

## Shark Bay Prawn Managed Fishery

### MANAGEMENT OVERVIEW

The Shark Bay Prawn Managed Fishery targets western king prawns (*Penaeus latisulcatus*), brown tiger prawns (*Penaeus esculentus*) and a variety of smaller prawn species including coral prawns (various species) and endeavour prawns (*Metapenaeus* spp.). King prawns are the dominant species caught, comprising about 70% of the catch. Tiger prawns make up most of the remaining 30%. The 27 boats in the fishery also catch between 20% and 30% of the annual scallop catch in Shark Bay.

Most large king and tiger prawns are exported whole or headless to Asia (Japan) and Europe, while the Australian markets take most of the smaller king prawns and coral prawns. The fishery has an annual value of around \$25-30 million, however the value of the catch fluctuates according to catches, the prices of prawns on world markets, and exchange rates.

Management of the Shark Bay Prawn Managed Fishery is based on limited entry, boat size, gear controls, season and area openings and closures, moon phase and daily fishing time controls.

The 1999 fishing season commenced on 10 March and is planned to close on 25 October. The timing of the opening of the season allows the harvest of large residual prawns which were not caught in the previous year's season. Within the main fishing period, various subsidiary openings and closures occur which are aimed at protecting prawns from growth and recruitment over-fishing. In 1999 a number of 'moon closures' have also been introduced, extending from three to five days over the full moon period, aimed at increasing economic efficiency by shifting fishing effort away from the period where catch rates are reduced and a greater proportion of the catch is soft-shelled and therefore less marketable.

Permanent nursery areas of the fishery remain closed to protect tiger prawn breeding stocks and to prevent the fishing of small prawns.

Cooperative management of the fishery is achieved through the Shark Bay Prawn Management Advisory Committee (MAC). This process has been established to achieve maximum economic return from the prawn resource as well as maintaining sustainability of the fishery and ensuring cost-effective management. 1999 saw the appointment of a new Chair to the Shark Bay Prawn MAC.

### COMPLIANCE AND COMMUNITY EDUCATION OVERVIEW

Licence and gear inspections were carried out by Fisheries Officers from Carnarvon and Denham.

Aircraft were again used extensively by officers at Carnarvon. These activities were supplemented by the use of a large patrol vessel from Geraldton which paid particular attention to surveillance of nursery areas and placed officers on board trawlers to inspect catch and gear.

A smaller patrol vessel, the PV *John Brockman*, commissioned in May 1998 and located at Denham, undertook patrols in the southern sector of the fishery, concentrating on the nursery areas in Denham Sound.

The Vessel Monitoring System (VMS) at Carnarvon was again trialled in conjunction with industry throughout April, May and June 1999.

Fisheries Officers provided information on conservation and compliance to operators within the industry during pre-season briefings.

### RESEARCH OVERVIEW

Research activities continued to focus on stock assessment and monitoring the status of the prawn stocks, particularly tiger prawns. All vessels completed detailed research logbooks which, together with pre-season surveys, made up the database for monitoring the fishery.

A new research initiative during 1997/98 was a collaborative project with industry to review the impact of trawling on non-target species and evaluate gear modifications to reduce bycatch and improve product quality.

The following status report summarises the research findings for this fishery.

### Fishery Status Report

#### Main Features

**Stock assessment complete:**

*Yes*

**Exploitation status:**

*King prawns and tiger prawns fully exploited*

**Breeding stock levels:**

*Adequate*

**Previous catch projections for year 1998:**

*Major penaeids 1,155-2,063 tonnes, comprising:*

<i>King prawns</i>	<i>790-1433 tonnes</i>
<i>Tiger prawns</i>	<i>365-784 tonnes</i>
<i>Endeavour prawns</i>	<i>1-13 tonnes</i>

*continued over*

**Catch current season (1998):**

<i>Major penaeids 2,185 tonnes, comprising:</i>	
<i>King prawns</i>	<i>1,614 tonnes</i>
<i>Tiger prawns</i>	<i>538 tonnes</i>
<i>Endeavour prawns</i>	<i>32 tonnes</i>

*\$32.5 million*

*Major penaeids 1,611-2,183 tonnes (based on five-year range)*

*Individual species (based on five-year range):*

<i>King prawns</i>	<i>1059-1614 tonnes</i>
<i>Tiger prawns</i>	<i>538-784 tonnes</i>
<i>Endeavour prawns</i>	<i>3-32 tonnes</i>

*Not applicable*

**Boundaries and Access**

The boundaries of this managed fishery are the waters of the Indian Ocean between latitudes 23°34' S and 26°30' S and adjacent to Western Australia on the landward side of the 200 m isobath (Prawn Figure 1).

Twenty-seven vessels are licensed to engage in prawn trawling in this fishery and all licences were active in 1998. The season opened on 17 March and closed on 3 November.

