

NICKOL BAY PRAWN FIGURE 3

Relationship between banana prawn landings and rainfall between December and March for the years 1966–2002.

Broome Prawn Managed Fishery

Management Summary

The Broome Prawn Managed Fishery targets western king prawns (*Penaeus esculentus*) and coral prawns (a combined category of small penaeid species). The fishery operates in a designated trawl zone off Broome and generally coincides with the seasonal closures for the Commonwealth Northern Prawn Fishery (NPF) and the Kimberley Prawn Managed Fishery.

The 2003 fishing season commenced on 24 May and is scheduled to close on 12 August, taking advantage of the new moon phases in an attempt to maximise catches of king prawns. Management controls also include limited entry and gear restrictions.

Bycatch reduction devices (grids) were fully implemented in the 2003 season, with all vessels operating in the fishery required to install grids in all gear (except try nets).

A draft application has been submitted for the fishery as part of Environment Australia's ecological sustainability reporting process under the *Environment Protection and Biodiversity Conservation Act 1999*. A final application is being developed which will be submitted to EA in 2004.

Governing Legislation/Fishing Authority

Broome Prawn Managed Fishery Management Plan 1999
Broome Prawn Managed Fishery Managed Fishery Licence

Consultation Process

Department–industry meeting

Research Summary

Research data for managing this small seasonal fishery is provided by detailed research logbooks completed by all boats. This data is used for stock assessment and monitoring which is discussed with industry at annual review meetings. A Delury depletion analysis is also completed which assists in the assessment of the king prawn stocks within this region. A comprehensive ESD report has been generated for this fishery which formed the basis for the application to meet the requirements of the Commonwealth's EPBC legislation.

The following status report summarises these research findings.

Broome Prawn Managed Fishery Status Report

Prepared by M. Kangas and E. Sporer

FISHERY DESCRIPTION

Boundaries and access

The boundaries of this fishery are 'all waters of the Indian Ocean off the north-west coast of Western Australia east of 120° east longitude and west of 123°45' east longitude on the landward side of the 200 m isobath'.

Within this schedule, the permitted fishing area is 'all Western Australian waters bounded by a line commencing at the intersection of 17°20' south latitude and 121°50' east longitude; thence east to the intersection of 17°50' south latitude and 121°55' east longitude; thence north-east to the

NORTH COAST BIOREGION

intersection of 17°40' south latitude and 122° east longitude; thence north to the intersection of 17°30' south latitude and 122° east longitude; thence north-west to the intersection of 17°20' south latitude and 122°55' east longitude; thence west to the commencement point'.

The permitted fishing area was opened for the 2002 fishing season on 1 June and closed on 15 August, allowing for a total of 75 nights' fishing, all of which were fished. The longer Northern Prawn Fishery mid-season closure has allowed for a longer fishing period in 2002 compared to earlier years.

Five WA-based NPF (Gulf of Carpentaria) boats are licensed to operate in this fishery.

Main fishing method

Otter trawl.

RETAINED SPECIES

Commercial production (season 2002): 209 tonnes

Landings

The total landings for the 2002 season were 209 t, including 121 t of king prawns and 88 t of coral prawns (Broome Prawn Figure 1). King prawn landings for 2002 were 47% higher than the five-year average (83 t), whereas the catch of coral prawns has been consistent at around 80 t over the last three years, with last year's catch being the highest since 1996 when landings of coral prawns were first recorded.

Fishing effort

Nominal effort recorded in the daily research logbooks for the fleet was 4,022 hours, the highest on record since 1997 (when detailed recording of hours began). The increased effort reflects the additional days allocated for fishing in 2002 over the appropriate moon phases, and the fact that catch rates were maintained over the extended fishing period.

Catch rate

Average catch rates of 30.2 kg/hr for king prawns and 21.9 kg/hr for coral prawns were recorded. The catch rate for king prawns remained relatively stable for the duration of the fishery, declining from an average of 34 kg/hr in June to 25 kg/hr in August, and was higher than in the previous three seasons. In 2002 the season incorporated three new moon periods, providing optimal conditions for fishing.

Recreational component: Nil

Stock assessment complete: Yes

A Delury depletion analysis incorporating lunar effects was carried out on the 2002 logbook data to quantify the standing stock of king prawns in the Broome fishery. From this analysis, a standing stock of approximately 320 t was estimated. This indicates that for the 2002 season approximately 40% of the stock was taken by fishing, utilising the 4,022 hours of fishing recorded in this fishery. The approach of using a depletion analysis has potential to examine variation in recruitment strength from year to year because the standing

stock estimate for each year will reflect this. When sufficient years of data have been assembled, it will be possible to relate the proportion of the king prawn stock not fished at the end of each fishing season (a measure of residual spawning stock) and the recruitment of king prawns in the subsequent year.

The depletion method applied has provided a good insight into stock levels. It has the advantage of being a very direct assessment method, with the potential to carefully control exploitation rates. It is intended to continue its use as the primary assessment method for this fishery.

Stock assessment is not undertaken for the coral prawn stock, as the small size of these species relative to the trawl mesh size ensures a low exploitation rate is maintained.

Exploitation status: Under-exploited

Breeding stock levels: Adequate

Depletion analysis indicated that approximately 60% of the king prawn stock was left when fishing ceased in the 2002 season. This stock would contribute to the spawning stock for 2003 and some females would have spawned prior to capture. These data indicate that the king prawn stock is being maintained well above the level of 20% of virgin biomass generally considered to be sufficient to sustain this type of prawn stock.

