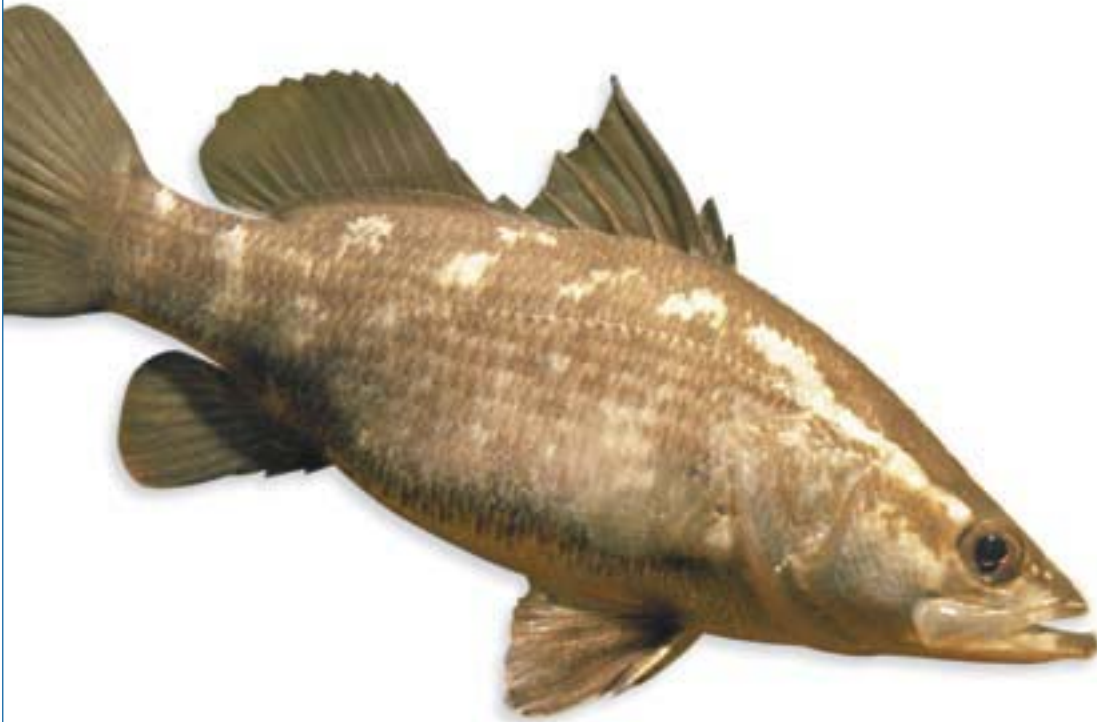


Annual status report 2005

Queensland Gulf of Carpentaria Inshore Finfish Fishery

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

This publication provides information on the Queensland Gulf of Carpentaria Inshore Finfish Fishery.

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Introduction

The Gulf of Carpentaria Inshore Finfish Fishery (GOCIFF) is a multi-species fishery that comprises an inshore (N3) and offshore (N9) commercial net fishery, and also includes commercial bait netting (N6), recreational fishing, Indigenous fishing and charter boat fishing tour operation components.

Commercially targeted species include barramundi, king and blue threadfins and grunter in the N3 fishery, and tropical shark and grey mackerel in the N9 fishery. Recreational fishers also target these species (except for tropical shark) as well as mangrove jack, black spot and gold spot cod, and red snappers. Indigenous fishers target a wide variety of fish species depending on the season. Traditional target species are frequently associated with edibility (texture and taste), quality (nutritional value) and cultural practice.

Product from the GOCIFF commercial sector is predominantly sold on the Australian domestic market. The only exported product is shark fin which is sold to Asian markets.

Description of the fishery

Fishing methods

Fishers in both the N3 and N9 fisheries use set mesh nets to harvest finfish. There are different restrictions on allowable net length, drop and mesh size for each fishery (see the Department of Primary Industries and Fisheries (DPI&F) report, *Ecological Assessment of the Gulf of Carpentaria Inshore Finfish Fishery*¹).

Mesh nets used in the N3 fishery are set fixed in estuaries, on foreshores and offshore waters out to 7 nm. Most fishers prefer to fish 162.5 and 178 mm mesh nets because those nets selectively catch fish of a size meeting market demand for fillet product.

Set mesh nets are also used in the N9 fishery, with each licence authorised to use a maximum net length of 1200 metres.

The commercial bait (N6) fishery uses small mesh (25 to 45 mm) set nets that are no longer than 200 m when fishing on a foreshore or within estuaries, and must be no longer than 400 m when fishing in offshore waters.

Recreational fishers primarily use hook and line to catch target fish species as well as cast and seine nets to catch baitfish species.

The Indigenous communities in the Gulf of Carpentaria (GOC) use traditional subsistence fishing methods for traditional and customary purposes, as well as recreational fishing practices to catch finfish and crabs. Traditional fishing methods include the use of spears, stone fish traps and nets and are used to supply product solely for community use.

¹ Roelofs, A.J. (2003). *Ecological Assessment of the Gulf of Carpentaria Inshore Finfish Fishery—A report to Environment Australia on the sustainable management of a multi-species tropical gillnet fishery*. Department of Primary Industries and Fisheries, Queensland: 87 pp.

Fishery area

The GOCIFF is the most westerly located commercial fishery in Queensland waters. It extends from Slade Point near the tip of Cape York Peninsula westward to the Queensland–Northern Territory border and operates in all tidal waterways out to the 25 nm line. The N3 fishery operates within estuaries and foreshores* and out to 7 nm from the coast, while the N9 fishery operates between 7 to 25 nm further offshore.

Main management methods used

DPI&F manages the commercial, recreational and Indigenous components of the GOCIFF through the Queensland *Fisheries (Gulf of Carpentaria Inshore Finfish) Management Plan 1999* (Gulf Management Plan), the Queensland *Fisheries Act 1994* and the Queensland *Fisheries Regulations 1995*.

