

Timor Reef Fishery Status Report 2004

INTRODUCTION

Commercial operators in the Timor Reef Fishery principally target goldband snapper (*Pristipomoides multidentis* and other *Pristipomoides* species) and also land significant quantities of red snappers (*Lutjanus malabaricus*, *L. erythropterus*), red emperor (*Lutjanus sebae*) and cods (Family Serranidae).

Prior to the declaration of the Australian Fishing Zone (AFZ) in 1975, the area was fished by international fishing vessels. A prohibition on finfish trawling was implemented in the late 1980s. Following exploratory fishing trials under a joint venture arrangement, and marketing trials underwritten by the Northern Territory Government, trapping and droplining by local operators commenced in 1987. Management arrangements were further refined in the early 1990s with the introduction of a precautionary licence reduction scheme. With the passage of revised jurisdictional arrangements in 1995, management of the fishery passed to the Northern Territory Fisheries Joint Authority.

In 2004, there were 12 licenses in the fishery, a reduction from 22 licenses in 1993. A ceiling of 45 fish traps for each licence was agreed to in 2002 and implemented as a licence condition in 2004.

The Timor Reef Fishery operates under the highest level of export accreditation against the Australian Government *Guidelines for the Sustainable Management of Fisheries* under the Commonwealth's *Environment Protection and Biodiversity Conservation Act* (EPBC Act). The management arrangements of the fishery are recognised by the Australian Government to be operating in a sustainable manner. The fishery is exempt from export regulations for 5 years.

PROFILE OF THE FISHERY

Commercial Sector

Area

The Timor Reef Fishery operates well offshore out in the Timor Sea, in a remote region

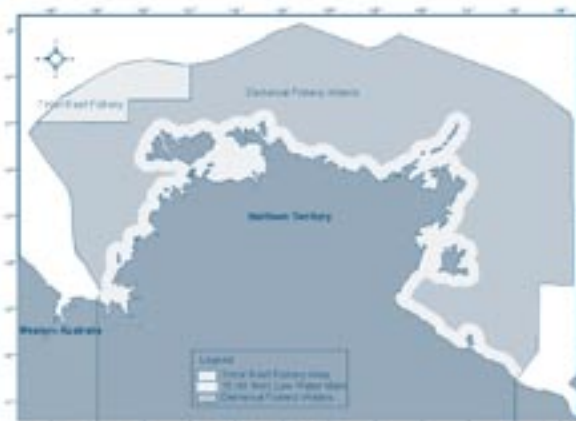


Figure 1. Area of the Timor Reef Fishery.

extending north-west of Darwin to the Western Australia/Northern Territory border and to the outer limit of the AFZ (Figure 1).

Fishing Method

Commercial operators are authorised to use baited traps and vertical lines, including handlines and droplines. Although some operators used traps during the early development phase of the Timor Reef Fishery, most chose to use vertical lines as the fishery developed. However, during 1999 and 2000 there was an industry wide change to trap fishing, and during 2002 only one operator was using droplines, with the remainder having changed to traps. There was a reversal of this trend back to droplines by many operators during 2004, as dropline caught fish are of better quality.

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

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

Byproduct species for the Timor Reef Fishery only make up 1% of the overall catch. These include predominantly small snappers from the Family Lethrinidae.

The 2004 byproduct level of less than 5% of overall catch is well below the 10% trigger value required for a review of management arrangements for the protection of byproduct species.

Effort

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

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

Catch Rates

Catch per boat day increased in 2000 with the introduction of traps. There was a decline in the Catch per Unit of Effort (CPUE) in 2001, followed by a steady increase from 2002 to 2004 (Figure 4).

Marketing

Due to the lack of consumer familiarity with tropical snapper and emperors during the early developmental phase of the fishery, initial catches were processed and sold as frozen fillets on southern domestic markets.

Trial shipments of whole fresh “gilled and gutted” goldband snapper were well received. Studies on tropical snappers indicated a shelf life of up to 20 days after capture. This led to a marketing break-through for these species.

Currently, almost all snappers landed within the line and trap fisheries are sold as “fresh

on ice” whole fish (including gills and stomach), with very small amounts sold as fillets. As the Darwin market is small, most product is forwarded to interstate markets, principally Brisbane and Sydney. Increasingly, operators are developing marketing arrangements outside the traditional central marketing systems, with a local representative of a major seafood wholesaler continuing to co-ordinate consignments to east-coast markets. At least one operator independently markets catch from his two vessels.

Non-retained Species

For the Timor Reef Fishery, the reported and observed level of bycatch (non-retained species) is very low, being less than 1% of total catch. The demersal tropical species landed in the fishery are well received throughout existing marketing channels, with operators reporting that all species can be sold.

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 2004, there were no recorded interactions with threatened species in the Timor Reef Fishery. The method of fishing and the location of the fishery generally prevent interactions with threatened species.

