



**Australian Government**

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**Department of the Environment and Heritage**

Assessment of the  
**New South Wales Ocean Trawl Fishery**

June 2006

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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.

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# Assessment of the ecological sustainability of management arrangements for the New South Wales Ocean Trawl Fishery

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>4</b>
Background.....	4
Overall assessment .....	8
Recommendations .....	10
<b>PART I - MANAGEMENT ARRANGEMENTS .....</b>	<b>12</b>
Conclusion .....	16
<b>PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES. 17</b>	
STOCK STATUS AND RECOVERY.....	17
<i>Maintain ecologically viable stocks.....</i>	<i>17</i>
Information requirements .....	17
Assessment .....	19
Management response .....	21
Conclusion .....	25
<i>Promote recovery to ecologically viable stock levels .....</i>	<i>26</i>
ECOSYSTEM IMPACTS .....	27
<i>Bycatch protection.....</i>	<i>27</i>
Information requirements .....	27
Assessment .....	28
Management response .....	29
Conclusion .....	30
<i>Protected species and threatened ecological community protection.....</i>	<i>30</i>
Information requirements .....	30
Assessment .....	30
Management response .....	31
Conclusion .....	32
<i>Minimising ecological impacts of fishing operations .....</i>	<i>32</i>
Information requirements .....	32
Assessment .....	33
Management response .....	34
Conclusion.....	34
<b>REFERENCES .....</b>	<b>36</b>
<b>LIST OF ACRONYMS.....</b>	<b>38</b>

## EXECUTIVE SUMMARY

### Background

The New South Wales (NSW) Department of Primary Industries (DPI, formerly NSW Fisheries) has submitted documentation to the Department of the Environment and Heritage (DEH) for assessment under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). These documents were prepared under the NSW legislated Environmental Impact Assessment (EIA) process for fisheries. The EIA process for the Ocean Trawl Fishery (OTF) was undertaken in conjunction with the EPBC Act assessment. The *Ocean Trawl Fishery Environmental Impact Statement* (OTF EIS), containing the draft *Fisheries Management Strategy* (FMS), was received by DEH in July 2004 and released for public comment on 9 August 2004. The public comment period ended on 10 September 2004, with a total of 34 public submissions received. DEH also provided comments to DPI on the OTF EIS. DPI then submitted a Preferred Strategy Report (PSR) to DEH in December 2005. The PSR provides DPI's responses to the range of issues raised in the public consultation process on the OTF EIS. For the purposes of this document, the EIS draft FMS and PSR constitute the submission.

As part of the NSW EIA process, the NSW Department of Planning (DoP) produced the *Report and Recommendations on the Environmental Impact Statement and Fishery Management Strategy for the Ocean Trawl Commercial Fishery* (DoP Report) in February 2006 that provided an independent assessment of the draft FMS, EIS and PSR for the OTF. The DoP assessment made ten recommendations for incorporation in the final OTF FMS.

The Director-General of DPI also made final recommendations in March 2006 to amend the FMS to address concerns that had arisen in the EIA process with the extent of latent and active fishing effort in the OTF. The DEH assessment took account of the DoP assessment and the recommendations from the Director-General of DPI.

As required under the NSW EIA legislative process, the NSW Minister for Primary Industries determined the outcomes of the OTF EIA process on 7 June 2006. The determination allows the fishery to continue to operate subject to modifications that reduce or eliminate detrimental effects of the fishery's activities on the environment. The determination requires the draft FMS to be further amended to take account of changes required by the PSR, recommendations in the DoP report and the final recommendations of the Director-General of DPI. The final FMS is yet to be approved and made available by the NSW Minister for Primary Industries. This is expected to occur by the end of 2006. In lieu of the FMS being finalised, the measures in the draft FMS and the NSW Minister's determination of the fishery can and are being implemented by DPI.

The DEH assessment against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries* has considered the submission, the determination of the OTF by the NSW Minister for Primary Industries and associated documents, public comments and DPI's response to the comments.

**Table 1: Summary of the NSW Ocean Trawl Fishery**

<b>Area</b>	Under an Offshore Constitutional Settlement (OCS) agreement, NSW has jurisdiction of waters less than 4000m in depth (approximately 80 nautical miles offshore) from the Queensland border south to Barrenjoey Point. From Barrenjoey Point south to the Victorian border, NSW
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	has jurisdiction for waters within 3 nautical miles of the coastline.
<b>Fishery status</b>	3 major species, silver trevally, eastern king prawn and school prawn are considered growth overfished.  Six of the top 12 finfish have shown declines in landings over the last 10 to 20 years.
<b>Target Species</b>	33 finfish, 6 crustacean and 5 mollusc species/species groups comprised 99% of the landed weight reported for 2000/01.  Major species include eastern king prawn, school whiting, octopus, school prawn, royal red prawn, cuttlefish, tiger flathead and silver trevally.
<b>Byproduct Species</b>	Varied, at least 120 species of fish and 30 species of invertebrates are marketed from trawl catches off NSW.
<b>Gear</b>	Demersal otter trawl gear, with specifications related to target species (prawns or fish) and area fished. Danish seine nets also permitted.
<b>Season</b>	Year round, with the exception of a number of specified juvenile prawn closures that are either year round or seasonal.
<b>Commercial harvest 2000/01</b>	A total of 4,582 tonnes: <ul style="list-style-type: none"> <li>• fish trawl – 1,171 t</li> <li>• prawn trawl – 3,411 t.</li> </ul>
<b>Value of commercial harvest 2000/01</b>	Approximately AU\$36 million at first point of sale: <ul style="list-style-type: none"> <li>• fish trawl – AU\$4 million</li> <li>• prawn trawl – AU\$32 million.</li> </ul>
<b>Recreational harvest</b>	Considerable overlap of recreationally important species and those captured by inshore trawlers, including sand flathead, southern calamari and rubberlip morwong.
<b>Number of entitlements</b>	A total of approx. 305 fishing businesses holding 5 types of endorsement: [the figures below are not cumulative; many hold more than one endorsement] <ul style="list-style-type: none"> <li>• Inshore ocean prawn trawl (267)</li> <li>• Offshore ocean prawn trawl (238)</li> <li>• Deepwater ocean prawn trawl (63)</li> <li>• North ocean fish trawl (62)</li> <li>• South ocean fish trawl (47)</li> </ul>
<b>Management arrangements</b>	Input controlled through: <ul style="list-style-type: none"> <li>• limited entry (fishers must hold a relevant ocean trawl endorsement);</li> <li>• controls on boats and fishing gear;</li> <li>• time and area closures; and</li> </ul> Output controlled through: <ul style="list-style-type: none"> <li>• trip limits for a number of species; and</li> <li>• size limits for a number of species.</li> </ul>
<b>Export</b>	A small proportion of catch (approximately AU\$3 million) is exported.
<b>Bycatch</b>	High, given the non-selective gear used. More than 300 species of fish and 80 species of mobile invertebrates have been recorded in observer studies and research trawls.

<b>Interaction with Threatened Species</b>	Potential for direct and indirect interactions with a number of threatened species, including seabirds, cetaceans, turtles, grey nurse and great white sharks, seals and syngnathids.
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In 1990 an OCS agreement between the Australian Government and the Government of NSW gave NSW jurisdiction over trawling in depths less than 4000 m (approximately 80 nautical miles from the coastline) for waters from the Queensland border south to Barrenjoey Point. From Barrenjoey Point south to the Victorian border, NSW has jurisdiction for trawling in waters within 3 nautical miles of the coastline. The Australian Government retains jurisdiction for trawling outside of 3 nautical miles.

At least 120 species of finfish and 30 species of invertebrates are marketed from trawl catches off NSW. In 2000/01, 33 finfish, 6 crustacean and 5 mollusc species (or species groups) constituted 99% of the landed catch weight reported by NSW ocean trawlers.

The OTF EIS lists the primary species of the OTF in 2000/01, in order of importance, as school whiting (*Sillago flindersi* and *S. robusta*), eastern king prawn (*Penaeus plebejus*), octopus (*Octopus* spp.), school prawn (*Metapenaeus macleayi*), royal red prawn (*Haliporoides sibogae*), cuttlefish (*Sepia* spp.), tiger flathead (*Neoplatycephalus richardsoni*), sand flathead (*Platycephalus* spp.), silver trevally (*Pseudocaranx dentex*), fiddler shark (*Aptychotrema rostrata*) and southern calamari (*Sepioteuthis australis*).

The ten most important key secondary species/species groups in 2000/01 were squid, blue swimmer crab (*Portunus pelagicus*), latchet (*Pterygotrigla polyommata*), John dory (*Zeus faber*), Balmain bug (*Ibacus* spp.), angel shark (*Squatina australis*), flounder (various species), red mullet (various species), redfish (*Centroberyx affinis*) and leatherjacket (various species).

The majority of the species harvested in this fishery are widespread in eastern Australian waters and many support commercial fisheries in other jurisdictions, including the Queensland East Coast Otter Trawl Fishery (ECOTF), the Queensland Finfish (Stout Whiting) Trawl Fishery (QTF) and the Australian Government Southern and Eastern Scalefish and Shark Fishery (SESSF).

The biology of the target species in the OTF varies from short-lived highly fecund prawn species to longer lived, slower growing finfish and invertebrates. The two most prominent species harvested in the OTF are school whiting and eastern king prawn.

School whiting, as a group, is composed of stout whiting (*S. robusta*) and red spot whiting (*S. flindersi*). Stout whiting is endemic to Australia, occurring in an eastern and western population. The eastern population extends from Bustard Head south to northern NSW and is thought to be a single stock. The western population extends from Shark Bay south to Fremantle (O'Neill *et al.*, 2003). Stout whiting is a demersal species, inhabiting the continental shelf and upper continental slope. Stout whiting attain their maximum size of 23 cm fork length at approximately five years of age. Red spot whiting occurs from southern Queensland to South Australia and also along the east coast of Tasmania. They are most commonly caught in depths up to 80 metres. Spawning time varies with location, occurring in winter in southern Queensland and northern New South Wales and during spring and summer in southern NSW. They can live for up to 7 years.