The GOCIFF is managed to optimise sustainable productivity and the protection of spawning target species using a variety of input controls including:

- limited entry (commercial fishery only)
- boat and gear restrictions
- spatial and temporal closures
- possession limits
- fish size limits.

The full description of input controls can be found in the DPI&F report *Ecological Assessment of the Gulf of Carpentaria Inshore Finfish Fishery*¹ and can be downloaded from:

<http://www.deh.gov.au/coasts/fisheries/qld/fin-fish/submission.html>.

Approximate allocation between sectors

The GOCIFF is mainly a commercial fishery, with the recreational sector estimated to take the equivalent of 10% of the commercial catch of barramundi. There are no comparative estimates for other recreationally important species at present. The spatial resolution of the DPI&F Recreational Fishing Information System (RFISH) is such that it is difficult to extract recreational catch estimates specifically for the GOC (see also the 'Improving our knowledge of Indigenous and recreational harvest' section).

Fishery accreditation under EPBC Act

The GOCIFF was granted a Wildlife Trade Operation (WTO) approval under Part 13 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 13 October 2004. The WTO approval acknowledges that the fishery is being managed in an ecologically sustainable manner and allows the continued export of product caught in this fishery. The current approval expires in October 2007. Another approval will be required if product from the fishery is to be exported subsequent to this date.

* Excluding areas that are closed to commercial fishing.

¹ *ibid*

Fishery profile

Catch and effort (target species)

Total harvest from all sectors 2004: 2318 t plus Indigenous and recreational harvest

Commercial harvest for 2004: 2277 t

Recreational harvest: No estimate at present

Indigenous harvest: Approximately 420 000 fish (no estimate of weight at present)

Charter harvest for 2004: 41 t

Commercial gross value of product (GVP) for 2004: A\$12 million

Number of licences: 87 (N3), 5 (N9), 105 (N6)

Commercial fishing boats accessing the fishery in 2004: 96

Commercial

Catches of barramundi were slightly higher in 2004 than 2003, however harvest levels are low compared to the period between 1999 and 2002 (Table 1, Figure 1). Catches of king threadfin have also shown a similar harvest pattern. Preliminary research on the effects of climate on tropical fisheries productivity has shown a correlation between the 'drought' (poor wet season) conditions the GOC region experienced in 2003 and 2004 and the lower catches of barramundi.² However, further research is needed to better understand this relationship.

Catches of grey mackerel were high in 2004 while tropical shark catches have been steady over the last five years (Table 1). The grey mackerel catches are particularly encouraging given the recent concerns for the stock expressed by the Department of Environment and Heritage (DEH) and following a recent stock assessment³ that suggested stocks might be declining.

In 2004, N3 operators continued to target barramundi and king threadfin (52% of the catch), although this has decreased when compared to the long-term average (64%) (Figure 2, Figure 3). This has mostly been due to the correspondingly larger proportional harvest of grey mackerel and tropical shark (23% combined).

N9 operators continue to predominantly harvest grey mackerel and tropical sharks although there has been an increase in the percentage harvest of Spanish mackerel (Figure 4, Figure 5).

² Gribble, N.A., Rasheed, M. and Balston, J. (2005). Drought impacts on Marine Ecosystems of the southern Gulf of Carpentaria. ASFB National Conference, Darwin.

³ Gribble, N.A., Buckworth, R., Garrett, R. and Stapley, J. (2005). Gulf of Carpentaria Grey mackerel, *Scomberomorus semifasciatus* (Macleay, 1884) stock: a joint Northern Territory and Queensland preliminary assessment. Unpublished report.

Table 1: Species composition of the total catch in tonnes (N3 and N9 combined) in the GOCIFF from 1990 to 2004.

Species group	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Barramundi	395	540	357	407	372	439	522	434	556	657	612	727	747	520	596
Grey mackerel	30	28	33	35	112	128	240	378	369	308	423	472	349	377	468
Shark—all**	195	181	201	175	315	479	347	304	339	361	391	374	393	434	396
King threadfin	428	483	415	336	223	248	290	242	335	351	319	475	445	279	303
Spanish mackerel	22	10	19	25	45	79	84	123	100	103	76	90	133	83	146
Blue threadfin	66	50	76	63	83	77	91	52	68	61	41	67	83	100	123
Jewel	1	1	11	26	36	26	23	12	19	16	22	33	48	48	52
Grunter—all**	16	7	11	13	21	19	22	17	14	14	16	30	34	31	52
Queenfish	17	10	11	7	18	18	15	12	14	13	10	16	26	26	35
Fish—unspecified**	24	26	30	61	47	34	33	24	26	24	29	53	33	53	30
Pomfret—black	2	2	1	3	2	4	3	6	8	6	5	3	5	9	16
Catfish—fork	2	4	4	6	11	10	10	8	10	5	5	4	6	7	13
Seaperch**				0.03	1	2	9	8	4	6	5	9	11	12	12
Jew—all**	33	14	17	7	10	11	12	6	4	3	7	3	5	5	8
Mullet—all**	1	1	1	2	1	1	3	3	1	1	2	5	1	8	6
Ray—all**	0.3	0.02	1	4	5	1	2	1		0.3	0.1	2	5	7	3
Fish—bait**	0.1	1	0.1	0.4	0.4	0.1	0.01	0.02		0.2	0.04	0.1	1	0.2	2
Triple tail	4	1	1	1	1	1	2	2	4	1	1	1	2	2	2
Mackerel—other**				0.1	3	2	3	2	2	1	5	1	2	3	5
Other fish**	68	38	66	26	22	32	32	23	12	10	19	25	28	13	17
Total—all combined	1272	1382	1236	1191	1318	1600	1732	1651	1878	1937	1981	2388	2353	2012	2277

