

**NORTHERN TERRITORY FISHERIES**

**JOINT AUTHORITY**

**REPORT FOR THE PERIOD**

**1 JULY 2007**

**TO**

**30 JUNE 2008**

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JOINT AUTHORITY

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1 July 2007

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30 June 2008

Commonwealth of Australia

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*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 2007 TO 30 JUNE 2008*



The Hon Tony Burke, MP  
Minister for Agriculture, Fisheries and Forestry  
Parliament House  
CANBERRA



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

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## 1. Introduction

This is the twenty-first annual report of the Northern Territory Fisheries Joint Authority (NTFJA). This report details the functions and activities undertaken during the period 1 July 2007 to 30 June 2008. Catch and effort statistics are compiled annually.

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

- Timor Reef Fishery;
- Demersal Fishery;
- Finfish Trawl Fishery; and,
- Offshore Net and Line 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 Northern Territory pearl oyster fishery passed to the NTFJA.

On 3 February 1995, the NTFJA, subject to the provisions of the Commonwealth *Fisheries Management Act 1991* and the Northern Territory *Fisheries Act 1988*, assumed responsibility, in waters adjacent to the Northern Territory, for the Demersal, Timor Reef, Offshore Net and Line 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 Division of the Northern Territory Department of Regional Development, Primary Industry, Fisheries and Resources (DRDPiFR).

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 Eric Abetz**

Minister for Fisheries, Forestry and Conservation

(1 July 2007 to 3 December 2007)

### **The Hon Tony Burke, MP**

Minister for Agriculture, Fisheries and Forestry  
(3 December 2007 to 30 June 2008)

### **The Hon Christopher Natt MLA**

Minister for Primary Industry and Fisheries  
(1 July 2007 to 30 June 2008)

Deputies for the NTFJA during the reporting period were:

For the Commonwealth Minister –

Mr Nick Rayns  
Managing Director (A/g)  
Australian Fisheries Management Authority  
(1 July 2007 to 2 July 2007)

Mr Glenn Hurry  
Managing Director  
Australian Fisheries Management Authority  
(3 July 2007 to 30 June 2008)

Mr Robert Murphy  
General Manager  
Department of Agriculture, Fisheries and Forestry  
(1 July 2007 to 30 June 2008)

For the Northern Territory Minister -

Ms Heather Brayford  
Executive Director of Fisheries DRDPiFR  
(1 July 2007 to 30 June 2008)

Secretariat services to the NTFJA are provided by DRDPiFR.

### 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
- (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
- (c) maximising economic efficiency in the exploitation of fisheries resources
- (d) ensuring accountability of the fishing industry and to the community generally in its management of fisheries resources.

The Northern Territory *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
- (b) achieving the optimal utilisation and equitable distribution of those resources.

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

### 4. Meetings of the Northern Territory Fisheries Joint Authority

Meetings of the NTFJA are convened on an "as needs" basis, with DRDPIFR coordinating the day to day management under the Northern Territory *Fisheries Act 1988*, on behalf of the NTFJA. A meeting of the NTFJA was convened on 26 September 2007 to discuss matters relevant to the NTFJA. A record of this meeting is at Annex B.

DRDPIFR representatives participated in the annual Northern Australian Fisheries Management Workshop (NAFMW), which was convened in September 2007. The NAFMW is convened annually to consider fisheries management, research and compliance issues and thereby ensures 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, Western Australia and the Northern Territory being accredited as sustainable fisheries under the Department of the Environment, Water, Heritage and the Arts (formerly the Department of the Environment and Heritage) audit process.

### 5. Advisory Committees

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



The Northern Territory *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 the Offshore Net and Line and Timor Reef fisheries met to discuss fishery matters during the reporting period. FMAC meetings are convened on an “as needs” basis and may be held more than annually. Regular communications and consultation occur 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, neighboring 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 met once during the reporting period on 3 December 2007.

## **6. Condition of the Fisheries**

The following fishery reports detail the status of the four NTFJA managed fisheries.

## Demersal Fishery

### INTRODUCTION

The Northern Territory Fisheries Joint Authority (NTJFA), through the NT *Fisheries Act 1988*, manages all finfish taken in the fishery with the day to day management of the fishery undertaken by NT Fisheries.

The Demersal Fishery targets goldband snapper (*Pristipomoides* sp.), but also catches increasingly significant quantities of red snappers (*Lutjanus malabaricus*, *L. erythropterus*), with the remainder of the catch comprising red emperor (*Lutjanus sebae*) and cods (Family Serranidae). Most products from this fishery are marketed as 'fresh on ice' product with the majority sold as whole fish on the Australian domestic market.

The Demersal Fishery utilises dropline and trap gears operating in waters 15 nautical miles from shore to the outer limit of the Australian Fishing Zone (AFZ), excluding the area of the Timor Reef Fishery.

In 2007, many Timor Reef fishers (who also hold Demersal licences) continued fishing immediately adjacent to the Timor Reef Fishery area for goldband and red snapper species. Reduced catches reported by fishers after oil and gas exploration companies carried out 3D seismic surveys within the more productive regions of the Timor Reef Fishery in combination with business decisions to more actively target the Demersal Fishery led to increased fishing effort in the Demersal Fishery from mid 2006 onwards.

In addition, limited supply, enhanced product quality, improved marketing techniques and a greater acceptance of red snapper by the Australian public has increased the value of the final product from the Demersal Fishery. In turn, these factors have made previously underutilised red snapper stocks within the Demersal Fishery a more attractive prospect.

Red snappers and red emperors are also caught, primarily by hook and line, by the recreational and fishing tour operator sectors. However, there is limited overlap with commercial operators given the offshore nature of the commercial fishery.

The Demersal Fishery has been assessed by the Australian Government Department of Environment, Water, Heritage and the Arts (DEWHA) against the *Guidelines for the Ecologically Sustainable Management of Fisheries* to receive full Export Exempt accreditation under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The fishery is due for reassessment in May 2009.

### PROFILE OF THE FISHERY

#### Commercial Sector

##### Area

The Demersal Fishery operates in waters 15 nautical miles from the coastal baseline to the outer limit of the AFZ, excluding the area of the Timor Reef Fishery (Figure 1).

Within the Demersal Fishery, the majority of fishing effort occurs in areas adjacent to the Timor Reef Fishery.

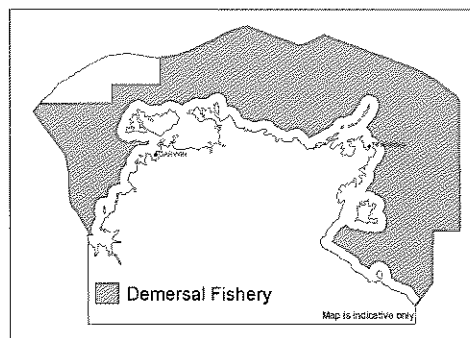


Figure 1. Area of the Demersal Fishery

##### Fishing method

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

##### Catch

There are two principal target groups in the Demersal Fishery. One of those groups is goldband snapper, which comprises the three species, *Pristipomoides multidentis*, *P. typus* and *P. filamentosus*. Together these species made up 46% of the total catch in 2007, with

*P. multidentis* being the most common of the three *Pristipomoides* species. The other major target group is the red snapper, comprising saddletail snapper (*Lutjanus malabaricus*) and red snapper (*L. erythropterus*). Significant byproduct species are red emperor (*L. sebae*), and cod (Family Serranidae) (Figure 2).

The species composition of the catch is gear dependant. Drop-liners catch a higher proportion of goldband snapper, compared with trap boats which catch almost equal proportions of red snappers (*L. malabaricus*, *L. erythropterus*) and goldband snapper (*P. multidentis*). A higher proportion of trapping was conducted during 2007 compared with droplining.

In 2007, the total catch from the Demersal Fishery was 330 tonnes, an increase over the 2006 total catch of 223 tonnes. The goldband snapper component was 153 tonnes and red snappers totalled 155 tones (Figure 2). This increase in catch was partly due to relocation of activities from the Timor Reef Fishery where operators reported reduced catches after oil and gas exploration companies carried out 3D seismic surveys in the Timor Sea and business decisions to more actively target the Demersal Fishery.

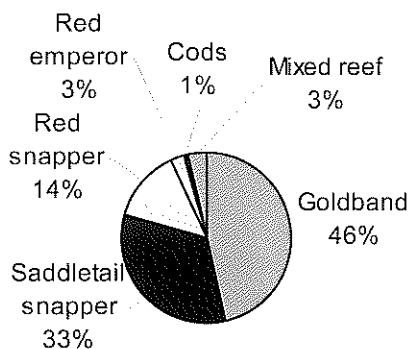


Figure 2. Catch composition for the commercial Demersal Fishery, 2007

### Byproduct species

Byproduct catch (mixed reef, cod and red emperor) is well below the 10% trigger value required for a review of management arrangements for the protection of byproduct species.

### Effort

During 2007, there were eight active licences in the Demersal Fishery compared to six active licences in 2006. The reported effort in this fishery was 297 boat days, which was marginally higher than the 281 boat days recorded in 2006 (Figure 3).

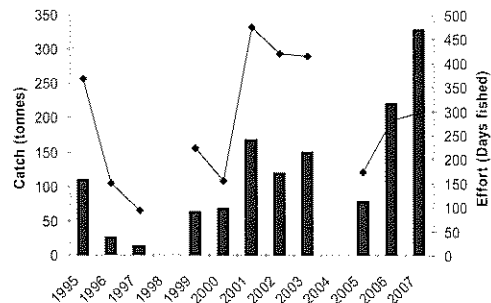


Figure 3. Catch and effort for the commercial Demersal Fishery, 1995 to 2007\*

\*Due to confidentiality constraints (ie. less than five operators working in a single fishery) data collected in 1998 and 2004 has not been published.

### Catch rates

Nominal catch per unit effort (CPUE) has fluctuated considerably over the history of this fishery (Figure 4). However, this is probably a reflection of the small number of operators and small amount of fishing activity rather than changes in fish abundance. The recent increase in catch rate is most likely to be due to a greater understanding of the fishing grounds.

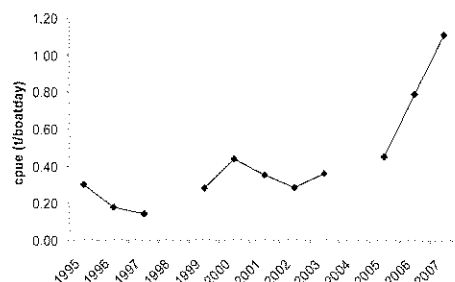


Figure 4. Catch rates for the commercial Demersal Fishery, 1995 to 2007

\*Due to confidentiality constraints (ie. less than five operators working in a single fishery) data collected in 1998 and 2004 has not been published.

published.

### **Marketing**

Currently all fish landed within 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 most product is forwarded to interstate markets, principally Brisbane and Sydney. Increasingly, operators are developing marketing arrangements outside the major metropolitan wholesale markets.

### **Recreational Sector**

Recreational fishers catch some of the same species targeted by the Demersal Fishery, 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 offshore areas typically fished in the Demersal Fishery, and therefore their activities are not considered to impact on the commercial fishery catch.

### **Non-retained Species**

There were no monitoring trips conducted in the Demersal Fishery during 2007. However, due to the similarity with the fishing methods used, gears, fishing grounds and catch composition to the Timor Reef Fishery, the same assumptions have been made about the levels of non-retained species. That is, non-retained species are less than 7% of the total catch weight.

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

Bycatch in this fishery is well below the 10% trigger value.

### **Threatened species interaction**

In 2007, there were no recorded interactions with threatened species in the Demersal Fishery. The method of fishing and the location of the fishery generally prevent the interaction with these species.

### **Ecosystem Impact**

The management arrangements for the Demersal 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 either its impact or occurrence. Underwater video observation of traps during commercial fishing operations throughout northern Australia has shown frequent entry and exit of fish from the traps used in the Demersal Fishery.

### **Social Impact**

The commercial fishery directly employs approximately 25 people as crew on boats, and numerous people through other industries, e.g. transport and boat repairs. However, recreational fishing targets some of these demersal species and forms an important component in the lifestyles and culture of a large proportion of people residing in the Northern Territory.

### **Economic Impact**

In 2007 there were eight active operators in the Demersal Fishery. The 2007 catch value was \$1.94 million (2006 \$1.20 million).

### **STOCK ASSESSMENT**

#### **Monitoring**

The Demersal Fishery is monitored primarily through logbooks, which operators are required to complete on a daily basis during fishing operations. These logbooks provide detailed catch and effort information, as well as information on the spatial distribution of the fishery. Logbooks are submitted with monthly marketing information by the 28<sup>th</sup> day of the following month.

