in the spawning grounds was approximately 15 kg/hr when the fishery ceased on 20 November.

King prawn breeding stock levels in the fishery are maintained at adequate levels during normal environmental conditions through the controls on effort and the extended breeding period and low overall catchability of the species compared to tiger prawns.

The breeding stocks of endeavour prawns are considered to be at adequate levels because their distribution overlaps that of the tiger prawns and the tiger prawn closures also protect a significant portion of the endeavour prawn breeding stock each year. In addition, endeavour prawns are also considered to be more resilient to fishing pressure due to their smaller size and low catchability, which is similar to king prawns.

Projected catch next season (2004):

460–690 tonnes tiger prawns

The catch prediction for tiger prawns is based on the historic relationship between recruitment survey indices (early and late March and early April) and the season's landings (April–November of the same year). For 2004, the projected tiger prawn catch is 460–690 t, which should be close to the high catch of tiger prawns recorded in 2003.

NON-RETAINED SPECIES

Bycatch species impact:

Low

Bycatch levels for Exmouth Gulf are relatively low by tropical trawl fisheries standards, with few species of significance to other fishing sectors being taken. Trialling of secondary bycatch reduction devices will continue to improve the quality of the prawn catch by reducing the volume of overall bycatch species retained in the trawls. In addition, five boats used hoppers (in-water sorting systems) during 2003, which improves bycatch survival and product quality.

Protected species interaction:

Low

While protected species including dugongs, turtles and sea snakes can be found in this general area, only sea snakes and occasionally turtles are encountered in the trawl catches. Both species are typically returned to the sea alive. Grids were compulsory in 2003, which eliminated the capture of any turtle or other large animal.

ECOSYSTEM EFFECTS

Food chain effects:

Low

Although the prawn species are managed at relatively high levels of annual harvest, the impact of the catch on local food chains is unlikely to be significant in view of the high natural mortality, extent of non-trawled nursery areas and variable biomass levels of prawns resulting from naturally occurring cyclone events.

Habitat effects:

Low

Historically the fishery impacted on shallow water areas (< 12 m) containing sponge habitats, but the refocusing of the fishery into deeper waters to take larger prawns since the early 1980s has reduced this interaction. The trawling effort is now focused in the deeper central and north-western sectors of Exmouth Gulf. During 2003, 37% of the licensed fishery area was fished. An extensive permanent trawl closure in the shallow eastern and southern sectors accounts for 28% of the licensed fishery area, and there is also a series of temporary closures to regulate the size and quantity of prawns taken.

Owing to the predominantly mud and sand habitats of the trawl grounds, the trawl gear has relatively little impact. Overall, the nature of this particular trawl fishery and the very tight controls on effort indicate that its environmental effect is now likely to be low.

SOCIAL EFFECTS

The estimated employment for the year 2003 was 41 skippers and crew. Additional processing and support staff are also based in Exmouth Gulf and Fremantle. Within the Exmouth area the fishery is one of the major regional employers and contributes to the economic viability of the Exmouth township.

ECONOMIC EFFECTS

Estimated annual value (to fishers) for year 2003:
\$11.9 million

The ex-vessel prices for prawns vary depending on the type of product and the market forces operating at any one time. In this fishery there is a high degree of vertical integration, with the fishing companies which own the boats undertaking direct marketing of the product into overseas markets. For this reason, the product prices quoted can only be estimates. Estimated prices were as follows:

King prawns	\$11.30/kg
Tiger prawns	\$11.95/kg
Endeavour prawns	\$7.60/kg
Coral prawns	\$2.00/kg

FISHERY GOVERNANCE

Acceptable catch range for next season:
771–1,276 tonnes

Under current fishing effort levels, the acceptable catch range for major penaeids is that obtained during the 1990s (771–1,276 t). The long-term acceptable catch ranges for individual

species are king prawns 350–500 t, tiger prawns 250–550 t and endeavour prawns 120–300 t (noting that maximum or minimum catches do not occur for all species simultaneously). These figures are for normal environmental conditions and are generally based on a five- to 10-year average.