** A number of species comprise the harvest.

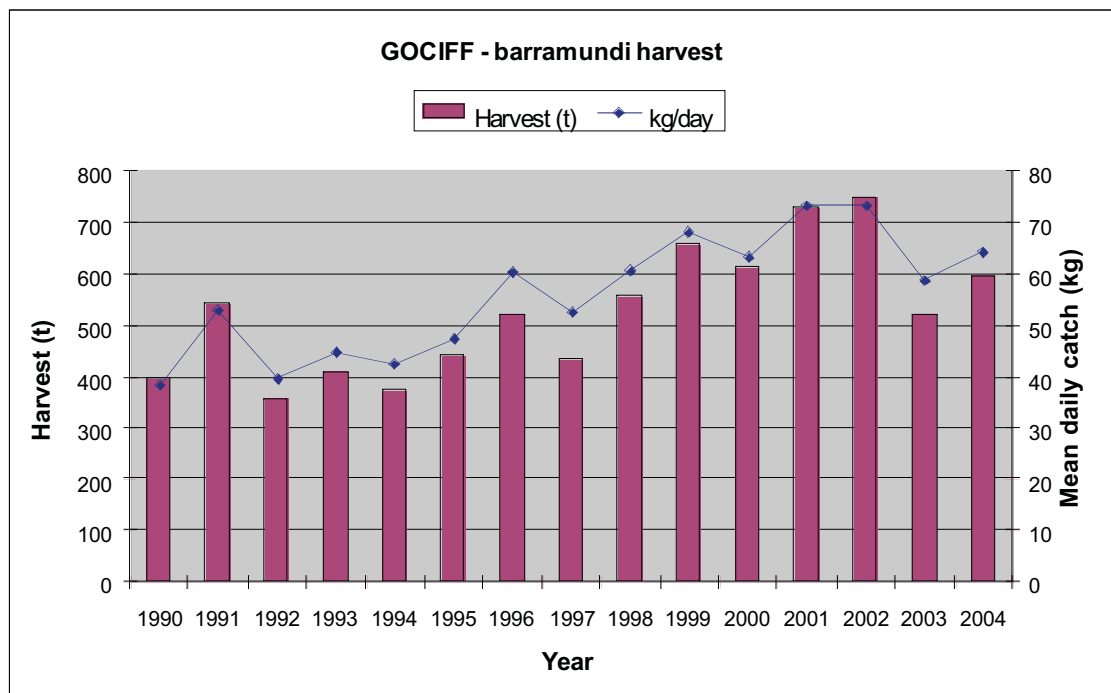


Figure 1: Total harvest (t) of barramundi in the GOCIFF from 1990 to 2004.

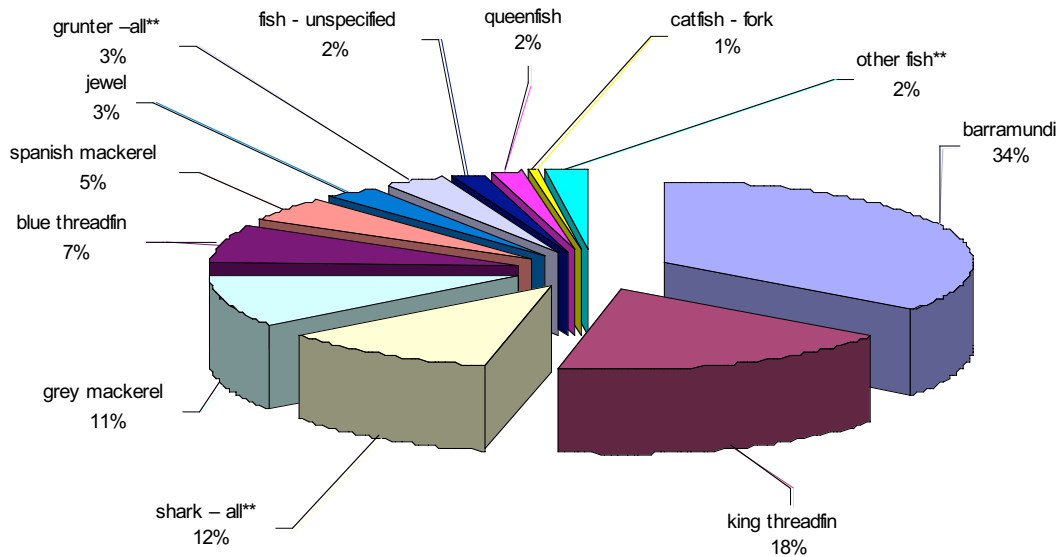


Figure 2: Species composition of total catches from the N3 fishery in 2004 (** a number of species comprise the harvest).

