

Annual status report 2008

Gulf of Carpentaria Line Fishery



The Department of Primary Industries and Fisheries (DPI&F) seeks to maximise the economic potential of Queensland's primary industries on a sustainable basis.

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Inquiries should be addressed to:

Intellectual Property and Commercialisation Unit

Department of Primary Industries and Fisheries

GPO Box 46

Brisbane Qld 4001

or

copyright@dpi.qld.gov.au

Tel: +61 7 3404 6999

Introduction

The Gulf of Carpentaria Line Fishery (GOCLF) is a multi-species fishery which predominately targets Spanish mackerel (*Scomberomorus commerson*) using surface troll lines. Other permitted species typically comprise only a small portion of the overall catch.

Permitted species encompass a variety of pelagic (living in open ocean) and demersel (bottom-dwelling) groups. Pelagic groups include trevally and the lesser mackerels that are caught via trolling methods. Demersel groups frequenting coral and rocky reef areas include tropical snappers, cods and emperors, and are primarily caught in waters between 10 and 30 m deep using hand lines (Roelofs, 2004).

Product harvested from the GOCLF is principally sold on the Australian domestic market; there is currently no export from this fishery.

This report covers fishing activity during the 2007 calendar year.

Fishery profile 2007

Total harvest from all sectors: Approximately 350 t¹ + Indigenous

Commercial harvest: Approximately 272 t

Recreational harvest 2005: Approximately 44 t

Indigenous harvest 2000-01: Approximately 220 000 fish²

Charter harvest: 34 t

Commercial Gross Value of Production (GVP): \$1.9 million

Number of licences: 47 primary licences

Commercial fishing boats accessing the fishery in 2006: 29

Fishery season: January to December

Source: DPI&F CFISH database, 25 August 2008

Description of the fishery

Fishing methods

The commercial line fishery operates as a small-boat fishery, with a number of tender boats operating from a mother boat (<20 m), or as small trolling boats targeting pelagic fish.

Commercial vessels operate a combination of gear types including hand-hauled, hand winch-hauled or electric/hydraulic winch-hauled lines, and heavy rod-and-reel lines; each apparatus is maintained by an individual while in use (common denominator of one person handling one item at a time). Conditions and environmental factors favour the use of specific gear types or combinations of gear types dependant on a number of variables such as fishing location, weather conditions, frequency of catch and the time of day.

Recreational fishers primarily use basic hook and line techniques to catch permitted species.

¹ The total harvest estimate includes the latest recreational harvest estimate from 2005, based on the assumption that the subsequent years of catch would be similar for a total estimate.

² North Queensland estimate only—includes communities outside the Gulf of Carpentaria.

Indigenous communities in the Gulf of Carpentaria (GOC) combine the use of traditional subsistence fishing and recreational fishing practices. Traditional fishing methods offer a customary and culturally educational approach which includes the use of spears, stone fish traps and nets; species harvested are utilised as supplies for the community.

Fishing area

The GOCLF area extends from Slade Point near the tip of Cape York Peninsula to the Queensland–Northern Territory border and includes all tidal waterways offshore to the 25 nm line (see Figure 1). The L4 fishery symbol area endorses fishing activity between the coastline and the 25nm boundary; permitted species harvested while operating under the use of this symbol is attributed to the GOCLF.



Figure 1: Map of GOCLF fishery area.

Main management methods used

The Queensland Fisheries Joint Authority (QFJA), through the Queensland *Fisheries Act 1994*, manages all targeted fishing for northern demersal and pelagic fin fish in waters adjacent to Queensland in the GOC.

A range of input and output controls govern the fishing activity within the Gulf of Carpentaria Line Fishery. Management of the commercial sector is through the regulation of effort and includes the following controls:

- limited entry
- closed area restrictions – South Mitchell River
- gear restrictions – including restrictions of the type of apparatus that can be used (numbers of lines and hooks) and size of the boat and number of tenders that can be used in the fishery
- species specific size and number regulations – size limits and number of fish regulations apply to a range of in-possession species
- prohibition on retaining barramundi (*Lates calcarifer*), black jewfish (*Protonibea diacanthus*), blue and king threadfin (*Eleutheronema tetradactylum* and *Polydactylus macrochi*), jewel fish (*Nibea squamosa*), queenfish (*Scomberoides spp*) and spotted grunter bream (*Pomodasys kaakan*).

The full description including details of gear restrictions and size/number regulations can be found in the Department of Primary Industries and Fisheries (DPI&F) Ecological Assessment of the Gulf of Carpentaria Line Fishery (Roelofs, 2004) and can be downloaded from:

www.environment.gov.au/coasts/fisheries/qld/line/pubs/line-fishery-submission.pdf

DPI&F manages the GOCLF with advice from the Gulf Management Advisory Committee (Gulf MAC) in accordance with the Queensland *Fisheries Act 1994*, the Queensland Fisheries Regulation 2008 and the Fisheries (Gulf of Carpentaria Inshore Fin Fish) Plan 1999.

Approximate allocation between sectors

The GOCLF is principally a commercial fishery. At present there is limited overlap between the fin fish species caught and the species taken by other sectors. The estimated participation of the Indigenous, recreational and charter boat fishing sectors in the fishery is considered to be minor.

Fishery accreditation under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

A Wildlife Trade Operation (WTO) approval was granted on 30 August 2007, acknowledging that the fishery is being managed in an ecologically sustainable manner. The WTO was approved under Parts 13 and 13A of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and expires on 30 August 2010.

Catch statistics

Commercial

In 2007, the commercial sector of the GOCLF recorded the highest harvest levels when compared with the preceding eight years. Table 1 shows a rise in harvest weight from 2006 to 2007, resulting in a higher than average catch per unit effort (CPUE) of 239 kg/day. Catch and CPUE in 2007 have exceeded their maximum previous ranges and have increased by 33% and 8% respectively since the 2006 effort year.