Eastern king prawns are endemic to Australian waters and are found on the east coast between Mackay in Queensland and north-eastern Tasmania. The population constitutes a single stock. While inhabiting estuaries as juveniles, eastern king prawns migrate into offshore waters at

approximately 12 months of age. Tagging studies have shown that there is northward migration of eastern king prawns at this time. Eastern king prawns mature at approximately 12 to 18 months of age and can live for up to three years (Kailola *et al.*, 1993).

The OTF produces over 4,000 tonnes of seafood product annually and is valued at about AU\$36 million at first point of sale, making it the most valuable commercial fishery in NSW. The ability to trawl for fish and prawns off NSW was historically available to all NSW licenced commercial fishers with a suitable vessel. In March 1997, both the prawn trawl and fish trawl were declared as restricted fisheries under the *Fisheries Management Act 1994*, requiring fishers to hold an endorsement on their commercial fishing licence authorising them to fish in defined sectors of the OTF.

Historically, most trawling for fish was undertaken with Danish seine nets. Since the 1980's, all trawling in oceanic waters off NSW has used demersal otter trawling gear. Various designs of nets are used to target different fish and prawn species. Regulations prescribe a minimum mesh size and in some cases, the dimensions of the net and any attachments to the net. The OTF EIS describes the 3 types of net currently permitted to be used in the OTF – a prawn otter trawl net, fish otter trawl net and fish Danish seine net. As long as nets meet these requirements, configurations can vary, for example, ocean prawn trawlers in NSW are mostly using triple gear.

Management measures employed in the OTF consist of input controls, including limited entry, sector specific endorsements, controls on boats and fishing gear, time and area closures, minimum size limits, output controls in the form of trip limits for some finfish and shark species, and compulsory use of bycatch reduction devices (BRDs) in all prawn trawl nets.

The OTF EIS discusses several studies that have investigated the incidental catch of species in the OTF, using both fish and prawn trawl gear. Observer data from the northern fish trawl sector in the mid-1990's showed that 83% of the bycatch by weight was small non-commercial species. The remaining bycatch was undersize individuals of commercial species including redfish, tiger flathead and snapper. Research work in the early 1990's in the prawn trawl sector found a target to bycatch ratio of 1:10.4. The bycatch was mostly composed of small commercial species and non-commercial finfish and invertebrates. While BRDs have since been made compulsory in the prawn trawl sector of the OTF, this bycatch observer work has not been repeated, so no quantitative information exists on the current level of bycatch in the prawn trawl sector. Research has also shown that sessile invertebrates often contribute a large part of the bycatch in newly or rarely trawled grounds and that these species are not resilient to continual trawling.

Some species that may be affected by this fishery are currently listed protected species under the Commonwealth EPBC Act. Possible protected species interactions in this fishery include the capture of marine turtles, grey nurse shark, great white shark and seals and indirect interactions with seabirds and cetaceans. The OTF EIS assigns a low to moderately-low risk level from the OTF to all of these protected species. These interactions are assessed under Principle 2 of this report.

Many species taken by the OTF are also significant in other commercial, recreational and Indigenous fisheries, managed by both NSW and other jurisdictions. Eastern king prawn and stout whiting are also targeted by the Queensland ECOTF and the QFTF respectively. Many of the OTF's primary and key secondary species are also target species of the Australian Government managed SESSF.

The OTF is currently managed under the *Fisheries Management Act 1994*. The NSW legislated Environmental Impact Assessment (EIA) process under the *Environmental Planning and*

*Assessment Act 1979* (EP&A Act) required an EIS to be prepared for the fishery, comprising a draft FMS and an environmental assessment of the draft strategy and the activities conducted by and in relation to the OTF. The FMS for the OTF, as revised from the draft FMS in accordance with the determination by the NSW Minister for Primary Industries of the fishery under the EP&A Act, will guide management of the OTF once approved by the NSW Minister for Primary Industries. DEH's assessment has been based on the EIS, draft FMS, PSR, report and recommendations from the NSW DoP and final recommendations from the Director-General of DPI, all of which identify the improvements to be delivered to the OTF's management arrangements over the coming years. A legislated share management plan is also being developed for the fishery that will bring into effect a number of management aspects addressed in the FMS.

### **Overall assessment**

The material submitted by NSW DPI demonstrates that the management arrangements for the fishery, in conjunction with the commitments made in the draft FMS and determination of the fishery under the NSW EP&A Act by the NSW Minister for Primary Industries, meet most of the requirements of the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*.

Management responses committed to in the draft FMS and NSW Minister's determination of the fishery include limited entry, various spatial and temporal closures, effort reduction measures including effort caps, gear restrictions, the compulsory use of BRDs in the prawn trawl sector, a scientific observer program and a fishery assessment process for primary and key secondary species.

While the final FMS will allow the fishery to be relatively well managed, DEH has identified a number of current risks that must be managed to ensure that their impacts are minimised:

- excessive levels of active and latent effort;
- lack of fine scale spatial and temporal data on which to base stock assessments;
- unvalidated catch and effort data which will underpin stock assessments for many species;
- a lack of estimated removals from non-commercial sectors, including recreational and Indigenous sectors, of OTF species for inclusion in stock assessments;
- the absence of bycatch monitoring, which hinders the ability of DPI to monitor and respond to changes in the fishery; and
- a lack of data on protected species interactions in the OTF.

While the FMS will make provision to address several of these risks in the ongoing management of the fishery, DEH has developed a range of recommendations to address these issues to ensure that the risk of impact is minimised in the medium term. Through the implementation of the recommendations and the continuation of a responsible attitude to the management of the fishery through the FMS, management arrangements are likely to be sufficiently precautionary and capable of controlling, monitoring and enforcing the level of take from the fishery while ensuring the stocks are fished sustainably.

The management regime aims to ensure that fishing is conducted in a manner that does not lead to over-fishing and for fishing operations to be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem. DPI is currently working to address existing problems and minimise environmental risks in the fishery.

The operation of the fishery is consistent with the objects of Part 13A of the EPBC Act. Given the management arrangements in place and the intent to introduce a wide range of additional measures in the final FMS, DEH considers that the fishery will not be detrimental to the survival or conservation status of the taxa to which it relates in the short term. Similarly, it is not likely to threaten any relevant ecosystem in the short term. DEH therefore recommends that the fishery be declared an approved Wildlife Trade Operation (WTO) with the actions specified in the recommendations to be undertaken by DPI to contain the environmental risks in the medium term. DEH considers that the fishery, as managed in accordance with the management regime, is not likely to cause serious or irreversible ecological damage over the period of the export decision. Specifically, the WTO declaration would allow the export of product from the fishery until November 2008, noting that the OTF was subject to two short term WTO decisions, the first of which commenced on 30 November 2005, to allow the completion of the NSW EIA process for the OTF.

The WTO declaration will require annual reporting on the progress of implementing the recommendations of this report and other managerial commitments. In addition, DEH considers management commitments made in the FMS to be vital to the ongoing sustainable management of the OTF. Therefore, a specific condition of the WTO declaration is the finalisation and approval of the FMS by December 2006. The implementation of the recommendations and management commitments in the FMS will be monitored and reviewed as part of the next DEH review of the fishery.

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

While little quantitative data is available on interactions with protected species in the OTF, marine turtles, sharks, seals and protected finfish are the most likely protected species to be directly captured in trawl nets. There is also the potential for seabirds to become entangled in trawl gear. As there have been no reported interactions with protected species, the actual and potential impact on Part 13 species is currently considered low. However, if the implementation of the FMS and recommendations arising from this assessment indicate that the fishery does interact with any protected species, DEH expects DPI to take immediate action to mitigate this impact. There are no listed threatened ecological communities in the fishery area.

DEH recommends that the OTF be declared an accredited management regime under Sections 208A, 222A, 245 and 265 of the EPBC Act. In making this judgement, DEH considers that the fishery to which the management regime relates does not, or is not likely to, adversely affect the survival in nature of 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 regime requires 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 management regime, would not be expected to have a significant impact on a listed threatened species or listed migratory species protected by the EPBC Act.

The implementation of recommendations and other commitments made by DPI in the submission will be monitored and reviewed as part of the next DEH review of the fishery in 2 years time.

## Conditions

1. Operation of the fishery will be carried out in accordance with the management regime in force under the New South Wales *Fisheries Management Act 1994*.
2. NSW DPI to advise DEH of any material change to the NSW OTF management arrangements that could negatively affect the assessment of the fishery against the criteria of the EPBC Act, within three months of that change being made.
3. Reports to be produced and presented to DEH annually, and to include:
  - a. information sufficient to allow assessment of the progress of NSW DPI in implementing the recommendations made in the *Assessment of the New South Wales Ocean Trawl Fishery, June 2006*; and
  - b. the status of the OTF performance indicators compared to the trigger points.
4. The FMS for the NSW OTF to be finalised and approved by December 2006.

## Recommendations

1. NSW DPI to advise DEH of any material change to the OTF's management arrangements that could negatively affect the assessment of the fishery against the EPBC Act criteria, within three months of that change being made.
2. When determining acceptable ranges for performance indicators as a part of a review, DPI to use ecological sustainability as a primary consideration.
3. DPI to develop and implement a compliance plan for commercial designated fishing activities including the OTF within 12 months of the approval of the FMS. The compliance plan should be regularly monitored and reviewed.
4. DPI to implement finer scale temporal and spatial logbook reporting in the OTF by mid 2008, to improve the robustness of resource assessments and allow for enhanced cross-jurisdictional cooperation.
5. DPI to develop and implement a robust system to validate catch and effort logbook data by mid 2008.
6. DPI to implement a system to improve the identification and recording of elasmobranch species taken in the OTF.
7. DPI to develop a robust and regular fishery assessment process that provides a basis for management decisions, which are precautionary and recognise the uncertainty and level of risk. The assessment process will examine the exploitation status of the primary and key secondary species using appropriate resource assessment tiers, within 3 years.
8. DPI to institute programs to provide appropriate estimates of the harvest rates of OTF primary and key secondary species by the recreational and Indigenous sectors, and incorporate these data into the fishery resource assessment process.
9. DPI to manage effort in each of the five sectors of the OTF with the aim of achieving ecologically sustainable levels and to actively pursue a reduction in latent effort in the OTF. DPI to provide DEH, within 12 months of the approval of the FMS, with a

timeline, including associated milestones and trigger points, for achieving an ecologically sustainable level of fishing effort for each sector of the OTF.