Eco-system Impact

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

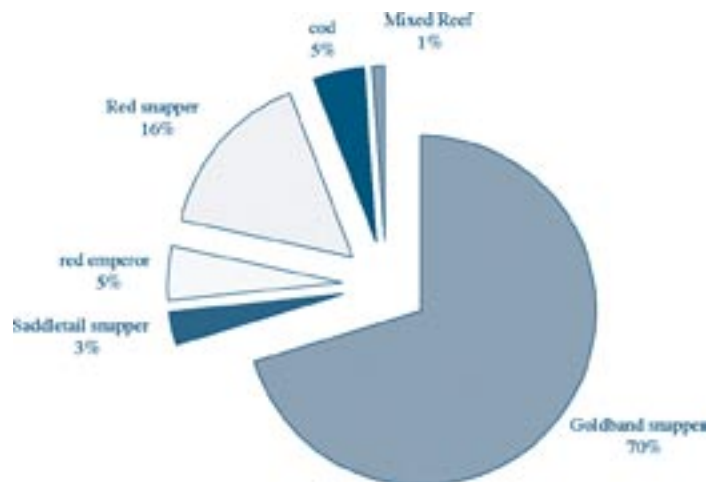


Figure 2. Composition of the catch from the Timor Reef Fishery for 2004.

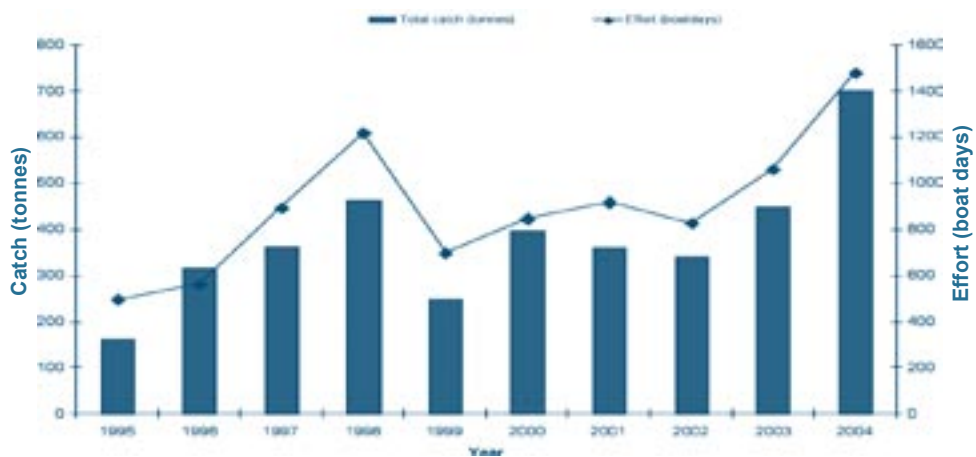


Figure 3. Catch and Effort for the Timor Reef Fishery 1995 to 2004.

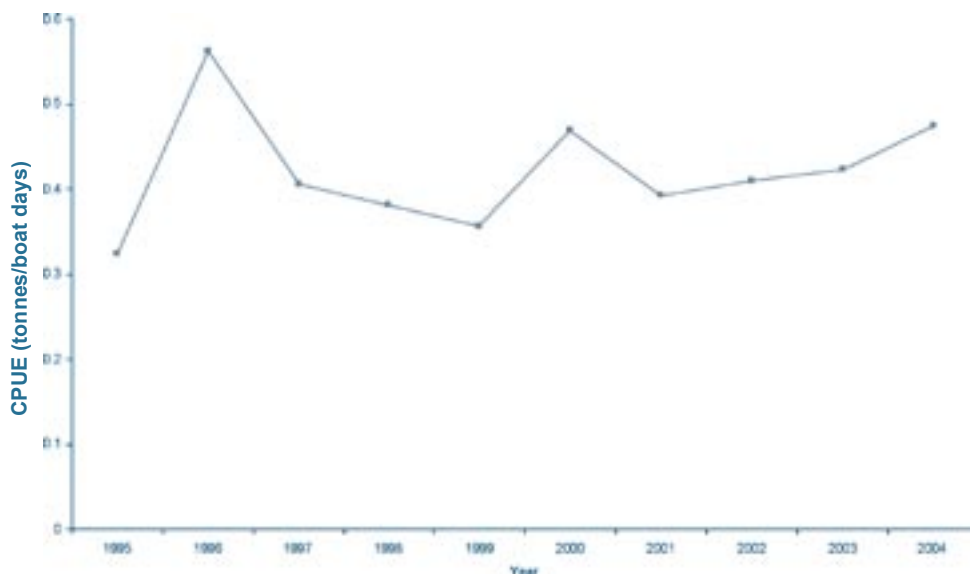


Figure 4. Catch rates for the Timor Reef Fishery, 1995 to 2004.