#### **Stock Assessment Methods and Reliability**

Stock assessment for goldband snapper has been combined for both the Demersal and Timor Reef Fisheries, as the majority of fishing effort undertaken in the Demersal Fishery occurs on

grounds adjacent to the Timor Reef Fishery, which may encompass the same goldband snapper stocks.

### **Current Harvest Status**

The 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 set by a review of management arrangements.

### **Future Assessment Needs**

Future assessment needs to concentrate on the degree of movement of both goldband and red snappers between Australia and Indonesia, the identification of juvenile snapper habitats and obtaining more accurate growth parameters from the capture of juvenile snapper. Better information on juvenile habitats, movements and biological characteristics will extend our knowledge of poorly understood life history parameters of primarily red snappers.

## **RESEARCH**

### **Summary to Date**

Geographic Information System (GIS) spatial statistical methods have shown that there is a relationship between bathymetry and geomorphology and high catches of goldband snapper. Although this work (FRDC project 2005/047), was undertaken in the Timor Reef Fishery, there are implications for the Demersal Fishery. Although the Demersal Fishery has a smaller catch than the Timor Reef Fishery, the results from this project have shown that there is a large, highly productive area within the Demersal Fishery that is currently under exploited (most likely due to economics as these are further from port).

The stock structure of goldband snapper has been determined through a number of externally funded projects.

The Fisheries Research and Development Corporation (FRDC) funded projects 1996/131; 1998/154, were collaborative projects between NT Fisheries, WA Department of Fisheries and Queensland's Department of Primary Industry (QDPI). These studies used mitochondrial DNA (mtDNA) and otolith microchemistry techniques

to determine the stock structure of goldband snapper resources between the Northern Territory and Western Australia. Opportunistic samples were obtained from Kupang (Indonesia). Both studies used fish from the same sites.

The genetic (mtDNA) study showed no differences between Australian sampling sites in the Timor and Arafura Seas, but a significant difference in the Timor Sea between Kupang (West Timor) and the north-west Australian site less than 200 nautical miles on either side of the Timor Trench (Ovenden et al., 2000). Otolith microchemistry revealed distinct populations for all sites sampled, indicating that substantial movement of adults between sites is unlikely (Newman et al., 2000). This means that analysis of catch information and management must take into account these fine scale patterns, rather than assume homogenous mixing among populations.

Growth and reproductive studies were undertaken on goldband snapper, as part of the collaborative Australian Centre for International Agricultural Research (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 this fishery between the Northern Territory, Queensland and Indonesia.

### **Current Research**

Current research is focused on developing a holistic approach to fisheries management using geospatial statistics and fuzzy logic rule-based modeling (FRDC project 2005/047). This work explores new ways of incorporating the very diverse forms of physical and environmental data (often on different spatial scales) with catch and effort data. The project has enabled an analysis of the many components that may affect fish abundance and catchability in a geo-referenced framework. The fuzzy rule-based modeling allows the uncertainties of human

knowledge to be captured as hard data. The final report on this work is expected to be available in 2009

## MANAGEMENT AND GOVERNANCE

### Objective

Management arrangements for the Demersal Fishery aim 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 red and goldband snappers from the Timor, Arafura Seas and the Gulf of Carpentaria 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 (see Table 1).

### History

With the passage of the revised jurisdictional arrangements contained in the Offshore Constitutional Settlement (OCS) of 1988, management responsibility for line fishing and trapping in waters adjacent to the Northern Territory passed to the Northern Territory Government from the Commonwealth.

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.

A further revision of the jurisdictional arrangements occurred in 1995. At that time, management responsibility for the Demersal 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.

Under this arrangement, NT Fisheries undertakes day to day management of the Demersal Fishery, on behalf of the NTFJA.

### 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.

The impacts of Illegal, Unreported and Unregulated (IUU) fishing in northern Australian waters, primarily by foreign fishers, are poorly understood. The NT government continues to work with the Australian Government to ensure appropriate measures are applied to mitigate IUU impacts on the sustainability of red snapper stocks.

While it is accepted that most IUU fishers are primarily targeting trepang or sharks, vessels holding significant quantities of red snapper are still being apprehended. Coastwatch surveillance aircraft reported a 40% reduction in sightings in 2007 compared to 2006, (7440 sightings in 2006) highlighting a significant reduction in illegal foreign fishing vessel presence in northern Australian waters. Research to determine the probable impact this illegal foreign presence is having on domestic shark and snapper stocks is continuing with AFMA funding a number of research projects attempting to determine the species and volumes of sharks and snappers being harvested. It is not yet possible to determine the potential effect IUU fishing is having on the tightly regulated domestic Demersal Fishery.

### Future plans

NT Fisheries, in consultation with industry have held a series of workshops to establish a development plan for offshore snappers. The levels of permitted gear (hand and droplines) will be incorporated into discussions with industry over the development plan for the combined offshore snapper fisheries.

Fishers in the Demersal Fishery share the same offshore snapper stocks with the Finfish Trawl Fishery and operators from both fisheries are involved in discussions to develop the shared resource. Discussions held so far have indicated a conservative development plan for the offshore snapper resource. Licensees in those fisheries sharing the offshore snapper resource

in the Arafura Sea have sought to introduce an additional finfish trawl licence to increase resource utilisation, particularly in the more remote regions.

Other issues discussed by industry relate to long term protection of the deepwater goldband snapper habitat areas from potential finfish trawl gear damage and the re-allocation of potential red snapper catch from the Demersal Fishery to the Finfish Trawl Fishery. A suitable mechanism to rationalise licence numbers is currently being developed that aims to avoid any potential for future catch conflicts and ensure the on-going sustainability of red snappers.

The NT and Australian Governments continue to work closely with the Indonesian Government to develop a bilateral Management Plan for red snapper shared stocks in the Arafura Sea.

### **Compliance**

Compliance with the Demersal Fishery management arrangements are undertaken by the Police, Marine and Fisheries Enforcement Section (PMFES) of the NT Police, Fire and Emergency Services, under the NT *Fisheries Act 1988*.

The PMFES monitors and enforces the Demersal Fishery management arrangements through the inspection of vessel arrivals and departures through the single port of Darwin. This includes verification of catch returns against market returns (i.e. requirement for all operators to specify where they are selling their product). The PMFES has the power to investigate the records of wholesalers and licensees.

In 2007, there were no recorded compliance issues for the Demersal Fishery.

### **Consultation, Communication and Education**

Regular consultation occurs between NT Fisheries, the NT Demersal Fishermen's Association and the Northern Territory Seafood Council (NTSC). In addition, NT Fisheries officers 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 environment and conservation groups are also invited to provide their views to NT Fisheries through the release of public discussion papers and other consultative processes.

NT Fisheries also circulate Fisheries Reports and newsletters to inform and educate stakeholders.

Table 1 Decision Rules for the Demersal Fishery

Species or Group	Management objectives	Performance indicator	Trigger reference point	Management response to be taken
Goldband snappers	Ensure inter-generational equity by maintaining ecologically sustainable annual catches in all sectors.	Optimal sustainable yield estimates.	Catch levels increase to 90% of estimated sustainable annual yield.	DFMAC to review fishery and make recommendations to the Director of Fisheries regarding appropriate measures to ensure annual catches do not exceed estimated sustainable yields and onboard monitoring if not already in place, to commence at earliest practical opportunity. <b>Amended arrangements to be implemented within 12 months of trigger being released.</b>
Red snappers		Optimal sustainable yield estimates.		
Red emperor		Significant change in catch composition on Demersal Fishery grounds.	Annual catch increase in proportion of the total catch by greater than 10% above the 5 year average.	DFMAC to review fishery and make recommendations to the Director of Fisheries and onboard monitoring to commence at earliest practical opportunity. <b>Amended arrangements to be implemented within 12 months of trigger being released.</b>
Cods				
Byproduct species	Ensure sustainability of byproduct species taken in the Demersal Fishery.	Monitoring of commercial logbook returns.	Annual catch increase in proportion of the total catch by greater than 10% above the 5 year average.	
Bycatch species	Ensure sustainability of bycatch species taken in the Demersal Fishery.	Onboard monitoring of the adjacent Timor Reef Fishery.	Total bycatch within the Demersal Fishery increases to 10% of total catch or a decline in a species relative numbers without a corresponding change in fishing area or fishing technique.	DFMAC to make recommendations to Director of Fisheries regarding appropriate remedial action and onboard monitoring to commence at earliest practical opportunity. <b>Amended arrangements to be implemented within 12 months of trigger being released.</b>
Endangered, threatened or protected species or communities	Maintain present level of interaction between demersal fishing operations and species and communities listed under the <i>EPBC Act 1999</i> .	Endangered, threatened or protected species and or communities are identified in Northern Territory waters.	Identifiable impacts observed by commercial fishers, fisheries observers or other agencies regarding EPBC listed species or communities.	DFMAC to make recommendations to Director of Fisheries regarding appropriate threat abatement plan implemented and onboard monitoring to commence at earliest practical opportunity. <b>Amended arrangements to be implemented within 12 months of trigger being released.</b>
Ecosystem components	Minimise effects of fishing on ecosystem components.	Identification of threatening processes.	Identification of significant negative interaction with components of the natural ecosystem present on demersal fishing grounds.	DFMAC to make recommendations to Director of Fisheries regarding appropriate remedial action. <b>Amended arrangements to be implemented within 12 months of trigger being released.</b>



## Timor Reef Fishery

### INTRODUCTION

Commercial fishing dominates activities in the remote Timor Reef Fishery, primarily targeting the higher valued goldband snapper. Significant quantities of saddletail snapper, red snapper, red emperor and cods are also harvested. Most products from this fishery are marketed as 'fresh on ice' product with the majority sold as whole fish on the Australian domestic market.

With the passage of revised jurisdictional arrangements in 1995, management of the fishery went to the NTFJA. The NTFJA, through the Northern Territory *Fisheries Act 1988*, manages all finfish taken in the fishery with the day to day management of the fishery being undertaken by NT Fisheries. In 2007, there were 12 licences in the fishery, a reduction from 22 licences in 1993.

Recreational fishing by individuals or through Fishing Tour Operators is rare in the Timor Reef Fishery. This is due to the remote offshore location of the fishery. There has been no Indigenous harvest recorded from this fishery.

The management arrangements for the Timor Reef Fishery are recognised by the Department of Environment, Water, Heritage and the Arts to be operating in an ecologically sustainable manner. The fishery is exempt from export regulations until May 2008.

Industry reported reduced catch rates after 3D seismic surveys were conducted in 2006 by oil and gas exploration companies in highly productive areas of the fishery. Operators reported that they temporarily relocated fishing activities to elsewhere within the fishery, and that this has resulted in higher effort being expended to locate fish and slightly lower catches.

### PROFILE OF THE FISHERY

#### Commercial Sector

##### Area

The Timor Reef Fishery operates well offshore in the Timor Sea, in a remote region extending north-west of Darwin to the Western Australia – Northern Territory border and to the outer limit of the Australian Fishing Zone (AFZ). The fishery

has an area of approximately 8400 nm<sup>2</sup> (Figure 5).

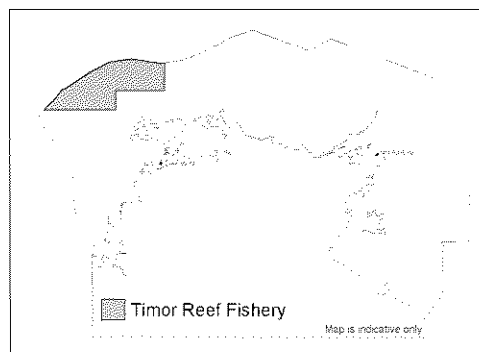


Figure 5. Area of the Timor Reef Fishery

#### Fishing method

Commercial operators are authorised to use baited traps and vertical lines, including handlines and droplines. Prior to 1999, the majority of operators in the Timor Reef Fishery used droplines. However, during 1999-2000 there was an industry-wide change to trap fishing, with only one operator using droplines during 2002. However, owing to the improved quality of line caught fish there was a reversal of this trend with many operators using droplines since 2004. Presently, two vessels use traps.

#### Catch

The principal target species of the Timor Reef Fishery are goldband snapper, which comprise the three species *Pristipomoides multidentis*, *P. typus* and *P. filamentosus*. Together these species comprise 58% of the total catch (Figure 6), with *P. multidentis* being the most common of the three *Pristipomoides* species. Other key species in the fishery are saddletail snapper, red snapper, red emperor and cods (Figure 6).

