

Timor Reef Fishery Status Report 2006

Introduction

The Timor Reef Fishery primarily targets the higher valued goldband snapper (*Pristipomoides multidens*) and other *Pristipomoides* species. Significant quantities of red snappers (*Lutjanus malabaricus*, *L. erythropterus*), red emperor (*Lutjanus sebae*) and cods (Family Serranidae) 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 passed to the Northern Territory (NT) Fisheries Joint Authority (NTFJA). The fishery is managed by the NTFJA under the NT *Fisheries Act 1988*. Day to day management of the fishery is undertaken by NT Fisheries. In 2006, there were 12 licences in the fishery, a reduction from 22 licences in 1993.

Recreational fishing by individuals or through Fishing Tour Operators is very low 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 relating to the Timor Reef Fishery are recognised by the Australian Government Department of Environment and Heritage (now known as the Department of Environment and Water Resources) to be operating in an ecologically sustainable manner. The fishery is exempt from export regulations until May 2008.

In 2006, oil and gas exploration companies carried out 3D seismic surveys within some of the more productive regions of the Timor Reef Fishery. During these surveys operators temporarily relocated fishing activities to elsewhere within the fishery.

Profile of the Fishery

Commercial Sector

Area

The Timor Reef Fishery operates well offshore out in the Timor Sea, in a remote region extending north-west of Darwin to the Western Australia/NT border and to the outer limit of the Australian Fishing Zone (AFZ). The fishery has an area of approximately 8400 nm² (Figure 1).

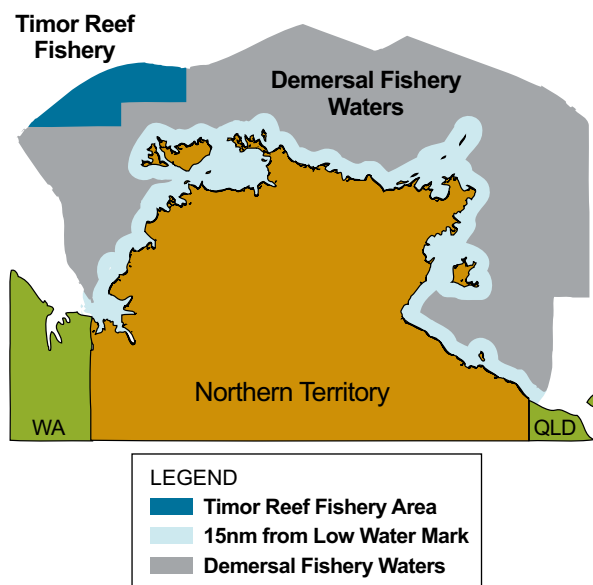


Figure 1. Area of the Timor Reef Fishery

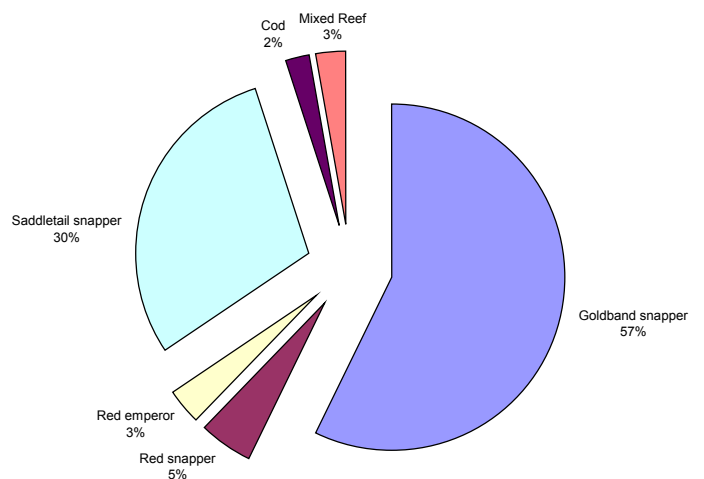


Figure 2. Composition of the catch from the Timor Reef Fishery for 2006

Fishing method

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

Catch

The principal target species of the Timor Reef Fishery are goldband snapper, which comprise the three species *Pristipomoides multidens*, *P. typus* and *P. filamentosus*. Together these species comprise 57 per cent of the total catch (Figure 2), with *P. multidens* being the most common of the three *Pristipomoides* species. Other key species in this fishery are saddletail snapper (*Lutjanus malabaricus*), red snapper (*L. erythropterus*), red emperor (*L. sebae*) and cods (Family Serranidae) (Figure 2).

