



**Australian Government**

---

**Department of the Environment and Heritage**

Assessment of the  
**Onslow and Nickol Bay Prawn Managed Fisheries**

November 2004

© Commonwealth of Australia 2004

This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from the Commonwealth, available from the Department of the Environment and Heritage. Requests and inquiries concerning reproduction and rights should be addressed to:

Assistant Secretary  
Wildlife Trade and Sustainable Fisheries Branch  
Department of the Environment and Heritage  
GPO Box 787  
Canberra ACT 2601

ISBN: 0 642 55088 3

### **Disclaimer**

This document is an assessment carried out by the Department of the Environment and Heritage of a commercial fishery against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. It forms part of the advice provided to the Minister for the Environment and Heritage on the fishery in relation to decisions under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999*. The views expressed do not necessarily reflect those of the Minister for the Environment and Heritage or the Australian Government.

While reasonable efforts have been made to ensure that the contents of this report are factually correct, the Australian Government does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this report. You should not rely solely on the information presented in the report when making a commercial or other decision.

# Assessment of the ecological sustainability of management arrangements for the Onslow and Nickol Bay Prawn Managed Fisheries

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>4</b>
Background.....	4
Overall assessment.....	6
Recommendations .....	8
<b>PART I - MANAGEMENT ARRANGEMENTS .....</b>	<b>9</b>
Conclusion.....	12
<b>PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES. 13</b>	
STOCK STATUS AND RECOVERY .....	13
<i>Maintain ecologically viable stocks.....</i>	<i>13</i>
Information requirements .....	13
Assessment .....	14
Management response .....	15
Conclusion .....	16
<i>Promote recovery to ecologically viable stock levels .....</i>	<i>17</i>
ECOSYSTEM IMPACTS .....	17
<i>Bycatch protection.....</i>	<i>17</i>
Information requirements .....	17
Assessment .....	18
Management response .....	18
Conclusion .....	19
<i>Protected species and threatened ecological community protection .....</i>	<i>19</i>
Information requirements .....	19
Assessment .....	20
Management response .....	20
Conclusion .....	21
<i>Minimising ecological impacts of fishing operations .....</i>	<i>21</i>
Information requirements .....	21
Assessment .....	21
Management response .....	22
Conclusion.....	23
<b>REFERENCES .....</b>	<b>24</b>
<b>LIST OF ACRONYMS.....</b>	<b>24</b>

## EXECUTIVE SUMMARY

### Background

The Department of Fisheries Western Australia (DFWA) has submitted a document for assessment under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The draft document *Application to Australian Government Department of the Environment and Heritage on the Onslow and Nickol Bay Prawn Managed Fisheries* (the submission) was received by the Department of the Environment and Heritage (DEH) in October 2003. The submission was released for a thirty-day public comment period that expired on 12 December 2003. No public comments were received. A final submission for assessment was received in September 2004.

The submission reports on the Onslow Prawn Managed Fishery (OPMF) and the Nickol Bay Prawn Managed Fishery (NBPMF) against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The DEH assessment considers the submission and associated documents.

**Table 1: Summary of the Onslow and Nickol Bay Prawn Managed Fisheries**

<b>Area</b>	Specified Indian Ocean waters adjacent to the State of Western Australia (Commonwealth and State waters).
<b>Fishery status</b>	OPMF is fully exploited. NBPMF is fully exploited.
<b>Target Species</b>	Western king prawns ( <i>Penaeus latisulcatus</i> ), brown tiger prawns ( <i>Penaeus esculentus</i> ), endeavour prawns ( <i>Metapenaeus endeavouri</i> ) and banana prawns ( <i>Penaeus merguensis</i> ).
<b>Byproduct Species</b>	Not limited, includes black tiger and coral prawns, bugs, blue swimmer crabs, finfish and scallops.
<b>Gear</b>	Otter trawl, configuration varies between areas.
<b>Season</b>	OPMF: Varies between areas, generally from March to November. NBPMF: Year round, designated nursery areas open in May and close between August and November.
<b>Commercial harvest</b>	Variable – 12 year catch history is 60 – 130 t for OPMF and 22 – 500 t for NBPMF.
<b>Value of commercial harvest (5 year annual average)</b>	OPMF: \$1.3 million. NBPMF: \$2.9 million.
<b>Commercial licences issued</b>	31 in OPMF and 14 in NBPMF.
<b>Management arrangements</b>	Input controlled through: <ul style="list-style-type: none"> <li>• limited entry;</li> <li>• seasonal and area closures; and</li> <li>• gear and boat restrictions.</li> </ul>
<b>Export</b>	Up to 80% of product exported to Asia.
<b>Bycatch</b>	Various, includes invertebrate and fish species.
<b>Interaction with Threatened Species</b>	Capture of seasnakes, syngnathids and turtles. Also potential interactions with dugong.

The OPMF includes Western Australia waters of the Indian Ocean between approximately 114°46' and 116°45' on the landward side of the 200 metre isobath. The fishery is further broken down into

three fishery areas, referred to as Areas 1, 2 and 3. A detailed description of the fishery's areas is provided in the *Onslow Prawn Fishery Management Plan 1991*. The NBPMF includes all waters of the Indian Ocean and Nickol Bay between 116°45' and 120° on the landward side of the 200 metre isobath.

Part of the area of both fisheries is in Commonwealth waters, however, both fisheries are wholly managed by Western Australia under an Offshore Constitutional Settlement (OCS) agreement between the Australian Government and the Government of Western Australia.

The OPMF and NBPMF target western king prawns (*Penaeus latisulcatus*), banana prawns (*P. merguensis*), and to a lesser extent, brown tiger prawns (*P. esculentus*) and endeavour prawns (*Metapenaeus endeavouri*). There is no limit to the quantity or species that may be taken as byproduct in the OPMF or NBPMF. Byproduct species taken in the fisheries include black tiger prawns, coral prawns, bugs, blue swimmer crabs, a number of finfish species and various invertebrates including scallops.

All of the target species are harvested by several other trawl fisheries throughout their Australian range. Western king prawns have been found from waters off South Australia around the coast to Western Australia, Northern Territory, Queensland and as far south as northern New South Wales (Kailola *et al.* 1993). Genetic differences have been identified between western king prawn populations in Western Australia, the Gulf of Carpentaria and South Australia (Richardson, 1982). Western king prawns can live for up to 4 years, although animals greater than 2 years are rarely caught under current fishing practices. Western king prawns mature at 6 to 7 months of age at an approximate size of 25 mm carapace length. This species can spawn numerous times throughout the year, producing approximately 100,000 to 700,000 eggs per spawning. Successful recruitment of juvenile western king prawns is correlated with settlement onto suitable habitat, which includes shallow sand or mud flats.

