Fishery Management Strategy

for the

NSW Ocean Trap and Line Fishery

November 2006

NSW DEPARTMENT OF
PRIMARY INDUSTRIES

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The Fishery Management Strategy for the Ocean Trap and Line Fishery will be updated from time to time. Amendments will be made available on the NSW DPI website:

http://www.dpi.nsw.gov.au/fisheries

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Abbreviations

ARC	Australian Research Council
DEH	Department of the Environment and Heritage (Commonwealth)
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESD	Ecologically sustainable development
FM Act	*Fisheries Management Act 1994*
FMS	Fishery management strategy
FRDC	Fisheries Research and Development Corporation
IFS	Indigenous Fisheries Strategy
MAC	Management Advisory Committee
MLL	Minimum legal length
nm	Nautical miles
NSW	New South Wales
NSW DPI	NSW Department of Primary Industries
OCS	Offshore Constitutional Settlement
OTLF	Ocean Trap and Line Fishery

1. Introduction

1.1 Background to the Fishery Management Strategy

In December 2000, the NSW Government made changes to the way fisheries are managed in NSW. These changes place increased emphasis on ensuring that fishing activities are environmentally sustainable. The changes require the development of a fishery management strategy for each major commercial fishery, fish stocking and for the beach safety program. They also require an assessment of the environmental impacts of those fishing activities.

The fishery management strategy (FMS) for the Ocean Trap and Line Fishery (OTLF) is much more than a collection of rules for the fishery. The strategy contains the vision, goals and objectives for the fishery, a broad description of the way the fishery operates, and outlines the future management framework. It also outlines a program for monitoring the performance of the fishery against the management goals. Where necessary, information about the impacts of harvesting by other fishing sectors (such as recreational fishing) is also provided, however the rules contained in this FMS apply only to the OTLF. The rules applying to other commercial and non-commercial fishing sectors are separate management arrangements and are not the subject of this strategy.

The Management Advisory Committee (MAC) for the OTLF provided significant input into the drafting of this strategy. Input into the draft strategy was also sought from all fishers endorsed in the OTLF, the Ministerial advisory councils on the seafood industry and recreational fishing, and the Fishery Management Strategy Working Group. Government agencies, such as the NSW Department of Planning and the Commonwealth Department of the Environment and Heritage, have also been consulted throughout the drafting of the FMS.

An Environmental Impact Statement (EIS) was prepared for the OTLF and publicly exhibited in March/April 2006. The EIS contained the draft FMS and an assessment of the environmental risk mitigation measures contained therein. The structure of the EIS was based on guidelines issued by the NSW Department of Planning (formerly Planning NSW), including an assessment of the biophysical, social and economic impacts of implementing the draft management strategy.

The EIS highlighted the importance of the OTLF to the community in terms of employment, supply of seafood to the community and economic benefits. The EIS concluded that, although there were several existing environmental risks, the management controls proposed by the draft FMS provided for an appropriate allocation of the resource and incorporated the measures needed to address the various principles of ecologically sustainable development.

After considering the EIS (among other things), the NSW Minister for Primary Industries made a formal determination under the *Environmental Planning and Assessment Act 1979* on 6 July 2006 with respect to the OTLF (see Appendix 1). The determination permits the fishery to continue subject to the draft FMS being modified to take account of the preferred strategies developed after the EIS public exhibition phase. The FMS presented below incorporates those changes and has since been approved by the Minister under the provisions of the *Fisheries Management Act 1994*.

The requirement for the Government to assess the environmental impacts of each individual Ocean Trap and Line Fishery authority upon its issue or renewal no longer applies.

1.2 The Ocean Trap and Line Fishery

The OTLF is one of eight major marine and estuarine based commercial fisheries in New South Wales. It is a multi-method, multi-species fishery using demersal fish traps and numerous line methods to target demersal and pelagic fish in ocean waters along the length of the NSW coast. The fishery also includes the taking of spanner crabs by nets (dillies) north of Korogoro Point (near Hat Head).

There is a variation in the levels of participation of fishers with some fishers operating in the OTLF on a full time basis while others work in a number of commercial fisheries reducing their participation in the OTLF to a part-time or seasonal basis. Table 1 shows the relationship between the OTLF and other commercial fisheries in NSW.

1.3 Vision and Goals of the Ocean Trap and Line Fishery

1.3.1 Fishery Vision

The vision for the OTLF is:

A profitable fishery that provides the community with fresh local seafood and carries out fishing in an ecologically sustainable manner.

1.3.2 Fishery Goals

The goals of the OTLF are:

1. Manage the OTLF in a manner that promotes the conservation of biological diversity in the marine environment;
2. Maintain stocks of primary and key secondary species harvested by the OTLF at sustainable levels;
3. Promote the conservation of threatened species, populations and ecological communities and protected species of fish likely to be impacted by the operation of the OTLF;
4. Appropriately share the resource and carry out fishing in a manner that minimises negative social impacts;
5. Promote a viable commercial fishery, consistent with ecological sustainability;
6. Facilitate effective and efficient compliance, research and management of the OTLF;
7. Improve knowledge about the OTLF and the resources on which it relies.

Table 1.1 Overview of the major marine commercial fisheries in NSW. (Source: NSW DPI licensing database extraction July 2006)

Fishery	Ocean trap and line	Estuary general	Ocean trawl	Ocean hauling	Lobster	Abalone	Estuary prawn trawl
Methods	Fish trap, Spanner crab net, Setline, Trotline, Driftline, Poling Handline, Jigging, Dropline, Trolling	Handline, Trap, Hauling net, Mesh net, Hand collecting	Otter trawl net	General purpose haul net, Garfish haul net, Purse seine net	Trap/pot	Diving (hookah)	Otter trawl net
Key species	Snapper, Leatherjackets, Bonito, Kingfish, Morwong, Blue-eye, Spanner crabs, Silver trevally	Yellowfin bream, Luderick, Dusky flathead, Sand whiting, Longfinned eels, Sea mullet, Pipis	King prawn, School prawn, Royal red prawn, Balmain bugs, Octopus, Silver trevally, Tiger flathead, Redfish, Calamari, School whiting	Sea mullet, Australian salmon, Blue mackerel, Sea garfish, Luderick, Yellowtail, Pilchards	Rock lobster (eastern)	Black lip abalone	School prawn, King prawn
Total catch in 2004/05 (t)	1511	4049	3970	5575	102 98	189	383
Est. value in 2004/05 (A$m)	8.4	18.2	23.0	12.5	3.8	8.0	2.0
No. of fishing businesses (July 2006)	478	654	299	300	140	48	198
Standard boat length in metres (approx.)	6-8	5	14	4	6-8	6	9
General no. of unlicensed crew	0-1	0*	2-3	0**	0-1	1	1

* Unlicensed crew permitted only when undertaking boat based prawn seining

** Unlicensed crew permitted in some forms of boat based hauling

2. Relevant Legislation and Policy

2.1 Ecologically Sustainable Development

Ecologically sustainable development (ESD) was defined under the National Strategy for ESD as "development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends". It can be achieved through the implementation of the following principles and programs[1]:

- precautionary principle – if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- intra-generational equity – the benefits and costs of pursuing ESD strategies should be distributed as evenly as practicable within each generation
- inter-generational equity – the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- conservation of biological diversity and ecological integrity – conservation of biological diversity and ecological integrity should be a fundamental consideration
- improved valuation, pricing and incentive mechanisms – such as user pays and the use of incentive structures to promote efficiency in achieving environmental goals.

2.2 The Fisheries Management Act

The *Fisheries Management Act 1994* (FM Act) seeks to achieve ecologically sustainable development for the fisheries of NSW through the achievement of its stated objectives, which are:

(1) To conserve, develop and share the fishery resources of the State for the benefit of present and future generations.

(2) In particular the objects of the Act include:

(a) to conserve fish stocks and key fish habitats, and

(b) to conserve threatened species, populations and ecological communities of fish and marine vegetation, and

(c) to promote ecological sustainable development, including the conservation of biological diversity,

and, consistently with those objects:

(d) to promote viable commercial fishing and aquaculture industries,

(e) to promote quality recreational fishing opportunities, and

(f) to appropriately share fisheries resources between the users of those resources, and

(g) to provide social and economic benefits for the wider community of New South Wales.

[1] Adapted from section 6 (2) of the NSW *Protection of the Environmental Administration Act 1991*.

2.3 Arrangements with the Commonwealth and other States

The extent and scope of the NSW OTLF and any entitlements issued therein are subject to arrangements made from time to time between the State of NSW and the Commonwealth and other State governments over the management of particular fisheries. Section 135 of the FM Act enables the State of NSW to make arrangements with the Commonwealth under the powers of the Commonwealth *Fisheries Management Act 1991* and section 141A of the FM Act gives the power to enter into agreements with other States. Refer to Part 5 of the FM Act and sections 71-78 of the Commonwealth Act for further information on the power to make (and terminate) arrangements.

Arrangements made under the Act can effectively modify the waters and the fishing methods that fall under the jurisdiction and law of NSW. At the commencement of this management strategy, a series of significant arrangements known as the 'Offshore Constitutional Settlement' (initially made in 1990) are in place that cede jurisdiction of trap and line fishing for certain species in certain waters beyond 3 nm to the State of NSW – refer to section 3.1.2 of this management strategy for a description of the effect of the existing arrangements on the OTLF.

The FMS will apply to all waters under NSW jurisdiction following any changes to the arrangements made between NSW and the Commonwealth or other states.

2.4 Fishery Management Framework

The OTLF is included in Schedule 1 of the FM Act and is a share management fishery. The FM Act requires that a share management plan be developed and implemented for all share management fisheries. At the time of approval of this FMS, the first share management plan for the OTLF was in the process of being prepared as part of the transition of the fishery to a full share management regime.

The primary role of a share management plan is to provide a legislative framework for the fishery and the rights of shareholders in a share management fishery. The share management plan provides for a range of fishery specific controls to be formalised into a regulation. Examples of these include the species that may be taken, the areas for taking fish, the times or periods during which the fishery may operate, the protection of fish habitat, and the use of boats, fishing gear and bait in the fishery.

The share management plan for the OTLF may also, over time, bring into operation a number of controls in the fishery that are described in this management strategy. One example of this is the penalty points scheme referred to in the management strategy. Whilst the management strategy relies on the penalty points scheme as a compliance mechanism for creating an effective deterrent, the workings and provisions of the scheme will need to be included in regulation or the relevant share management plan for the fishery.

A share management plan must include objectives and performance indicators, which, for the OTLF, will be complementary with the goals and objectives of this management strategy. The share management plan must also specify at what point a review of the plan is required when a performance indicator is not being met. The performance monitoring and review process to be included in the share management plan will complement the review process outlined in this management strategy. This will ensure that there is a robust review and reporting framework for the fishery that is underpinned by the provisions of the share management plan. In addition to these 'performance-based' reviews, a share management plan is also subject to scheduled periodic review.

2.5 The NSW Environmental Planning and Assessment Act

Division 5 of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) requires an EIS to be prepared for each designated fishing activity described in Schedule 1A of the FM Act, for the purposes of an environmental assessment.

Prior to the EIS being prepared, a draft FMS must be prepared under the FM Act. The EIS assesses the likely impact of implementing the draft FMS on the biophysical, economic and social environments.

Once a draft FMS and EIS has been prepared and subject to a determination by the Minister for Primary Industries (under s.115O(4) of the EP&A Act), the requirement to undertake an environmental assessment of each individual fisher's licence approval does not apply.

2.6 The Commonwealth Environment Protection and Biodiversity Conservation Act

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) makes it an offence for a person to undertake an action that has the potential to significantly impact on a matter of 'national environmental significance' without first obtaining a permit from the Commonwealth Minister for the Environment and Heritage. Matters of national environmental significance include: declared World Heritage areas; declared Ramsar wetlands; listed threatened species and ecological communities; listed migratory species; listed marine species; nuclear actions; and the environment of Commonwealth marine areas.

The EPBC Act was amended in January 2002 to incorporate the provisions of the Wildlife Protection Act (which was concurrently repealed). The new Part 13A of the EPBC Act has the effect of removing the previous blanket exemption from export control that historically applied to marine species. As a result, the export of all marine organisms falls under the control of the EPBC Act and is subject to ecological sustainability assessments based on guidelines established by the Commonwealth. If a fishery is not assessed as exempt, it will more than likely be able to continue to supply product for export through an approved wildlife trade operation (section 303FN) under the EPBC Act. The declarations generally have conditions attached that will bring the management and operations of the fishery in line with the Commonwealth guidelines. Once declarations are made, exporters may need to apply for and obtain a permit from the Department of the Environment and Heritage (DEH) to export.

The EIS prepared for the OTLF was submitted to the Commonwealth Government for export approval. The Commonwealth has since issued a number of Wildlife Trade Operation (WTO) export approvals for the fishery (refer to www.deh.gov.au for further details).

2.7 The NSW Marine Parks Act

The NSW Government is using a systematic approach to identify sites for marine protected areas and to prioritise new areas for marine biodiversity conservation in NSW waters. There are three types of marine protected areas in NSW - large multiple-use marine parks, small aquatic reserves and the marine and estuarine components of national parks and nature reserves.

Marine Parks aim to conserve biodiversity by protecting representative samples of the habitats in defined 'bioregions'. Zoning and operational plans are used to guide the protection of conservation

values and manage activities that occur within the marine park. Four zones are used in marine parks - sanctuary zones, habitat protection zones, general use zones and special purpose zones.

Consultation occurs with the community prior to the declaration of marine parks. It is also important that the Ocean Trap and Line MAC participate in the consultation over the selection of marine protected areas, as declaration of such areas can be beneficial to all sectors of the community, including the commercial fishing sector. However, such declarations can also impact on the operations of ocean trap and line fishers.

The *Marine Parks Act 1997* was introduced to provide for the declaration of marine parks in NSW. The objects of the Act are as follows:

(*a*) *to conserve marine biological diversity and marine habitats by declaring and providing for the management of a comprehensive system of marine parks*

(b) to maintain ecological processes in marine parks

(c) where consistent with the preceding objects:

(i) to provide for ecologically sustainable use of fish (including commercial and recreational fishing) and marine vegetation in marine parks, and

(ii) to provide opportunities for public appreciation, understanding and enjoyment of marine parks.

This FMS has been prepared taking into account, and ensuring consistency with, the objects of the *Marine Parks Act 1997*.

Up to date information on the creation and zoning of marine parks in NSW waters is available on the Marine Park Authority website: www.mpa.nsw.gov.au

2.8 Changes to Regulations

Most of the regulations that currently apply to the OTLF appear in the *Fisheries Management (General) Regulation 2002* (FM Regulation). The FM Regulation sets out the working arrangements that underpin the provisions of the FM Act, and are made pursuant to that Act. For example, an offence appears in the Act for possessing prohibited size fish (section 16), however it is the FM Regulation that prescribes the fish species subject to size limits and what those size limits are (clause 9).

This FMS includes a number of actions that will impact on the current regulations that apply to the fishery. Where necessary, existing regulations will be amended or new regulations introduced to give effect to the actions and programs outlined in the FMS.

2.9 Indigenous Fisheries Strategy

Fishing has been an integral part of the cultural and economic life of Aboriginal communities since they have been in this land. Fishing has been an important source of food, a basis for trade and an important part of cultural and ceremonial life. Traditionally, Aboriginal fishers had responsibility for providing not just themselves but for family and community. These cultural expectations continue in Aboriginal communities today, particularly in regard to improved access to fisheries resources.

In December 2002, the NSW Indigenous Fisheries Strategy and Implementation Plan (IFS) was released. The IFS seeks to protect and enhance the traditional cultural fishing activities of

Aboriginal communities, and ensure Aboriginal involvement in the stewardship of fisheries resources. There are some issues that will be addressed immediately by the IFS and others that will only be resolved after lengthy negotiation involving Aboriginal communities, the broader community, fishing groups and government agencies. The IFS puts in place a process which will ensure discussion and negotiation can continue with progressive resolution of problems and challenges (see NSW Indigenous Fisheries Strategy and Implementation Plan, 2002).

While the relationship between Indigenous fishing and the OTLF is probably not as direct as with the inland, estuarine or beach-based fisheries, there are possible linkages with many of the species caught by the OTLF which spend part of their life cycle in estuaries or nearshore waters. To better understand the linkages between this and other fishing activities to Indigenous issues, a substantial research study has been proposed through the IFS which seeks, among other things, to identify the species, areas and harvesting techniques of cultural importance to Aboriginal people in NSW.

Furthermore, although Aboriginal participation in the OTLF is limited, Aboriginal people have aspirations of becoming more involved in commercial fisheries. Such aspirations were identified as recently as June 2003 during an Indigenous Fisheries Strategy workshop. The workshop identified fishing closures, licence transfer rules, market value of entitlements and the gradual decline of Aboriginal commercial fishers in the industry as constraints for Indigenous involvement in commercial fisheries.

3. The Harvest Strategy

3.1 Extent of the Fishery

3.1.1 Number of fishers

As at July 2006, the NSW DPI licensing database showed that 478 fishing businesses held entitlements to operate in the OTLF, with some businesses holding multiple endorsements within this fishery and/or in other fisheries. The number of fishers entitled to operate in the fishery varies over time, due to a number of factors including the transfer and amalgamation of fishing businesses and late payments on renewal of fishing licences.

3.1.2 Area of operation

The OTLF extends from NSW coastal baseline seaward to the 4,000 metre isobath (approx. 60 to 80 nm offshore) (Figure 3.1). The ocean waters from the NSW coastal baseline to 3 nm offshore are state waters and fall under the jurisdiction of NSW. The waters from 3 nm to the 4,000 metre isobath are Commonwealth waters, however an Offshore Constitutional Settlement (OCS) established in 1990 allows NSW to manage some of the fishing activities in those waters (see below).

Ocean waters are defined under Schedule 1 of the FM Regulation as waters east of the natural coastline of NSW, which is defined by a line drawn along the high water mark of the sea. In general, where an estuary meets the coast, the natural coastline is defined as follows:

- a line drawn across the eastern most extremity of two breakwalls
- a line drawn from the eastern most extremity of one breakwall to the northern or southern extremity of the high water mark on the opposite bank
- a line drawn across the entrance between the eastern most high water mark of the two banks.

Additional areas of ocean waters may be closed to the OTLF through the declaration of marine protected areas, such as marine parks, aquatic reserves, intertidal protected areas and national park or reserve extension areas.

Before 1991, the Commonwealth Government controlled all fishing in waters greater than 3 nm from shore. In 1990, the Commonwealth and NSW Governments signed the OCS which gave jurisdiction of all ocean trap and line fishing activities within the 4,000 metre isobath (about 60 to 80 nm offshore) to NSW. The Commonwealth retained jurisdiction of the tuna and oceanic squid fisheries beyond 3 nm.

Resolution of the OCS meant that many fishers who previously held both NSW and Commonwealth licences needed only to renew their State licence each year, resulting in significant licence fee savings. Under OCS agreements, fishing boats that were previously licensed to fish outside 3 nm under Commonwealth jurisdiction were automatically issued an authority on their State boat licence (called an 'OG1') to continue to work in offshore waters.

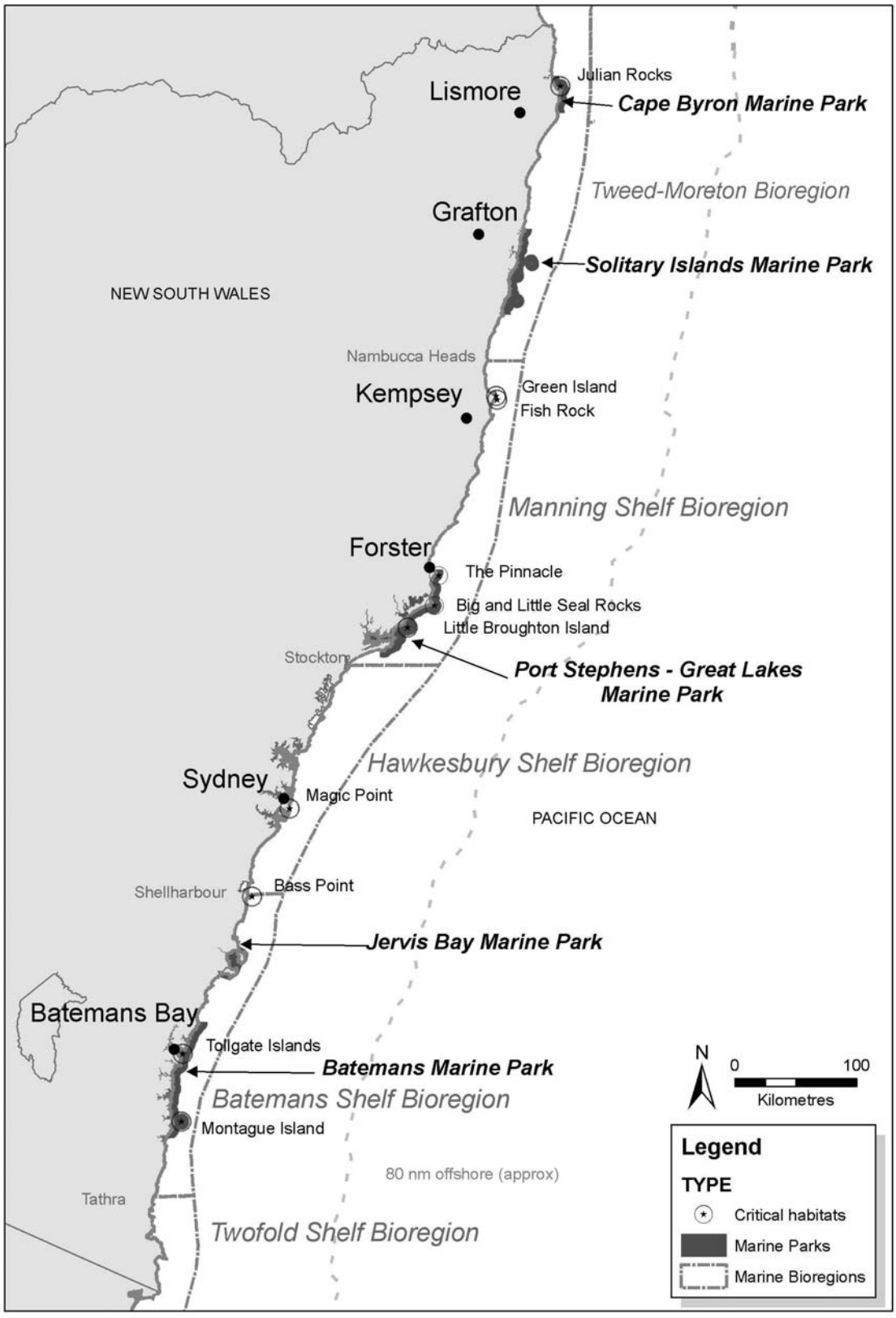

Figure 3.1 Map of the area of the OTLF including marine bioregions, marine parks and grey nurse shark critical habitats.

3.1.2.1 Habitat management

Habitat management guidelines and plans have been and will continue to be prepared under the FM Act to prevent or minimise the impact of all types of activities on fish habitat. Habitat management plans can potentially close areas to commercial fishing and other activities. The Ocean Trap and Line MAC will provide advice and contribute to any reviews of NSW DPI habitat management policy and guidelines or habitat protection plans, where they relate to areas fished by ocean trap and line fishers.

Commercial fishers are often aware of the key habitat areas for fishery production. This knowledge can assist NSW DPI to identify and prioritise sites that may benefit from rehabilitation and potentially contribute to increased fishery production.

3.1.3 Activities endorsed in the fishery

The fishery is categorised into a number of endorsement types that determine the types of fishing gear each fisher is allowed to use. Table 3.1 lists the endorsement types available in the fishery and details the activity that is authorised by each endorsement. For example, only fishers with a demersal fish trap endorsement on their fishing licence are permitted to use fish traps.

Table 3.1 Endorsements in the OTLF.

Endorsement type	Endorsement description
Spanner crab (northern zone)	Authorises use of a spanner crab net to take spanner crab for sale from ocean waters that are north of a line drawn east from the southern breakwall at Yamba.
Spanner crab (southern zone)	Authorises use of a spanner crab net to take spanner crab for sale from ocean waters that are south of a line drawn east from the southern breakwall at Yamba
Line fishing (western zone)	Authorises use of line methods to take fish from ocean waters that are west of the 100 fathom (183 metres) depth contour. This endorsement does not authorise the holder to take school or gummy shark from waters that are south of a line drawn east from the northern point of the entrance to Moruya River. The endorsement does not authorise the taking of the deeper water species blue eye trevalla, ling, gemfish, hapuku and bass groper.
Line fishing (eastern zone)	Authorises use of line methods to take fish from ocean waters that are east of the 100 fathom (183 metres) depth contour. This endorsement does not authorise the holder to take school or gummy shark from waters that are south of a line drawn east from the northern point of the entrance to Moruya River.
Demersal fish trap	Authorises the taking of fish for sale from ocean waters by bottom set fish traps.
School and gummy shark	Authorises the taking of school shark and gummy shark by line methods south of a line drawn east from the northern point of the entrance to the Moruya River

Note: fishers may hold more than one endorsement. Additionally, any vessels operating outside 3 nm must have an OG1 authorisation.

3.1.4 Fishing gear used in the fishery

Fishing gear used in the fishery consists mostly of trap and line methods used to target finfish, as well as spanner crab nets designed to specifically target spanner crabs.

The following sections describe the fishing gear able to be used in the fishery and provide details relating to the standard dimensions of that gear. The use of these gear types is subject to a range of time and area closures and other controls as outlined in the management responses in this strategy.

3.1.4.1 Fish trap (bottom/demersal)

Fish traps are generally timber framed with a wire mesh covering (not less than 50 mm mesh size), which are baited and set on or adjacent to reefs at depths of 10 to 150 metres. Fish traps have maximum dimensions of 2 metres x 2 metres x 2 metres, although most traps used in the fishery measure approximately 2 metres x 1.5 metres x 1 metre. Fish traps must be marked with a buoy (> 150 mm diameter) and must rest on the seabed not less than 5 metres apart. Fish traps are set with bait secured in the middle to lure fish through wire funnels into the trap. Fish escape panels will be mandatory in fish traps to reduce impacts of undersized and unwanted species.