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

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

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

Social Impact

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

Economic Impact

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

STOCK ASSESSMENT

Monitoring

This fishery is monitored primarily through daily logbooks, through which operators provide detailed catch and effort information, as well as data on spatial distribution of the fishery. This logbook data must be returned together with monthly summary sheets by the 28th day of the following month. In addition to logbook data the Demersal Fishery is monitored using observer data collected from the Timor Reef Fishery. Due to resource constraints only one onboard monitoring trip was conducted during 2004. While onboard, observers document vessel and gear information, location and depth fished, fishing practices, catch composition, and where possible, measure all landed species.

Stock Assessment Methods and Reliability

A stock assessment of goldband snapper in the Timor Reef Fishery was undertaken in 2003. Also included in this analysis is the section of the Demersal Fishery from the boundary of the Timor Reef Fishery to Longitude 131° E.

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

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

Both computer modelling and finer spatial data analysis showed trends that were of concern. While catch rates for the entire fishery (Figure

3) have increased since 1995 and appear to be relatively stable, this masks a contrary trend occurring on a finer spatial scale. However all modelled scenarios suggest a decline in biomass under current levels of fishing effort. How quickly this occurs depends upon assumptions made about the level of exchange between the two areas, the level of Indonesian fishing effort, and whether Australian fishing effort increases.

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

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

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

Current Status

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

Future Assessment Needs

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

RESEARCH

Summary to Date

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

Further investigation of the stock structure of *P. multidens* from other sites within Indonesia was undertaken as part of a collaborative ACIAR funded project (FIS/1997/165) between the NT, CSIRO, and Indonesia. This study found that multiple stocks exist within Indonesian waters (Ovenden *et al.*, 2004). While there appears to be genetic similarity between samples from the Australian sectors of the Timor and Arafura Seas, there is evidence to suggest a restriction of gene flow along the northern and western Australian coastline, with a genetic disjunction in the Kimberley area (Ovenden *et al.* 2002).

A subsequent FRDC funded project (98/154) investigated the stock structure of *P. multidens* across northern Australia by analysing oxygen and carbon isotope ratios in otoliths obtained from the same samples. This study showed location-specific signatures and indicated that fish from all sites sampled within Australia (Exmouth, Rankin Bank, Broome, Vulcan

Shoals, Timor Sea, and Arafura Sea) were different. Samples obtained opportunistically from Kupang (Indonesia) and Papua New Guinea, were incorporated into the study and were found to be different from each other and from Australian samples (Newman et al. 2000). This research implies that there is unlikely to be substantial movement of *P.multidens* between these distinct adult assemblages.

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

Incorporation into Management

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

Current Research

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

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

MANAGEMENT/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 this fishery. (refer to Table 1).

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

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

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

History

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

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

Separate management measures were implemented for the Timor Reef Fishery in 1993 when it was annexed from the Demersal Fishery. Overall fishing capacity within the boundary of the Timor Reef Fishery was reduced from a potential 60 to 22 licences. Limits on the number of operators were implemented in responding to concerns that fishers displaced from interstate fishing restructuring programs may lead to over exploitation of goldband snapper stocks.

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

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

Current issues

In 2004, the reported catch levels for target species, incidental (byproduct) and non-retained catch were within acceptable levels.

Future plans

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

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

Compliance

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

The PMFES effectively monitors 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, if necessary, to investigate the records of wholesalers and licensees.

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

Consultation, Communication and Education

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

The low levels of participation in the Timor Reef Fishery allows all stakeholders to be directly involved in discussions on any proposed management arrangements. A framework for a Timor Reef Fishery Management Advisory Committee has been developed to formally represent the interests of all stakeholders and provide a forum for any proposed amendments to the management regime.

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

The Fisheries Group also puts out publications in the form of Fisheries reports and newsletters to inform and educate stakeholders.

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Table 1. Review of 2004 catch figures against management trigger points for the Timor Reef Fishery.

Species	Catch Tonnes	% Total Catch	Fishery Management Review Trigger	Status
Goldband Snapper	486	70%	Annual catch exceeds 900 tonnes	Trigger not exceeded
Red Snappers (including Saddletail snapper)	132	19%	Annual combined catch exceeds 1,300 tonnes	Trigger not exceeded
Red Emperor	35	5%	Annual catch exceeds 25% of total catch	Trigger not exceeded
Cod	35	5%	Annual catch exceeds 10% of total catch	Trigger not exceeded
Mixed Reef	7	1%	Annual catch of by-product exceeds 10% of total catch	Trigger not exceeded
By-Catch	<7	<1%	Annual catch of by-catch exceeds 10% of total catch	Trigger not exceeded
Total Catch	703	-	-	-