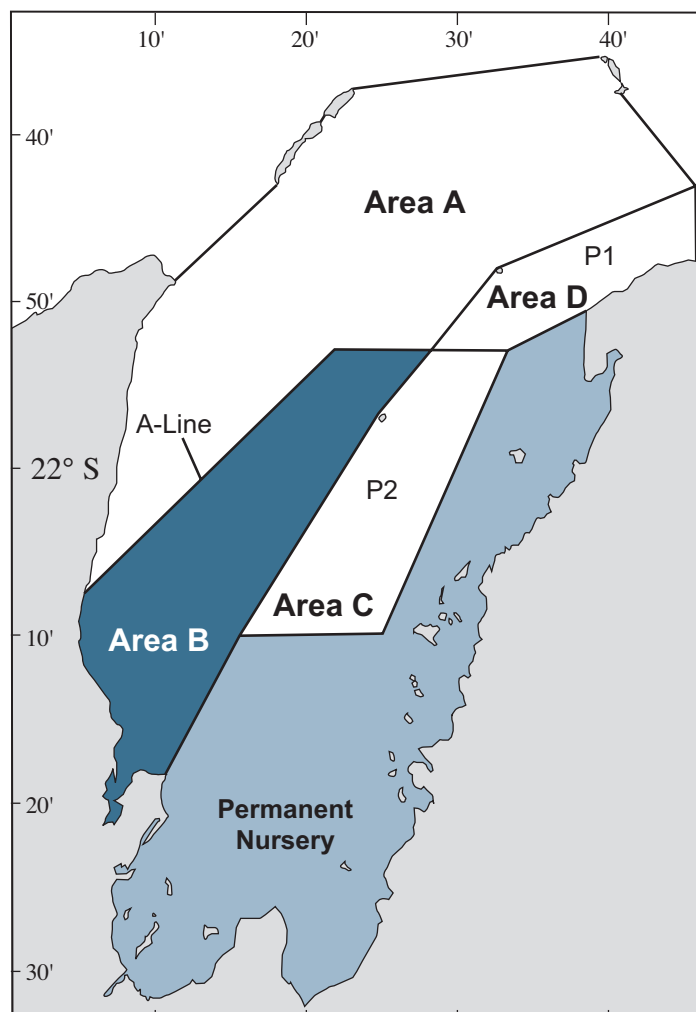
New management initiatives (2003/04)

For the 2004 season, secondary bycatch devices or FEDs must be installed in two of the four nets towed by each vessel.

Legislative changes to permit greater flexibility in gear configurations through unitisation, without increasing the total net headrope length in the fishery, are currently in the drafting stage.

EXTERNAL FACTORS

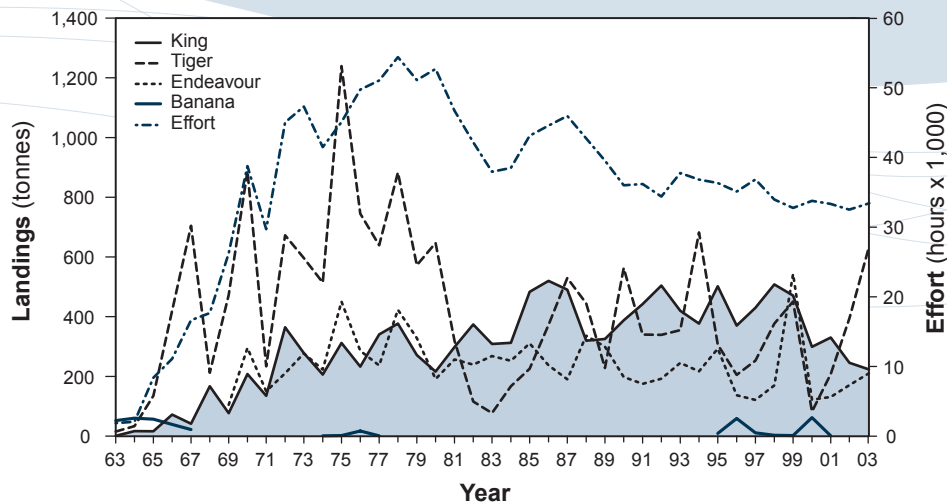
The impacts of cyclones appear to have a significant effect on the productivity of Exmouth Gulf. The recovery of inshore nursery areas of structured seagrass and algal habitats in three years after Cyclone Vance has been shown to be fast compared to other regions of Australia where cyclones occur. Research will continue to monitor seagrass and algal communities in 2004.