Table 1: Total commercial catch (in tonnes), effort (number of boats in the fishery and days fished), CPUE (kg/day) and GVP (\$million) for the GOCLF 2000-07 (Source: DPI&F CFISH Database, 25 August 2008).

	2000	2001	2002	2003	2004	2005	2006	2007
Catch (t)	126	132	209	188	211	237	205	272
Boats	23	27	35	30	26	30	26	29
Days	738	746	1186	1145	924	1115	925	1136
kg/day	171	178	176	164	228	212	222	239
GVP (\$ million)	0.9	0.9	1.5	1.3	1.5	1.8	1.4	1.9

The GOCLF predominately targets Spanish mackerel with approximately 80% of the total harvest attributed to this individual species (Figure 2). Spanish mackerel catches have increased by 16% in comparison to 2006 harvest levels (Figure 3). In 2007, nine licences were responsible for 80% of the Spanish mackerel harvest in the GOCLF. Spanish mackerel in the GOC is harvested via line and as a by-product to net fishing methods. In 2007 line fishing remained the dominant fishing method for Spanish mackerel in the GOC; line fishing harvested 98% of the combined catch from the commercial line and net fisheries.

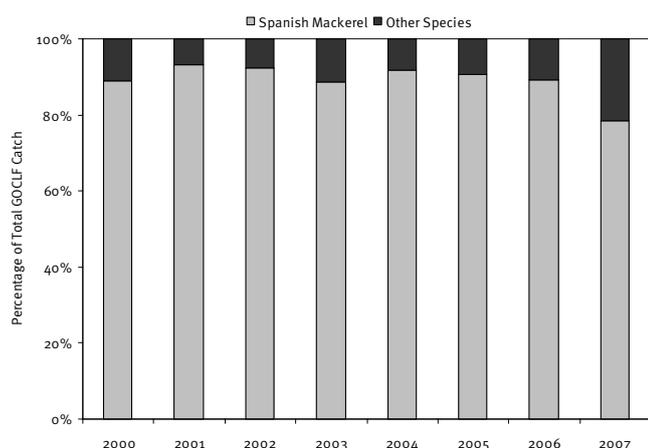


Figure 2: Contribution of Spanish mackerel to the total commercial catch compared with other species (all species combined) in the GOCLF 2000-07 (Source: DPI&F CFISH Database, 25 August 2008).

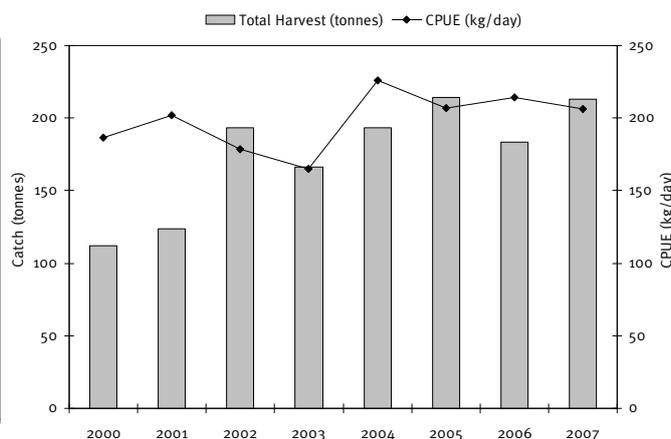


Figure 3: Total commercial catch (in tonnes) and CPUE (kg/day) of Spanish mackerel in the GOCLF 2000-07 (Source: DPI&F CFISH Database, 25 August 2008).

A number of other permitted species were retained for sale in 2007 (see Table 2). Other permitted species catch continued to fluctuate with 2007 harvest levels showing an increase of approximately 165% from the last reporting year; the number of fishing effort days on which minor permitted species have been caught and retained have also proportionally increased. Commercial fishing for demersal species in the GOCLF is generally limited to coral and rocky reefs and in weather conditions that are not conducive to trolling. The highest catches recorded for other permitted species occurred within the months of May, July and August, comparable to the highest recorded catch months for Spanish mackerel.

Table 2: Commercial catch (in tonnes) of minor permitted species in the GOCLF 2000-07 (Source: DPI&F CFISH Database, 25 August 2008).

Species Groups	2000	2001	2002	2003	2004	2005	2006	2007
Cod - All*	n/a ^a	1.4	6.3					
Coral Trout*	2.2	n/a ^a	1.6	0.7	n/a ^a	n/a ^a	n/a ^a	2.2
Emperor - Red	n/a ^a	0.3	3.6					
Mackerel - Grey	n/a ^a	2.1	8.4	11				
Other Fish*	7.8	7.4	9.2	12.9	8.4	11.3	11.7	18.7
Red Snapper*	n/a ^a	16.9						

*The harvest includes a number of species.

^aWhere catch is represented by n/a—catch attributed to less than five boats and therefore not revealed due to confidentiality reasons.

Red snappers, grey mackerel and cods were the highest caught groups of minor permitted species in the GOCLF for 2007. Cod harvest levels have increased by approximately 350% in comparison to 2006 figures. Red snapper harvest levels have attributed 17 t of catch in the commercial sector, representing approximately 30% of minor permitted species and just over 6% of the total GOCLF harvest.

A small number of fishers take the majority of the other permitted species, indicating that this increase is due to targeted fishing rather than as a by-product when targeting Spanish mackerel. Given the small overall value of fish taken and the small number of fishers targeting these fish, this increase is not considered a sustainability risk to GOC demersal fin fish stocks. The Gulf MAC will investigate this trend however to determine whether there is a need to review the management measures in the GOCLF.

