

NORTHERN TERRITORY FISHERIES

JOINT AUTHORITY

REPORT FOR THE PERIOD

1 JULY 2004

TO

30 JUNE 2005

NORTHERN TERRITORY FISHERIES
JOINT AUTHORITY

REPORT FOR PERIOD

1 July 2004

to

30 June 2005

Commonwealth of Australia

ISSN 1033-9574

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without written permission.

Published by

Australian Fisheries Management Authority
CANBERRA

Compiled by

David Mckey
Aquatic Resource Management Officer
Department of Primary Industry, Fisheries and Mines
GPO Box 3000
DARWIN NT 0801

**FISHERIES MANAGEMENT ACT 1991
(COMMONWEALTH)**

**FISHERIES ACT 1988
(NORTHERN TERRITORY)**

NORTHERN TERRITORY FISHERIES JOINT AUTHORITY

REPORT OF THE NORTHERN TERRITORY FISHERIES JOINT AUTHORITY

FOR THE PERIOD: 1 JULY 2004 TO 30 JUNE 2005



Senator the Hon Eric Abetz
Minister for Fisheries, Forestry and Conservation
Parliament House
CANBERRA



The Hon Konstantine Vatskalis MLA
Minister for Primary Industry and Fisheries
Parliament House
DARWIN

Contents

	Page No
1 Introduction	1
2 Members of the Joint Authority	1
3 Functions and Powers of the Northern Territory Fisheries Joint Authority	1
4 Meeting of the Northern Territory Fisheries Joint Authority	2
5 Advisory Committees	2
6 Condition of the Fisheries	3
7 Management Arrangements	13
8 Fisheries Monitoring, Research, Surveillance and Enforcement	18
9 Financial Arrangements	26
10 Management Arrangements and Landings	27

Figure

1 Area of the Timor Reef fishery	3
2 Composition of the catch from the commercial Timor Reef fishery, 2004	4
3 Catch and effort for the commercial Timor Reef fishery, 1995 to 2004	4
4 Catch rates for the commercial Timor Reef fishery, 1995 to 2004	4
5 Area of the demersal fishery	5
6 Catch and effort for the commercial demersal fishery, 1996 to 2004	6
7 CPUE for the commercial demersal fishery, 1996 to 2004	7
8 Area of the finfish trawl fishery	8
9 Catch composition for the commercial finfish trawl fishery, 2004	9
10 Catch and effort for the finfish trawl fishery, 1995 to 2004	9
11 CPUE for the finfish trawl fishery, 1995 to 2004	9
12 Area of the shark fishery	10
13 Catch and effort for the commercial shark fishery, 1983 to 2004	11
14 Compositions of the commercial shark fishery catch, 2004	11
15 CPUE for the commercial shark fishery, 1983 to 2004	12

Table 1	Management Arrangements and Landings for NTFJA Fisheries	27
---------	--	----

Annex

A	Northern Territory Government Gazette	29
B	Record of Decisions	33

1. Introduction

This is the eighteenth annual report of the Northern Territory Fisheries Joint Authority (NTFJA). This report details the functions and activities undertaken during the period from 1 July 2004 to 30 June 2005. Catch and effort statistics are compiled annually.

The NTFJA assumed management responsibility for the following fisheries in all waters adjacent to the Northern Territory (NT):

- Timor Reef fishery;
- Demersal fishery;
- Finfish trawl fishery; and,
- Shark fishery

Enabling Legislation

The NTFJA was established in February 1983, under the then Commonwealth legislation (*Commonwealth Fisheries Act 1952*) to provide for the Commonwealth and the Northern Territory to jointly manage declared fisheries and fisheries resources in waters adjacent to the Northern Territory. With the passage of the Offshore Settlement Agreement of 1987, management of the NT pearl oyster fishery passed to the NTFJA.

On 3 February 1995, the NTFJA, subject to the provisions of the Commonwealth *Fisheries Management Act 1991* (FMA) and the Northern Territory *Fisheries Act 1988*, assumed responsibility, in waters adjacent to the Northern Territory, for the Demersal, Timor Reef, Shark and Finfish trawl fisheries. At that time, management of pearl oysters passed to the Northern Territory. Day to day administration of these fisheries is provided by the Fisheries Group of the Northern Territory Department of Business, Industry, and Resource Development (DBIRD)

The NTFJA was established under "The Arrangement between the Commonwealth of Australia and the Northern Territory", published in the Australian Government Gazette of 1 February 1995 and the Northern Territory Gazette of 1 February 1995 (No. S7, 1 February 1995). A copy of this Arrangement is provided at Annex A.

2. Members of the Joint Authority

The members of the NTFJA during the reporting period were:

Senator the Hon Ian Macdonald
Minister for Fisheries, Forestry and Conservation
(1 July 2004 to 30 June 2005) and,

The Hon Kon Vatskalis MLA
Minister for Primary Industry and Fisheries
(1 July 2004 to 30 June 2005)

Deputies for the NTFJA during the reporting period were:

For the Commonwealth Minister –

Mr Richard McLoughlin
Managing Director
Australian Fisheries Management Authority
(AFMA)
(1 July 2004 to 30 June 2005)

Mr Glenn Hurry
General Manager
Department of Agriculture, Fisheries and Forestry
(DAFF)
(1 July 2004 to 30 June 2005)

For the Northern Territory Minister -

Mr Richard Sellers
Director of Fisheries DBIRD
(1 July 2004 to 30 June 2005)

Secretariat services to the NTFJA are provided by DBIRD.

3. Functions and Powers of the Northern Territory Fisheries Joint Authority

Section 62 of the Commonwealth *Fisheries Management Act 1991* together with Section 66 of the Northern Territory *Fisheries Act 1988* provides for the function of the NTFJA, viz:

"keeping constantly under consideration the condition of the fishery, formulating policies and plans for the good management of the fishery,

and for the purposes of the management of the fishery exercising the powers conferred on it by the Northern Territory Fisheries Act and co-operating and consulting with the other authorities including other Joint Authorities within the meaning of the Commonwealth Act, in matters of common concern."

The Commonwealth Act also provides that in undertaking these functions, the Joint Authority must pursue the objectives of –

- (a) implementing cost-effective fisheries management; and,
- (b) ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development and the exercise of the precautionary principle, in particular the need to have regard to the impact of fishing activities on non-target species and the marine environment; and,
- (c) maximising economic efficiency in the exploitation of fisheries resources; and,
- (d) ensuring accountability of the fishing industry and to the community generally in its management of fisheries resources.

The NT *Fisheries Act 1988* also provides the following objectives for the NTFJA.

- (a) ensuring, through proper conservation, preservation and fisheries arrangement measures, that the living resources of the waters to which the Act applies are not endangered or over-exploited; and,
- (b) achieving the optimal utilisation and equitable distribution of those resources.

Management of the recreational component of NTFJA fisheries resides with the DBIRD.

4. Meetings of the Northern Territory Fisheries Joint Authority

Meetings of the NTFJA are convened on an "as needs" basis, with DBIRD coordinating the "day

to day" management under the NT *Fisheries Act 1988*, on behalf of the NTFJA. A meeting of the NTFJA was convened on 15 September 2004 to discuss matters relevant to the NTFJA. A record of this meeting can be found at page 32.

DBIRD representatives participated in the annual Northern Australian Fisheries Management Workshop (NAFMW), which was convened in September 2004. The NAFMW is convened annually to consider fisheries management, research and compliance issues in seeking to ensure collaborative and complementary actions in managing fisheries resources throughout northern Australia.

The NAFMW is convened under formal Memorandum of Understandings for cooperative management of fish stocks. The issues considered at the NAFMW have been extended to incorporate recent serious concerns raised over Illegal, Unreported and Unregulated (IUU) fishing impacts on domestic northern shark stocks. This has become an important issue, particularly with domestic shark fisheries in Queensland and the Northern Territory recently being accredited as sustainable fisheries by the Department of Environment and Heritage audit process.

5. Advisory Committees

The administrative arrangements implemented in association with the Offshore Constitutional Settlement (OCS) arrangements envisaged that existing fishery advisory forums would be utilised, wherever possible.

The NT *Fisheries Act 1988* provides for stakeholder involvement in the formulation of management arrangements and advising the Executive Director of Fisheries on operational arrangements through the appointment of Fishery Management Advisory Committees (FMACs).

FMACs, appointed for NTFJA fisheries, did not meet throughout the reporting period. Fisheries Management Advisory Committee meetings are convened on an "as needs" basis.

Regular communications and consultation occurs between stakeholders to discuss matters of concern within the various fisheries. Stakeholders involved in such discussions include representatives from licensee committees, the Northern Territory Seafood Council, neighbouring jurisdictions, other extractive stakeholders and wider interest groups.

A Northern Territory representative has been afforded membership to the Queensland Gulf of Carpentaria (GoC) Fisheries Management Advisory Committee covering all fisheries (other than the Northern Prawn Fishery) in Queensland's component of the GoC. This appointment assists in ensuring the consideration of complementary management arrangements and the implications of dual Queensland/Northern Territory licenced vessels operating in the GoC. The GoC Fisheries Management Advisory Committee convened on 19-20 April 2005.

6. Condition of the Fisheries

Offshore demersal fisheries

Separate management regimes have been implemented for the Timor Reef, Demersal, Finfish Trawl and Shark fisheries. These arrangements seek to set commercial participation at relatively low levels and to satisfy legislative objectives of ensuring the sustainability of our fisheries resources.

To assist in this regard, DBIRD has implemented procedures for the collection, collation and analysis of commercial catch and effort data from commercial fishers, which is supplemented by information obtained through onboard monitoring by research staff. This time series data (including information collected over the last two decades) is the principal source of data for stock assessments undertaken for Joint Authority fisheries.

The Timor Reef, Demersal and Finfish Trawl Fisheries have now all been assessed against the Commonwealth guidelines for sustainable fisheries as required under the *Environment Protection and Biodiversity Conservation (EPBC)*

Act. All achieved the highest possible level of accreditation, being declared as fully exempt from export controls for a period of five years. The Shark Fishery has been assessed by the Department of the Environment and Heritage and been declared a Wildlife Trade Operation for a total period of three years.

Timor Reef Fishery

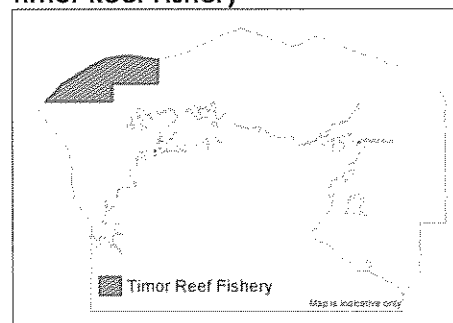


Figure 1. Area of the Timor Reef fishery

The Timor Reef Fishery operates well offshore out in the Timor Sea, in a remote region extending north-west of Darwin.

The key fish species landed by commercial operators in the Timor Reef fishery are goldband snapper (*Pristipomoides* spp.), red snappers (*Lutjanus malabaricus* & *L. erythropterus*) and cods (*Epinephelus* spp.). Commercial operators are using traps and baited lines to catch these main species. A separate licence is required to operate within the confines of the Timor Reef fishery. There are currently 12 licensees in the fishery, a reduction from 22 licensees in 1993. A ceiling of 45 fish traps for each licence was agreed to in 2002.

Profile of the fishery - Commercial Sector

Fishing method

Commercial operators are authorised to use baited traps and vertical lines, including handlines and droplines. Although some operators used traps during the early development phase of the Timor Reef fishery, most chose to use vertical lines as the fishery developed.

During 1999 and 2000 there was an industry wide change to trap fishing, and during 2002 only one operator was using droplines, with the

remainder having changed to traps. There was a reversal of this trend back to droplines by many operators during 2003 and 2004, as dropline caught fish generally received a price premium.

Catch

The principal target species of the Timor Reef fishery are goldband snapper, which comprise the three species *Pristipomoides multidens*, *P. typus* and *P. filamentosus*.

Together these species comprise 70% of the total catch (Figure 2), with *P. multidens* being the most common of the three *Pristipomoides* species. Other key species in this fishery are saddletail snapper (*Lutjanus malabaricus*), red snapper (*L. erythropterus*), red emperor (*L. sebae*) and cods (Family Serranidae).

In 2004, the total catch from the Timor Reef fishery was 703 tonnes, while the goldband snapper catch component was 486 tonnes.