3.1.4.2 Spanner crab net (dilly)

Spanner crab nets or dillies are flat, rectangular steel frames which have a net over the frame and bait in the centre of the net. A dilly must have an area within its frame of no more than 1.6 m^2.

Baited traps are generally left for approximately one hour before they are lifted into the boat by a line hauler. Multiple spanner crab nets are often set along one line to assist in retrieving the nets.

3.1.4.3 Line methods

The regulations set out controls that apply to the number of lines and hooks used in commercial line methods within 3 nm, and this FMS includes additional controls on the number of hooks used in waters beyond 3 nm. Variations to the controls inside 3 nm apply to fishers with a school and gummy shark endorsement. The information provided below gives a general outline of the different methods used.

Setlines/trotlines

Setlines and trotlines are similar gear types that may either be attached to a row of floats and suspended below the water surface, or weighted to the seabed by a series of weights with a mooring rope and buoy at one end of the line. Within the 3 nm boundary, a maximum of 10 lines with no more than 6 hooks or gangs of hooks attached per line may be used. The use of setlines as surface-set (or 'pelagic') longlines is managed by the Commonwealth Government and does not form part of the OTLF.

Driftline

A driftline is a baited hook or gang of hooks attached by line from a single float or buoy which drifts freely on the ocean surface. Each line must not be attached to another driftline or any object which prevents it from floating freely.

Handline

Handlines are single lines with hooks or gangs of hooks lowered into the water by a rod or by hand.

Dropline

Droplines are vertically set lines with hooks attached by snoods. These are generally used in deepwater areas such as waters adjacent to offshore drop-offs and submarine canyons.

Trolling

Trolling involves using a line to tow lures or baited hooks behind a vessel to target pelagic fish. 'Leadlining' is a term given to trolling activities where weights are placed on the trolled lines to target fish lower in the water column.

Jigging

Jigging is a line with large weighted lure that is jigged near the seabed whilst drifting.

Poling

Poling is where bait or lures are attached to lines on the end of poles, which are lowered into a feeding school of fish and the hooked fish are then lifted into the boat.

3.1.5 Boats used in the fishery

Due to the diverse nature of the OTLF, the composition of the fleet varies significantly depending on the methods used and the species targeted. Fishers who operate in near shore waters are able to use relatively small boats, which require less capital investment. Fishers involved in fish trapping or deepwater lining operations generally use large ocean going vessels up to 20 metres in length, which require higher levels of capital investment. However, the average boat length is approximately 6-8 m.

Under the share management plan, it is proposed to implement a maximum boat length limit of 16 m in the OTLF. This will not apply to vessels above this length that have historically operated in the fishery (subject to certain conditions and guidelines determined by the Director-General).

3.2 Species

3.2.1 Species allowed

The OTLF is a multi-species fishery. Around 200 species are taken in the OTLF with the main species targeted being spanner crab, snapper, yellowfin bream, grey morwong, bonito, yellowtail kingfish, blue-eye, bar cod as well as school and gummy sharks. This FMS categorises retained species as "primary", "key secondary" or "secondary", depending on the quantity and relative value of that species taken by ocean trap and line fishing. A description of these categories is provided below. A total of 25 species or 'species groups' are listed as primary or key secondary species in this fishery (Table 3.2).

Detailed information about each of the primary and key secondary species, including catch trends, CPUE trends, seasonality of catches and relative catches by fishery and method, can be found in the EIS prepared for the OTLF (available at www.dpi.nsw.gov.au).

3.2.1.1 Primary species

Primary species are the target species of the OTLF, or those species that are landed in large quantities or are economically significant to the fishery. Consequently the primary species receive a higher management and research priority within this FMS. The FMS requires the development of a resource assessment for each of the primary species where necessary.

3.2.1.2 Key secondary species

A number of species have been identified as "key secondary" species because, although not generally targeted, they are an expected catch of trap and line fishing and provide significant economic benefit to the fishery. Resource assessments will also be undertaken on these species, though at a more rudimentary level than for the primary species where necessary.

Table 3.2 Primary and key secondary species in the OTLF

	Common name[2]	Scientific name	Family name
Primary Species	Australian bonito	*Sarda australis*	SCOMBRIDAE
	Banded (Bar) rock cod	*Epinephelus ergastularius*	SERRANIDAE
	Blue-eye trevalla	*Hyperoglyphe antarctica*	CENTROLOPHIDAE
	Grey (Rubberlip) morwong	*Nemadactylus douglasii*	CHEILODACTYLIDAE
	Gummy shark	*Mustelus antarcticus*	TRIAKIDAE
	Leatherjackets (mixed species)	various	MONACANTHIDAE
	Silver trevally	*Pseudocaranx dentex*	CARANGIDAE
	Snapper	*Pagrus auratus*	SPARIDAE
	Spanner crab	*Ranina ranina*	RANINIDAE
	Yellowfin bream	*Acanthopagrus australis*	SPARIDAE
	Yellowtail kingfish	*Seriola lalandi*	CARANGIDAE
Key Secondary Species	Bass groper	*Polyprion americanus*	PERCICHTHYIDAE
	Eastern blackspot pigfish	*Bodianus unimaculatus*	LABRIDAE
	Gemfish	*Rexea solandri*	GEMPYLIDAE
	Hapuku	*Polyprion oxygeneios*	PERCICHTHYIDAE
	Jackass morwong	*Nemadactylus macropterus*	CHEILODACTYLIDAE
	Mahi mahi (Dolphinfish)	*Coryphaena hippurus*	CORYPHAENIDAE
	Mulloway	*Argyrosomus japonicus*	SCIAENIDAE
	Pearl perch	*Glaucosoma scapulare*	GLAUCOSOMIDAE
	Sharks (mixed species)*	various	various
	Silver sweep	*Scorpis lineolatus*	SCORPIDIDAE
	Spanish mackerel	*Scomberomorus commerson*	SCOMBRIDAE
	Spotted mackerel	*Scomberomorus munroi*	SCOMBRIDAE
	Teraglin	*Atractoscion aequidens*	SCIAENIDAE
	Wobbegong sharks	*Orectolobus maculatus, O. ornatus, O. halei*$^{\infty}$	ORECTOLOBIDAE

* "Sharks (mixed species)" includes catches reported as 'unspecified sharks', and also includes catches reported under other categories including whaler and dogfish groups, and school, hammerhead, mako and ghost sharks. $^{\infty}$Possible third species of wobbegong shark not presently recognised in catch data.

[2] Common names consistent with the CSIRO *Codes for Australian Aquatic Biota* or, where bracketed, *Standard Fish Names in Australia* (commercial species).

3.2.1.3 Secondary species

Secondary species are categorised as those that are retained by the fishery but which do not fall under the primary or key secondary categories described above. These 'secondary' species are taken incidentally during trap and line fishing. This strategy contains measures to ensure the catch of secondary species by ocean trap and line fishers remains low and within the range of historic levels.

Many species taken in the OTLF are also taken in other NSW commercial fisheries, by other sector groups and by fisheries managed under the jurisdiction of the Commonwealth or other States. The FM Act establishes a system of advisory councils who provide advice to the Minister for Primary Industries on cross-fishery management issues. NSW DPI management and research staff will also meet periodically with adjacent jurisdictions to consider consistent management regimes for shared species and to discuss initiatives such as resource assessment, complementary size limits, monitoring programs and recovery programs for overfished species. Cross-jurisdictional collaboration has occurred often on an as-needed basis in the past, however, a more formalised approach to joint management will now be undertaken.

3.2.2 Bycatch species

Bycatch consists of those animals that are discarded from the catch, and that part of the "catch" that is not landed but is killed as a result of interaction with fishing gear. Fish that are landed are sometimes discarded because there is no market for that type (or size) of fish, or because the regulations prevent the fish from being retained (*e.g.* if it is smaller than the minimum legal length or is a species protected from commercial fishing).

Bycatch species in the OTLF can generally be classified into fish that are juveniles of species that are of commercial or recreational importance, mature fish being smaller than the MLL, those that are of particular conservation significance and others which are neither a commercial or recreational species nor of specific conservation importance.

3.2.2.1 Bycatch reduction devices

This management strategy includes the implementation of fish escape panels in fish traps to reduce the bycatch of small fish (see management response 1.2b). It also introduces new measures to minimise any interactions with threatened species, such as the endangered grey nurse shark.

3.2.3 Size limits

Size limits apply to a number of species taken in the OTLF. Clause 9 of the FM Regulation lists the minimum legal lengths that apply to species permitted to be taken in the fishery. The FMS includes evaluation of the appropriateness of existing minimum size limits for ocean trap and line species, and an assessment of whether minimum size limits should be specified for any other ocean trap and line species (see management response 2.1(e)).

3.2.4 Protected species

Commercial fishers are not permitted to take either protected fish or fish protected from commercial fishing. These species are listed in clause 6 and clause 7 of the FM Regulation.

A range of threatened species, other than fish, are protected by other legislation including the NSW *Threatened Species Conservation Act 1995*, the NSW *National Parks and Wildlife Act 1974*, and

the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Such species may be classified as endangered or vulnerable and cannot be taken by commercial fishers.

3.2.5 Interactions with threatened species and species of public concern

Although interactions with threatened species have not been commonly recorded in this fishery, this FMS includes two direct measures to obtain data on any such interactions. The first of these measures is the implementation of a cross-fishery observer-based survey which will *inter alia* collect data on occurrences of threatened species in catches. Secondly, a modification to the catch reporting system incorporates mandatory reporting of fishers' interactions with threatened (and protected) species during fishing operations.

A number of management responses also appear in section 9 of this FMS aimed at minimising impacts on threatened species. These measures include educating fishers in the identification/avoidance of threatened species, using fishing closures, modifying gear use and implementing the provisions of any threatened species recovery plans and threat abatement plans.

3.2.6 Status of species within the fishery

The determination of the status of the primary and key secondary species is central to the sustainable operation of the OTLF, and is a key component of the FMS. NSW DPI uses a standardised method of reporting on the exploitation status of fish stocks across all commercial fisheries. Stock status is described using the terms defined in Table 3.3. Where available, data on the recreational harvest, including charter boat catch, and catch from other sectors are also taken into consideration when determining exploitation status. This allows a species based management approach where all known impacts on a species are considered.

Table 3.3 The characteristics of the categories of exploitation status that are used to determine the status of key species, as part of the resource assessment system

Category	CHARACTERISTICS
Recruitment overfished	• Recruitment is being significantly or measurably suppressed as a result of a small spawning biomass • Other characteristics of an 'overfished' stock (see below) are likely to be evident • Unequivocal determination will require a well-calibrated population model or stock-recruitment relationship
Overfished	• Fishing mortality rates are more than double natural mortality rates • Estimates of biomass are less than 30% of the estimated unfished stock • Catch rates are less than 30% of the initial catch rates • Length and age distributions unstable (excessively affected by recruitment, too few age or size classes in the exploitable population given a species' life history) • Trends in length/age compositions are evident which indicate increasing (and/or excessive) fishing mortality • The 'Spawning Potential Ratio' is less than 20%
Growth overfished	• Yield per recruit would increase if length at first capture was increased or fishing mortality decreased
Fully fished	• Fishing mortality is approximately the same as natural mortality • Estimates of the biomass are greater than 30% of the estimated unfished biomass • Catch rates have been steady for 5-10 years and/or catch rates are greater than 30% of initial catch rates • Length and age distributions are stable • Species are fished throughout their entire geographic range
Moderately fished	• Fishing mortality is less than half of natural mortality • Estimates of the biomass are greater than 70% of the estimated unfished biomass • Catch rates are greater than 70% of initial catch rates • Species are fished in most of their geographic range but non-fishing areas are known to exist

Lightly fished	• Fishing mortality less than 25% of natural mortality • Estimates of the biomass are greater than 90% of the estimated unfished biomass • Catch rates are greater than 90% of initial catch rates • Only small proportions of the geographic range are fished • Markets would likely limit catch and effort
Uncertain	• A significant amount of evidence has been collected and considered, but there are inconsistent or contradictory signals in the data that preclude determination of exploitation status
Undefined	• Catch data are available but no reasonable attempt has been made to determine exploitation status

Source: NSW Department of Primary Industries (2006).

Table 3.4 outlines the exploitation status of the primary and key secondary species taken in the OTLF as at 2006. A number of species are classified as undefined, and the strategy includes responses to measurably improve the quality of reported information and knowledge of stock status for these species. Section 6.1.1 and Appendix 4 provides details of the methods to be employed to detect help determine the status of the primary and key secondary species, as part of the resource assessment process.

Table 3.4 Exploitation status of primary and key secondary species taken in the OTLF (as at 2006).

	Species	Exploitation status
Primary Species	Australian bonito	Undefined
	Banded (Bar) rock cod	Undefined
	Blue-eye trevalla	Moderately fished
	Grey (Rubberlip) morwong	Fully fished
	Gummy shark	Fully fished
	Leatherjackets (mixed species)	Undefined for mixed species. Moderately fished for 'ocean leatherjackets'
	Silver trevally	Overfished (growth)
	Snapper	Overfished (growth)
	Spanner crab	Fully fished
	Yellowfin bream	Fully fished
	Yellowtail kingfish	Overfished (growth)
Key Secondary Species	Bass groper	Undefined
	Eastern blackspot pigfish	Undefined
	Gemfish	Overfished (recruitment)
	Hapuku	Undefined
	Jackass morwong	Fully fished
	Mahi mahi (Dolphinfish)	Undefined
	Mulloway	Overfished (possibly recruitment)
	Pearl perch	Undefined
	Sharks (mixed species)	Undefined
	Spanish mackerel	Undefined
	Spotted mackerel	Undefined
	Silver sweep	Fully fished
	Teraglin	Undefined
	Wobbegong sharks	Undefined

3.2.7 Overfished species

If a species taken in this fishery is determined as overfished (either of the three types of overfishing), the implementation of, or assistance in developing, a recovery program for that species is required (see objective 2.2 and related management responses in section 9 of this FMS). However, a recovery program is not required for species that are determined as 'growth overfished' if the Director-General, NSW 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.

The process of developing a recovery program for an overfished species initially involves NSW DPI preparing a summary of the known factors that have led to the determination being made. In addition to the summary, a range of management options will be identified and outlined. Consultation will then formerly commence with the relevant MAC and advisory bodies. The recovery program will be developed under the management strategy for the fishery which is the key harvester of the species concerned, and must include a description of the actions proposed to return to acceptable levels those parameter(s) that have led to the determination of the species being overfished. The recovery program will also set out a timeframe for that process (including annual reviews) and may specify further appropriate action should recovery targets not be met.

3.2.7.1 Definitions of overfished status

The NSW DPI Resource Assessment System (Table 3.3) uses a continuum of three categories of overfishing which, when detected, in most cases require management action. 'Growth overfishing' occurs when individual fish are typically harvested under the size that takes best advantage of the species growth in relation to expected natural mortality. 'Recruitment overfishing' is the most serious form of overfishing and occurs when fishing pressure has reduced the ability of a stock to replenish itself, *i.e.* the size of the spawning biomass is so reduced as to compromise recruitment. Between these two categories, the general term 'overfishing' is used to capture situations that represent excessive fishing mortality being placed on a stock with the result that it is likely to have a small relative spawning biomass and suppression of recruitment. However, significant measurable evidence that would confirm the stock's status as 'recruitment overfished' is lacking.

3.2.7.2 Designating a species as overfished

The information needed to clearly determine that a species has been growth overfished is more likely to be available than the information needed to detect recruitment overfishing (in the absence of an obvious stock collapse). Most formal definitions of recruitment overfishing are determined on the basis of an understanding of relative rates of fishing mortality, population growth and population biomass as well as the relationship between spawners and recruitment (*e.g.* Hilborn and Walters, 1992). Even the most thoroughly studied species in NSW may not have relevant information on all those topics.

NSW DPI will consider advice from fisheries scientists as part of the annual assessment of the status of fish stocks in NSW. That advice could result from the findings of monitoring and research conducted by scientists employed by NSW DPI, or from other agencies or institutions doing research relevant to assessment of species harvested in NSW. If the species is the subject of a formal resource assessment process, the indication of overfishing is likely to come from having a performance indicator outside acceptable bounds. Other species' status will be reviewed on the basis of the best available biological and catch information.

A stock that has had sufficient fishing mortality to cause a reduction in recruitment requires effective remediation. However, information that clearly demonstrates that a species' recruitment has been impacted by fishing is difficult and expensive to collect, and likely to be rare. Management responses will need to be precautionary and are likely to draw inference from total catch and catch composition, rather than from direct measurements of recruitment. For example, rapid declines in total catch (especially when the species is targeted in a spawning aggregation), decreases or rapid increases in average size or missing years in age compositions are all indicative of potential problems with recruitment.

When new information that is likely to change the present status of a fish species is received by NSW DPI, its scientists will review the status determination for that species against the criteria specified in Table 3.3 and report on the updated status in the resource assessment report. If a species is designated as overfished, a recovery program involving all harvest sectors will be developed as provided for in section 3.2.7 above.

3.2.7.3 Appropriate management responses for different types of overfishing

'Growth overfishing' generally implies the productivity of a stock is sub-optimal by harvesting animals at too small a size. Fish stocks that are growth overfished are not necessarily in danger of imminent collapse and populations can be growth overfished and yet catches can still be stable. However, growth overfishing may increase the risk to the population of subsequent recruitment failure arising from increased fishing pressure or external factors. The typical and most appropriate response to growth overfishing is to increase the average size at first harvest. This is commonly done by imposing a minimum size limit or increasing an existing one. The efficacy of such a response depends largely on the methods of capture and whether the selectivity of those methods can be appropriately altered to match the new size limit, to prevent the wasteful discarding and possible mortality of large numbers of undersized individuals. Careful thought must be given to changing size limits where there are problems in adjusting the selectivity of the primary fishing methods for that species. Nevertheless, the primary objective of a recovery program for growth overfished species should be to improve the management of a stock to ensure sustainability and optimise economic yield at a fully fished status.

Recovery programs for species suspected of having depressed recruitment due to overfishing *i.e.* species determined as 'overfished' or 'recruitment overfished', must include strong precautionary action. Actions could include (but may not be limited to) temporary fishery closures or caps on either catch or fishing effort. Recovery programs for recruitment overfished species may also include changes to the monitoring program for that species and/or require targeted research to improve the assessment of risk to the species in critical areas.

3.2.7.4 Species in the fishery determined as being overfished

Gemfish (Rexea solandri) – *recruitment overfished*

The eastern stock of gemfish underwent a collapse in recruitment in the late 1980s, and the stock has failed to show any significant recovery since the mid 1990s (Rowling and Makin, 2001). Eastern gemfish has been nominated for listing as an endangered species under the Commonwealth EPBC Act as well as under the NSW FM Act, and at the time of approval of the FMS decisions regarding these nominations are pending. All NSW commercial fishers are currently subject to a 50 kg trip limit for eastern gemfish, to discourage targeted fishing for the species. Furthermore, NSW will

collaborate with the Commonwealth with a view to implementing compatible arrangements with respect to any temporal or spatial closures of spawning areas.

The OTLF has been the primary harvester of gemfish in NSW and this FMS requires the development of a recovery program for that species [see management response 2.2(a)]. If eastern gemfish is listed as a threatened species under the FM Act, the possession and sale of gemfish will be prohibited unless otherwise provided for by a Ministerial order. If the species is listed as a threatened species under the EPBC Act, measures consistent with the protection offered by the FM Act, will need to be considered.

Silver trevally (Pseudocaranx dentex) – *growth overfished*

There has been a significant decline in commercial landings of silver trevally since the mid 1980s, and the study by Rowling and Raines (2000) concluded that the stock was growth overfished. Significant quantities of silver trevally are landed by the OTLF, the Estuary General Fishery (prior to Botany Bay becoming a recreational fishing haven) and the Recreational Fishery, however more than 40% of commercial landings are taken by ocean fish trawlers. Significant quantities were historically also taken in the Commonwealth trawl sector of the Southern and Eastern Scalefish and Shark Fishery.

As the NSW Ocean Trawl Fishery is the primary NSW fishery in which silver trevally are taken, a recovery program for the species will be developed under the Ocean Trawl FMS. The recovery program will include the introduction of a minimum legal length of 30 cm total length for silver trevally. The OTLF will contribute to the development of the recovery program, and will implement actions as needed under that program.

Snapper (Pagrus auratus) – *growth overfished*

Approximately 96% of commercial landings of snapper during 2004/05 were taken by fishers in the OTLF. Landings of snapper in all areas of NSW have been dominated by two and three year old fish (typically 70% of total landings). Fewer than two percent of landings were older than ten years despite clear evidence that longevity exceeds 30 years.

The OTLF is the primary harvester of snapper and this FMS requires the development of a recovery program for that species (see management response 2.2a). The recovery program for snapper will specify actions listed in this FMS (eg. management responses 1.2(b), 1.2(g) & 2.2(a)), as well as identifying the programs in place or planned affecting all harvest sectors to reduce any risk of recruitment overfishing.

Yellowtail kingfish (Seriola lalandi) – *growth overfished*

Yield per recruit information shows that yellowtail kingfish in NSW are harvested at sizes that do not maximise biological yield (Stewart & Ferrell, 2001). The OTLF is the primary commercial harvester of yellowtail kingfish, however the recreational catch is likely to be equivalent or greater.

Monitoring of the length composition of commercial catches of kingfish is currently underway and further analysis of CPUE will be done through the resource assessment program. Despite its status of being growth overfished, a recovery program is not currently considered necessary for yellowtail kingfish. A recovery program will, however, be developed and implemented if analysis of the information being gathered warrants such a program. A “Review of saltwater fish size limits” was publicly exhibited by NSW DPI in 2005. The review noted that harvesting kingfish below the 75cm size at maturity is likely to be limiting the productivity of the species. The review included an option

to increase the minimum size at which kingfish can be harvested from 60 cm to 65 cm and this increase was supported by the relevant commercial and recreational fishing advisory councils. Due to the cross-sector harvest of this species, NSW DPI will implement the approved outcome of that review, including examining further changes that are consistent with optimum yield.

There are also two management arrangements that have been specifically introduced for yellowtail kingfish in the last 15 years. In 1990, a minimum legal length of 60 cm was introduced which reduces harvest pressure on juvenile kingfish and increases the chance of escapement of fish through the fishery and into the spawning stock. In April 1996, the use of pelagic kingfish traps by commercial fishers was prohibited to reduce harvest pressure on the stock and reduce impacts on juvenile fish.

*Mulloway (*Argyrosomus japonicus*) – overfished*

Mulloway are primarily harvested in the recreational fishery but are also listed as a key secondary species in the OTLF. Length and age composition in landings data are indicative of a heavily fished stock that is growth-overfished (Silberschneider and Gray, 2005). The optimum length at capture is approx. 80-100 cm, yet the minimum legal length (currently 45 cm) is much smaller than the size at sexual maturity (70 cm) and the spawning potential is likely to be less than 10% of unfished levels. In 2006, the NSW DPI resource assessment process classed mulloway as 'overfished' and a recovery program for mulloway will need to be developed in consultation with all harvest sectors. The OTLF will contribute to the development of the recovery program, and will implement actions as required under that program.

4. Management Controls and Administration

There are two broad types of fishery management controls, known as input controls and output controls. Input controls limit the amount of effort commercial fishers put into their fishing activities, indirectly controlling the amount of fish caught. They need to continually be modified in response to fishing technology. Input controls can include restrictions on the number of licences, the size and engine capacity of boats, the number of fishing lines and/or hooks used, the construction and number of traps, and the areas and times which can be worked. Output controls, on the other hand, directly limit the amount of fish that can be landed and are well suited for single species, high value fisheries using single gear types.

The OTLF in NSW is managed predominantly by input controls. The following section describes in broad terms the diverse range of controls that apply to activities in the fishery. The general rules applying to commercial fishing and the specific rules for this fishery, such as gear specifications, are detailed in the *Fisheries Management (General) Regulation 2002*. The preceding and following text represents the position at the commencement of the FMS, however, some of these provisions will change as the strategy is progressively implemented.

4.1 Limited entry

The OTLF is moving towards the final stage of category 1 share management. Access to the fishery will be limited to shareholders (or their nominated fisher) who hold shares above any minimum shareholding level established in the share management plan. Access to the spanner crab sector of the fishery was first limited in 1995 and access to other sectors of the fishery were first limited (under a 'restricted fishery' management regime) in 1997.

4.2 Commercial fishing licences

A commercial fishing licence is required by an individual before they can take fish for sale or be in possession of commercial fishing gear in or adjacent to waters. The licence only authorises activities that are covered by the endorsements, issued in respect of each part of fishery and specified on the licence. Conditions may be placed on licences and endorsements in order to restrict fishers' commercial activities where required.

Commercial fishing licences are currently available to:

- persons who held a licence immediately prior to the commencement of the FM Act
- owners of a recognised fishing operation (RFO) which include a business that holds an offshore prawn trawl endorsement or contains a minimum level of validated catch history, or the nominated fisher of an RFO, or
- individuals who are the holder of shares in a share management fishery.

This last provision will become more relevant as share management is implemented in the OTLF.

4.2.1 Fishing endorsements

It is important to identify the difference between endorsements and entitlements in the fishery and how they relate to commercial fishing licences.

Entitlements in the fishery are associated with fishing businesses, while endorsements currently appear on commercial fishing licences of individuals and authorise the use of specific gear or taking of certain species. Some fishing businesses are owned and held in the names of more than one individual (including company or partnership names). Currently in the OTLF, only one person can be nominated to hold the primary endorsement in respect of a fishing business. Other licensed fishers may currently, subject to the criteria outlined in the Regulation, hold separate endorsements to operate in the fishery in the form of a 'skipper's endorsement'. These arrangements will change upon the issue of final shares and as the endorsements that arise from the shares held by a fishing business will appear on a Fishing Business Card instead of on commercial fishing licences.

Six classes of endorsement exist in the fishery at the commencement of the FMS. Table 3.1 lists the endorsement types and the gear able to be used by virtue of holding each endorsement type.

The eligibility to hold endorsements in a share management fishery is based on the shareholder holding the minimum number of shares specified in the share management plan for the fishery. Separate minimum shareholdings may apply to each endorsement.

4.2.2 Nomination policy

Part of the introduction of the restricted fishery regime in 1997 was the creation of rules to allow the endorsements of a fishing business to be nominated to a person. This was necessary due to fishing businesses being held in company or partnership names, and because fishing licences can only be issued to natural persons. Tight restrictions applied to nominations under the restricted fishery framework.