Recreational

DPI&F are currently conducting a state-wide diary program which will provide some coverage of recreational catch estimates in the GOC. Until the collected data is analysed the most recent data estimates were those collected during the 2005 effort year. Refer to the 2006 GOCLF Annual Status Report for previous figures and catch statistics related to recreational harvest in the GOC.

Charter

The charter fishery commonly targets a similar range of species to the commercial sector; Table 3 shows 2007 species groups which were retained and/or released by a minimum of five boats. Charter operations in the GOC harvested an estimated 34 t of fish and released approximately 63 t in 2007. During the 2007 effort year only 35% of all charter catch was retained.

In 2007, harvest by charter operations was dominated by red emperor (7 t), spotted mackerel (4 t) and Spanish mackerel (3.9 t); in addition, significant quantities of coral trout and school mackerel were retained. Charter operations typically release more fish than they retain, particularly for species such as trevally. Coral trout and mackerel species exhibit the reverse of this release trend and substantially more are retained by anglers—coral trout and mackerels are appreciated for their high eating quality.

Table 3: Total retained and released (in brackets) harvest (in kg) by commercial tour operators of target and other permitted species in the GOCLF 2003-07 (Source: DPI&F CFISH Database, 25 August 2008).

Species Groups	2003	2004	2005	2006	2007
Bream - All*	2803 (1768)	2238 (1679)	1877 (774)	1657 (658)	1637 (381)
Cod - All*	1697 (10546)	1513 (10871)	1440 (9316)	1095 (8475)	1783 (3834)
Coral Trout*	2135 (1214)	2621 (1033)	3326 (1721)	3143 (937)	3058 (863)
Emperor - Red	3437 (1629)	4679 (92242)	6431 (3784)	6458 (4419)	7006 (4716)
Kingfish - Black	175 (241)	110 (382)	133 (581)	169 (655)	64 (265)
Mackerel - Grey	123 (1842)	143 (1087)	145 (2090)	654 (919)	244 (636)
Mackerel - School	n/a [‡]	782 (595)	1422 (119)	2511 (1859)	3014 (3022)
Mackerel - Spanish	2446 (2248)	2612 (2822)	3346 (3996)	4858 (2117)	3921 (3528)
Mackerel - Spotted	110 (438)	n/a [‡]	n/a [‡]	n/a [‡]	4050 (262)
Mackerel - Unspecified*	726 (4235)	516 (4103)	767 (1806)	339 (1587)	399 (4521)
Mangrove Jack	405 (2782)	511 (2905)	382 (2717)	136 (1683)	153 (1155)
Other fish*	7411 (31536)	8715 (29569)	10922 (31370)	7152 (27142)	7108 (26369)
Perch - Moses	2325 (3176)	1401 (2883)	1024 (2453)	618 (2025)	299 (1262)
Red Snapper*	1055 (423)	1412 (317)	2065 (656)	1632 (249)	1211 (251)
Trevally - All*	2282 (20887)	738 (19613)	1095 (22270)	410 (16585)	297 (12480)

*The harvest includes a number of species.

**Given that it is not possible to attribute catches to a given fishery in the GOC, charter species and harvest numbers represented in Table 3 are replicated in the Charter section of the GOCIFF Annual Status Report.

[‡]Where catch is represented by n/a—catch attributed to less than five boats and therefore not revealed due to confidentiality reasons.

Indigenous

Estimates for Indigenous fisheries harvest are not current; the most recent estimates of harvest activity within the bounds of the GOC were compiled in the 2000-01 National Recreational and Indigenous Fishing Survey (NRIFS). Refer to the 2006 GOCLF Annual Status Report for figures and catch statistics related to the Indigenous harvest in the GOC.

Spatial issues/trends

Between 2003 and 2006 Spanish mackerel catch and effort have shown similar annual harvest patterns. Figure 4 illustrates the distribution of Spanish mackerel commercial catch and CPUE in the fishery for 2007. In 2007, the higher CPUE and catch have become more concentrated around Mornington Island showing a slight change from previous trends.

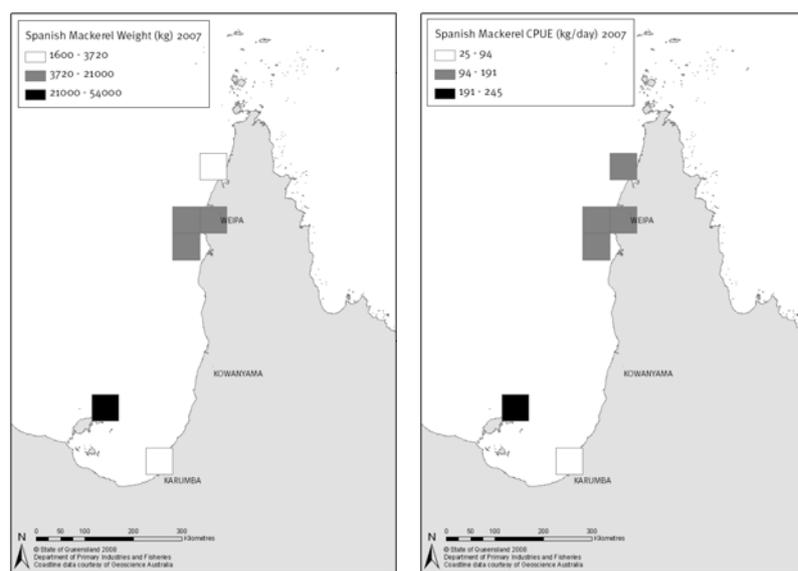


Figure 4: Spatial distribution of Spanish mackerel commercial catch (kg) and CPUE (kg/day) respectively, 2007.