Banana prawns are distributed across northern Australia from Shark Bay in Western Australia to the Tweed River in northern New South Wales. The banana prawn generally inhabits shallow, estuarine and intertidal areas to depths of 45 metres. They live in turbid waters, inhabiting sheltered mangrove creeks as juveniles, and medium to low energy coastlines as adults. Banana prawns are known to aggregate in high numbers forming a 'boil' on the surface. This behaviour makes them highly susceptible to exploitation. Banana prawns only live for 12 to 18 months, becoming sexually mature at 7 to 8 months. Banana prawn recruitment is positively correlated with rainfall, therefore the highest banana prawn catches are often associated with high rainfall during the preceding summer.

Brown tiger prawns are distributed along the northern coast of Australia, from Western Australia to southern Queensland. While no genetic differences have been detected between brown tiger prawns in different regions (Mulley and Latter, 1981), it is thought they operate as functionally independent stocks. Each brown tiger prawn stock is associated with relatively sheltered waters where there are substantial amounts of seagrass, which is the main juvenile habitat for this species.

Endeavour prawns are distributed from Shark Bay in Western Australia, across northern Australia to New South Wales, with a high degree of genetic isolation between populations. Adult endeavour prawns live primarily over sand and mud substrates and are generally found in coastal waters to 50 metres depth, inshore of the main fishing grounds for brown tiger and western king prawns. As with brown tiger prawns, juvenile endeavour prawns are usually associated with seagrass habitats in shallow estuaries.

The five-year averages for the economic value of OPMF and NBPMF are \$1.3 million and \$2.9 million respectively. The value of each fishery varies annually, in line with large fluctuations in the landed catch. On average, approximately 70 to 80% of the product from these two fisheries is exported to Asian countries.

The type of gear used varies across areas in the OPMF and NBPMF. In Area 1 of the OPMF, fishers are permitted to use twin demersal otter trawl gear, comprising two 10.98 metre trawl nets. Two types of nets are used, flat nets when the target species are western king prawns and brown tiger prawns, and banana nets when targeting banana prawns. In Areas 2 and 3 of the OPMF, and in the NBPMF, the only limitation on the gear used is an overall headrope length of 29.27 metres. Consequently, multiple configurations of otter trawl are used, including quad rigs. Trawl shots in the OPMF and NBPMF average between 90 and 180 minutes, depending on the species being targeted. Shots can be as short as 30 minutes when targeting banana prawn aggregations. The depth of trawling is also dependent on the species being targeted. Banana prawns are generally caught in water depths between three and six metres around river mouths. Most of the other target prawn species are captured at depths ranging from eight to 15 metres.

Fishery management arrangements for the OPMF and NBPMF include limited entry, seasonal and area closures, gear controls and restrictions on boat size. In addition, both vessel monitoring systems (VMS) and bycatch reduction devices (BRDs) became mandatory throughout the fleet in 2003, while fish exclusion devices (FEDs) are currently being trialled for introduction in 2004-05.

Direct information on bycatch in the OPMF and NBPMF is limited. Some information has been derived from voluntary logbooks in these fisheries, however there is limited participation in this initiative. Therefore, analyses of bycatch primarily rely on data collected in other prawn fisheries including the Shark Bay Prawn Managed Fishery and Exmouth Gulf Prawn Managed Fishery.

Some species that may be affected by these fisheries are currently listed protected species under the EPBC Act. Possible protected species interactions in these fisheries include the capture of marine turtles, seasnakes and syngnathids. These fisheries may also interact with dugong. These interactions are assessed under Principle Two of this report.

Take of the target species in the OPMF and NBPMF by the recreational and indigenous sectors is not significant. Several of the target prawn species are taken in other commercial fisheries, either as target or byproduct species. The extent to which DFWA takes into account removals of target species by other sectors and fisheries is discussed in Part One of this report.

The OPMF is managed under the *Onslow Prawn Fishery Management Plan 1991*. The NBPMF is managed under the *Nickol Bay Prawn Fishery Management Plan 1991*. The management plans for both fisheries are formal statutory documents that are sub-ordinate legislation to the *Fish Resources Management Act 1994*.

## **Overall assessment**

The material submitted by DFWA indicates that the OPMF and NBPMF operate in accordance with the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. DEH considers that the OPMF and NBPMF are well managed fisheries that are unlikely to have an unacceptable or unsustainable impact on the environment in the short to mid term.

Recommendations have been developed to ensure that the risk of impact is minimised in the longer term. Management measures include limited entry, spatial and seasonal closures and gear and boat restrictions. DEH welcomes DFWA's commitments to introduce an observer program to verify bycatch quantity and composition over the next 5 years, review the performance measures for the

target species by the end of 2005 and investigate a more rigorous method for determining acceptable catch ranges in the future. DFWA has also indicated it will implement a mechanism to validate commercial data within 2 years. In addition, the fisheries are active over a relatively small area of the licensed fishing grounds. Overall, the management regime, along with the commitments made, suggest that the fisheries are being managed in an ecologically sustainable way.

In making its assessment, DEH considers that the management arrangements are sufficient to ensure that the fisheries are conducted in a manner that does not lead to over-fishing and that stocks are not currently overfished. Considering the management arrangements in place, and the relatively small area of each fishery actively fished, DEH considers that fishing operations are managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.

The assessment finds that the fisheries are managed in an ecologically sustainable way and their operation is consistent with the objects of Part 13A of the EPBC Act. DEH recommends that the export of species taken in the fisheries should be exempt from the export requirements of Part 13A of the EPBC Act, with that exemption to be reviewed in 5 years. DEH considers that the fisheries, as managed in accordance with the management plans, are not likely to cause serious or irreversible ecological damage over this period.

As the official fishery areas encompass Commonwealth as well as State waters, consideration under Part 13 of the EPBC Act is required regarding the impact of the fisheries on listed threatened species, listed migratory species, cetaceans and listed marine species.

Protected species occurring in the fishery areas include marine turtles, syngnathids, seasnakes, cetaceans and dugongs. While logbook reports have indicated that marine turtles, seasnakes and syngnathids are occasionally caught by the fisheries, the actual and potential impacts on Part 13 species under the management arrangements is considered low and adequate protection is provided. There are no listed threatened ecological communities in the fishery areas.

