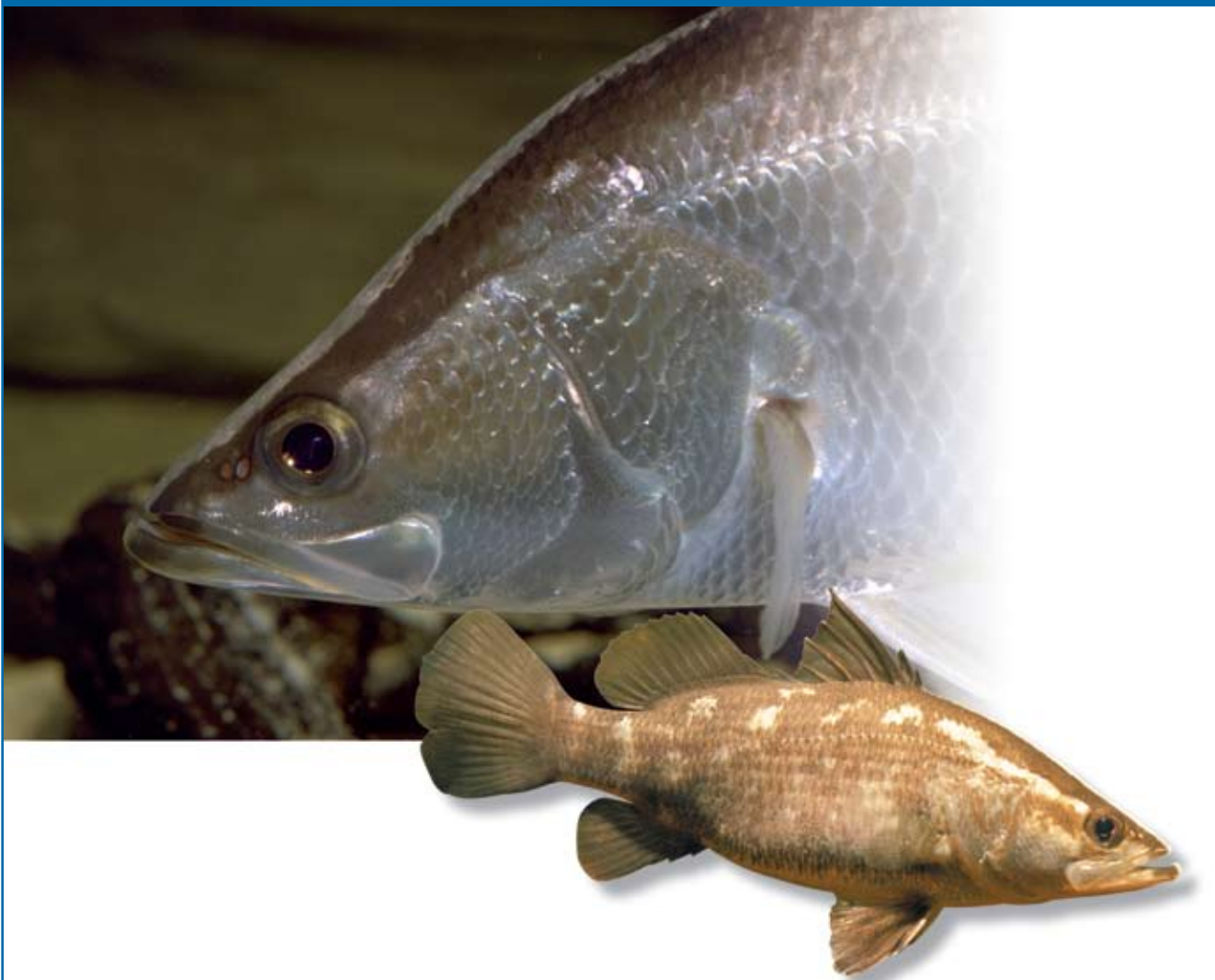


Annual status report 2010

Gulf of Carpentaria

Inshore Fin Fish Fishery



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Fishery profile 2009

Key species N3 inshore—Barramundi, king and blue threadfins N9 offshore—Tropical shark and grey mackerel Recreational—as above (except for tropical shark) as well as mangrove jack and estuary cod	Total number of commercial licences in 2009 N3—86; N9—5
Total harvest from all sectors 1985 t	Commercial licences accessing the fishery in 2009 N3—80; N9—2
Commercial harvest 1867 t	Fishery season Commercial (from midday 2 February 2009 to midday 25 September 2009). Taking/possessing barramundi outside of the commercial fishery season is prohibited for all sectors.
Recreational harvest (2005) approximately 101 t	Fishery symbols N3, N9, N11 (bait)
Indigenous harvest approximately 420 000 fish ¹	Monitoring undertaken Fishery dependent sampling & compulsory daily commercial fisher logbooks
Charter harvest 17 t	FOP days monitored in 2009 61
Commercial Gross Value of Production (GVP) \$12 million	Accreditation under the EPBC Act Yes ² —Expires: 20 August 2010
Allocation between sectors 93% commercial; 5% recreational; 3% charter	Logbook validation Nil
Total exports Predominantly domestic product, except for shark fin, which is exported to Asian markets.	Quota managed No
Key fish resources	Stock status
Barramundi (<i>Lates calcarifer</i>)	Sustainably fished
Comments: Commercial catches are within in historical levels and catch rates have been steadily increasing since 1981. Good representation of ranges of fish lengths and ages in the sampled populations over time.	

¹ Total North Queensland estimate only—includes Indigenous fishers outside the Gulf of Carpentaria.

² Wildlife Trade Operation approval granted 20 August 2007 Approved under Part 13 of the EPBC Act subject to conditions applied under section 303FT (re-accredited 10 April 2008 to reflect the new *Fisheries Regulation 2008* management arrangements).

Grey mackerel (<i>Scomberomorus semifaciatus</i>)	Uncertain
Comments: Catches and catch rates are variable. Recent research indicates the possible existence of multiple localised adult sub-stocks of grey mackerel (meta populations) within the Gulf of Carpentaria. The GOC stock is managed as a whole and shared with Northern Territory. As sustainability reference points in the Performance Measurement System are not monitored at a regional/local spatial level it was not possible at this time to determine regional catch trends.	