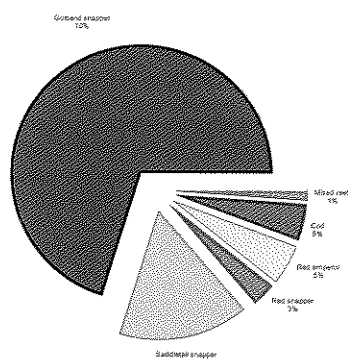


Figure 2. Composition of the catch from the commercial Timor Reef fishery, 2004

Byproduct species

The byproduct predominantly comprises small snappers from the Family Lethrinidae. The 2004 byproduct level of less than 5% of overall catch is well below the 10% trigger value required for a review of management arrangements for the protection of byproduct species.

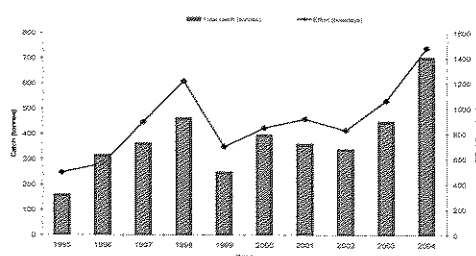


Figure 3. Catch and effort for the commercial Timor Reef fishery, 1995 to 2004

Effort

Over the past three years fishing effort (boat days) has been relatively constant (Figure 3). During 2004, nine operators fished a total of 1479 boat days (Figure 3).

In 2004, there were 12 licences operating in the fishery. As mentioned earlier, the number of licences was reduced from 22, by a two for one licence reduction program.

Catch rates

Catch per boat day increased in 2000 with the introduction of traps. There was a decline in catch per unit effort (CPUE) in 2001, followed by a steady increase since then (Figure 4).

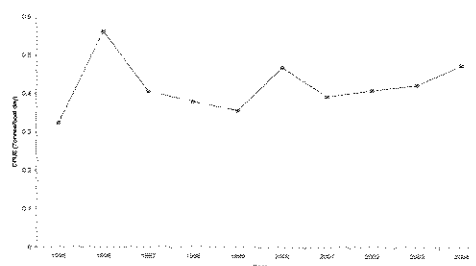


Figure 4. Catch rates for the commercial Timor Reef fishery, 1995 to 2004

Marketing

Due to the lack of consumer familiarity with tropical snapper and emperors during the early developmental phase of the fishery, initial catches were processed and sold as frozen fillets on southern domestic markets. Trial shipments of whole fresh "gilled and gutted" goldband snapper were well received. Studies on tropical snappers indicated a shelf life of up to 20 days after capture. This led to a marketing breakthrough for these species.

Currently, most snappers landed within the line and trap fisheries are sold as “fresh on ice” whole fish (including gills and stomach), with very small amounts sold as fillets. As the Darwin market is small, most product is forwarded to interstate markets, principally Brisbane and Sydney. Increasingly, operators are developing marketing arrangements outside the traditional central marketing systems, with a local representative of a major seafood wholesaler continuing to coordinate consignments to East Coast markets. At least one operator independently markets the catch from his two vessels.

Non-retained species (bycatch)

Non-retained (bycatch) species include chinaman fish (*Symphorus nematophorus*), red sea bass (*Lutjanus bohar*), big eye trevally (*Caranx sexfasciatus*), and starry triggerfish (*Abalistes stellatus*).

For the Timor Reef fishery, the reported and observed level of bycatch for 2004 was less than 1% of total catch. The demersal tropical species landed in the fishery are well received throughout existing marketing channels, with operators reporting that most species can be sold. Bycatch in this fishery is well below the 10% trigger value.

Threatened species interaction

There was no recorded interaction with threatened species in the Timor Reef fishery for 2004. The method of fishing and the location of the fishery generally prevent interactions with these species.

Eco-system Impact

The management arrangements for the fishery allow operators to use passive vertical lines and traps. Interaction with the habitat is limited to the effects of traps and vertical line weights on the substrate and the effect of anchors. Anchoring is usually limited to overnight stand down of fishing activity.

No interaction between the fishing gear and protected species has been observed. Such interactions are not expected with a deep-water trap and line fishery.

The impact of “ghost fishing”, i.e. the continued fishing of lost traps, is not considered to be significant in terms of either its impact or

occurrence. Underwater video observation of traps during commercial fishing operations throughout northern Australia has shown the entry and exit of fish from the traps used in the fishery.

A prohibition on fish trawling within the area of the Timor Reef fishery was declared in the late 1980s. Such a declaration sought to provide greater protection of the then emerging fishery from the impacts of demersal fish trawling. The Commonwealth Government managed Northern Prawn Fishery allows prawn trawlers to operate year round in offshore waters throughout northern Australia. Prawn and scampi (deep-water shellfish) trawling activity is generally limited to water greater than 200 m deep in areas immediately north of current demersal fishing grounds.

Social Impact

This fishery directly employs over 20 people as crew on boats and numerous people in other support industries, e.g. transport, boat repairs etc.

Economic Impact

At the point of first sale in 2004, the overall catch value of the commercial Timor Reef fishery was \$4.3 million. The goldband snapper component was \$3.18 million (2003 - \$1.968 million) and the catch value of saddletail snapper was \$0.53 million (2003 - \$0.386 million).

Demersal Fishery

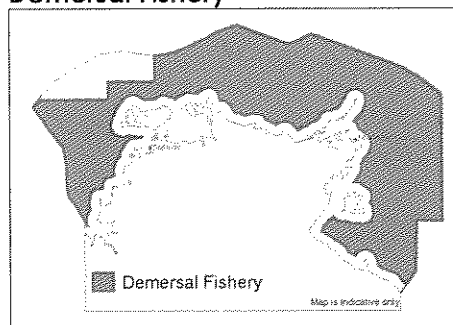


Figure 5. Area of the demersal fishery

The demersal fishery is a multi-species dropline and trap fishery operating in waters 15 nautical miles from shore (Figure 5) to the outer limit of

the Australian Fishing Zone (AFZ). It is managed under the NT *Fisheries Act 1988*.

The demersal fishery targets goldband snapper (*Pristipomoides multidens*), but also catches significant quantities of red snappers (*Lutjanus malabaricus*, *L. erythropterus*), red emperor (*Lutjanus sebae*) and cods (Family *Serranidae*). The catch is kept on ice and the majority transported as whole fish to Sydney and Brisbane markets.

Red snappers and red emperors are also taken by the recreational sector, however these are from inshore areas.

Initially, operators in this fishery targeted red snappers, however market prices for these species were not high enough to make them economically attractive. In recent years many Timor Reef fishers (who also hold demersal licences) have begun exploring grounds immediately adjacent to the Timor Reef fishery for goldband snapper. This has led to an expansion of fishing effort in the demersal fishery from 2001 onwards, and the focus on goldband snapper as the target species.

The demersal fishery has been assessed against the Australian Government *Guidelines for the Sustainable Management of Fisheries* under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and received the highest level of accreditation being exempt from export regulations for 5 years.

Profile of the fishery - Commercial Sector

Area

The demersal fishery operates in waters from 15 nautical miles from the shore to the outer limit of AFZ, excluding the area of the Timor Reef fishery (Figure 1).

Within the demersal fishery, 95% of fishing effort occurs in the area adjacent to the Timor Reef fishery to Longitude 1310E.

Fishing method

Methods in this fishery are identical to the Timor Reef fishery where operators use either traps or droplines to target goldband snapper.

A drop line or vertical long line consists of a weighted main line, the lower section of which has a number of branch lines, each with 30-40 hooks. Hooks, generally baited with squid, are set within 25 m of the seabed for three to 15 minutes. The fishery developed using lines buoyed and set free of the vessel and later retrieved and hauled aboard by a mechanised winch. Most drop line vessels now use hydraulic or electric reels.

Most operators now use traps in preference to baited lines. They are constructed of steel mesh. Fish enter the trap through a single funnel.

A clip door, situated opposite the funnel entrance allows the easy removal of captured fish and provides access to the bait box.

Catch

The main Target species for the majority of fishers are goldband snappers. Other major target groups are saddletail snapper (*Lutjanus malabaricus*), red snapper (*L. erythropterus*), red emperor (*Lutjanus sebae*) and cod (Family *Serranidae*).

While catches have increased during the past four years (Figure 6), prior to 2001 the majority of operators fished less than 10 days per year in this fishery. From 2000 onwards, traps predominantly took the catch.

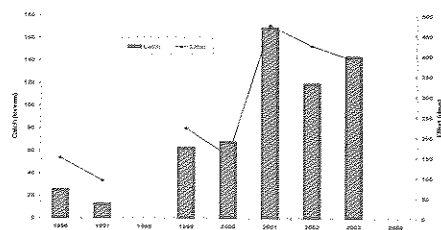


Figure 6. Catch and effort for the commercial demersal fishery, 1996 to 2004* (Due to confidentiality constraints 1998 and 2004 data cannot be published)

Byproduct species

Byproduct species predominantly comprise small snappers from the Family *Lethrinidae*. The 2004 byproduct level of less than 6% of overall catch was well below the 10% trigger value required for a review of management arrangements for the protection of byproduct species.

Effort

The effort in the demersal fishery doubled from 2000 to 2001 as operators in the Timor Reef fishery began utilising their demersal licences and exploring areas adjacent to the Timor Reef fishery (Figure 6). Only 3 of the 60 licences were active during 2004.

Catch rates

Catch per boat day increased significantly in the demersal fishery with the introduction of traps in 1999 (Figure 7). The increase in catch rate is due to the greater efficiency of traps over drop lines in catching fish that are dispersed on the grounds.

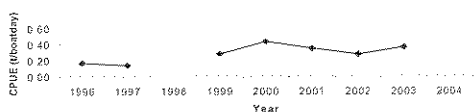


Figure 7. CPUE for the commercial demersal fishery, 1996 to 2004* (Due to confidentiality constraints, 1998 and 2004 data cannot be published)

Prior to 2001, the majority of the catch was taken by a couple of operators only. Therefore care should be taken in interpreting small shifts in CPUE trends as this may reflect operator efficiency rather than a change in fish abundance.

Marketing

Currently most tropical snappers landed in the line and trap fisheries are sold "fresh on ice" as whole fish, with only a small amount sold as fillets.

The small size of the local Darwin market means that most product is forwarded to interstate markets, principally Brisbane and Sydney. Increasingly, operators are developing marketing arrangements outside the wholesale central interstate marketing systems.

Recreational Sector

Recreational fishers catch some of the same species, particularly red snappers and red emperor, from inshore waters. However, the overall impact on the offshore commercial fishery is considered negligible.

Fishing Tour Operator Sector

Very few Fishing Tour Operators (FTOs) are active in the demersal fishery and as with recreational fishers, catch of the same species is taken in inshore waters and therefore is not considered to impact on the commercial fishery.

The following 5 sections apply to all sectors

Non-retained species (bycatch)

Non-retained (bycatch) species include chinaman fish (*Symphorus nematophorus*), red sea bass (*Lutjanus bohar*), big eye trevally (*Caranx sexfasciatus*), and starry triggerfish (*Abalistes stellatus*).

The reported and observed level of bycatch in the demersal fishery is very low, being less than 1% of the total catch. The demersal species caught in the fishery are well received through existing marketing channels and operators report that most species landed can be sold.

The 2004 bycatch level of less than 1% is well below the 10% trigger value required for a review of management arrangements for the protection of bycatch species.

Threatened species interaction

There was no recorded interaction with threatened species in the demersal fishery for 2004. The method of fishing and the location of the fishery generally prevent interactions with these species.

Eco-system Impact

The management arrangements for the fishery allow operators to use passive vertical lines and traps. The effect of setting and hauling traps on substrate and bottom fauna is unknown. Anchoring is usually limited to overnight stand down of fishing activity.

The impact of "ghost fishing", i.e. the continued fishing of lost traps, is not considered to be significant in terms of its either impact or occurrence. Underwater video observation of traps during commercial fishing operations throughout northern Australia has shown the entry and exit of fish from the traps used in the fishery.

Social Impact

The commercial fishery directly employs less than 20 people however there are benefits for other industries, e.g. transport, boat repairs etc. Recreational fishers also target some of these species (within coastal waters) and recreational fishing forms an important component of the lifestyles and culture of a large proportion of people residing in the Northern Territory.