This FMS supports the adoption of a new approach to the issuing of endorsements that will by carried out as part of the implementation of category 1 share management fisheries and will reduce

administration (with associated costs) and make it easier for business owners to obtain skippers at short notice. It involves issuing a 'Fishing Business Card' in respect of each business that details the endorsements that may be activated by the licensed commercial fisher in possession of the card. This program will replace the current endorsement nomination and skipper policies. The fishing business owner will simply need to notify the Department (in the approved form and manner) of a change in the nomination before handing the Fishing Business Card to a different licensed fisher amongst the owner's pre-registered list of eligible nominated fishers. The share management plans will contain specific requirements for nominations and may specify minimum time periods for nominations in order to prevent fishing businesses from operating 'around the clock'.

Pending the introduction of the full share management fishery and Fishing Business Card arrangements, the following interim arrangements apply in the OTLF with respect to nominations. Where the business meets the $20,000 ocean trap and line transfer criteria an unlimited number (one at a time) of skipper nominations can apply. Where the business does not meet the transfer criteria, i.e. < $20,000 and is an RFO, the two nomination rule (one nomination and back to the owner) shall apply. Where the business is a Fishing Operation[3] (FO), nominations are not permitted.

4.2.3 Provision for unlicensed crew

The holder of a commercial fishing licence or fishing boat licence endorsed in the OTLF may use unlicensed crew up to the limit (if any) specified in the share management plan.

A licensed fisher employing crew must maintain records about her/his crew. Information relating to crew must be recorded on the mandatory catch and effort return submitted in respect of the fishing business.

4.3 Fishing boat licensing

In addition to each fisher having to be licensed, every fishing boat used in connection with the OTLF must also be licensed. There has been a cap on the total number of boat licences since 1984 (includes boats used in all fisheries) and this restriction will remain.

To prevent any increase in size and therefore efficiency of vessels in the fishery, a strict boat replacement policy currently exists and will continue under the FMS. Boats 6 metres in length or less may be replaced with boats up to 6 metres. Boats that are greater than 6 metres in length may only be replaced with boats that are no more than 10% or one metre greater in length, whichever is lesser. The 10% tolerance continues to relate to the original boat length to avoid a progressive increase in boat length over time.

Under the OCS agreement, fishing boats that were previously licensed to fish outside 3 nm under Commonwealth jurisdiction were automatically issued an authority on their State boat licence (called an 'OG1' or an offshore general authorisation) to continue to work in offshore waters. Only boats that are licensed with an OG1 authorisation are currently permitted to operate in ocean waters beyond 3 nm.

It should be noted that under the share management plan, it is proposed to implement a maximum boat length limit of 16 m in the OTLF. This will not apply to vessels above this length that

[3] A fishing business for which NSW DPI has validated the catch history and which does not qualify as a Recognised Fishing Operation.

have historically operated in the fishery (subject to certain conditions and guidelines determined by the Director-General).

4.3.1 Abeyance period for fishing boat licences

Fishing boat licences can currently be held in abeyance for a period of up to two years from the date of expiry of the licence or when advised in writing by the owner. Fishing boat licence fees are not payable during the period of abeyance, but the full amount due is payable if the licence is reinstated within the two years specified.

It is proposed under the share management system that no time limit will apply on attaching a physical boat to a licence (ie. a fishing boat licence can be maintained without an associated boat), but the licence fees will continue to have to be paid each year.

4.4 Renewal of licences

Commercial fishing licences and fishing boat licences must currently be renewed annually or upon the expiry of the period specified on the licence. Fishers are sent renewal application forms approximately one month before the expiry date on the licence. If a commercial fishing licence is not renewed within 60 days of the expiry date on the licence, the renewal application is taken to be an application for a new licence. Additional fees apply to late renewal applications.

4.5 Transfer policies

4.5.1 Transfer of licensed fishing boats

Licensed fishing boats used in the OTLF currently operate under "general purpose" or "boat history" rules whereby the licence of a general purpose boat may be transferred separately from any fishing business and has no associated catch history. General purpose boats are generally operated in fisheries where the fisher, rather than the boat, is the principal unit of effort. The majority of licensed fishing boats used in the OTLF operate under "boat history" rules. The licence of a boat history boat, and any associated endorsements, can only be transferred as part of the associated fishing business. NSW DPI advises fishing boat owners whether a boat has a boat history or general purpose licence. Any transfer of a fishing boat licence must first be approved by the Director-General, NSW DPI.

Under the share management plan, it is proposed that all fishing boat licences will be able to be transferred to other fishing business owners independently of the other components of the fishing business. However, no additional boat licences will be issued and controls on access to particular fisheries will be managed through the shareholdings and eligibility for endorsements.

4.5.2 Transfer of fishing business entitlements

Commercial fishing licences and endorsements to participate in a fishery are not freely transferable. Currently, commercial fishing licences and endorsements only become available to a new entrant if a fishing business with the required level of validated catch history or particular fishing entitlements is acquired. Under the current Licensing Policy, fishing businesses must be sold as an entire package (i.e. the catch history, boat history vessels and/or endorsements associated with boats cannot be split). Proposals regarded as contrary to the intention of the Licensing Policy are not approved.

These transfer arrangements will be superseded by the implementation of share management provisions and minimum shareholdings for the fishery upon the commencement of the share management plan. While shares are likely to be more freely tradeable than the restricted fishery and current limited access fishery entitlements, the fundamental principle of avoiding increases in fishing effort through transfer arrangements will be applied.

4.5.3 Licence splitting policy

The Commonwealth and the State Governments have had a long standing nationally agreed policy in place on "licence splitting". The policy seeks to prevent entitlements held by one person or entity, and issued by more than one jurisdiction, from being split and transferred separately. In NSW the transfer of a fishing business is not approved unless all entitlements issued to the business by other jurisdictions are also transferred to the same person or surrendered, unless the separate transfers have been approved by all fisheries management agencies involved.

Where fishing effort has been historically 'shared' across a number of entitlements held by a person, the National licence splitting policy seeks to prevent any increase in effort in each of the respective fisheries that might occur following the splitting of the entitlements.

New regulations, introduced in mid-2006, provide the powers to cancel, refuse to renew, refuse to transfer, or to restrict the NSW fishing entitlements of any dual licenced operator who splits any external fishing authorities (i.e. Commonwealth or other State/Territory authorities) associated with their fishing business.

4.6 Appeal mechanisms

Fishers may lodge an appeal to the Administrative Decisions Tribunal (ADT) against a decision to refuse to issue or renew, suspend, cancel or place conditions on a commercial fishing licence (or an endorsement on that licence) or a fishing boat licence.

The main role of the ADT is to review administrative decisions of New South Wales government agencies. To lodge an appeal with the ADT, a request must first be made to NSW DPI for an internal review of the decision, then a written application should be lodged with the ADT no more than 28 days after the internal review was finalised.

The ADT can make various orders concerning an appeal application including:

- upholding the original decision
- reversing the decision completely or in part
- substituting a new decision for the original decision
- ordering the agency to reconsider the decision in light of the ruling.

For further information, refer to the *Administrative Decisions Tribunal Act 1997* or the website: www.lawlink.nsw.gov.au

4.7 Code of practice

This FMS promotes the development of a code of practice for all ocean trap and line fishers, to encourage responsible fishing practices and to minimise the impact of trap and line fishing on the environment [see management response 1.2(e) in section 9].

4.8 Time and area closures

The *Fisheries Management Act 1994* provides for the use of fishing closures in the OTLF to, among other things:

- protect and conserve areas of key habitat
- manage the amount of fishing effort in an area/region
- manage conflicts between stakeholders over the use of the resource and to ensure it is equitably shared
- minimise bycatch and the impacts of the fishery on threatened and protected species.

Fishing closures can be established on a seasonal, time, area, operator or gear specific basis. Fishing closures are required to be published in the NSW Government Gazette, however, if the Minister for Primary Industries considers that a fishing closure is required urgently, the Minister may introduce the closure and advise the public through media outlets and by displaying prominent signs in areas adjacent to the waters affected. In the case of an urgent closure, the Minister is to publish the closure in the Government Gazette as soon as practicable. Details on up-to-date fishing closures that apply to the OTLF can be found on the NSW DPI website at: www.dpi.nsw.gov.au or in the relevant share management plans once finalised.

4.9 Permits

Section 37 of the *Fisheries Management Act 1994* allows for permits to be issued for research or other authorised purposes. These permits provide a legal framework for activities that fall outside normal operating rules set out in the Act or its Regulation. Each permit sets out a number of conditions, which vary depending on the purpose of the permit. These conditions ensure that permits are used only for the purpose intended by their issuing and are often used to limit the extent of the permitted activity.

Permits are issued under section 37 of the *Fisheries Management Act 1994* are only valid insofar as they do not conflict with approved determinations of native title made under the Commonwealth *Native Title Act 1993*. Permits are valid for the period specified on the permit, and may be suspended or cancelled at any time by the Minister for Primary Industries. Permits are not transferable.

4.9.1 Controls on collection of bait-for-own-use

The fishery for bait-for-own-use is presently carried out under permit by fishers who target tuna in fisheries managed by the Commonwealth. There is also some targeting of tuna within NSW jurisdiction that also utilises bait gathered by lift nets. These bait gathering activities have always been constrained to three species; yellowtail, blue mackerel and pilchards. NSW fishers using a lift net to gather bait have been required to report their bait catches since 1997. Commonwealth Section 37 permit holders are required to fill in a live bait daily logbook and return it to the Department within 7 days of fishing.

This FMS [management response 4.2(d) in section 9] outlines the participation of the Ocean Trap and Line MAC in the development of a policy for bait gathering using lift nets that is being prepared under the Ocean Hauling Fishery Management Strategy. Development of the policy will allow for the consideration of the use of lift nets by NSW line fishers to take bait for taking species other than tuna (eg. kingfish).

4.10 Catch limits or quotas

A commercial daily catch limit (or trip limit) applies to a range of species taken from NSW waters as part of the OTLF. These daily catch limits are intended to complement the quota system administered by the Commonwealth Government that limits the harvest levels of these species by Commonwealth endorsed boats, and to achieve a level of consistency on the fishing controls that exist in State waters. New trip limits also apply to the taking of certain shark species by NSW fishers to prevent major effort shifts onto these species given the relatively high environmental risks. Details of up-to-date trip limits applying to the Ocean Trap and Line Fishery can be found on the NSW DPI website at: www.dpi.nsw.gov.au

4.11 Seafood safety programs

Food safety programs that relate to the OTLF are administered by NSW Food Authority under the *Food Act 1989*. Food safety programs for all commercial fisheries are currently being prepared by NSW Food Authority and will be supported under the FMS.

4.12 Cost recovery policy

NSW DPI currently recoups some of the costs that are attributable to industry through a cost recovery policy. Cost recovery is a common principle among Australian commercial fisheries and an important component of ecologically sustainable development.

NSW DPI is in the process of implementing cost recovery in a progressive manner, so that charges are passed on to industry in a planned and orderly way. In November 2000, the Government announced a policy to develop and implement a cost recovery framework for the new category 1 share management fisheries. This framework will be subject to extensive industry consultation. During this period, the total amount of money collected for NSW DPI, for its existing management services, will not increase (other than CPI-linked increases) without the support of the relevant management advisory body. At the time of commencement of the FMS, the cost recovery policy was under review.

It is important to note that new services required to be implemented under the management strategy as a result of the environmental assessment process will need to be funded by the fishery participants. A range of regulatory and administrative fees are payable by fishing business owners in the OTLF. The management strategy does not, in itself, set the charges, or limit or otherwise govern the way fees are charged.

5. Compliance

NSW DPI has approximately 100 fisheries officers responsible for coordinating and implementing compliance strategies in NSW. These strategies include:

- maximising voluntary compliance
- providing effective deterrence for offences
- providing effective support services.

Approximately 75 of these fisheries officers are located in areas along the NSW coast where the OTLF occurs. Their general duties include conducting patrols, inspecting commercial and recreational fishers and fishing gear, and recording rates of compliance.

A compliance strategic plan will be developed to provide the direction for education, advisory and enforcement services provided by NSW DPI for all designated commercial fishing activities, including the OTLF (see management response 6.1(a) in section 9). To ensure that compliance service is delivered in a consistent manner, quality inspection guidelines will be developed. These guidelines will set out a procedural approach to be adopted when undertaking inspections of fishers and fishing gear in the OTLF. The quality inspection guidelines will ensure that all issues requiring compliance by commercial fishers under this FMS are subject to a compliance program.

5.1 A penalty points system

A penalty points scheme linked to endorsement suspension and share forfeiture provisions will be introduced under the management strategy and developed through the share management plan for the OTLF (see management response 6.1(d) in section 9).

The OTLF generally has a high compliance rate. However, despite the relatively large number of potential offences and the maximum penalties specified in the FM Act and Regulation, there are still a small number of ocean trap and line fishers who regularly operate beyond the rules. The penalty points system will provide a clear deterrent to fishers who are considering breaching the provisions of the FMS or associated rules, as well as guiding the courts with a regulated management plan that reflects the serious nature of some fisheries offences.

Similar to the motor vehicle driving licence demerit points scheme administered by the Roads and Traffic Authority, the system would provide for a list of penalty points assigned to serious or repeated offences. Under the scheme if a fisher accrues a certain amount of penalty points, endorsements could be suspended and/or shares forfeited. Details of how the scheme will operate, such as the points attributable to each offence and the sanction threshold levels, will be developed in consultation with Management Advisory Committees.

6. Research

NSW DPI has developed a strategic research plan covering priorities across all fisheries which is responsive and takes account of the research requirements identified under each FMS.

6.1 Proposed research areas

Research needed for management of the OTLF can be categorised into five broad topics:

1. resource assessment of primary and key secondary species;
2. quantification and reduction of bycatch;
3. economic research;
4. impacts of trap and line fishing on ecosystems (including habitat and trophic interactions);
5. impacts of fishing on threatened species.

The first three topics above are considered to be the highest priority for research relevant to the sustainability and viability of the OTLF. Resource assessments of varying degrees have been done only for a few species in the fishery, and are therefore the highest priority for research. The impact of bycatch in this fishery on fish stocks is likely to depend on the mortality rates of discarded fish and

needs to be quantified. Research on the economics of the fishery is important to provide better information on fishing business viability that can be taken into account in future fishery management. The impact of trap and line fishing on ocean ecosystems represents a very broad area for research, which will require significant resources and a long-term approach. The available data and anecdotal evidence suggests that the impacts on habitats and threatened species by the OTLF is minimal, with the priority at present being to obtain more accurate information about the levels of interaction, rather than undertake research projects on the impacts.

6.1.1 Resource assessment of primary and key secondary species

Targeted species within this fishery require effective processes of resource assessment so that significant changes in population abundance and structure can be detected and acted upon. All targeted species are economically important to some sectors of the fishery. Resource assessments for most species in the OTLF are at a rudimentary level. Monitoring of reported commercial landings each year has been done for many of the more important species, but its use in assessing the status of the stocks is limited. Size and age-based monitoring is a significant improvement upon the monitoring of catch and effort alone. Resource assessment processes should be established for all high risk species as a priority, although the level of assessment is likely to differ due to species identification problems, particularly with some sharks. Until species identifications are consistent and reliable, it will not be possible to achieve Class 1 or 2 assessments (see Table 6.1 below). Where age-based assessments have been previously completed on species in the fishery (snapper, silver trevally, mulloway and yellowtail kingfish), the results have shown the species to be growth overfished. The steady declines in landings and average sizes that have been observed for some other species in the fishery suggests that they may also be growth overfished.

There remains a lack of knowledge of the general biology for most species harvested in the fishery. Fundamental information on growth rates, sizes at sexual maturity and spawning seasons is required to better inform fisheries management. This information should be combined with monitoring of the size and age structures of landings and the reported yearly catch and effort data to develop basic population models. These assessments will show whether species are currently being harvested at appropriate rates.

6.1.2 Classes of resource assessment

Table 6.1 summarises the characteristics of each class of resource assessment that has been developed for species harvested in NSW. A detailed description of the assessment classes is provided in Appendix 4 (Scandol 2004). Table (adapted from Scandol 2004) contains the initial assessment classes that are proposed for the primary and key secondary species of the fishery. The content of Table 6.2 will require continual revision.

Table 6.1 Summary of the attributes of the various classes of resource assessment

Attribute	**Class of Resource Assessment**				
	One	**Two**	**Three**	**Four**	**Five**
Biomass estimate	•				
Estimate of fishing mortality	•				
Quantitative risk analysis of future harvesting	•				
Standard fisheries biological reference points	•				
Credible indicator of abundance	•	•			
Representative time-series of commercial catch	•	•	•	•	
Age-structured data (where possible)	•	•			
Local information for growth, mortality, selectivity and maturity	•	•	•		
Length-structured data	•	•	•		
Non-local information for growth, mortality, selectivity and maturity			•	•	•
Externally reviewed or publishable	•	•	•	•	•

(Source: Scandol 2004)

Table 6.2 A summary of the proposed target resource assessment classes for primary and key secondary species of the fishery. Age information will be collected for species granted a Class 2 assessment where no local information on growth is available.

Species	Species Type	Resource Assessment Class	EIS Risk Rating	Indicators	Comments
Australian bonito	P	2	Moderately-High	Catch; CPUE; Age/Length	**New program - no existing age or length data**
Banded (Bar) rock cod	P	2	**High**	Catch; CPUE; Age/Length	**New program - some existing length data**
Blue-eye trevalla	P	2	Moderate	Catch; CPUE; Age/Length	Ongoing monitoring program
Grey morwong,	P	2	Moderately-High	Catch; CPUE; Age/Length	**New program - some existing length data**
Gummy shark	P	3	**High**	Catch; CPUE	Species identification issues - no existing age or length data
Leatherjackets (mixed species)	P	3	Moderately-High	Catch; CPUE; Age/Length	Species complex; Most landings would be ocean leatherjacket
Silver trevally	P	2	Moderate	Catch; CPUE; Age/Length	Subject to recovery program; Ongoing assessment program
Snapper	P	2	Moderately-High	Catch; CPUE; Age; Length	Ongoing monitoring program
Spanner crab	P	2	Moderately-Low	Catch; CPUE; Surveys; Length	Most of this stock is in Queensland; Subject to joint NSW/Qld survey program; Ongoing assessment program
Yellowfin bream	P	2	Low	Catch; CPUE; Age/Length	Ongoing monitoring program
Yellowtail kingfish	P	2	Moderately-High	Catch; CPUE; Age/Length	Ongoing monitoring program
Bass groper	K2	3	Moderately-High	Catch; CPUE; Length	**New program - some existing length data**
Eastern blackspot pigfish	K2	3	**High**	Catch; CPUE; Age/Length	**New program - no existing age or length data**
Gemfish	K2	1	Moderately-Low	Catch; CPUE; Length	Mostly Commonwealth fishery; Ongoing monitoring program
Hapuku	K2	3	Moderately-High	Catch; CPUE; Length	**New program - some existing length data**
Jackass morwong	K2	3	Moderate	Catch; CPUE; Length	Mostly Commonwealth fishery; some existing length data
Mahi mahi (Dolphinfish)	K2	3	Moderate	Catch; CPUE; Length	**New program - no existing age or length data**
Mulloway	K2	2	Moderate	Catch; CPUE; Length	FRDC study in progress - existing age and length data
Pearl perch	K2	3	Moderately-High	Catch; CPUE; Length	**New program - no existing age or length data**
Sharks (mixed species)	K2	2	**High**	Catch; CPUE	Species complex; Species identification issues
Spanish mackerel	K2	3	Moderate	Catch; CPUE; Length	Most of this stock is in Queensland
Spotted mackerel	K2	3	Moderate	Catch; CPUE; Length	Most of this stock is in Queensland
Silver Sweep	K2	2	Moderate	Catch; CPUE; Length	**New program - no existing age or length data**
Teraglin	K2	2	Moderately-High	Catch; CPUE; Length	**New program - some existing length data**
Wobbegong sharks	K2	3	**High**	Catch; CPUE; Age/Length	Carpet sharks; Species identification issues

6.1.3 Quantification and reduction of bycatch

Levels of bycatch in the OTLF have not been assessed for most of the methods used, but have been assumed to be small when compared to other fisheries such as the Ocean Trawl Fishery, Estuary Prawn Trawl Fishery and Estuary General Fishery. Information from small-scale observer work and fishers logbooks has shown that levels of discarding in the demersal trap fishery (Stewart & Ferrell, 2001) and the kingfish fishery (Stewart *et al*., 2004) can be high. These identified bycatch issues generally incorporated the discarding of under-sized target species, and may be similar for other methods used in the fishery. Assumptions of low levels of bycatch have come from anecdotal evidence and these assumptions may, over time, be tested for all methods in the fishery through the scientific observer study [management response 1.2(a) in section 9].

Where information is available to show that levels of bycatch are unacceptably large, the activity should be phased out or further research undertaken to investigate:

i) the mortality of the discarded bycatch; and

ii) ways of reducing these discard levels.

Species captured from shallow waters in this fishery are generally alive with little or no obvious damage. However, it is important to estimate the mortality of these discards, and those drawn from deeper waters, to assess what impact the fishery may be having on stocks.

It is important that any modifications intended to reduce levels of bycatch, such as escape panels in demersal fish traps [management response 1.2(b)] and the use of circle hooks [management response 1.2(f)] be monitored for their ongoing effectiveness. Onboard observer studies can be used to provide information in these cases.

Ghost-fishing of lost traps is assumed to be problematic and this FMS proposes mechanisms to quantify the numbers of traps that are lost [management response 1.1(b)]. There is little information on whether lost traps continue to capture animals and, if so, whether they die or can escape. Small-scale manipulative field experiments can be done to quantify whether ghost-fishing is likely to be an issue in this fishery.

6.1.4 Economic research

To address the economic objectives of the management strategy, research will be needed to assess the economic viability of businesses endorsed in the OTLF, and to quantify the flow-on effects from these activities to the economies of coastal communities.

Previous studies of the economic viability of ocean trap and line operators relied on the results of a survey of a sample of fishing businesses for the 1999/2000 financial year (Roy Morgan, 2001). As the financial situation of fishers is likely to have changed, a further survey is required to provide updated information, or alternative methodologies may need to be applied. Additional information should also be collected on variations in prices among receivers and for different size classes of fish (particularly those where growth overfishing may become an issue).

Currently, there are only limited data available on the flow-on (or multiplier) effects from the OTLF, which includes not only the direct employment, income and expenditure generated by participants in the fishery, but also those benefits indirectly generated as a result of inputs and other ancillary services provided to the ocean trap and line fishing fleet. Study of flow-on effects should be undertaken at the regional level and would ideally be linked with regional economic assessments.

6.1.5 Impacts of trap and line fishing on ocean ecosystems (including habitat and trophic interactions)

The structure and functioning of ocean ecosystems and the myriad of ecological processes that occur underpin the sustainability of the fisheries that depend on the fish, crustacean and mollusc resources of NSW oceanic waters. Little directed research has been done anywhere to assess the impacts that fishing has on the structure of oceanic ecosystems, although a number of recent reviews which assembled data from many diverse studies suggest that impacts of fishing may be severe (Jennings and Kaiser, 1998; Hall, 1999; Myers and Worm, 2003).

There is a need to develop biodiversity indicators for the ecological system in which the OTLF operates. Research to provide such indicators will likely be long-term, and will need to draw on a variety of expertise and knowledge. This FMS promotes initiatives in research and monitoring that could significantly improve the working knowledge of the fishery in its environment. These initiatives, such as the mapping of major trapping grounds and associated geological features [management response 1.1(a) in section 9], collecting information on the potential for 'ghost-fishing' [management response 1.1(b)], improvements in the accuracy of species identification on catch returns [management response 7.3(a)], and the quantification of discards by the observer program [management response 1.2(a)], will provide some basis for future studies aimed at developing appropriate indicators for monitoring biodiversity.

A collaborative study currently underway between NSW DPI and the University of British Columbia should also provide an ecosystem-based model for fisheries operating in the coastal waters of NSW. This study is compiling all the relevant data and examining the inter-relationships between species and/or trophic levels within our coastal ecosystems, thereby improving the knowledge base needed to help determine the impacts of fishing on natural systems.

The impacts of trap and line fishing on habitats are thought to be minimal, but have not been assessed by any scientific study in NSW. Physical damage to demersal habitats such as sponges, corals and rocky reefs may occur from demersal fish traps, entangled fishing lines and anchors. The observer-based study will be able to identify some interactions between habitats and the fishery by recording where and when the fishery uses different gear types, and noting any evidence of flora or fauna that are representative of different habitat types that become snagged on traps or lines and lifted to the surface. Where concerning interactions are identified, targeted research will be done to further quantify the extent of the interaction and, if necessary, develop methods to minimise the impact.

6.1.6 Impacts of fishing on threatened species

Little is known about the biology and ecology of many of the species listed as threatened, and the potential impacts of commercial fishing on these species are also poorly understood. This FMS seeks to improve the accuracy of information available on interactions between the OTLF and threatened species through the observer program [management response 1.2(a) in section 9] and improvements in catch monitoring reports [management response 3.1(a)]. The recovery plans or priority action statements for relevant threatened species should drive research on such issues, and determine specific projects to be targeted at the species of concern. Such studies would involve examining the biology and ecology of threatened species to assess the potential impact of a variety of threats, including trap and line fishing. A project assessing the broad-scale interactions between fishing and marine mammals, reptiles and avifauna in NSW marine waters was recently completed

(Ganassin and Gibbs, 2005). This project identifies specific issues and provides some recommendations for improvement to current management which are provided for within this FMS.

6.2 The Conservation Technology Unit

In March 2001, NSW Fisheries (now NSW DPI) established a Conservation Technology Unit to examine gear technology for use in commercial and recreational fisheries in support of the management objectives developed to achieve conservation management goals. This focused research initiative may help address gaps in knowledge including the mortality of released line caught fish and the selectivity of gears used in the OTLF. The research will also assist in identifying the most appropriate gear to be used in the fishery and ensure that future changes to gear regulations can be based on accurate scientific information. The development of new and innovative fishing techniques will help minimise unwanted catches, discarding and impacts on the environment.

6.3 Catch monitoring

The information collected on commercial catches assists in the ongoing monitoring and assessment of the status of fish stocks. The catch and effort information collected from commercial fishers has other critical roles in fisheries management including helping to understand patterns of fishing activities and the mix of species from targeted and general fishing operations.