Socio-economic characteristics and trends

Currently there is no export trade from the GOCLF given that the retained species are not a high-priced product; harvest is sold for approximately \$5-35/kg dependant on species and quality of product. The majority of species are sold domestically and supply a small component of the Queensland and interstate seafood trade.

Figure 5 illustrates the contribution of GOCLF Spanish mackerel catch with regards to the commercial licences' annual boat income. As previously stated the majority of GOCLF Spanish mackerel harvest is taken by nine of the licences accessing the fishery. Of these, five licences derive their entire income solely from the GOCLF. Figure 5 shows that over 75% of the active licences earn less than 60% of their entire fishing income through the GOCLF.

Participation in the commercial sector of the GOCLF was higher in 2007 than in 2006 with an additional three boats accessing the fishery (Figure 6). There was an increase in the number of fishing days and a noticeably higher Gross Value of Production (GVP) which was estimated at \$1.9 million. In 2007 Spanish mackerel fishermen received a lower total average income when compared with 2006. Fishermen participating in the GOCLF predominately earn less than \$80 000, with approximately 45% of the fleet grossing less than \$10 000.

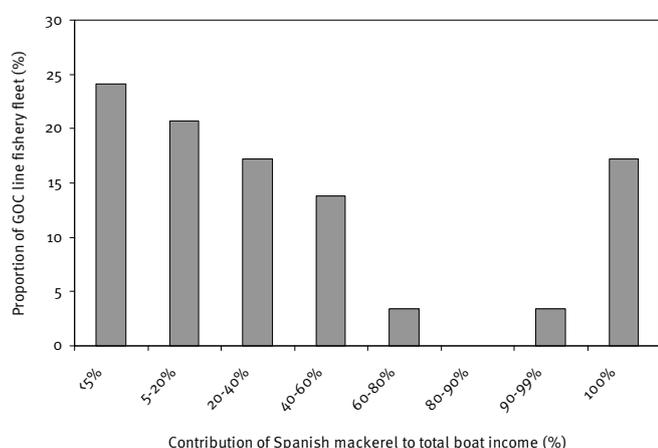


Figure 5: Contributions of GOCLF Spanish mackerel harvest to licence holders' annual fishing income in 2007 (Source: DPI&F CFISH Database, 25 August 2008).

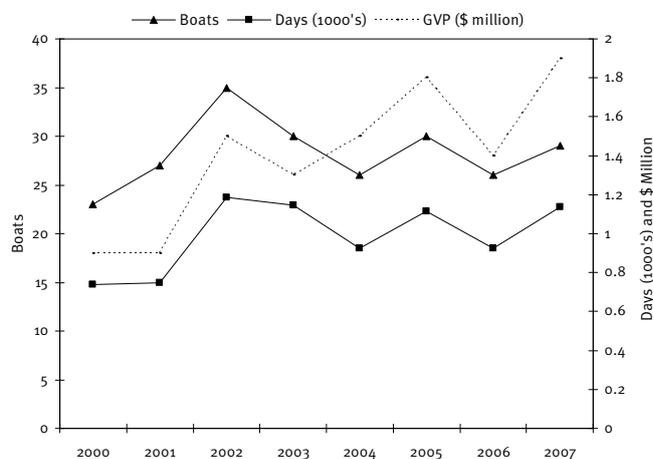


Figure 6: Number of commercial line boats accessing the GOCLF, annual days fished and whole fishery GVP (\$million) figures, 2000-07 (Source: DPI&F CFISH Database, 25 August 2008).

Fishery performance

Appraisal of fishery in regard to sustainability

An assessment of Spanish mackerel and shark stocks in Northern Australia in 1997 suggested that Spanish mackerel in the GOCLF were fully exploited at sustainable levels (Walters and Buckworth, 1997). While comprehensive stock assessments have not been made for other commonly caught species these species are being harvested at low levels and are therefore considered to be at negligible risk of overfishing.

An Ecological Risk Assessment Workshop held in Cairns during October 2004 determined that there are no specific predator-prey relationships involving Spanish mackerel that are threatened by fishing activities in the GOCLF. Current biological knowledge concluded that Spanish mackerel does not maintain a keystone role within the Gulf marine ecosystem and that the removal of this species would not overtly disadvantage any trophic groups or individual species (Zeller and Snape, 2006).

Given the low expendable effort and the vast geographic area and remoteness of the fishery, the GOCLF is presently being managed in a sustainable manner, with low risk of overfishing or local concentrations of effort leading to unsustainable harvest levels.

Progress in implementing Department of the Environment, Water, Heritage and the Arts (DEWHA) recommendations

DEWHA made a series of recommendations to DPI&F during its initial assessment of the Gulf of Carpentaria fishery in August 2004. The fishery recently underwent reassessment in August 2007, and was granted a new three-year WTO approval. Progress against the initial recommendations has been finalised below in Table 4.

Table 4: Final progress report for remaining round one DEWHA recommendations.

Recommendation	Final Progress Statement
<p>DPI&F to inform DEWHA of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on protected species or the ecosystem.</p>	<p><i>Completed and Ongoing</i></p> <p>There were no changes to management arrangements in 2007.</p>
<p>By the end of 2006 DPI&F to develop fishery specific objectives linked to performance indicators and performance measures for target, by-product, bycatch, protected species and impacts on the ecosystem.</p>	<p><i>Completed and Ongoing</i></p> <p>An interim Performance Measurement System was implemented by DPI&F in March 2008 and is reported against below.</p> <p>The PMS is continuing to effectively ensure that fisheries management is monitoring the sustainable use of GOCLF fish stocks whilst aiming to minimise impacts on the broader ecosystem.</p>
<p>DPI&F to monitor the status of the fishery in relation to the performance measures once developed. Within 3 months of becoming aware that a performance measure has not been met, DPI&F to finalise a clear timetable for the implementation of appropriate management responses.</p>	<p><i>Ongoing</i></p> <p>The interim Performance Management System (PMS) will aid DPI&F in monitoring the GOCLF fishery. DPI&F will aim to finalise a clear timetable of management responses, within three months of becoming aware that a performance measure has not been met. Performance measures will be regularly assessed and reported against in the time frames specified within the PMS itself.</p>
<p>From 2005, DPI&F to report publicly on the status of the fishery on an annual basis, including explicitly reporting against each performance measure, once developed</p>	<p><i>Completed and Ongoing</i></p> <p>The 2008 ASR represents the fourth consecutive report to be completed for the GOCLF. The 2008 report is the final ASR completed under the initial WTO recommendations.</p>