Economic Impact

In 2004 there were only three active operators in this fishery. It is the policy of the Fisheries Group that information obtained from a fishery with less than five active operators will not be released without prior consent from the licensee(s). As a result, the 2004 catch value for the fishery remains confidential.

Finfish Trawl Fishery

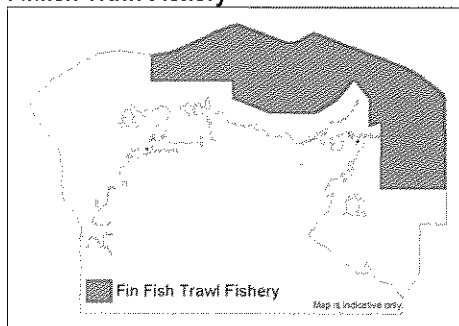


Figure 8. Area of the finfish trawl fishery

The trawl fishery was intensively fished by Thai and Taiwanese pair trawlers during the 1970s. Foreign fleets continued fishing, under licence agreements, following the ratification of the AFZ in November 1979. Taiwanese pair trawlers (1979-1990), Thai-Australian stern trawlers (1985-90) and Chinese pair trawlers (1989) operated in the AFZ waters adjacent to the NT. Overall catches peaked at approximately 10,000 tonnes from the Arafura Sea in 1983.

Currently the finfish trawl fishery comprises of a single finfish trawl operator fishing in offshore waters east of Darwin and includes the northern region of the GoC. Fishing operations are conducted using a semi pelagic demersal trawl thereby limiting any damage to the seabed. The fishery is co-managed under the *Northern Territory Fisheries Act 1988*.

The principal species landed are the red snappers (*Lutjanus malabaricus* and *L. erythropterus*). Around 70% of the landed catch is sold in interstate markets.

The finfish trawl fishery has been assessed against the Australian Government *Guidelines for the Sustainable Management of Fisheries* under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The management arrangements of the fishery are recognised by the Australian Government to be operating in a sustainable manner, and the fishery is exempt from export regulations for five years.

Profile of the fishery - Commercial Sector

Area

The finfish trawl fishery operates in waters east of Darwin to the outer limit of the AFZ, excluding the area of the Timor Reef fishery (Figure 1).

Within this overall area, only a relatively small proportion is currently fished due to the single operator targeting the higher yield red snapper fishing grounds. The finfish trawl fishery area partially overlaps with the demersal fishery. Although legally able, the finfish trawl operator does not presently fish the same grounds as the demersal fishery licensees.

Fishing method

To date this fishery has been limited to a single trawl operator. Fishing operations are conducted using a semi pelagic demersal trawl. This trawl net was developed cooperatively by industry and the Fisheries Group to minimise habitat disturbance whilst ensuring commercial catch rates were maintained.

The quality of the retained catch was also improved by the reduction in the number of sponges and other unwanted species associated with the operations of traditional demersal trawls.

Catch

Saddletail snapper (*Lutjanus malabaricus*) and red snapper (*L. erythropterus*) are the target species of the finfish trawl fishery, comprising 80% of the total catch (Figure 9).

Other significant species are sweet lip, red spot emperor, and goldband snapper.

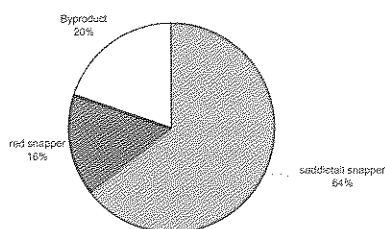


Figure 9. Catch composition for the commercial finfish trawl fishery, 2004

Since 1995, catches have increased steadily, peaking in 2001 (Figure 10). In 2004, the catch was 1005 tonnes. As there is only one operator in this fishery, care must be taken in interpreting catch trends as they may reflect business decisions rather than fishery trends.

Byproduct species

Byproduct species for the fishery include red spot (*L. lentjan*), goldband snappers (*Pristipomoides multidens* and *P. typus*) and painted sweetlip (*Diagramma pictum*) along with other minor species.

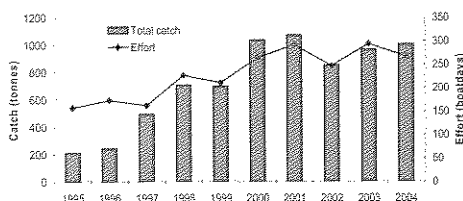


Figure 10. Catch and effort for the finfish trawl fishery, 1995 to 2004

Effort

Effort has increased steadily from 158 boatdays in 1995 to 292 boatdays in 2001. During 2004 effort was 267 boatdays (Figure 10). However as there is only one operator, care should be used in interpreting any trends in this fishery based on effort, as there are many reasons for any changes in fishing effort.

Catch rates

Since 1997 the CPUE has shown little change, ranging from 3.0 to 3.9 tonnes per boat day (Figure 11). CPUE for 2004 was 3.8 tonnes/boat day.

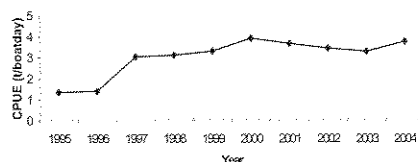


Figure 11. CPUE for the finfish trawl fishery, 1995 to 2004

Marketing

Product is exported from Darwin in refrigerated containers as 70% of the product is sold in Australia as fresh fish and about 5% of the product is trucked to Perth.

Recreational Sector

Recreational fishers take some of these demersal species, particularly red snappers and red emperor from inshore waters, however their impact on the offshore commercial fishery is considered negligible.

Fishing Tour Operator Sector

The majority of FTO activity is in inshore waters where some of the same species are taken.

The following 5 sections apply to all sectors

Non-retained species (bycatch)

A high proportion of the discarded species (by weight) are sharks and rays, which are returned to the water alive. 17% of the total catch of the commercial finfish trawl fishery is discarded.

Threatened species interaction

There was no recorded interaction with threatened species in the finfish trawl fishery in 2004. The method of fishing and the location of the fishery generally prevent interaction with these species.

Eco-system Impact

The Fisheries Group has encouraged fishing practices that cause minimal eco-system impact. The development, in conjunction with industry, of a semi-pelagic demersal trawl net that minimises seabed disturbance and reduces the amount of bycatch was important in reducing the environmental impact of this fishery.

Social Impact

This fishery directly employs less than 10 people; however there are benefits for other industries, e.g. transport, boat repairs etc. Recreational fishers also target some of these species (within coastal waters) and recreational fishing forms an important component of the lifestyles and culture of a large proportion of people residing in the Northern Territory.

Economic Impact

The value of the fishery is confidential (information for less than five active operators cannot be released without consent).

Shark Fishery

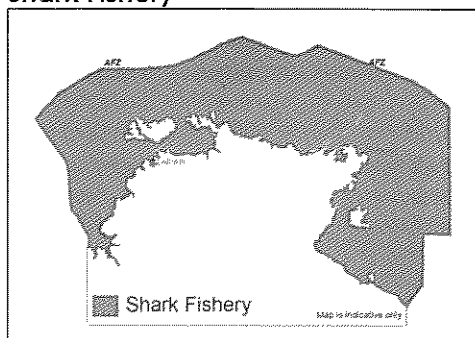


Figure 12. Area of the shark fishery

Target species for the commercial shark fishery are the blacktip sharks (*Carcharinus tilstoni* and *C. sorrah*) and grey mackerel (*Scomberomorus semifasciatus*) with a variety of other sharks and pelagic finfish landed. A conservative approach has been adopted in managing the northern shark fishery given the well documented biological characteristics of sharks, particularly, slow growth rates, late age of sexual maturity, low level of natural mortality and low fecundity (few offspring).

Management arrangements established under the OCS provide for the day to day operations of the shark fishery. Current arrangements no longer recognise the historical management zones with the introduction of Total Allowable Effort quotas into the fishery (May 2005).

Considerable cooperative research efforts are under way with adjacent jurisdictions, with the Northern Territory actively contributing to the formulation and implementation of a National

Plan of Action for Sharks (NPOA). A regional Northern Operational Plan has been developed and agreed responses to address issues (raised in the NPOA) are currently being implemented into management arrangements in a timely manner.

Sharks are also taken as by-product in a range of fisheries targeting other species.

Profile of the fishery - Commercial Sector

Area

Depending on the type of gear used, the area of the fishery is from the high water mark to the Australian Fishing Zone boundary (Figure 12).

Operators are authorised to fish in a managed zone, with spatial restrictions placed on the use of certain gear. The historical zones, coastal, Arafura and Gulf of Carpentaria, arising from historical allocation of licences for NT and Commonwealth jurisdictions have been phased out with the introduction of Total Allowable Effort quotas into the fishery in May 2005.

The majority of the fishing is undertaken within the coastal zone (within 12 nm of coast or baseline) and immediately offshore in the Gulf of Carpentaria. Little fishing was undertaken in the offshore component of the fishery during 2004.

Fishing method

Operators may use either longlines or pelagic nets, but the use of bottom set gillnets is prohibited.

Most shark fishing is undertaken by pelagic gill net, with three operators fishing for sharks using longlines during 2004. Nets are generally 1000 to 2500 m in length with a mesh size of 150 mm to 250 mm. Most nets are constructed of monofilament nylon, with a drop of 50 to 100 meshes. They are weighted and have a buoyed headline.

Catch

The total catch of all species for the fishery from logbook records* in 2004 was 1559 tonnes, a slight decrease (7.6%) on the 2003 total of 1687 tonnes.

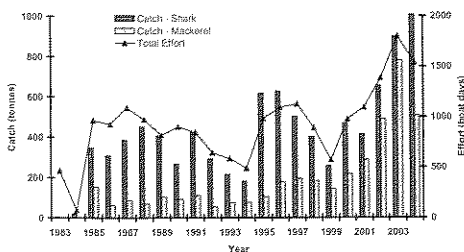


Figure 13. Catch and effort for the commercial shark fishery, 1983 to 2004

However, the 2004 total shark catch increased by 17% to 1089 tonnes, from 899 tonnes in 2003 (see Figure 13). The increase reflected a diversification in target species, with blacktip shark catches decreasing from 501 tonnes in 2003 to 440 tonnes in 2004. In 2004, blacktips represented 27% of the catch, a slight decline from the 2003 proportion of 29% (Figure 14). Grey mackerel catches also declined in 2004, to 481 tonnes (30% of the total catch; Figure 14), from 766 tonnes (45% of the shark fishery catch) in 2003 (Figure 14).

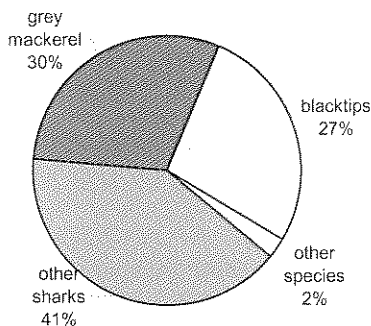


Figure 14. Compositions of the commercial shark fishery catch, 2004

There has been a strong increasing trend in catches in this fishery since 1999. Although grey mackerel remained the principal single target species in the fishery, the decline in total catch for this species in 2004 was merely a return to 2002 levels. Operators reported market difficulties with grey mackerel during the principal catching period for this species, so that the grey mackerel catch decline probably represents a response in targeting of effort. However, it is not possible to deduce from recorded catches and effort whether, in any fishing operation, the target was any particular species or species group, or just the suite of species typical of the fishery.

*Logbook records are continually revised, with errors corrected, new records included, and adjustments to criteria for inclusion in the data set. Thus published total catch or effort estimates, and values derived from them, may change over time. Additionally, in this year's Status Report, conversion ratios for grey mackerel product forms have been updated. Consequently, estimates of historical catches of grey mackerel have been revised downwards in the series presented here.

Byproduct species

The catches of sharks other than blacktips increased from 399 tonnes (24%) of the fishery's catch in 2003 to 649 tonnes (40%) in 2004 (Figure 14). These were principally other whalers (several species of Family Carcharhinidae, mostly *Carcharhinus* spp. and *Rhizoprionodon* spp.) and hammerhead sharks (*Eusphyrus blochii* and *Sphyrna* spp.)

There were 26 tonnes of mackerels other than grey mackerel landed (1.6% of the total catch), all declared to be narrow-barred Spanish mackerel, *Scomberomorus commerson*. Small but significant quantities of other fish species landed were tunas, mainly *Thunnus tonggol*, (8.4 tonnes) and queenfish (typically *Scomberoides commersonianus*), 3.0 tonnes.