Fishers in the OTLF will continue to be required to submit records on a regular basis detailing their catch and fishing effort. Information includes the total landed catch by species, days fished and area fished for each method used. All commercial landings in the fishery are currently reported by the one-degree latitude ocean zones, consistent with all other ocean fisheries in NSW. This information will continue to be entered onto a database by NSW DPI, to allow for analysis of fishing activity, catch and effort levels. The entry of catch return information onto the database will be subject to stringent control procedures including deadlines for data entry following the receipt of a catch return by NSW DPI. A policy will be developed to manage the timely receipt and entry of commercial catch return data into the commercial catch records database. A number of management responses are contained in this strategy to improve the quality and reliability of the information provided by ocean trap and line fishers catch and effort returns.

To maximise the accuracy of the data collected on catch and effort returns a range of quality-control procedures are currently in place or scheduled for implementation in the near future, namely: -

- Every return is scanned for errors when received by the “Commercial Catch Records” section in NSW DPI, and suspected omissions or errors are queried with fishers (by phone and/or written correspondence) and corrected if necessary.
- Logical checks of data accuracy (range, consistency and validity checks) are performed automatically by computer during data-entry. Likely errors are queried with fishers (by phone and/or written correspondence) and corrected if necessary.
- Data from the commercial catch statistic database are regularly downloaded to a database which can be accessed or queried by scientific staff and managers responsible for individual fisheries. Subsequently, any problems with data identified by these officers are queried and may be corrected by the commercial catch records section after consulting fishers where necessary.

- A previous pilot survey was undertaken to assess the accuracy of data entry with respect to the catch records. The results showed that data-entry errors by staff were of minimal significance. Errors were rare and generally concerned minor species. It is planned to repeat this survey to provide ongoing monitoring of the quality and accuracy of data entry.
- Following implementation of routine reporting of the quantities of fish handled by registered fish receivers in NSW, it will be possible to compare the quantity of catch (by species) reported by fishers on catch returns with the quantity handled by fish receivers in NSW. This will provide a cross-validation of weights of individual species caught and handled in NSW.
- The information collected on catch returns and options for improving the catch return forms (and increasing the reliability of data) will be reviewed periodically by the management advisory councils and annually by the "Catch and Effort Working Group" which comprises stakeholder representatives, including each commercial fishery.

All existing and proposed procedures attempt to maximise data quality. It is, however, inevitable that the accuracy of data supplied by fishers cannot be directly assessed and can sometimes be variable, particularly with respect to fishing effort data. Consequently, the commercial catch statistics supplied by fishers and maintained in the commercial catch records database are most accurately described as representing "reported landed catch".

7. Consultation

There are a range of consultative bodies established in NSW to assist and advise the Minister and NSW DPI on fisheries issues. There are committees that are established to provide advice on specific issues as well as bodies that advise on matters which cut across different fisheries or sectors.

7.1 The Management Advisory Committee

Share management and major restricted fisheries in NSW each have a Management Advisory Committee (MAC) that provides advice to the Minister for Primary Industries on: -

- The preparation of any management plan or regulations for the fishery.
- Monitoring whether the objectives of the management plan, strategy or those regulations are being attained.
- Reviews in connection with any new management plan, strategy or regulation.
- Any other matter relating to the fishery.

The industry members of the MAC comprise representatives that are elected by endorsement holders in the fishery. There is an industry representative from each section in the fishery. The members hold office for a term of three years, however, the terms of office are staggered and the terms of half of the industry members expire every 18 months.

The non-industry members on the MAC representing recreational fishers, conservation groups and NSW DPI, are appointed by the Minister for Primary Industries and also hold terms of office for up to three years. To ensure that all issues discussed by the committee are fairly represented, the MAC

is chaired by a person who is not engaged in the administration of the FM Act and is not engaged in commercial fishing.

Although the MAC receives advice from NSW DPI observers on research, compliance and administrative issues relating to the fishery, only members of the MAC have voting rights on the decisions of the MAC.

The actual composition and role of the MAC is set by the FM Act and its Regulations and may be altered from time to time.

7.2 Ministerial Advisory Councils

Two Ministerial advisory councils are currently established under the *Fisheries Management Act 1994*. The Councils provide advice on matters referred to them by the Minister for Primary Industries, or on any other matters the Councils consider relevant. They report directly to the Minister for Primary Industries.

The wild harvest fishery related Ministerial advisory councils in place at August 2006 are the:

- Seafood Industry Advisory Council (SIAC).
- Advisory Council on Recreational Fishing (ACoRF).

The OTLF and each of the other share management fisheries have representatives on the SIAC. These representatives are nominated by each of the respective management advisory committees and appointed by the Minister for Primary Industries.

A "Discussion paper on the advisory structures in the NSW seafood industry" was distributed to industry in December 2003 and resulted in changes to the then existing advisory structure, which comprised of ACoRF, the Advisory Council on Commercial Fishing (ACCF) and the Advisory Council on Aquaculture (ACoA): the latter two were amalgamated to create SIAC. The name and composition of ministerial advisory councils are determined by regulations under the FM Act, and may be altered from time to time.

8. Interactions with Other Fisheries

The fisheries of NSW are intrinsically complex due to the large diversity of species caught, the wide range of areas fished and gear types used. Many species taken in the OTLF are also taken in other NSW commercial fisheries, by recreational fishers, by Aboriginal fishers and by fisheries managed under the jurisdiction of the Commonwealth or other States.

Ocean waters off NSW contain a large number of fish and invertebrate species due to the overlap of sub-tropical and temperate ecosystems, and the relatively narrow continental shelf. Of the primary and key secondary species taken by trap and line fishing in NSW ocean waters, most are also significant in the catch taken by one or more commercial or recreational fisheries, either in NSW or in adjoining jurisdictions. Species such as yellowfin bream, mulloway, and silver trevally are targeted and constitute a large percentage of the overall landings in other commercial fisheries.

8.1 Other NSW commercial fisheries

Apart from interaction by way of the species taken, trap and line fishing in ocean waters overlaps with the other ocean fisheries in regard to areas fished. There have been interactions between

trap and line fishers, trawl fishers and lobster fishers, mainly involving interaction between the two types of fishing gear being fished on the same grounds. Many businesses endorsed in the OTLF also hold endorsements in other NSW commercial fisheries, such as the Lobster, Estuary General, Ocean Trawl or Ocean Hauling fisheries.

The largest interaction with the OTLF based on area fished and species taken occurs with the Ocean Trawl Fishery. The Ocean Trawl Fishery operates between the NSW coastal baseline and the 4,000 metre isobath in ocean waters between Barrenjoey Headland and Smoky Cape, and between the NSW coastal baseline and 3 nm to sea south of Barrenjoey Headland (and many of the same trawlers operate in the Commonwealth's South East Trawl Fishery outside 3 nm). In addition to the overlap in areas fished, there is a significant overlap in the species landed in these fisheries.

There is a reasonable interaction between operators in the OTLF and Lobster Fishery, with a number of fishers being endorsed in both fisheries. This is most likely due to the historic fishing patterns, which saw the use of traps to target both finfish and lobsters until access to the Lobster Fishery was separately restricted in 1993.

Although there is some conflict between commercial fishing sectors in NSW, the interaction of fishers participating in more than one fishery possibly reduces the level of conflict that may be expected if each fisher participated in one fishery only. The diverse nature of commercial fishers in NSW means that most fishers have an understanding of the issues affecting each other and the industry as a whole.

8.1.2 Recreational fishery

To obtain reliable estimates of non-commercial fishing patterns and levels of harvest, a National Recreational and Indigenous Fishing Survey (Henry and Lyle, 2003) was completed in 2002 based on fisher activity from May 2000 - April 2001. Data from the national survey, and a survey from September 1993 to August 1995 (Steffe *et al*., 1996) of NSW offshore recreational fishers, shows considerable interaction between recreational fishing and the OTLF, as almost all of the target species within the fishery are also targeted by recreational anglers and/or charter boat operators. The surveys also indicate that the recreational catch of some species, such as black-spot pigfish, mahi mahi, bream, kingfish, mulloway, pearl perch and teraglin are comparable and in some cases larger than the OTLF catch.

The marine and estuarine charter fishing industry was restricted in 2000 when eligible vessels became licensed under the FM Act. Since licensing arrangements commenced, operators have been required to enter logbook returns, detailing the catch taken on board the vessel during charter activities, as part of a compulsory monitoring program. There is potential for greater competition between the commercial deepwater dropline fishers and charter fishing industry because of the increasing recreational effort directed at deepwater species such as blue-eye, gemfish and bar cod.

8.1.3 Indigenous fishing

A number of species taken by the OTLF are also targeted by Aboriginal fishers, including leatherjackets, snapper, yellowtail kingfish and silver trevally (Schnierer and Faulkner, 2002). However, as most indigenous fishing occurs in estuarine and near shore ocean waters, the level of direct interaction between the OTLF and the Indigenous Fishery is thought to be low. In 1997, NSW Fisheries (now NSW DPI) conducted a small survey on Aboriginal coastal fishing. The survey showed that Aboriginal people fished regularly, often to feed large or extended families. When certain

circumstances exist, a permit may be issued under the *Fisheries Management Act 1994* that authorises Aboriginal people to meet specific cultural obligations with respect to traditional fishing.

The exact number of Aboriginal people directly involved in this fishery is not presently known. While there is provision for Indigenous representation on the Ocean Trap and Line MAC, to date no such representative has been nominated.

Further information on the interaction of the OTLF with Indigenous fishing can be found in the OTLF EIS (see Volume 3 Appendix B4).

8.2 Commercial fisheries in adjacent jurisdictions

Interactions between fisheries managed in adjacent jurisdictions and the OTLF are based around area fished and species harvested. Listed below is information about fisheries in adjacent jurisdictions that have a reasonable level of interaction with the OTLF.

8.2.1 Commonwealth Southern and Eastern Scalefish and Shark Fishery (SESSF)

This fishery comprises of the Commonwealth trawl, gillnet, hook and trap, east coast deepwater trawl, and Great Australian Bight trawl sectors. Of these, interactions occur between the OTLF and the Commonwealth trawl sector and the gillnet, hook and trap sector.

The Commonwealth trawl sector harvests species taken in the OTLF, including blue-eye, hapuku, gemfish, silver trevally, grey morwong, leatherjackets and snapper, with some of these species managed by quota. It is likely that for the majority of species, trawled fish come from the same stock utilised by ocean trap and line fishers. Methods used include mid-water trawl, demersal otter trawl, Danish seine trawl and pair trawl. The Commonwealth trawl sector covers the areas of the Australian Fishing zone extending southward from Barrenjoey Headland around the NSW, Victorian and Tasmanian coastlines to Cape Jervis in South Australia.

The gillnet, hook and trap sector covers the taking of Commonwealth managed species of demersal scalefish including blue-eye trevalla, pink ling and blue warehou and demersal shark species including gummy shark and school shark. Gillnet, hook and trap fishers use a variety of methods including demersal gillnets, drop lines, demersal and automatic longlines, and traps. Hook operators use a range of hook and line methods to target scalefish, in particular blue warehou, ling and blue eye trevalla. The management arrangements for the gillnet, hook and trap fishery are a combination of individual transferable quotas, limited entry, area restrictions and some gear restrictions.

8.2.2 Commonwealth Skipjack Tuna Fishery

The skipjack tuna fishery targets only skipjack tuna (*Katsuwonus pelamis*). Methods include purse seine, pole, minor line and longline, with the majority of catch coming from purse seine netting. Of the 19 operators authorised to use the purse seine method in the Commonwealth Eastern Tuna and Billfish Fishery (ETBF), an average of only 5 vessels per year recorded skipjack tuna in the ETBF from 1990 to 2001. The waters off the NSW coast (beyond 3 nm) south of Ulladulla to near Gabo Island produce the majority of catch taken in the skipjack tuna fishery.

8.2.3 Commonwealth Eastern Tuna and Billfish Fishery

Fishers in the Eastern Tuna and Billfish Fishery (ETBF) use pelagic longline and minor line methods to catch yellowfin tuna (*Thunnus albacares*), bigeye tuna (*Thunnus obesus*) and broadbill swordfish (*Xiphius gladius*). All permit holders in the ETBF may land skipjack tuna (*Katsuwonus pelamis*).

Fishers in the ETBF use lines that can be many kilometres long and are set for periods of up to 10-12 hours. During this time the longlines may become entangled with gear used by other fishers, including NSW ocean trap and line fishers, as the lines drift with prevailing currents. There have been reports of longline fishers cutting the headgear from fish traps to release (or untangle) their longline.

8.2.4 Queensland Spanner Crab Fishery

This fishery targets the same species of spanner crab as taken in the OTLF, and indeed it is thought to be a single stock that straddles the State border. Most of the catch is exported as live product to east Asia.

The Queensland Spanner Crab Fishery is much larger than the NSW fishery (total catch in excess of 1,500 t in QLD compared to approximately 120 t in NSW), and is managed under total allowable commercial catch (TACC). The Qld total allowable commercial catch in 2004/05 and 2005/06 was 1,727 t and has been increased to 1,923 t for each of the years 2006/07 and 2007/08. There were unprecedented increases in catch rates over the 2000-2005 assessment period which would have led to a very large rise in the TAC. However, with strong industry support, the TAC was only increased by approximately 200 t. Spanner crabs in NSW are managed by a range of input controls, such as limited access, time and gender closures, dilly limits, gear design and size limits. In the past moving to a quota scheme has been considered and consultation with and surveys of endorsements holders have shown a majority support for quota management. A move to a quota system, together with consistent management arrangements between NSW and QLD, will be considered under this FMS.

8.3 Aquaculture (marine fish farming)

Farming in marine waters is a relatively new but increasingly valuable aquaculture industry in NSW. Aquaculture production from marine waters (offshore sites) primarily comes from sea cage fin fish farming (including snapper and mulloway), and bivalve farming (*i.e.* blue mussels). Snapper farming was worth approximately $220,000 in 2001/02 and worth approximately $135,000 in 2002/03, most of which was produced in marine sea cage farms.

Sea cage farming involves the deployment of cages moored onto the ocean floor. Fingerlings are raised in land-based hatcheries and stocked into cages, where they are fed, graded and raised to a market size. The technology used for farming is similar to that used for Atlantic salmon in Tasmania and tuna in South Australia. Potential environmental impacts are monitored regularly by farmers in line with strict license conditions. Local broodstock are used for fingerling production to ensure escapees do not affect the genetic integrity of wild stocks. Marine water farms can often act as fish attracting devices, and at certain times of the year bait and pelagic species will gather near the farming structures.

It is expected that the growth of marine waters aquaculture in NSW will be limited due to the lack of good sheltered deep water sites. However, the expansion to commercial production of a

number of existing farms will ensure this industry remains a valuable component of aquaculture production in NSW. Species that are being considered for culture in offshore sites in the future include scallops, pearl oysters, abalone, kingfish and tuna. One of the key interactions between marine aquaculture and the OTLF is competition in the market place for shared species, as price is responsive to supply.

9. Goals, Objectives and Management Responses

This section sets out the long term goals, objectives and management responses for the Ocean Trap and Line Fishery that have been developed in order to achieve the vision for the fishery.

9.1 A Model Framework

Figure 9.1 A model of the framework for a fishery management strategy.

The link between the goals, objectives and management responses is not as simple as that portrayed in Figure 9.1. The reality is that most management responses assist in achieving more than one goal and objective due to the complex relationships that exist, particularly in a multi-method multi-species fishery.

For example a fishing closure to protect spawning fish fits into the "maintaining sustainable populations" goal, but it can have other benefits that assist the fishery to meet other goal and objectives, such as providing greater protection to habitat and biodiversity. This outcome provides a range of benefits for the fishery over and above maintaining sustainable populations (see Figure 9.2).

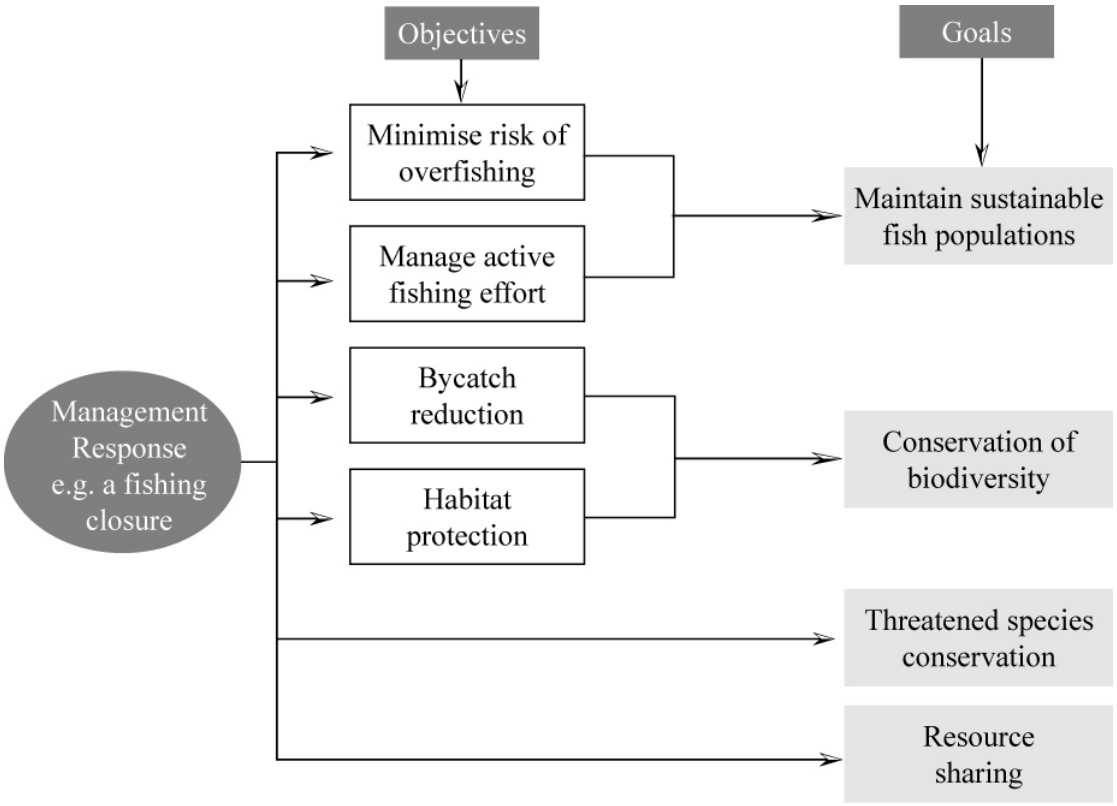

Figure 9.2 Example of how a management response affects multiple goals and objectives

This complex structure has been dealt with in the following section by listing each of the management responses once only, under the objective that the response contributes most towards achieving. Management responses with an asterisk (*) indicate new management actions that are to be implemented to address the outcomes of the EIS risk assessment on the existing operation of the fishery.

Information relating to the implementation of management responses is provided in a table located in Appendix 2. The implementation table outlines the time periods within which each management response is scheduled to be implemented, as well as information relating to the head of power for implementation and the group who has the lead responsibility for carrying out the actions.

The management responses listed in the following section relate to specific actions that directly contribute to meeting the goals and associated objectives defined for the OTLF. The overall management regime for the OTLF includes the management responses (below), the principles and guidelines contained within the harvest strategy (section 3), as well as the general requirements of the FM Act and associated Regulations.

9.2 Goals, Objectives and Management Responses

GOAL 1. Manage the OTLF in a manner that promotes the conservation of biological diversity in the marine environment

Objective 1.1 Mitigate the impact of trap and line fishing in NSW ocean waters on ecosystem integrity (species, populations, and ecological communities)

*1.1(a) Map major trap and line fishing grounds (including available information on associated geological features), assess the level of use of the OTLF on each ground and identify the areas in NSW ocean waters where trap and line fishing occurs (taking account of marine protected areas)

Background: As major trapping grounds are identified, their broad location will be entered on maps. The maps will include relevant geological features and provide information on the level of ocean trap and line fishing that occurs in each area (taking into account the different gear types and seasonal variations where known). The purpose of such maps is to graphically demonstrate the areas where trap and line fishing currently occurs and does not occur to allow an assessment of the impact of trap and line fishing on each ground to be made. The maps will also assist in managing the cross-fishery interactions with lobster fishing and ocean trawling activities (see Goal 4), and would also be helpful when considering area closures (eg. to examine the potential impacts of any new Marine Parks on the fishery).

1.1(b) Collect information on the number of fish traps in the fishery lost during fishing operations and implement appropriate management actions if necessary

Background: The quantity of traps that are lost each season due to various reasons such as weather, ocean currents, entanglement with gear used in other fisheries, ships breaking head gear, etc is unknown. 'Ghost-fishing' is the term given when an item of fishing gear is unable to be retrieved and continues to have the ability to capture or entangle animals. Initial results from research into the potential impacts of trap loss on mortality in lobster show that ghost fishing may be a significant source of lobster mortality. As fish traps are essentially identical to lobster traps, lost fish traps may also be a source of mortality, although the risk is likely to be less as fish traps are more likely to break up due to their use in shallower, more turbulent waters. Further research would assist in both identifying and assessing the risks and identifying appropriate and effective mechanisms to mitigate the impacts of trap loss.

In order to determine the numbers of traps lost, and ultimately whether there is any potential risk of 'ghost-fishing' from lost fish traps, the catch reporting system has been amended to collect data on the number of traps lost and recovered. The 'Comments' section on the catch and effort return form could be used by fishers to report such things as partial trap retrieval which would indicate that some lost traps were destroyed and unable to ghost-fish. The scientific observer program may also provide estimates of trap loss, depending on the level of coverage of the trap fishery. An example of an appropriate management action is time release mechanisms for the head gear on fish traps.

1.1(c) Use fishing closures to control fishing activities within the OTLF

Background: Fishing closures may by used to protect key fish habitat and minimise impact on sensitive ocean habitat, avoid direct interactions with marine and terrestrial threatened species, populations or ecological communities, equitably share the resource between ocean trap and line fishers and other stakeholders or minimise conflict between resource users. Fishing closures may be gear specific, so that only the relevant gear type/s are affected by such a closure. Closures are periodically reviewed and modified to take account of changing fishing patterns and/or environmental conditions. Any new fishing closures should take account of areas closed to trap and line fishing through marine protected areas.

Fishing closures prohibit fishing over an area either absolutely or conditionally. In this FMS the term "fishing closure" has a broad meaning encompassing any legally enforceable prohibition or restriction on fishing activity. This includes: fishing closures made under Division 1, Part 2 of the FM Act; aquatic reserve notifications made under Subdivision 3, Division 2, Part 7 of the FM Act; regulations under section 20 of the FM Act; regulations under section 220ZE of the FM Act; regulations under section 205B of the FM Act and any closure included within share management plans.

This is an adaptive provision in the FMS which allows the modification of fishing practices from time to time in response to new issues that may arise. The response itself does not require any immediate action upon implementation of the management strategy.

Objective 1.2 Mitigate the impact of ocean trap and line fishing activities on bycatch (*i.e.* non-retained catch including prohibited species and unwanted catch)

*1.2(a) Design and implement an industry funded scientific observer program to document the degree of interaction of commercial designated fishing activities, including the OTLF, with non-retained and threatened species

Background: There are limited quantitative data in the NSW OTLF on discard rates and interactions of the fishery with threatened and protected species. Previous studies have demonstrated that the most cost-effective way of obtaining rigorous estimates of incidental catches of a fishery is through a properly designed onboard observer study. The observer program will involve observations on the rate and species composition of bycatch for each gear type in the fishery, document any interactions with threatened and protected species, and estimate the accuracy of catch returns in terms of the quantity caught and species identification. The program will identify, during the design phase, the areas of highest risk to bycatch, and will be able to record the effectiveness of bycatch reduction devices implemented through the management strategy. The program will be designed and costed in consultation with the Ocean Trap and Line MAC, and the priorities for monitoring across fisheries will be determined taking account of factors such as the relative level of environmental risk.

Furthermore, the environmental performance of the NSW Category 1 Share Managed fisheries, excluding Lobster and Abalone, will be reviewed every two years under the fishery management strategies to determine whether the monitoring program (including the observer program) is needed in future years and, if so, to refine priorities and the level of work.

*1.2(b) Implement fish escape panels in fish traps, initially comprising 50 x 75 mm mesh, that minimises bycatch and the retention of juvenile and small fish

Background: A FRDC funded study into the mesh selectivity of fish traps used in New South Wales (Stewart & Ferrell 2001) was completed. The study found that the selectivity of 50 mm hexagonal wire mesh was inappropriate for important species with minimum legal size limits in the fishery (e.g. snapper, bream, grey (rubberlip) morwong) and smaller fish of other species (e.g. silver trevally). Trials using escape panel mesh of 50 x 75 mm showed that it was effective at reducing the bycatch of undersized fish (predominantly snapper at a minimum legal length (MLL) of 28cm) with minimal loss of other commercially valuable species because this size escape mesh panel selects for a 25cm (total length) snapper. The snapper MLL has since increased to 30 cm and the implementation of a 50 x 75 mm escape mesh panel will not substantially reduce the risk of the fishery to snapper as approximately 39% of the snapper caught in traps with this mesh size were found to be undersize. Escape panels with even larger mesh were found to be more effective in reducing bycatch. An escape panel with an appropriately oriented 50 x 87 mm or 60 x 80 mm mesh would be more compatible with the 30 cm snapper MLL, as well as selecting for grey morwong and silver trevally at this size. However, there is potential for substantial losses of other marketable species (e.g. pigfish, ocean jackets and bream) with larger mesh sizes and the meshing rate of fish may be greater if larger mesh size is incorrectly oriented.

Under this response, an escape panel with a minimum mesh size of 50 x 75 mm will be implemented in the entire back panel of the trap with a short (i.e. one year) phase-in period. The observer program will collect information on the effectiveness of the escape panel with 50 x 75 mm mesh under normal fishing operations. The appropriateness of the escape panel mesh size will be reviewed after the term of the first share management plan (i.e. 5 years after the commencement of the plan) unless otherwise specified in the plan; if a recovery program for an overfished species is developed under management response 2.2(a); if the MLL for snapper is further increased; or if the closure regime specified in management response 1.2(g) is found to be ineffective. Any further advances in the size of mesh contemplated in the future will only be introduced after consultation with the Ocean Trap and Line MAC and an analysis of the economic impacts of the changes and meshing rates of fish.