Recommendation	Final Progress Statement
<p>Within 18 months, DPI&F to develop a process to improve estimates of recreational and Indigenous take and factor these into stock assessments and management controls to ensure overall catch levels are sustainable.</p>	<p><i>Ongoing</i></p> <p>DPI&F is continuing to improve and investigate means of improving the collection of Indigenous and recreational fisheries catch data, through assessment of methodologies and design of pilot studies. Indigenous fisheries pilot studies are being developed in collaboration with southern GOC communities; difficulties are arising with regards to a system that maintains a culturally appropriate method of recording traditional ecological knowledge.</p> <p>Indigenous and recreational harvest knowledge will help to provide more accurate estimates of sustainable yields in the GOC. It will also disclose important species specific information which can be used in future ecosystem based fisheries modelling.</p>
<p>DPI&F to continue to seek out alternative cost effective fishery independent sampling techniques, particularly for target species, and report outcomes in the annual status report from 2005.</p>	<p><i>Ongoing</i></p> <p>DPI&F are reviewing and continuing to source alternative cost effective fishery independent sampling/monitoring techniques, particularly for species harvested in the GOCLF. Observer coverage was conducted in 2006 and is scheduled again for 2009. To date no alternative cost-effective methods have been identified due to the low value and small scale of the fishery.</p>
<p>DPI&F to continue to work towards developing sustainable yield estimates of target species to determine sustainable harvest levels, particularly for Spanish mackerel and seaperch.</p>	<p><i>Completed and Ongoing</i></p> <p>Precautionary limit reference points have been developed for target, by-product and bycatch species; values are specified in the GOCLF PMS.</p> <p>A sustainable yield estimate has been produced for red snapper, however research is still being conducted with regards to producing a sustainable yield estimate for Spanish mackerel. Commercial fisheries participation in the data collection programs is being investigated as a cost effective means of gathering information.</p> <p>DPI&F will monitor the performance of the GOCLF against precautionary limit reference points in the PMS while sustainable yield estimates are being developed.</p>

The second round of recommendations for the GOCLF has been listed in Table 5 below; progress made against these newly approved recommendations have been detailed where appropriate.

Table 5: Implementation progress of round two DEWHA recommendations for the Gulf of Carpentaria Line Fishery.

Recommendation	Progress
DPI&F to prohibit the retention of all EPBC Act listed Chondrichthyan species in the GOCLF.	<i>In Progress</i> Currently under review.
DPI&F to specifically consider the management of CITES listed species, in particular members of the Pristidae family, in the GOCLF.	<i>In Progress</i> Currently under review.
DPI&F to continue to improve estimates of recreational and Indigenous harvest. Once available, DPI&F to take estimates of IUU fishing, recreational and Indigenous harvests into account in stock assessments and to introduce management arrangements to mitigate any risks identified.	<i>Ongoing</i> DPI&F are currently running a state-wide diary program which will provide some coverage of the GOC. This program is an ongoing revised diary program focused on recreational boat owners. A participation telephone survey is also being planned for 2009. On 1 October 2008 new restrictions were introduced with regards to traditional and customary fishing. ³ New provisions detailed purpose of use, permitted apparatus and location restrictions which functionally limits the scope of Indigenous harvest.
As a part of the development of the Performance Measurement System, DPI&F to include a reference point related to protected species interactions and to refine the current reference point for Spanish mackerel.	<i>Not started</i> DPI&F acknowledge that the PMS requires further refinement of a reference point for Spanish mackerel and to include a reference point for protected species interactions. Further development of PMS reference points is underway.
DPI&F to monitor the status of the fishery in relation to the Performance Measurement System once finalised. Within 3 months of becoming aware that a performance measure has not been met, DPI&F to finalise a clear timetable for the implementation of appropriate management responses.	<i>Ongoing</i> This is the first year in which the newly developed GOCLF Performance Measurement System objectives have been reported against. As part of DPI&F's commitment to sustainable fisheries management, performance of the fishery against identified objectives will be analysed and reported on annually. A timetable for the implementation of appropriate management responses arising from the performance measure triggers will be developed within three months.

Performance against fishery objectives

The interim Performance Management System (PMS) for the GOCLF was finalised in March 2008. The PMS is a key component of management arrangements for the GOCLF, as it provides a series of transparent and

³ For more information go to <http://www2.dpi.qld.gov.au/fishweb/18780.html>

verifiable measures against which DPI&F can assess and report on the performance of the fishery. The PMS also provides a measurably sustainable basis for the ongoing operation of the fishery.

Table 6: Performance measures and their outcomes for the Gulf of Carpentaria Line Fishery.