10. DPI to implement the management arrangements outlined in the FMS relating to school whiting (target catch range, trigger points, gear and area restrictions) within 12 months of the approval of the FMS.
11. DPI to develop and implement appropriate mechanisms, by November 2008, to promote a high level of compliance with the effort management measures and fishery closures outlined in the FMS.
12. DPI to cooperate with other relevant jurisdictions to pursue complementary management and research of shared stocks for all relevant primary and key secondary OTF species that provide for sustainable harvest limits and effective assessment of stock status. In particular, DPI will cooperate with:
  - the Australian Fisheries Management Authority in relation to finfish species also harvested by the Southern and Eastern Scalefish and Shark Fishery, notably ocean perch, silver trevally, redfish and school whiting; and
  - the Queensland Department of Primary Industries and Fisheries in relation to eastern king prawn.
13. DPI to develop and implement a recovery strategy for all OTF primary and key secondary species classified as recruitment overfished, within 6 months of the species being so classified. For species classified as growth overfished, the status of the stock/s will be reviewed and specific measures implemented, as required, within 12 months to prevent the stocks from becoming recruitment overfished.
14. By the end of 2007, DPI to develop and implement a system sufficient to identify changes in the composition and quantity of bycatch over time and establish more robust estimates of interactions with threatened and protected species in the OTF.
15. DPI to continue to pursue a reduction in the amount of bycatch taken in the OTF through the refinement of bycatch mitigation technology and to support the investigation of methods for increasing survivability of bycatch species.
16. DPI to, before the end of 2008, review the data collected on interactions of the OTF with protected species listed under the EPBC Act and other large species of bycatch. If the review indicates the OTF has interactions with any protected species listed under the EPBC Act, DPI to introduce appropriate management responses, which may include turtle excluder devices, seal excluder devices and closed areas, into the fishery as a priority.

## PART I - MANAGEMENT ARRANGEMENTS

The NSW OTF is managed by the NSW DPI, the principal agency responsible for conserving the aquatic environment and managing fisheries resources in NSW.

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

- The *Fishery Management Strategy* for the OTF;
- The *Fisheries Management Act 1994*;
- The *Fisheries Management (General) Regulation 2002*; and
- Relevant Gazetted notices and licence conditions.

A number of other documents, including research reports, scientific literature and discussion papers are integral to the management of the fishery.

NSW fisheries are subject to a legislated EIA process which involves the development of a detailed EIS and extensive consultation with stakeholders, leading to the implementation of a final FMS that provides a comprehensive future management framework for the fishery. The EIS and FMS are available on the NSW DPI website and in hard copy from NSW DPI both as drafts for public consultation and as final versions. The OTL EIA process was undertaken in conjunction with this assessment. The NSW Minister for Primary Industries made a determination on 7 June 2006 on the outcomes of the OTF EIA process. The EIA process is expected to be completed by the end of 2006 when the final FMS for the fishery will be approved by the NSW Minister for Primary Industries and publicly available.

The OTF is included in the *Fisheries Management Act 1994* as a share management fishery, with the exception of the southern fish trawl sector, which will continue to be a restricted fishery, pending the resolution of jurisdictional issues with the Australian Government.

The *Fisheries Management Act 1994* requires that a share management plan (SMP) be developed and implemented for all share management fisheries. A SMP for the OTF will be prepared as part of the transition of the fishery to a full share management regime. A SMP for the OTF is under development and can only come into effect after the fishery has been determined by the NSW Minister for Primary Industries. The primary role of the SMP is to provide the legislative framework for the share-based component of the management regime governing the OTF. The SMP will allow a range of fishery specific controls to be formalised into regulation, for example, any rules relating to minimum shareholding levels or the trading of shares.

The SMP will also assist in bringing into operation a number of aspects of the fishery described in the draft FMS, such as the penalty points scheme as a compliance and enforcement tool. The SMP must include objectives and performance indicators that should be consistent with the FMS, once approved.

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Because of the importance of the management plan 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:** *NSW DPI to advise DEH of any material change to the OTF's management arrangements that could negatively affect the assessment of the fishery against the EPBC Act criteria, within three months of that change being made.*

The draft FMS was developed through a consultative process. The OTF EIS, which contained the draft FMS, was made available for public comment for a month and this was widely advertised, as reflected in the large number of public submissions received. In addition, there is a range of consultative bodies designed to advise on fisheries issues in NSW.

All share management and restricted fisheries in NSW have a management advisory committee (MAC). Historically, the OTF has had two MACs, one for the ocean fish trawl and one for the ocean prawn trawl, although in recent years they have been amalgamated into a single MAC for the OTF. The MAC comprises an independent chair and representatives from the fishing industry, recreational fishing sector, Indigenous sector, conservation sector and DPI, as managers of the fishery. The MAC provides advice to the NSW Minister for Primary Industries on:

- the preparation of any plan or regulations for the fishery;
- monitoring whether the objectives of the management plan or regulations are being attained;
- reviews in connection with any new management plan or regulation; and
- any other matters relating to the fishery.

The draft FMS includes a management action to continue the single OTF MAC, as the primary consultative body for issues affecting the OTF. The draft FMS also includes a performance measure that triggers if less than two OTF MAC meetings are held in any calendar year, aiming to ensure that regular consultation is taking place.

There are also established Ministerial advisory councils, including the NSW Seafood Industry Advisory Council (SIAC) which includes representatives from each major commercial fishery, including the OTF, but also from the post-harvest sector.

The development of the draft FMS has resulted in the creation of a set of goals, objectives and management responses for the OTF. The seven goals of the OTF draft FMS are supported by numerous performance measures and trigger points. The draft FMS commits to revising the current performance measures if new information becomes available and undertaking a comprehensive review of the appropriateness of all performance indicators and trigger points within two and a half years of the commencement of the FMS, in conjunction with the OTF MAC.

Noting the commitment to review and update the performance measures, DEH is largely satisfied with the performance criteria set for all goals, however has some concerns regarding those relating to interactions with protected species. This matter is discussed further in Part II, Objective 2 of the report.

If trigger points are breached at any time, a review report, outlining any required remedial actions proposed, must be presented to the NSW Minister for Primary Industries within 6 months of the breach. Review reports will be prepared in consultation with the OTF MAC and may also require input from representatives from other fisheries. All review reports will be publicly available.

If a review report concludes that the trigger point has been breached due to the operation of the fishery or if the fishery objectives would be compromised if the fishery continued to operate unchanged, management action must be taken with the objective of returning the performance indicator to an acceptable range within a specified time period. The draft FMS does not define the

acceptable ranges for each performance indicator as part of a review, which should be determined though consideration of the issues identified in the review report. DEH recommends that ecological sustainability should be a primary consideration in the development of acceptable ranges for trigger points.

***Recommendation 2:*** *When determining acceptable ranges for performance indicators as a part of a review, DPI to use ecological sustainability as a primary consideration.*

Prior to the development of the draft FMS, the offshore prawn trawl sector of the OTF was managed under a set of management arrangements introduced in 1990 and revised in 1994. No formal management arrangement document has existed for the fish trawl sector of the OTF, though regulations and policies with respect to the fishery have been in force during this time.

Management of the OTF has been based mainly on input controls, including:

- limited entry – fishers must hold a NSW commercial fishing licence with one of 5 endorsement types. A total of 677 fishing business hold endorsements across the OTF. Generally there is one vessel associated with each fishing business;
- controls on fishing gear and boats, including net specifications, hull size and engine power;
- boats are licenced and boat replacement policies apply to control fishing capacity;
- time and area closures – a number of protection areas for juvenile prawns, juvenile fish and habitat exist in the ocean prawn trawl sector of the OTF. These closures can be year round or seasonal. In the fish trawl sector, all waters north of Smokey Cap are closed. All forms of trawling are excluded from sanctuary and habitat protection zone in Marine Parks and in grey nurse shark critical habitat protection areas; and
- protection of species listed as protected under the *Fisheries Management Act 1994*.

Output controls have also been applied in the form of trip limits which apply to a number of species that operate under a quota system in the Australian Government managed SESSF and minimum size limits that apply to a number of finfish species taken by the OTF. These size limits apply to commercial and recreational fishers.

NSW fisheries officers have broad powers, which include the authority to board and search vessels and enter and search premises. Approximately 65 fisheries officers are based in coastal NSW and service the ports from which the majority of OTF vessels operate. The general duties of these fisheries officers include conducting patrols, inspecting commercial fishing gear and catch, and recording rates of compliance. Some officers also perform sea-going compliance aboard patrol vessels based in Coffs Harbour, Sydney and Eden.

Given the broad geographical range of the OTF, compliance activities are coordinated within fisheries districts. The district plan for each location sets out the priority compliance issues which may include patrolling fisheries closures, inspecting commercial vessel's gear and catch and inspecting recreational fishers.

The *Fisheries Management Act 1994* and the *Fisheries Management (General) Regulation 2002* provide for a number of offences relating to fishing activities that encompass the methods used and the species taken by the OTF. The most serious offences relate to fishing in closed waters and the possession of undersize or protected fish.

The OTF EIS does not provide any information on the number of inspections undertaken and the number of offences recorded in the OTF in recent years. Several actions outlined in the draft FMS are related to improving compliance in the OTF. These include an action to develop, implement and monitor a compliance plan for commercial designated fishing activities, including the OTF; the implementation of a penalty points scheme and the development of education programs to ensure OTF skippers have a sound understanding of the fishery and the management arrangements in place. DEH considers that the development of a compliance plan for the OTF is a priority area and agrees with the 12 month timeframe once the FMS has been approved.