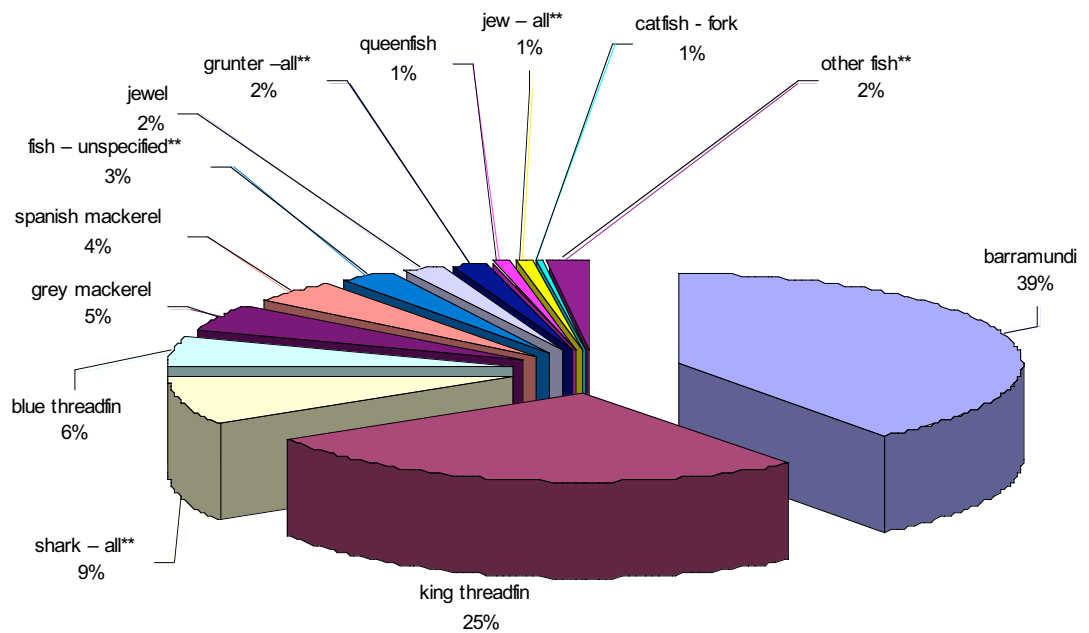


Figure 3: Long-term average species composition of total catches from the N3 sector of the GOCIFF from 1990 to 2004 (** a number of species comprise the harvest).

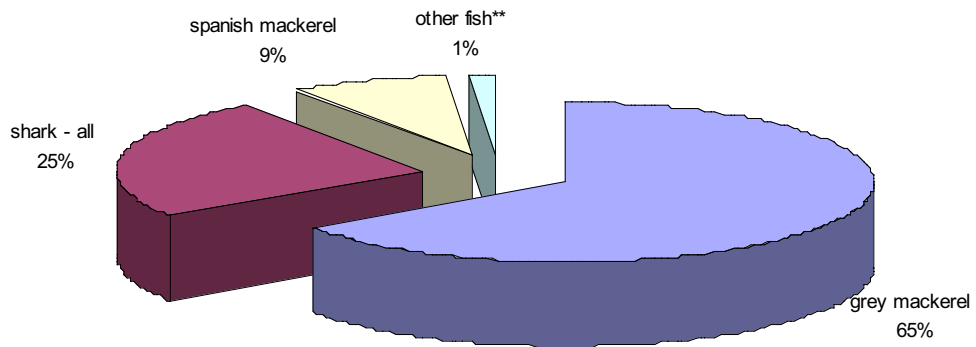


Figure 4: Species composition of total catches from the N9 fishery in 2004 (** a number of species comprise the harvest).

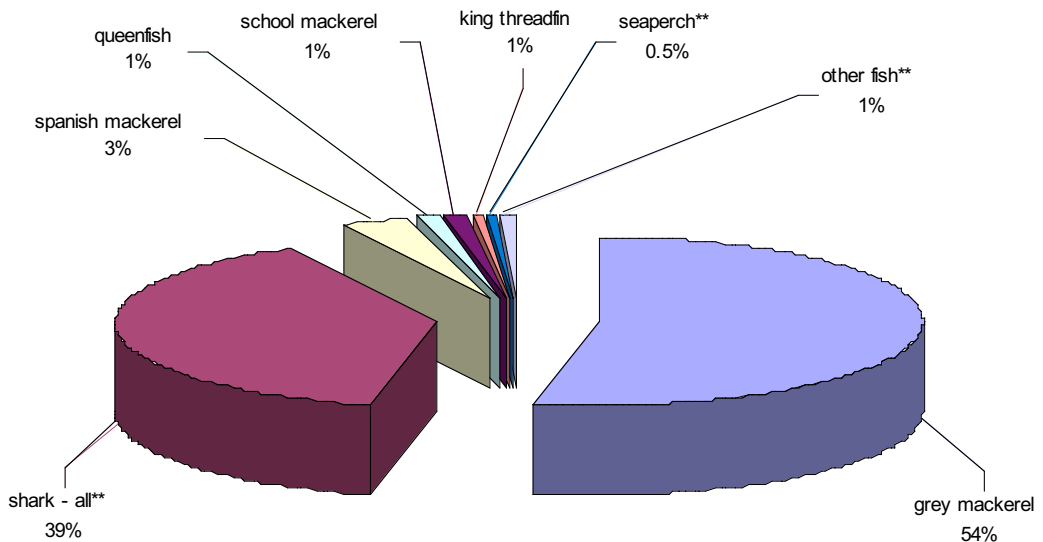


Figure 5: Long-term average species composition of total catches from the N9 sector of the GOCIFF from 1990 to 2004 (** a number of species comprise the harvest).

Recreational, Indigenous and charter catch

Since 1995, commercial tour operators have removed on average an estimated 25 t of fish per year from stocks of commercially harvested species in the GOCIFF. They release substantially more fish than they retain, particularly species such as barramundi and grey mackerel. The actual number of fish caught is likely to be much higher than the yearly harvested average (e.g. Commercial Fisheries Information System (CFISH) data indicates that over 90% of barramundi caught during charter operations from 1999 to 2002 were reported released by the fisher).

Harvest estimates derived from the National Recreational and Indigenous Fishing Survey (NRIFS) indicate the Indigenous sector potentially contribute a substantial amount (approximately 420 000 fish) to the total take of fish species in northern Queensland.⁴ However, the species most commonly harvested by Indigenous fishers are mullet (16%), bream (10%), snappers (9%) and catfish (5%), and not the more recreationally and commercially targeted species such as barramundi (1% or 5745 fish) and threadfin salmon (3% or 11 950 fish).

Non-retained species/bycatch

DPI&F and industry are proactive in reducing interactions and increasing the survival of species incidentally caught in nets through Codes of Conduct (an Environmental Management System (EMS) program), education programs and management arrangements such as closures, net mesh restrictions and net attendance rules.

Because of high catch utilisation rates, the GOCIFF commercial net fishery at present has low levels of bycatch and is unlikely to significantly impact on the populations or the biodiversity of bycatch species groups that are discarded during fishing operations.⁵ Low bycatch rates in the GOCIFF have been achieved through the high degree of selectivity of fishing gears and methods for targeting particular fish species, as well as industry value-added marketing programs. Input and output controls that contribute to reducing fishing pressure on bycatch include gear restrictions, effort reduction schemes, spatial and temporal closures, and in-possession limits. Bycatch is monitored in the N9 fishery by DPI&F observers onboard the fishing vessels.