Sharks were also landed as an incidental catch in a range of commercial fisheries targeting other species. Catches with the Restricted Bait Net entitlement held by these fisheries were 29.7 tonnes. The Coastal Line fishery additionally landed 8.3 tonnes, while there were small shark yields from the Coastal Net fishery, at 2.8 tonnes, and the Barramundi fishery (3.7 tonnes). The total catch of 44 tonnes of shark landed by fisheries other than the shark fishery in 2004 was similar to the 46 tonnes landed by these fisheries in 2003. Shark landings from fisheries other than the shark fishery have fluctuated between 32 and 79 tonnes since 1994.

Effort

Effort fluctuations have largely driven the highly variable trends in catches of sharks and mackerel in this fishery. It must also be appreciated that recorded effort currently does not indicate target species, so that we are currently only able to report effort directed at the

fishery as a whole. This will be addressed through logbook amendments to be introduced in July 2005.

After initial low effort in the early 1980s, effort in the shark fishery was stable at around 900-1000 boat days through the late 1980s and early 1990s. (The mean for 1985-1991 was 932.6 boat days – see Figure 15). The 1990s was a period of particular variability. After a low point of 490 boat days in 1994, effort generally increased, deviating from this pattern with a sharp increase in 1997 (to 1127 boat days) but declining again over the next two years, to 892 boat days and 573 boat days in 1998 and 1999 respectively. Effort then steadily increased in following years to the series peak of 1800 boat days in 2003. This was followed by a decline to 1538 boat days in 2004.

Catch rates

Catch rates for shark (Figure 15) have shown a relatively flat trend of the last two decades, excepting high points during the mid-1990s and 2004. Catch rates for total shark in the shark fishery, for most years between 1983 and 2004, have been between 300 and 500 kg/day fished, but reached 626 kg/day in 1995, and 573 kg/day in 2004. Catch rates for blacktip sharks have shown a similar pattern, varying in the range of 244-398 kg/day between 1997 and 2003. However, with a catch rate of 286 kg/day in 2004, they did not show the increase in catch rate shown by total sharks. Grey mackerel catch rates, in contrast to a steady and marked increase from the early 1990s until 2003, declined to 313 kg/day, from 426 kg/day in 2003.

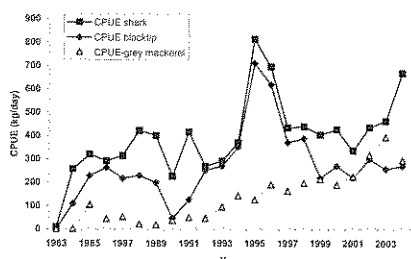


Figure 15. CPUE for the commercial shark fishery, 1983 to 2004.

Marketing

Grey mackerel is marketed domestically as fillet, trunks and whole fish. Shark is marketed in trunk,

fillet and whole forms, both as fresh and frozen product. Fin is also sold but must be landed with a prescribed proportion of shark trunks. While some shark product is retained for local further processing and consumption, most is sent interstate, with over 20% of total shark catch for direct export.

Recreational Sector

Area

The significant areas for shark catches are the Darwin Harbour area, McArthur River area and the Cobourg Peninsula

Fishing method

Most sharks are taken during reef fishing and general fishing (fishing with no specific target). These types of fishing generally use lines with bait.

Catch

Sharks are not specifically targeted by recreational fishers, but are caught when fishing for other species. In 1995, over 80,000 individuals were caught, with 18% retained, giving a harvest of 15,000. Reef fishing and non-target fishing accounted for 74% and 18% of the total shark catch respectively. The proportion of shark harvested depends on the type of fishing. During non-target fishing 34% of sharks caught are harvested, whilst reef fishers only harvest 12%.

In 2000, 76,000 individuals were caught, with 8000 harvested and the remainder released. This indicates a 47% reduction in harvest rate since 1995. The fishing mortality of released sharks is not known.

Fishing Tour Operator Sector

Area

Sharks are not specifically targeted by FTOs, but are landed when fishing for other species.

Catch

In 2004, 6322 sharks were caught by FTOs, representing a 20% increase in sharks caught by FTO clients over 2003 figures. Of these, an estimated 6021, or 95%, were released. The species of sharks caught and harvested were not recorded and the mortality rate of released

sharks is not known.

The number of sharks caught by FTO clients has more than doubled since 1995 when just under 3,000 sharks were caught. However, the proportion of sharks harvested has declined. In 1995, 60% of sharks captured were harvested, this figure decreased rapidly to only 10% in 1997 and has declined further to around 5% in 2004.

Indigenous Sector

Area

Most fishing occurs in the close vicinity of communities and outstations, in inland or near coastal waters.

Catch

Sharks and rays were one of the more important groups of fish caught by indigenous people in northern NT. In 2000, over 12,000 sharks and rays were harvested, comprising just over 3% of the total finfish harvest. The species of sharks and rays caught and harvested were not identified.

The following 5 sections apply to all sectors

Non-retained species (bycatch)

Sharks are generally seen as a non-targeted or incidental catch for the recreational sector. A low proportion of the sharks caught are harvested, although this does depend on the type of fishing and the fishing location. Besides various mackerel species, the majority of other species caught by the recreational sector during targeted game fishing are trevally and queenfish. Most of these fish are retained, with a harvest rate of over 83%. Other minor species caught also have a high retention rate of 78%.

Although gill nets are often regarded as non-selective fishing gear, when used by a skilled operator they are very effective at taking the target catch. Nevertheless the amount of bycatch depends strongly on location and season. Most shark species are now retained apart from the Tawny Shark, *Nebrius ferrugineus*. Rays are an uncommon bycatch and are not retained, and usually released alive. Some finfish with poor market acceptability (for

example, some trevally and queenfish) are not retained.

Threatened species interaction

During 2004, one spear tooth or northern river shark *Glyphis* spp. was recorded by fishery observers in the shark fishery. These species are regarded as threatened in Commonwealth waters, but their status in NT waters is not well known. The distribution and abundance as well as the biology of these species are all but unknown. Consequently, there are research proposals seeking funds to examine the distribution and status of these species in NT waters, as well as to develop mitigation approaches.

Eco-system Impact

There are studies under way which examine the relative impact of harvesting sharks and grey mackerel.

Little is known about the stock structure of the principal shark species harvested, particularly the extent to which Indonesia, Western Australia, Queensland and the Northern Territory share their fishery resources. However this is being investigated in an Australian Centre for International Agricultural Research (ACIAR) supported project. A project led by the CSIRO, *Artisanal shark and ray fisheries in eastern Indonesia: their socioeconomic and fisheries characteristics and relationship with Australian Resources* is a collaboration of several Australian and Indonesian agencies.

The Australian Government, States and the Northern Territory are co-operatively managing shark stocks, with the Commonwealth, Northern Territory, Queensland and Western Australia partners in the development and implementation of a regional Operational Plan for the Sustainable Use of northern Australian Shark Resources.

The Fisheries Research and Development Corporation (FRDC) Project, *Northern Australian Sharks and Rays: the Sustainability of Target and Bycatch Species (Phase 2)* seeks to obtain comprehensive data on the species composition (target and bycatch) in those fisheries in northern Australia which take sharks, including fisheries for which sharks are bycatch.

This catch composition information forms a baseline against which the fishery can be monitored for biodiversity change in the future, and is considered of particular importance given the suspected large ecological impact of foreign illegal fishing on Australian shark stocks. As well as providing biological information, this project is providing genetic information that adds to the understanding of the spatial relationships of the northern shark stocks. In 2004, staff on this project undertook four observer cruises on shark fishery vessels, and examined shark bycatch of four barramundi fishing operations.

Additional FRDC-funded research (representing another collaboration among the northern research agencies) is to examine the spatial stock structure of grey mackerel, and is to begin during 2005.

Controls on fishing gear have been introduced to minimise any physical impact on the seabed, other than anchoring. A prohibition on the use of bottom set gill nets was introduced following interactions with turtles

Social Impact

In 2004, there were a total of 17 licences operating in the shark fishery. Most vessels employ a skipper and two or three crew members.

Economic Impact

At the point of first sale in 2004, the overall catch value of the commercial shark fishery was just under \$8.55 million (\$10.3 million in 2003). The black tip shark component was valued at \$1.18 million (2003 - \$2.8 million), \$5.08 million for other sharks (2003 - \$4.5 million) and \$2.12 million for grey mackerel (2003 - \$3.4 million).

7. Management Arrangements

Timor Reef Fishery

Management

Management objectives for the Timor Reef fishery are achieved by maintaining target, incidental and non-retained catch levels within acceptable ranges. Should landings of goldband snapper rise above sustainable yield estimates, a

review of the management arrangements will commence. Similarly, a significant decline in catch rates would prompt a review of the management measures for this fishery (Table 1).

Existing arrangements also seek to ensure the sustainability of byproduct species taken in the Timor Reef fishery. Acceptable catch ranges for by-product are not more than 10% of the weight of aggregate landings in the fishery. Monitoring is achieved through analysis of commercial logbook reports.

Controls on the construction and use of fish traps and vertical lines minimise the effects on ecosystem components. Should significant interaction with components be identified, the appointed advisory group will make recommendations regarding appropriate remedial action. No such interactions were identified throughout the reporting period.

History

A joint venture feasibility study between an Australian and Japanese company was undertaken in the early 1980s to investigate the potential for a domestic dropline fishery. Landings from the trial were around 1500 tonnes per annum. It was not until 1987 that commercial droplining by domestic operators commenced. Jurisdictional arrangements were changed in 1998, at which time management responsibility for line fishing and trapping in waters adjacent to the NT passed to the Northern Territory Government.

In responding to concerns that excess fishing capacity may lead to the over-exploitation of goldband snapper stocks, a moratorium on the issue of further entitlements for what is now known as the Timor Reef fishery was announced in December 1991. Only those fishers active in the fishery or licence holders able to demonstrate a commitment to entering the fishery retained access.

Separate management measures were implemented for the Timor Reef fishery in 1993 when it was annexed from the demersal fishery. Overall fishing capacity within the boundary of the Timor Reef fishery was reduced from a potential 60 to 22 licences. Limits on the number of operators were implemented in responding to

concerns that fishers displaced from interstate fishing restructuring programs may lead to over exploitation of goldband snapper stocks.

A further revision of the jurisdictional arrangements occurred in 1995. At that time management responsibility for the Timor Reef fishery was passed to the NTFJA. The NTFJA provided for the Commonwealth and the Northern Territory to jointly manage the fishery given the likelihood of shared resources with adjacent national and international jurisdictions. The Fisheries Group undertakes day-to-day management of the Timor Reef fishery.

Agreement was reached on a ceiling of 45 fish traps during 2002. The limit was imposed as a precautionary measure and to provide clarity on the amount of fishing gear used under each licence.

Current issues

Anecdotal reports from domestic fishers suggest illegal foreign fishing catches are increasing significantly.

There are serious concerns over the impacts of illegal foreign fishing activities in the Fishery.

Future plans

An industry request to review the levels of permitted gear (handlines and droplines) and management arrangements will be undertaken throughout 2005 with a view to developing a formal plan of management for the fishery.

Goldband snapper are also landed outside the boundary of the Timor Reef fishery, but are likely to be part of the same stock. Management triggers recognise this, with the management arrangements under constant review.

Consultation, Communication and Education

Regular consultation occurs between the Fisheries Division, the NT Timor Reef Licensee Committee and the Northern Territory Seafood Council (NTSC). In addition to this, Fisheries staff make regular visits to the wharf to speak informally with fishers.

The low levels of participation in the Timor Reef fishery allows all stakeholders to be directly involved in discussions on any proposed management arrangements. A framework for a

Timor Reef FMAC has been developed to formally represent the interests of all stakeholders and provide a forum for any proposed amendments to the management regime.

Conservation groups and non-government organisations are advised and consulted on topical fisheries issues, including the Timor Reef fishery, through regular advisory meetings with senior fisheries officers and the Executive Director of Fisheries. Members of the public, including community and environmental/conservation groups are also invited to provide their views to the Fisheries Group through the release of public discussion papers and other consultative processes.

The Fisheries Group also distributes publications in the form of Fishery reports, newsletters and fish notes to inform and educate stakeholders.