The species composition of the catch is gear dependant. Drop-liners catch a higher proportion of goldband snapper, compared with trap boats which catch almost equal proportions of red snappers and goldband snapper. There was a higher proportion of trapping this year compared with droplining influencing the slight variation in composition of the total catch from 2006.

In 2007, the total catch from the Timor Reef

Fishery was 689 tonnes, with the goldband snapper catch component being 403 tonnes. This is a slight decrease (5%) in total catch compared to 2006 (726 tonnes), with a small decrease (3%) in the proportion of goldband snapper harvested when compared to the 2006 figure of 416 tonnes.

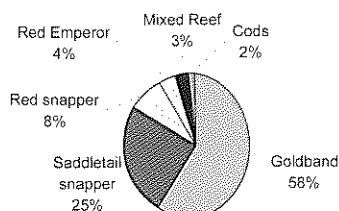


Figure 6. Catch Composition for the commercial Timor Reef Fishery, 2007

### Byproduct

Byproduct species for the Timor Reef Fishery only make up 3% of the overall catch. These include predominantly small snappers, such as *Lutjanus vitta* and *L. russeli*, emperors, such as red spot emperor (*Lethrinus lentjan*), and Robinson's seabream (*Gymnocranius grandoculus*).

The 2007 byproduct level is well below the 10% trigger value required to initiate a review of management arrangements for the protection of byproduct species.

### Effort

During 2007, 11 licences were actively fished and a total of 1340 boat days recorded; an increase from last year's figure of 1178 boat days (Figure 7).

### Catch rates

Nominal catch per unit effort (CPUE) has steadily increased since 1999 which reflects the introduction of traps and increasing investment in the fishery by new operators (Figure 8).

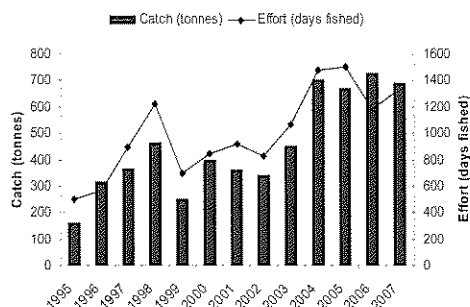


Figure 7. Catch and effort for the commercial Timor Reef Fishery, 1995-2007

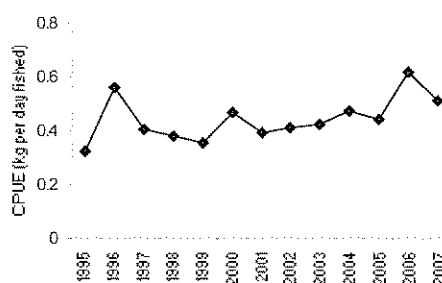


Figure 8. Catch rates for the commercial Timor Reef Fishery, 1995-2007

### Marketing

Due to the lack of consumer familiarity with tropical snappers 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 break-through for these species.

Currently, almost all snappers landed within the dropline 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 metropolitan marketing systems, with a local representative of a major seafood wholesaler continuing to co-ordinate consignments to east

coast markets. At least one operator independently catches from his two vessels.

### **Non-retained Species**

Non-retained species include chinaman fish, red sea bass, big eye trevally and starry triggerfish.

For the Timor Reef Fishery, the reported and observed level of bycatch (non-retained species) is less than 1% of the total catch.

Bycatch in this fishery is below the 10% trigger value.

### **Threatened species interaction**

In 2007, no interaction between the fishing gear and protected species was reported or observed in the Timor Reef Fishery. Such interactions are not expected to occur with a deep-water trap fishery.

### **Ecosystem Impact**

The management arrangements for the fishery allow operators to use passive fishing gear comprised of droplines and traps. Interaction with the habitat is limited to the effects of traps and dropline weights on the substrate, and the effect of anchors. Traps are connected individually to an identifying float by a single line. Traps are not attached to each other in order to avoid excessive interaction with the substrate upon hauling. 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 either its impact or occurrence. Underwater video observation of traps during commercial fishing operations throughout northern Australia has shown the unimpeded 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 to the then emerging fishery from the impacts of demersal fish trawling. The Australian Government managed Northern Prawn Fishery allows prawn trawlers to operate year round in offshore waters throughout northern Australia. Prawn and scampi (deepwater

shellfish) trawling activity is generally limited to water greater than 200 m deep in areas immediately north of current Timor Reef Fishing grounds.

### **Social Impact**

This fishery directly employs over 42 people as boat crew, packers and marketers and numerous people in other support industries, including transport, ice manufacturers, packaging companies, boat repairs and electrical maintenance services.

### **Economic Impact**

At the point of first sale in 2007, the overall catch value of the Timor Reef Fishery was \$4.53 million. The goldband snapper component was valued at \$3.41 million in 2007 (2006 - \$2.77 million) with saddletail snapper component valued at \$0.59 million (2006 - \$0.86 million).

## **STOCK ASSESSMENT**

### **Monitoring**

This fishery is monitored primarily through logbooks, which operators are required to complete on a daily basis during fishing operations. These logbooks provide detailed catch and effort information, as well as information on the spatial distribution of the fishery. Logbooks are submitted with monthly marketing information by the 28<sup>th</sup> day of the following month.

In addition to logbooks, NT Fisheries officers conducted onboard monitoring of two commercial fishing trips. While onboard, observers documented vessel and gear information, location, depth, fishing practices, catch composition (including bycatch) and, where possible, measured all landed species.

### **Stock Assessment Methods and Reliability**

A stock assessment of goldband snapper for the Timor Reef Fishery was undertaken in 2003. This analysis also included part of the Demersal Fishery from the boundary of the Timor Reef Fishery to longitude 133° E, as 95% of the Demersal Fishery catch of goldband snapper is within this area. These two sectors encompass the same goldband snapper stocks. The models used in this stock assessment were extensions of

those developed by Professor Carl Walters at a workshop in Darwin in 1996 and details can be found in Ramm (1997).

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 important productivity parameters for goldband snapper) are not known. However, the goldband snapper biomass has been estimated to be between 3000 – 20 000 tonnes, with 9000 tonnes considered the more realistic estimate. It has been recommended that the harvest level of goldband snapper should not exceed 10-15% (900-1350 tonnes) of estimated biomass.

### Current Status

In the Timor Sea, goldband snappers are targeted by Indonesian long line vessels as well as Australian dropline and trap vessels. These methods target fish above the size of maturity. Harvest levels in the Australian sector of the Timor Sea are below current reference points.

### Future Assessment Needs

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

## RESEARCH

### Summary to Date

Fine spatial analysis of this fishery was undertaken as part of a Fisheries Research and Development Corporation (FRDC) funded project 2005/047 which commenced in October 2005. This project used GIS spatial statistics methods to investigate new ways to incorporate the very diverse forms of physical and environmental data, often on different scales, with Timor Reef Fishery logbook data. This study showed that bathymetry and geomorphology strongly influence catches of goldband snapper (Figure 9).

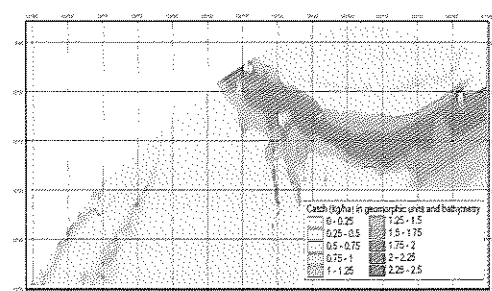


Figure 9. Abundance of goldband snapper catch (kg/ha)

The stock structure of goldband snapper has been determined using both genetic methods and otolith microchemistry, and was funded by FRDC (1996/131, 1998/154). These studies were collaborative projects between NT Department of Primary Industry, Fisheries and Mines (DRDPPIFR), Western Australian Department of Fisheries and Queensland Department of Primary Industries (QDPI). Both studies used fish from the same sites.

The genetic study showed no differences between Australian sampling sites in the Timor and Arafura Seas, but a significant difference in the Timor Sea between Kupang (West Timor) and the north-west Australian site. These sites were located less than 200 nautical miles from each other on either side of the Timor Trench (Ovenden et al., 2002). Otolith microchemistry revealed distinct populations for all sites sampled, indicating that substantial movement of adults between sites is unlikely (Newman et al., 2000).

Growth and reproductive studies were undertaken on goldband, as part of the collaborative ACIAR funded project between Australia and Indonesia (FIS/1997/165). This study provided updated 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 between the Northern Territory, Western Australia and Indonesia.

## Current Research

Current research is focused on developing a holistic approach to fisheries management using Geospatial statistics and fuzzy rule-based modelling. This work, funded by FRDC (project 2005/047), explores new ways of incorporating the very diverse forms of physical and environmental data (often on different spatial scales), with catch and effort data from the Timor Reef Fishery. This will enable analysis of the many components that may affect fish abundance and catchability in a geo-referenced framework. The fuzzy rule-based modelling allows the uncertainties of human knowledge to be captured as hard data. This work is expected to be completed in 2007 with the final report due for release in 2008.

A project to determine the potential impacts of 3D seismic surveys on gold band snapper hearing was undertaken by Curtin University with the Fisheries Division as collaborators. This project was funded by Santos Ltd and was completed in December 2007. However, the results of the tests were deemed inconclusive and suggested more targeted work was required to isolate the cause of any effects.

## MANAGEMENT AND GOVERNANCE

### Management

#### Objective

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 the fishery (Table 2).

Existing arrangements also seek to ensure the sustainability of byproduct species taken in the Timor Reef Fishery. Acceptable catch ranges for byproduct are not more than 10% of the weight of aggregate landings in the fishery.

Monitoring of the fishery is achieved through analysis of commercial logbook reports and onboard observers.

Controls on the construction and use of fish traps and droplines minimise the effects on ecosystem components. Should significant interaction with components be identified, the appointed Timor Reef fishery Management Advisory Committee (TRFMAC) will make recommendations regarding appropriate remedial action. No such interactions were identified during 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 1995, 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 response 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. NT Fisheries undertake 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**

The impacts of Illegal, Unreported and Unregulated (IUU) fishing in northern Australian waters, primarily by foreign fishers are poorly understood. The NT Government continues to lobby the Australian Government to ensure adequate resources are allocated by the Australian Government (governing body is the Australian Fisheries Management Authority (AFMA)) to mitigate IUU impacts on the sustainability of red snapper stocks.

While it is accepted that most IUU fishers are primarily targeting trepang or sharks, apprehended vessels holding significant quantities of red snapper are still present. Coastwatch surveillance aircraft reported a 40% reduction in sightings in 2007 compared to 2006, (7440 sightings in 2006) highlighting a significant reduction in illegal foreign fishing vessel presence in northern Australian waters. Research to determine the probable impact of this illegal foreign presence is continuing, with AFMA funding a number of research projects attempting to determine the species and volumes of sharks and snappers being harvested. It is not yet possible to determine the affect that IUU fishing is having on the tightly regulated domestic Timor Reef Fishery.

Oil and gas exploration companies carried out 3D seismic surveys within the Timor Reef Fishery in 2006, after which reduced catch rates were reported by fishers from within the survey areas. Operators reported that they temporarily relocated fishing activities to elsewhere within the fishery. NT Fisheries, with financial assistance from exploration companies, carried out additional research and monitoring of the survey areas in an attempt to quantify the surveys impacts. Industry and NT Fisheries continue to lobby oil and gas exploration companies in an

effort to increase cooperation and to reduce economic impacts on fishing operators.

### **Future plans**

An industry request to review the levels of permitted gear (traps and droplines) and management arrangements was undertaken throughout 2006–07 with a view to developing a formal plan of management for the fishery. The TRFMAC received advice from the Timor Reef Fishery Assessment Group (TRFAG) whose task was to explore the potential of introducing catch quota management of the target species into revised management arrangements. The TRFMAC has considered the TRFAG's findings and has recommended that catch quota management be introduced into the management arrangements of the Timor Reef Fishery. The TRFMAC recommendation is being carefully considered by Government to determine how the recommendations can be incorporated into a draft management plan 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 regular review.

### **Compliance**

Compliance with the Timor Reef Fishery management arrangements is undertaken by the Police, Marine and Fisheries Enforcement Section (PMFES) of the NT Police, Fire and Emergency Services, under the NT *Fisheries Act 1988*.

The PMFES monitors compliance and enforces the Timor Reef Fishery management arrangements 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 PMFES has the power to investigate the records of wholesalers and licensees.

In 2007, there was no significant domestic compliance issues recorded for this fishery.

