

Timor Reef Fishery Status Report 2005

INTRODUCTION

Commercial operators in the Timor Reef Fishery principally target goldband snapper (*Pristipomoides multidens* 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 2005, there were 12 licences in the fishery, a reduction from 22 licences in 1993. A limit 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 as assessed against the *Guidelines for the Sustainable Management of Fisheries* under the Commonwealth *Environment Protection and Biodiversity Conservation Act* (EPBC Act). The management arrangements of the fishery are recognised by the Australian Government Department of Environment and Heritage 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 extending north-west of Darwin to the Western Australia/Northern Territory border and to the outer limit of the AFZ. The fishery has an area of approximately 8400 nm² (Figure 1).

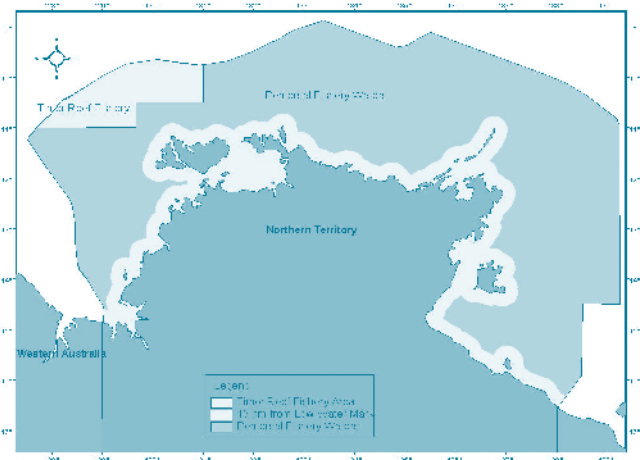


Figure 1. Area of the Timor Reef Fishery

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. Presently, two vessels use traps and the remainder dropline.

Catch

The principal target species of the Timor Reef Fishery are goldband snapper, which comprise the three species *Pristipomoides multidens*, *P. typus* and *P. filamentosus*. Together these species comprise 70% of the total catch (Figure 2), with *P.*