Demersal Fishery

Management

Management arrangements for the demersal fishery seek to maintain catches of goldband snapper and red snappers by all sectors within acceptable ranges. Red snappers are also a target species of the finfish trawl fishery. Should landings of goldband snapper from the Timor and Arafura Seas rise above sustainable yield estimates, a review of the management arrangements will commence. Similarly, a significant decline in catch rates would prompt a review of the management measures for this fishery (Table 1).

History

With the passage of the revised jurisdictional arrangements contained in the OCS of 1988, provisions were made for the Commonwealth and the Northern Territory to jointly manage the fishery given the likelihood of shared resources with adjacent national and international jurisdictions.

In 1993, the area of the Timor Reef fishery was annexed from the demersal fishery and the inshore boundary was altered to separate the demersal fishery from the inshore coastal line fishery. All operators who had previously held a fishing entitlement to this area were issued a

demersal licence if they did not already hold such an entitlement.

In 1995 management responsibility for the demersal fishery was passed to the NTFJA. The Fisheries Group now undertakes day to day management of the demersal fishery on behalf of the NTFJA.

Agreement was reached on placing a ceiling of 45 fish traps per entitlement for the Timor Reef fishery in 2002. No limits on the number of traps or droplines have been set for the developing demersal fishery.

Current issues

Encouraging further development of this under-utilised fishery and encouraging operators to undertake fishing throughout the entire fishery area continue to be the key objectives for industry and government.

Joint industry/government forums have been held throughout 2004-2005 to explore the possibility of introducing an additional finfish trawler to aid in the development of the more remote regions of the fishery.

There are serious concerns over the impacts of illegal foreign fishing activities in the Fishery. Anecdotal reports from domestic fishers suggest illegal foreign fishing catches are increasing significantly.

Future plans

A review of the levels of permitted gear (traps and drop lines) in consultation with industry is planned. No limits on the number of traps or droplines have been set to assist operators in developing the demersal fishery.

Consultation, Communication and Education

Regular consultation occurs between the Fisheries Division, the NT Demersal Fishermen's Association and the NTSC. In addition to this, Fisheries staff make regular visits to the wharf to speak informally with fishers.

The low levels of participation in the demersal fishery allow all stakeholders to be directly involved in discussions on any proposed management arrangements. A framework for a Demersal Fishery Management Advisory

Committee (DFMAC) has been developed to formally represent the interests of all stakeholders and provide a forum for any proposed amendments to the management regime.

Conservation groups and non-government organisations are advised and consulted on topical fisheries issues, including the demersal fishery, through regular advisory meetings with senior fisheries officers and the Executive Director of Fisheries. Members of the public, including community and environmental/conservation groups are also invited to provide their views to the Fisheries Group through the release of public discussion papers and other consultative processes.

The Fisheries Group also distributes publications in the form of Fisheries reports, newsletters and fish notes to inform and educate stakeholders.

Finfish Trawl Fishery

Management

Management of the finfish trawl fishery seeks to ensure the ecological sustainability of target and by-product species. The objectives aim to ensure that overall landings of target species are maintained within agreed levels.

An appropriate management response would be made in consultation with stakeholder groups if performance triggers are reached.

Incidental (by-product) and non-retained (bycatch) catch are monitored during on board observer trips conducted by fisheries officers. Any significant increase in by-product will prompt a review of the fishery.

History

With the passage of the revised jurisdictional arrangements contained in the OCS of 1995, management of the trawl, shark and line fishing and trapping in waters adjacent to the NT passed to the NTFJA.

The NTFJA provided for the Commonwealth and the Northern Territory to jointly manage the fishery given the likelihood of shared resources with adjacent national and international jurisdictions. The Fisheries Group on behalf of

the NTFJA undertakes the day-to-day management of the fishery.

Current issues

Joint industry/government forums have been held throughout 2004-2005 to explore the possibility of introducing an additional finfish trawler to aid in the development of the finfish trawl fishery.

There are serious concerns over the impacts of illegal foreign fishing activities in the Fishery. Anecdotal reports from domestic fishers suggest illegal foreign fishing catches are increasing significantly.

Future plans

Further development of the finfish trawl fishery remains a priority throughout 2005-2006.

The Fisheries Group will continue to monitor the fishery to ensure catches are maintained within agreed ranges.

Consultation, Communication and Education

Joint industry/government forums are used to consult with the single finfish trawler. The Fisheries Group also distributes publications such as Fisheries reports and newsletters to inform and educate stakeholders.

Shark Fishery

Management

Management of the shark fishery seeks to maintain shark and grey mackerel catches within appropriate ranges, dictated by scientific understanding of sustainable harvest levels and the underlying value of the fishery in providing food and economic value. This is achieved through a range of input controls and containment of fishing capacity through a "three for one" licence reduction program. This licence reduction program requires new entrants to acquire and transfer three restricted shark fishery licences to the Territory for the issuance of an unrestricted shark fishery licence. Overall capacity has been reduced from 38 licences to 17 licences in 2004.

Finning ratio licence conditions were imposed on shark licensees in late 2003 and seek to prevent the targeting of large shark for their fins alone. The fin ratios were reviewed in December 2004

which resulted in a general reduction of 17% from previous levels.

The revised ratio is 6.5% fresh or frozen fin as a proportion of trunk weight, 13% fresh or frozen fin as a proportion of fillet weight and 3% fresh or frozen fin as a proportion of whole weight. Licensees must have an appropriate amount of meat for every fin in their possession.

Catch restrictions apply to Spanish mackerel. This by-product limit seeks to link landings of Spanish mackerel to grey mackerel catches. Such a measure was agreed to address concerns by other sectors about pelagic net fishers targeting Spanish mackerel.

A review of the incidental capture of sharks, including finning, in other fisheries targeting non-shark species concluded in 2003. A prohibition on the possession of sharks and shark product was also agreed for the Timor Reef, demersal, finfish trawl and Spanish mackerel fisheries. In 2003, agreement was reached with the barramundi, coastal net and coastal line fisheries on levels of incidental catches of sharks. The fin to meat ratios are also applicable to these fisheries, with the newly revised ratios being imposed.

In 2004, the shark fishery underwent an ecological assessment under the Commonwealth Government's *Environmental Protection and Biodiversity Conservation Act*. The management arrangements of the fishery were assessed against the Guidelines for Ecological Sustainable Fisheries by the Department of Environment and Heritage (DEH). The fishery was found to be operating in a sustainable manner and accredited with a Wildlife Trade Operation (WTO) in December which permits the fishery to continue to export shark products. The WTO will be reviewed by 30 November 2007.

The DEH placed a range of conditions on the fishery to be implemented over the life of the WTO to ensure ongoing sustainability of the fishery. These conditions related to gear and effort reductions to limit the impact of fishing on sharks and to specify the number of fishing days which can be used by either pelagic net or long-line fishing methods.

History

A large commercial shark fishery commenced throughout northern Australia in the early 1970s. At that time, a Taiwanese gill net fleet targeted a range of pelagic shark and fish species, with foreign fishing vessels working within 12 nautical miles (approximately 22 km) of the coast prior to 1978. Foreign fishing vessels were excluded from the GoC in 1979.

With the declaration of the AFZ in 1979, the foreign fishing fleet's exclusion zone adjacent to Arnhem Land and the Wessel Islands increased to between 40 and 50 nautical miles offshore. A bilateral agreement between Australia and Taiwan permitted continued access for 30 gill netters to land up to 7,000 tonnes of shark from northern Australian waters. Further restrictions were introduced in 1986 due to declining catch rates and concerns about the incidental capture of dolphins. These restrictions limited the length of gill nets to not more than 2.5 km, thereby rendering foreign gillnetting uneconomic. Despite the permitted use of baited longlines, foreign fishing operations in northern Australian waters ceased in late 1986.

Direct involvement by domestic fishers in coastal waters occurred in the early 1980s. At that time, the Northern Territory actively encouraged the development of the inshore component of the fishery. Landings remained low with catches ranging from 100 to 500 tonnes, with shark fillets sold on established food markets throughout southern Australia.

Current issues

The Northern Territory supported the finalisation and implementation of a National Plan of Action for Sharks (NPOA) and the development of a regional agreement on the management of shared shark resources with Indonesia and East Timor. The Northern Territory is signatory to a multi-jurisdictional "Operational Plan" for northern Australian shark fisheries to achieve the outcomes of the NPOA. This Operational Plan was endorsed at a meeting of fisheries officers from all jurisdictions in September 2004.

The need for a desktop assessment of grey mackerel was agreed at a joint industry/government workshop in 2003-2004. The initial scoping study for grey mackerel developed

suitable modelling techniques and data requirements in 2004, with the preliminary assessment planned for completion in 2005.

There are serious concerns over the impacts of illegal foreign fishing activities in the Fishery. A review of the impacts of Illegal, Unreported and Unregulated (IUU) fishing in northern Australian waters, primarily by foreign fishers is currently underway. An expected outcome of this review is to ensure adequate resources are allocated by the Australian Government (governing body is the Australian Fisheries Management Authority) to mitigate IUU impacts on the sustainability of shark stocks. This review is due to conclude in 2005-2006.

The Off-shore Net and Line Licensee Committee of the Northern Territory Seafood Industry Council (formerly the Shark Fishermen's Association) implemented a voluntary 'no-take' policy in December for all sawfish in Northern Territory waters in recognition of the higher risk these species face in the fishery. This policy will continue while analysis of recorded sawfish interactions by species is conducted to determine distribution and status of catch rates. This review is due to conclude in 2005-2006.

A review of the management objectives, performance indicators and trigger points (see Table 1) will be undertaken in 2005-2006 to determine if proposed gear and effort reductions are an adequate management response to address trigger reference points being exceeded for Grey mackerel and other shark byproduct during 2004-2005. The findings of the review will be reported in the 2005-2006 annual report.

Future plans

The incidental landings of sharks in fisheries targeting other species are subject to annual review. The finning ratios are to be reviewed by December 2005 to ensure they meet the sustainability criterion. Due to changing fishing methods within the fishery, the fishery will be reviewed at the annual shark workshop in 2005.

The management arrangements of the fishery were assessed against the Guidelines for Ecological Sustainable Fisheries by the Department of Environment and Heritage (DEH). The fishery was found to be operating in a

sustainable manner and accredited with a Wildlife Trade Operation (WTO) which permits the fishery to continue to export shark products. The WTO will be reviewed on 30 November 2007.

The implementation of new effort controls into the management arrangements of the fishery, during 2005, will ensure a significant reduction in shark catches taken by the long-line fishing method.

Consultation, Communication and Education

Regular communications and consultation occurs between the Northern Territory Off-shore Net and Line Licensee Committee, the NTSC, neighbouring states, other extractive stakeholders and wider interest groups to discuss matters of concern within the fishery. Workshops are convened annually to provide a forum for industry, management and researchers to canvass all issues of interest to the shark fishery.

The Fisheries Group also distributes publications such as Fisheries reports and newsletters to inform and educate stakeholders.

8. Fisheries Monitoring, Research, Surveillance and Enforcement

Timor Reef Fishery

Monitoring

This fishery is monitored primarily through daily logbooks, in which operators provide detailed catch and effort information, as well as data on spatial distribution of the fishery. This logbook data must be returned together with monthly summary sheets by the 28th day of the following month.

In addition to logbook details the fishery is monitored using observer information. Due to resource constraints only one onboard monitoring trip was conducted during 2004. While onboard, observers document vessel and gear information, location and depth fished, fishing practices, catch composition, and where possible, measure all landed species.

Stock assessment methods and reliability

A stock assessment of goldband snapper in the Timor Reef fishery was undertaken in 2003. Also

included in this analysis is the section of the demersal fishery from the boundary of the Timor Reef fishery to Longitude 131° E.

These two sections encompass the same goldband snapper stock and 95% of the demersal fishery catch of this species is currently in this area. The models used in this stock assessment were an extension of those developed by Professor Carl Walters at a workshop in Darwin in 1996 (Ramm, 1997).

Spatial analysis of CPUE data on a finer scale was undertaken at three locations in the Timor Reef fishery. The areas chosen were Tassie Shoal, Lyndoch Shoal and Franklin, Flinders, Blackwood and Evans Shoals that were combined into a single group. These areas were chosen as they accounted for 15-30% of the fishery over the period 1995-2003.