DEH recommends that the *Onslow Prawn Fishery Management Plan 1991* and the *Nickol Bay Prawn Fishery Management Plan 1991* be declared accredited management plans under Sections 208A, 222A, 245 and 265 of the EPBC Act. In making this judgement, DEH considers that the fisheries to which the plans relate do not, or are not likely to, adversely affect the survival in nature of a listed threatened species or population of that species, or the conservation status of a listed migratory species, cetacean species or listed marine species or a population of any of those species. DEH also considers that the management plans require that all reasonable steps are taken to avoid the killing or injuring of protected species, and the level of interaction under current fishing operations is low. On this basis, DEH considers that an action taken by an individual fisher, acting in accordance with the *Onslow Prawn Fishery Management Plan 1991* or the *Nickol Bay Prawn Fishery Management Plan 1991*, would not be expected to have a significant impact on a listed threatened species or listed migratory species protected by the EPBC Act.

To further strengthen the effectiveness of the management arrangements for the OPMF and NBPMF, and to contain the environmental risks in the medium to long term, DEH has developed a series of recommendations. The implementation of these and other commitments made by DFWA in the submission will be monitored and reviewed as part of the next DEH review of the fisheries in 5 years time.

## Recommendations

1. DFWA to advise DEH of any material change to the OPMF or NBPMF legislated management plans and/or arrangements that could affect the criteria on which EPBC decisions are based, within three months of that change being made.
2. The ESD Report, including all performance measures, responses and information requirements to be incorporated into the management regime and decision making process.
3. DFWA to ensure, where appropriate, that any relevant indigenous, conservation and recreational interests in the fisheries are considered through consultative mechanisms.
4. DFWA, in its Annual State of the Fisheries Report, to report on the performance of the fisheries against performance measures that relate to the sustainability of the fisheries.
5. DFWA to develop and implement a robust system to validate commercial logbook reporting of catch and effort for all target and byproduct species.
6. DFWA to incorporate into the management regime, an objective to minimise protected/listed species interactions, to minimise or maintain at sustainable levels the take of other non-retained species and to minimise impacts on the marine environment.
7. DFWA to provide a mechanism, which allows fishers to record interactions with protected/listed species. DFWA to implement an education program to ensure that industry has the capacity to make these reports at an appropriate level of accuracy.
8. DFWA to review the specifications of the BRD grids used in the OPMF and NBPMF to ensure they are effective at reducing the incidental catch of turtles and other large bycatch species likely to be encountered in the fisheries.
9. DFWA to, in collaboration with licence holders, develop and implement a spatial management system within the OPMF and NBPMF that takes account of the impacts of fishing on:
  - Important nursery areas for target species;
  - Important feeding/spawning/breeding/refuge grounds for key byproduct and protected species; and
  - Benthic habitats present in the fishery area.

## PART I - MANAGEMENT ARRANGEMENTS

The Onslow Prawn Managed Fishery (OPMF) and the Nickol Bay Prawn Managed Fishery (NBPMF) are managed by the Department of Fisheries Western Australia (DFWA).

The management regimes are described in the following documents, all of which are, or will be publicly available:

- *Onslow Prawn Fishery Management Plan 1991*;
- *Nickol Bay Prawn Fishery Management Plan 1991*;
- *Fish Resources Management Act 1994* (FRMA);
- *Fisheries Resources Management Regulations 1995*; and
- Relevant Gazetted notices and licence conditions.

A number of other documents, including the Ecologically Sustainable Development (ESD) Report for the OPMF and NBPMF (a draft of which is included in the submission), research reports, scientific literature and discussion papers, are relevant to the management of the fisheries.

Further information on the fisheries and their performance can be found in the following reports:

- The State of the Fisheries Report (annual);
- The Annual report to the Auditor General; and
- Other irregular reports, including the submission to the Department of the Environment and Heritage (DEH).

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Due to the importance of the management plans and documents referred to above to DEH's assessment of the fishery, an amendment could change the outcomes of the assessment and decisions stemming from it. Decisions resulting from this assessment relate to the arrangements in force at the time of the decision. In order to ensure that these decisions remain valid, DEH needs to be advised of any changes that are made to the management regime and make an assessment that the new arrangements are equivalent or better, in terms of ecological sustainability, than those in place at the time of the original decision.

**Recommendation 1:** *DFWA to advise DEH of any material change to the OPMF or NBPMF legislated management plans and/or arrangements that could affect the criteria on which EPBC decisions are based, within three months of that change being made.*

The ESD Report, on which the submission is largely based, is an integral part of the management regime. It examines benefits and costs associated with the fisheries. It also identifies and assesses risks posed to the fishery and environmental components. The ESD Report documents the performance of the fishery and its management in terms of the ecological, economic, social and governance issues associated with the fisheries. Once finalised, this report will be publicly available in document form and on the DFWA website. The management commitments specified in this report have been fundamental in DEH's assessment and consequent recommendations. The ESD report is not currently a formal component of the legislative arrangements. Although DEH is satisfied that this lack of a legislative base will not cause issues in the fisheries in the short term, we recommend that the report be formally incorporated into the management regime and decision making process.

DFWA has advised that it proposes to formally publish the management objectives and performance measures for the fisheries as part of a series of Ministerial guidelines, as an adjunct to the management plans. The Ministerial Policy Guidelines will provide the policy framework for the management of each fishery. This document will reflect the management objectives, philosophy

and guidance for decision making, including the legislated management plan, the ESD report, and as relevant, reference to other documents.

**Recommendation 2:** *The ESD Report, including all performance measures, responses and information requirements to be incorporated into the management regime and decision making process.*

The current management arrangements for the OPMF and NBPMF were developed through formal consultation with industry. The FRMA requires that the Fisheries Minister must gazette a notice of intention to determine a management plan and invite interested persons to comment. When amending a management plan, the FRMA requires consultation with persons nominated in the management plan. In the case of the OPMF and NBPMF, consultation regarding management plan amendment is only required with licence holders. DFWA also arranges annual meetings with industry members regarding both fisheries, to review data from the past season's harvest and discuss management arrangements.

While workshops involving all major stakeholders (industry, conservation, research, government) were held for the Shark Bay Prawn and Exmouth Gulf Prawn Managed Fisheries during the development of their ESD reports, no such workshop was held for either the OPMF or NBPMF. Thus, there has been little consultation with stakeholder groups, other than industry, on the management arrangements of the fisheries. DEH considers that this is not conducive to broader stakeholder participation or transparency in management decision making. DEH recommends that the interests of all relevant stakeholders should be taken into account when reviewing the management arrangements for the OPMF and NBPMF.

**Recommendation 3:** *DFWA to ensure, where appropriate, that any relevant indigenous, conservation and recreational interests in the fisheries are considered through consultative mechanisms.*

The fisheries are managed according to the regime described in the *Onslow Prawn Fishery Management Plan 1991* and *Nickol Bay Prawn Fishery Management Plan 1991*. Objectives, performance indicators, performance measures and management actions related to target and byproduct species are specified in the ESD Report for the fisheries. An assessment of the effectiveness of these measures is included in Part Two of this report. The ESD Report does not include an objective related to bycatch, protected species or the ecosystem. This issue is further discussed in Part Two of this report.