Performance Measure	Performance
<p>Spanish mackerel</p> <p>Estimated catch by all sectors exceeds the estimated sustainable yield of Spanish mackerel</p> <ul style="list-style-type: none"> ▪ Aggregate landings by all sectors reach 90% of the sustainable yield (by whole weight) and/or total fishery catch declines by 30% over the calendar year (by whole weight) 	<p><i>Not Triggered</i></p> <p>Sustainable yield for Spanish mackerel has not yet been determined.</p> <p>Total fishery catch has increased by 15% between the 2006 and 2007 calendar year.</p>
<p>By-product</p> <p>By-product in the GOC line fishery increases by 20% of the total landings of the calendar year (by whole weight)</p>	<p><i>Triggered</i></p> <p>By-product catch increased by approximately 22% of the total fisheries harvest in the 2007 calendar year.</p> <p>By-product species harvest totalled 59 t from a total fishery harvest of 272 t. This percentage triggered the by-product performance measure indicator by 2%.</p> <p>Analysis of the data indicates that this increase is due to targeted fishing for demersal species by a small number of fishers. The Gulf MAC will review the operations of the fishery by 1 July 2009 to determine if there is a need to amend the operations of the fishery to address this change.</p>
<p>Bycatch</p> <p>Bycatch in the GOC line fishery increases by 10% of the total catch over the calendar year (whole weight)</p>	<p><i>Not measured</i></p> <p>No comparison data available. The next FOP trip is scheduled for 2009.</p>
<p>Protected, endangered and threatened species and/or communities</p> <p>Level of interaction with endangered/threatened/protected species in the GOC Line Fishery increases significantly</p>	<p><i>Not Triggered</i></p> <p>There have been no recorded interactions with protected, endangered and threatened species and/or communities.</p>

As detailed in Table 6, the by-product performance measure has been triggered. This PMS measure has been triggered as a result of a small number of fishers who appear to have modified their fishing activities to deliberately target demersal fin fish, as part of their L4 line fishing operations. Given that there is currently very little effort expended in the GOCLF this is not considered to pose any risk to fisheries resources. The small increase in total Spanish mackerel catches suggests that there is no evidence that the increased take of demersal species is the result of declining availability of the principal target species in the GOCLF. However, this issue will be fully investigated to ensure appropriate arrangements are in place for managing target fishing for demersal fin fish during the review of the fin fish fishery. It is anticipated that this review will commence in 2009.

Resource concerns

This fishery is regarded as sustainable, based on current management arrangements and levels of effort.

Ecosystem

Non-retained species / bycatch

Bycatch in the commercial sector of the GOCLF is considered negligible (Roelofs, 2004). The fishing gear and methods sought to target fish in the GOCLF limits the take of species other than Spanish mackerel and the other main demersal and pelagic fish species. Fishing methods employed in the GOCLF include the use of troll and hand lines which effectively target legal sized species and bycatch is limited (Roelofs, 2004). Active fishing involves individual attention to a gear type with incidental species released immediately and alive.

Recreational fisheries have relatively high levels of bycatch due to a growing movement towards the practice of catch and release fishing, and to comply with regulated fish sizes, species and bag limits. The fate of fish species discards in the recreational fishery is not known; however, survival is likely to be high for average size fish that are not unduly harmed during the handling and release stages. A collaborative study by DPI&F and Rainforest and Reef Research Centre (RRRC), with funding from the Fisheries Research and Development Corporation (FRDC) ⁴, is investigating post-release survival of line caught reef species to assess the impact of line fishing on bycatch. Line-caught fish were subjected to one of two barotrauma relief procedures and compared with fish that were not treated. Preliminary results for short-term survival rates indicate between 78 and 100% of released coral trout, red emperor, red throat emperor and crimson snappers survived for at least three days. The long-term experiment is dependant on contributions by recreational anglers; recapture rates are determined by tag and release after the application of barotrauma treatments. Long-term data suggests that barotrauma procedures, particularly venting, positively influence the survival rate of red emperor, crimson snapper and saddletail snapper. The project has not yet been finalised with further collection and analysis required to achieve a statistically sound result.

No data on the level of bycatch in the Indigenous subsistence sector of the fishery are available, although the level is thought to be very low.

Interactions with protected species

CFISH logbook data indicate that there were no interactions with endangered, threatened or protected species in the GOCLF for 2007. A Species of Conservation Interest (SOI) logbook has been developed to provide more detailed information on the level of interactions with protected species across all Queensland fisheries. The SOI logbook was implemented with new catch logbooks for the GOCLF in 2006.

⁴ For more information go to http://www.dpi.qld.gov.au/cps/rde/dpi/hs.xsl/28_5828_ENA_HTML.htm

Fishery impacts on the ecosystem

It is unlikely that there is any significant physical impact on the ecosystem from the fishery, because of the troll line fishing method that is predominantly used.

Other ecosystem impacts

Workshops

A Threats and Impacts workshop was held in Darwin during May 2008. Attendees comprised a variety of backgrounds spanning DEWHA, CSIRO, universities, private companies and Fisheries management agencies. The workshop examined threatening processes and their impacts in the North Marine Region. It provided key input into the Draft North Marine Bioregional Plan as part of the Marine Bioregional Planning program being undertaken by DEWHA. The Bioregional Plan is part of a strategy to develop a national representative system of marine protected areas around Australia and may have an impact on the management of the GOCLF.

Foreign and illegal fishery activities

Illegal, Unreported and Unregulated (IUU) fishing vessel incursions in GOC waters are a recognised threat to the sustainability of northern Australian fisheries. During 2007 there were a total of nine apprehensions recorded by the Australian Fisheries Management Authority (AFMA) in the GOC. All apprehended vessels were Indonesian boats which sailed from homeports in West Papua (Indonesia) equipped to predominately target shark (Beckmann, 2008). There are no reports of IUU fishing on other pelagic species in the GOC region. Concerns are held for the take of protected species and other species of conservation interest.

Measures of IUU activities over the past 20 months have shown a marked decrease in illegal foreign fishing in the GOC due to increased apprehension rates at home ports in West Papua. General surveillance sightings for the same period have also decreased (Beckmann, 2008).