A recruitment survey within the closed area south of the Carnarvon/Peron Line and Extended Nursery Area (ENA) was used to determine the extent of the ENA to be opened. The entire ENA was opened together with the Carnarvon/Peron Line on 16 April.

Denham Sound was closed to trawling from 1 May and reopened on 1 August when the ENA was closed to protect juvenile recruits.

The Torbay Line opened on 1 August and closed on 3 November.

**Annual Production****Main fishing method**

Otter trawl.

**Landings**

The total landings of major penaeids for the 1998 season were 2,185 tonnes, comprising 1,614 tonnes of king prawns, 538 tonnes of tiger prawns and 32 tonnes of endeavour prawns. There were also 237 tonnes of minor penaeids (coral prawns) landed.

King prawn landings for 1998 were considered exceptional, exceeding the five-year average by 46% (Prawn Figure 2). This may be due to the strength of the Leeuwin Current which was well above average, and/or to continued high levels of effective fishing effort.

Tiger prawn landings were lower than the five-year average by 12%.

Scallop landings by the prawn fleet totalled 75 tonnes meat weight. All Shark Bay Prawn Managed Fishery vessels have Shark Bay Scallop Managed Fishery Class B licences.

**Fishing effort**

Effort recorded in the 1998 daily logbooks for the fleet showed nominal effort as 56,175 hours, which was a reduction of 2,000-3,000 hours when compared to the last four years' effort. Though the effective fishing effort remained high for 1998, the actual number of hours fished was slightly reduced because of the shorter fishing period during 1998 compared to the last four fishing seasons.

**Catch rate**

Catch rates of 28.7 kg/hr for king prawns and 9.6 kg/hr for tiger prawns were recorded for the 1998 season. These represent an increase of 17% and a decrease of 10.3% respectively over the five-year averages for these species.

**Stock Assessment**

The king and tiger prawn stocks are fully exploited. For tiger prawns, this assessment is supported by the position of recent indices of recruitment and spawning stock with respect to the accepted spawning stock–recruitment relationship (SRR). Environmental factors are being incorporated to improve understanding of the SRR for the king prawn stock, and we continue to employ an examination of catch trends to support our evaluations. Indications are that at current effort levels, catches of these two species are likely to remain in the vicinity of 1,100 and 500 tonnes respectively.

**Breeding Stock Levels**

Owing to the multi-species nature of this fishery, levels of exploitation of both king and tiger prawn stocks are being carefully monitored with the aim of achieving maximum sustainable catches simultaneously.

Current stock and recruitment studies indicate that the king prawn stock remains at a point where recruitment is not affected by spawning stock levels. At the current level of exploitation, fluctuation in annual king prawn harvest is likely to result from effort levels and environmental variation, and not from abundance of spawning stock.

In contrast, the recruitment levels of tiger prawns during the 1980s were affected by the spawning stock biomass. Management practices have been employed to increase the survival of these spawning stocks. A reduction in the fleet size from 35 to 27 vessels through the buy-back scheme introduced in 1990, together with the new area closures introduced in that year, appears to have benefited tiger prawn stocks. Tiger prawn catches have returned to the levels achieved in

the 1970s, in the range 400-700 tonnes. Changes in the efficiency of the fishing fleet must be monitored carefully to ensure that tiger prawn spawning stocks are not over-exploited.

**Catch Projection for Year 1999**

Under current effort levels, and based on the five-year range of catches, the projected king prawn catch is 1,059-1,614 tonnes, while the tiger prawn catch range, under normal environmental conditions, will be 538-784 tonnes. The Leeuwin Current index was one of the strongest on record, which would indicate that the catch of king prawns may reach record levels during 1999.

**Product Value for Year 1998**

Wholesale prices for prawns vary depending on the type of product and the market forces operating at any one time. Generally, average prices were as follows:

King prawns	\$14.50/kg
Tiger prawns	\$16.40/kg
Endeavour prawns	\$10.00/kg
Coral prawns	\$3.50/kg