DEH suggests that performance indicators and measures should be capable of detecting and responding to changes in the fishery. This would require ongoing monitoring of the fishery against such performance measures and a clear process for responding to breaches of performance measures. DFWA has advised that if there is a breach in a performance measure, this will be reported in the State of the Fisheries Report. If a breach materially affects the sustainability of a target species, or negatively impacts on byproduct, bycatch, protected species or the ecosystem, the breach will be reported to the Minister for Fisheries within three months for subsequent management review and action with timeframes for implementation.

Management of the fisheries is based on a system of input controls including:

- Limited entry, with 31 licences in the OPMF and 14 licences in the NBPMF;
- Various seasonal and spatial closures, including several designated nursery areas in both fisheries; and
- Gear and boat restrictions.

Compliance and enforcement tools utilised in the fisheries include vessel monitoring systems (VMS), which were introduced in 2003, and random at sea, port and processor inspections. From 2000 to 2002, no offences were detected for either fishery. No data were available at the time of writing the submission on the level of compliance since the introduction of VMS, but DEH expects that the introduction of VMS should further improve compliance with the management arrangements. Due to the relatively small number of operators, and their involvement in managerial decisions, it is likely that licence holders feel an ownership of the management arrangements and are likely to comply with them. DEH is satisfied that these compliance measures contain the means of enforcing critical aspects of the management arrangements for the fisheries.

The annual State of the Fisheries Report reviews the major aspects of the OPMF and NBPMF, including a summary of the stock assessments undertaken, catch and effort data and, for the NBPMF, a projected banana prawn catch for the next season. The State of the Fisheries Report also provides a brief risk rating for bycatch species impact, protected species interactions and ecosystem effects. In addition, the ESD Report will be reviewed every five years. DEH is satisfied that a five year review of the entire OPMF and NBPMF, together with annual reviews of the major aspects of the fisheries, represent an appropriate level of periodic review for the OPMF and NBPMF. To ensure transparency and public accountability in fisheries management, DEH recommends that the State of the Fisheries Report should also report against performance measures that relate to the sustainability of the fisheries.

**Recommendation 4:** *DFWA, in its Annual State of the Fisheries Report, to report on the performance of the fisheries against performance measures that relate to the sustainability of the fisheries.*

Fishery dependent data relating to the target species are collected on a regular basis in both fisheries. Licence holders submit compulsory monthly commercial logbooks, providing data on catch and effort. A voluntary daily reporting system also exists, however, DFWA acknowledges that few of the licence holders participate. Discussion of the information collection systems can be found in Part Two of this report.

The nature of trawl fishing means that species other than those targeted by the fishery are captured, often in significant quantities. Bycatch assessment and management and an analysis of each fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates is contained under Principle Two of this report.

Species targeted by the OPMF or NBPMF are functionally independent stocks, therefore, there are no specific cross jurisdictional issues to consider. A number of the byproduct species taken by the fisheries are harvested by other fisheries and DFWA participates in the Northern Australian Fisheries Management Workshop (NAFMW), which includes State, Territory and Commonwealth Fishery managers, researchers, and compliance staff, as well as representatives from Indonesia and East Timor. The NAFMW provides the opportunity to discuss issues or concerns with jointly harvested stocks.

DEH considers that the current management arrangements comply with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under that policy. DEH expects that DFWA will also ensure compliance with any future plans or policies as they are developed.

No regional or international management regimes, to which Australia is a party, are of direct relevance to the fishery. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea (UNCLOS). The management regime essentially complies with this. Other international regimes are applicable to fisheries management but do not explicitly involve this fishery, for example the 1992 Convention on Biological Diversity and in particular the 1995 Jakarta Mandate requiring that, in relation to the sustainable use of marine and coastal biological diversity, the precautionary principle should apply in efforts to address threats to biodiversity. While these agreements are not specifically addressed in the submission, both fishery's compliance with their requirements can be assessed by examination of Part Two of this report. The application of the International Convention for the Prevention of Pollution from Ships (MARPOL) to vessels operating in the fisheries is explicitly discussed under Principle 2, Objective 3.

DEH considers it is incumbent on all authorities to develop a thorough understanding of the framework of national, regional and international agreements and their applicability to export-based fisheries for which they are responsible.

### **Conclusion**

DEH considers that the OPMF and NBPMF management regimes are documented, publicly available and transparent. The management arrangements are adaptable and the ESD Report specifies a number of objectives and performance criteria by which the effectiveness of the management arrangements can be measured and reviewed.

The management arrangements are capable of controlling the harvest through a number of input controls appropriate to the size of the fishery. Periodic review of the fishery is provided for, as are the means of enforcing critical aspects of the management arrangements.

The management regimes take into account arrangements in other jurisdictions, and adhere to arrangements established under Australian laws and international agreements.

DEH considers that there is scope to further refine the management arrangements and has provided a number of recommendations for improvements in the longer term.

## **PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES**

### **Stock Status and Recovery**

Principle 1: *‘A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover’*

### **Maintain ecologically viable stocks**

Objective 1: *‘The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability’*

### **Information requirements**

Fishery dependent data are collected through compulsory monthly logbooks, which include mandatory reporting of the total catch of all target and byproduct species landed and the number of days fished. Monthly logbook data have been collected since the 1980s. Some fishery dependent data are also collected through voluntary daily logbooks, which provide finer scale detail on catch, effort and areas of operation, however, DFWA acknowledges that this data is limited, as few licence holders submit daily logbook returns. No fishery independent data for either fishery are collected.

The submission provides no information on how commercial logbook data are validated. Validation of spatial and temporal effort of the fleet is now possible using VMS data. Logbook data on the quantity of prawns landed could also be validated during random port and processor inspections, however, it appears that few port and processor inspections are undertaken as the focus in recent years has been on gear inspections, licence checks and surveillance of fishing operations. DEH notes that processor records and VMS data are used to validate logbook data in the Exmouth Gulf and Shark Bay prawn fisheries.

Given the lack of any fishery independent data, robust validation of logbook data is essential. DFWA has indicated that it intends to introduce a system to validate commercial fishery data with processor data in the OPMF and NBPMF within two years. DEH welcomes this commitment and recommends that DFWA develop and implement a robust system to validate commercial logbook reporting of catch and effort for target and byproduct species.