The species composition of the catch is gear dependant (Figure 3). 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. multidens*). There was a higher proportion of trapping this year compared with using drop lines. This is reflected in a significant species composition change in the total catch compared with that in 2005.

In 2006, the total catch from the Timor Reef Fishery was 726 tonnes, of which the goldband snapper catch was 416 tonnes. This is an increase in total catch compared to 2005 when 669 tonnes were landed, but a small decrease in the proportion of goldband snapper harvested compared to the 2005 figure of 453 tonnes.

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

The 2006 by-product level is well below the 10 per cent trigger value required to initiate a review of management arrangements for the protection of by product species.

Effort

During 2006, seven licence holders actively fished and 1178 boat days were recorded, which is a decrease from last year's figure of 1503 boat days (Figure 4).

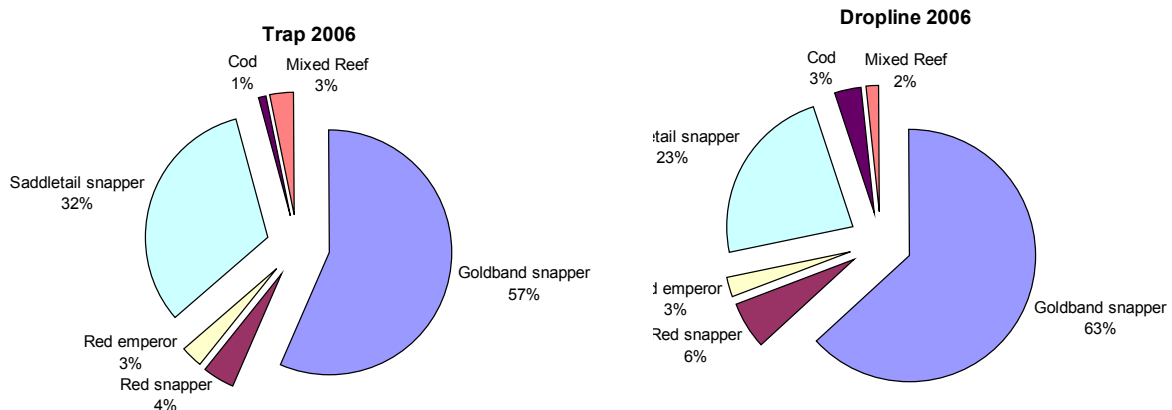


Figure 3. Comparison of catch composition harvested using different fishing gear in the Timor Reef Fishery during 2006

Catch Rates

Catch per unit effort (CPUE) increased in 2000 with the introduction of traps; however, there was a decline in CPUE in 2001, with catch rates relatively steady from 2001 to 2005, and an increase in CPUE during 2006 (Figure 5).

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.

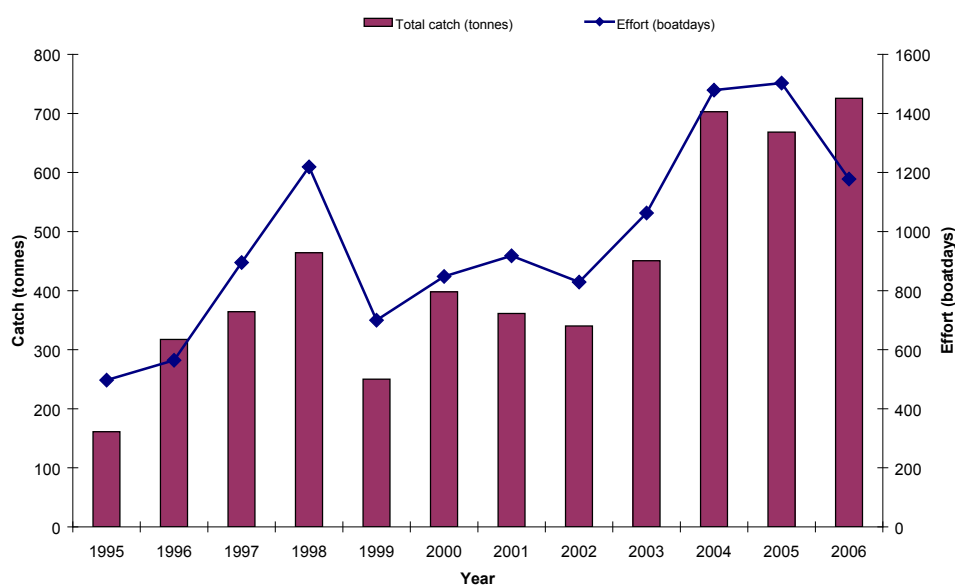


Figure 4. Catch and effort for the Timor Reef Fishery, 1995-2006



Figure 5. CPUE for the Timor Reef Fishery, 1995-2006

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 of the product is forwarded to interstate markets, principally Brisbane and Sydney. Increasingly, operators are developing marketing arrangements outside the traditional central marketing systems, with a local representative of a major seafood wholesaler continuing to coordinate consignments to east coast markets. At least one operator independently markets catch from his two vessels.