**Recommendation 3:** *DPI to develop and implement a compliance plan for commercial designated fishing activities including the OTF within 12 months of the approval of the FMS. The compliance plan should be regularly monitored and reviewed.*

Compliance with the OTF's management arrangements would also be strengthened by the use of electronic vessel monitoring systems (VMS). This would assist in monitoring the various fisheries closures in place and the management responses outlined in the draft FMS related to controlling effort. A full discussion of this is included in Part II, Principal 1 (see **Recommendation 11**).

The draft FMS outlines two types of performance reporting. A performance report examines the performance of the OTF with respect to the FMS. Review reports are generated in response to trigger point breaches and have been discussed in detail earlier in this Part.

A performance assessment examining each performance indicator will be undertaken annually and a report on the performance indicators will be submitted to the NSW Minister for Primary Industries within two years of the commencement of the FMS and then biennially. This report will also include a review of the progress made in implementing the management responses included in the FMS and will be made publicly available.

As a contingency or in response to an unexpected event, the NSW Minister for Primary Industries can order a review or make a modification to the FMS or fishing regulations. The Minister must consult the OTF MAC on any proposed modification or review.

A SMP will be developed for the OTF once the FMS commences. The review process that will be included in the SMP will ensure there is a robust review and reporting framework for the OTF. In addition to the performance based reviews, as discussed above, a SMP must also be subject to scheduled periodic review, although the draft FMS does not indicate a timeframe for the review of the SMP.

Fishery dependent data relating to the catch of target and byproduct species is collected via the mandatory monthly Catch and Effort Return system. Some fishery independent information has been collected for the OTF. Discussion of the information collection system can be found in Part II of this report.

An analysis of the OTF'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 Part II, Principle 2 of this report.

The OTF harvests species that are also landed in other NSW commercial fisheries, including the Estuary Prawn Trawl Fishery and Ocean Trap and Line Fishery. Commercial fisheries exist in Queensland for eastern king prawns and stout whiting, while most of the finfish species landed by the OTF are also caught by the SESSF. Ideally, management arrangements for fisheries affecting a single stock should be complementary. If this is not achievable, management arrangements should,

as a minimum, take into account the harvest and management regime of other jurisdictions who are fishing the same stock, particularly when assessing stock status and availability for harvest. For example, NSW's participation in forums such as the Australian Fishery Managers Forum, the Northern Fisheries Managers Forum and the Southern Fisheries Managers Forum, facilitates cross-jurisdictional cooperation. A detailed discussion of cross-jurisdictional issues is included in Part II, Principle 1.

A number of recovery plans are of relevance to the OTF, including the *Recovery Plan for Marine Turtles in Australia* (Environment Australia, 2003) and the *Recovery Plan for the Grey Nurse Shark (Carcharias taurus) in Australia* (Environment Australia, 2002). The *National Plan of Action for the Conservation and Management of Sharks* (Shark Advisory Group and Lack, 2004) is also relevant to the OTF. The draft FMS commits to implement the provisions of any relevant threatened species recovery plan or threat abatement plan, including the protection of identified 'critical habitat' areas.

DEH is satisfied that the management arrangements outlined in the draft FMS comply with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under that policy.

No regional or international management regimes, to which Australia is a party, are of direct relevance to the OTF. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea. 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, the fishery's compliance with their requirements can be assessed by examination of Part II of this report. The application of the International Convention for the Prevention of Pollution from Ships (MARPOL) to vessels operating in the fishery 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 OTF management regime is documented, publicly available and transparent, and is developed through a consultative process. The management arrangements are adaptable and underpinned by appropriate objectives and performance criteria by which the effectiveness of the management arrangements can be measured, enforced and reviewed.

The management arrangements, as provided for in the commitments for the final FMS, are capable of controlling the harvest through a combination 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 regime takes into account arrangements in other jurisdictions, and adheres 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 obtained through the mandatory monthly Catch and Effort Returns system. Fishers report their landings by species, effort expended by method and areas fished to DPI at the end of each month. Landings by species and effort are generally reported by fishing method for an ‘ocean zone’, although some data are reported for mixed zones. Each ocean zone comprises 1° of latitude, or approximately 60 nautical miles, along the NSW coastline. The current returns also request an estimate of the total trawl time and the number of shots. This compares with fishery dependent data in the ECOTF, which is now collected on a shot-by-shot basis in 6 minute grids. The use of VMS data allows the Queensland Department of Primary Industries and Fisheries (DPI&F) to have even finer spatial scale data.

In the prawn trawl fishery, the use of monthly catch and effort data would make the determination of catch per unit effort (CPUE) trends difficult, as it is impossible to determine which species were being actively targeted and in which sector (inshore, offshore, deepwater) that effort was being expended. DEH is concerned that the current data collection system could mask declines in CPUE for key species such as eastern king prawns. In addition, DEH sees benefits in collecting data at a more precise spatial resolution. DEH is also aware of limitations in using the NSW data together with Queensland data for joint stock assessments on the eastern king prawn stock, given the finer temporal and spatial scale at which Queensland data is collected. Noting the objective in the draft FMS to improve the quality of the catch and effort information collected from the OTF, DEH recommends that DPI implement finer temporal and spatial scale logbook reporting of catch and effort in the OTF by mid 2008, to improve the robustness of resource assessments and allow for enhanced cross-jurisdictional cooperation. DEH appreciates the need for structured changes to data recording and analysis systems but considers that DPI needs to give priority to this issue over the next two years.

**Recommendation 4:** *DPI to implement finer scale temporal and spatial logbook reporting in the OTF by mid 2008, to improve the robustness of resource assessments and allow for enhanced cross-jurisdictional cooperation.*

Fishery dependent catch and effort data are generally not validated, although there is scope to randomly cross reference logbook data with fish receiver records. The reliance on non-validated fishery dependent data for the assessment of the target and key byproduct species taken in the OTF is concerning. Therefore, DEH sees catch and effort logbook data validation as a priority issue and proposes a timeline of mid 2008 to implement effective changes. DEH notes the management response outlined in the draft FMS to implement a scientific observer program may offer an appropriate system to validate logbook data.

**Recommendation 5:** *DPI to develop and implement a robust system to validate catch and effort logbook data by mid 2008.*

There may be some mis-reporting of particular groups, for example, elasmobranchs. The OTF EIS notes that many elasmobranchs that are reported as school sharks, are known to be species of whaler sharks. Given that several species of elasmobranchs rated a high risk in the EIS, DEH considers it a priority to ensure that catch records for these species in particular are accurate, so that future stock and risk assessments undertaken on these species are robust. In addition, one of the key issues identified in the *National Plan of Action for the Conservation and Management of Sharks* is the need to improve identification of shark species by all resource users.

**Recommendation 6:** *DPI to implement a system to improve the identification and recording of elasmobranch species taken in the OTF.*

While VMS is not currently a requirement for vessels operating in the OTF, DEH has made a recommendation for robust compliance measures to be developed and implemented in order to promote a high level of compliance with key management responses outlined in the draft FMS (see **Recommendation 11**). The NSW DoP has also recommended the introduction of VMS into the OTF within 5 years of the FMS commencing. DEH notes that the availability of VMS data would provide DPI with a system to validate effort data recorded in logbooks.

The OTF EIS provides details on the considerable research that has been conducted on target and key byproduct species landed in the OTF, although a large proportion of this is now dated.

A joint NSW/Australian Government research program studying the biology and stock assessment of important fish trawl species was conducted between the mid 1970s and the 1990s and provided much of the biological and fishery data used for the current management of the OTF. Stock assessments for eastern gemfish and redfish resulted from this work and valuable biological information was collected and analysed for jackass morwong, tiger flathead, ocean perch, mirror dory, school whiting and royal red prawns.

A repeat of a 1970s research project on the continental slope grounds, conducted in the 1990s (Andrew *et al.*, 1997) documented significant changes in the abundance and size composition of trawl fish resources. Recent research has also been undertaken on silver trevally (Rowling and Raines, 2000) and on the selectivity of fish trawl gear for a number of important south-east trawl species (Knuckey *et al.*, in prep).

A number of research projects were also undertaken on the eastern king prawn stock in the late 1980s and early 1990s, the results of which were combined and led to the development of a detailed yield model for the ocean king prawn fishery (Glaister *et al.*, 1990; Gordon *et al.*, 1995).

The OTF EIS lists a number of research projects that are currently underway, including studies on the growth and mortality of school prawns and the selectivity of prawn and fish trawl nets.

The OTF EIS notes that despite the research available, more knowledge is required to ensure that the OTF is managed sustainably. DEH notes the management responses in the draft FMS to investigate the cost effectiveness of using fishery independent surveys to provide abundance indices and other information for resource assessment of the primary species and key secondary species taken in the OTF within 3 years and to develop and implement a strategic research plan within 12 months, and is highly supportive of these commitments.

Overall, DEH considers that there is a need to improve both the temporal and spatial nature of fishery dependent data collected by DPI for the OTF (**Recommendation 4**) and that these data should be appropriately validated (**Recommendation 5**). The implementation of these recommendations should ensure that there is a reliable information collection system in place, appropriate to the scale of the OTF. DEH also considers that while much research has been conducted on key species of the OTF, further research and fishery independent information would be beneficial for the sustainable management of OTF resources. DEH is highly supportive of the commitments made in the draft FMS to facilitate this.

## Assessment

The OTF EIS notes that many of the species that make up a large proportion of the OTF landings have either inadequate or no stock assessments. As a part of the OTF EIS a risk assessment of all primary, key secondary and secondary species was undertaken. The risk assessed was the probability of these stocks becoming unsustainable within the next 20 years if the current operation of the OTF continued. Risk was assigned based on a series of resilience and fishery impact profile factors.