*1.2(c) Use best-practice handling techniques, including the prohibition on the use of fish spikes, clubs or any other such implement that could unduly harm non-retained organisms

Background: Some techniques used to return unwanted animals to the water unduly injure animals. Such techniques are used to hasten the sorting process or to avoid handling dangerous animals. Fishers should adopt alternative techniques for returning animals to the water which avoid injuring those animals, taking into account occupational health and safety issues. In 1999, Ocean Watch (a non-profit company sponsored by the NSW seafood industry) produced a publication outlining bycatch solutions for non-trawl fisheries proposing better handling techniques. The prohibition of spikes and clubs is a specific action, however, the use of best handling techniques is an ongoing aim for the fishery.

1.2(d) Prohibit the finning of sharks and discarding carcasses

Background: A prohibition currently applies on the taking and landing of all shark species mutilated in any manner other than by heading, gutting or removing gills, and on the possession of any shark fins (alone) in any boat in all waters of NSW. The finning of sharks and the discarding of carcasses is prohibited because it is a wasteful practice.

*1.2(e) Develop a code of practice for the OTLF to:

i) promote best practice handling of bycatch (particularly with the removal of undersize spanner crabs from dillies) and to achieve a premium quality product for the retained catch

ii) promote slow lifting rates for traps to reduce pressure trauma and therefore maximise the likelihood of survival of bycatch

iii) promote the release of wobbegong sharks that are caught in fish traps and are below 130 cm in length

iv) use the shortest rope possible for the head gear to avoid entanglement by marine life or marine craft

v) discourage the unnecessary deployment of unattended gear for the purpose of 'holding ground', and

vi) encourage the responsible use of fishing gear around other commercial and recreational fishers and other user groups e.g. scuba divers, whale watchers and swimmers

Background: A code of practice will provide a guide to fishers concerning socially and environmentally acceptable behaviour, and is especially useful for encouraging such behaviour in cases where ensuring compliance with regulations is not possible or is overly expensive. A code of practice which has the support of surrounding communities can go a long way to improving the relations between the commercial fishing industry and other stakeholders. The code may contain both mandatory and voluntary requirements.

*1.2(f) Implement, so as to reduce gut hooking of prohibited size and other non-retained fish, the exclusive use of:

i) circle hooks (offset and non-offset) for all unattended line fishing methods in waters of a depth of 92 metres (50 fathoms) or greater, and

ii) non-offset circle hooks for all unattended line fishing methods in waters of a depth less than 92 metres (50 fathoms)

Background: Studies in other areas have shown that the use of circle hooks on unattended lines can reduce the incidence of gut-hooked fish and increases post release survival of bycatch. Circle hooks are designed to prevent the exposed point and barb from puncturing internal organs if the hook is swallowed. As fish swallow the baited hook and begin to move away, the movement pulls the hook from the throat, thereby decreasing the chance of gut hooking. Circle hooks are already in common use by NSW setline and dropline fishers.

A circle hook is defined as a hook where a straight line drawn from the point of the hook, and following the trajectory of the point of the hook, crosses the eye or shank of the hook. This means that generally, although not exclusively, the point of the hook is oriented perpendicular to the shank, as opposed to conventional J-style hooks where the trajectory of the point is generally parallel to the shank. When the hook (except the eye) is laid on a flat surface, non-offset circle hooks will lay in the same dimensional plane (i.e. flat), whereas offset hooks will appear uneven in that the point or some other part of the hook would be raised off the flat surface.

A phase in period will apply to this change in hook requirements to give fishers the opportunity to change their gear in an orderly manner. Accordingly, only offset and non-offset circle hooks will be permitted on unattended line fishing methods as outlined in (i) and (ii) above from 1 July 2007.

Management response 3.1(c) is closely related to this response, and focuses on mitigating the impact of the fishery on grey nurse sharks.

*1.2(g) Identify, in consultation with local fishers, the areas and/or times where undersized snapper consistently congregate, and close those areas to fish trapping.

Background: Undersized snapper are discarded from fish traps with an unknown mortality. While use of escape panels that select larger snapper is the most effective means of reducing catches of small snapper, credible industry advice suggests that the concomitant loss of other marketable species would make fish trapping an unviable proposition for the majority of endorsement holders. An alternative means of reducing the number of undersized snapper caught in fish traps is warranted and industry suggested the closure of known trapping grounds where undersize snapper consistently congregate.

Accordingly, a project of identifying and closing the specific areas and/or times where undersize snapper are known to congregate will be undertaken, in consultation with local fishers, within one year of the approval of the FMS. An industry-funded program should be developed and implemented by DPI to test whether this approach achieves the desired objective of minimising the capture of undersized snapper. If the closure regime is found to be ineffective, then the use of larger escape panel mesh (eg. 50 x 87 mm) in fish traps should be implemented, accompanied by the development of measures to mitigate the impact on fishers' catches.

Objective 1.3 Mitigate the impact of the OTLF on ocean habitats and their associated biota

*1.3(a) Modify the use of trap and line fishing methods in areas where their use is identified as having a detrimental impact on fish habitat

Background: While the impact of the OTLF on fish habitat is thought to be low, a management response is needed to reduce any unacceptable impacts should they be identified or occur in future. Where fishing methods are known or believed to be having detrimental impacts on fish habitat or threatened species, their use should be modified so as to avoid or minimise those impacts. These impacts may be identified through research programs foreshadowed in this FMS or through consultation with the Ocean Trap and Line MAC or Ministerial Advisory Councils. Other than the specific changes to fishing gear described elsewhere in this FMS, this management response does not propose any immediate actions.

Objective 1.4 Prevent the introduction and translocation of marine pests and diseases by fishing activities

1.4(a) Implement, in consultation with the MAC, measures required in accordance with any marine pest or disease management plan

Background: The Minister for Primary Industries or other authorities may alter management arrangements from time to time to minimise or mitigate the impact of marine pests and diseases. Recent examples of outbreaks were the suspected incidence of white spot disease in NSW prawns and the mass mortality of pilchards across southern Australia. There are concerns of the use of imported bait that potentially carry disease that could impact on wild fish stocks. At times it may be a requirement for the commercial fishing industry to respond to outbreaks by modifying fishing practices. Proposed measures will be discussed with the Ocean Trap and Line MAC prior to implementation.

GOAL 2. Maintain stocks of primary and key secondary species harvested by the OTLF at sustainable levels

Objective 2.1 Prevent overfishing of the stocks of primary and key secondary species by ocean trap and line fishers

*2.1(a) Monitor the quantity, length, and/or age and sex composition of the primary and key secondary species taken by commercial designated fishing activities, including the OTLF, as part of the overall resource assessment system

Background: In addition to the collection of information about activities in the fishery, it is necessary to collect relevant information about the composition of the catch of the important species exploited by the fishery. During the development of this strategy a total of 25 species and species groups are identified as primary or key secondary species for ocean trap and line fishing in NSW. For many of these species there is currently little or no information available about the size or age composition of the exploited population. A catch monitoring program will be established as part of the management strategy, to provide sufficient information to support an assessment of the status of the stocks of the primary and key secondary species taken in the fishery.

The type of information gathered within the monitoring programs for the 25 primary and key secondary species is based on the classes for resource assessment. This information, in conjunction with the framework set out in Scandol (2004), will be used to determine the stock-status of these species. Note that the status of some stocks may remain uncertain even after additional data have been collected and analysed, given the limited contrast in the data available. The environmental performance of the NSW Category 1 Share Managed fisheries, excluding Lobster and Abalone, will be reviewed every two years under the fishery management strategies to determine whether the monitoring programs should be revised and, if so, to set priorities and the level of work. These reviews are necessary to ensure the ongoing effectiveness and efficiency of the monitoring program and the use of industry funds for this purpose.

*2.1(b) Using the approved resource assessment framework, conduct resource assessments of the primary and key secondary species taken by commercial designated fishing activities, including the OTLF, where necessary, and review the assessments at least every three years thereafter with an external review of the assessment framework at least every four years

Background: The quantity of information available to assess fish stocks varies for each primary species, ranging from having completed major projects to having little information to include in an assessment beyond catch and effort information. For the primary and key-secondary species, the monitoring program will change from the use of commercial landings to the use of catch-per-unit-effort data, length-composition data and, in some cases, age- composition data. Within statistical constraints, these data will be used to confirm that the stock remains stable; and, if possible, used to determine the stock-status of these species. For the key secondary species the short term aim will be to gather and analyse information which will enable an initial assessment of the status of the stock to be completed (often for the first time). More details about the methods to be used to develop and undertake these resource assessments can be found in Scandol (2004) and NSW Department of Primary Industries (2006).

It is important to note that resource assessments are done on a species basis and are therefore reliant on harvest estimates from all sectors and adjacent jurisdictions. Furthermore, the scope and reliability of the assessments will vary for each species depending on its life history, biological characteristics and availability of research and monitoring information. The results of resource assessments will be used in deciding sustainable levels of catch and/or effort. A periodic review of resource assessments is important for ensuring ongoing improvement in the assessments and the programs providing information for them.

*2.1(c) Monitor commercial landings of all secondary species (other than the key secondary species) taken in the fishery annually for comparison against an historical range for each of those species or groups of species, as part of the overall resource assessment system

Background: It is important that available resources for resource assessment are directed towards assessing the primary and key secondary species (note that resource assessments may be undertaken for some species that are considered 'secondary' in the OTLF because they are important species in another designated fishery).

The catch of secondary species (other than the key secondary species) will be monitored to determine whether they are outside the historical range of catches (i.e. outside the lowest and highest catches within the previous 15 years). This ensures species that are less widespread in the fishery will still be monitored at a broad scale. The monitoring will aim to detect unprecedented changes in landings of the species taken in very small quantities by the OTLF. Given the number of species involved, the secondary species may be monitored in groups as appropriate.

*2.1(d) Investigate the cost effectiveness of using fishery independent surveys to provide abundance indices and other information for resource assessment of the primary species taken in the OTLF

Background: One of the key pieces of information needed to develop quantitative resource assessments is a time series of relative abundance estimates. This can be difficult to obtain from commercial landings data due to changes in fishing practices, varying catchability of different fishing gears and problems of misreporting. Fishery independent surveys can be designed to reduce biases due to the above factors, however such studies are expensive to implement and need long-term commitment to funding. It is important to assess the potential usefulness of such studies for the resource assessment of ocean trap and line species, and whether the fishery independent surveys being conducted in estuaries will be likely to provide sufficient information for some of the primary species in the OTLF. The cost effectiveness of using a fishery independent survey will be reviewed at the request of the OTL MAC.

*2.1(e) Review and where appropriate implement minimum legal lengths for the primary and key secondary species to give a high probability that at least 50% of the fish of each particular species landed have reached reproductive maturity (unless alternative strategies apply to individual species)

Background: This response aims to prevent incidences of recruitment overfishing. Size limits are designed to allow a sufficient proportion of the population to survive to maturity and thereby breed at a rate necessary to sustain the population in the long term. It is important however, to maintain the natural sex ratio in the population. As noted in the proposed response, there may be exceptions for some species.

Size limits are already in place for several of the primary species. A review of all size limits, involving community consultation, is conducted as required. If in the interim, additional information becomes available indicating that a size limit needs to be introduced or changed prior to the periodic review, this response enables the appropriate action to be taken. Grey (rubberlip) morwong is one species that needs specific attention because there have been large declines in the commercial catches and the average size composition of landings since the mid-1980s.

*2.1(f) Implement changes to reduce the risk of the OTLF to wobbegong sharks, including:

i) a trip limit (applying to a minimum 24 hour period) of 12 wobbegong shark carcasses

ii) a minimum legal length for wobbegong sharks of 130 cm total length, subject to scientific peer review of the relevant research and the potential efficacy of a size limit by NSW DPI

iii) collecting additional biological data on the various wobbegong species through the observer program

iv) developing and distributing educational material to endorsement holders highlighting the distinguishing characteristics of the different wobbegong species to enable better species identification.

Background: The majority of commercial wobbegong catches occur in the OTLF, where they have historically been taken as both a target species by setline methods and as byproduct by other methods. Little is known about the biology of wobbegong sharks, and the commercial landing of wobbegong sharks steadily declined from about 120 tonnes in 1990/91 to about 55 tonnes in 1999/00, however the commercial landings have been relatively stable in recent years. In January 2002, NSW Fisheries (now NSW DPI) released a discussion paper 'Management of Wobbegong Sharks in NSW' which sought community and stakeholder submissions on possible management options for wobbegong sharks. There was strong support from the consultation process for maximum and minimum size limits, proposed at 100 cm as a minimum and 200 cm as a maximum. Discussions with commercial fishers suggest that a maximum size limit for wobbegong sharks is not practical due to the difficulties in measuring large wobbegong sharks. The EIS considered the overall risk posed by the existing operation of the OTLF to wobbegong sharks as 'high'.

The new daily trip limit proposed to apply to wobbegong sharks (under (i) above) is aimed at preventing targeting while allowing a small limit to provide for legitimate incidental catches when endorsement holders are fishing for other species. Wobbegong catches are also included within the broader trip limit for various shark species outlined in management response 2.1(m). The effectiveness of the wobbegong trip limit will be kept under review and if it is evident that targeting or high grading is occurring, then additional measures (eg. a total prohibition on take) will need to be implemented.

While a new minimum legal length (MLL) for wobbegong sharks has been proposed based on research undertaken by a PhD student at Macquarie University, the research is yet to be peer reviewed by NSW DPI scientists. Prior to implementing the new MLL, NSW DPI will conduct a scientific peer review of the relevant research and assess whether any issues such as discard mortality of undersize sharks (recently suggested by some scientists as being potentially high) has any bearing on the efficacy, and ultimately the decision about whether to implement, the proposed MLL. In the interim, the code of practice for the fishery will encourage the release of any wobbegong sharks below 130 cm in length caught in fish traps (see management response 1.2(e)).

An assessment will also be undertaken to determine whether the different species of wobbegong sharks can be properly identified without the head (or parts of the head). If not, the whole head (or part thereof) may need to be landed by fishers to facilitate proper species identification.

Furthermore, the catch reporting system will be amended to include the various wobbegong species [see management response 7.3(b)], and educational material will be developed and distributed to endorsement holders to improve the accuracy of reporting.

*2.1(g) Review the economic impacts of increasing the size limit for snapper to 32 cm and implement the outcomes of the review.

Background: On 1 July 2001, the minimum legal length for snapper increased from 28 cm to 30 cm. The scientific data suggests that yield would be further increased with an additional increase to 32 cm, however, the commercial fishery is concerned about the impact of such an increase on the economic viability of snapper fishing. Before any further increase in the snapper size limit, an economic study will be undertaken to determine whether the longer term biological and economic benefits of increasing the limit outweigh the short term economic costs.

*2.1(h) Cap the NSW catch of school and gummy sharks and participate in the development of a multi-jurisdictional quota scheme with the Commonwealth and southern States

Background: The school and gummy shark resources have been assessed by the Commonwealth as being overfished and fully-fished, respectively. School shark are assessed as vulnerable due to exploitation (IUCN Red List, 2005). The Australian Fisheries Management Authority, in conjunction with the southern States, has implemented a quota scheme to limit the total harvest. While the catch of school and gummy sharks is comparatively small in NSW than in other jurisdictions, there is a need to cap the NSW catch to prevent it from increasing. School and gummy sharks are also included in the combined shark trip limit outlined under management response 2.1(m). NSW will also participate in the global quota scheme to assist in the rebuilding of stocks. The NSW harvest is largely restricted by the gear able to be used in ocean waters, in comparison to the waters in other jurisdictions where mesh nets are still authorised. The use of mesh nets in NSW ocean waters was prohibited over 20 years ago.

*2.1(i) Modify the gear controls applicable to the spanner crab fishery and investigate the feasibility of a quota system to manage the harvest of spanner crabs in the longer term

Background: A range of input controls currently exists for the spanner crab fishery. Several of these controls need to be modified to ensure sustainability of the fishery. The modifications to the management controls for the spanner crab sector are outlined in Appendix 3 and include changes to the dimensions of the gear, number of dillies permitted on board a boat and the mesh size of the netting.

The spanner crab stock is shared with Queensland where the fishery is managed predominantly by output controls (quota), though several input controls remain. The characteristics of the NSW spanner crab fishery makes it well suited to management by quota and full complementary management arrangements between States is therefore possible. However, the volume and value of the NSW fishery is substantially smaller than the fishery in Queensland (i.e. approximately 10% of the Queensland catch) and the cost of managing the NSW catch through a quota scheme may be excessive given the value of the fishery.

An investigation into the feasibility of a quota system will be undertaken to examine the cost and benefits of implementing a quota scheme in the longer term.

*2.1(j) Utilise onboard observers to collect additional biological information, including size at maturity and fecundity/brood size data, for the important elasmobranch species taken by the fishery

Background: A public consultation draft of an Australian National Plan of Action for the Conservation and Management of Sharks was released in July 2002. This document sets out the need for concerted national action to reduce the risks of commercial and recreational fishing to the variety of shark species found in Australian waters. Two of the primary recommendations found in the plan involve improving the identification of captured sharks and thereby increasing the accuracy of reported catch data, and undertaking targeted research on shark species.

In addition to the size and sex composition data collected for primary and key secondary species under management response 2.1(a) it is necessary that data be obtained on the important biological characteristics governing maturation and fecundity for those elasmobranch species which are significant in trap and line catches, including wobbegong sharks. The generally slow growth rates and low reproductive rates of elasmobranchs make them particularly susceptible to overfishing. The paucity of relevant biological data for the main species taken in the OTLF needs to be addressed in order to determine if any of these species require more targeted management actions to prevent overfishing of the stocks. This work is best done by onboard observers as shark species are generally cleaned aboard the catching vessel prior to landing.

2.1(k) Prohibit the taking of all female spanner crabs carrying ova

Background: In order to protect spawning females, the taking of any female carrying ova is prohibited under the FM Act.

2.1(l) Prohibit the taking of male spanner crabs from 20 November to 20 December and female spanner crabs from 20 October until 20 January

Background: Seasonal spawning closures are in place to protect spawning aggregations and migrating male and female spanner crabs.

*2.1(m) Implement additional controls for shark species harvested in the OTLF, including:

i) a combined total catch limit of one tonne of specified sharks over any 24 hour period, irrespective of the number of fishing trips undertaken

ii) a combined total catch limit of two tonnes of specified sharks for any single fishing trip that exceeds 48 hours in duration

iii) examination of the option of basing the above trip limits on the number of shark carcasses (rather than total weight) able to be landed

iv) ongoing review of shark catches and development of future gear or catch controls to ensure the long term sustainability of shark populations

Background: It is widely acknowledged that the slow growth rates and low reproductive rates of elasmobranchs make them particularly susceptible to overfishing. To prevent increased targeting of certain shark species, particularly by fishers recently diversifying into shark fishing, the above trip limits will apply in respect of whalers (all species), school, gummy, ghost, hammerhead, mako, Port Jackson, spinner, tiger and wobbegong sharks. Wobbegong sharks are included in this limit as well as being subject to a specific wobbegong shark trip limit [see management response 2.1(f)].

Further examination is needed on whether the trip limits should be based on the number of shark carcasses (rather than weight) to avoid potential difficulties with fishers being able to comply with the rules and the enforcement of any breaches. The management response also provides for the ongoing review of shark catches and development of future gear or catch controls to ensure long term sustainability of elasmobranch populations, particularly in response to any new information such as catch levels, bycatch levels, species identification and biological data.

Objective 2.2 Promote the recovery of overfished species

*2.2(a) Where the OTLF is a major harvester of a species determined as overfished in NSW, develop and implement a recovery program for that species, in particular:

i) develop and implement a recovery program for gemfish (recruitment overfished)

ii) develop and implement a recovery program for snapper (growth overfished)

iii) determine if a recovery program is required for any other species through the management strategy or subsequent research, and implement necessary actions.

Background: There are three categories of overfishing in NSW: 'recruitment overfished', 'overfished' and 'growth overfished'. It should be noted that development of a recovery program may not be required for all species determined as growth overfished, providing certain circumstances apply – refer to section 3.2.7 for details.

As the OTLF has been a major harvester of gemfish in NSW, a recovery program for gemfish will be developed as part of the OTLF Management Strategy, and will specify: (1) the continuation of a NSW 'daily trip limit' of 50 kg which applies to all commercial methods; and (2) the assessment by scientific observers of any discarded catch. The trip limit for gemfish was reduced from 150 kg to 50 kg in May 2000 in response to overfishing concerns and acts to discourage NSW fishers from targeting gemfish. NSW will also collaborate with the Commonwealth with a view to implementing compatible arrangements with respect to any temporal or spatial closures of spawning areas.

The OTLF is a major harvester of snapper in NSW. Consequently, the recovery program for snapper will be developed as part of the OTLF Management Strategy and will include: (a) recovery target/s, (b) assessing the economic impacts of increasing the snapper minimum legal length to 32 cm [management response 2.1(g)], (c) any scientific assessments of bycatch, discard mortality and the effectiveness of escape panel meshes, and (d) a clear enunciation of the programs in place or planned affecting all harvest sectors that seek to reduce the risk of recruitment overfishing.

Yellowtail kingfish has been identified as being growth overfished but a formal recovery program is not being recommended at this time. A "Review of saltwater fish size limits" discussion paper in 2005 included an option to increase the minimum size at which yellowtail

kingfish can be harvested from 60 cm to 65 cm. This increase was supported by the relevant commercial and recreational fishing advisory councils. Due to the cross-sector harvest of this species, NSW DPI will implement the approved outcome of the review. Updated length composition commercial catch data will enable a clearer assessment of the species and a review of the stock-status will be completed by 2007. If the overfished status of this species remains in the medium term, then a recovery program may need to be developed and implemented.

*2.2(b) Where the fishery is a minor harvester of an overfished species, contribute to the development of any recovery program for the species and adopt any measures required by a program. In particular, implement the provisions of the recovery program for silver trevally to be developed under the Ocean Trawl Fishery Management Strategy

Background: The Ocean Trawl Fishery Management Strategy is developing a recovery program for silver trevally that will include a minimum legal length for silver trevally (30 cm total length).

Mulloway has also been recently identified as overfished and in need of a recovery program. Both the recreational sector and Estuary General Fishery individually harvest a greater quantity of mulloway than the OTLF. A recovery program for mulloway will be developed in consultation with all harvest sectors.

The OTLF will contribute to the development of these recovery programs and will implement actions as required under those programs.

Objective 2.3 To conserve fish stocks by managing levels of active fishing capacity in the fishery

2.3(a) Implement the following limits on gear use in the fishery:

*i) a maximum number of 30 fish traps to be used by an endorsement holder at any one time

ii) maximum use at any one time of 10 set lines with 6 hooks each line inside 3 nm (except when shark fishing south of Moruya when hooks of size 9/0 or greater are being used)

iii) maximum use at any one time of 30 driftlines with 1 hook (or 1 gang of hooks comprising no more than 5 hooks) attached to each line

*iv) a maximum use at any one time of 1,200 hooks by an endorsement holder using any line fishing methods outside 3 nm

*v) a maximum of 6 single or 3 double poles able to be used at any one time during poling operations

Background: Limiting the number of traps, rods and lines that may be used by ocean trap and line fishers is a means of controlling the fishing capacity in the fishery and reduces the risk associated with the existing management arrangements. Fishing effort will also be controlled through limits on the number of endorsements available. Management response 5.3a will establish a 10 year target for total fishing effort to achieve a fishery that is commercially viable and ecologically sustainable. Once effort levels established under 5.3a are achieved, the above gear limits could be adjusted in response to further changes in effort levels.

*2.3(b) Prohibit the use of on-board automatic baiting machines in the fishery

Background: An automated baiting mechanism allows fishers to set and bait a greater number of hooks by a single vessel and enables faster deployment of the gear. Prohibiting the use of these machines is a means of controlling the level of active effort that can be applied in the fishery at any one time. Few, if any, automated baiting machines are currently used in the NSW fishery and this response will ensure that they do not become commonplace. Automatic baiting machines are permitted to be used in the hook sector of the Commonwealth Southern and Eastern Scalefish and Shark Fishery, where the key species taken are subject to individual catch quotas.

GOAL 3. Promote the conservation of threatened species, populations and ecological communities and protected species of fish likely to be impacted by the operation of the OTLF

Objective 3.1 **Identify and minimise or eliminate any impacts of fishing activities on threatened species, populations and ecological communities (including mammals, birds, reptiles, fish, invertebrates and vegetation), and protected species of fish and where required promote their recovery**

3.1(a) Continue, in consultation with Ocean Trap and Line MAC, the mandatory reporting arrangements enabling the collection of information on interactions with or sightings of threatened or protected marine species and interactions with other threatened or protected species

Background: The guidelines for 'ecological sustainable' fisheries approved by the Commonwealth under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 *include a requirement to collect information on interactions with endangered, threatened or protected species and threatened ecological communities. These species, populations and communities are listed in the FM Act*, Threatened Species Conservation Act 1995 *and the EPBC Act. Information on interactions with threatened species will come from the modified reporting arrangements, the scientific observer survey and any other verifiable interactions on threatened or protected species.*

It is important that fishers are able to distinguish threatened and protected species from similar species in order to correctly identify and, where possible, avoid interactions with them. An example of this type of information is the grey nurse shark identification material. For this purpose, information will be disseminated to endorsement holders to assist them in identifying and avoiding protected and threatened species.

3.1(b) Implement the provisions of any relevant threatened species recovery plans, threat abatement plans, priorities action statements or other similar management arrangements designed to protect threatened species and/or critical habitat areas

Background: Once a species, population or ecological community has been listed as threatened, a recovery plan may be developed. A priorities action statement must also be prepared for species listed as threatened under NSW legislation. These are designed to return the species, population or ecological community to a point where its survival in nature is assured. The plans and statements referred to in this response could include those being developed under the Fisheries Management Act 1994*, the* Threatened Species Conservation Act 1995 *or other State or Commonwealth legislation.*

Additionally, threatened species legislation requires the development of a threat abatement plan for any listed key threatening processes. A threat abatement plan outlines actions to eliminate or manage the key threatening process, and identifies the authorities responsible for carrying out those actions.