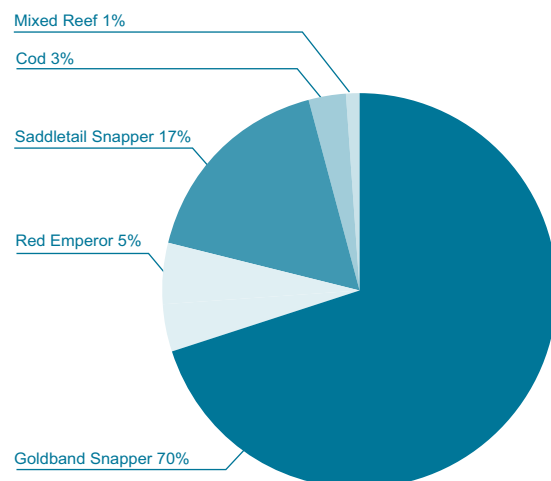


Figure 2. Composition of the catch from the Timor Reef Fishery for 2005

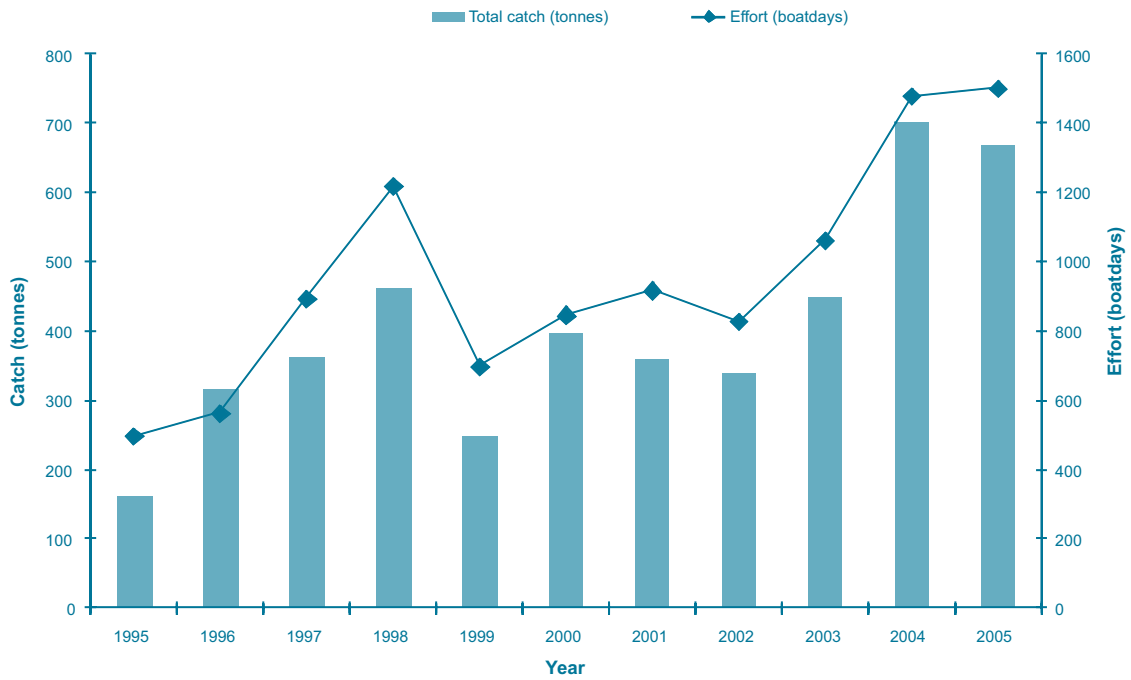


Figure 3. Catch and Effort for the Timor Reef Fishery 1995-2005

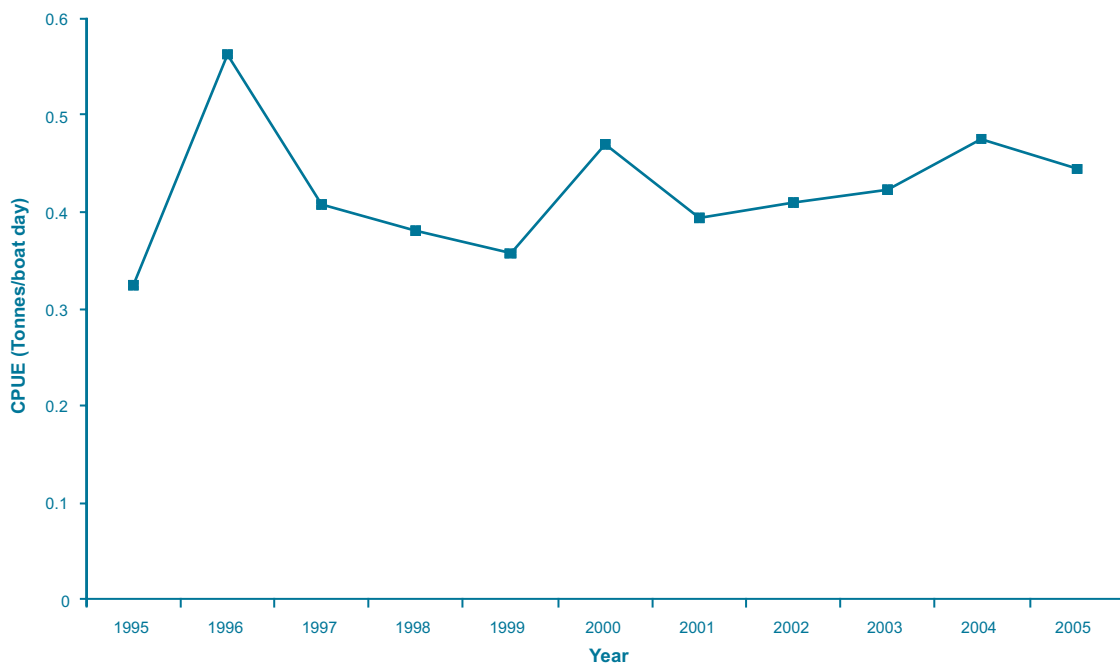


Figure 4. Catch rates for the Timor Reef Fishery, 1995-2005

multidens being the most common of the three *Pristipomoides* species. Other key species in this fishery are saddletail snapper (*Lutjanus malabaricus*), red snapper (*L. erythropterus*), red emperor (*L. sebae*) and cods (Family Serranidae).