**Recommendation 5:** *DFWA to develop and implement a robust system to validate commercial logbook reporting of catch and effort for all target and byproduct species.*

The submission indicates that no specific research has been conducted in either the OPMF or NBPMF. The ESD Report does not specify any research which could be undertaken to strengthen the assessment of the landed species. The ESD report does highlight that many prawn species taken in these fisheries can be either positively or negatively affected by environmental conditions, the relationship being species dependent. These relationships are used in the management of the fishery, for example the acceptable catch range (ACR) of banana prawns is dependent on rainfall. Therefore DEH encourages DFWA to further develop and improve understanding of these relationships.

The assessment of the performance of the management regimes of the OPMF and NBPMF is completely reliant on fishery dependant data. Given that these data are not validated, DEH is concerned about the reliability of the information collection system in place in each of the fisheries.

Continuation and expansion of existing data collection systems, combined with robust validation of commercial logbook data, will be important for the future management of these fisheries.

## Assessment

The status of breeding stocks and the intra-annual variation for all the major prawn species harvested by the fisheries are assessed and evaluated annually by DFWA. The performance of each fishery is assessed at least once every year and includes a review of the catch, effort, catch rates and distribution of effort. These assessments are undertaken with industry input, and the results are reported in the annual *State of the Fisheries* report. DEH is concerned about the robustness and lack of broad stakeholder participation in these assessments and has made a recommendation in Part One of this report regarding this matter (see **Recommendation 3**).

The ESD report includes performance measures for all primary species. The performance limit for each species is generally an ACR. For most species, the ACR has been developed entirely on the basis of the past 10 years catch history. DEH is concerned that these performance measures may not be sufficiently precautionary as the range has been set at the outside extremities of historical landings. A more precautionary approach would be to set the range within the known range of past landings. While this may cause some “false alarms”, real problems would be identified. DEH is also concerned that these performance measures may not be sensitive to trends (positive or negative) in landings. DFWA has committed to reviewing the performance measures for the target species by the end of 2005 and will investigate using a more rigorous method (for example, an autoregressive moving average method) for determining ACRs in the future. DEH welcomes this commitment.

Catches of banana prawns are highly variable and correlated to rainfall. In the NBPMF, a rainfall-commercial catch relationship has been developed for banana prawns, which illustrates that banana prawn catch increases with increasing rainfall. Two ACRs for banana prawns operate in the NBPMF, for high and low rainfall years. In the OPMF, the catches of banana prawns have been within the performance measure since 1994. In the NBPMF, the catch of banana prawns exceeded the ACR in 2000 and was below the ACR in 2001. In 2002 the catch returned to within the ACR.

Brown tiger prawn abundance has been shown to decrease in years with high cyclonic activity. Catches of brown tiger prawns in the NBPMF have been within the performance limit since 1990. Catches of brown tiger prawns in the OPMF have been within the ACR since 1995, however, historical data indicates that the ACR was exceeded regularly between 1990 and 1994.

Catches of western king prawns in the OPMF have been within the ACR since 1990. In the NBPMF there was a low catch of 8 tonnes in 2001 that breached the performance limit. This breach was attributed to a 60% decrease in effort levels.

Catches of endeavour prawns have been within the ACR for both the OPMF and NBPMF between 1990 and 2001.

The ESD Report identified black tiger prawns as the only byproduct species being of sufficient risk to require specific ongoing monitoring. An acceptable catch range of 0 – 2 tonnes in each fishery has been identified for this species and catches are monitored through logbooks. Landings of black tiger prawn have been within the performance limit for both fisheries since 1992.

Coral prawns have traditionally been the major byproduct group harvested by the OPMF and NBPMF. While coral prawns are not actively targeted, DFWA acknowledges that if the market were to improve, this species may be more highly sought. Performance measures, by means of an

ACR, have been developed for each byproduct group for each fishery. DEH notes that these ACRs are somewhat limited as they are based on the 10 year catch history and contain no catch rate or biological data. Despite this, DEH is supportive of the efforts by DFWA to have performance measures outlined in the ESD report for byproduct species. Of particular relevance to the NBPMF was the unusually high catch of 900 tonnes of squid in the 2004 season. Given that the performance measure for invertebrates (squid, cuttlefish and octopus) outlined in the ESD report triggers if greater than 2 tonnes is landed, DEH expects that DFWA will review the risk assessment that was undertaken for squid and introduce management measures as appropriate.

The species targeted by these fisheries are also harvested by several other Australian fisheries and the distribution and spatial structure of the stocks are well understood. All of the target species have a broad distribution across the northern part of Australia, however due to the specific habitat requirements of their juveniles, they each have a number of separate locations where they occur in commercial quantities. The submission states that the stocks of all the target species harvested by the OPMF and NBPMF are functionally separate to other stocks of the same species harvested by other Western Australia prawn fisheries. Given this, caution must be used when attempting to extrapolate research findings and data from larger prawn fisheries (ie Shark Bay and Exmouth Gulf) to the OPMF and NBPMF.

DEH is satisfied that the majority of species retained in this fishery are fundamentally independent within WA waters. Concerns were raised at the NAFMW in September 2002 that increasing fishing pressure and opportunistic targeting of squid in fisheries around the coast could significantly affect the status of this shared stock. DEH acknowledges that squid are usually taken in very small quantities in these two fisheries, approximately 1 tonne total, although in 2004, 900 t were taken. DEH notes that a recommendation has been made for the Kimberley Prawn Managed Fishery regarding the complementary management and research of shared stocks such as squid. Any management measures arising from that recommendation should be applied across all fisheries, including OPMF and NBPMF, as appropriate.

There is no significant recreational or indigenous take of the target species. Compliance data suggests that the illegal harvest of prawns is low. Thus, the only significant removal is from the commercial sector. DEH has concerns over the reliability of the commercial data, as logbook data are currently not validated, and has made a recommendation addressing this issue (see **Recommendation 5**).

### **Management response**

The management regimes for the OPMF and NBPMF aims to maintain ecologically sustainable stock levels through a number of input controls.

The input controls specific to the OPMF include:

- Licences limited to 31;
- 4 classes of licences, with varying access to the three areas of the fishery. Only 4 licences have access to the entire fishery;
- Seasonal and area closures, including 3 designated nursery areas that are not permanently protected; and
- Gear and boat restrictions, which vary between areas. In Area 1 only twin trawl gear is allowed, each with a maximum headrope length of 10.98 m. The only restriction for the remainder of the fishery is an overall headrope length of 29.27 m, thus operators can use twin or quad gear within this overall restriction.

In addition, VMS requirements came into force in the OPMF in October 2002 and bycatch reduction devices (BRDs) were introduced in 2001 with the requirement that vessels must have half of their gear fitted with a BRD. Full implementation of BRDs occurred in 2003.