Both computer modelling and finer spatial data analysis showed trends that were of concern. While catch rates for the entire fishery (Figure 3) have increased since 1995 and appear to be relatively stable, this masks a contrary trend occurring on a finer spatial scale. However all modelled scenarios suggest a decline in biomass under current levels of fishing effort. How quickly this occurs depends upon assumptions made about the level of exchange between the two areas, the level of Indonesian fishing effort, and whether Australian fishing effort increases.

An absolute figure cannot be placed on sustainable harvest, because key parameters (Indonesian catch and effort, the level of interchange of fish and recruits, and the important productivity parameters for goldband snapper) are not known. However, the goldband snapper biomass has been estimated to be between 3,000-20,000 tonnes, with 9,000 tonnes considered the more realistic estimate. It has been recommended that the harvest level of goldband snapper should not exceed 10-15% of estimated biomass.

Genetic analysis using mitochondrial DNA has shown that goldband snapper (*Pristipomoides multidens*) is the same stock in both the Timor and Arafura Seas, but there are a number of separate stocks throughout Indonesia.

Otolith microchemistry indicates that adult goldband snapper are relatively sedentary and there is unlikely to be substantial movement between Western Australia and the Northern Territory, thus these stocks can be managed separately.

Current status

In the Timor Sea, Indonesian long line and Australian trap and dropline vessels target goldband snappers. These methods target fish above the size of maturity, which means that the majority of fish landed in these fisheries have bred prior to capture. Harvest levels in the Australian sector of the Timor Sea are below current reference points.

Future Assessment Needs

Future assessment needs to concentrate on the degree of movement of snappers between Australia and Indonesia, the identification of red snapper juvenile habitats and obtaining more accurate growth parameters from the capture of juvenile goldband snapper.

Research

Summary to date

The FRDC funded project 1996/131; "Stock structure of *Pristipomoides multidens* resources across northern Australia " used mitochondrial DNA (mtDNA) analysis to determine the structure of *P. multidens* stocks in Western Australia and the Northern Territory. Opportunistic samples obtained from Kupang (Indonesia) were also incorporated into this project. Results from this study indicate that *P. multidens* from northern Australian waters, and from waters around Kupang, are separate stocks.

Further investigation of the stock structure of *P. multidens* from other sites within Indonesia was undertaken as part of a collaborative ACIAR funded project (FIS/1997/165) between the NT, CSIRO, and Indonesia. This study found that multiple stocks exist within Indonesian waters (Ovenden *et al.*, 2004). While there appears to be genetic similarity between samples from the Australian sectors of the Timor and Arafura Seas, there is evidence to suggest a restriction of gene flow along the northern and western Australian coastline, with a genetic disjunction in the

Kimberley area (Ovenden *et al.* 2002).

A subsequent FRDC funded project (98/154) investigated the stock structure of *P. multidens* across northern Australia by analysing oxygen and carbon isotope ratios in otoliths obtained from the same samples. This study showed location-specific signatures and indicated that fish from all sites sampled within Australia (Exmouth, Rankin Bank, Broome, Vulcan Shoals, Timor Sea, and Arafura Sea) were different. Samples obtained opportunistically from Kupang (Indonesia) and Papua New Guinea, were incorporated into the study and were found to be different from each other and from Australian samples (Newman *et al.* 2000). This research implies that there is unlikely to be substantial movement of *P. multidens* between these distinct adult assemblages.

Growth and reproductive studies were undertaken on *P. multidens*, as part of the collaborative ACIAR funded project between Australia and Indonesia (FIS/1997/165). This study provided updated stock assessment parameters that were incorporated into stock assessment models for the current assessment.

Incorporation into management

The recent research findings have confirmed the validity of present management arrangements for this fishery. The research results suggest goldband snapper between Indonesia and Australia and in particular the Arafura Sea for the purpose of fisheries management can be managed as separate stocks.

Current Research

Current research is focused on developing new methods through GIS spatial analysis tools to investigate trends in catch and effort in this fishery and assist in the development of ecosystem based fishery management strategies. An FRDC application has been submitted to further develop this methodology.

There is also continued refinement of population parameters and stock assessment for this fishery.

Compliance

Compliance with the Timor Reef fishery management arrangements are undertaken by the Marine and Fisheries Enforcement Section

(MFES) of the NT Police, Fire and Emergency Services, under the *NT Fisheries Act 1988*.

The MFES effectively monitors and enforces the Timor Reef fishery management arrangements through the inspection of vessel arrivals and departure through the single port of Darwin. This includes verification of catch returns against processor returns (i.e. requirement for all operators to specify where they are selling their product). The MFES has the power, if necessary, to investigate the records of wholesalers and licensees.

In 2004, there were no significant domestic compliance issues recorded for this fishery.

Demersal Fishery

Monitoring

The demersal fishery is primarily monitored using compulsory commercial fishers logbooks which provide valuable catch and effort information, as well as data on the spatial distribution of the fishery. This logbook data must be returned together with monthly summary sheets by the 28th day of the following month.

In addition to logbook data, the demersal fishery is monitored using observer data collected from the Timor Reef fishery. Demersal fishers using the same fishing methods generally fish the grounds in the Arafura Sea directly adjacent to the Timor Reef boundary. The catches and grounds themselves are similar to those within the Timor Reef fishery area in all respects enabling observer data to be validly applied to the demersal fishery. The low level of fishing and the economic value do not presently justify an onboard monitoring program outside that of the Timor Reef fishery.

Stock assessment methods and reliability

Gold band snapper stock assessment has been combined for both the demersal and Timor Reef fisheries. This is because 95% of fishing effort undertaken in the demersal fishery occurs on grounds adjacent to the Timor Reef fishery, which encompass the same goldband stocks. Stock assessment for the red snappers (*Lutjanus malabaricus*, *L. erythropterus*) has been undertaken as part of the stock assessment for the Finfish trawl fishery which targets these

species and operates within the same boundaries as the demersal fishery.

Current status

Most recent stock assessments of tropical snappers in relation to sustainable harvest levels indicate that current catch levels in the Australian sector of the Arafura Sea are below triggers for a review of management arrangements.

Future Assessment Needs

Future assessment needs to concentrate on the degree of movement of snappers between Australia and Indonesia, the identification of red snapper juvenile habitats and obtaining more accurate growth parameters from the capture of juvenile snapper.

Research

Summary to date

Recent research has concentrated on both goldband and red snappers.

The FRDC funded project 1996/131; "Stock structure of *Pristipomoides multidens* resources across northern Australia" used mitochondrial DNA (mtDNA) analysis to determine the structure of *P. multidens* stocks in Western Australia and the Northern Territory. Opportunistic samples obtained from Kupang (West Timor) were also incorporated into this project. Results from this study indicate that *P. multidens* from northern Australian waters, and from waters around Kupang, are separate stocks. Further investigation of the stock structure of *P. multidens* from other sites within Indonesia was undertaken as part of a collaborative ACIAR funded project (FIS/1997/165) between the NT, CSIRO, and Indonesia.

This study found that multiple stocks exist within Indonesian waters (Ovenden *et al.* 2004). While there appears to be genetic similarity between samples from the Australian sectors of Timor and Arafura Seas, there is evidence to suggest a restriction of gene flow along the northern and western Australian coastline, with a genetic disjunction in the Kimberley area (Ovenden *et al.* 2002).

A subsequent FRDC funded project (98/154) investigated the stock structure of *P. multidens* across northern Australia by analysing oxygen

and carbon isotope ratios in otoliths obtained from the same samples. This study showed location-specific signatures and indicated that fish from all sites sampled within Australia (Exmouth, Rankin Bank, Broome, Vulcan Shoals, Timor Sea and Arafura Sea), were different. Samples obtained opportunistically from Kupang (Indonesia) and Papua New Guinea, were incorporated into the study and were found to be different from each other and from Australian samples (Newman et al. 2000). This research implies that there is unlikely to be substantial movement of *P. multidentis* between these distinct adult assemblages.

Growth and reproductive studies were undertaken on *P. multidentis*, *L. malabaricus* and *L. erythropterus*, as part of the collaborative ACIAR funded project between Australia and Indonesia (FIS/1997/165). This study provided updated stock assessment parameters which were incorporated into stock assessment models for the current assessment.

Incorporation into management

The recent research findings have confirmed the validity of present management arrangements for the demersal fishery. The research results suggest goldband snapper between Indonesia and Australia and in particular the Arafura Sea for the purpose of fisheries management can be managed as separate stocks.

Current Research

Current research is focused on developing new methods through GIS spatial analysis tools to investigate trends in catch and effort in this fishery.

Research is presently being undertaken to identify juvenile red snapper habitats.

Compliance

Compliance with the demersal fishery management arrangements are undertaken by the MFES of the NT Police and Fire and Emergency Services, under the NT *Fisheries Act* 1988.

The MFES effectively monitors and enforces the demersal fishery management arrangements through the inspection of vessel arrivals and departure through the single port of Darwin. This

includes verification of catch returns against processor returns (i.e. requirement for all operators to specify where they are selling their product). The MFES has the power, if necessary, to investigate the records of wholesalers and licensees.

In 2004, there were no recorded domestic compliance issues for this fishery.

Finfish Trawl Fishery

Monitoring

Due to resource constraints only one monitoring trip was conducted during 2004. While onboard, observers document vessel and gear information, location and depth fished, fishing practices, catch composition, and measure landed species.

Stock assessment methods and reliability

Stock assessments for the finfish trawl fishery have been undertaken in 1996 and 2004. The initial assessment used a Stock Reduction Analysis model developed by Prof Carl Walter (1996) and in the more recent assessment, Yield per recruit and Biomass Dynamics models, which incorporated updated biological parameters were used.

An absolute figure cannot be placed on sustainable harvest, because key parameters (Indonesian catch and effort, and level of interchange of fish and recruits, and the important productivity parameters for red snapper) are not known. However for the Australian sector of this fishery, the biomass of red snappers has been estimated from a fishery independent survey in 1990 to be 24000 tonnes. It has been agreed that a trigger point be implemented for management purposes if harvest levels exceed 10 % of the estimated biomass.

Genetic studies undertaken as part of an ACIAR project (FIS/1997/165) indicate that red snapper (*L. erythropterus*) and saddletail snapper (*L. malabaricus*) stocks are shared with Indonesia in the Arafura Sea, but there are indications of relatively little mixing between sections of the Arafura Sea.

Stock assessment reliability

The high level of Indonesian trawl fishing in the

Arafura Sea adjacent to the AFZ does not necessarily imply that the Australian sector is unsustainable. The question of sustainability of the Australian sector of this fishery depends upon where recruitment occurs and the level of movement of fish between the two countries. If movement rates of red snapper between Indonesia and Australia are low, and there is good recruitment to the Australian fishery from nursery areas within Australia, then the effect of large scale Indonesian fishing may be small. However if recruitment was primarily from Indonesia and movement rates between sectors high, then the effect would be more significant.

In the past five years CPUE has remained relatively constant (Figure 4) and harvest levels in the Australian sector of the Arafura Sea are below current reference points.

Future Assessment Needs

Future assessment needs to concentrate on the degree of movement of red snappers between Australia and Indonesia to resolve whether Australia is acting as a donor of red snappers to Indonesia. Identification of juvenile habitats and where recruitment occurs is also important.

Previous stock assessment models have used the 1990 trawl survey biomass estimates as a base. This estimate is now 15 years old and an upgraded stock assessment which incorporates current biomass estimates would be desirable.

Modelling needs to be undertaken to investigate different scenarios (using alternative spatial dynamics) for the fishery, as well as exploring the use of alternative management responses.

Compliance

Compliance with the Northern Territory finfish trawl fishery management arrangements are undertaken by the MFES of the NT Police and Fire and Emergency Services, under the NT *Fisheries Act 1988*.

The MFES effectively monitors and enforces the finfish trawl fishery management arrangements through the inspection of vessel arrival and departures through the port of Darwin and Nhulunbuy. This includes verification of catch returns against processor returns (i.e. requirement for all operators to specify where

they are selling their product). The MFES has the power, if necessary, to investigate the records of wholesalers and licensees. In 2004 there were no recorded compliance issues with the domestic fishery.