### **Consultation, Communication and Education**

Regular consultation occurs between NT Fisheries, the NT Timor Reef Fishermen's Association and the Northern Territory Seafood Council. In addition to this, NT Fisheries staff regularly visits the wharf to speak informally with fishers.

The low levels of participation in the Timor Reef Fishery allow all stakeholders to be directly involved in discussions on any proposed management arrangements. The TRFMAC formally represents the interests of all stakeholders and provides a forum to discuss any proposed amendments to the management regime. The TRFMAC met in June and November in 2007. The TRFAG was convened in 2006 and last met in March 2007 to discuss the potential for alternative management arrangements. Recommendations from this group were passed to the TRFMAC for consideration.

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

NT Fisheries also produces publications in the form of Fisheries Reports and newsletters to inform and educate stakeholders.

Table 2 Decision Rules for the Timor Reef Fishery

Species or Group	Management objectives	Performance indicator	Trigger reference point	Management response to be taken
Goldband snappers	Ensure inter-generational equity by maintaining ecologically sustainable annual catches in all sectors.	Optimal sustainable yield estimates.	Annual catch exceeds 900 tonnes (estimated sustainable yield) (2007, 403 tonnes.)	TRFMAC to review fishery and make recommendations to the Director of Fisheries regarding appropriate measures to ensure annual catches do not exceed estimated sustainable yields.  Amended arrangements to be implemented within 12 months of trigger being released.
Red snappers (including saddletail snapper)	Ensure inter-generational equity by maintaining ecologically sustainable annual catches in all sectors.		Annual combined catch exceeds 1,300 tonnes (estimated sustainable yield) (2007, 228 tonnes.)	
Red emperor	Ensure inter-generational equity by maintaining ecologically sustainable annual catches in all sectors.	Significant change in catch composition on Timor Reef Fishery grounds.	Annual catch increase in proportion of the total catch by greater than 25% above the 5 year average.	TRFMAC to review fishery and make recommendations to the Director of Fisheries.  Amended arrangements to be implemented within 12 months of trigger being released.
Cods			Annual catch increase in proportion of the total catch by greater than 10% above the 5 year average.	
Byproduct species	Ensure sustainability of byproduct species taken in the Timor Reef fishery.	Monitoring of commercial logbook returns.	Annual catch increase in proportion of the total catch by greater than 10% above the 5 year average.	
Bycatch species	Ensure sustainability of bycatch species taken in the Timor Reef Fishery.	Onboard monitoring of Timor Reef Fishery.	Total bycatch within the Timor Reef Fishery increases to 10% of total catch or a decline in a species relative numbers without a corresponding change in fishing area or fishing technique.	TRFMAC to make recommendations to Director of Fisheries regarding appropriate remedial action and onboard monitoring to commence at earliest practical opportunity.  Amended arrangements to be implemented within 12 months of trigger being released.
Endangered, threatened or protected species or communities	Maintain present level of interaction between Timor Reef fishing operations and species and communities listed under the <i>EPBC Act 1999</i> .	Endangered, threatened or protected species and or communities are identified in Northern Territory waters.	Identifiable impacts observed by commercial fishers, fisheries observers or other agencies regarding EPBC listed species or communities.	TRFMAC to make recommendations to Director of Fisheries regarding appropriate threat abatement plan implemented and onboard monitoring to commence at earliest practical opportunity.  Amended arrangements to be implemented within 12 months of trigger being released.
Ecosystem components	Minimise effects on ecosystem components.	Identification of threatening processes.	Identification of significant negative interaction with components of the natural ecosystem present on Timor Reef fishing grounds.	TRFMAC to make recommendations to Director of Fisheries regarding appropriate remedial action.  Amended arrangements to be implemented within 12 months of trigger being released.



## Finfish Trawl Fishery

### INTRODUCTION

The principal species landed in the Finfish Trawl Fishery are red snappers. Products from this fishery are marketed primarily as whole fresh fish with the majority sold on the Australian domestic market.

The Finfish Trawl Fishery is comprised of a single Finfish Trawl operator fishing in offshore waters east of Darwin and includes the northern region of the Gulf of Carpentaria east to the Queensland border.

The NTFJA, through the Northern Territory *Fisheries Act 1988*, manages finfish taken in the fishery with the day to day management of the fishery undertaken by NT Fisheries.

The Finfish Trawl Fishery has been assessed by the Commonwealth Department of Environment and Heritage (now known as the Department of Environment, Water, Heritage and the Arts (DEWHA)) against the *Guidelines for the Ecologically Sustainable Management of Fisheries*. The fishery has received full Export Exempt accreditation under the Commonwealth *Environment Protection and Biodiversity Conservation Act* (the EPBC Act). The assessment is due for review in May 2009.

### PROFILE OF THE FISHERY

#### Commercial Sector

##### Area

The Finfish Trawl Fishery operates in offshore waters east of Darwin to the outer limit of the Australian Fishing Zone (AFZ), excluding the area of the Timor Reef Fishery (Figure 10).

Within this overall area of approximately 202 000 km<sup>2</sup>, only a relatively small portion is currently fished due to the single operator targeting the higher yield red snapper fishing grounds. Although legally able, the Finfish Trawl operator does not presently fish the same grounds as the Demersal Fishery licensees.

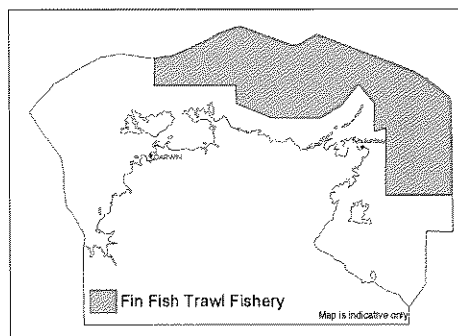


Figure 10. Area of the Finfish Trawl Fishery

### Fishing method

This fishery has only one licensed trawl operator. Fishing operations are conducted using a semi-pelagic demersal trawl. This trawl net was developed cooperatively by industry and NT Fisheries to minimise habitat disturbance while 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.

The operator is currently trialing bycatch reduction devices (BRD's) and square mesh cod-ends in order to increase the value of the landed product, rather than increase his catch volume.

### Catch

Saddletail snapper and red snapper are the target species of the Finfish Trawl Fishery, comprising 72% of the total catch (Figure 11).

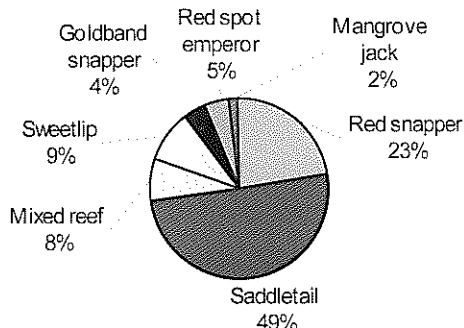


Figure 11. Catch composition for the commercial Finfish Trawl Fishery, 2007

Since 1995, catches have increased steadily, peaking in 2001 (Figure 12). In 2007, the catch

was 847 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.

In 2007, byproduct harvest was 233 tonnes. These species include primarily goldband snappers, red spot, and painted sweetlip

### Effort

Fishing effort has increased steadily from 158 boat days in 1995, peaking at 294 boat days in 2003. During 2007 effort was 257 boat days, an increase from the 235 days in 2006 (Figure 12). However, as with interpreting catch, there are many reasons for changes to effort that are particularly emphasised by a single operator for overall fishery trends.

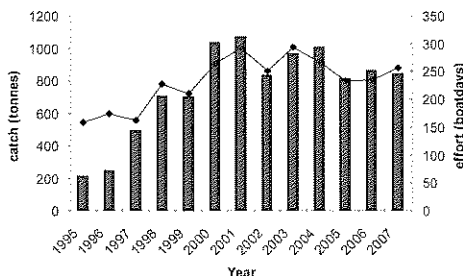


Figure 12. Catch and effort for the commercial Finfish Trawl Fishery, 1995-2007

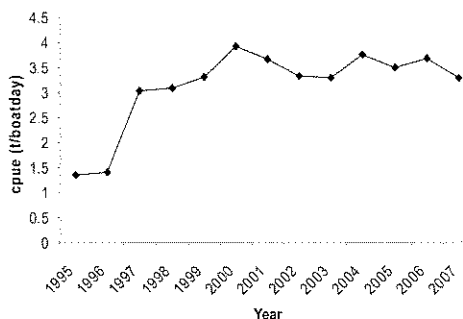


Figure 13. Catch rates for the commercial Finfish Trawl Fishery, 1995-2007

### Catch rates

Since 1997, the average catch per unit effort (CPUE) has varied between 3.0 and 3.9 tonnes per boat day (Figure 13). Average CPUE for 2007 was 3.3 tonnes/boat day.

### Marketing

Product is transported from Darwin in refrigerated trucks to southern markets as 90% of the product is sold in Australia as fresh fish. The majority of the remaining 10% is sold to export markets in Asia and the US.

### Recreational Sector

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

### Fishing Tour Operator Sector

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

### Non-retained Species

For the commercial Finfish Trawl Fishery, 18% of the total catch is discarded. High proportions of discarded species (by weight) are sharks and rays (as there is a 'no-take' regulation in place with regard to these species).

To assist in reducing release mortality, the operator has developed a system comprising grids and rails on the fish hopper to enable sharks and rays to be returned to the water via a chute, alive and in a timely manner. The hopper system is being evaluated by other trawl fisheries interstate with the intention of incorporating its use as standard operating practice.

### Threatened species interaction

In 2007, there was one recorded interaction with a Flatback turtle (*Natator depressus*) in the Finfish Trawl Fishery. The turtle was released alive directly from the specially designed fish hopper grid system. The method of fishing and the location of the fishery generally prevent the interaction with these species.

### Ecosystem Impact

NT Fisheries has encouraged fishing practices that cause minimal impact to the ecosystem.

The development, in conjunction with industry, of a semi-pelagic demersal trawl net minimises sea bed disturbance and reduces the amount of bycatch and environmental impact in the fishery.

Additionally, the operator is trialling Bycatch Reduction Devices and employing square mesh codends to further reduce broader ecosystem impacts.

### **Social Impact**

This fishery directly employs less than 10 people. However, there are flow-on benefits from the fishery for other industries (e.g. freight haulage and vessel repairs). 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 this particular fishery (one operator only) is confidential. It is the policy of NT Fisheries that information obtained from a fishery with less than five active operators will not be released without prior consent from the licensee(s).

## **STOCK ASSESSMENT**

### **Monitoring**

This fishery is monitored primarily through logbooks, which operators are required to complete on a daily basis during fishing operations. These logbooks provide detailed catch and effort information, as well as information on the spatial distribution of the fishery. Logbooks are submitted with monthly marketing information by the 28<sup>th</sup> day of the following month. In addition to logbooks, NT Fisheries officers conduct onboard monitoring of commercial fishing trips. While onboard, observers document vessel and gear information, location, depth, fishing practices, catch composition (including bycatch) and, where possible, measure most landed species.

One onboard monitoring trip was conducted in the calendar year. However, this level of monitoring is considered adequate given the single operator, relatively low levels of bycatch and the pro-active actions taken to further reduce the level of bycatch.

### **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 Walters (Ramm 1997). The more recent assessment, Yield Per Recruit and Biomass Dynamics models, incorporated updated biological parameters.

An absolute figure cannot be placed on sustainable harvest for the fishery because key parameters (Indonesian catch and effort, level of interchange of fish and recruits, and important productivity parameters for red snapper) are not well 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 24 000 tonnes. It has been agreed that a trigger point be implemented for management purposes if harvest levels exceed 10% of this figure.

Genetic studies undertaken as part of an Australian Centre for International Agricultural Research (ACIAR) project (FIS/1997/165) indicate that red snapper and saddletail snapper stocks are shared with Indonesia in the Arafura Sea (Salini et al. 2006).

### **Current Harvest Status**

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 or movement rates between sectors is 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**

Identification of the future assessment needs for red snapper research is being addressed at a

national level through the Northern Australian Fisheries Management Forum (NFAM) and the Northern Stock Assessment Group (NSAG). There is consensus that the following areas are of high priority:

- completion of an updated red snapper stock assessment
- data warehousing for historical data
- investigation of the degree of movement of red snappers
- investigation of the effect of illegal, unreported and unregulated (IUU) fishing on red snapper stocks
- identification of juvenile habitats
- undertaking of fishery independent surveys.

## RESEARCH

### Summary to Date

A joint project between NT Fisheries, CSIRO and Indonesia (funded by ACIAR) has investigated the biology, life history and sustainability of the target species for this fishery saddletail and red snapper which account for 72% of the Finfish Trawl Fishery catch. Findings from this project are outlined in the final report of ACIAR project FIS/1997/165 (available on the ACIAR website, <http://www.aciar.gov.au>).