This response recognises that the statutory provisions of a threatened species recovery plan or threat abatement plan, or an arrangement necessary to protect a critical habitat area, must be implemented and given precedence over the provisions of this FMS.

*3.1(c) Implement changes to reduce or prevent the impact of the OTLF on grey nurse sharks, including:

i) the exclusive use of circle hooks for all unattended line fishing methods, in accordance with the requirements specified in management response 1.2(f)

ii) prohibiting the use of wire trace on bottom setlines used in waters within 3 nm of the coastline as well as within the defined buffer zones of all identified grey nurse shark critical habitat areas and key aggregation sites

iii) investigating the effectiveness of the use of circle hooks for all attended line fishing methods, and

iv) working with ocean trap and line fishers to implement spatial and/or temporal closures in grey nurse shark critical habitat areas and key aggregation sites on a site-by-site basis to gear types that pose a high and medium direct risk to grey nurse sharks, taking account of the characteristics of each site and its relative importance to grey nurse sharks

Background: The grey nurse shark Carcharias taurus *is listed as an endangered species under the NSW* Fisheries Management Act 1994. *The east coast population of grey nurse sharks is listed as critically endangered under the Commonwealth* Environment Protection and Biodiversity Conservation Act 1999.

The grey nurse shark population in eastern Australia is under serious threat. Its abundance in NSW and Queensland waters declined dramatically prior to 1984 because it was killed in large numbers by hook and line, and spear fishing. Since then numbers have not recovered despite being protected and they have continued to die mainly as a result of accidental catch by hook and line fishers, in bather protection nets, and due to illegal fishing and spear fishing.

Since the introduction of the grey nurse shark critical habitat areas in 2002, grey nurse sharks are still being observed with hooks and line in their mouths within these locations. The exclusive use of circle hooks for all unattended line fishing methods (as per the requirements specified in management response 1.2(f)) and the prohibition of wire trace on bottom setlines in certain areas should reduce the chance of incidental capture of grey nurse sharks.

The effectiveness of circle hooks when used on all attended line fishing methods will also be reviewed to determine if the benefits warrant this additional change to the operation of the fishery. NSW DPI will also work with OTL fishers to develop arrangements to close key grey nurse shark areas to trap and line fishing.

*3.1(d) Using the code of practice, promote the use of fishing techniques that avoid the capture of, or interaction with, protected fish and fish protected from commercial fishing

Background: 'Protected fish' refers to species of fish that are protected from all forms of fishing and are listed in section 19 of the FM Act. 'Fish protected from commercial fishing' as the name suggests, refers to species of fish that are protected from commercial fishing only and are listed in section 20 of the FM Act. There are a range of measures that could be included in

the code of practice that may minimise the interactions or impacts on protected fish and fish protected from commercial fishing such as using different bait or not using whole fish bait to avoid capture of certain species, and promoting best practice handling techniques. It is already unlawful for any person to retain a protected species and as such the focus of this response is to encourage fishers to avoid interactions with species that have 'protected' status.

*3.1(e) NSW DPI to work with the NSW Department of Environment and Conservation to identify the nature and extent of interactions between the OTLF and marine mammals in NSW waters and implement appropriate mitigative measures

Background: This management response aims to promote ongoing cooperation between NSW DPI (as the fisheries management agency) and the NSW Department of Environment and Conservation (as the agency responsible for marine mammal management) with respect to any interactions between fishing activities in the OTLF and marine mammals. It is envisaged that the cooperation would involve an open exchange of information and joint development of any measures that may be needed over time to prevent or reduce adverse interactions with marine mammals.

GOAL 4. Appropriately share the resource and carry out fishing in a manner that minimises negative social impacts

Objective 4.1 **Provide for appropriate access to the fisheries resource by other stakeholders (e.g. recreational, Indigenous), acknowledging the need of seafood consumers to access fresh quality fish**

*4.1(a) Estimate the total catch of primary and key secondary species in the OTLF, taking account of the recorded commercial catch and estimates of recreational, Indigenous and illegal catch

Background: Estimates of harvest rates from all sectors are vital for resource assessments and to ensure access to resources is appropriately shared. Information on the recreational and Indigenous catch will be drawn from the results of the National Recreational and Indigenous Fishing Survey, related studies to be undertaken in NSW and information obtained from other sources such as charter boat logbooks. Information on illegal catches will come mainly from the results of compliance actions and associated intelligence.

Objective 4.2 **Provide for fair and equitable sharing of the fisheries resource with other commercial fisheries (NSW, interstate and Commonwealth)**

*4.2(a) Monitor management arrangements and the annual landings of key ocean trap and line species in fisheries that are outside NSW jurisdiction but which impact on stocks shared with the NSW OTLF, as part of the resource assessment system

Background: Many of the primary and key secondary species in the OTLF are also significant in landings of fisheries under other jurisdictions. Increased targeting or harvesting of particular species can have implications for sustainability and sharing of access to that stock. Observing changes in harvest levels by other fisheries can allow implications arising from increased targeting or landing to be detected early and appropriate action to be taken.

*4.2(b) Monitor the annual landings of secondary species (other than the 'key secondary' species) in the OTLF

Background: A large number of species are taken incidentally but retained in the OTLF and while quantities landed are small, this response seeks to identify and limit any unusual increases in landings of any of these species. Many of these species are significant in landings of other commercial or recreational fisheries.

4.2(c) Use cross-fishery and cross jurisdictional consultation to discuss and manage issues relating to, but not limited to, the multiple use of specific fishing grounds, collaborative research, fair and equitable access to stocks, complementary management arrangements and other interactions between fishing sectors

Background: There have been recent examples of interactions between the OTLF and the trawl and lobster fisheries where cross-fishery consultation provided a useful mechanism to resolve

conflicts. There will be times when direct consultation between fishers within NSW and/or with other jurisdictions such as Queensland and the Commonwealth is required. Cross-fishery consultation and the management tools in this strategy will be used to provide for fair and equitable access to fisheries resources.

The existing Management Advisory Committee (MAC) and Advisory Council processes are typically used for cross-fishery consultation, however the Minister may at times establish working groups to address specific issues. An example of this is the Juvenile Prawn Summit Working Group that was formed during 2000 to provide advice on harvesting the State's prawn stocks.

*4.2(d) Participate in the development and implementation of a policy (including reporting procedures) to manage the use of the lift net for collection of 'live' bait by NSW ocean trap and line fishers

Background: In 1985 a concession was introduced to allow licensed commercial fishers in NSW to use lift nets for taking bait (pilchards, yellowtail and blue mackerel) for own use for tuna fishing. In 1995 the lift net was prescribed in the Regulations. The lift net does not form a part of any restricted fishery and was included in the Ocean Hauling Fishery Management Strategy to enable its use to continue within an appropriate framework. The Ocean Hauling Fishery is the primary harvester of these bait species and it is appropriate that this activity is managed in direct association with ocean hauling.

The Ocean Hauling Fishery Management Strategy provides for the development of a policy to manage the taking of baitfish by NSW line fishers. The policy must be developed in consultation with the Ocean Trap and Line MAC, particularly with regard to eligibility criteria for access to permits. Development of the policy will allow for the consideration of the use of lift nets to take bait for taking species other than tuna (e.g. kingfish).

*4.2(e) Implement a policy to manage the impact of dual endorsed Commonwealth tuna boats in NSW waters, in particular to regulate boat length and/or catches taken by larger than standard size boats, such as through amending the existing policy that allows tuna boats to upgrade in length whilst retaining State entitlements

Background: The NSW licensing policy currently allows licensed fishing vessels over 6 metres to be replaced by a new vessel that is within 1 metre or 10% of the original vessel length (on a once only basis). An exemption applies to vessels with Commonwealth tuna longline permits. Those vessels have been able to upgrade no longer than the maximum boat length applying in the East Coast Tuna Longline Fishery (providing the longline permit was attached to the vessel before 16 January 1991) and retain State entitlements provided that there is no increase in effort or catch in fisheries other than the East Coast Tuna Longline Fishery. This policy has been in place to allow NSW endorsed vessels to compete in quota managed Commonwealth fisheries where there are pressures to increase capacity in order to remain competitive. Vessel owners are made aware of the requirement that they should not increase their effort in State managed fisheries, however no formal system of monitoring currently exists to ensure that effort is not increased. This management response aims to eliminate the risk under the current policy associated with larger upgraded tuna vessels being able to continue to operate in the smaller scale State fishery. The new policy will take account of any new management arrangements implemented under the Commonwealth's Eastern Tuna and Billfish Fishery Management Plan, among other things.

Objective 4.3 Provide for the fair and equitable sharing of the fisheries resource within the OTLF

*4.3(a) Respond, where necessary, to information about significant changes in the relative catches of the primary and key secondary species taken by different endorsement types within the OTLF

Background: The primary and key secondary species are of major importance to the fishery. It is important to monitor the relative catch levels across fishing methods to detect any changes that may occur within the fishery.

Objective 4.4 Identify and mitigate any negative impacts of the OTLF on Aboriginal, cultural or other heritage

4.4(a) Manage the OTLF in a manner consistent with the Indigenous Fisheries Strategy and Implementation Plan.

Background: The Indigenous Fisheries Strategy and Implementation Plan (IFS) was released during December 2002. The IFS puts in place a process that will ensure discussion and negotiation to resolve problems and challenges in relation to indigenous involvement in the fisheries of NSW. A funding application is being developed to conduct a significant research program that would determine the fish species, areas and/or harvest techniques of cultural importance to Aboriginal people so that any interactions with the OTLF may be identified. Such a program may identify species that are taken in ocean based commercial fisheries but spend part of their life cycle within estuaries or near-shore waters where cultural fishing practices are more common.

4.4(b) Modify the activity, where relevant, in response to new information about areas or objects of cultural significance in order to minimise the risk from ocean trap and line fishing activities

Background: Fishers in the OTLF must respond appropriately to new information about items or locations of Aboriginal and other cultural significance (e.g. a recently discovered shipwreck), and this management response seeks to reinforce that intention.

Objective 4.5 To promote harmony between the commercial fishery and other resource users, including recreational fishers, Indigenous fishers and local communities, through fair and equitable sharing of the resource

4.5(a) In consultation with the Ocean Trap and Line MAC, identify areas of high interaction between the OTLF and other resource users and respond appropriately to resolve any conflicts

Background: It is important, when promoting harmony amongst resource users, to identify areas of potential conflict and determine the most appropriate use of commercial fishing gear in areas where more than one resource user group is apparent. Issues over access to fishery resources or locations often arise in areas where there is high interaction between multiple user groups. The maps developed under management response 1.1a will be crucial to the effective implementation of this management response. This response provides a means of resolving any conflicts identified by measures such as improving communications or small spatial or temporal closures.

GOAL 5. Promote a viable commercial fishery, consistent with ecological sustainability

Objective 5.1 Provide secure fishing entitlements for ocean trap and line fishers

5.1(a) Implement the share management provisions of the *Fisheries Management Act 1994*

Background: The category 1 share management provisions allow for the allocation of shares in perpetuity, with the payment of statutory compensation for the market value of the shares if the Government decided to close the fishery and cancel the shares. Category 1 share management provides a secure property right and a stronger incentive for business investment and resource husbandry.

Objective 5.2 Manage the harvesting of the primary and key secondary species by size to achieve optimal biological yield and economic return in the longer term

*5.2(a) Determine and implement strategies for harvesting fish at a size that provides optimum balance between biological yield and economic return for the primary and key secondary species in the longer term

Background: Determination of the size of fish harvested that optimise both biological yield and economic return needs to take into account the available information on reproductive biology (e.g. size at maturity), growth and natural and fishing mortality rates for the species mix taken, as well as information on gear technology, discard mortality, input costs and market prices. The results of such analyses will be used to make informed decisions on the size limits imposed on certain species, selectivity of fishing gear used and other harvest strategies associated with the fishery.

Objective 5.3 Establish a level of fishing effort to achieve a fishery that is commercially viable (and ecologically sustainable) over the longer term

*5.3(a) Manage fishing effort in the OTLF by:

i) capping the number of each endorsement type at currently active levels

ii) establishing a maximum level of fishing effort for each sector of the OTLF to be achieved within 10 years of the commencement of the share management plan

Background: The current total level of effort (active and latent) in the OTLF is greater than the level that would provide a positive economic return from the fishery. In particular, there is currently a high level of latent fishing effort in each sector of the OTLF that, if activated, could have a significant adverse impact on the commercial viability of fishing businesses reliant on the fishery. (Latent fishing effort/capacity is defined as those endorsements never used or used at very low levels.)

Careful planning is required to facilitate an orderly process of structural adjustment, including setting achievable targets for effort levels, selecting adjustment tools and setting implementation timelines. Adjustment tools may include the use of minimum shareholding

requirements under the share management plan, and may be supplemented by a range of other adjustment tools and controls to manage fishing capacity. Modelling will be undertaken to make informed decisions on the most appropriate way to apply minimum shareholdings and any other restructuring tools. This process will be undertaken in consultation with the Ocean Trap and Line MAC.

Point (i) of this response will prevent the risks to commercial viability and the biological environment that might otherwise result if latent effort was activated. The criteria for determining the current level of active endorsements will be determined with reference to the time of commencement of the strategy and in consultation with the Ocean Trap and Line MAC.

Point (ii) will include consideration of the number of entitlements, how often they are used and the capacity of those operators (i.e. a measure of the capability to catch fish). To ensure that the effort targets are achieved, effort milestones will be set at various points throughout the 10 year period that trigger additional management action if effort levels are not sufficiently reduced by those times.

Objective 5.4 Promote the economic viability of the OTLF and assess the economic benefits of the fishery to the community

*5.4(a) Refine the performance indicator for monitoring trends in the commercial viability of typical fishing businesses within each designated commercial fishing activity, so as to be based on net returns

Background: This management strategy includes a performance indicator for monitoring economic viability of fishing business with trap and line endorsements, using gross returns. However, net return rather than gross return is a better indicator of economic performance as it accounts for changes in fishers' costs over time. An understanding of the average net return across fishing businesses requires data on seafood prices, as well as the cost of inputs such as fishing gear, fuel and bait. A process will be developed in consultation with the MAC to determine how best to collect data on the costs of going fishing, taking into account confidentiality/privacy concerns and the cost-effectiveness of the data collection methods. Once this process is developed, the performance indicator can be modified accordingly.

*5.4(b) Investigate the data available to assess the economic multiplier (flow-on) effects of commercial fishing, including the OTLF, to the broader community, and develop strategies to improve the quality/usefulness of such data

Background: There have been few detailed assessments of the economic benefits of commercial fishing in terms of flow-on effects for local and regional economies, or returns to the broader community for access to a community owned resource. Fishing activities (and in this case expenditure and income associated with the activity of trap and line fishing in ocean waters) are believed to be important to many local economies. There is little doubt that some coastal communities derive substantial economic benefits from trap and line fishing in ocean waters, not only from direct employment but also from the provision of ancillary services. There may be some areas where the economic impacts of management changes need to be directly assessed, taking account of the actions in this strategy. Advice will be sought from the Ocean Trap and Line MAC and experts in economic analysis on the best data to use to describe the multiplier effects of the commercial fisheries, and to assess any significant impacts.

*5.4(c) Identify and promote post-harvest practices which will ensure the best return in dollars per kilogram for product of the fishery

Background: The economic viability of the fishery is dependent on obtaining the best return possible for the product landed. Opportunities are likely to arise where the economic return to the fishery could be increased by improving handling practices or value adding, and it is in the interests of the fishery to widely promote such practices. Good post-harvest practices can be promoted through the code of practice to be prepared for the fishery.

5.4(d) Develop a cost recovery framework, in consultation with the MAC and the Ministerial advisory body relating to commercial fishing

Background: A cost recovery framework is currently being developed and will be subject to consultation with industry advisory bodies. The framework will allow for the fair charging of the costs of management and access rights and give industry a greater ability to plan. See section 4.12 for further information on the cost recovery policy.

Objective 5.5 Manage food safety risks in the harvesting of fish in the fishery

5.5(a) Co-operate with NSW Food Authority in the development and implementation of food safety programs relevant to the fishery

Background: Food safety plans covering the production and distribution of seafood in NSW are currently being developed and implemented by NSW Food Authority. These plans may impose statutory requirements on fishers to comply with the approved standards. Supporting food safety programs is an effective way of promoting consumer confidence in products harvested by the fishery and contributing to the future viability of the industry.

GOAL 6. Facilitate effective and efficient compliance, research and management of the OTLF

Objective 6.1 Promote and maximise compliance with the provisions contained in the OTLF Management Strategy

*6.1(a) Develop, implement and monitor a compliance plan for commercial designated fishing activities, including the OTLF

Background: Currently, compliance plans are developed by NSW DPI compliance officers at the district level. Relevant aspects of these plans will be reviewed and combined into a compliance plan for commercial designated fishing activities, including the OTLF, on a state-wide basis. The Ocean Trap and Line MAC will periodically review the operation of the parts of the compliance plan relevant to each of the fishery sectors.

Compliance with the management strategy can be encouraged through participation of fishers in decision-making. The cost of compliance with provisions in the FMS will be minimised if fishers are involved in the development of those provisions and understand the potential benefits. Such participation should seek to encourage the flow of information between fishery operators and their representatives on the MAC, and an appropriate level of explanation to all endorsed fishers about the reasons for decisions regarding management of the fishery. This could be assisted by holding MAC meetings in relevant ports, and continuing the policy of making MAC meetings open to the attendance of endorsed fishers.

*6.1(b) Investigate the feasibility of the vessel monitoring system (VMS), or another electronic monitoring system that meets the same need, with a view to implementing the system if it is found to be a practical and cost-effective addition to existing compliance and/or catch reporting methods

*Background: NSW DPI has been monitoring developments in Vessel Monitoring Systems (VMS) in other States and countries over the last few years and has been examining the possibility of introducing a cost effective system in NSW. A VMS uses satellite technology to report the position, speed and other information on commercial fishing vessels. An electronic catch and effort recording system (*i.e. *log book system) can be integrated into the VMS, allowing fishers the option to report catches via a computer on the boat or at home. VMS systems are currently relatively expensive to implement and maintain, though they appear to be getting less expensive through time as the technology improves. Other similar type systems may be developed that are cost effective as well as practical for use on smaller vessels. Consideration will be given to the costs and benefits of introducing VMS or any other alternative system, including any potential additional costs to government or industry.*

The introduction of VMS, or another similar electronic monitoring system, could result in savings of fees, such as compliance fees, under the full cost recovery framework, and would allow for a more complete understanding of fishery operations and how fishing businesses would be affected by management decisions, such as area closures. The adoption of some form of VMS will enhance management flexibility and compliance with regard to jurisdictional boundaries, inter-fishery boundaries, grey nurse shark critical habitats, Marine Park zoning, aquatic reserves and any other spatial closures.

*6.1(c) Implement a penalty points scheme (incorporating endorsement suspension and share forfeiture for serious offences and habitual offenders)

Background: It is crucial that effective deterrents are in place to discourage illegal activity in the fishery, especially given the difficulty in enforcing compliance at sea. The penalty points scheme will be similar to the demerit points scheme used by the RTA for driver's licences and will be applied across fisheries. The detail of the scheme will be developed in consultation with industry and implemented through regulation or in the share management plan.

6.1(d) Develop strategies to support appropriate practices and behaviour in commercial fisheries, including development of training and accreditation courses in core competencies, and the introduction of fit and proper person requirements

Background: The training and accreditation standards foreshadowed in this response will aim to ensure that skippers have a sound understanding of the fishery and the rules that apply, including the need for provision of accurate data. New licence holders are currently provided with an introduction to NSW fisheries at the local NSW DPI fisheries office, but the type and level of detail discussed varies from office to office. Increasing the professionalism of operators can provide long term benefits to the industry. Any such strategies will need to consider existing training or accreditation programs run by the seafood industry or by other agencies, such as the NSW Maritime Authority.

Furthermore, strategies should be developed to ensure that persons licensed to fish in NSW are fit and proper (ie. do not have an unacceptable history of breaches of fisheries legislation and policies). This may include implementing minimum standards of past compliance with the laws of NSW, other States/Territories or the Commonwealth upon the issue of any new commercial fishing licences.

Objective 6.2 Identify research priorities required to provide for the sustainable operation of the OTLF

*6.2(a) Develop and implement a Research Strategic Plan for designated fishing activities, including the OTLF, taking account of the priorities for research outlined in the harvest strategy

Background: Draft research plans have previously been prepared and discussed with the Ocean Trap and Line MAC, along with the assignment of priorities to research proposals. Such plans will be reviewed, in consultation with the MAC, to ensure their relevance and efficacy in relation to the goals and objectives of the approved Fishery Management Strategy and the priorities outlined in the harvest strategy. A new Research Strategic Plan for the fishery, detailing the priorities and possible sources of funding, would then be developed. Development of the plan will benefit from the risk assessment and identification of knowledge gaps in the Environmental Impact Statement.

Objective 6.3 Ensure effective and efficient management of the OTLF

*6.3(a) Develop and implement a fishing business card system

Background: Only one person may be nominated to hold endorsements in respect of a fishing business. The FM Act limits the number of people able to hold endorsements in respect of a fishing business to one, except in the case of skipper endorsements where multiple

endorsements can be issued although they are often linked to the boats attached to a specific business. Under current circumstances, for a skipper to work another boat, a new licence with endorsements must be issued; a process that can take several weeks to complete.

To increase the flexibility for business owners to acquire a skipper at short notice a new system will be developed; the fishing business card system. Under this system the owner of a fishing business with entitlements in the OTLF will be issued a Fishing Business Card. The fishing business owner can then register a pool of appropriately licensed fishers associated with their business. A registered person will only be taken to be endorsed with respect to that business when they are in possession of the card. They may operate in all fisheries specified on the card. All registered persons and those in possession of the card must abide by all rules and regulations that would normally apply to the endorsed fishing business owner.

Objective 6.4 Provide effective and efficient communication and consultation mechanisms in relation to management of the OTLF

6.4(a) Utilise a key consultative body, such as the Ocean Trap and Line Management Advisory Committee (MAC), when undertaking industry consultation on all aspects of the OTLF

Background: The Ocean Trap and Line MAC provides advice to the Minister for Primary Industries on a broad range of issues relating to the management of the OTLF. The MAC includes endorsed commercial fishers elected to represent the interests of those in the OTLF and non-industry members, appointed by the Minister for Primary Industries, to represent other interest groups such as indigenous, recreational and conservation groups. The MAC provides a forum for discussion on issues relating to the fishery.

Objective 6.5 Implement this Strategy in a manner consistent with related Commonwealth and State endorsed programs aimed at protecting aquatic environments and achieving the objectives of ecological sustainable development

6.5(a) Manage the OTLF consistently with other jurisdictional or natural resource management requirements, such as the marine parks program, aquatic biodiversity strategy, threatened species program, Indigenous Fisheries Strategy and other relevant strategies

Background: The management strategy will be operating alongside other programs relating to the management of marine resources, and in most instances must be consistent with those programs. The management strategy must be adaptive if inconsistencies between the programs become apparent. This response enables a whole of Government approach to management of the marine environment.

6.5(b) Provide for the issue of permits under Section 37 of the FM Act authorising the use of modified fishing practices to assist research programs or for purposes consistent with the vision and goals of this management strategy

Background: Permits are required to use fishing gear in a manner that is different to that specified in this management strategy, or the associated regulations. This response allows approval to be given to industry members who are participating in research programs to trial new approaches to fishing gear design.

GOAL 7. Improve knowledge about the OTLF and the resources on which it relies

Objective 7.1 Improve the community's understanding and perception of the OTLF

*7.1(a) Promote awareness of the OTLF as part of the overall communication strategy across all commercial designated fishing activities by implementing issue-focused education programs

Background: The Management Advisory Committee and NSW DPI will develop and monitor these programs to ensure they are cost-effective. For example, as an initial step, the Fishery Management Strategy and the Environmental Impact Statement and any resulting reports will be made available to the public by placing them on the NSW DPI website and providing copies at NSW DPI Offices.

Objective 7.2 Promote scientific research to collect relevant information about the biology of the primary and key secondary species, the impacts of fishing on other species and the environment, and the status of the fishery as a whole, including economic and social factors

*7.2(a) Promote and support targeted research projects, which are relevant to:

i) the biology or resource assessment of the primary and key secondary species in the OTLF

ii) the impacts of ocean trap and line fishing on biodiversity and the environment

iii) economic and social factors affecting the fishery, and the effects of management changes on fishing businesses and communities

Background: The current level of knowledge about most of these proposed areas of research is less than desired to properly understand the functioning of this fishery. The MAC, through the FMS and contributing to a Research Strategic Plan, should identify and promote relevant research projects, and offer whatever assistance can be practically provided by fishers or others connected with the fishery. Ideally, the MAC will also be pro-active in the development of necessary research projects, and in supporting such projects to obtain competitive funding.

Objective 7.3 Improve the quality of the catch and effort information collected from endorsement holders

7.3(a) Periodically review the mandatory catch and effort return forms submitted by ocean trap and line fishers and implement changes if:

i) the data are insufficient for the purpose of conducting resource assessments or an environmental assessment

ii) the forms are found to be exceedingly complex for fishers to complete, ensuring an emphasis on quality rather than quantity of information collected.

Background: Ocean trap and line fishers submit a catch and effort return form to NSW DPI each month and the information is used to increase understanding of the fishery and the resources upon which it relies. An informal working group involving commercial fishers and NSW DPI staff has been established to periodically review the current catch and effort return forms. The working group will make recommendations for changes that are considered necessary to improve the quality of data collected. Any recommendations of this working group will be discussed with the Ocean Trap and Line MAC.

*7.3(b) Assess the accuracy of the current catch recording system, and species identification in catch records, and provide advice to industry to make needed changes

Background: Correct species identification is critical to the performance of many areas of the management strategy. Most species in the fishery are accurately reported, however some species are not (e.g. the different species of sharks and leatherjackets). The onboard observer program may provide first hand information on local names for fish. This information will be used to ensure that industry education is appropriately targeted.

*7.3(c) Modify the reporting system to remove lobster trap as a method on the ocean trap and line catch returns

Background: Some fishers, who are also endorsed in the Lobster Fishery, enter their other catch from lobster traps on their ocean trap and line catch returns. However, the catch taken out of lobster traps is not part of the OTLF and needs to be recorded separately. This issue is also being addressed within in the fishery management strategy for the Lobster Fishery.