EXMOUTH GULF PRAWN FIGURE 1

Boundaries of the Exmouth Gulf Prawn Managed Fishery.

Exmouth Gulf Annual Prawn Catch and Effort



EXMOUTH GULF PRAWN FIGURE 2

Exmouth Gulf Prawn Managed Fishery annual landings and effort, 1963–2003.

Shark Bay Scallop Managed Fishery Status Report

Prepared by E. Sporer and M. Kangas, with management input by M. Holtz

FISHERY DESCRIPTION

The Shark Bay Scallop Managed Fishery is based on the take of southern saucer scallop (*Amusium balloti*), and is usually Western Australia's most valuable scallop fishery. The catch is taken using otter trawl by boats licensed to take only scallops (14 Class A licences) and boats that also fish for prawns in the Shark Bay Prawn Managed Fishery (27 Class B licences).

Catch in this fishery varies widely depending on the strength of recruitment, which is thought to be influenced by the strength of the Leeuwin Current. Most of the catch is marketed to south-east Asia as frozen scallop meat (roe-off).

Governing legislation/fishing authority

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

Consultation process

Joint Trawl Management Advisory Committee
Department–industry meetings

Boundaries

The outer boundaries of the fishery encompass 'the waters of the Indian Ocean and Shark Bay between 23°34' south latitude and 26°30' south latitude and adjacent to Western Australia on the landward side of the 200 m isobath, together with those waters of Shark Bay south of 26°30' south latitude'. Within these general areas, scallop trawling only occurs in waters east of the outer islands of Shark Bay, in depths between 16 m and 40 m. In addition to the outer shelf region, a reef area eastward of the Naturaliste Channel, between the

northern end of Dirk Hartog Island and the southern end of Bernier Island, is also closed to scallop (and prawn) trawling; and no scallop trawling is allowed east of a line extending northward from Cape Peron to the mainland.

The boundaries for Class A boats are the waters of Shark Bay and Denham Sound west of longitude 113°30'36" E and north of a line running due east from the northern extremity of Cape Bellefin to Peron Peninsula (see Shark Bay Prawn Figure 1).

Management arrangements

Management of the fishery is based on input controls which include limited entry, season and area closures, gear controls and crew limits.

Management is aimed at catching scallops at the best size and condition for the market, thereby maximising the economic return, while maintaining breeding stock levels. The scallop stock commences spawning in mid-April (continuing through until the end of November) and meat condition declines as spawning continues. Therefore, the opening date of the season is a compromise between breeding stock levels (measured by a pre-season survey of stock abundance) and the seasonal decline in meat condition associated with spawning.

The 2003 scallop season commenced on 20 May in Denham Sound, which remained open for six days with 12 Class A scallop boats fishing the area. The opening of the extended nursery area for prawns on 21 May meant that 11 Class B scallop boats fished the Denham Sound area for one day only and then left to fish in the ENA. Fishing for scallops on the main Shark Bay scallop grounds commenced on 26 May; however, the Class A boats had ceased fishing after approximately 24 hours. Eleven of the 12 dedicated scallop boats then left Shark Bay to fish for scallops in the Abrolhos Islands and Mid West Trawl Managed Fishery, where the catch rates of scallops were significantly higher during this season. The one remaining Class A scallop boat ceased fishing for scallops by 10 June because of low catch rates and poor