A lack of accurate information regarding IUU harvest levels can affect the accuracy of resource assessments, which in turn can influence the effectiveness of sustainable management practices in the region.

Research and monitoring

Recent research and implications

The stock structure of northern and western Australian Spanish mackerel has recently been examined using various methods including chemical analysis of otoliths, comparison of parasite abundances and genetic material analysis (Buckworth *et al.* 2007). Fish were sampled from across northern Australia and Indonesia. The study indicated that Spanish mackerel in northern Australia form three distinct genetic stocks: an east coast stock, a Torres Strait stock, and a single stock across the north and west coasts of the continent. The authors suggested that it is unlikely that there is movement of Spanish mackerel between these groups and that the northern and western Australian stock should be managed as a single unit. The study also suggested that there has been no movement of adult fish from Australia to Indonesia, however experiments did not reveal whether Indonesian fish move to Australia (Buckworth *et al.* 2007).

An Ecological Risk Assessment (ERA) prepared in 2004 on the GOCLF stated precaution should be given to Spanish mackerel stocks determined to be shared across the GOC and the Northern Territory (Zeller and Snape, 2006). Precaution is due where a single stock is being targeted by more than one population of fishers due to the potential to amplify the effort. DPI&F routinely engages in precautionary management and maintains communication with neighbouring jurisdictions across northern Australia to ensure balanced cooperative

management of shared resources. The results of the Buckworth *et al.* (2007) study will be incorporated into future reviews of the ERA.

Ongoing research has been conducted to identify means of improving the knowledge of the status of red snapper stocks. Recent research has confirmed that red snapper in Australia and Indonesia waters belongs to a single stock (Salini *et al.* 2006). As a result of this finding, it was concluded that the key input for a formal red snapper stock assessment, estimation of annual total catch, could not be determined. The proposed stock assessment for red snapper will therefore not be completed; however, in September 2008 the North Australian Fisheries Committee (NAFC) endorsed a Harvest Strategy Framework for red snappers in Northern Australia (NAFC, 2008). The fisheries harvest strategy will set out the management requirements necessary to achieve both the biological and economic objectives of the red snapper fishery, and provide fisheries managers and industry with a transparent process with which to manage the fishery (NAFC, 2008). As a part of the strategy a series of indices of abundance and stock health will be developed as a priority for stock status.

Monitoring programs and results

Long Term Monitoring Plan

Monitoring of Spanish mackerel in the GOC began in 2007 though the program is still in its initial phases. The objectives of the new monitoring program are to collect length, sex and age structure data from commercial and recreational catches to be used in stock assessments and to address the DEWHA recommendation “*to develop sustainable yield estimates of target species to determine sustainable levels, particularly for Spanish mackerel*”.

The monitoring strategies are similar to those employed on the east coast of Queensland and involve fishery dependent sampling on major fishing grounds in the GOC. Representative age, length and sex structure information is collected from both the recreational and commercial sectors in northern and southern regions in the GOC. Detailed information will be available in ‘Fisheries Long Term Monitoring Program Sampling Protocol—Spanish Mackerel: (2007 onwards) Section I.’⁵

The program will report regularly on monitoring survey data through Annual Status Reports and Summary Reports and may aid in future stock assessment analysis and performance measurement systems.

Results from the first year of monitoring are limited but include:

- 481 fish were measured from the commercial sector. The fish ranged from 740 mm to 1480 mm in total length with an average length of 1061 mm (Figure 6).
- 36 fish were measured from the recreational sector. These fish were all measured at one competition. The fish ranged from 810 mm to 1120 mm in total length with an average length of 971 mm (Figure 7).
- Similar numbers of male (47%), and female (53%) Spanish mackerel were sampled in 2007.

⁵ This report is still in preparation but is a priority for completion as soon as possible.

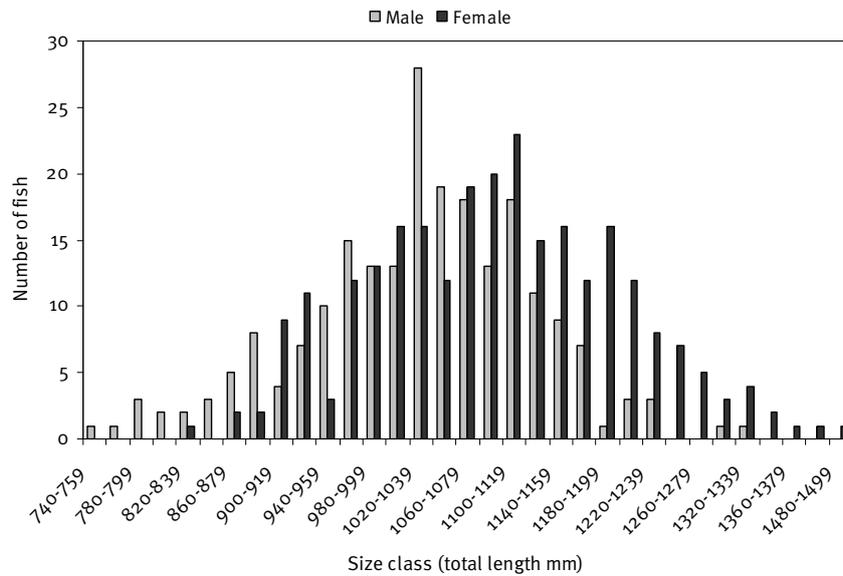


Figure 6: Size frequency distribution of Spanish mackerel sampled from the commercial sector in 2007. Total number of fish measured was 481.