10. Performance Monitoring and Review

10.1 Performance Monitoring

Many of the management responses listed in section 9 of this FMS assist in achieving multiple goals. Therefore, rather than examining the performance of each individual response or objective, it is more efficient and appropriate to measure the performance of the FMS against the seven goals (i.e. the major objectives). A periodic report will, however, be prepared (as outlined later in this section) detailing the progress made in implementing each of the management responses.

10.1.1 Performance indicators

The performance indicators provide the most appropriate indication of whether the management goals are being attained. A number of monitoring programs are to be used to gather information to measure performance indicators. These performance indicators are detailed in Table 10.2. It should be noted that a number of relatively direct performance indicators have been selected rather than using a large number of surrogate indicators, in order that the limited resources available for implementation of the management strategy can be most effectively utilised. These will be further refined in light of the practical implementation of the FMS.

10.1.1.1 Data requirements and availability

The data requirements and availability for each performance indicator in Table 10.2 relate to the collection of information used to measure the performance indicators and the data that are available. The data requirements may be specific to the fishery, or encompass cross-fishery interactions such as the catch of a species by several commercial fisheries or harvest sectors.

10.1.1.2 Robustness

The robustness ratings applied to each performance indicator in Table 10.2 has been selected using the definitions outlined in Table 10.1 below.

Table 10.1 Robustness classifications (Source: SCFA, 2000)

Robustness level	Description
High	The indicator is a direct measure of the goal or, if indirect, is known to closely reflect changes in the issue of interest
Medium	The indicator is suspected to be a reasonably accurate measure against the goal, or the known error is in the conservative direction
Low	The degree to which the indicator measures against the objective is largely unknown or known to be low. Often this will involve surrogate indicators

10.1.2 Trigger points

The trigger points specify the point when a performance indicator has reached a level that suggests a potential problem with the fishery and a review is required. The review will determine the suspected reasons for the tripping of the trigger point and whether any action is required (see section 10.3.2 for further information on reviews in response to trigger points).

Table 10.2 establishes the performance indicators and trigger points that will be used to measure whether the FMS is effective in achieving the management goals.

10.2 Predetermined Review of Performance Indicators and Trigger Points

It is likely that changes to the activities authorised under the FMS will evolve over time. It is also likely that better performance indicators will become apparent over the course of the next few years and it would then be an inefficient use of resources to continue monitoring the performance indicators that appear in the FMS. If new information becomes available as a result of research programs, more appropriate performance indicators and trigger points can be developed and the Minister for Primary Industries may amend the FMS accordingly.

A comprehensive review of the appropriateness of all performance indicators and trigger points will be carried out not more than two and a half years from the commencement of the FMS, in consultation with the Ocean Trap and Line MAC.

As new or improved guidelines for fishery reporting become available, such as those being considered in the *'National ESD Reporting Framework for Australian Fisheries – the how to guide for wild capture fisheries report'*, they will be taken into account to promote continuous improvement in the management of the fishery.

10.3 Reporting on the Performance of the Management Strategy

There are two types of performance monitoring reports to be prepared under this FMS. One is a performance report, which reports generally on the performance of the fishery with respect to the FMS. The other type of report is a review report, which is to be prepared if a performance indicator for the fishery is tripped. Both types of reports are discussed in further detail below.

10.3.1 Performance report

A performance assessment examining each performance indicator will be undertaken annually and a report on the performance indicators will be submitted to the Minister for Primary Industries within two years of the commencement of the FMS, and biennially thereafter. The report is the formal mechanism for reporting on performance indicators and trigger points, and will be made publicly available. It will also include a review of progress made in implementing each of the management responses. The performance report may be submitted to the Minister for Primary Industries in conjunction with performance reports for other relevant FMSs.

The vast majority of management responses in the FMS are linked to specified implementation timeframes. Some of these management actions are subject to specific trigger points that ensure reviews and appropriate remedial actions if the target timeframes are not met.

If the performance report identifies that any specified target timeframe has not been met, a review will be undertaken and any necessary remedial measures recommended to the Minister for

Primary Industries[4]. The fishery will continue to be regarded as being managed within the terms of the FMS whilst any remedial measures associated with unmet timeframes or triggering of performance indicators are being considered through the review process and/or by the Minister for Primary Industries.

10.3.2 Review report in response to trigger points

If the trigger point for a performance indicator is tripped, a review is to be undertaken of the likely causes for the trip. Any such review is to include consultation with the Ocean Trap and Line MAC. In some circumstances, the trip may be related to a performance indicator that measures broader cross fishery issues and will require consultation with other management advisory committees or the Ministerial advisory councils. Cross fishery issues are most likely to involve catch levels of a species that is harvested in more than one fishery.

NSW DPI will collect and analyse information relevant to the performance of the fishery, such as compliance rates, economic data, catch data and other statistics as the information becomes available and prior to the preparation of reports relating to performance monitoring in the FMS. This does not, however, prevent a review from being conducted at any other time should it become apparent that a performance indicator has tripped a trigger point.

Once the relevant information is obtained an initial analysis against the trigger points will be undertaken by NSW DPI. Where the data or information indicate that a trigger point has been tripped, details will be provided to the relevant fishery MAC and the relevant Ministerial advisory councils. Consultation will then occur with the Ocean Trap and Line MAC and other relevant advisory bodies either through a meeting or out of session. During this consultation, advice will be sought on the suspected reasons for any trips. During this consultation the MAC will also be able to provide advice on the preparation of any review reports that are required.

A review report outlining the remedial actions recommended in response to trigger point trips, is to be provided to the Minister for Primary Industries within 6 months of the trigger point being tripped.

Where economic, biological or ecological sustainability are factors for concern in a review, the review should consider, but not be limited to, the following factors:

- changes in the relative catch levels among harvest sectors (including those beyond NSW jurisdiction);
- new biological or stock information (from any source) available since the most recent review of the species;
- changes in the activities or effectiveness of fishing businesses targeting the species;
- changes in principal markets or prices for the species; and
- environmental factors.

Review reporting should include whether the suspected reasons for the trigger point being tripped are the result of a fishery effect or an influence external to the fishery, or both.

[4] In some circumstances a required action may be completed outside the scheduled timeframe, but prior to the commencement of the review (*e.g.* an action was due for completion by September 2005, but it is actually completed in October 2005, prior to the review). When this occurs, it is not necessary to proceed with a review.

If a review concludes that the reasons for the trigger point being tripped are due to the operation of the fishery, or if the fishery objectives are 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 nature of any remedial action proposed may vary depending on the circumstances that have been identified as responsible for the trigger point being tripped.

If a review considers that the management objectives or performance monitoring provisions are inappropriate and need to be modified, the management strategy itself may be amended by the Minister for Primary Industries. If the reasons are considered to be due to the impacts on the resource from factors external to the fishery, these factors should be identified in the review and referred to any relevant managing agency for action.

A review may recommend modifications to any fishery management strategy that allows harvesting of that species. This approach to the review process will avoid triggering multiple reviews for a species that is caught in multiple fisheries.

All review reports will be publicly available.

10.3.2.1 External drivers

External drivers are factors that are known to potentially impact on the performance of the fishery but which are outside of the control of NSW DPI or the commercial fishing industry (e.g. market prices, pollution etc.). Any external influences that may contribute to a trigger being tripped will be identified during the review and, if necessary, referred to any relevant managing agency for action.

Accordingly, there may be circumstances where no change to management arrangements or the management strategy is deemed necessary following the review. For example, a review could be triggered because the landed catch of a species declines. However, there would be little cause for concern over the performance of the management strategy if the decline in landed catch of a species was clearly caused by a drop in market prices. Any price fluctuations can result in fishers adjusting their activities.

Table 10.2 Performance indicators and trigger points for the fishery

GOAL 1. Manage the OTLF in a manner that promotes the conservation of biological diversity in the marine environment					
No.	**Performance indicator**	**Data requirements and availability**	**Trigger point**	**Robustness**	**Justification/comments**
1	The estimated quantity of the ocean trap and line catch (by method) which is discarded	Estimates of discarded catch for any observed method, and information on any relevant gear changes in the fishery	The quantity of discards for any observed method increases between consecutive observer surveys	Low	It is difficult to directly measure the impact of this fishery on biodiversity in the marine environment. The development of more appropriate indicators is required but it is acknowledged that this is a long term objective that will need to draw on a variety of expertise and knowledge. The performance indicators listed here will be used as surrogates until more direct indicators can be developed. Continuous improvements in fishing gear design and efficiency and fishing practices are a feature of the FMS. Until an appropriate baseline or reference point is established, interpretation of changes in the discarded component of catches will not be able to be clearly linked to fishery-based improvements.
2	Species composition (for all retained and bycatch species) for fishing methods used within the fishery	Quantitative landings from fisher logbooks and discard data from onboard observer surveys	Significant shift in species composition detected between consecutive observer surveys for any method	Medium	Similar to the indicator above, interpretation of changes in the species composition of catches will not be able to be clearly linked to changes in fishing practices until a baseline exists. Gray (1997) describes a range of species richness indexes which may assist in determining whether significant shifts in species composition have occurred.
3	Response of the fishery to marine pest and disease incursions	Reports on the monitoring of marine pests and diseases are needed and will be provided to the Ocean Trap and Line MAC as needed	Guidelines specified in any Marine Pest and Disease Management Program are not adopted by the OTLF	Low	Marine Pest and Disease Management Programs are responsible for monitoring marine pests and diseases (e.g. noxious fish), and developing contingency plans in the event of new incursions. This performance measure monitors whether management of the fishery is responsive to existing or new marine pest or disease incursions that may threaten the biodiversity in the marine environment
4	Areas closed to commercial ocean trap and line fishing in NSW managed waters	Spatial information is required for all closures (including marine parks, aquatic reserves and section 8 fishing closures). This information is available through the Marine Parks Authority and through NSW DPI in the event of any future fishing closures implemented for fishery management purposes	Areas closed to commercial ocean trap and line fishing become open after the commencement of the FMS	Medium	Significant closed areas prevent any direct impacts of the fishery on biodiversity in those areas, thus minimising the total impact on biodiversity at the regional or state scale. A triggered review would consider the merits of opening and/or closing different areas to the OTLF

GOAL 2. Maintain stocks of primary and key secondary species harvested by the OTLF at sustainable levels					
No.	**Performance indicator**	**Data requirements and availability**	**Trigger point**	**Robustness**	**Justification/comments**
1	Changes in the exploitation status of primary or key secondary species to 'overfished' or 'recruitment overfished'	The exploitation status of primary and key secondary species as determined each year by fisheries scientists in accordance with the *Framework for the Assessment of Harvested Fish Resources in NSW* (Scandol, 2004), considering reported catch and effort data, any available observer data, biological sampling data and any fishery independent data	The exploitation status of a primary or key secondary species is changed to 'overfished' or 'recruitment overfished' by NSW DPI	High	There are two types of overfishing of serious concern. 'Overfishing' occurs when fishing mortality is much greater than natural mortality and indices of stock abundance have declined. 'Recruitment overfishing' is used to describe cases where the fishing pressure has reduced the spawning stock to such a low level that recruitment is significantly affected. The management responses under Objective 2.5 already provide for the development of a recovery program in the event that a species is identified as overfished. This indicator aims to detect any increase in the number of primary or key secondary species being identified as 'overfished' or 'recruitment overfished', as that may indicate that the FMS is not moving the fishery towards a sustainable basis.
2	Total annual landings of all secondary species (other than key secondary species) taken in the fishery as a percentage of the total annual landings in the fishery	Requires commercial landings data for all species taken in the fishery. Data are available through mandatory catch reporting provided by endorsed ocean trap and line businesses	Contribution of secondary species to total trap and line landings exceeds 15% in any two consecutive years	Low	This indicator does not measure sustainability levels per se, but might indicate shifts in targeting or sudden declines in catch of primary/key secondary species or increases in catch of secondary species. The ratio in previous years has been around 10%.

GOAL 3. Promote the conservation of threatened species, populations and ecological communities and protected species of fish likely to be impacted by the operation of the OTLF					
No.	**Performance indicator**	**Data requirements and availability**	**Trigger point**	**Robustness**	**Justification/comments**
1	Interactions between the fishery and any threatened species, population or ecological community that are likely to threaten the survival of that threatened species, population or ecological community	Data will be obtained and available through catch reporting provided by endorsed OTLF fishers, and also by any onboard observer surveys and reports from compliance officers	Any interactions between the fishery and a threatened species, population or ecological community reported by endorsement holders in the fishery or observed during an observer survey that are likely to threaten the survival of that threatened species, population or ecological community, as determined by the Director-General of NSW DPI on advice from relevant threatened species experts	High	Currently, little information is available on interactions between the OTLF and threatened species. Commercial fishers are required to report a variety of details when an interaction occurs with a threatened species including contact or capture with gear and condition upon release. Every interaction recorded will be referred to the relevant threatened species authority to determine whether the interaction is likely to threaten the survival of a threatened species, population or ecological community. Any such assessment should include consideration of trends in the number or degree of interactions as well as any other cumulative impacts.
2	Interactions between the fishery and protected species that are likely to threaten the survival of a protected species	Data will be obtained through catch reporting provided by endorsed OTLF fishers, and also by any onboard observer surveys and reports from compliance officers	A biennial review undertaken by NSW DPI of interactions between the fishery and a protected species reported by endorsement holders in the fishery or observed during an observer survey is likely to threaten the survival of that protected species, as determined by the Director-General of NSW DPI on advice from relevant threatened species experts	High	Currently, little information is available on interactions between the OTLF and protected species. Commercial fishers are required to report a variety of details when an interaction occurs with a protected species including contact or capture with gear and condition upon release. NSW DPI will undertake a biennial review of the level of interaction with protected species to determine whether the levels are likely to threaten the survival of a protected species. Any such assessment should include: consultation with the relevant authority; consideration of trends in the number or degree of interactions as well as any other cumulative impacts.
3	Number of grey nurse sharks caught by the OTLF	Data will be obtained through catch reporting provided by endorsed OTLF fishers, observer surveys and from any targeted research programs being undertaken on grey nurse sharks	Trigger point to be determined once baseline data collected	High	There is a high level of scientific and community concern about the status of grey nurse sharks and there is demonstrated interaction between this species and hook and line fishing, particularly before their critical habitat areas were declared. As such, this indicator has been separated from the more general threatened species indicator (see performance indicator 1 above) and will highlight trends in the future level of interaction and cause a review with possible further mitigative action if the level is found to be unacceptable

GOAL 4. Appropriately share the resource and carry out fishing in a manner that minimises negative social impacts					
No.	**Performance indicator**	**Data requirements and availability**	**Trigger point**	**Robustness**	**Justification/comments**
1	Change in the distribution of landings between the *commercial sector* and *non-commercial sectors* (combining recreational and Indigenous) for each OTLF primary species	Requires commercial landings data and a time series of information (or estimates) of catches by other stakeholder sectors. Data and estimates will be obtained through mandatory catch reporting by commercial fishers and through any recreational or Indigenous fishing surveys, and compliance observations	Maximum absolute difference in the distribution of landings between the commercial and non-commercial sectors is greater than 25 percentage points when compared every five years	Medium	Further work would be needed to define specific targets for appropriate sharing of the resource and what might be considered a negative social impact. In the interim, an arbitrary trigger point has been specified that will detect a relative large shift in catch over time between the commercial sector and other stakeholder harvest sectors. This performance indicator can only be measured if updated estimates of non-commercial catch become available between comparison years.
2	Change in the distribution of landings among the *NSW commercial fisheries* for each OTLF primary species	Requires commercial landings data from NSW commercial fisheries, that will be collected and available through mandatory catch reporting arrangements	Maximum absolute difference in the distribution of landings between the assessment and reference years is greater than 15 percentage points	Medium	This indicator compares the distribution of landings among the NSW commercial fisheries for each OTLF primary species over time. The data used in the assessment year will be the total landings from the two fiscal years prior to that assessment year. This will be compared to the total landings of two reference years from five years previous. This cycle will continue with assessments occurring every five years.
3	Change in the distribution of landings among the OTLF *endorsement types* for each OTLF primary species	Requires commercial landings data from NSW ocean trap and line fishers, that will be collected and available through mandatory catch reporting arrangements	Maximum absolute difference in the distribution of landings between the assessment and reference years is greater than 25 percentage points	Medium	This indicator compares the distribution of landings among OTLF endorsement types for each OTLF primary species over time and will assist in monitoring and managing equitable allocations within the fishery. The data used in the assessment year will be the total landings from the two fiscal years prior to that assessment year. This will be compared to the total landings of two reference years from five years previous. This cycle will continue with assessments occurring every five years.

GOAL 5. Promote a viable commercial fishery, consistent with ecological sustainability					
No.	**Performance indicator**	**Data requirements and availability**	**Trigger point**	**Robustness**	**Justification/comments**
1	Net economic returns to the fishery	Requires data on the average market price of fish (CPI adjusted), total commercial landings in the fishery, indicative operational costs and management costs. Average price data is available from the Sydney Fish Market. Landings data are available through the catch returns submitted by fishers. Indicative data on operational costs will need to come from a variety of direct and indirect sources. NSW DPI will supply management cost information.	The Director-General of NSW DPI is satisfied that the gross value of production of the fishery has not exceeded the sum of indicative industry operational costs and government management costs relevant to the fishery for 3 consecutive years	High	This indicator provides a measure of economic viability of the fishery by monitoring the net returns to the fishery. Net return is a better indicator of economic performance than gross returns as it accounts for changes in fishers' costs over time. A process of determining indicative operational costs will need to be developed in consultation with the Seafood Industry Advisory Council and the MAC. The data obtained will be used to underpin the ten year share-based restructuring program that will be developed in consultation with the MAC for this fishery. The trigger point may need to be reviewed if inconsistent with the objectives of the restructuring program.
2	Average market value of ocean trap and line shares when traded	The market value of shares will be collected and recorded by the Share Registrar upon share transfer	Trigger to be determined within two years of the commencement of the share management plan	Medium	Market value of shares provides a general indication of investor's confidence in the economic viability of participating in the OTLF, as it takes account of a range of contributing factors

GOAL 6. Facilitate effective and efficient compliance, research and management of the OTLF					
No.	**Performance indicator**	**Data requirements and availability**	**Trigger point**	**Robustness**	**Justification/comments**
1	Percentages of total annual inspections in the OTLF which result in the detection of minor or major offences	Data requirements include a record of the number and types of offences detected, records of which are kept by NSW DPI	Percentage of inspections resulting in the detection of offences exceeds either of the following: (i) 20% for minor offences; (ii) 10% for major offences	Low	This indicator provides a simple low cost measure of compliance by OTLF fishers with management rules. Differentiation between major and minor offences will be determined during the development of the penalty points scheme. In the interim, an overall compliance rate of less than 85% will be used as the trigger point
2	Number of Ocean Trap and Line MAC meetings held each year	The number of Ocean Trap and Line MAC meetings held is available through records kept by NSW DPI	Number of OTL MAC meetings is less than 2 in any calendar year, unless otherwise agreed to by the MAC	Low	Holding two Ocean Trap and Line MAC meetings per year is currently a requirement of the Regulation, which ensures that regular consultation is taking place
3	Reviews and outcomes of strategic plans for research and compliance in the OTLF	Data about frequency and outcomes of reviews required - available through records kept by NSW DPI	The research or compliance strategic plans expire without being reviewed by NSW DPI, or the strategic plans are not modified consistent with the approved outcomes of a review	Medium	Strategic plans focus research and compliance activities and help to ensure maximum efficiency and cost effectiveness of the programs undertaken. It is important that they are reviewed and updated within the timeframes specified therein

GOAL 7. Improve knowledge about the OTLF and the resources on which it relies					
No.	**Performance indicator**	**Data requirements and availability**	**Trigger point**	**Robustness**	**Justification/comments**
1	Number of primary and key secondary species in the OTLF with an 'uncertain' or 'undefined' exploitation status	Exploitation status for each primary and key secondary species is stated in the FMS and will be reported in status reports to be produced each odd-numbered year from 2007	The number of primary and key secondary species with an 'uncertain' or 'undefined' exploitation status has not decreased between two consecutive odd-numbered years	High	A reduction in the number of key species with an 'uncertain' or 'undefined' exploitation status will demonstrate an improvement in the knowledge base for the primary and key secondary species in the fishery
2	The difference between the current and target resource assessment class for primary and key secondary species of the OTLF	Target resource assessment classes are outlined in the Resource Assessment Framework and current resource assessment classes will be obtained from status reports to be produced each odd-numbered year from 2007	The sum of the difference between the current and target assessment class for primary and key secondary species has not decreased between two consecutive odd-numbered years	High	The Resource Assessment Framework defined five classes of resource assessment into which all harvested species can be placed. Each primary and key secondary species was allocated a target resource assessment class. A movement of primary and key secondary species towards their target resource assessment class demonstrates an improvement in the knowledge base for these species.
3	The number of research projects underway which have a flow of benefits to the OTLF and fill information gaps identified by the EIS	Relevant data will be held by NSW DPI and/or external funding bodies	The number of relevant research projects relevant to identified information gaps falls to less than two during any one year	Medium	This is a general indication of the minimum commitment consistent with improving the knowledge base relating to the fishery. Note: the number of research projects does not include routine monitoring and observer programs.
4	Accuracy of catch return data (in terms of quantity of product, record completeness and species identification)	Requires commercial landings, marketing data and information on species identification. Information available from catch returns submitted by fishers, Registered Fish Receiver data and through the observer program.	The percentage of species records with poor reporting does not decline after 1 year of operation of new reporting procedures	High	Improving the accuracy of data, in terms of quantity of product retained and species identification, is important for improving the knowledge base. This performance indicator picks up on the re-design of the 'returns' form and the accuracy of reporting of both quantity retained and species identification.

10.4 Contingency Plans for Unpredictable Events

In addition to the circumstances outlined above, the Minister for Primary Industries may order a review and/or make a modification to the fishing regulatory controls, administrative arrangements or the management strategy in circumstances declared by the Minister for Primary Industries as requiring contingency action, or upon the recommendation of the Ocean Trap and Line MAC. In the case of the former, the Minister for Primary Industries must consult the Ocean Trap and Line MAC on the proposed modification or review.

These circumstances may include (but are not limited to) food safety events, environmental events, results of research programs or unpredictable changes in fishing activity over time. The Minister for Primary Industries may also amend this fishery management strategy if matters identified during the finalisation of any other fishery management strategy indicate that a modification is necessary.

Notwithstanding the above, the Minister for Primary Industries may also make amendments to the management strategy that the Minister considers to be minor in nature at any time.

10.5 Monitoring Performance of Resource Assessment

Stock assessment involves the use of various statistical and mathematical calculations to make quantitative predictions about the reactions of fish populations to alternative management choices (Hilborn and Walters, 1992). These calculations can vary from simple graphical presentations of commercial landings to sophisticated computer models that predict the biomass of the stock under various harvest regimes. The data and the scientific expertise required to apply these methods varies enormously. Stock assessment processes for the OTLF need to be defined to suit the resources available.

A resource assessment process for primary and key secondary species has been developed (Scandol 2004). This framework summarises the issues associated with resource assessment in NSW and proposes a long term strategy to monitor stock status and assess stocks. Because of the relatively large number of primary species, and the range of knowledge about these species or species-groups, the resource assessment strategy will need to be appropriately based on the level of existing knowledge, the data likely to be available, and the value of the fishery. A long-term approach will be used to assess the status of the primary species. Two principles have been applied to the long-term proposal for resource assessments:

- assessment methods will be consistent with the data (i.e. the assessment program design will not rely on data sources that are not funded)
- assessment methods will be at least equivalent to approaches for fisheries of similar value in other Australian jurisdictions.

The exact methods applied to assess the state of the stock has required the development of novel approaches (see NSW Department of Primary Industries, 2006). An independent review of the assessment methods will be completed within three years with the following terms of reference, to:

- report upon the technical soundness of the assessment methods proposed
- report upon the cost-effectiveness of the assessment methods proposed

- indicate if the assessment process will be likely to provide timely information for the management of the fishery
- report upon the conditions where the assessment process is likely to be unsatisfactory
- recommend revisions to the proposed approach including additional data collection strategies that should be considered.

The schedule for providing resource assessments cannot and should not be the same for all primary species. Priorities for each species should be determined in consultation with the assessment scientists and the appropriate MAC. Consequently, those species that are identified as having the highest risk will be assessed first.

References

Note: articles that have not been externally peer reviewed and published in a journal or book are denoted with an asterisk (*).

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Appendices to the FMS

Appendix 1	Determination with respect to the OTLF
Appendix 2	Implementation table for the OTLF
Appendix 3	Input controls for the spanner crab fishery
Appendix 4	Description of the classes of resource assessment for species harvested in NSW

Appendix 1 – Determination with respect to the OTLF

DETERMINATION WITH RESPECT TO
A DESIGNATED FISHING ACTIVITY UNDER SECTION 115O OF THE
ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

I, IAN MACDONALD, MLC, the Minister for Primary Industries, pursuant to section 115O of the *Environmental Planning and Assessment Act 1979* ("the Act"), determine to permit the designated fishing activity described in Schedule 1 to be carried out subject to such modifications as will eliminate or reduce the detrimental effect of the activity on the environment set out in Schedule 2.

I have examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the designated fishing activity.

I have considered *inter alia*:

1. the Environmental Impact Statement ("EIS") for the Ocean Trap and Line Fishery published by NSW Department of Primary Industries in March 2006 and the representations duly received with respect to the designated fishing activity to which the statement relates;
2. a report and recommendations of the NSW Department of Planning dated June 2006;
3. the recommendations of the Deputy Director-General, Agriculture, Fisheries and Regional Relations, NSW Department of Primary Industries dated June 2006;
4. the matters required to be considered under section 115N of the Act relating to threatened species conservation; and
5. the matters referred to in section 19(2) and section 20(3) of the *Marine Parks Act 1997*.

IAN MACDONALD, MLC
Minister for Primary Industries

Dated this day of 2006

SCHEDULE 1
Designated fishing activity

Fishing activities for commercial purposes in the Ocean Trap and Line Fishery as described in Schedule 1 of the Fisheries Management Act 1994.

SCHEDULE 2
Modifications

The draft fishery management strategy exhibited in March 2006 as part of the Environmental Impact Statement for the designated fishing activity is revised so as to incorporate:

a) the amendments expressly stated in the preferred strategy report for the activity dated June 2006; and

b) the recommendations of the Deputy Director-General, Agriculture, Fisheries and Regional Relations, NSW Department of Primary Industries dated June 2006.