Recreational fisheries have high levels of bycatch due to growing movement towards the practice of catch and release of fish for sporting reasons and to comply with regulated fish sizes and species. This is especially true for the most sought after species, barramundi, of which about 72% of the total national catch is released each year.² 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 Fisheries Research and Development Corporation research project (FRDC Project No. 2003/039) on the survival of lure caught barramundi from a freshwater billabong in the Northern Territory estimated a high overall post-release survival rate of 90.5 %.⁶ A joint Northern Territory–Queensland application to extend this investigation to large barramundi in marine waters is currently being considered by FRDC.

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

⁴ Henry, G.W. and Lyle, J.M., Eds. (2003). National Recreational and Indigenous Fishing Survey (FRDC Project No. 99/158), NSW Fisheries: 187 pp.

⁵ Halliday, I.A., Ley, J.A., Tobin, A., Garrett, R., Gribble, N.A. and Mayer, D.G. (2001). The effects of net fishing: addressing biodiversity and bycatch issues in Queensland inshore waters (FRDC Project no. 97/206), Department of Primary Industries, Queensland: 95pp.

² *ibid*

⁶ de Lestang, P., Griffin, R.K. and Allsop, Q.A. (2004). Assessment of the post-release survival and stress physiology of barramundi (*Lates calcarifer*). FRDC Project No. 2002/039, Northern Territory Government, Department of Business, Industry and Resource Development: 51 pp.

Interactions with protected species

DPI&F has reported that the level of capture and/or mortality of, or injuries to, endangered, threatened or protected species in the GOC commercial net fishery is very low.¹ A Species of Conservation Interest (SOCI) logbook has now been developed to provide more detailed information on the level of interactions with protected species in GOC fisheries. DPI&F plan to implement the SOCI logbook along with new catch logbooks during 2006. Fishers are still, however, legally required to report interactions with whales, dolphins and dugongs to the Environmental Protection Agency (EPA).

The commercial fishing industry driven EMS, implemented in 2003, will assist in the survival of returned protected species through use of best practice methods for handling and release.

Foreign and illegal fishery activities

The recent reported increase in unlicensed foreign fishing vessel (FFV) incursions into GOC waters is being viewed by Australian fisheries managers as a serious threat to the sustainability of northern Australian fisheries. FFVs appear to be targeting sharks and other pelagics, however inshore finfish are also being taken. There are also concerns over the observed take of protected species and other species of conservation interest. Also, the number of ghost nets and discarded long lines along the GOC shoreline, already a serious issue, is likely to escalate as FFV discard apparatus in an attempt to evade capture by Australian authorities.

While harvest levels from FFV are not well known at present, the lack of accurate information is likely to influence the accuracy of resource assessments which in turn will influence the effectiveness of sustainable management practices in the region.

Addressing the impacts of illegal fishing activities will be required if the future sustainability of fish stocks in the northern Australia is to be achieved. DPI&F is working together with the Australian, Northern Territory and Western Australian governments on this matter. The capture of tropical shark species by FFV was a major focus of the Northern Australian Fisheries Managers (NAFM) workshops in 2004 and 2005.

Fishery impacts on the ecosystem

Commercial net fishing, recreational line fishing and Indigenous fishing activities are essentially passive fishing methods that have little effect on the ecosystem and environment generally. Drift fishing operations are not permitted in Queensland GOC net fisheries. The majority of sensitive seabed habitats in the GOC, such as seagrass meadows and coral reefs, are located within spatial closures and so are further protected from any net fishing activities which could potentially degrade the habitats.

Tropical commercial net fisheries target high order predator fish species with highly selective fishing gear types and methods, and catch small amounts of bycatch relative to other net fisheries (e.g. trawl fishing). The abundance of competing predator and prey species were found to be similar between closed and open areas to commercial fishing in tropical Queensland estuaries³.

¹ ibid

At current levels of fishing effort, the GOC commercial net fisheries are therefore likely to have little impact on ecologically related, associated or dependent fish species.

Ghost fishing from discarded nets has an adverse impact on marine wildlife and actions have been proposed to reduce the level of discarded/lost nets.⁷ A Natural Heritage Trust-funded project is developing a network of communities around the GOC focused on tackling the impacts of ghost nets 'on-the-ground'. The project has already achieved considerable success in removing ghost nets from some of the GOC's remote beaches through the provision of funding to coastal Indigenous communities. The great majority of the beached nets appear to originate from fisheries outside Australian waters requiring international solutions to alleviate the problem. Australia has representation through the DEH National Oceans Office at international forums such as the Asia-Pacific Economic Cooperation (APEC) and Arufura and Timor Seas Expert Forum (ATSEF) where options for mitigating the ghost net problem are being discussed.

General ecosystem health

The GOC and Cape York Peninsula region is an area rich in flora and fauna species. Due to its remoteness and extreme climate, the GOC and Cape region remains largely undeveloped and its rivers, coastal swamps, saltpans and coastal integrity remain relatively untouched.⁸

Major GOC seagrass areas are found in the ports of Weipa and Karumba and these are monitored annually by DPI&F for changes in biomass and extent.^{9,10} Although there has been large natural variation in seagrass abundances associated with floods and higher than average temperature events, both areas have remained relatively stable over the past 6 to 10 years. As seagrass meadows can be used as an indicator of ecosystem health, it appears that the marine habitats in these busy commercial port areas are in reasonable shape.