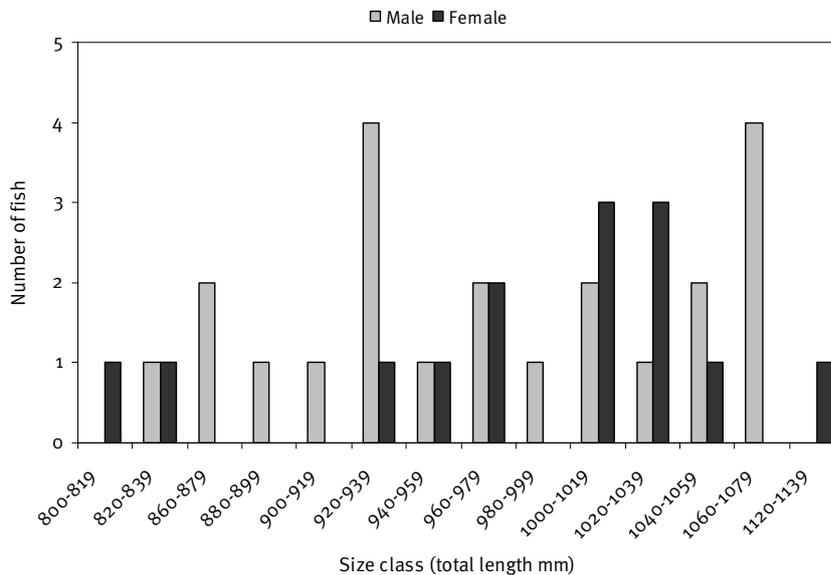


Figure 7: Size frequency distribution of Spanish mackerel sampled from the recreational sector in 2007. All fish were measured at the Weipa Fishing Classic. Total number of fish measured was 36.

Future monitoring will focus on increasing commercial, charter and recreational fisher participation in the program to collect samples and information for age, length and sex of Spanish mackerel.

A ‘Keen Angler Program’ was recently implemented in the GOC, to increase the collection of Spanish mackerel samples from the recreational sector outside of major fishing competitions. This will help to ensure that the data is more representative of all sectors across all areas.

Fishery Observer Program

The DPI&F voluntary Fisheries Observer Program (FOP) operated in the commercial sector of the GOCLF in 2006. The program objectives are to collect information on the composition and length frequencies of the retained catch and bycatch, as well as interactions with protected species.

The Fisheries Observer Program continues to operate in Queensland's diverse fisheries and in accordance with operational planning in this fishery conducts their business on a three year rolling plan. The GOCLF will receive observer coverage again in 2009, with an anticipated 50 days of reporting.

Collaborative research

See Recent research and Implications.

Fishery management

Compliance report

During 2007, 888 line fishing inspections were undertaken in the Gulf of Carpentaria. Of these, 39 were commercial vessel inspections. The majority of the remaining inspections were of recreational fishers, with a smaller number of inspections comprising show sites, camp sites, fishing clubs, charter/tour operators, private property, motor vehicles and marketing premises.

During this period, nine offences were detected, corresponding to a compliance rate of 98.9% of units inspected. A summary of offences is provided in Table 7.

Offences are reported as either a Fisheries Infringement Notice (FIN) or FIN Caution.

Table 7: Offences recorded in the Gulf of Carpentaria Line Fishery 2007.

OFFENCE	FIN	FIN Caution
Take or possess fish regulated by size	5	1
Brought fish ashore and returned fillets to the boat	-	1
Take or possess species during closed season	1	-
Contravene closed waters	-	1
TOTAL	6	3

Note: All of the offences were by recreational fishers.

Changes to management arrangements in the reporting year

There have been no changes to management arrangements during the reporting year.

Consultation, communication and education

Consultation with stakeholders in the GOCLF mainly occurs through Gulf MAC. Two meetings were held in 2007. Gulf MAC provides advice to the QFJA and DPI&F on management measures for the GOCLF. The regulation of the harvest of Spanish mackerel in the GOC is under the control of the QFJA. The QFJA met once during the reporting period.

Complementary management

Fisheries researchers and managers from State, Territory and Commonwealth jurisdictions meet annually at the Northern Australia Fisheries Management Forum to review current research, set research priorities and consider

management strategies to facilitate the development and implementation of complementary management for shared fisheries resources.

References

Beckmann, A (Australian Fisheries Management Authority), email, 8 September 2008.

Buckworth, R, Newman, S, Ovenden, J, Lester, R, and McPherson, G 2007, *The Stock Structure of Northern and Western Australian Spanish Mackerel. Fishery Report Number 88. Final Report, Fisheries Research & Development Corporation Project. Project number 1998/159*, Fisheries Group, Department of Business Industry and Resource Development, Northern Territory Government, Darwin.

Roelofs, A 2004, *Ecological Assessment of the Gulf of Carpentaria Line Fishery - A report to Environment Australia on the sustainable management of a multi-species tropical line fishery. February 2004*, Department of Primary Industries and Fisheries, Brisbane.

Salini, J, Ovenden, J, Street, R, Pendrey, R, Haryanti & Ngurah 2006, 'Genetic population structure of red snappers (*Lutjanus malabaricus* Bloch & Schneider, 1801 and *Lutjanus erythropterus* Bloch, 1790) in central and eastern Indonesia and northern Australia', *Journal of Fish Biology*, vol. 68, Supplement B, pp. 217-234.

Walters, CJ & Buckworth, RC 1997, 'Shark and Spanish mackerel stocks assessed.' *Northern Territory Fishing Industry News, July 1997*, vol. 8, pp. 14-15.

Zeller, B & Snape, N 2006, *Ecological Risk Assessment of Queensland-managed fisheries in the Gulf of Carpentaria. A report to the Australian Government on ecological risk assessment requirements set out in Wildlife Trade Operation approvals for Gulf fisheries under the Environment Protection and Biodiversity Conservation Act 1999*, Department of Primary Industries & Fisheries, Brisbane.

Information compiled by

Anna Garland

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Front cover image

Spanish mackerel (*Scomberomorus commerson*)