The compliance operations for the finfish trawl fishery are appropriate to the size of the fishery (i.e. one operator). A compliance risk assessment has been undertaken for the fishery in 2004, with no major domestic fishery issues identified

Shark Fishery

Monitoring

The basic monitoring information from the shark fishery comes from compulsory catch and effort logbooks. Monthly summary returns for the commercial fishery form a time series from 1983. A transition from monthly summary returns to recording each set has been managed since the late 1990s, and from July 2005 the target species are to be recorded. This reflects a policy of improving the quality and utility of logbook information collected.

Observer cruises add information on species composition and provide other biological and ecological data. Four observer cruises on commercial shark boats were undertaken during 2004, as well as the examination of the shark bycatch of four barramundi fishery operations. These provided data on species composition of both harvest and bycatch (retained and non-retained catch).

Research is planned for the development of a tagging protocol for monitoring of harvest rates of the principal target shark species, as well as indicator species. This will entail extensive management strategy evaluation and experimentation to ensure optimum monitoring /management combinations

Stock assessment methods and reliability

The shark fishery has a history of continual assessment. In the 1980s, a joint assessment was conducted between the then NT Department of Primary Industry and Fisheries, CSIRO, and the Australian Fisheries Service. The *Pelagic Fish Stock Assessment Program* estimated that, in waters adjacent to the Northern Territory, the

maximum sustainable yield for the black tip sharks, *C. tilstoni* and *C. sorrah*, was 3,400 tonnes annually. This consisted of 1,900 tonnes in the Arafura and Gulf of Carpentaria (GoC) zones and 1,500 tonnes in the Northern Territory zone.

Although CSIRO studies indicated that blacktip sharks form a single large genetic stock throughout northern Australia, mark-recapture studies showed that movement rates both along-shore and offshore are relatively restricted between the northern Australia Arafura Sea, the GoC and the Bonaparte Gulf. Mixing is sufficient to ensure a genetically homogeneous population but, at the same time, interactions are sufficiently restricted that segments of the population could be fished down without impacting on production throughout the population as a whole (Stevens et al. 2000).

Assessment in the mid-1990s (Walters and Buckworth 1997) suggested a potential yield estimate for Western Australia, the Northern Territory and Queensland of at least 2,000 tonnes per year. The optimum annual harvest rate is 6-7% per year of the component of the stock vulnerable to gill net fishing. This age-structure modelling (Walters and Buckworth 1997) indicated that the overall stock should have been increasing, at a rate of between 5% and 10% per year since the mid 1980s, when Taiwanese catches were greatly reduced.

However, CPUE data from the Northern Territory gill net fishery to 1995, on which this assessment was based, suggested a decline in relative abundance since the mid 1980s. Possible reasons listed included:

- The unaccounted removal of around 1,500 tonnes per year from the northern Australian stock component. This may be due to foreign fishing in the Arafura Sea, combined with unreported domestic catches.
- The slow depletion of an inshore, resident component of the overall stock, without a major impact of recent fishing on the stock as a whole (i.e. overall stock may be recovering, but the inshore density is reduced by domestic fishing in spite of that overall increase).

- The unreliability of the assessment techniques that are based almost entirely on CPUE statistics from both the Taiwanese and domestic gill net fisheries. The report indicated that the use of CPUE as an index of abundance was problematic.

There are now an additional eight years of CPUE data available since Walters and Buckworth (1997) undertook their assessment, and although there has been strong variation (particularly the strong peaks of 1995 and 1996), there has actually been little long-term change in the catch rate trend for black tip sharks (see Figure 15.).

The problems with use of CPUE as an index of abundance are shown by apparent target fishing within the fishery. The very strong and persistent increasing trend in the catch rate of grey mackerel suggests that this species was increasingly targeted until 2003. The downturn of 2004 probably reflects general targeting of sharks instead, in response to market pressures. This is evidenced by the catch rate variation among the total sharks, blacktip sharks and grey mackerel (Figure 15): they are substantially in counterpoint i.e. years in which catch rates of grey mackerel peaked, shark catch rates declined, and vice versa. It was not feasible to allocate existing logbook effort data among the target groups, but the inference from these observations is that catch rate trends presented for sharks and mackerel in this fishery are unlikely to capture all but the strongest trends in abundance. The slight declines evident for black tip shark catch rates in Figure 15 may reflect increased diversion of effort by operators to the highly valued grey mackerel and, with the development of markets, to the broad suite of shark species other than blacktips, rather than a decrease in black tip shark abundance.

Current Exploitation Status

Exploitation by the FTO and recreational sectors is considered to be quite low. The level of harvest rate by the commercial sector is below most estimates of sustainable yield. Logbooks do not indicate target species. Given the very strong increasing trend in grey mackerel catches and catch rates, an ostensible decline in shark CPUE could result from increased direction of fishing toward mackerel and away from shark.

However, given the high degree of uncertainty in stock estimates, and since the mid-1990s a declining trend in CPUE adjusted for the amount of gear deployed, conservative management precludes any significant increase in harvest rates. As a result, the fishery is thus considered to be fully fished.

Future Assessment Needs

There is clearly a need for updated assessment of the shark fishery. It is planned that target species in the fishery will be re-assessed at least every three years. However the information on fishery status that can be provided by logbook catch and effort data alone is limited, and new assessments are unlikely to be more informative.

A key recommendation from previous assessments has been to establish sources of information on harvest rates or abundance levels of the NT shark stocks, independent of logbook data. Consequently, research to develop mark-recapture (tagging) to provide on-going monitoring for the NT shark fishery has been proposed. This work is planned as a co-operative program with fishers and research agencies, to provide an index of harvest levels. Further, there should be a concerted effort to obtain black-tip catch statistics and from the foreign fisheries currently operating in the Arafura Sea, north of the AFZ. Constraints on resources have meant that these recommendations are yet to be implemented.

Of serious concern is the lack of accurate information currently available on the magnitude and impact on northern Australian shark and finfish stocks of Illegal Unreported and Unregulated (IUU) fishing by foreign vessels in northern Australia waters. The magnitude of these incursions is believed to number in the thousands. The consequences of this fishing for the Australian fishery are difficult to predict. This is firstly because we do not accurately know the magnitude of that illegal fishing. Secondly, movement rates and life history linkages between inshore (where most Australian fishery effort is directed) and offshore (most IUU fishing) are poorly known for most species, and thirdly, we do not know the ecological effects that may arise by fishing down many of the top predatory fish from the offshore area. Thus broader ecosystem effects of fishing, and in particular the impact of

high levels of IUU effort, need to be addressed in future assessments.

Research

Summary to date

In the mid 1980s, the Northern Territory shark fishery was the subject of a major joint NT/ Qld/ WA/ Commonwealth Pelagic Fish Stock Assessment Program.

This research program undertook extensive gillnet and other sampling around the Northern Territory coastline, to establish species and size composition, provide basic biological information, and tagged sharks to provide growth and movement information. Occasional tag recoveries are still occurring. Outcomes from this research were discussed above. Research during the 1990s was limited to monitoring of trends in the commercial fishery data and stock assessment modelling using all available data.

However, the recognised need for more information on the broad suite of sharks species taken in northern Australia prompted the development of the FRDC-funded projects, *Northern Australian Sharks and Rays: the Sustainability of Target and Bycatch Species, Phase 1 and Phase 2* (see below).

Incorporation into management

Results of research have allowed informed and conservative management regimes to be implemented for the shark fishery.

Current Research

The projects, *Northern Australian Sharks and Rays: the Sustainability of Target and Bycatch Species, Phases 1 and 2*, are providing substantial information on species composition and biology of sharks and rays in the shark fishery, as well as bycatch in other fisheries.

Observer information on catch composition is considered an important basis for monitoring biodiversity. Although the blacktip species are well-known biologically, this has not been true of many of the species that are less-frequent catch components. Thus the biological information accumulated and communicated (e.g. Beatty and Crofts 2004) from these projects on this suite of species is valuable for the future management of

the fishery. These projects are national projects, with collaboration between the northern states and NT as well as Victoria and the CSIRO. Development of a collaborative tagging program with commercial fishers is also under way.

Given the value of the grey mackerel in the fishery, there is also a need for further information on this species. An initial FishNote has been prepared to increase stakeholder information on grey mackerel (Crofts and de Lestang 2004). Information will be required on stock structure, movements and age structure of the population. Collaborative projects to undertake this research will be initiated during 2005.

Compliance

Compliance activities for the shark fishery management arrangements are undertaken by the MFES of the NT Police, Fire and Emergency Services, under the *NT Fisheries Act 1988*.

The MFES effectively monitors and enforces management arrangements for the shark fishery through the inspection of vessel arrivals and departures through the single port of Darwin. This includes verification of catch returns against processor returns (i.e. requirement for all operators to specify where they are selling their product). The MFES has the power, if necessary, to investigate the records of wholesalers and licensees.

In 2004, there were no significant domestic compliance issues recorded for this fishery

9. Financial Arrangements

The Northern Territory Government has previously determined to provide financial resources for the management of NTFJA fisheries.

This revenue was paid into the Northern Territory Fishing Industry Research and Development Fund. A summary of revenue and expenditure follows.

The Northern Territory received \$76 130 (preliminary figures) in licence fees for Joint Authority fisheries (Shark \$14 965; demersal,

\$49 405; finfish \$1 680; Timor Reef \$10 080) in 2004-2005.

The revenue generated from licences partially offsets management and research costs. Research projects carried out to ensure ongoing sustainability of the NTFJA fisheries during 2004-2005 are listed below. Amounts shown depict direct NT cash committed to the projects during 2004-2005.

- Grey mackerel stock structure project – NT funds committed \$ 13 855
- NTFJA fisheries EA accreditation project \$ 46 667
- Shark monitoring project - \$ 15 000
- Contribution to NT Seafood Council consultation costs - \$30 882
- Pilot project to develop GIS spatial analysis techniques (Timor Reef, Demersal Fishery) - \$21 000
- Industry contribution to FRDC research fund - \$20 000

Table 1. Management Arrangements, Trigger reference points and Landings for NTFJA Fisheries

Fishery	No. of Restricted Licences	No of Unrestricted Licences	Management Regime	Target Species Trigger Reference Points	Sustainable Yield Estimates	Landings (2004)
Shark	9	10	<p>Effort Controls</p> <p>Restriction of the total number of licences issued</p> <p>2500 m of net mesh size 150 mm to 250 mm</p> <p>Longline to 20 nautical miles</p> <p>3:1 licence reduction program</p>	<p><u>Blacktip sharks</u></p> <p>Catch levels increase to 2000 t over the next calendar year.</p>	2000 tonnes for northern Australia	<p>Black Tipped shark 440 t</p> <p>Other shark 649 t</p> <p>Grey mackerel 481 t</p> <p>Spanish mackerel 26 t</p> <p>Other 11 t</p>
Demersal	Not Applicable	60	<p>Effort Controls</p> <p>Limit on licences issues</p> <p>Vertical Lines with a maximum of 5 hooks</p> <p>Droplines with 6-40 hooks</p> <p>Restrictions on the possession of sharks and mackerels</p>	<p><u>Red Snappers</u></p> <p>Combined finfish trawl and demersal fishery catch levels increase to 2500 t over the next calendar year.</p> <p><u>Gold Band Snapper</u></p> <p>Triggers to be implemented into management arrangements when sustainable yield estimates are developed.</p> <p><u>Red Emperor and Cod</u></p> <p>Currently being developed</p>	<p>Red Snapper –Arafura Sea 1500t (Ramm 1997b)</p> <p>Timor Sea 600-2500t (Ramm 1994)</p> <p>GoC 2880-9015t (Anon 1994).</p>	<p>Confidentiality considerations preclude publication of catch data. 2004 catch of red snapper <50% of trigger point</p>

Timor Reef	2	10	<p>Effort Controls</p> <p>Limit on licences issues</p> <p>Vertical Lines with a maximum of 5 hooks</p> <p>Droplines with 6-40 hooks</p> <p>Maximum of 45 traps per licence</p> <p>Transferability on amalgamation of two restricted licences</p> <p>Must hold a Demersal Licence</p> <p>Restrictions on the possession of sharks and mackerels</p>	<p>Goldband/ Red Snappers</p> <p>Catch levels for goldband and red snapper increase to lower sustainable yield estimates over the next calendar year</p> <p>Goldband snapper trigger = 900t</p> <p>Red snapper trigger = 1300t</p> <p>Catch levels decline by 30% over the next calendar year.</p> <p>Red emperor and Cod</p> <p>Catch rates of red emperors increase to 25% of the catch and cods increase to 10% of the catch over the calendar year</p> <p>Catch levels decline by 30 % over the next calendar year.</p>	<p>Gold Band Snapper –</p> <p>Arafura Sea 100-400t (Ramm 1994)</p> <p>Timor Sea 900t (Ramm 1997)</p> <p>GoC: No estimate currently available</p>	<p>Goldband Snapper 486 t</p> <p>Red Snappers 134 t</p> <p>Red Emperor 35 t</p> <p>Other Reef Fish 42 t</p>
Fish Trawl	Not Applicable	1	<p>Effort Controls</p> <p>Restrictions on the use of fishing gear</p>	<p>Red Snapper</p> <p>Combined finfish trawl and demersal fishery catch levels increase to 2500 t over the next calendar year.</p> <p>Catch levels decline by 30% over the next calendar year (finfish trawl only).</p>	<p>1500 t for Arafura Sea (Ramm 1997b)</p> <p>GoC 2880-9015t (Anon 1994).</p>	<p>Confidentiality considerations preclude publication of catch data. 2004 catch of red snapper <50% of trigger point</p>

Please note that the details outlined provide a general summary of the management arrangements only and should not be relied upon as a complete description of all legislative requirements. The Northern Territory Fisheries Act and Regulations provide precise information about legislative arrangements implemented for the fisheries nominated.