Overall seagrass habitat also appears to be in good condition for the majority of coastal habitats in the GOC. A joint Queensland and Northern Territory survey of intertidal habitats in 2004 found surprisingly similar seagrass species distributions and abundances to those established in surveys conducted 20 years prior, indicating a high degree of resilience in the system despite the influences of major climatic events such as cyclones and floods.¹¹

⁷ Kiessling, I. (2003). Finding solutions. Derelict fishing gears and other marine debris in northern Australia. Hobart, The National Oceans Office: 56 pp

⁸ Stanton, J.P. (1975). A preliminary assessment of wetlands in Queensland. Australia, Division of Land Use Research, CSIRO.

⁹ Roelofs, A.J., Rasheed, M.A. and Thomas, R. (2005). Port of Weipa Long-Term Seagrass Monitoring, Progress Report—September 2004. Report to Ports Corporation Queensland, Department of Primary Industries and Fisheries, Queensland: 15 pp.

¹⁰ Rasheed, M.A. and McKenna, S.A. (2005). Port of Karumba Long Term Seagrass Monitoring, Progress Report—October 2004. Report to the Ports Corporation of Queensland. Department of Primary Industries & Fisheries, Queensland: 12 pp.

¹¹ Roelofs, A., Coles, R. and Smit, N. (2005). A survey of intertidal seagrass from Van Diemen Gulf to Castlereagh Bay, Northern Territory, and from Gove to Horn Island, Queensland. Report to the National Oceans Office. Department of Primary Industries & Fisheries, Queensland: 27pp.

Research and monitoring

Recent research and implications

Queensland leads a multi-state, multi-agency collaboration in an FRDC-funded project on grey mackerel which commenced in July 2005—a similar initiative for threadfin salmons is currently being considered for funding by FRDC (December 2005).

This approach has already benefited fisheries for northern Spanish mackerel and red snappers, with jurisdictions pursuing an integrated 'across-the-top' strategy for fishery research and management under the NAFM umbrella.

Queensland is an active participant in research initiatives to assess the sustainability of northern shark resources. In December 2005, the current CSIRO-led, FRDC-funded program is expected to report on risk assessment analysis for over 140 sharks and rays taken in target and bycatch fisheries. A follow-up program will investigate mitigation procedures for at-risk species, including sawfish (Pristidae) which are highly vulnerable to net fisheries.¹² A re-assessment of the status of GOC blacktip sharks—the major catch component of the Queensland N9 fishery and the Northern Territory pelagic shark fishery—is underway by the NAFM Northern Shark Assessment Group (R. Buckworth, Northern Territory Fisheries and N. Gribble, DPI&F, pers comm. 20th September 2005), using updated fishery and biological parameter estimates and an advanced age-structured model. The initial outcomes of the modelling exercise indicates that a large quantity of shark is being removed that can not be accounted for in the commercial catch data. The large catch is assumed to be from illegal foreign fishing. A major issue confronting the researchers, and in turn the advice they provide to fishery managers, is how best to incorporate the poorly quantified illegal foreign fisher harvest of these species in GOC waters in the modelling.

There is a growing realisation that an understanding of coastal fisheries resource and ecosystem implications of prolonged on-land drought conditions, as currently experienced across northern Australia, must be factored into species sustainability assessments and fishery management planning. Preliminary analysis of GOC barramundi, grunter and seagrass populations suggests a strong linkage between river catchment rainfall and flows, and fishery production³, but the details are as yet unknown. Incorporation of climate information into stock assessments of key target species shows great potential for predicting annual catch levels (e.g. barramundi¹³).

Monitoring programs and results

The DPI&F Long Term Monitoring Program (LTMP) provides fishery-independent monitoring of barramundi stocks and freshwater fisheries resources.

The 2004 barramundi LTMP surveys were successfully completed and all fish obtained have been aged. The data is currently being incorporated into a new stock assessment model. This model will take into account commercial logbook and recreational diary data, and fishery-independent (LTMP data) and environmental variables to assess the status of the stocks (N. Gribble, DPI&F, pers comm. October 2005).

¹² Peverell, S.C. (2005). 'Distribution of sawfishes (Pristidae) in the Queensland Gulf of Carpentaria, Australia, with notes on sawfish ecology.' *Environmental Biology of Fishes* 73(4): 391-402.

³ *ibid*

¹³ Balston, J. (2005). Modelling impacts of climate variability on the commercial barramundi (*Lates calcarifer*) fishery of north-eastern Queensland. MODSIM 2005 International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, Melbourne 2005. 475-481.

The barramundi component of the LTMP program will be reviewed when results from the model are available. The results will assist in the further development of the LTMP to ensure the monitoring program meets the data requirements for future resource assessments.

The 2004 LTMP freshwater fish community surveys were conducted in June and July. The surveys provide information on the abundance of juvenile barramundi in rivers flowing into the GOC. Environmental data collected by LTMP is being assessed by Department of Natural Resources and Mines' scientists to determine which variables correlate best to fish species composition and abundance data. Results from this analysis will be available in 2006 and will set the direction for the type of freshwater habitat and water quality information to be collected by the LTMP in the future.

Only the N9 fishery is monitored by onboard observers at present. In 2004, fishing activities were observed for 26 days onboard three vessels.

DPI&F also monitors each fishing operators' adherence to the boundaries of the N9 fishery through the location data collected from the Vessel Monitoring System (VMS) that each vessel is required to carry. VMS data to date shows good compliance rates for this fishery.

Collaborative research

Due to the shared nature of harvested GOCIFF species with adjoining jurisdictions, many of the research projects on species in the GOCIFF are collaborative. Past and current research projects on which DPI&F were/are partners includes:

- *FRDC Projects 2001/077 and 2002/064: Northern Australia Sharks and Rays—Phase I* is now complete. Phase I was essentially a pilot study and issue identification exercise that supported the development of Phase II of the project. Shark Phase II examined the impact of fishing on chondrichthyans across northern Australia and will be completed following a sustainability risk assessment workshop to be held in 2006. Information gathered from the project so far has enabled managers to prioritise species for future management. This project has strong linkages with the delivery of the National Plan of Action for the Conservation and Management of Sharks.
- *FRDC Projects 1995/049 and 1999/125: Tropical Resource Assessment Program (TRAP) Phase I and Phase II.* Phase II evaluated the effectiveness of effort reduction measures of the Gulf Management Plan.
- *ACIAR Project FIS/2003/037: Artisanal shark and ray fisheries in Eastern Indonesia and their relationships with Australian resources.* This project aims to allow Indonesia and Australia to jointly manage shared elasmobranch stocks while also assisting in the development of a National Plan of Action for Sharks and Rays in Indonesia. The project is expected to be completed by the end of 2006.