### Incorporation into Management

Stock assessment findings have been incorporated into management plans, ensuring that trigger points are set within sustainable limits for the Australian sector of these stocks.

### Current Research

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

## MANAGEMENT AND GOVERNANCE

### Management

#### Objective

Management of the Finfish Trawl Fishery seeks to ensure the ecological sustainability of target, byproduct and bycatch species. Trigger points and management actions for the Finfish Trawl Fishery are listed in Table 3. An appropriate

management response would be made in consultation with stakeholder groups should a trigger point be reached. Amended arrangements are to be implemented within 12 months of a trigger being activated.

### History

With the passage of the revised jurisdictional arrangements contained in the Offshore Constitutional Settlement (OCS) of 1995, management of the trawl, shark and line fishing and trapping in waters adjacent to the Northern Territory passed to the NTFJA.

The NTFJA provides for the Commonwealth and the Northern Territory to jointly manage the fishery given the likelihood of shared resources with adjacent national and international jurisdictions. NT Fisheries on behalf of the NTFJA undertakes the day-to-day management of the fishery.

### Current issues

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* (EPBC Act). The fishery received the highest level of accreditation (export exempt) and has been added to the list of fisheries exempt from export regulations for five years.

The impacts of Illegal, Unreported and Unregulated (IUU) fishing in northern Australian waters, primarily by foreign fishers are poorly understood. The NT Government continues to work with the Commonwealth Government to ensure appropriate programs are implemented to mitigate IUU impacts on the sustainability of red snapper stocks.

While it is accepted that most IUU fishers are primarily targeting trepang or sharks, apprehended vessels holding significant quantities of red snapper are still present. Coastwatch surveillance aircraft reported a 40% reduction in sightings in 2007 compared to 2006, (7440 sightings in 2006) highlighting a significant reduction in illegal foreign fishing vessel presence in northern Australian waters. Research to determine the probable impact this illegal foreign presence is having on domestic shark

and snapper stocks is continuing with AFMA funding a number of research projects attempting to determine the species and volumes of sharks and snappers being harvested. It is not yet possible to determine the potential effect IUU fishing is having on the tightly regulated domestic Finfish Trawl Fishery.

#### **Future plans**

NT Fisheries, in consultation with industry have held a series of workshops to develop a Sectorial Development Plan for offshore snappers.

Fishers in the Demersal Fishery share the same offshore snapper stocks with the Finfish Trawl Fishery. Operators from both fisheries are involved in discussions to develop the shared resource. Discussions held so far have indicated a conservative development plan for the offshore snapper resource.

Licensees in fisheries sharing the offshore snapper resource in the Arafura Sea have sought to introduce an additional Finfish Trawl licence to increase resource utilisation, particularly in the more remote regions. In 2006, the NTFJA granted approval to issue an additional Finfish Trawl licence for the fishery subject to certain criteria being filled. A process to facilitate this and ensure total catch across offshore snapper fisheries remains sustainable is being developed. This process will need to address issues such as the long term protection of the deepwater goldband snapper habitat areas from finfish trawling and the permanent re-allocation of potential red snapper catch from the Demersal Fishery to the Finfish Trawl Fishery to avoid any potential for future catch conflicts and ensure the

on-going sustainability of red snappers.

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

#### **Compliance**

Compliance with the Northern Territory Finfish Trawl Fishery management arrangements are undertaken by the Police, Marine and Fisheries Enforcement Section (PMFES) of the NT Police, Fire and Emergency Services, under the NT *Fisheries Act 1988*.

The PMFES monitors and enforces the Finfish Trawl Fishery management arrangements through the inspection of vessel arrival and departures through the 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 PMFES has the power to investigate the records of wholesalers and licensees. In 2007 there were no recorded compliance issues with this 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, with no major domestic fishery issues identified.

#### **Consultation, Communication and Education**

Joint industry-government forums are used to consult with the single Finfish Trawl operator. NT Fisheries also circulate Fisheries Reports and newsletters to inform and educate stakeholders.

Table 3 Decision Rules for in the Finfish Trawl Fishery

Species/Group	Management objectives	Performance indicator	Trigger reference point	Current status review	Management response to be taken
Red snappers	Ensure intergenerational equity by maintaining ecologically sustainable annual catches in all sectors	Sustainable yield estimates for nominated regions	Combined Finfish Trawl and Demersal fishery catch levels increase to 2500 t over the next calendar year. Catch levels decline by 30% over the next calendar year (Finfish Trawl only).	Combined red snapper catches in 2007. - 610 tonnes  Catch levels decreased by 10% over 2006 catch levels.  Trigger reference point not exceeded.	Stakeholders to review fishery and make recommendations to the Executive Director of Fisheries regarding appropriate measures to ensure annual catches do not exceed estimated sustainable yields. Amended arrangements to be implemented within 12 months of trigger being released.
Byproduct species	Ensure ecological sustainability of byproduct species taken in the Finfish Trawl Fishery	Monitoring of commercial logbook returns	Annual catch increase in proportion of the total catch by greater than 35%	2007 – 28%  Trigger reference point not exceeded.	Stakeholders to review fishery and make recommendations to the Executive Director of Fisheries. Amended arrangements to be implemented within 12 months of trigger being released.
Bycatch species	Ensure ecological sustainability of bycatch species taken in the Finfish Trawl Fishery	Onboard monitoring of Finfish Trawl Fishery	Total bycatch within the Finfish Trawl Fishery increases to 35% of total catch or a decline in a species relative numbers without a corresponding change in fishing area or fishing technique	2007 – 18%  No identified decline in a species relative numbers.  Trigger reference point not exceeded.	Stakeholders to make recommendations to Executive Director of Fisheries regarding appropriate remedial action. Amended arrangements to be implemented within 12 months of trigger being released.
Endangered, threatened or protected species or communities	Ensure the continued protection of species and communities listed under the EPBC Act 1999 and the Territory Wildlife and Conservation Act 2000	Endangered, threatened or protected species and or communities are identified in NT waters	Identifiable impacts observed by commercial fishers, fisheries observers or other agencies regarding EPBC listed species or communities	No identifiable impacts have been observed in 2007.  Trigger reference point not exceeded.	Stakeholders to make recommendations to Executive Director of Fisheries regarding the implementation of a threat abatement plan, if required. Amended arrangements to be implemented within 12 months of trigger being released.
Ecosystem components	Minimise effects on ecosystem components	Identification of threatening processes	Identification of significant negative interaction with components of the natural ecosystem present on Finfish Trawl fishing grounds	No negative ecosystem interactions identified.  Trigger reference point not exceeded.	Stakeholders to make recommendations to Executive Director of Fisheries regarding appropriate remedial action. Amended arrangements to be implemented within 12 months of trigger being released.

## Offshore Net and Line Fishery

### INTRODUCTION

The commercial Offshore Net and Line Fishery (ONLF) is a mixed target fishery. The target species are blacktip sharks (*Carcharhinus tilstoni*, *C. limbatus* and *C. sorrah*) and grey mackerel (*Scomberomorus semifasciatus*), with a variety of other sharks and pelagic finfish also landed.

A joint authority between the Northern Territory and the Commonwealth, established under an OCS arrangement, manages the ONLF. This provides for the Territory to manage the day to day operations of the fishery on behalf of the NTFJA. From the commencement of the fishery, an overarching conservative approach has been taken in its management. The ONLF is a small scale fishery operating in a large area. Strict gear specifications have been introduced, resulting in selective targeting of smaller more productive sharks species, with little impact on larger, susceptible shark species.

The fishery is limited entry, with the number of commercial participants having been reduced considerably over the years through a three-for-one licence reduction scheme. There are now seventeen licences permitted to operate in the fishery of which 11 were active in 2007.

Cooperative research efforts are under way with adjacent jurisdictions, with the Northern Territory actively contributing to the implementation of the National Plan of Action for Sharks (NPOA Sharks). The Northern Territory also coordinates the northern response to the requirements of the Operational Plan for the Sustainable Use of Northern Australian Shark Resources (OPSUNASR).

In 2007 the ONLF received a Wildlife Trade Operation level of export as assessed against the Australian Government Guidelines for the Sustainable Management of Fisheries under the EPBC Act. The management arrangements of the fishery are recognised by the Australian Government to be operating in an appropriately precautionary manner, and the fishery is exempt from export regulation for three years. The fishery is due for reassessment in November 2010.

Small numbers of sharks are also taken as byproduct in a range of fisheries targeting other species. The incidental take of sharks in other Northern Territory fisheries remains around 5% of the total combined fisheries shark catch indicating that the dedicated Offshore Net and Line Fishery accounts for 95% of the total shark catch.

### PROFILE OF THE FISHERY

#### Commercial Sector

##### Area

Licensees are authorised to fish in Northern Territory waters from high water to the AFZ boundary, an area of approximately 522 632 km<sup>2</sup>, with spatial restrictions placed on the use of certain gear. However, the majority of the fishing is undertaken within the coastal zone (within 12 nm of the coast or baseline) and immediately offshore in the Gulf of Carpentaria. Little fishing was undertaken in the offshore area of the fishery during 2007, as in previous years.

##### Fishing method

Operators may use either longlines or pelagic nets, but the use of bottom set gillnets is prohibited. The majority of shark fishing is undertaken by pelagic gill net. Although the legal maximum length is 2000 m, for operational reasons, nets are generally 1000 to 2000 m in length with a mesh size of 160 mm to 185 mm. Most nets are constructed of monofilament nylon, with a drop of 50 to a maximum 100 meshes. The nets are weighted and have a buoyed headline. Longlines are permitted no more than 15 nm of length and a maximum of 1000 snoods (hooks). Autobaiting gear is also prohibited.

##### Catch

As described above, operations in the ONLF are such that there are two separate target species groups: sharks, principally the blacktip sharks, and grey mackerel.

Logbook records indicated a total catch of all species for the fishery in 2007 of 1193.1 tonnes, again a slight decrease (7.6%) from the 2006 catch of 1292 tonnes. The total shark catch for 2007 was a notable increase (18.6%) to 925 tonnes, from the 780 tonnes of 2006 (Figure 14).

This was despite a decrease in total effort in the fishery, with 729 days fished. Precautionary measures introduced to contain effort in the fishery in 2005, as well as IUU fishers and operational considerations, have successfully led to reduced domestic effort over the last three years, relative to the preceding few years (Figure 14).

Blacktip shark catches were 493 tonnes, an increase of 7.9% on the 457 tonnes landed in 2006. The proportion of blacktips in the landed catch was 41.4% compared to 37.2% in 2006 and 27% of the catch in 2004 and 2005 (Figure 15). The grey mackerel catch of 240 tonnes, 20.2% of the total landings, was a 40.4% decrease from the 404 tonnes taken in 2006 (Figure 14).

The previously strong increasing trend in catches evident since 1999 was reversed in 2005 (Figure 1). Although grey mackerel remained the principal single target species in the fishery, operators report that market forces and other operational considerations such as weather conditions may be among the principal drivers of variation within grey mackerel catches. Catch variations largely result from variations in targeting. However, it has not been 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.

No other fishery in the Northern Territory is licensed to target shark or grey mackerel. A prohibition on the possession of sharks and shark product exists for the Timor Reef, Demersal, Finfish Trawl, and Spanish Mackerel Fisheries.

### Byproduct Species

The catches of sharks other than blacktips increased from 323 tonnes in 2006, to 431 tonnes in 2007 (36.2% of the total catch, Figure 15). This may be due to a number of factors, but it is most likely a result of the increase in observer coverage which has led to better shark identification. Byproduct species were principally several species from the Family Carcharhinidae (the whaler or requiem sharks), mostly *Carcharhinus* spp., among the most important of which was the pig eye shark (*C. amboinensis*,

producing 171 tonnes) and *Rhizoprionodon* spp., as well as hammerhead sharks (*Eusphyrus blocchii* and *Sphyrna* spp.).

There were 16.4 tonnes of mackerels other than grey mackerel landed (1.4% of the total catch), all declared to be narrow-barred Spanish mackerel (*Scomberomorus commerson*). Small quantities of other fish species landed included tunas, mainly *Thunnus tonggol*, (a combined total of 8.6 tonnes), 2.0 tonnes of queenfish (*Scomberoides* spp.) plus trevallies (mostly *Caranx* spp. and *Carangoides* spp.) and pomfret (*Parastromateus niger*) as well as several coastal species, each with landings of less than one tonne.