Non-retained Species

For the Timor Reef Fishery, the reported and observed level of by-catch (non-retained species) is less than 1 per cent of the total catch. The demersal tropical species landed in the fishery are well received throughout existing marketing channels.

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

By-catch in this fishery is below the 10 per cent trigger value.

Threatened Species Interaction

In 2006, 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.

Ecosystem Impact

The management arrangements for the fishery allow operators to use passive fishing gear comprised 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. 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.

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 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 of the then emerging fishery from the impact 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, marketers and numerous people in other support industries, such as transport and boat repairs.

Economic Impact

At the point of first sale in 2006, the overall catch value of the commercial Timor Reef fishery was \$4.08m. The goldband snapper component was \$2.77m (in 2005 it was \$3.3m) and the catch value of saddletail snapper was \$0.86m (in 2005 it was \$0.45m).

Stock Assessment

Monitoring

The fishery is monitored primarily through logbooks, which operators are required to fill out on a daily basis during fishing operations. The 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 28th day of the following month. In addition to logbooks, NT Fisheries officers conduct on-board monitoring of commercial fishing trips. While on-board, observers document vessel and gear information, location, depth, fishing practices, catch composition (including by-catch), and where possible, measure all landed species.

Eight on-board monitoring trips were conducted during 2006. This increased number of observer trips was due to the need to monitor immediately before, during and after seismic surveys that were conducted within the fishery. These additional trips were funded by Santos Ltd.

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 per cent 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 an extension of those developed by Professor Carl

Walters at a workshop in Darwin in 1996. 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 and 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 per cent of estimated biomass.

Current Status

In the Timor Sea, goldband snappers are targeted by Indonesian long line vessels as well as Australian trap and drop line 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 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

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 statistical methods to look at 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 6).

The stock structure of goldband snapper (*P. multidentis*) has been determined using both genetic methods and otolith micro-chemistry. It was funded by FRDC (1996/131, 1998/154). These studies were collaborative projects between NT DPIFM, Western Australian Department of Fisheries and Queensland Department of Primary Industries and Fisheries. 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 *P. multidentis*, 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 NT, 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 modeling allows the uncertainties of human knowledge to be captured as hard data. This work is expected to be completed in 2007.

A project to ascertain if hearing damage has occurred in goldband snappers due to seismic survey exposure was undertaken by Curtin University in collaboration with NT Fisheries. The project was funded by Santos Ltd and is expected to be completed in December 2007.

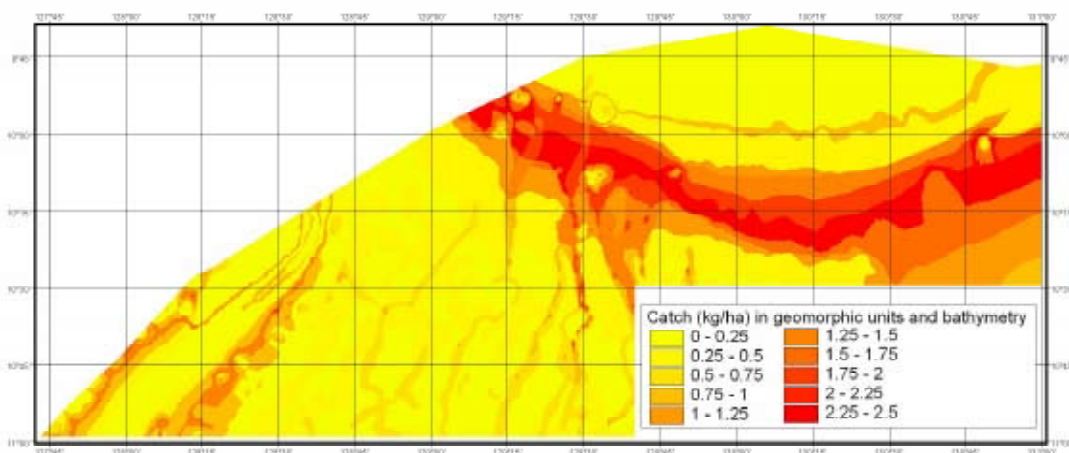


Figure 6. Abundance of goldband snapper catch (kg/ha) in relation to geomorphic units and bathymetry

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 (Table 1).