Five elasmobranch species were identified as being at high risk from the operation of the OTF (fiddler sharks, angel sharks, saw sharks, greeneye dogfish and endeavour dogfish), mostly due to their low resilience and lack of stock assessments. A further seven finfish species (silver trevally, latchet, redfish, leatherjacket, ocean perch, rubberlip morwong and moonfish) and two crustaceans (eastern king prawn and school prawn) were identified as being at moderately high risk. Stocks of silver trevally, redfish and eastern king prawns have been identified as growth overfished, while the remaining species have declining catch trends and inadequate stock assessments.

The draft FMS includes a management response to develop a system to conduct resource assessments of each of the primary and key secondary OTF species within 3 years, with an ongoing 3 year review cycle. In order to meet this commitment, DPI have developed a 5 tier stock assessment classification system (refer to Table 2), with Class 1 referring to data rich species (for example, eastern king prawn) and Class 5, referring to those species for which no data is available (for example, many bycatch species) (Scandol, 2003).

**Table 2: Stock assessment classes proposed to be used in determining stock assessments of primary, key secondary and secondary species of the OTF (taken from OTF EIS).**

Class	Characteristics
1	<ul style="list-style-type: none"> <li>▪ Credible time series of an index of abundance (survey data or good logbook data)</li> <li>▪ Biomass estimate with errors</li> <li>▪ Risk analysis of managerial strategies</li> <li>▪ Use of standard fishery reference points as trigger points</li> <li>▪ Time series of a recruitment index</li> <li>▪ Externally reviewed or published</li> </ul> <p><b>Example: eastern king prawns</b></p>
2	<ul style="list-style-type: none"> <li>▪ Credible time series of CPUE data</li> <li>▪ Local data on individual growth and total mortality</li> <li>▪ Some information on adult movement from tagging studies</li> <li>▪ Indicator/trigger points based upon landings, CPUE, age/length structure</li> </ul> <p><b>Example: most primary OTF species</b></p>
3	<ul style="list-style-type: none"> <li>▪ Representative time series of landings</li> <li>▪ Time series of CPUE data with mixed credibility</li> <li>▪ Local data on individual growth and total mortality</li> <li>▪ Indicator/trigger points based upon landings, CPUE, age/length structure</li> </ul> <p><b>Example: key secondary and some secondary OTF species</b></p>

4	<ul style="list-style-type: none"> <li>▪ Questionable time series of landings due to species identification issues</li> <li>▪ Data on individual growth and total mortality from other sources, if available</li> <li>▪ Indicator/trigger points based upon landings only</li> </ul> <p><b>Example: some secondary OTF species</b></p>
5	<ul style="list-style-type: none"> <li>▪ Species not landed, but known to suffer fishing mortality</li> <li>▪ Data on individual growth and total mortality from other sources, if available</li> <li>▪ No stock status trigger points defined, or only used within indicators of discarding</li> </ul> <p><b>Example: bycatch species</b></p>

Generally the bulk of primary OTF species fall into Class 2, key secondary species into Class 3 and secondary species into Class 4.

DEH considers the implementation of such a fishery assessment process to be a key management response in the FMS and supports this with an equivalent recommendation. DEH considers that the fishery assessment process should be robust in that it should:

- use the best available information and comment on the accuracy of this data;
- incorporate data from all sectors and jurisdictions harvesting a particular species;
- consider estimates of effort creep; and
- include a review process to ensure ongoing improvement in the fishery assessment process.

**Recommendation 7:** *DPI to develop a robust and regular fishery assessment process that provides a basis for management decisions, which are precautionary and recognise the uncertainty and level of risk. The assessment process will examine the exploitation status of the primary and key secondary species using appropriate resource assessment tiers, within 3 years.*

While the National Recreational and Indigenous Fishing Survey (NRIFS) (Henry and Lyle, 2003) provided a snapshot of recreational and Indigenous harvest of species targeted by the OTF, there is no on-going program in NSW to collect harvest information from the recreational or Indigenous sectors. Given that the recreational and Indigenous catch of some primary and key secondary species harvested by the OTF could be significant, DEH recommends that DPI develop and implement a system to collect robust data on the harvest rates of OTF species of all non-commercial sectors that can be incorporated into the fishery assessment process.

**Recommendation 8:** *DPI to institute programs to provide appropriate estimates of the harvest rates of OTF primary and key secondary species by the recreational and Indigenous sectors, and incorporate these data into the fishery resource assessment process.*

As a part of the overall stock assessment system proposed in the draft FMS, a separate management response is to monitor the quantity, length and/or age and sex composition of the primary and key secondary species taken by the OTF through a catch monitoring program.

## Management response

The OTF is managed primarily through a range of input controls including, limited entry, gear and boat restrictions, spatial and temporal closures and for some species, minimum size limits and trip limits. These management measures were fully discussed in Part I.

A key area of concern with the current management arrangements is the large amount of active effort in both the fish and prawn trawl sectors of the OTF. Adding to this concern is the presence of a high level of latent fishing effort in both sectors, that if activated, would increase pressure on the species harvested by the OTF.

The EIS highlighted the risks from excess effort currently in the fishery and additional risks from the potential activation of the high level of latent effort. A number of submissions received on the EIS also raised concerns with unsustainable effort levels and the inadequacy of proposed controls in the draft FMS.

One objective of the draft FMS is to establish a level of fishing effort in the OTF that is commercially viable and ecologically sustainable. Management responses outlined in the draft FMS include:

- limiting the number of endorsement types and using other tools to minimise latent effort, within 3 years;
- extending the restrictions on hull capacity, engine power and net length that currently apply to the offshore prawn trawl sector to the other sectors of the OTF;
- establishing a maximum level of fishing effort for each sector of the OTF over the next 10 years. Over the next 12 months, milestones and triggers will be developed to ensure gradual reductions are being achieved; and
- limiting the annual number of days/nights each boat may work in the prawn and fish trawl sectors, with an initial cap of 200 nights per boat per year.

The PSR for the OTF acknowledges that there needs to be shorter term effort control milestones within the 10 year overall effort control target. The PSR recommended the draft FMS be revised to introduce a system within 3 years of the commencement of the FMS that limits the number of days/nights each boat can work in the fishery. The PSR notes that the OTF MAC has supported the introduction of an initial cap of 200 nights per boat per year across the fishery with future allocation based on shareholdings in the fishery. The PSR also notes that DPI is working with the NSW SIAC on a structural adjustment framework and action plan to achieve an appropriate level of effort in NSW fisheries.

The NSW DoP's *Report and Recommendations on the Environmental Impact Statement and Fishery Management Strategy for the Ocean Trawl Commercial Fishery, February 2006* supports this approach and recommends NSW DPI give further priority to structural adjustment schemes for the OTF, including consideration of compatible structural adjustment arrangements with the Commonwealth. The NSW Minister for Primary Industries' determination of the OTF includes recommendations from the Director-General of DPI requiring, within two years of the commencement of the OTF SMP, the total number of days /nights worked in the OTF to be limited to current active levels and that these be allocated in proportion to shareholdings and that the allocations be adjusted over time to ensure the level of fishing effort provides for ecological sustainability and commercial viability.

DEH considers these management responses to be key commitments of the final FMS, and are necessary to ensure that the OTF is managed in an ecologically sustainable way. DEH supports the action to cap the number of days/nights each boat may work, in order to better manage active effort levels within the fishery.

DEH is encouraged by the measures proposed to limit effort levels but notes that DPI has provided limited details on the process that will be used to achieve these management responses. Given the importance of effort controls to the ongoing sustainability of the fishery, DEH considers this matter should be given priority by DPI. DEH considers that DPI should develop a timeline and trigger points relating to the better management of effort levels within the fishery and recommends that these be provided to DEH within 12 months of the approval of the FMS. DEH also recommends that ecologically sustainability should be the primary consideration when determining effort levels for the various sectors of the OTF.

**Recommendation 9:** *DPI to manage effort in each of the five sectors of the OTF with the aim of achieving ecologically sustainable levels and to actively pursue a reduction in latent effort in the OTF. DPI to provide DEH, within 12 months of the approval of the FMS, with a timeline, including associated milestones and trigger points, for achieving an ecologically sustainable level of fishing effort for each sector of the OTF.*

While the current management arrangements for the OTF detail a number of gear and boat restrictions, the fact that two of the OTF's target finfish (silver trevally and redfish) species and two target prawn species (eastern king prawn and school prawn) are classified as growth overfished indicates that gear selectivity in both the fish and prawn trawl sectors of the OTF may be inappropriate. To address these concerns, the draft FMS includes a management response to ensure the selectivity of the gear used in the OTF (excluding gear used in designated whiting areas) is appropriate in relation to the biology of the species being targeted. The specific measures outlined in the draft FMS place some restrictions on the size and construction of the cod-end which make substantial differences to selectivity (ie. single twine mesh in fish trawl cod-ends), but do not change the current regulation regarding mesh size for fish trawl nets, which remains at 90 mm. The draft FMS places a 12 month timeframe on the implementation of these measures and acknowledges that these are short-term measures to improve selectivity until the results of current and future research are considered, and net configurations with better selectivity for the target species are formulated.

The draft FMS includes some specific management responses related to the management of school whiting that set a target catch range and improve gear selectivity. A target range, based on recent landings, for the annual landed catch of whiting (red spot and stout whiting species combined) will initially be set at 1,100 to 1,400 tonnes annually, with a trigger point set to conduct a review of the harvesting arrangements for school whiting if the annual catch lies outside this range. The draft FMS indicates that if the upper limit of this range is exceeded, consideration will be given to creating a separate limited access fishery. In addition, the draft FMS outlines a number of gear and area restrictions for vessels operating under prawn and fish trawl sector endorsements. Prawn trawl endorsement holders will be required to use square mesh codends when operating in waters open to trawling. Fish trawl endorsement holders may use a net with a minimum mesh size of 90 mm throughout and a double braided twine codend in waters open to trawling that are less than 55 m deep. This is subject to a commitment to conduct research and implement the results of research relating to the selectivity of a single rig net designed specifically to target whiting.