Sharks were landed as an incidental catch in a range of commercial fisheries targeting other species. Under the Restricted Bait Net entitlement held by these fisheries, catches in 2007 were 16.9 tonnes. A strict 500 kg limit of shark per trip as byproduct applies for the Barramundi, Coastal Line and Coastal Net Fisheries. The Barramundi Fishery harvested 11.9 tonnes, while the Coastal Net Fishery landed 4.3 tonnes, and the Coastal Line Fishery 4.5 tonnes. The total catch of 39 tonnes of shark landed by fisheries other than the ONLF in 2007 was similar to the 44 tonnes landed by these fisheries in 2004, and a reduction from the 54 tonnes of 2005 and 41 tonnes of 2006. Shark landings from fisheries other than the ONLF have fluctuated between 32 and 79 tonnes since 1994.

In most years, a very small catch of grey mackerel is recorded as taken in the Spanish Mackerel Fishery. In 2007, the harvest of grey mackerel in this fishery was just two fish, weighing a total of 10.5 kg.

### Effort

Effort fluctuations have largely driven the high variability in catches of sharks and mackerel in the ONLF. Fishers indicate that effort reflects both operational and market conditions. Recorded effort prior to 1 July 2005 (when known as the Shark Fishery) did not indicate target species. As a result only effort directed at the fishery as a whole can be reported. This constraint has been addressed through recently-introduced logbook amendments.

After initial low effort in the early 1980s, effort in



the ONLF was stable at around 900-1000 boat days through the late 1980s and early 1990s (Figure 14; the mean for 1985-1991 was 932.6 boat days). 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. Measures introduced to contain effort resulted in a decline to 1538 boat days in 2004, 1176 boat days in 2005, 899 boat days in 2006, to 729 boat days in 2007. It is also important to note that, in very remote areas such as the Top End and the western Gulf of Carpentaria, operational considerations such as weather and fuel availability are important contributors to effort variation.

### Catch rates

Nominal catch rates for shark (Figure 16) have shown a relatively flat trend over the last two decades, except during high points in the mid-1990s and an increasing trend during 2004-07. Catch rates for total shark in the ONLF, for most years since 1983, have been between 300 and 500 kg/day fished, but reached 626 kg/day in 1995, exceeded 700 kg/day in 2004 and 2005, and were 877 kg/day and 1268 kg/day in 2006 and 2007 respectively. Catch rates for blacktip sharks have shown a similar pattern, varying in the range 244-398 kg/day between 1997 and 2003. However, with catch rates of 286 kg/day in 2004 and 322 kg/day in 2005, only in 2006 and 2007 was there a similar increase in catch rate to that shown by sharks in total, with the respective catch rates for blacktip sharks being 514 kg/day and 677 kg/day. Grey mackerel catch rates have generally followed a pattern of a steady increase from the early 1990s, but experienced a decline in 2007 to 330 kg/day, similar to the catch rates of 2002 and 2004 (436 kg/day and 415 kg/day respectively).

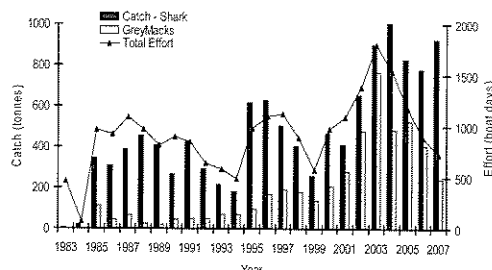


Figure 14. Catch and effort for the commercial Offshore Net and Line Fishery, 1983-2007

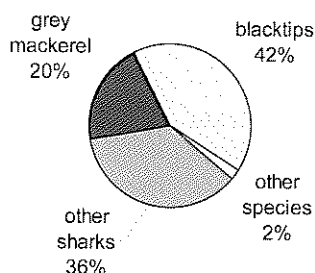


Figure 15. Catch composition for the commercial Offshore Net and Line Fishery, 2007

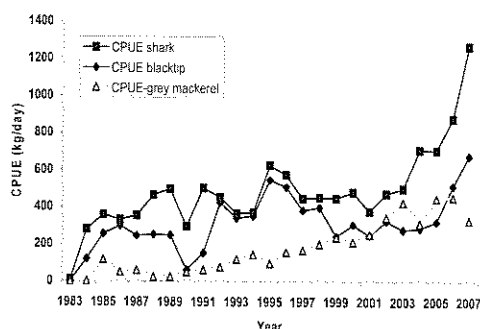


Figure 16. Catch rates for the commercial Offshore Net and Line Fishery, 1983-2007

## 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 a valuable product but must be landed with a prescribed proportion of shark meat. This measure is designed to contain wasteful practices in which only the fins are retained and the shark body is returned to the water. While some shark product is retained for local processing and consumption, most is sent interstate, with over 20% of total shark catch earmarked for direct export overseas.

## Recreational Sector

### Area

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

### Fishing method

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

### Recreational Sector Catch

Sharks are not targeted by recreational fishers, but are caught during other targeted fishing activities.

In 2000, a survey of recreational fishers found that over 76 000 sharks were caught, with 8000 harvested and the remainder released. This indicates a 47% reduction in harvest rate since 1995. In 1995, over 80 000 individuals were caught, with only 18% were retained, giving a harvest of 15 000 individuals.

The 2000 survey indicated that barramundi fishing, reef fishing and non-target fishing accounted for 14%, 26% and 52% of the total shark catch respectively. The mortality rate of released sharks is not known. In 1995, 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 undertaken. During non-target fishing 34% of sharks caught are harvested, while reef fishers only harvest 12%.

Grey mackerel was not identified as a specific catch in either the 2000 or 1995 recreational fishing surveys. All species of mackerel were reported as one group, including Spanish, grey, and spotted mackerel. In 2000, the estimated total mackerel catch was 25 233 individuals with 64% released.

## Fishing Tour Operator Sector

Sharks and grey mackerel are not specifically targeted by Fishing Tour Operators (FTOs), but are landed during other targeted fishing activities.

### Fishing Tour Operator Sector Catch

In 2007, 8,886 sharks were caught by FTOs. Of these, 8,672 or 98%, were released, representing a 10% increase in sharks caught by FTO clients over 2006 figures. The species of sharks caught and harvested were not recorded and the mortality rate of released sharks is not known.

The proportion of captured sharks that are harvested by FTO clients is about the same as the general recreational fisher community.

## Indigenous Sector

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

### Indigenous Sector Catch

Sharks and rays were one of the more important groups of fish caught by Indigenous people in the coastal areas of the Northern Territory. In 2000, a survey of Indigenous fishing activities found that 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.

## Non-retained Species by all sectors

Although gill nets are often regarded as non-selective fishing gear, when used by a skilled operator they are very effective at taking the targeted 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*, and species subject to the 'no take' policy such as sawfishes and *Glyphis* spp. In 2007, the ONLF caught and released alive 728 narrow

sawfish (*Anoxypristis cuspidata*) and one tagged creek whaler shark (*Carcharhinus fitzroyensis*). Rays are an uncommon bycatch in the surface set nets and are usually released alive. Some finfish with poor market acceptability (for example some trevally and queenfish) are retained only when there are suitable markets.

### Threatened species interaction

In 2007, the ONLF operators reported interactions with four turtles, seven green sawfish and ten freshwater sawfish all of which were released alive. To assist with the release of animals, operators in the fishery are well versed with the recovery methods for turtles and all vessels carry a copy of the '*Protected species awareness information for professional fishing operations – Marine Turtles*', which details recovery methods. To assist accurate reporting, operators also carry the National Heritage Trust publication '*Protected Marine Species Identification Guide*' to assist with identification of turtles, sawfish, sharks and other protected species. In addition, all new entrants (licensees, nominees and skippers) in the fishery are required to be interviewed by the relevant Fisheries Manager. The interview includes a session highlighting the requirement to report all interactions with threatened, endangered and protected species.

Research projects are currently being conducted, in conjunction with Charles Darwin University, regarding the spatial scale and status of sawfish populations, to better understand their potential interaction with fishing operations.

### Ecosystem Impact

A number of studies are underway which examine the relative impact of harvesting sharks and grey mackerel.

Little has been known about the large scale stock structure of most of the shark species harvested, particularly the extent to which Indonesia, Western Australia, Queensland and the Northern Territory share fishery resources. However, this problem has been investigated in an Australian Centre for International Agricultural Research (ACIAR) sponsored project. FIS/2003/037 led by the CSIRO. The project *Artisanal shark and ray fisheries in eastern Indonesia: their*

*socioeconomic and fisheries characteristics and relationship with Australian Resources* was a collaborative effort between several Australian and Indonesian agencies. The project provided basic biological information, examined stock status and described socioeconomic attributes of the fisheries. Although, as an aid project, it was principally designed for the benefit of fisheries management in Indonesia, the project has made a substantial contribution to biological knowledge of regional shark stocks. Important results are that Australian and Indonesian populations of *Carcharhinus sorrah* were demonstrated to be genetically separate, so that these stocks can be managed separately. Similarly, the Australian and Indonesian populations of *Rhizoprionodon acutus* were also distinct. Populations of *Sphrynra lewini*, *Prionace glauca*, *C. falciformis*, *C. obscurus* and *Rhynchobatus* spp. however, were genetically not distinguishable across the two areas, so that caution and cooperation in their management is suggested.

The Fisheries Research and Development Corporation (FRDC) project, *Northern Australian Sharks and Rays: the Sustainability of Target and Bycatch Species, Phase II* was recently completed (Salini et al. 2007). The project has provided comprehensive data on species composition and biological characteristics of sharks and rays taken in northern Australia fisheries, including those fisheries for which the sharks and rays are bycatch. The major output of the project was a risk analysis which provides for prioritisation for research and management direction. Both the ACIAR and FRDC funded projects provide genetic and other information that adds to the understanding of the spatial relationships of northern shark stocks.

The catch composition information provided by these projects forms a baseline against which the ONLF can be monitored for biodiversity change in the future, and is considered of particular importance in assessing the potential ecological impact of foreign illegal fishing on Australian shark stocks.

In 2007, six observer trips were undertaken on shark fishery vessels the RDPIFR. A FRDC funded research project (representing further

collaboration among the northern research agencies) is examining the spatial stock structure of grey mackerel. The project began during 2005 and will continue into 2008.

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 2007, there were a total of 17 licences operating in the ONLF. Most vessels employ a skipper and have two or three crew members.

### **Economic Impact**

At the point of first sale in 2007, the overall catch value of the commercial shark fishery was just over \$3.29 million (\$4.34 million 2006). The black tip shark component was valued at \$0.76 million (2006 - \$0.70 million), \$1.51 million for other sharks (2006 - \$1.57 million) and \$0.84 million for grey mackerel (2006 - \$1.86 million).

## **STOCK ASSESSMENT**

### **Monitoring**

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

Observer trips add information on species composition and provide other biological and ecological data. Six observer trips on commercial shark boats were undertaken during 2007. These provided data on species composition for both harvest and bycatch (retained and non-retained catch). An increased program of such monitoring activities has been planned for the future.

Research has been initiated to develop a tagging protocol for monitoring the harvest rates for the principal target shark species, as well as indicator species. The project, funded under the

Australian Research Council (ARC) Linkage program, and the NT Fishing Industry Research and Development Fund, entitled *Estimating fishing-related mortality and designing sustainable management protocols for shark fisheries in Northern Australia* is led by the Charles Darwin University in collaboration with the fishing industry, NT Fisheries and the Australian Institute of Marine Science (AIMS). The project will evaluate various combinations of monitoring and management regimes through experimentation to present managers with an informed choice of management options. During 2007, around 800 sharks of various species were tagged, as well as 16 recaptured bringing the total for the project to 1800 tagged and 39 recaptured.

### **Stock Assessment Methods and Reliability**

The ONLF has a history of continual assessment. In the 1980s, a joint assessment was conducted between the then NT, 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 blacktip sharks, *C. tilstoni* and *C. sorrah*, was about 3400 tonnes annually. This consisted of 1900 tonnes in the Arafura and Gulf of Carpentaria (GoC) zones and 1500 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 alongshore 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 2000 tonnes per year. The optimum annual harvest rate is 6-7% per year of the component of the stock

vulnerable to gill net fishing. The 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 the assessment was based, suggested a decline in relative abundance since the mid 1980s, for which several potential, unquantified sources were identified. These sources included losses to other fisheries, across the northern border or undeclared within other Australian fisheries which, it was calculated, could account for up to 1500 tonnes of catches, as well as localised depletion effects. However, the unreliability of the assessment was emphasised. In particular, it was recognised that the CPUE statistics, on which the assessment relied, were a poor index of abundance. A 2005 update of the age structured model by the Northern Assessment Group (consisting of researchers and managers from the management agencies responsible for the northern shark fisheries) noted that the declining trend shown to 1995 in the previous assessment was no longer a feature of the time series. Nevertheless, the assessment of the stock remained uncertain. The model incorporated the additional eight years of CPUE data available since Walters and Buckworth (1997). The dominant characteristic of the CPUE data is strong variation, particularly the large peaks of 1995 and 1996.