Annex A: Excerpt of the Northern Territory Government Gazette of February 1995

ARRANGEMENT BETWEEN THE COMMONWEALTH AND THE NORTHERN TERRITORY IN RELATION TO THE NORTHERN SHARK FISHERY

An ARRANGEMENT entered into between the Commonwealth of Australia (the Commonwealth) of the one part and the Northern Territory (the Territory) of the other part.

WHEREAS-

- (a) paragraph 4(i)(a) of the Acts Interpretation Act 1901 of the Commonwealth provides that where an Act is enacted on or after the date of commencement of this section that it is not to come into operation immediately upon its enactment, is expressed to confer power, inter alia, to make an instrument of a legislative or administrative character, then, unless the contrary intention applies, the power may be exercised, and anything may be done for the purpose of enabling the exercise of the power, before the Act concerned comes into operation as if it had come into operation;
- (b) subsection 2(2) of the Fisheries Management Act 1991 of the Commonwealth (the Management Act) provides that Part 5 of the Management Act, which provides for co-operation with the States and Northern Territory in the management of fisheries, commences upon the repeal or the ceasing to have effect (as the case may be) of Part IVA of the *Fisheries Act* 1952 of the Commonwealth;
- (c) by subsection 7(3) of the Fisheries Legislation (Consequential Provisions) Act 1991 of the Commonwealth (the Consequential Provisions Act) as amended by section 24 of the Primary Industries and Energy Legislation Amendment Act 1993 Part IVA of the *Fisheries Act* 1952, unless sooner repealed, ceases to have effect at the end of the period of 3 years beginning 3 February 1992, the day on which section 7 of the Consequential Provisions Act commenced;
- (d) paragraph 7(4)(a) of the Consequential Provisions Act provides that upon the commencement of Part 5 of the Act, the Northern Territory Fisheries Joint Authority, established by subsection i2D(i) of the *Fisheries Act* 1952, continues in existence as if it had been established under Part 5 of the Management Act;
- (e) arrangements were entered into under section 12H (4) of the *Fisheries Act* 1952 between the Commonwealth and the Territory in relation to the:
 - (i) Pelagic Fishery, published in the Commonwealth of Australia Gazette No 8109 on 14 April 1988;
 - (ii) Pelagic Fishery except with pelagic gillnets in waters within 12 nautical miles seaward of the baseline or by trolling, published in the Commonwealth of Australia Gazette No 8109 on 14 April 1988;
- (f) paragraph 7(4) (b) of the Consequential Provisions Act provides that upon the commencement of Part 5 of the Act, any arrangement made with a State or Territory under subsection i2H(i) or (4) of the *Fisheries Act* 1952 that was in force immediately before that commencement continues in force as if it had been made under Part 5 of the Management Act;

- (g) the Arrangements referred to in paragraph (e) of this Arrangement were made under Division 3 of Part FVA of the *Fisheries Act* 1952;
- (h) subsection 75(1) of the Management Act provides that an Arrangement under Division 3 of Part 5 of the Management Act may be terminated by instrument approved by the Governor-General and the Governor or Governors of the State or States concerned;
- (i) section 59 of the Management Act provides:
 - (i) that Part 5 of the Management Act Has effect as if the Northern Territory was a State
 - (ii) that a reference in that Part to the Governor of a State shall be read, in relation to the Northern Territory, as a reference to the Administrator of the Territory;
- (j) subsection 33 (3) of the Acts Interpretation Act 1901 provides inter alia that where an Act confers a power to make any instrument, the power shall, unless the contrary intention appears, be construed as including a power exercisable in the like manner and subject to the like conditions (if any) to repeal any such instrument;
- (k) subsection 8(1) of the Interpretation Act 1978 of the Territory provides that where a provision of an Act is expressed to confer power, or to amend a provision of another Act in such a manner that the other Act, as amended, will confer power, to take any action, including power to make an appointment or to make an instrument of a legislative or administrative character then, before the first-mentioned provision or the second-mentioned provision as amended, as the case may be, comes into operation, that power may be exercised and anything may be done for the purposes of enabling the exercise of the power or of bringing the appointment or instrument into effect;
- (l) subsection 64(2) of the *Fisheries Act* 1988 of the Territory (the Territory Act) empowers the Territory to terminate an arrangement under Part 5 of the Management Act;
- (m) subsection 71(1) of the Management Act provides that the Commonwealth may make an arrangement with a State or States represented on a Joint Authority that the Joint Authority is to have the management of a particular fishery in waters relevant to that State or any of those States;
- (n) subsection 74(1) of the Management Act provides that an arrangement under, inter alia, section 71 is to be made by an instrument approved by the Governor-General and the Governor or Governors of the State or States concerned;
- (o) subsection 64(1) of the Territory Act as amended by section 37 of the Fisheries Amendment Act 1994 of the Territory empowers the Territory to make an arrangement under Part 5 of the Management Act;
- (p) both the Commonwealth and the Territory are desirous of exercising their powers to make a further Arrangement in relation to the fishery referred to in clause 2 of this Arrangement.

NOW THEREFORE, in pursuance of the Management Act and the Territory Act and of all the powers so enabling, it is mutually arranged as follows:

1. The Arrangements entered into between the Commonwealth and the Northern Territory as referred to in paragraph (e) of the recitals to this Arrangement are, pursuant to subsection 75 (i) of the Management Act and subsection 64(2) of the Territory Act, terminated.
2. The Commonwealth and the Territory hereby arrange that the fishery, being for any purpose other than recreation, in waters relevant to Northern Territory, being coastal waters and waters of the Australian fishing zone that lie within the area described in Schedule 2 to the Petroleum (Submerged Lands) Act 1967 under the heading "Area that includes the Adjacent Area in respect of the Northern Territory", for:
 - (a) all fish of the Class Chondrichthyes (cartilaginous fishes) using any fishing method;

but excluding fish to which this paragraph otherwise would apply taken in the exercise of a right conferred in relation to another fishery by a fishing concession granted by the Australian Fisheries Management Authority under the Management Act;

- (b) all fish of the Class Osteichthyes (bony fish) taken in the exercise of a right conferred by a licence or other authority granted by the Territory on behalf of the Northern Territory Fisheries Joint Authority for the fish to which paragraph (a) applies;

is to be managed by the Northern Territory Fisheries Joint Authority in accordance with the law of the Territory.

3. The Minister responsible for administering the Management Act and the Minister responsible for administering the Territory Act may agree in writing to the maximum quantity of other fish the subject of paragraph 2(b) that may be taken from time to time under a licence or other authority referred to in that paragraph and on matters of mutual interest in relation to the fishery.
4. This Arrangement shall, upon being executed on behalf of the Commonwealth and of the Territory and upon being approved by the Governor-General of the Commonwealth and the Administrator of the Northern Territory, take effect on 3 February 1995.
5. Without affecting the construction which this Arrangement would have if no provision of this Arrangement or part thereof is invalid, it is the intention of this Arrangement that if any provision of this Arrangement or part thereof is invalid, the remainder of that provision or part thereof was not included in this Arrangement even if the result is to extend the fishery by this Arrangement.

Dated 19th December, 1994

Signed for and on behalf of the
Commonwealth of Australia by the
Honourable DAVID PETER BEDDALL,
Minister for Resources

Signed for and on behalf of the
Northern Territory by the
Honourable MICHAEL JAMES PALMER
Minister for Primary Industries and Fisheries

In the presence of
P. STEVEN

In the presence of
A.R.SPRIGG

OUT OF SESSION MEETING OF THE NORTHERN TERRITORY FISHERIES JOINT AUTHORITY

15 September 2004

DARWIN NT

RECORD OF DECISIONS

Attendance members

Deputy for the Australian
Government Minister for
Fisheries, Forestry and
Conservation
Richard McLoughlin

Deputy for the Northern
Territory Minister for Business,
Industry and Resource
Development
Richard Sellers

Secretary
David McKey (NTDBIRD)

Observers
John Talbot (DAFF)
Steve Sly (NTDBIRD)
Sachi Wimmer (DAFF)

1. PROCEDURAL MATTERS

Officials of the Commonwealth and NT Fisheries met to discuss current issues relevant to the NTFJA on 15th September 2004. Details of the discussion and recommendations from this meeting are detailed below for consideration and endorsement by the NTFJA out of session.

1.1 Confirmation of Agenda.

Members confirmed the agenda with no changes.

Recommendation to the JA: that the record of decisions of the NTFJA meeting of 19 August 2003 be confirmed.

2. MATTERS FOR CONSIDERATION

2.1 Application for granting an additional shark fishery licence.

The Northern Territory deputy, Richard Sellers, briefed the Commonwealth delegate on the latest developments in this issue.

It was noted that this issue has taken a long time to resolve, mainly in regard to jurisdictional responsibilities. Richard McLoughlin indicated he would seek further information on the issue

Recommendations to the JA: - AFMA to seek further information on the additional licence application for the shark fishery and report to the NT member.

3. OTHER ITEMS

3.1 Update on review of shark bycatch in non-target fisheries.

The background paper was tabled, and the issues were discussed.

The NT deputy gave a brief update on the NT's shark regulations including the finning ratios licence condition introduced in December 2003. The bycatch restrictions introduced for all fisheries that have an incidental catch of shark were also discussed in detail and included in the background paper tabled by the NT.

Richard McLoughlin requested that the NT provide him with further information on the finning ratios licence conditions and any future capacity reduction proposals that the NT was considering for the NT shark fishery.

Richard McLoughlin sought to include sharks on the NTFJA agenda as a priority item.

Recommendations to the JA: - The NT to provide AFMA with additional background information on the fisheries licences conditions and future management proposals for his consideration.

3.2 Update on status of annual reports for 2000-2001, 2001-2002,

The draft annual report for 2002-2003 will be presented to the Commonwealth for consideration by first week in October.

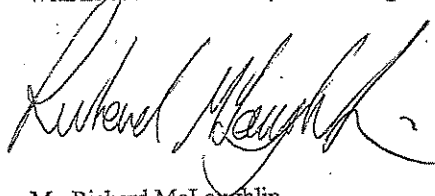
Recommendations to the JA:

- The NT to provide the Commonwealth with final reports for 00-01 and 01-02 by 30th September 2004.
- The NT to provide the Commonwealth with a draft copy of the annual report for 02-03 by 8th October 2004.

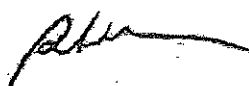
NEXT MEETING

Members proposed that the next meeting of the NTFJA would coincide with the 2005 Northern Australia Fisheries Management Workshop.

With no further business, the meeting was closed at 1730.



Mr. Richard McLoughlin
Manager
Australian Fisheries Management
Authority
Deputy for the Australian Government
Minister for Fisheries, Forestry, and
Conservation, Northern Territory
Fisheries Joint Authority



Mr. Richard Sellers
Director of Fisheries
Northern Territory Department of
Business, Industry and Resource
Development
Deputy for the Northern Territory
Minister for Primary Industry and
Fisheries, Northern Territory Fisheries
Joint Authority