NON-RETAINED SPECIES

Bycatch species impact: Low

Owing to the short duration of this fishery and the small number of boats involved, the impact on bycatch species is considered to be minimal. In 2002, 54% of the gazetted fishing area was fished which represents less than 1% of the total Broome Prawn Managed Fishery area. The introduction of fish escapement devices within the nets by 2004/05 should reduce this risk even further.

Protected species interaction: Negligible

The fishery operates in relatively deep water, and this fact, combined with the short season, restricted trawl area and small number of boats involved, means that interaction with protected species is minimal. The introduction of bycatch reduction devices (grids) in the fishery during 2002 should eliminate the capture of large animals including turtles.

ECOSYSTEM EFFECTS

Food chain effects: Low

The short duration and limited spatial coverage of this fishery, combined with the small number of boats involved, results in a relatively small amount of biomass being taken by this fishery. Consequently the impacts on the food chain will be small to insignificant.

Habitat effects: Negligible

The fishery targets non-schooling king prawns with a secondary catch of coral prawns (common name due to colour, not habitat association) in relatively deep water. The

fishery is permitted to operate only in a discrete area offshore, north-west of Roebuck Bay (which is the nursery area for this king prawn stock). The defined trawling area was surveyed by Fisheries Research Division and industry divers prior to establishment of the management plan to ensure minimal impact on the adjacent pearl fishery habitat. The sea floor in the trawl area was mud or sand, which is unlikely to be adversely impacted by trawling.

SOCIAL EFFECTS

The estimated employment generated by the fishery for the year 2002 was 20 skippers and crew over the three-month season. The vessels operate for the remainder of the year in the prawn fisheries further north.

ECONOMIC EFFECTS

Estimated annual value (to fishers) for year 2002:
\$1.9 million

Ex-vessel prices for prawns vary depending on the type of product and the market forces operating at any one time. Generally, average prices received by boats fishing off Broome for 2002 were as follows:

King prawns	\$13.85/kg
Coral prawns	\$3.00/kg

FISHERY GOVERNANCE

Acceptable catch range: 55–260 tonnes

Under current effort levels and previous environmental conditions, the acceptable ranges of prawn catches are as follows:

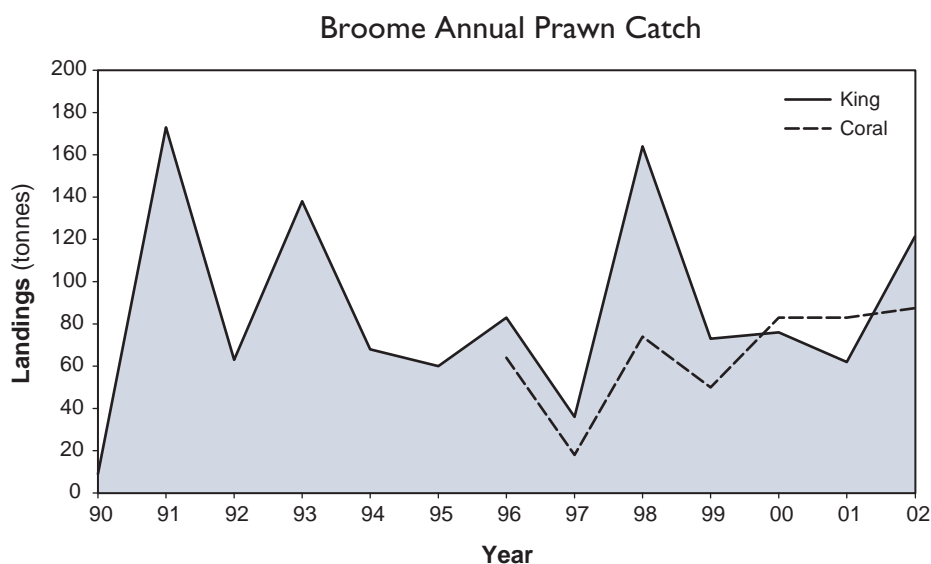
King prawns	35–170 t
Coral prawns	20–90 t

For king prawns the acceptable range is based on the catches of the 1990s, while for coral prawns it is based on the seven-year range since catches were first recorded. Therefore, the 121 t of king prawns taken in 2002 is in the middle of the acceptable range for this species. The catch of 88 t of coral prawns is at the upper levels of their range.

EXTERNAL FACTORS

Catches of king prawns in the Broome Prawn Managed Fishery have fluctuated between 36 t and 173 t since 1991. Before that time this fishing area was used on a casual basis by boats transiting to the Northern Prawn Fishery in the Gulf of Carpentaria. The success of this fishery depends on how the limited fishing season coincides with the king prawn recruitment and catchability, which is strongly influenced by the lunar period. Historically, the timing of this fishery has been set to coincide with the NPF mid-season closure rather than the appropriate lunar periods. Consequently, the timing of the fishing period has not always been optimal for maximising the catch from the king prawn stock. This was most evident in 2001 when a low exploitation rate occurred.

This fishery is valuable, despite its short season, because it allows up to nine weeks of fishing by five boats in a way that complements their fishing activity in the NPF, and in other fisheries in Western Australia.



BROOME PRAWN FIGURE 1

Annual landings for the Broome Prawn Managed Fishery, 1990–2002.