The basic problem with CPUE as an index of abundance is that it may reflect other factors, such as the ways in which fishers respond to markets and cost structures, much more than it does the abundance of the fish. This is illustrated by apparent targeted fishing within the Fishery. The very strong and persistent increasing trend in the catch rate of grey mackerel suggests that this species has been increasingly targeted, rather than the abundance of stocks increasing steadily. The downturn of 2004 probably reflected general targeting of sharks during that year, in response to market pressures, while the resumption of the trend in 2005 and 2006 again probably reflected target fishing of grey mackerel. The catch rate

variations among the total sharks, blacktip sharks and grey mackerel (Figure 16) are substantially in counterpoint: those years in which catch rates of grey mackerel peaked, shark catch rates declined, and vice versa. Existing logbook effort data could not be allocated 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 variations evident for blacktip shark catch rates in Figure 16 may simply reflect diversion of effort by operators to whichever fishing target they predicted would have the greatest net value at any time.

### **Current Harvest Status**

Exploitation by the FTO and recreational sectors is considered to be quite low. The harvest by the commercial sector is below most estimates of sustainable yield, and is a small fraction of the catch taken by the Taiwanese-Australian joint venture fishery of the 1970s and 1980s, or current estimated landings for Indonesia (Blaber 2006).

Logbooks did not indicate target species until July 2005. Given the very strong increasing trend in grey mackerel catches and catch rates, variations and trends in CPUE could result from increased direction of fishing in response to contrasting market demands for mackerel or shark. However, given the high degree of uncertainty in stock estimates and declining CPUE trend in blacktip and total shark in the late 1990s, and uncertainties about the status of grey mackerel, conservative management currently precludes any significant increase in harvest rates. The ONLF is thus considered to be fully-fished.

### **Future Assessment Needs**

There is clearly a need for continued updated assessment of the ONLF. 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 without additional information.

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 an on-going index of harvest levels for the NT shark fishery has been instituted (as described above). Further, there should be a concerted effort to obtain blacktip catch statistics 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.

There is little information available on the magnitude and impact on northern Australian shark and finfish stocks of Illegal, Unreported and Unregulated (IUU) fishing by foreign vessels operating in northern Australian waters. The consequences of this fishing for the Australian fishery are difficult to predict. This is not only because we do not yet know the magnitude and composition of IUU fishing over time, but also because 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. 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 the effect of high levels of IUU effort, need to be addressed in future assessments. The magnitude of IUU effort and catches, as well as ecosystem effects, are being examined in current CSIRO–AFMA projects.

An initial assessment for grey mackerel was undertaken during 2006. The main conclusion of this assessment was that the fishery is not currently over-fished. However, the assessments were limited by their reliance on catch and effort data, and the inability to determine whether sharks or grey mackerel were the principal target. Additionally, spatial dynamics of the species as described by the project *Determination of Management Units for Grey Mackerel Fisheries in Queensland and the Northern Territory*, (FRDC 2005/010) will need to be addressed in future assessment work.

## RESEARCH

### Summary to Date

In the mid 1980s, the NT Shark Fishery (now known as the ONLF) was the subject of a major joint Commonwealth, NT, Queensland and Western Australian Pelagic Fish Stock Assessment Program, sampling extensively around the Northern Territory coastline, to establish species and size composition and provide basic biological information. Sharks were tagged to provide growth and movement information. The project provided substantial information, including extensive and long-term information on movements and growth from the mark-recapture work (Stevens et al. 2000). The most recent tag recovery from this program occurred in 2004. Outcomes from this research were discussed above. With the fishery being very small from the mid 1980s until the mid 1990s, research during the 1990s was mostly limited to monitoring of trends in the commercial fishery data and stock assessment using all available data (Walters and Buckworth 1997). However, the recognised need for more information on the broad suite of sharks species taken in northern Australia prompted a series of national projects on the sustainability of sharks and rays in northern Australia, conducted since the late 1990s (Stobutzki et al. 2003; Rose et al. 2003; Salini et al. 2007). These projects progressively characterised catches, species composition and gear types across all northern Australian fisheries that take sharks. The projects developed observer programs and provided a substantial body of biological knowledge on sharks and rays in the northern Australian fisheries. The principal outputs of this project series included risk analyses that indicate knowledge gaps that should be addressed, and or the need for mitigative management.

### Incorporation into Management

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

### Current Research

An ongoing observer program has been developed to yield information on catch composition, an important basis for monitoring biodiversity, as well as size and reproductive

status of the catch species. 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 previous and ongoing projects are valuable for the future management of the fishery.

Development of a collaborative tagging program with commercial fishers is also under way, as described above, with the intention of delivering a protocol for monitoring harvest rates of the principal shark species. In addition, the participation of the Charles Darwin University (CDU) and the Australian Institute of Marine Science (AIMS) has expanded the scope of projects undertaken on NT sharks. Projects for 2007 and 2008 include studies of the distribution and abundance of *Glyphis* spp. and the genetics and biology of bull and pig eye sharks (*Carcharhinus leucas* and *C. amboinensis*, respectively).

Given the value of the grey mackerel in the fishery, there is also a need for further information on this species. An initial FishNote was prepared to increase stakeholder information on grey mackerel (Crofts and de Lestang 2004). Information on stock structure, movements and age structure of the population will be provided by current research in FRDC project 2005/010, *Determination of Management Units for Grey Mackerel Fisheries in Queensland and the Northern Territory*, initiated during 2005.

## MANAGEMENT AND GOVERNANCE

### Management

Management of the ONLF (formerly known as 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 and output 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 ONLF licences to the Territory for the issuance of an

unrestricted ONLF licence. By 2005, overall capacity had been reduced from 38 licences to 17 licences.

Fin ratio licence conditions were imposed on Offshore Net and Line licensees in late 2003 and seek to prevent the targeting of large shark for their fins alone. The fin ratios are reviewed periodically and have resulted in a general ratio reduction of 17%. A review of the fin ratios was conducted in 2007 with another review scheduled for late 2008.

The current ratios are 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. The ratio is designed to factor in operational circumstances such as unintentional loss of useable product through machinery malfunctions, chiller breakdowns, predator and sea-lice attack. Linked to the shark fin ratio legislation is the licence condition that no shark product is allowed on board a vessel upon commencement of the next voyage.

Catch restrictions apply to the harvest of Spanish mackerel in the ONLF. Only 30 trunks or whole Spanish mackerel may be taken by Offshore Net and Line Fishers per trip with no more than 10 additional trunks per tonne of grey mackerel. This limit is intended to link landings of Spanish mackerel to grey mackerel catches. Such a measure was agreed to address concerns by other sectors regarding pelagic net fishers targeting Spanish mackerel but recognised incidental catches did occur while fishing for grey mackerel.

A prohibition on the possession of sharks and shark product is in place for the Timor Reef, Demersal, Finfish Trawl and Spanish Mackerel Fisheries. The Barramundi, Coastal Net and Coastal Line Fisheries have allowances for incidental catches of sharks. The fin to meat ratios also apply to these fisheries, with the fin to meat ratios imposed in addition to trip limits.

Logbooks are reviewed annually and updated accordingly. Validation of the logbook program is conducted by observer trips and compliance

checks. Data collected from observer trips compared with logbook returns from non-observer trips is consistent, indicating that the logbook returns are factual. Similarly, Northern Territory Police, Marine and Fisheries Enforcement Section (PMFES) officers conducting compliance checks of logbook returns with catches onboard the vessels have found no irregularities.

In 2007, the ONLF underwent an ecological assessment of management arrangements by the Department of Environment, Water, Heritage and the Arts (DEWHA) against the *Guidelines for Ecological Sustainable Fisheries* (the Guidelines) under the *Environmental Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The ONLF was found to be operating in an appropriately precautionary manner and accredited with a WTO which permits the fishery to export shark products until November 2010. Advice regarding the status of the fishery and progress in meeting the recommendations of the WTO is required and has been provided annually by Fisheries.

### 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 as close as 12 nautical miles (approximately 22 km) of the coast prior to 1978. Foreign fishing vessels were excluded from the Gulf of Carpentaria 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 7000 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 dedicated domestic shark fishers in coastal waters began 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 markets throughout southern Australia.

In 2004, the ONLF was assessed against the Australian Government's Guidelines under the EPBC Act. The ONLF was accredited with a WTO with recommendations, permitting the fishery to continue to export shark products until November 2007. The WTO recommendations were negotiated between DEWHA and RDPIFR and agreed to be completed or undertaken by the time of the re-assessment.

In 2006, as part of the WTO recommendations RDPIFR reviewed the catch logbook program. Logbooks were amended to include the capacity to record bycatch by weight on a shot-by-shot basis.

In 2007, RDPIFR conducted a review on the adequacy of management arrangements, objectives, performance indicators and trigger points using the latest available verified data. The review determined that the current management objectives and performance indicators for the fishery were being met while trigger points were yet to be reached. In addition, management actions and responses to triggers were considered appropriate and in alignment with a conservative approach. The outcomes of the review were provided to DEWHA as part of the fishery's WTO conditions.

The completion of the FRDC report *Northern Australian Sharks and Rays: the Sustainability of Target and Bycatch species, phase II* in 2007 further supported the outcomes of the RDPIFR review and provided additional information to assist in the identification of species of potentially higher risk and to guide the development of some species specific measures (Table 4). However, not all information from the FRDC Report could be used to review management arrangements and provide a current species risk analysis as results were based on 2004 data. Since 2004



RDPIFR has, after a number of discussions with FRDC Report collaborators, implemented a number of mitigation measures based on a conservative regime, prior to the results of the report being fully available.

To improve the identification and quantification of shark catches on a species specific basis, NT Fisheries has developed a shark identification guide booklet which has been provided to each vessel in the fleet. NT Fisheries has also participated in a National Heritage Trust (NHT) funded research project, *Pilot study to develop methodology to determine Indigenous fishing impacts on sharks and ray in the Northern Territory*, to gain an understanding of the harvest of shark by the Indigenous sector.

### **Current issues**

The Northern Territory is signatory to a multi-jurisdictional "Operational Plan" for northern Australian shark fisheries to achieve the outcomes of the National Plan of Action for Sharks (NPOA). This Northern Operational Plan was endorsed at a meeting of fisheries officers from all jurisdictions in September 2004. The Shark Implementation and Review Committee (SIRC) was established by the Marine and Coastal Committee (MACC) to oversee the implementation and review of the NPOA. A review of the progress in meeting the NPOA is scheduled for 2008 with a revised plan due in 2009.

The impacts of foreign IUU fishing in northern Australian waters are poorly understood. The NT Government continues to lobby the Australian Government to ensure adequate resources are allocated to mitigate IUU impacts on the sustainability of shark stocks.

Most IUU fishers are primarily targeting trepang or sharks, and are a significant illegal presence in northern Australian waters. Coastwatch surveillance aircraft reported a 40% reduction in sightings in 2007 compared to 2006 (7440 sightings in 2006). Research to determine the probable impact IUU is having on domestic shark stocks is continuing with AFMA funding a number of projects attempting to determine the species and volumes of sharks being harvested. It is not yet possible to determine the potential effect IUU

fishing is having on the predominately inshore, tightly regulated, small domestic ONLF. The collaborative research project to develop mark-recapture (tagging) protocols to provide on-going monitoring for the Northern Territory ONLF will also assist in determining movement rates and life history linkages between inshore (where most domestic fishing occurs) and offshore (mostly IUU activity) stocks

### **Future plans**

The incidental landings of sharks in fisheries targeting other species are subject to annual review. The fin ratios are reviewed periodically to ensure they meet the sustainability criterion.

In alignment with the recent WTO recommendations, an Ecological Risk Assessment will be conducted for the ONLF with outcomes to be provided to DEWHA in December 2008. It is planned that in 2008, logbooks will be further modified to ensure finer reporting of any commercial fishing interaction with threatened, endangered and protect species, including location and the status of the creature when released.

In addition, a Northern Management and Science Working Group meeting is scheduled for 2008 to discuss the status and future research requirements of northern Australian shark stocks. Outcomes of this meeting will be incorporated to form management direction and actions for Northern Territory fisheries.