**General Comments**

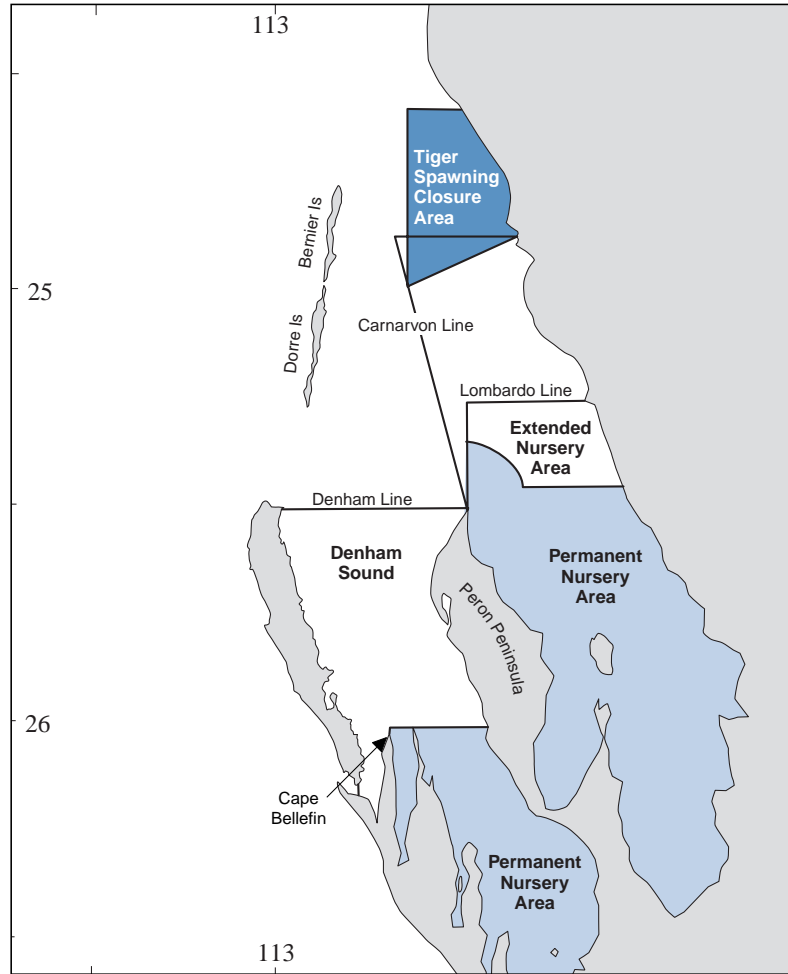
The tiger prawn closure area introduced during the 1996 season was again implemented from 12 July to 8 October (Prawn Figure 1). North of Koks Island (which lies just off the northern tip of Bernier Island), 24-hour fishing was allowed from 17 March until 8.00 a.m. on 11 April to fish for squid.

Two new vessels with increased fishing power replaced two older vessels within the prawn fleet this season. The effective effort in this fishery is increasing, which may affect the more vulnerable tiger prawn stock.

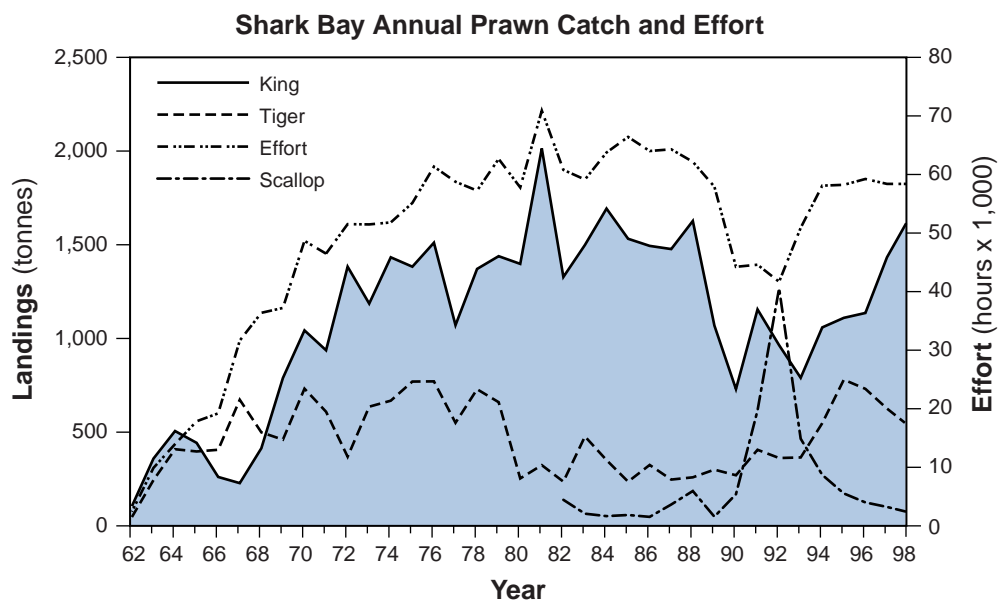
The Fisheries Research Division will continue to investigate the relationship between the strength of the Leeuwin Current (Fremantle sea level) and king prawn catches, as it shows promise of improving catch forecasts.

In collaboration with the fishing industry, and in conjunction with a Natural Heritage Trust-funded project, research has been conducted into reducing bycatch through the use of bycatch reduction grids and other modifications to trawling gear.

Spatial models of this fishery are also under development; these will assist researchers to advise managers and the fishing industry on the likely outcome of management changes on the status of stocks and on the value of the fishery.



**Prawn Figure 1** Boundaries of the Shark Bay Prawn Managed Fishery.



**Prawn Figure 2** Shark Bay Prawn Managed Fishery annual catch and effort, 1962-1998.