The draft FMS assigns a medium term timeframe to these management responses (within 3 years), however DEH notes that the PSR requires introduction of the management arrangements within 12 months. DEH considers it important that responses are undertaken in the same timeframe as the wider gear specification changes discussed above and therefore, provides a complementary recommendation that DPI implement the arrangements relating to the management of school whiting within 12 months of the approval of the FMS.

**Recommendation 10:** *DPI to implement the management arrangements outlined in the FMS relating to school whiting (target catch range, trigger points, gear and area restrictions) within 12 months of the approval of the FMS.*

A number of spatial and temporal closures also apply to both the prawn and fish trawl sectors of the OTF. Ten current prawn trawl fishery closures are listed in the OTF EIS. The closures are a mixture of year round and seasonal closures, implemented with the primary objective of protecting juvenile prawns. Some of these closures also offer protection to juvenile fish and habitat.

A closure is in place for the fish trawl sector of the OTF, with all waters north of Smokey Cape closed to fish trawling. A closure has been in place off Port Kembla since 1999 to protect juvenile fish and still applies. Closures to fish trawling are also in place in the waters of Twofold Bay and Merimbula Bay. In addition, all forms of trawling are excluded from specified marine park zones and grey nurse shark critical habitat protection areas.

The draft FMS includes a number of management responses related to spatial and temporal closures for the OTF including:

- implementing a series of closures to trawling to protect the range of ocean habitats and associated biodiversity, including closure of all reefs and depths greater than 1,100 metres;
- continuing the prohibition on using fish trawl nets north of Smokey Cape;
- closing approximately 75% of waters south of Barrenjoey Point to all trawling;
- identifying areas and/or times of problem bycatch to target catch ratios and restrict trawling appropriately. In particular, by implementing closures to trawling around river entrances during time of high river discharge;
- maintaining and enhancing the effectiveness of the juvenile prawn closures, including making all such closures year-round (with some conditions) and investigating the need to establish such closures adjacent to the mouths of all major estuaries along the NSW coast; and
- developing strategies to establish 'refuge' areas and spawning closures for species targeted by trawling.

DEH considers that the range of closures outlined in the draft FMS have the potential to significantly improve the management arrangements for the OTF, but given the lack of detail provided on such things as refuge areas and spawning closures, it is difficult to make a full assessment of the proposals. While most of these management responses have a 1 to 3 year timeframe for implementation, it may take a longer time to detect improvement, especially for species such as elasmobranchs. DEH also agrees with the assessment undertaken in the OTF EIS that the management responses outlined in the draft FMS may offer benefits to those species at high and moderately high risk, but this is highly dependent on the specific and differing needs of elasmobranchs and finfish species being considered in the design of closures. The PSR proposes some enhancements to the final FMS by reducing the timeframes for introducing closures in relation to reefs and juvenile king prawns and investigating the need for closures off estuary mouths and extending existing closures to the shoreline along with developing further inshore and offshore closures to address the impacts of prawn trawling. The NSW DoP report also supports the PSR approach.

DEH notes that the PSR specifies a review, within 4 years, of the spatial management measures proposed in the draft FMS and will evaluate the need for further closures based on available research, monitoring results and completed mapping work. DEH considers the implementation of effective spatial measures to be a key component in improving the longer term sustainability of the

fishery and intends to closely monitor the implementation of spatial management measures in the FMS and further address this issue in the next DEH review of the fishery.

Minimum size limits apply to 18 important finfish species taken in the OTF. The size limits have been designed to allow for a sufficient proportion of the population to survive to maturity and therefore ensure sufficient recruitment for the long term sustainability of the species. The size limits are prescribed in Regulation and apply to both commercial and recreational fishers. Trip limits also apply to 12 species that are subject to quota management in the Australian Government managed SESSF.

With the introduction of effort capping in each of the OTF sectors to be introduced immediately and refined over the next 3 years and the improved system of spatial and temporal closures, DEH considers that a system that provides real-time monitoring of a vessel's location would be beneficial to ensuring the success of these management responses. DEH notes the commitment in the draft FMS to review developments in VMS and associated catch and effort reporting systems, with a view to implementing a cost-effective VMS system for the OTF.

The NSW DoP report considers that the implementation of VMS is a necessary prerequisite for the effective management of trawl fisheries in open waters. The report highlights that the draft FMS and PSR propose quite a comprehensive management regime of effort and spatial closures, which might be difficult to implement cost effectively without VMS. The DoP report recommends the FMS be revised to require the introduction of VMS in the fishery within 5 years of the FMS commencing.

DEH considers the implementation of a cost-effective VMS or other effective compliance system for the OTF to be a priority action in ensuring compliance with the range of management measures to be implemented under the FMS and recommends that DPI develop and implement, by November 2008, appropriate mechanisms to promote a high level of compliance with the effort management measures and spatial and temporal closures required in the fishery.

**Recommendation 11:** *DPI to develop and implement appropriate mechanisms, by November 2008, to promote a high level of compliance with the effort management measures and fishery closures outlined in the FMS.*

The OTF EIS identified the inconsistent management regimes between State and Commonwealth jurisdictions as being a key factor increasing the risk levels of some primary and key secondary species. In response to this, the draft FMS commits to monitoring management arrangements and landings of primary OTF species outside of NSW. This is to be done by using cross-jurisdictional consultation to improve complementary management arrangements and research and modifying the arrangements for fish trawling south of Barrenjoey Point to achieve greater complementarity with the Australian Government managed SESSF.

To help achieve this last management response, several arrangements were specified in the draft FMS including closing approximately 75% of State waters south of Barrenjoey Point to trawling, defining a limited number of whiting trawl grounds and capping the catch of the primary and key secondary species taken by fish trawling, and the catch of school whiting taken by fish and prawn trawling (based on the best two years of catch between 1999 to 2003). While DEH is supportive of all of these management responses, the process outlined to cap catch suggests that the catches obtained between 1999 and 2003 were at sustainable levels, which is yet to be substantiated by robust stock assessments. DEH considers that any capping of catch should be based on sustainable yield estimates, in conjunction with the quota system set for the SESSF. Disappointingly, the final

PSR removed the management response to cap individual vessel limits. DEH considers that the harvest of key species jointly targeted by the OTF and the SESSF, in particular ocean perch, silver trevally, redfish and school whiting, should be capped on the basis of the sustainable yield of the stock. DEH notes that the harvest strategies currently in place for SESSF species will be reviewed, in line with the recent commitment by the Australian Fisheries Management Authority to develop harvest strategies for all Commonwealth fisheries by 1 January 2007. DEH considers that any harvest strategies developed by NSW should be compatible to SESSF harvest strategies for shared stocks. A similar approach should be taken with stocks shared with Queensland fisheries.

**Recommendation 12:** *DPI to cooperate with other relevant jurisdictions to pursue complementary management and research of shared stocks for all relevant primary and key secondary OTF species that provide for sustainable harvest limits and effective assessment of stock status. In particular, DPI will cooperate with:*

- *the Australian Fisheries Management Authority in relation to finfish species also harvested by the SESSF, notably ocean perch, silver trevally, redfish and school whiting; and*
- *the Queensland Department of Primary Industries and Fisheries in relation to eastern king prawn.*

The draft FMS includes an overarching goal to maintain stocks of primary and key secondary species harvested by the OTF at sustainable levels which is supported by two high level performance indicators and associated trigger points. The performance indicators deal with the exploitation status of primary and key secondary species and the ratio of landings of secondary species to primary/key secondary species to monitor any shift in the targeting of species.

The draft FMS also includes a management response to monitor the commercial landings of the remainder of secondary species taken in the OTF annually for comparison against an historical range for each of those species. While this is a less precautionary approach than that taken for primary and key secondary species, DEH understands that more resources need to be directed towards the major species harvested in the OTF and considers this proposal to be sufficient, as a part of the development of the wider stock assessment system.

## **Conclusion**

DEH considers that the management regime required under the FMS is appropriately precautionary and provides for the fishery to be conducted in a manner that does not lead to over-fishing. DEH considers that the information collection system, stock assessment and management arrangements generally are sufficient to ensure that the fishery is 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 those proposed under the FMS, and has provided a number of recommendations for improvements in the medium 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’*

A number of species harvested by the OTF have been identified as being overfished, including silver trevally, redbfish, eastern gemfish, eastern king prawn and school prawn. In addition, the most recent Bureau of Rural Sciences status reports identified ocean perch, school whiting and royal red prawn as uncertain status.

An objective of the draft FMS is to promote the recovery of overfished species. Management responses include the development and implementation of a recovery program when the OTF is deemed to be the major harvester of a species determined as overfished. In this regard, the draft FMS requires the development of a recovery program for silver trevally. In addition, the draft FMS requires a determination as to whether a recovery program is required for any other species identified as ‘high risk’ in the environmental assessment conducted as a part of the OTF EIS or subsequent research, and implement necessary actions.

The draft FMS includes a new management response that will be specified in the recovery program for silver trevally, introducing a minimum legal size of 30 cm total length along with the other requirements outlined in the draft FMS for fish trawl nets.

The draft FMS also includes a management response to contribute to the development of any recovery programs and adopt any measures to be introduced as part of a recovery program when the OTF is a minor harvester of an overfished species. In this regard, the draft FMS requires a determination if additional measures are needed to improve the selectivity of fish trawl nets for redbfish (given the changes being made as part of the silver trevally recovery program) and the implementation of the provisions of the recovery program that will be developed for gemfish under the Ocean Trap and Line FMS.

It is important to note that the harvest strategy of the draft FMS includes an exception to the management responses outlined above, by stating that a recovery program is not required for species that are determined as growth overfished if the Director-General of DPI, considers that the combination of the existing harvest strategy and life history characteristics of the species provides sufficient protection for the stock from the effects of fishing.