Existing arrangements also seek to ensure the sustainability of by-product species taken in the Timor Reef Fishery. Acceptable catch ranges for by-product are not more than 10 per cent 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 drop line fishery. Landings from the trial were around 1500 tonnes per year. It was not until 1987 that commercial drop-lining 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 NT 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 NT Fisheries Joint Authority (NTFJA). NTFJA provided for the Commonwealth and the NT to jointly manage the fishery given the likelihood of shared resources with adjacent national and international jurisdictions. NT Fisheries undertakes day-to-day management of the Timor Reef Fishery.

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

Current Issues

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

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 adequate resources are allocated by the Australian Government (the 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 sharks, apprehended vessels holding significant quantities of red snapper are becoming more prevalent. Coastwatch data highlights the significant 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 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 Timor Reef Fishery.

Oil and gas exploration companies have carried out 3D seismic surveys within the Timor Reef Fishery, which have impacted on commercial harvests from the immediate survey areas. Industry and NT Fisheries, with financial assistance from exploration companies, are carrying out additional research and monitoring of the survey areas in an attempt to better quantify the surveys impacts. Industry and NT Fisheries continue to liaise with oil and gas exploration companies in an effort to increase cooperation and to reduce the economic impact on fishing operators. These surveys have forced operators to temporarily relocate fishing activities to other areas within the fishery.

Future Plans

An industry request to review the levels of permitted gear (hand lines and drop lines) and management arrangements will be undertaken throughout 2006 and 2007 with a view to develop a formal plan of management for the fishery. The Timor Reef Fishery Management Advisory Committee (TRMAC) has formed and tasked a Timor Reef Fishery Assessment Group (TRFAG) to explore the potential of introducing catch quota management of the target species into revised management arrangements. The

Fishery Assessment Group is expected to report its findings, along with recommendations to a meeting of TRMAC during 2007.

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 and the management arrangements are under constant review.

Compliance

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

MFES effectively 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).

MFES has the power, if necessary, to investigate the records of wholesalers and licensees.

In 2006, there were no significant domestic compliance issues recorded for this fishery.

Consultation, Communication and Education

Regular consultation occurs between NT Fisheries, the NT Timor Reef Licensee Committee and the NT Seafood Council. In addition, NT Fisheries staff undertake regular visits to 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. TRMAC met in February. It formally represents the interests of all stakeholders and provides a forum to discuss any proposed amendments to the management regime. TRFAG was convened in June to

discuss the potential for alternative management arrangements. Recommendations from this group will be passed to the TRMAC 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. Members of the public, including community and environmental/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 puts out publications in the form of Fisheries Reports and newsletters to inform and educate stakeholders.

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Table 1. Management objectives and performance indicators for the Timor Reef Fishery, 2006

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.	Optimal sustainable yield estimates.	Annual catch exceeds 900 tonnes (estimated sustainable yield) (2006 414 tonnes).	TRMAC to review fishery and make recommendations to the Executive Director, Fisheries regarding appropriate measures to ensure annual catches do not exceed estimated sustainable yields.
Red snappers (including saddletail snapper)			Annual combined catch exceeds 1,300 tonnes (estimated sustainable yield) (2006 254 tonnes).	Amended arrangements to be implemented within 12 months of trigger being released.
Red emperor		Significant change in catch composition on demersal fishery grounds.	Annual catch increase in proportion of the total catch by greater than 25 per cent above the five-year average.	TRMAC to review fishery and make recommendations to the Executive Director, 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 per cent above the five-year average.	
By-product species	Ensure sustainability of by-product 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 per cent above the five-year average.	
By-catch species	Ensure sustainability of by-catch species taken in the Timor Reef Fishery.	Onboard monitoring of Timor Reef Fishery.	Total by-catch within the Timor Reef Fishery increases to 10 per cent of total catch or a decline in a species relative numbers without a corresponding change in fishing area or fishing technique.	TRMAC to make recommendations to the Executive Director, Fisheries regarding appropriate remedial action and onboard monitoring to commence at earliest practical opportunity.
Endangered, threatened or protected species and/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 NT waters.	Identifiable impacts observed by commercial fishers, fisheries observers or other agencies regarding EPBC listed species or communities.	TRMAC to make recommendations to the Executive Director, Fisheries regarding appropriate threat abatement plan implemented and onboard monitoring to commence at earliest practical opportunity.
Ecosystem components	Minimise effects on ecosystem components.	Identification of threatening processes.	Identification of significant negative interaction with components of the natural ecosystem present on demersal fishing grounds.	TRMAC to make recommendations to the Executive Director, Fisheries regarding appropriate remedial action