In 2005, the total catch from the Timor Reef Fishery was 669 tonnes, while the goldband snapper catch component was 453 tonnes. The decrease from a total catch of 703 tonnes in 2004 is largely accounted for by a decrease in goldband snapper landed compared to the 485 tonnes in 2004.

Byproduct species for the Timor Reef Fishery only make up 1% of the overall catch. These include predominantly small snappers such as *Lutjanus vittus*, *L. russeli*, and emperors such as red spot emperor (*Lethrinus lentjan*) and Robinson's seabream (*Gymnocranius grandoculus*).

The 2005 byproduct level is well below the 10% trigger value required for a review of management arrangements for the protection of byproduct species.

Effort

During 2005, ten operators fished a total of 1503 boat days, which is marginally higher than during 2004 (Figure 3).

In 2005, there were 12 licences operating in the fishery. As mentioned earlier, the number of licences was reduced from 22, through an ongoing two for one licence reduction program.

Catch rates

Catch per unit effort (CPUE) increased in 2000 with the introduction of traps, however there was a decline in CPUE in 2001, but has remained relatively steady in the following years (Figure 4).

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 breakthrough 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 less than 7% of 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*).

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

Threatened species interaction

In 2005, 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 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. 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 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 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, packagers, marketers and numerous people in other support industries, e.g. transport, boat repairs etc.

Economic Impact

At the point of first sale in 2005, the overall catch value of the commercial Timor Reef fishery was \$4.3 million. The goldband snapper component was \$3.3 million (2004 - \$3.18 million) and the catch value of saddletail snapper was \$0.45 million (2004 - \$0.53 million).

STOCK ASSESSMENT

Monitoring

This fishery is monitored primarily through logbooks, which operators are required to fill out on a daily basis during fishing operations. These logs 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, fisheries officers conduct onboard monitoring of commercial fishing trips. While onboard, observers document vessel and gear information, location, depth, fishing practices, catch composition (including by-catch), and where possible, measure all landed species.

Due to resource constraints two onboard monitoring trips were conducted during 2005.

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 an extension of those developed by Professor Carl Walters at a workshop in Darwin in 1996 and details can be found in 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 1995-2003.

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 if current levels of fishing effort are maintained. 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. Finer spatial analysis of this fishery will be undertaken as part of FRDC project 2005/047 which commenced in October 2005.

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 (Ovenden et al., 2002), but

there are a number of separate stocks throughout Indonesia (Ovenden et al., 2004).

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 (Newman et al., 2000) therefore it is appropriate that these stocks 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. 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 stock structure of goldband snapper (*P. multidentis*) has been determined through a number of externally funded projects.

The FRDC funded projects 1996/131; 1998/154, were collaborative projects between NT DPIFM, WA Department of Fisheries and Queensland DPI. These studies used mitochondrial DNA (mtDNA) and otolith microchemistry techniques to determine the stock structure of *P. multidentis* 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 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. 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 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 modeling allows the uncertainties of human knowledge to be captured as hard data. This work is expected to be completed in 2007.

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 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 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 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. 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 implemented

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.

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 Federal Government to ensure adequate resources are allocated by the Australian Government (governing body is the Australian Fisheries Management Authority) to mitigate IUU impacts on the sustainability of 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. 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 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.

Future plans

An industry request to review the levels of permitted gear (handlines and droplines) and management arrangements will be undertaken throughout 2006/07 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 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, if necessary, to investigate the records of wholesalers and licensees.

In 2005, 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 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 to discuss 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 Director of Fisheries. 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. Review of 2005 catch figures against management trigger points for the Timor Reef Fishery

Species	Catch Tonnes	% Total Catch	Fishery Management Review Trigger	Status
Goldband snapper	459	70%	Annual catch exceeds 900 tonnes	Trigger not exceeded
Red snappers (including saddletail snapper)	133	20%	Annual combined catch exceeds 1,300 tonnes	Trigger not exceeded
Red emperor	34	5%	Annual catch exceeds 25% of total catch	Trigger not exceeded
Cod	21	3%	Annual catch exceeds 10% of total catch	Trigger not exceeded
Mixed reef	21	3%	Annual catch of byproduct exceeds 10% of total catch	Trigger not exceeded
Bycatch	<7	<1%	Annual catch of bycatch exceeds 10% of total catch	Trigger not exceeded
Total Catch	669	-	-	-