While DEH accepts that growth overfishing is not as serious a concern as recruitment overfishing, if action is not taken to address species that are classified as growth overfished, the risk to the population of subsequent recruitment failure arising from increased fishing pressure or external factors, increases. As all species identified in the submission as overfished are classified as growth overfished, it is possible that under the suggested approach no recovery strategies will be developed for species currently highly exploited by the fishery such as eastern king and school prawn stocks and silver trevally. DEH considers that the EIS has identified considerable risks to the status of growth overfished stocks that need to be addressed by more definitive actions than prioritising monitoring and assessment. DEH considers that priority should be given to developing recovery strategies for all OTF primary and key secondary species classified as recruitment overfished and that these should be developed and implemented within 6 months of the species being classified as recruitment overfished. DEH also considers that for species categorised as growth overfished, there needs to be a firm commitment to reviewing the status of the stock/s to identify the risks of those stocks becoming recruitment overfished and if significant risks are identified then specific measures

should be implemented within 12 months to prevent the stocks from becoming recruitment overfished.

**Recommendation 13:** *DPI to develop and implement a recovery strategy for all OTF primary and key secondary species classified as recruitment overfished, within 6 months of the species being so classified. For species categorised as growth overfished, the status of the stock/s will be reviewed and specific measures implemented, as required, within 12 months to prevent the stocks from becoming recruitment overfished.*

## Conclusion

The assessment that stocks are overfished is being addressed through the FMS requirement for recovery programs and a recovery program is under development for silver trevally. Several primary and key secondary species harvested by the OTF are currently classified as growth overfished and are at risk of becoming recruitment overfished. DEH considers that the measures contained in the FMS provide for the recovery of these stocks should they become recruitment overfished. DEH has some concerns with the continued risks of growth overfishing leading to further stocks becoming recruitment overfished, and has made a recommendation to further address these risks to ensure the sustainability of stocks in the medium to longer term.

## 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

Fishers are not required to record bycatch on Monthly Catch and Effort Returns, so there is no routine and regular collection of fishery dependent data on bycatch in the OTF.

The OTF EIS discusses several research and observer programs that have investigated incidental catch in the OTF, using both fish and prawn trawl nets. The research vessel RV *Kapala* completed several trawling surveys between the 1970's and 1990's, representative of commercial trawling in the ocean prawn trawl (inshore and offshore), ocean fish trawl shelf, ocean fish trawl south and deepwater sectors of the OTF. The results of these cruises have been compiled and published as the *Kapala* Cruise Reports and provide composition and relative frequency of bycatch, by the OTF sector.

Observer work was undertaken on fish trawl vessels operating in the northern sector of the OTF between 1993 and 1995 (Liggins, 1996) and in the ocean prawn trawl sector between 1990 and 1992 (Kennelly *et al.*, 1998).

No further bycatch monitoring work has been undertaken in the prawn trawl sector, therefore, no quantitative information exists on the effect of the introduction of BRDs into prawn trawl nets and the current levels of bycatch in the prawn trawl sector of the OTF. The OTF EIS notes several information requirements of the OTF, including the spatial and temporal variability in the abundance and diversity of bycatch species, the effectiveness of current BRDs and the post-discard survival of bycatch species. DEH considers the development and implementation of an ongoing monitoring program and further research into bycatch in the OTF as high priorities for the future management of the fishery. DEH notes the management response outlined in the draft FMS to

design and implement an industry funded scientific observer program to document the degree of interactions of the OTF with non-retained and threatened species and to collect information regarding the effectiveness of BRDs currently used in the OTF. DEH considers this to be a high priority action in the management arrangements and therefore supports this with an equivalent recommendation.

**Recommendation 14:** *By the end of 2007, DPI to develop and implement a system sufficient to identify changes in the composition and quantity of bycatch over time and establish more robust estimates of interactions with threatened and protected species in the OTF.*

## Assessment

The bycatch of the OTF has been described in the studies discussed above. The Kapala Cruise Reports identify some 300 non-commercial bycatch species. The three most frequent non-commercial species, by sector, were:

- Ocean prawn trawl – long-spined flathead, crested flounder and long-finned gurnard;
- Ocean fish trawl shelf – greenback stingaree, sandyback stingaree and longspine snipefish;
- Ocean fish trawl south – long-spined flathead, eastern smooth boxfish and sparsely-spotted stingaree; and
- Deepwater – armoured flathead, cuttlefish and cucumber fish.

Observations on vessels using fish trawl gear in the northern sector of the OTF showed that 83% of the bycatch (by weight), comprised small non-commercial species. Approximately 17% of the bycatch (by weight) comprised small individuals of commercial species, in particular, redfish, tiger flathead and snapper (Liggins, 1996).

Observations on prawn trawl vessels found that the bycatch comprised mostly small commercial and non-commercial species of finfish and invertebrates (Kennelly *et al.*, 1998). This study reported a target to bycatch ratio, by weight, of 1:10.4.

Sessile invertebrates, such as sponges, bryozoans and sea pens, frequently comprise a significant component of trawl catches on grounds that have not been trawled for some time. It was found that the greatest impacts of trawling on these species occurred shortly after trawling had re-commenced (Watling and Norse, 1998) suggesting that these species have a low resilience to trawl nets.

The OTF EIS includes a risk analysis of 156 species of non-commercial bycatch that were recorded in the Liggins (1996) and Kennelly *et al.*, (1998) observer studies. Discards of commercially harvested species were assessed in the primary, key secondary and secondary species risk analysis discussed previously. The risk analysis undertaken for non-commercial bycatch used the same process as that previously described for the primary, key secondary and secondary species. Ninety five percent of the species assessed had a high (30%) or moderately high (65%) level of risk from the operation of the OTF. The OTF EIS notes that this risk rating may be conservative, as data on the total population of many of these species is not known, therefore, it is difficult to assess whether the OTF is having a significant effect on populations. Additionally, the risk assessment used data from a study that pre-dated the introduction of BRDs into the prawn trawl sector of the OTF, therefore the composition and frequency of species captured may now be different to that assessed. DEH considers the implementation of an ongoing system to collect information on the composition

and quantity of bycatch in the OTF (see **Recommendation 14**) will address the second of these points.

### **Management response**

In 1999, the use of BRDs was made compulsory in prawn trawl nets. There are currently 8 BRDs approved for use in ocean prawn trawl nets. BRDs are not compulsory for vessels operating in the fish trawl sector of the OTF as their design would exclude many of the primary and key secondary species that are targeted. Therefore, further management responses are required to reduce bycatch in the fish trawl sector.

The OTF EIS notes that given the large number of species encountered as bycatch in the OTF, the best management objective is to minimise bycatch as a whole. Given the diversity of species encountered, the OTF EIS concludes that several management responses may be necessary, including more effective BRDs and spatial and seasonal closures, to provide a comprehensive approach to minimising bycatch. Such management responses will be better informed when better data is available on the spatial and temporal patterns of bycatch in the fish trawl sector.

The draft FMS includes an objective to mitigate the impact of the OTF on non-retained species, and this is supported by a number of management responses including:

- a number of the suggested closures, including the closure of all reefs, the closure of areas surrounding river entrances during time of high discharge and the restriction of trawling in areas with high incidental catch to target catch ratios;
- amending the specifications of the approved 'square mesh panel' BRD to improve its effectiveness;
- implementing additional BRD requirements for prawn trawl nets south of Smoky Cape and continuing the prohibition on using fish trawl nets north of Smoky Cape;
- investigate alternative handling practices to improve survival of incidental species, in particular, prohibiting at-sea finning and discarding of shark carcasses, banning the riddling of prawns and restricting the use of 'spikes'; and
- developing a code of conduct for OTF fishers to encourage the effective use of BRDs, avoid fishing in areas or at time when small fish are abundant, promote best handling of bycatch and minimise the accidental capture of marine mammals and threatened species.

In addition the management response regarding limiting effort in the OTF will also offer benefits to bycatch species generally. The NSW DoP Report highlights the need to ensure BRD development is undertaken in partnership between DPI and the commercial fishing industry, to continually improve bycatch reduction in the fishery.

DEH considers that the management responses outlined in the draft FMS are adequate to reduce the bycatch of small species in the OTF and supports this with an equivalent recommendation.

**Recommendation 15:** *DPI to continue to pursue a reduction in the amount of bycatch taken in the OTF through the refinement of bycatch mitigation technology and to support the investigation of methods for increasing survivability of bycatch species.*

DEH remains concerned that specific management responses are required for larger bycatch, including sharks and turtles. This concern is discussed in further detail under Objective 2 of this Principle.

The draft FMS outlines two performance measures and trigger points directly related to bycatch:

- species composition (all retained and bycatch species) in the OTF, which triggers if there is a significant shift in species composition as determined by the “Large Area Species Richness” index; and
- the proportion of the total trawl catch which is discarded, and the species composition of the discards, which triggers if the species richness and quantity of discards does not on average decrease from the implementation of BRDs and other commitments in the draft FMS.

In the absence of detailed information on bycatch in the OTF, DEH supports the use of the interim bycatch performance measures that are outlined in the draft FMS. However, DEH considers that an important area for future work is the development of reference points for key bycatch species that are known to be susceptible to trawling.

### **Conclusion**

DEH considers that given the suite of management arrangements proposed for the FMS, there is a high likelihood the fishery will be conducted in a manner that does not threaten bycatch species. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DPI would undertake appropriate actions to ensure that bycatch species are not threatened by this fishery.

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

### **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**

There is very little information available on the interaction of the OTF with threatened and protected species. The best information available is that for listed finfish species, that are currently listed under NSW threatened species legislation, which was collected by OTF observer programs discussed under the bycatch section (Liggins, 1996 and Kennelly *et al.*, 1998). Fishers operating in the OTF are not required to record protected species interactions in the logbooks currently used in the fishery.

To address the lack of data, the draft FMS commits to a scientific observer program, one objective of which will be to document the degree of interaction of the OTF with threatened species.

Mandatory reporting of interactions with threatened, endangered and protected species has been introduced in all NSW commercial fisheries. A reporting system and information package has been distributed to all relevant fishers.

### **Assessment**

The draft FMS notes, while little quantitative data is available on interactions with protected species in the OTF, marine turtles, sharks, seals and protected finfish are the most likely protected species to be directly captured in trawl nets. There is also the potential for seabirds to become entangled in

gear, however, this is thought to be rare as in the adjacent Australian Government SESS, seabird mortality has been observed to be virtually non-existent (Knuckey and Liggins, 1999).