- A three-year FRDC-funded project that will provide a *Determination of management units for grey mackerel fisheries in Queensland and the Northern Territory (FRDC Project 2005/010)* commenced in 2005. The project will help define population boundaries for grey mackerel and will assist Queensland and Northern Territory fisheries agencies in developing appropriate management measures for grey mackerel across northern Australia. The project involves researchers from CRC Reef Research Centre, James Cook University, Fisheries Western Australia, Northern Territory Department of Primary Industry Fisheries and Mines, DPI&F and the University of Queensland.

Fishery management

Compliance report

The Queensland Boating and Fisheries Patrol (QBFP) reported that a total of 159 inspections were conducted on commercial net, recreational and fishing charter boat operations in the GOC over the 2003–04 and 2004–05 financial years. There were 20 breaches detected and two cautions issued in the period.

A new Compliance Activity System has recently been implemented by DPI&F that will record detailed information on activities performed by the QBFP. The new system records:

1. breach reports Issued (including offences and court outcomes)
2. unattended breach reports
3. fisheries infringement notices (FINS) issued
4. all field activities (from new field occurrence logs)
5. complaints made via the Fishwatch hotline (including follow up actions).

All offences and field activities are recoded to six nautical mile commercial fishing grids. This will allow enforcement activities and offences to be represented spatially and to guide reviews of compliance strategies. Progress to date includes the development of the new system to record breach reports, unattended breach reports and FINS. The new field occurrence logs were trialled in Cairns and implemented across Queensland from July 2005.

Changes to management arrangements in the reporting year

No major changes to management arrangements were made during the reporting year. The Gulf Management Plan was amended in July 2005 to provide new dates for the closed season for barramundi. The dates for the next four years are as follows:

- (a) 25 September 2005 to 21 January 2006
- (b) 30 September 2006 to 26 January 2007
- (c) 4 October 2007 to 29 January 2008
- (d) 7 October 2008 to 2 February 2009.

A number of management arrangements remain proposed. These arrangements include in-possession limits for shark and grey mackerel for those fishers not authorised to target these species, and the extension of Queensland's shark finning legislation to include rays.

The Gulf Management Plan is to be reviewed within five to nine years following its implementation. The review is scheduled to commence in 2006.

Consultation, communication and education

Promotion of regulations applying to both commercial and recreational fishers is an ongoing role of DPI&F. Approximately 160 000 recreational fishing brochures containing size and possession limit information were distributed in 2004.

In addition, approximately 500 stakeholders were sent copies of the fisheries newsletter 'Fish' four times during 2004. The newsletter highlights recent achievements, the latest research and proposed changes to management arrangements. DPI&F also introduced 'FishFlash' in February 2004, an email based newsletter with links to the latest fisheries news. Approximately 300 stakeholders subscribe to FishFlash, which is now up to its 19th issue.

Consultation also occurs through the Gulf Management Advisory Committee (GulfMAC), with meetings generally held at least twice a year. GulfMAC provides an opportunity for stakeholders to advise DPI&F and the Queensland Fisheries Joint Authority (QFJA) on management measures for the GOCIFF.

Complementary management

Fisheries managers from the states, territory and Commonwealth meet annually at the NAFM Forum to review recent research results, set research priorities and decide on complementary management strategies and catch quotas to ensure that these shared resources are used in a sustainable manner. One of NAFMs current focal points is northern sharks, and especially the sustainability of exploited shark populations in Australian waters that are also being targeted illegally by foreign fishing fleets.

DPI&F convened a stakeholder workshop in November 2004, which included participants from the Northern Territory, to undertake an ecological risk assessment (ERA) of all retained and non-retained species in the Queensland GOC fisheries. In the context of this forum, grey mackerel was ranked as a high priority requiring immediate management and research focus. This species (along with tropical shark species) has been the focus of discussion at NAFM and a research project on grey mackerel stock delineation is underway.

Queensland has been the lead agency during the development of operational plans for northern fisheries for shark and grey mackerel, and their ratification by stakeholder jurisdictions. The shark operational plan gives substance to the initiatives agreed to by signatories to the National Plan of Action—Sharks. Operational plans for Spanish mackerel and red snapper are likely to be the next in line for development. The operational plans help to better align research and compliance initiatives, and deliver complementary management of shared stocks.

Fishery performance

Appraisal of fishery in regard to sustainability

The fishery is regarded as being managed in a precautionary and sustainable manner resulting in relatively stable catch levels and an increasing catch rates trend for the major commercial species, barramundi.

Target species are considered fully exploited. Some concern is held for shark species and grey mackerel due to the paucity of information on the species. Formal stock assessments have been conducted recently for grey mackerel and blacktip sharks.

Research projects currently underway will address some of the data gaps for shark species and grey mackerel.

Progress in implementing DEH recommendations

The recommendations made by DEH in regard to addressing risks that were identified with this fishery can be found at:

<http://www.deh.gov.au/coasts/fisheries/qld/fin-fish/pubs/finfish-submission.pdf>.

DPI&F has made significant progress in implementing a number of these recommendations. These include:

Annual status report

DPI&F is reporting publicly on the status of the GOCIFF through this report and will continue to do so annually.