### **Compliance**

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

The PMFES monitors and enforces management arrangements for the ONLF 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 PMFES has the power to investigate the records of wholesalers and licensees.

In 2007, there were no significant domestic compliance issues recorded for this Fishery.

### **Consultation, Communication and Education**

Regular communication and consultation occurs between stakeholders to discuss matters of concern within the ONLF. Stakeholders involved in such discussions include the Northern Territory Offshore Net and Line Licensee Committee, the Northern Territory Seafood Council, neighbouring jurisdictions, other extractive stakeholders and wider interest groups.

Workshops have been convened as required, and these serve as a forum for industry, management and researchers to canvass all issues of interest to the ONLF.

The ONLF Management Advisory Committee (ONLMAC), comprises membership from a wide range of stakeholder interest groups to provide expert advice to the Director of Fisheries. This committee met in September 2006 to work through issues to ensure the fishery continues to be sustainably managed in an open and transparent manner.

Table 4 Decision Rules for the Offshore Net and Line Fishery

	Species/Group	Management objectives	Performance indicator	Trigger reference point	Management Response Taken	Proposed Future actions
Target Shark Species	Black tip sharks <i>C. tistonia</i> & <i>C. sorrah</i>	Ensure inter-generational equity by maintaining ecologically sustainable annual catches in all sectors	Sustainable yield estimates	Catch levels increase to 2000 t over the next calendar year  Catch levels decline by 30% over the previous two calendar years	<ul style="list-style-type: none"> <li>Annual analysis and reporting of status</li> <li>Cap on licences</li> <li>Licence reduction scheme</li> <li>Significant reduction of allowed effort in longline and pelagic net fishing gear</li> </ul>	<p>MACs to review fisheries annually and make recommendations to the Director of Fisheries.</p> <p>Any amended arrangements will be implemented within 12 months of trigger being reached.</p>
Byproduct Species	<i>C. limbatus</i> <i>S. mokarran</i> <i>E. blochii</i> <i>C. cautus</i> <i>C. amblyrhynchoides</i> <i>C. melanopterus</i> <i>C. fitzroyensis</i> <i>R. oligolinx</i>	Ensure ecological sustainability of these species in all fisheries	Monitoring of commercial logbook returns  Onboard monitoring of Offshore Net and Line Fishery	<p>Catch increases in proportion of the total catch by greater than 35% over the next calendar year</p> <p>Catch increases to 10% of the total catch over the next calendar year</p>	<p>As above</p> <ul style="list-style-type: none"> <li>ONLF code of conduct</li> <li>Improved logbooks enabling more accurate reporting of shark species in ONLF</li> <li>Fin to meat ratios introduced</li> <li>Shark ID guidebooks distributed through ONLF</li> <li>Strict limit of shark harvest in Barramundi, Coastal Line and Coastal Net Fisheries</li> <li>Research targeting increasing knowledge of shark species catch composition, distribution and abundance.</li> </ul>	<p>As for target species.</p> <p>All Fishery logbooks to be reviewed regarding the reporting of byproduct and Bycatch species</p> <p>Continuing research via aligned projects and observer program to collect samples, information on catch composition, fishing mortality, distribution and abundance of specific shark species</p>
Bycatch Species		Ensure ecological sustainability of bycatch species in all fisheries	Monitoring of commercial logbook returns  Onboard monitoring of Offshore Net and Line Fishery	Total bycatch within the shark fishery increases to 10% of total catch in successive calendar years or a % decline in a species relative numbers without a corresponding change in fishing area or fishing technique	<ul style="list-style-type: none"> <li>As above</li> <li>No take of shark in Timor Reef, Demersal, Finfish Trawl &amp; Spanish Mackerel Fisheries</li> </ul>	As for Byproduct species.
Endangered, threatened or protected species	Including: <i>P. clavata</i> <i>P. microdon</i> <i>P. zisron</i> <i>A. cuspidata</i>	Ensure the continued protection of species and communities listed under the <i>EPBC Act 1999</i> and the <i>Territory Wildlife and Conservation Act 2000</i>	Endangered, threatened or protected species and or communities are identified in NT waters	Identifiable impacts observed by commercial fishers, fisheries observers or other agencies regarding EPBC listed species or communities.	<ul style="list-style-type: none"> <li>As above</li> <li>"No take" policy of sawfish adopted by ONLF</li> <li>ONLF code of conduct</li> <li>Release Techniques Education Program</li> </ul>	<p>MACs to review fisheries annually and make recommendations to the Director of Fisheries</p> <p>Fishery logbooks to be amended to include records of any interaction with endangered, threatened or protected species</p>
	Ecosystem components	Minimise effects on ecosystem components	Identification of threatening processes	Identification of significant negative interaction with components of the natural ecosystem present on fishing grounds		MACs to review fisheries annually and make recommendations to the Director of Fisheries

## **7. 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 \$80 095 in licence fees for Joint Authority Fisheries (Offshore Net and Line \$14 960; Demersal \$52 800; Finfish \$1 775; Timor Reef \$10 560) in 2007-2008.

The revenue generated from licences partially offsets management and research costs. Research projects carried out to ensure ongoing sustainability of the NTFJA fisheries during 2007-2008 are listed below. Amounts shown depict direct NT cash committed to the projects during 2007-2008.

- Grey Mackerel Stock Structure Project – NT funds committed - \$ 8 400
- NTFJA Fisheries DEW Accreditation maintenance - \$ 17 500
- Shark Monitoring Project, including contribution to ARC project to develop appropriate monitoring protocols for the Offshore Net and Line Fishery - \$ 10 000
- Contribution to NT Seafood Council consultation costs - \$45 000
- Pilot project to develop GIS spatial analysis techniques (East Timor, Timor Reef, Demersal Fishery) - \$ 62 000
- Contribution to FRDC Research Fund on behalf of Industry - \$32 500

## 8. References

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- Newman, S. J., Steckis, R. A., Edmonds, J. S., Lloyd, J. (2000). Stock structure of the goldband snapper, *Pristipomoides multidens* (Pisces: Lutjanidae) from the waters of northern and western Australia by stable isotope ratio analysis of sagittal otolith carbonate. *Marine Ecology Progress Series* **198**, 239-247.
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## **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 12D(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 12H(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

In the presence of  
P. STEVEN

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  
A.R.SPRIGG

## **Annex B: Record of Decisions**

### **MEETING OF THE NORTHERN TERRITORY FISHERIES JOINT AUTHORITY**

26 September 2007  
Ambassador Room  
Crown Plaza Hotel  
32 Mitchell St, DARWIN, NT

#### **RECORD OF DECISIONS**

##### **Attendance Members:**

**Delegate for the Australian  
Government Minister for  
Fisheries, Forestry and  
Conservation  
Robert Murphy**

**Deputy for the Northern  
Territory Minister for Primary  
Industry, Fisheries and Mines  
Heather Brayford**

**Secretary  
David Mckey (NTDPIFM)**

##### **Observers**

**Nick Rayns (AFMA)  
Graham Rudd (AFMA)  
Nancy Pedersen (DAFF)  
Andrew Townley (DAFF)  
Peter Millington (WA FISH)  
Lindsay Joll (WA FISH)  
Grant Hall (QDPI)  
Jim Gillespie (QDPI)  
Shane Hansford (QDPI)  
Mark Doohan (QDPI)**

Robert Murphy (Chair) opened the meeting at 15.20.

#### **1. PROCEDURAL MATTERS**

Officials of the Commonwealth and NT Fisheries met on 26 September 2007 to discuss current issues relevant to the NTFJA. Details of the discussion and recommendations from this meeting are detailed below.

### ***1.1 Identification of Deputies and Secretaries to the NTFJA***

The identification of present delegates, deputies and appointment of a secretary and the identification of observers to the meeting was noted.

Officials of the Commonwealth and NT Fisheries confirmed that their status as members' delegates and deputies was in order. David Mckey (NTDPFM) was appointed as secretary to the NTFJA. Observers at the meeting were noted and are recorded as present in this record.

### ***1.2 Confirmation of Agenda***

Members confirmed the agenda (attachment 1) as it stood.

### ***1.3 The Record of Decisions from the NT Fisheries Joint Authority (NTFJA) meeting of 14 September 2006***

The Record of Decisions arising from the NT Fisheries Joint Authority (NTFJA) meeting of 14 September 2006 and out of session decision of April 2006 were reviewed, it was noted all recommendations have been actioned or in progress and was deemed to be an accurate reflection of decisions taken.

**Recommendation to the JA:** that the Record of Decisions of the NTFJA meeting of 14 September 2006 and the April 2006 out of session decision be confirmed.

## **2. MATTERS FOR CONSIDERATION**

### ***2.1 Update on Status of Annual Reports for 2005/2006, 2006/2007***

The information paper included in the agenda was noted, and the issue discussed. Members noted the progress to date including the completion of the 2005/2006 report and the commitment of the NT to provide a draft NTFJA annual report for 2006/2007 to members by the end of December 2007. The NT confirmed its commitment to producing the NTFJA annual report within one year of the reporting period.

#### **Recommendations to the JA: -**

1. That members note the completion of NTFJA annual reports for 2005/2006

2. That members note the commitment of the NT to provide a draft NTFJA annual report for 2006/2007 to members by the end of December 2007 in line with previous agreements.

## ***2.2 Update on the Issue of an Additional Finfish Trawl Licence***

Heather Brayford provided an update on the NT's progress to issue an additional Finfish Trawl Licence.

In essence, the grant of an additional Finfish Trawl licence, following a public Expression of Interest (EOI) process, is proposed as one component of a broader set of reforms within an overarching Offshore Snapper Development Plan (OSDP). Other components include:

1. excision of a portion of Goldband snapper habitat from the Finfish Trawl Fishery
2. a licence buyback scheme in the Demersal Fishery
3. the establishment of catch limits within the Finfish Trawl Fishery and revised trigger review points in the Demersal Fishery

The EOI process will require respondents to fund steps 1 and 2 above and address a range of other criteria including, but not limited to-

- Capacity to fund a research and monitoring program, including an observer scheme.
- Capacity to meet licence fees, increasing over time to a target of \$12,000 per annum. This will offset the loss of revenue arising from re-structure of the demersal fleet.
- Contribution to social and economic growth in the Northern Territory.

The EOI process will also set out a number of environmental, economic, technical and financial criteria (with relevant weightings) upon which EOI's will be evaluated through an assessment panel which may include independent members to determine a successful Proponent. A memorandum and information package which clearly sets out the processes and seeking formal approvals where necessary from the NT NTFJA member has been developed. The information package will be supplied to the Commonwealth Minister.

**Recommendation to the JA:** - That members note the information provided in the update.

## **OTHER BUSINESS**

### **Timor Reef Fishery Update**

Heather Brayford and David McKey provided an update on developments within the Timor Reef Fishery relating to the drafting of a Management Plan for the fishery incorporating a revision of current management arrangements.

Issues flagged in the revision are a request by industry to move the fishery to output catch controls and ITQ allocations. To facilitate exploration of this request, a representative Fishery Management Advisory Committee has been established which in turn, has formed a Timor Reef Fishery Assessment Group to determine the appropriateness of setting a TAC for the main target species in the Fishery. Any revised management arrangements for the Fishery would need to recognize recommendations underpinning the DEW 5 year export exemption currently in place.

**Recommendation to the JA:** - That members note the information provided in the update.

#### **Offshore Net & Line Fishery Update**

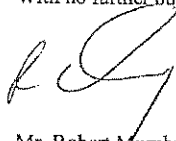
Heather Brayford and David McKey provided an update on the Offshore Net & Line Fishery relating to current management arrangements including catches and the capping of effort via introduction of Individual Transferable Effort (ITE) quotas for both pelagic net gear and the allocation of a much limited number of long line gear days to reduce potential impacts on mainly larger sharks. The Fishery operates under a WTO accreditation which expires end November 2007.

**Recommendation to the JA:** - That members note the information provided in the update.

#### **NEXT MEETING**

Members agreed that the next meeting of the NTFJA would be held in conjunction with NAFM 2008.

With no further business, the meeting was closed at 15.35.



Mr. Robert Murphy  
General Manager Fisheries and Marine  
Environment  
Delegate for the Australian Government  
Minister for Fisheries, Forestry and  
Conservation  
Northern Territory Fisheries Joint  
Authority



Ms. Heather Brayford  
Executive Director of Fisheries  
Deputy for the Northern Territory  
Minister for Primary Industry, Fisheries  
and Mines  
Northern Territory Fisheries Joint  
Authority