The input controls specific to the NBPMF include:

- Licences limited to 14;
- Seasonal and area closures, including 4 designated nursery areas that are not permanently closed to trawling; and
- Gear and boat restrictions (standard otter trawl nets, with a total headrope length of 29.27m)

In addition, VMS was implemented in the NBPMF in 2002 and the same BRD requirements as for the OPMF were introduced in 2001, with full implementation of BRDs in 2003.

DEH understands that nursery areas are set aside to protect benthic habitats, such as seagrass, that are beneficial for the successful recruitment of juvenile prawns. DEH is concerned that the designated nursery areas of the NBPMF and OPMF are subject to varying levels of trawling pressure throughout the year. DEH also understands that DFWA are currently reviewing the designated nursery areas for both fisheries and the need for permanent closures of 'core' nursery grounds. DEH has made a recommendation regarding the need for DFWA to develop and implement a spatial management system within the OPMF and NBPMF (**Recommendation 9**). DEH expects that important nursery areas for the target prawn species will be considered as part of the implementation of this recommendation.

As discussed above, performance measures in the form of ACRs have been identified for the target species and byproduct groups harvested by the OPMF and NBPMF and the ESD Report specifies review and response requirements should these ranges be breached. An assessment of the performance measures show that catches of banana prawn were outside the ACR in the NBPMF in 2000 and 2001. As the catch in the NBPMF was within the ACR in 2002, no specific management actions were undertaken. The ESD Report commits to a series of actions to be undertaken prior to the commencement of the next season in the event that the banana prawn performance limit is exceeded. DEH is concerned that despite the performance measure being breached in two consecutive years, no review was undertaken and no management actions were implemented. As outlined in Part One of this report, DFWA has committed to a clear process for responding to breaches of performance measures. DEH therefore expects that DFWA will respond to any future breaches in an appropriate and timely manner.

## **Conclusion**

DEH considers that the management regimes in the OPMF and NBPMF are appropriately precautionary and provide for the fisheries to be conducted in a manner that does not lead to over-fishing. DEH considers that the information collection system and stock assessment and management arrangements generally are sufficient to ensure that the fisheries are conducted at catch levels that maintain ecologically viable stock levels with acceptable levels of probability.

DEH considers that there is scope to further refine some of the existing information collection, assessment and management responses and has provided a number of recommendations for improvements in the longer term.

## Promote recovery to ecologically viable stock levels

Objective 2: *'Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes'*

This objective is not applicable to these fisheries at present. Performance measures and management responses are in place to ensure that the risk of overfishing any of the target or byproduct stocks remains negligible. While there have been cases in the past where DFWA has not responded to performance measures being breached, DEH considers that the commitment to a robust process regarding breaches of performance measures, as outlined in Part One, will ensure any future breaches are detected and acted upon in a timely manner.

### Conclusion

DEH considers that the target and byproduct species harvested by the OPMF and NBPMF are not below a defined reference point but should that occur in the future, the fisheries are conducted such that there is a high degree of probability the stocks would recover to ecologically viable stock levels within nominated timeframes.

### Ecosystem impacts

Principle 2: *'Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem'*

### Bycatch protection

Objective 1: *'The fishery is conducted in a manner that does not threaten bycatch species'*

### Information requirements

Limited information is available from the OPMF and NBPMF on the composition and quantity of bycatch, as the compulsory monthly logbooks do not have the capacity to record discarded species. The information used in the ESD Report is from a small number of voluntary logbooks and the Shark Bay and Exmouth Gulf prawn fisheries.

DEH has concerns regarding the extrapolation of bycatch data from Shark Bay and Exmouth Gulf to these fisheries as neither targets banana prawns and both are predominantly night time fisheries (in the Exmouth Gulf prawn fishery, nights can be traded for days after significant rainfall when the catch of banana prawns should be high). In addition, Shark Bay and Exmouth Gulf, both have closures over the full moon period. These factors could result in the bycatch being significantly different (both in terms of composition and quantity) to that in either the OPMF or NBPMF. In response to this concern, DFWA has committed to implement a research level observer program over the next 5 years to verify bycatch quantity and composition in the OPMF and NBPMF. DEH welcomes the commitment to improve bycatch data in the fisheries.

An important component of this bycatch program is a current Fisheries Research and Development Corporation (FRDC) project (FRDC project number 2002/038) on biodiversity indicators that is collecting information on bycatch in both trawled and untrawled areas of Onslow and Nickol Bay in 2004-05. This included actual sampling in the OPMF during 2004 and a small observer program in the NBPMF to identify key species. This information will be incorporated into future risk assessments and management of bycatch in the fisheries.

## Assessment

Six bycatch species or groups were identified as being captured by, or interacting with, the OPMF and NBPMF in the ESD Report. These include:

- 4 protected species (to be discussed in Objective 2);
- Invertebrates (seastars); and
- Fish (undescribed).

The ESD workshop concluded that the fisheries were of low risk to fish and invertebrates, due to the relatively low levels of effort, the small spatial area of the fishery grounds actually trawled (5% in the OPMF and 6% in the NBPMF), the habitats generally trawled (sand and mud) and the configuration of the gear, which DFWA maintains reduces the probability of capturing invertebrates.

As no bycatch data were available for the OPMF or NBPMF, the ESD risk assessment used data from the Shark Bay and Exmouth Gulf prawn fisheries. In the Shark Bay prawn fishery the bycatch is 4 to 8 times the volume of the target catch and 70-80% of the bycatch is small finfish. In the Exmouth Gulf prawn fishery, the bycatch is 2.5 times the volume of the target species, and is also dominated by small finfish. The 21 species of fish captured in the Shark Bay prawn fishery were individually assessed using criteria developed by Stobutzki *et al.* (2000). Only two species rated as being highly susceptible to trawling, but given the high turnover rates and wide distribution range of these species it was concluded that the fishery would be of minimal risk to these species.

DEH has expressed concerns regarding the applicability of data from other fisheries such as Shark Bay and Exmouth Gulf prawn fisheries. Given the commitment made by DFWA to implement a research level observer program to verify the composition and quantity of bycatch in the fisheries, DEH expects that at the 5 year review of the ESD Report, more fishery specific data will be available to conduct a risk assessment of the potential impact of the OPMF and NBPMF on bycatch.

## Management response

The submission states that the impact on bycatch species in the OPMF and NBPMF is minimal due to the low effort expended, the various seasonal and area closures operating in the fisheries, and the relatively small spatial area the fisheries actively operate in. BRDs are now compulsory in both fisheries, and there will be 100% implementation by the end of 2004. The BRD grid being used has similar specifications to those used in the Shark Bay and Exmouth Gulf prawn fisheries. Data from Shark Bay shows that total bycatch has decreased by 50% and the capture of large specimens (turtles etc) has decreased by 100% since the introduction of BRDs. The BRD grids used in the OPMF and NBPMF are further discussed under Objective Two of Principle Two.