The risk analysis of threatened and protected species undertaken in the OTF EIS included a preliminary assessment which identified 43 listed threatened marine fish, birds, reptiles and mammals as not requiring further assessment because of the very small probability of any interaction with the OTF. The remaining 51 protected and threatened species were subject to detailed risk assessment.

The risk assessment found all threatened and protected species to be at low or moderately low risk. All species of seabirds were assigned a moderately low risk level, as were the Australian and New Zealand fur seal species. The four species of marine turtles assessed (loggerhead, green, hawksbill and leatherback) were all given a low risk assessment. The two species of shark listed as threatened under the EPBC Act, grey nurse and great white shark were both given a low risk rating.

DEH considers, that given the lack of quantitative data currently available on protected species interactions in the OTF, the risk analysis undertaken in the OTF EIS is adequate. However, this risk analysis should be reviewed as quantitative data from the observer program and fishery dependent data become available.

There are no listed ecological communities in the fishery area.

### **Management response**

There is currently a prohibition on the retention of any threatened or protected species in the OTF. No other specific management arrangements are specifically designed to mitigate the impact of the OTF on protected and threatened species.

The draft FMS includes a management action to determine, through the on-board observer work, the level of interactions of the OTF with marine turtles and seals and assess the need to introduce turtle and/or seal excluder devices or other measures to minimise impacts on these species within 3 years. DEH considers this a priority management response and considers the timeframe for management action should be shortened to immediate, as soon as interactions with either marine turtles or seals become evident. The PSR notes that an assessment of the need for Turtle Excluder Devices (TEDs) and Seal Excluder Devices (SEDs) should be conducted in the medium term. While DEH currently considers there is not sufficient quantitative information available to immediately introduce mitigation measures into the fishery, the extent of interactions with protected and threatened species in the OTF will be monitored through annual reporting of interactions and DEH will require immediate management action in the event interactions are shown to be a regular event.

In addition, several of the management responses included in the draft FMS to address broader environmental objectives, including the series of closures outlined, may also offer additional protection to protected and threatened species.

DEH notes the proposed change to the performance indicator and trigger point regarding protected species for all FMS's. The proposed trigger point measures the possibility of an interaction threatening the survival of a protected species or threatened species, population or ecological community. The EPBC Act requires that all reasonable steps are taken to ensure relevant species are not killed or injured as a result of fishing and the fishery is not likely to adversely affect the survival or recovery in nature of the species. The EPBC Act requires that actions are taken to minimise interactions with protected species, irrespective of the survival status of the species,

therefore DEH disagrees with the position that mitigation action is only taken if the survival of the species is threatened by interactions (see **Recommendation 16**).

DEH remains concerned that the draft FMS does not provide sufficient protection for the bycatch of larger species, such as turtles and sharks. DEH notes the commitment in the draft FMS to include an assessment of the need for TEDs and SEDs following the collection of observer data and logbook data. DEH considers a revised assessment of the need for specific management responses for larger bycatch and protected species a key priority and supports this with a recommendation.

**Recommendation 16:** *DPI to, before the end of 2008, review the data collected on interactions of the OTF with protected species listed under the EPBC Act and other large species of bycatch. If the review indicates the OTF has interactions with any protected species listed under the EPBC Act, DPI to introduce appropriate management responses, which may include turtle excluder devices, seal excluder devices and closed areas, into the fishery as a priority.*

## **Conclusion**

DEH notes that interactions with protected species in this fishery are thought to be minimal, although this assessment is not based on firm quantitative data. At the present time, DEH considers that the fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species. Should this situation change, or if new data indicate otherwise, DEH expects that appropriate actions will be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

A recommendation has 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**

As is the case for many Australian fisheries, little work has been done on describing the spatial distribution of habitat types on the NSW continental shelf. Bax and Williams (2001) conducted a survey to map major seabed features and habitats on a megascale on the South East Australian continental shelf. With respect to NSW, this survey covered the NSW coastal area south of Bermagui to the Victorian border. The survey found that soft-grounds represent 89%, and reefs and bedrock represent 11%.

A study has also been undertaken which classified the NSW continental shelf seabed into a variety of geomorphological units, describing the sediment characteristics of each unit. Biogenic habitats and species assemblages associated with geomorphological units are yet to be described (Boyd *et al.*, 2004).

Four major information gaps were identified in the OTF EIS risk analysis on marine habitats:

- identification of fishing grounds and mapping the distribution of fishing effort;
- identification and mapping the distribution of broad habitat types;
- assessment of the effect of the size of the fishery on habitats; and

- lack of biological and ecological knowledge for biogenic habitats.

The draft FMS contains several management actions to address these information gaps, the most significant of which is the commitment to develop a strategic research plan. Other management responses included in the draft FMS will be included within the strategic research plan, including:

- defining and mapping trawling grounds and determining the intensity of trawling on each ground;
- promoting and supporting targeted research into the distribution of marine habitats off NSW and the potential impacts of trawling on these habitats, biodiversity and the environment; and
- promoting research to improve understanding of ecosystem functioning and the effects of trawling.

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 the management responses included in the draft FMS to promote and support research in this area.

### **Assessment**

The OTF EIS included a comprehensive review of the habitat types important for the long-term sustainability of the OTF.

A risk analysis was undertaken for the types of marine habitats affected by the OTF (shown with associated risk rating):

- Geological: hard ground high vertical relief (Intermediate);  
hard ground low vertical relief (High); and  
soft ground (Moderately-High).
- Biogenic: biota of hard ground high vertical relief (Intermediate);  
biota of hard ground low vertical relief (High); and  
biota of soft ground (High).
- Water column (Low).

The risk analysis carried out on marine habitats identified four major impediments to reducing risk levels. The first, major information gaps, was discussed previously in this section. The other three are:

- fishing practices that cause irreversible damage to habitats;
- adequate refuge areas are needed to conserve habitats; and
- inconsistent fishery management regimes among jurisdictions.

The OTF EIS included a risk analysis on the risk of the OTF to the biophysical environment (water quality, noise and light, greenhouse gases and air quality). The assessment found that all components of the biophysical environment were at low risk from the operations of the OTF, given that regulations control and define certain activities that minimise or eliminate the potential for contamination of the environment and the heightened awareness of fishery of gross pollution from

their vessels (debris, noise and light) and the need to improve the image of the OTF to the general public.

### **Management response**

The OTF EIS noted the importance of maintaining healthy fish habitat to ensure the long term sustainability of fish stocks. There was also recognition of the need for effective whole of catchment management to conserve and protect coastal and marine habitats. This is undertaken to some extent through existing legislation and policies. The *Fisheries Management Act 1994* provides for fish habitat protection through habitat protection plans, aquatic reserves, protection of mangroves and certain other marine vegetation, while in 1999 an updated Policy and Guidelines for Aquatic Habitat Management and Fish Conservation was released by DPI.

NSW is also committed, under international, national and state agreements, to conserve marine biodiversity and manage the ecologically sustainable use of fish and marine vegetation. A key component of which is to establish Marine Protected Areas – of which, several types have implications for the protection of marine biodiversity in the area of the OTF, including marine parks and aquatic reserves.

In response to the risk analysis carried out on habitat types, the draft FMS contains a number of management responses directed towards addressing the impediments to reducing the risk level of those habitats rated a high risk (as noted above):

- the closure of all reefs, including low profile reef;
- the requirement to use new trawl gear that minimises the impacts on habitats and associated biota, in particular, prohibiting or limiting the size of bobbins and restrictions on ground chain size;
- develop strategies to establish refuge areas and spawning closures for species targeted by trawling;
- using cross-fishery and cross-jurisdictional consultation to discuss and manage issues relating to multiple use of fishing grounds;
- modification of the arrangements for trawling in the area south of Barrenjoey Point to achieve greater complementarity with the Commonwealth fishery; and
- manage the OTF consistently with other jurisdictional or Natural Resource Management requirements.

As the OTF EIS found that all of the components of the biophysical environment were at low risk from the operations of the OTF (as discussed above) no specific management responses were included in the draft FMS related to this issue. One management response that is relevant is the commitment to develop a Code of Conduct in which specific reference is made to minimising pollutants and reducing marine debris.

Impacts on water quality through the discharge of plastic wastes and pollution from vessels are controlled under MARPOL legislation. DEH considers that given the commitment to develop a Code of Conduct that will include provisions related to marine pollution, the OTF essentially complies with this legislation.

### **Conclusion**

DEH considers that the fishery, with the implementation of the commitments made in the draft FMS and PSR, will be conducted in a sufficiently precautionary manner to minimise the impact of fishing operations on the ecosystem generally. Recommendations have been made elsewhere in this

report to ensure the risk of significant impact by the fishery on the marine environment generally is minimised in the longer term.

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## LIST OF ACRONYMS

ACCF	Advisory Council on Commercial Fishing
BRD	Bycatch Reduction Device
CPUE	Catch Per Unit Effort
DEH	Department of the Environment and Heritage
DoP	New South Wales Department of Planning
DPI	Department of Primary Industries
DPI&F	Department of Primary Industries and Fisheries
ECOTF	East Coast Otter Trawl Fishery
EIA	Environment Impact Assessment
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FMS	Fishery Management Strategy
MAC	Management Advisory Committee
MARPOL	International Convention for the Prevention of Pollution from Ships
NRIFS	National Recreational and Indigenous Fishing Survey
NSW	New South Wales
OCS	Offshore Constitutional Settlement
OTF	Ocean Trawl Fishery
PSR	Preferred Strategy Report
QFTF	Queensland Finfish (Stout Whiting) Trawl Fishery
SED	Seal Excluder Device
SESSF	South East Scalefish and Shark Fishery
SIAC	Seafood Industry Advisory Council
SMP	Share Management Plan
TED	Turtle Excluder Device
VMS	Vessel Monitoring System
WTO	Wildlife Trade Operation