Protected species education

DPI&F has recently delivered a comprehensive education program to commercial and recreational fishers promoting protected species and the need to adopt appropriate fishing practices to help minimise the number of interactions. Education material has been mailed to all licensed commercial fishers, numerous recreational fishing clubs, and bait and tackle stores. The education material includes a brochure for recreational anglers, a waterproof summary guide for commercial fishers and a DVD on seabird care and handling. In addition, the endangered and threatened species course, which new master fisherman must undertake before they are issued a licence, has been updated with information contained in the new *Looking after protected species in Queensland—a comprehensive guide for commercial fishers*. A Memorandum of Understanding (MOU) has also been developed between DPI&F and DEH in order to streamline the protected species reporting process.

Performance measurement systems

As part of its obligations under the EPBC Act, DPI&F is required to develop fishery specific objectives linked to performance indicators and performance measures for target, bycatch, protected species and impacts on the ecosystem for all GOC fisheries. DPI&F has recently developed an information paper regarding development of performance measures to help guide fisheries managers and Management Advisory Committees in establishing consistent and appropriate fishery objectives, performance indicators, performance measures and management responses. Performance measures for the N3, N9 fisheries will be developed in 2006.

The recently completed ERA of GOC fisheries will inform the performance measures development process.

Ecological risk assessment

DPI&F conducted an ERA workshop in November 2004 that met the DEH recommendation to identify target, by-product and bycatch species most at risk from the fishery. Workshop attendees included representatives from the Indigenous and recreational fishing sectors; commercial net, line and finfish trawl fishing sectors; the EPA and Queensland Parks and Wildlife Service; local conservation groups; and the Northern Territory and Queensland fisheries researchers and managers. Actions will be developed from the ERA that will mitigate risks to species identified as requiring further management responses.

Improving our knowledge of Indigenous and recreational harvest

Under the RFISH program, DPI&F conducts a regular recreational fishing phone survey coupled with a 12-month recreational fishing diary program. Traditionally, the RFISH data has been used to establish state-wide participation rates for recreational fishing as well as providing limited spatial estimates of harvest for the major/popular recreational fish species. In 2005, a feasibility study was undertaken on the statistical power of data collected under RFISH to provide finer scale spatial estimates (e.g. at a regional level) of recreational harvest than has been previously reported. The outcomes of the feasibility study will be considered as DPI&F develops a process to improve estimates of recreational take across all of Queensland's fisheries.

DPI&F are investigating methods to improve estimates of harvest by the Indigenous sector in the GOC. The capacity of processes such as 'sea country planning' and the use of Indigenous Subsistence Fishing Survey Kits are being considered at present.

Finer levels of shark catch information

DPI&F are required to collect data on shark catch by species or species groups for the GOC net fisheries. New logbooks have been developed for the N3 and N9 fisheries that will collect the required finer detailed information. It is proposed that the new logbooks will be implemented during 2006 for both fisheries. Logbook data will be validated by at-sea observers and greater detail on shark species identification will be obtained by this program.

Protected species interactions

DEH have recommended that DPI&F need to develop a mechanism to improve knowledge of the level of interactions with protected species in the GOC net fisheries. An SOCI logbook has now been developed that will provide this information. DPI&F plan to implement the SOCI logbook along with the new catch logbooks during 2006. The new logbooks will provide information on the location of protected species interactions and will identify if there are any interaction 'hot spots'.

Shark finning amendment

DEH recommended that DPI&F amend its restriction on shark finning to include rays (*all chondrichthyans*) by December 2005. This amendment has been proposed, however due to government processes, progress of this amendment is awaiting the release of a Regulatory Impact Statement and subsequent public consultation.

Management performance

The Gulf Management Plan has review events in place that, if breached, require a management response. A number of management options are available to DPI&F to address fishery issues if and when required by a review event.

Review events are primarily based on an increase in effort levels and on significant declines in mean finfish catch size distributions, abundance of juveniles, catch per unit effort (CPUE) and changes to areas fished. Analysis of the performance of the GOCIFF against these measures indicates that no breaches of review events have occurred in the reporting period.

From its assessment of the GOCIFF management arrangements, DEH recommended that the triggers in the review events and subsequent management actions could be better defined. Consequently, new performance measures and/or reference points will be developed for the GOCIFF in consultation with GulfMAC by the end of 2006.

Resource concerns

DEH have expressed concern at the status of shark species and grey mackerel due to a paucity of information. DPI&F and Northern Territory Fisheries have recently completed stock assessments for these species.

The assessment of grey mackerel stocks suggested stock levels in Queensland GOC waters were declining in 2003. The assessment also suggested that there was a slight decline in grey mackerel stocks GOC-wide (although with wide confidence limits). Catches in 2004, however, have been high and possibly indicating a respite to this declining trend in CPUE and catches.

The Queensland and Northern Territory black tip shark stock assessment was not as clear in its outcomes (N. Gribble, DPI&F, pers comm. January 2006). The assessment model could not be resolved due to what appeared to be a large unaccounted take of tropical sharks in the GOC region. This is assumed to be the result of illegal foreign fishing activities in the region which, worryingly, appears also to be on the increase. Researchers are now deciding on how best to incorporate the poorly quantified illegal foreign fisher harvest of these species in GOC waters in the modelling.

The ERA¹⁴ conducted by DPI&F in 2004 for harvested species in the Queensland GOC also identified grey mackerel at high risk to the effects of harvesting and a number of management actions have been proposed to lessen the harvesting pressure on this species. Proposed management actions include the following:

- New management arrangements will be introduced to address fishing impacts in the QFJA fishery.
- New entry criteria for target fishing of grey mackerel are being developed.
- An in-possession limit to address incidental catch for non-authorized vessels is proposed.

¹⁴ Zeller, B. (2005). 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, Queensland.

- An operational plan for this and other north Australia fishery target species are being developed to coordinate research, compliance and progress complementary management of shared stocks.

The impact of the N3 and N9 fishery on breeding stocks of target shark species, barramundi and king salmon were all ranked as moderate. No other retained commercial GOCIFF species received a risk ranking above low.

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Front cover image

Barramundi (*Lates calcarifer*)