Fish exclusion devices (FEDs) are also being introduced into both fisheries during 2004-05 and this would be expected to decrease the capture of finfish. The submission also states that a bycatch action plan (BAP) for the fisheries will be developed in 2004. DEH considers that the OPMF and NBPMF are unlikely to threaten bycatch species, given the management arrangements in place and the relatively small scale nature of both fisheries

As there is no bycatch data collected in the OPMF or NBPMF and the ESD workshop concluded there was no risk to bycatch species or groups, there are no specific performance measures or trigger levels for bycatch species. The ESD Report does not include any objectives relating to bycatch, protected species or the ecosystem, however, DFWA has included a generalised performance measure for bycatch in the ESD Report that will trigger a review of the risk

assessment if effort in either of the fisheries increases by 50% or more. DEH is concerned that the lack of fishery specific data, coupled with a generalised performance measure related to significant increases in effort, could result in changes to the composition and/or quantity of bycatch in the fisheries going unnoticed. DEH recommends that DFWA develop and incorporate into the management regime an objective to minimise, or maintain at sustainable levels, the take of bycatch in order to take a more ecosystem based approach to the management of the OPMF and NBPMF. Protected species and ecosystem impacts are further discussed under Principle 2, Objectives 2 and 3 respectively.

**Recommendation 6:** *DFWA to incorporate into the management regime, an objective to minimise protected/listed species interactions, to minimise or maintain at sustainable levels the take of other non-retained species and to minimise impacts on the marine environment.*

## **Conclusion**

DEH considers that it is likely that the fisheries are conducted in a manner that does not threaten bycatch species. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DFWA would undertake appropriate actions to ensure that bycatch species are not threatened by these fisheries.

## **Protected species and threatened ecological community protection**

Objective 2: *'The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities'*

### **Information requirements**

As no data are collected routinely on bycatch species in either the OPMF or NBPMF, the data available on the interaction of the fishery with protected species are limited to reports made in a small number of voluntary logbooks. Data from other WA fisheries including the Shark Bay and Exmouth Gulf prawn fisheries have also been used in the risk assessment for the fisheries, however, DEH has expressed concerns about the adequacy of extrapolating this data, given differences between the fisheries. The biodiversity indicators project (FRDC project number 2002/038) is expected to provide information on all bycatch species, including protected species.

There are no threatened ecological communities in the OPMF or NBPMF.

Given the potential for protected species interactions, DEH considers that priority should be given to establishing data collection systems that provide a more reliable means of monitoring and managing the impact of the fishery on protected species. One of the biggest barriers to successful commercial reporting of protected species interactions is the capacity of the fishers to identify the species involved. In addition, many operators may not be aware of the importance of reporting for the species involved. Both of these barriers can be reduced through education programs and opportunistic advice from researchers. DEH recommends that an education program on the importance of protected species reporting and identification be run in conjunction with the introduction of any fishery dependent reporting mechanism to increase the value of this approach.

**Recommendation 7:** *DFWA to provide a mechanism, which allows fishers to record interactions with protected/listed species. DFWA to implement an education program to ensure that industry has the capacity to make these reports at an appropriate level of accuracy.*

## Assessment

The risks posed by the fisheries to protected species were assessed during the ESD workshop and are discussed in the ESD Report. In the 'capture' category the analysis concluded that there was a negligible risk to seasnakes and turtles, and a low risk to syngnathids. In the 'interaction but no capture' category, dugongs rated a negligible risk.

The negligible risk rating given to seasnakes is a result of data from the Shark Bay prawn fishery observer program, which found that 99% of captured seasnakes were returned alive. Between 1999 and 2002, 18 turtles were reported captured in the NBPMF. In the OPMF between 1999 and 2002 three turtles were reported as captured. Two species are most commonly captured by these fisheries, the olive ridley (*Lepidochelys olivacea*) and loggerhead (*Caretta caretta*). Logbook information suggests that one captured turtle has not been returned to the water alive. These data pre-date the introduction of BRD grids into the fisheries. The negligible risk rating is a result of the introduction of BRDs, including grids and turtle exclusion hatches, into both fisheries. Syngnathids rated a low risk, as while they are incidentally caught by both fisheries, the habitat types over which the fisheries primarily operate are unfavourable to syngnathids. In addition, data from the Shark Bay observer program indicate that very few syngnathids are caught. Dugong were given a negligible risk as there have been no reports of either fishery interacting with dugong and the habitat types over which the fisheries primarily operate are not the preferred seagrass habitat of dugong.

DEH generally accepts the outcomes of the risk assessments presented in the ESD Report. However, DEH considers that the risk assessment should be reviewed in light of the introduction of BRDs into both fisheries. The submission commits to reviewing the risk assessment as more fishery specific data becomes available and DEH expects that improved data will become available through the implementation of **Recommendation 7**.

## Management response

The ESD workshop concluded there was no risk to protected species encountered by either fishery, therefore there are no specific performance measures or trigger levels for protected species. DFWA has included a generalised performance measure for protected species in the ESD Report that will trigger a review of the risk assessment if effort in either of the fisheries increases by 50% or more. DEH is concerned that the lack of fishery specific data, coupled with a generalised performance measure related to significant increases in effort, could result in increases in protected species interactions in the fisheries going unnoticed. A recommendation has been made regarding the need to develop objectives related to minimising protected/listed species interactions (**Recommendation 6**) and to improve reporting of interactions (**Recommendation 7**).

The primary management tool designed to minimise protected species are BRD grids. While all nets in the OPMF and NBPMF have been fitted with BRD grids since the 2003 season, the 200 mm bar spacing in these grids is larger than that used in grid devices in other trawl fisheries in Australia. DEH is highly supportive of the review of, and continual improvements to, BRD performance and notes that work has been underway in northern Australian prawn fisheries to ensure grid specifications will effectively remove all turtle species likely to be encountered by a fishery. As a result DEH recommends that DFWA review the specifications of the BRD grids used in the OPMF and NBPMF to ensure they are effective at reducing the incidental catch of all turtle species and other large bycatch species likely to be encountered in the fisheries.

**Recommendation 8:** *DFWA to review the specifications of the BRD grids used in the OPMF and NBPMF to ensure they are effective at reducing the incidental catch of turtles and other large bycatch species likely to be encountered in the fisheries.*

The requirement for all nets to have FEDs fitted by 2004-05 will also minimise the quantity and likelihood of protected species captures.