Appendix 2 - Implementation table for the OTLF

The following implementation table outlines the target time periods within which each management response is scheduled to be implemented. The table also provides information relating to the head of power for implementation and who has the lead responsibility for carrying out the action(s). A general description of the terms used in the table with respect to target timeframes are:

Term	Description
Immediate	Upon the time of approval of the strategy
Short Term	Within one year of the date of approval of the strategy
Medium Term	Within 3 years of the date of approval of the strategy
Long term	In excess of three years of the date of approval of the strategy
As required	Whenever the circumstances warrant action
Ongoing	Continuing into the future

Where the implementation date (e.g. a particular month) has been included for a management response instead of the terms above, the date represents a specific target time within which the management response is planned to be implemented.

Despite the target timeframes listed below, some programs may need to be reprioritised or rescheduled over time in order to direct the limited resources available for implementation to the most critical program areas for designated periods. This may involve prioritising programs within this FMS as well shared or separate programs scheduled in other fisheries. For example, it may be a better use of resources to temporarily divert funding originally targeted for fishery monitoring purposes into addressing some of the critical structural adjustment issues facing the fishery and the industry. One of the key factors to consider in any reprioritisation or rescheduling exercise is the level of relative environmental risk.

The approved FMSs for the Estuary General, Ocean Hauling, Estuary Prawn Trawl and Freshwater Fish Stocking designated fishing activities are taken to be amended (pursuant to s.7C(2A)) to provide for the reprioritisation and rescheduling of programs as described above.

Appendix 2. Implementation table for the OTLF

Goal 1. Manage the Ocean Trap and Line Fishery in a manner that promotes the conservation of biological diversity in the marine environment					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
1.1 Mitigate the impact of trap and line fishing in NSW ocean waters on ecosystem integrity (species, populations, and ecological communities)	a) Map major trap and line fishing grounds (including available information on associated geological features), assess the level of use of the OTLF on each ground and identify the areas in NSW ocean waters where trap and line fishing occurs (taking account of marine protected areas)	1, 7	Long term	NSW DPI OTL MAC OTL Fishers	-
	b) Collect information on the number of fish traps in the fishery lost during fishing operations and implement, in consultation with the MAC, appropriate management actions if necessary	1, 2, 3, 7	Short term and then as required	NSW DPI OTL Fishers	-
	c) Use fishing closures to control fishing activities within the OTLF to…	1, 2, 3, 4, 6	As required	NSW DPI	Regulatory
1.2 Mitigate the impact of ocean trap and line fishing activities on bycatch (i.e. non-retained catch including prohibited species and unwanted catch)	a) Design and implement an industry funded scientific observer program to document the degree of interaction of commercial designated fishing activities, including the OTLF, with non-retained and threatened species	All	Medium term and then ongoing	NSW DPI OTL MAC	-
	b) Implement fish escape panels in fish traps, initially comprising 50 x 75 mm mesh, that minimises bycatch and the retention of juvenile and small fish	1, 2, 3, 4	Short term	NSW DPI	Regulatory
	c) Use best-practice handling techniques, including the prohibition on the use of fish spikes, clubs or any other such implement that could unduly harm non-retained organisms	1, 2, 3, 4	Ongoing (except Immediate for spikes and clubs)	NSW DPI OTL Fishers	Various
	d) Prohibit the finning of sharks and discarding carcasses	1, 2, 3, 4	Ongoing	NSW DPI	Regulatory
	e) Develop a code of practice for the OTLF to…	1, 2, 3, 4, 5, 6	Medium term	NSW DPI OTL MAC	Various
	f) Implement, for all unattended line fishing methods, the exclusive use of: i) circle hooks (offset and non-offset) in waters ≥ 92 m, ii) non-offset circle hooks in waters < 92 m	1, 2, 3, 4, 5	By 1 July 2007	NSW DPI	Regulatory
	g) Identify, in consultation with local fishers, the areas and/or times where undersized snapper consistently congregate, and close those areas to fish trapping	1, 2, 5	Short term and then ongoing	NSW DPI OTL Fishers	Various
1.3 Mitigate the impact of the OTLF on ocean habitats and their associated biota	a) Modify the use of trap and line fishing methods in areas where their use is identified as having a detrimental impact on fish habitat	1, 2	As required	NSW DPI	Various
1.4 Prevent the introduction and translocation of marine pests and diseases by fishing activities	a) Implement, in consultation with the MAC, measures required in accordance with any marine pest or disease management plan	1, 2, 6	As required	NSW DPI OTL Fishers	To be determined

Goal 2. Maintain stocks of primary and key secondary species harvested by the OTLF at sustainable levels					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
2.1 Prevent overfishing of the stocks of primary and key secondary species by ocean trap and line fishers	a) Monitor the quantity, length, and/or age and sex composition of the primary and key secondary species taken by commercial designated fishing activities, including the OTLF, as part of the overall resource assessment system	2, 7	Short term and then ongoing	NSW DPI	-
	b) Using the approved resource assessment framework, conduct resource assessments of the primary and key secondary species taken by commercial designated fishing activities, including the OTLF, where necessary, and review the assessments at least every three years thereafter with an external review of the assessment framework at least every four years	1, 2, 4, 7	Short term to develop and then ongoing to conduct assessments	NSW DPI	-
	c) Monitor commercial landings of all secondary species (other than the key secondary species) taken in the fishery annually for comparison against an historical range for each of those species or groups of species, as part of the overall resource assessment system	2, 4, 5, 7	Short term and then ongoing	NSW DPI	-
	d) Investigate the cost effectiveness of using fishery independent surveys to provide abundance indices and other information for resource assessment of the primary species taken in the OTLF	2, 6, 7	Medium term	NSW DPI OTL MAC	-
	e) Review and where appropriate implement minimum legal lengths for the primary and key secondary species to give a high probability that at least 50% of the fish of each particular species landed have reached reproductive maturity (unless alternative strategies apply to individual species)	2, 4	Medium term	NSW DPI	Regulatory
	f) Implement changes to reduce the risk of the OTLF to wobbegong sharks, including i) 12 carcass trip limit, ii) 130 cm MLL, subject to DPI review, iii) collection of biological data, iv) distribute educational material to fishers	1, 2	i) Immediate, ii) As required, iii) Ongoing, iv) Medium term	NSW DPI	Regulatory
	g) Review the economic impacts of increasing the size limit for snapper to 32 cm and implement the outcomes of the review	2, 5	Short term	NSW DPI	-
	h) Cap the NSW catch of school and gummy sharks and participate in the development of a multi-jurisdictional quota scheme with the Commonwealth and southern States	1, 2, 4, 6	Short term and then ongoing	NSW DPI	Policy and/or Regulatory
	i) Modify the gear controls applicable to the spanner crab fishery and investigate the feasibility of a quota system to manage the harvest of spanner crabs in the longer term	2, 6	Immediate for gear, Medium term for quota mgt	NSW DPI OTL MAC	Various
	j) Utilise onboard observers to collect additional biological information, including size at maturity and fecundity/brood size data, for the important elasmobranch species taken by the fishery	1, 2, 7	Medium term and then as required	NSW DPI	-
	k) Prohibit the taking of all female spanner crabs carrying ova	2	Ongoing	NSW DPI	Regulatory
	l) Prohibit the taking of male spanner crabs from 20 November to 20 December and female spanner crabs from 20 October until 20 January	2	Ongoing	NSW DPI	Regulatory
	m) Implement additional controls for shark species harvested in the OTLF, including i) one tonne trip limit, ii) two tonne trip limit, iii) ongoing review of gear and catch controls	1, 2	i) & ii) Immediate, iii) Ongoing	NSW DPI	

Goal 2 cont. Maintain stocks of primary and key secondary species harvested by the OTLF at sustainable levels					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
2.2 Promote the recovery of overfished species	a) Where the OTLF is a major harvester of a species determined as overfished in NSW, develop and implement a recovery program for that species, in particular: i) gemfish, ii) snapper, iii) other species	1, 2, 4, 5	i) Short term, ii) Medium term, iii) Ongoing	NSW DPI	Various
	b) Where the fishery is a minor harvester of an overfished species, contribute to the development of a recovery program for the species, and adopt any measures required by a program	1, 2, 4, 5	As required	NSW DPI OTL MAC	Various
2.3 To conserve fish stocks by managing levels of active fishing capacity in the fishery	a) Implement the following limits on gear use in the fishery: …	1, 2, 3, 4	Short term	NSW DPI	Regulatory
	b) Prohibit the use of on-board automatic baiting machines in the fishery	2, 4, 5	Immediate	NSW DPI	Regulatory

Goal 3. Promote the conservation of threatened species, populations and ecological communities and protected species of fish likely to be impacted by the operation of the Ocean Trap and Line Fishery					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
3.1 Identify and minimise or eliminate any impacts of fishing activities on threatened species, populations and ecological communities (including mammals, birds, reptiles, fish, invertebrates and vegetation), and protected species of fish and, where required, promote their recovery	a) Continue, in consultation with OTL MAC, the mandatory reporting arrangements enabling the collection of information on interactions with or sightings of threatened or protected marine species and interactions with other threatened or protected species	3, 7	Immediate	NSW DPI OTL MAC	Policy and/or Regulatory
	b) Implement the provisions of any relevant recovery plans, threat abatement plans, priorities action statements or other similar management arrangements designed to protect threatened species and/or critical habitat areas	3, 6	As required	NSW DPI OTL MAC	Various
	c) Implement changes to reduce or prevent the impact of the OTLF on grey nurse sharks, including: i) circle hooks on unattended lines (as per MR1.2(f)), ii) prohibiting wire traces on bottom setlines used in waters < 3 nm and in GNS buffer zone areas, iii) investigate circle hooks for attended lines, iv) implement closures	1, 3	i) by 1 July 2007, ii) Immediate, iii) & iv) Short term	NSW DPI	Regulatory
	d) Using the code of practice, promote the use of fishing techniques that avoid the capture of, or interaction with, protected fish and fish protected from commercial fishing	3	Medium term and then ongoing	NSW DPI OTL fishers	Regulatory
	e) NSW DPI to work with the NSW DEC to identify the nature and extent of interactions between the OTLF and marine mammals in NSW waters and implement appropriate mitigative measures	1, 3	Ongoing	NSW DPI	To be determined

Goal 4. Appropriately share the resource and carry out fishing in a manner that minimises negative social impacts					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
4.1 Provide for appropriate access to the fisheries resource by other stakeholders (*e.g.* recreational, Indigenous), acknowledging the need of seafood consumers to access fresh quality fish	a) Estimate the total catch of primary and key secondary species in the OTLF, taking account of the recorded commercial catch and estimates of recreational, Indigenous and illegal catch	2, 4, 5, 7	Ongoing	NSW DPI	-
4.2 Provide for fair and equitable sharing of the fisheries resource with other commercial fisheries (NSW, interstate and Commonwealth)	a) Monitor management arrangements and the annual landings of key ocean trap and line species in fisheries that are outside NSW jurisdiction but which impact on stocks shared with the NSW OTLF, as part of the resource assessment system	2, 4, 5, 7	Ongoing	NSW DPI	-
	b) Monitor the annual landings of secondary species (other than the 'key secondary' species) in the OTLF	1, 4, 6, 7	Ongoing	NSW DPI	-
	c) Use cross-fishery and cross-jurisdictional consultation to discuss and manage issues relating to, but not limited to, the multiple use of specific fishing grounds, collaborative research, fair and equitable access to stocks, complementary management arrangements and other interactions between fishing sectors	1, 2, 4, 5, 6, 7	Ongoing	NSW DPI	-
	d) Participate in the development and implementation of a policy (including reporting procedures) to manage the use of the lift net for collection of 'live' bait by NSW ocean trap and line fishers.	1, 2, 4, 5, 6, 7	Short term	NSW DPI OTL MAC	Policy
	e) Implement a policy to manage the impact of dual endorsed Commonwealth tuna boats in NSW waters, in particular to regulate boat length and/or catches taken by larger than standard size boats, such as through removing the existing policy that allows tuna boats to upgrade in length whilst retaining State entitlements	1, 2, 4, 5	Short term	NSW DPI	Policy
4.3 Provide for the fair and equitable sharing of the fisheries resource within the OTLF	a) Respond, where necessary, to information about significant changes in the relative catches of the primary and key secondary species taken by endorsement types within the OTLF	4, 5	Ongoing	NSW DPI OTL MAC	Various

Goal 4 cont. Appropriately share the resource and carry out fishing in a manner that minimises negative social impacts					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
4.4 Identify and mitigate any negative impacts of the OTLF on Aboriginal cultural or other heritage	a) Manage the OTLF in a manner consistent with the Indigenous Fisheries Strategy and Implementation Plan	4	As required	NSW DPI	Various
	b) Modify the activity, where relevant, in response to new information about areas or objects of cultural significance in order to minimise the risk from ocean trap and line fishing activities	4	As required	NSW DPI OTL Fishers	Various
4.5 To promote harmony between the commercial fishery and other resource users through fair and equitable sharing of the resource	a) In consultation with the OTL MAC, identify areas of high interaction between the OTLF and other resource users and respond appropriately to resolve any conflicts	4, 6	As required	NSW DPI OTL MAC OTL Fishers	-

Goal 5. Promote a viable commercial fishery, consistent with ecological sustainability					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
5.1 Provide secure fishing entitlements for ocean trap and line fishers	a) Implement the share management provisions of the *Fisheries Management Act 1994*	2, 4, 5	Ongoing	NSW DPI	Regulatory
5.2 Manage the harvesting of the primary and key secondary species by size to achieve optimal biological yield and economic return in the longer term	a) Determine and implement strategies for harvesting fish at a size that provides optimum biological yield and economic return for the primary and key secondary species in the longer term	2, 4, 5	Long term	NSW DPI OTL MAC	-
5.3 Establish a level of fishing effort to achieve a fishery that is commercially viable (and ecologically sustainable) over the longer term	a) Manage fishing effort in the OTLF by: (i) capping the number of each endorsement type at currently active levels (ii) establishing a maximum level of fishing effort for each sector of the OTLF to be achieved within 10 years of the commencement of the share management plan	1, 2, 3, 4, 5	(i) To be determined (ii) Short term	NSW DPI	Various
5.4 Promote the economic viability of the OTLF and assess the economic benefits of the fishery to the community	a) Refine the performance indicator for monitoring trends in the commercial viability of typical fishing businesses within each designated commercial fishing activity, so as to be based on net returns	5, 6, 7	Medium term	NSW DPI OTL MAC	-
	b) Investigate the data available to assess the economic multiplier (flow-on) effects of commercial fishing, including the OTLF, to the broader community, and develop strategies to improve the quality/usefulness of such data	5, 7	Medium term	NSW DPI OTL MAC	-
	c) Identify and promote post-harvest practices which will ensure the best return in dollars per kilogram for product of the fishery	5, 6	Ongoing	OTL MAC	-
	d) Develop a cost recovery framework, in consultation with the MAC and the Ministerial advisory body relating to commercial fishing	4, 5, 6	Short term	NSW DPI OTL MAC	Policy
5.5 Manage food safety risks in the harvesting of fish in the fishery	a) Co-operate with NSW Food Authority in the development and implementation of food safety programs relevant to the fishery	5, 6	Ongoing	OTL Fishers	FP Act

Goal 6. Facilitate effective and efficient compliance, research and management of the Ocean Trap and Line Fishery					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
6.1 Promote and maximise compliance with the provisions contained in the Ocean Trap and Line Management Strategy	a) Develop, implement and monitor a compliance plan for commercial designated fishing activities, including the OTLF	1, 2, 3, 4, 5, 6	Short term and then ongoing	NSW DPI	Policy
	b) Investigate the feasibility of the vessel monitoring system (VMS), or another electronic monitoring system that meets the same need, with a view to implementing the system if it is found to be a cost-effective and practical addition to existing compliance and/or catch reporting methods	1, 2, 5, 6, 7	Medium term	NSW DPI OTL MAC	-
	c) Implement a penalty points scheme (incorporating endorsement suspension and share forfeiture for serious offences and habitual offenders)	1, 2, 3, 4, 5, 6	Medium term	NSW DPI	Regulatory
	d) Develop strategies to support appropriate practices and behaviour in commercial fisheries, including development of training and accreditation courses in core competencies, and the introduction of fit and proper person requirements	All	Long term	NSW DPI OTL MAC	Regulatory
6.2 Identify research priorities required to provide for the sustainable operation of the OTLF	a) Develop and implement a Research Strategic Plan for designated fishing activities, including the OTLF, taking account of the priorities for research outlined in the harvest strategy	1, 2, 3, 5, 6, 7	Short term and then ongoing	NSW DPI	Policy
6.3 Ensure effective and efficient management of the OTLF	a) Develop and implement a fishing business card system	5, 6	Short term	NSW DPI OTL MAC	Various
6.4 Provide effective and efficient communication and consultation mechanisms in relation to management of the OTLF	a) Utilise a key consultative body, the OTL MAC, when undertaking industry consultation on all aspects of the OTLF	6	Ongoing	NSW DPI	Policy and/or Regulatory
6.5 Implement this Strategy in a manner consistent with related Commonwealth and State endorsed programs aimed at protecting aquatic environments and achieving the objectives of ecological sustainable development	a) Manage the OTLF consistently with other jurisdictional or natural resource management requirements, such as the marine parks program, aquatic biodiversity strategy, threatened species program, Indigenous Fisheries Strategy and other relevant strategies	1, 3, 4, 5, 6	Ongoing	NSW DPI	Various
	b) Provide for the issue of permits under Section 37 of the FM Act authorising the use of modified fishing practices to assist research programs or for purposes consistent with the vision and goals of this management strategy	All	Ongoing	NSW DPI	Regulatory

Goal 7. Improve knowledge about the Ocean Trap and Line Fishery and the resources on which it relies					
OBJECTIVES	**MANAGEMENT RESPONSES**	**CONTRIBUTES TO GOALS**	**TARGET TIMEFRAME**	**RESPONSIBILITY**	**AUTHORITY**
7.1 Improve the community's understanding and perception of the OTLF	a) Promote awareness of the OTLF as part of the overall communication strategy across all commercial designated fishing activities by implementing issue-focused education programs	4, 6, 7	Ongoing	NSW DPI OTL MAC	-
7.2 Promote scientific research to collect relevant information about the biology of the primary and key secondary species, the impacts of fishing on other species and the environment, and the status of the fishery as a whole, including economic and social factors	a) Promote and support targeted research projects which are relevant to the biology or resource assessment of the primary and key secondary species in the OTLF; the impacts of ocean trap and line fishing on biodiversity and the environment; and economic and social factors affecting the fishery	All	Short term and then ongoing	NSW DPI OTL MAC	-
7.3 Improve the quality of the catch and effort information collected from endorsement holders	a) Periodically review the mandatory catch and effort return forms submitted by ocean trap and line fishers	All	Ongoing	NSW DPI OTL MAC	Policy and/or Regulatory
	b) Assess the accuracy of the current catch recording system, and species identification in catch records, and provide advice to industry to make needed changes	1, 2, 3, 6, 7	Medium term	NSW DPI OTL MAC	-
	c) Modify the reporting system to remove lobster trap as a method on the ocean trap and line catch returns	2, 4, 6, 7	Immediate	NSW DPI	Policy and/or Regulatory

Appendix 3. Input controls for the spanner crab fishery

The following is a range of modified input controls to be implemented in the spanner crab sector of the OTLF within the short term (unless an alternative timeframe is stated below):

1) Zoning

i) Fishing business owners will be permitted to hold both a southern and northern spanner crab endorsement on the same fishing business.

Background: Presently, fishing businesses are not permitted to hold a southern and northern zone spanner crab endorsement. To assist in improving the economic viability of the fishery, this restriction will be removed so that businesses can operate in both components of the fishery, providing the fishing business holds both endorsements.

2) Fishing Gear

i) The Regulation will be amended to define the basic unit of fishing gear used in the spanner crab fishery as a 'dilly' instead of a 'spanner crab net'.

Background: The term dilly is commonly used through the NSW and Queensland fishery. This change will provide better consistency with the Queensland regulations.

ii) The use of regulated size mesh and double-layered mesh netting will be reviewed within 18 months of the commencement of the FMS, with the view to reducing the capture of small spanner crabs.

Background: Double-layered meshing may be more effective at catching smaller spanner crabs because it reduces the effective mesh size of the dillies. A review will examine the available information on the effect of varying mesh sizes on the catches of small spanner crabs, and will result in the implementation of additional management measures if warranted.

iii) Dilly frame size will be amended to be a maximum area of 1.6 m^2.

Background: This change gives endorsement holders greater flexibility with respect to design of the gear without increasing the overall area of netting.

iv) The following boat limits will apply:

a) not more than 20 dillies for a single commercial fisher, and

b) not more than 30 dillies for a commercial fisher with crew.

Background: 'Boat limits' as opposed to 'in use' limits are easier to enforce in the spanner crab fishery and, as such, this response should improve the effectiveness of the compliance program.

3) Identification of dillies

i) The floats attached to each string of dillies must:

a) be at least 15 cm in diameter or the shortest dimension if the float is not round

b) clearly display the owner's licensed fishing boat (LFB) number

c) have a flag attached that rises least 2 metres above the water, and

d) clearly display the number of dillies attached to that string, unless that number is clearly displayed on the flag attached to the float.

Background: Improved identification has been suggested from a compliance perspective. These changes are consistent with current Queensland regulations and support present NSW regulations of identification of set fishing gear. The identification of set fishing gear must comply with all other relevant parts of the Regulation.

4) Stock Management

i) To integrate results of NSW/QLD survey comparison project with future management.

Background: A project is currently underway to compare the resource assessment work undertaken in NSW and Queensland and to investigate opportunities for further collaboration with respect to research and management arrangements. The results of this study may influence future research and management programs relating to the spanner crab sector of the OTLF.

ii) Best handling practices such as the careful removal of crabs from dillies and return to water to be included in the code of practice.

Background: Previous research has demonstrated the negative effects that poor handling practices can have on spanner crabs caught in dillies and subsequently discarded (e.g. because they are undersize). This response seeks to encourage industry, through the code of practice, to take greater care when removing spanner crabs from dilly nets to reduce the number of flippers or legs damaged during the removal process.

Appendix 4. Classes of resource assessment for species harvested in NSW

Class One

Class One or dynamic assessment models have been built and successfully applied to the management of the NSW eastern rock lobster, abalone and gemfish fisheries. This class of assessment calibrates complex population models to indices of abundance and other information about population structure. These models require a credible and high contrast index of abundance or the integration of other data. Projecting the stock dynamics forward in time can be used as the basis of a quantitative risk analysis of alternative harvesting options. The "trigger points" of these models should be interpreted in terms of the limit/target biological reference points, such as B_t/B_0 or $F_t/F_{0.1}$, that are used to manage international fisheries. Such models are time consuming and expensive to prepare, execute and analyse. The best forecast results of these models are obtained when an index of recruitment is available and applied. Application of stock-recruitment relationships will degrade the forecasts from these models.

It is recommended that lobster and abalone fisheries continue to use Class One assessments. Other primary/target species will be provided with Class One assessments upon the basis of assessment priority and research opportunity. In the short term (less than three years) most species will not have a research program focussed upon the completion of Class One assessments. Effective and efficient management systems will be built upon other classes of resource assessment. The proposal to use the TAC Committee to determine the effort in the commercial prawn fisheries will require improvements to the resource assessment of these stocks. The socio-economic and biological consequences of allocating effort between fisheries requires additional consideration and analysis. Prawns support the most valuable commercial fishery in NSW and require prioritisation within resource assessment research programs. The ARC Linkage (PhD-based) project to investigate these fisheries was initiated in March 2004[5]. Even if the TAC Committee does not play a significant role in the management of these stocks, this research should generate important outcomes for these fisheries and raise the assessment of these important stocks to Class One.

Class Two

Class Two assessment would be applied when there is a good understanding of the individual growth and total mortality in NSW and a credible, though not necessarily excellent, index of abundance for that species (such as a credible CPUE time-series). The population structure would be monitored with indicators derived from age and length-based data (only lengths would be used for crustaceans).

Class Two assessments would thus be completed using empirical indicators only. These indicators and the associated target and trigger points would be determined and, after appropriate consultation, included in an amended FMS. Targets and trigger points for these indicators will be determined using: biological knowledge of a species (such as length at maturity); and/or simulation testing methods. Certain primary/target species would be promoted to Class One assessments as

[5] Mathew Ives was selected as the successful candidate and is expected to complete his PhD on a "Quantitative Analysis of Prawn Harvesting Strategies in NSW" by the end of 2006.

priorities indicate. Species identified as primary or target species within an FMS would be given Class Two assessments along with as many key secondary species as possible (but with lower priority).

Class Three

Class Three assessment would be applied to the more valuable species when the indicator of abundance was less credible or there was no potential for any age structured monitoring to occur. Length structured monitoring and assessment would be applied to these species only. There should be basic local information on the biology and mortality of species undergoing Class Three assessments. Class Three assessments would thus be completed using empirical indicators only. These indicators and the associated target and trigger points would be determined and, after appropriate consultation, included in an amended FMS. Targets and trigger points for these indicators will be determined using: biological knowledge of a species (such as length at maturity); and/or simulation testing methods. All species identified as byproduct or key secondary species (but not given a Class Two assessment) should be assessed in this way. Some non-key secondary or byproduct species could be included as growth and mortality information became available.

Class Four

Class Four assessments would be applied only to species of very low value and where very little information exists apart from landings data. Resource assessment would be based upon landings or catch per fisher data only. The method currently used to define the trigger points for commercial landings within the completed FMS will continue to be used until a superior methodology can be justified. This would be the simplest form of resource assessment and only used for any secondary or byproduct species that are not assessed with Class Two or Class Three methods. There must be at least credible information on commercial landings for this method to be applied.

Class Five

Class Five assessment recognises that no species-specific resource assessment can be undertaken (usually because there is no locally collected information from commercial or recreational fisheries). Assessment of these species could be based upon data from the observer program or fishery independent surveys as it became available but such work is not likely to be high priority. It is probable that assessment of these species will be via “ecosystem” indicators and/or indicators of discarding. This class is reserved for species where there is no information at present but where the species is known to experience some type of fishing mortality.