## **Conclusion**

DEH notes that recorded interactions with protected species appear to be minimal in these fisheries and considers that the fisheries are conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that appropriate actions will be undertaken to ensure the fisheries avoid mortality or injury to these species and avoid or minimise impacts on threatened ecological communities.

Recommendations have been developed to ensure that the risk of unacceptable impact on protected species is minimised in the longer term.

## **Minimising ecological impacts of fishing operations**

Objective 3: *'The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally'*

### **Information requirements**

Fishery dependent data, including catch, effort, gear design and knowledge of the spatial and temporal closures have been used in the assessment of the risk of these fisheries to the ecosystem. The submission is silent on the availability of sediment and habitat data for these fisheries. Information has been gathered from work on trophic interactions undertaken in similar fisheries. The biodiversity indicators project (FRDC project number 2002/038) will also provide more information.

DEH is concerned at the lack of information collection and research covering the fisheries impact on the ecosystem and environment generally. However, DEH understands that this lack of information is the case across a range of Australian and international fisheries and until appropriate research techniques and programs are developed and implemented this will continue to be the case. DEH strongly supports research in this area.

### **Assessment**

The OPMF and NBPMF both have the potential to cause ecosystem impacts through the use of benthic trawl gear, trophic impacts through the removal of the target species and the discarding of large amounts of bycatch. The ESD workshop analysed the risks to general ecosystem components. The risk assessment identified a negligible risk to seagrass, coral and sponge habitats and provisioning through the discarding of bycatch. The impact of the fishery on trophic interactions and impacts to sand and mud bottoms were identified as low risk. This assessment will be reviewed every five years.

Benthic habitats are thought to be at low risk due to the small area of the fisheries that are actively trawled. Seagrass habitats are actively avoided by trawlers due to entanglement in the net and the BRD grid. DEH accepts that the proportion of the fishery areas currently fished is small, but is

concerned that very little of either fishery is permanently protected from trawling and that effort could migrate into new grounds without restriction. This is further discussed under the management response section of this objective.

The submission considered the impact of removing large amounts of prawns on the trophic structure of the ecosystem and concluded that this would be minimal due to the natural variations observed in prawn populations and because there are no higher level species that prey on prawns alone. DEH also notes that with the introduction of BRDs into both fisheries, the amount of bycatch being discarded should decrease and thus reduce provisioning.

As none of the issues were of a sufficient risk rating, no specific targets or performance measures have been developed. However, to ensure the fisheries are both managed according to ecosystem based principles, DEH has recommended that DFWA implement objectives into the management regime associated with minimising impacts on the marine environment (see **Recommendation 6**).

### **Management response**

No management measures in the OPMF or NBPMF have the primary objective of reducing the ecosystem effects of the fisheries, however, the management methods used to maintain significant biomass levels of prawns and other byproduct species assist with minimising the impact of the fishery on the broader ecosystem. The fisheries are only active in 5 – 6% of the licensed fishery areas, however, apart from some inshore closures in the OPMF relating to navigation hazards and exclusion zones around jetties, there are no other areas of either fishery permanently protected from the impacts of trawling, including designated nursery areas.

DEH understands that DFWA is currently reviewing the designated nursery areas for both fisheries and the need for permanent closures of ‘core’ nursery grounds. DEH recommends that DFWA should work with licence holders to develop a spatial management system that takes account of the impacts of fishing operations on important areas for target, key byproduct and protected species and the various benthic habitat types present in the fishery area.

**Recommendation 9:** *DFWA to, in collaboration with licence holders, develop and implement a spatial management system within the OPMF and NBPMF that takes account of the impacts of fishing on:*

- *Important nursery areas for target species;*
- *Important feeding/spawning/breeding/refuge grounds for target, key byproduct and protected species; and*
- *Benthic habitats present in the fishery area.*

Other management measures such as gear restrictions, spatial and seasonal closures and limited numbers of licences further minimise the potential of general ecosystem impacts. DEH considers that the management measures in place in the OPMF and NBPMF, coupled with the relatively small scale nature of the fisheries, are sufficiently precautionary to minimise threats to the ecosystem.

Impacts on water quality through the discharge of plastic wastes and pollution from vessels are controlled under MARPOL legislation. The submission is silent on specific actions and requirements in the fisheries related to the prevention of marine pollution from vessels. DEH expects that operators are required to comply with the legislation and retain any plastic waste and dispose of it only when the vessel returns to port.

## **Conclusion**

DEH considers that the fisheries are conducted in a sufficiently precautionary manner to minimise the impact of fishing operations on the ecosystem generally. A recommendation has been developed to ensure that the risk of significant impact by the fishery on the marine environment generally is minimised in the longer term.

## REFERENCES

Kailola, P. J., Williams, M. J., Stewart, P. C., Reichelt, R. E., McNee, A. and Grieve, C. (1993) *Australian Fisheries Resources*. Bureau of Resource Sciences and the Fisheries Research and Development Corporation. Canberra. pp. 422.

Mulley, J. C. and Latter, B. D. H. (1981) Geographical differentiation of tropical Australian penaeid prawn populations. *Australian Journal of Marine and Freshwater Research* **32**: 897 – 906.

Richardson, B. J. (1982) Geographical distribution of electrophoretically detected protein variation in Australian commercial fisheries. III Western king prawn, *Penaeus latisulcatus* Kishinouye. *Australian Journal of Marine and Freshwater Research* **33**: 933 – 937.

Stobutzki, I. C., Blaber, S., Brewer, D., Fry, G., Heales, D., Jones, P., Miller, M., Milton, D., Salini, J., Van der Velde, T., Wang, Y., Wassenberg, T., Dredge, M., Courtney, A., Chilcott, K. and Eayrs, S. (2000) *Ecological Sustainability of Bycatch and Biodiversity in Prawn Trawl Fisheries*. Fisheries Research and Development Corporation Final Report 96/257.

## LIST OF ACRONYMS

ACR	Acceptable catch range
BAP	Bycatch Action Plan
BRD	Bycatch reduction device
DEH	Department of the Environment and Heritage
DFWA	Department of Fisheries Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESD	Ecologically Sustainable Development
FED	Fish exclusion device
FRDC	Fisheries Research and Development Corporation
FRMA	<i>Fish Resources Management Act 1994</i>
m	metre
mm	millimetre
MARPOL	International Convention on Marine Pollution
NAFMW	Northern Australian Fisheries Management Workshop
NBPMF	Nickol Bay Prawn Managed Fishery
OCS	Offshore Constitutional Settlement
OPMF	Onslow Prawn Managed Fishery
t	tonnes
UNCLOS	United Nations Convention on the Law of the Sea
VMS	Vessel monitoring system
WA	Western Australia