King threadfin (<i>Polydactylus macrochir</i>)	Uncertain
Comments: Commercial catches and catch rates appear stable. However recent research suggests King threadfin may have highly localised populations and may be under increased fishing pressure in some areas. As sustainability reference points in the Performance Measurement System are not monitored at this spatial level it was not possible at this time to determine localised/regional catch trends.	
Blue threadfin (<i>Eleutheronema tetradactylum</i>)	Sustainably fished
Comments: Commercial catches and catch rates are stable. Life history characteristics are more resilient to fishing pressure. No indications of stock declines.	
Blacktip sharks (<i>Carcharhinus limbatus</i> and <i>C. tilstoni</i>)	No assessment made
Comments: Assessment of blacktip sharks has been deferred to the Shark Working Group that has been established to assess the harvest of shark species in Queensland fisheries. An assessment of the commercial harvest of sharks is planned at the end of 2010.	
Spot-tail sharks (<i>Carcharhinus sorrah</i>)	No assessment made
Comments: Comment as for blacktip sharks.	
Hammerhead sharks	No assessment made
Comments: Comment as for blacktip sharks.	

Introduction

The Gulf of Carpentaria Inshore Fin Fish Fishery (GOCIFFF) is a multi-species fishery comprising a commercial inshore (N3) net fishery, a commercial offshore (N9) net fishery, commercial bait netting (N11) and recreational fishing, Indigenous fishing and charter boat fishing of species related to the GOCIFFF within the Queensland jurisdiction of the Gulf of Carpentaria. This report covers fishing activity during the 2009 calendar year.

Fishery description

Fishing area and methods

The GOCIFFF 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 nautical miles (nm) line (Figure 1). The N3 net fishery operates within estuaries and foreshores³ and out to 7 nm from the coast, while the N9 net fishery operates further offshore, between 7 and 25 nm.

Fishers in both the N3 and N9 net fisheries are authorised to use set mesh nets to harvest fin fish. There are different restrictions on allowable net length, drop and mesh size for each fishery (see Roelofs 2003).

N3 fishery mesh nets are set in estuaries, on foreshores and in offshore waters out to 7 nm from the territorial sea baseline. Most fishers prefer to use mesh net sizes that selectively catch fish of a size meeting market demand for fillet product. Licence holders in the N9 fishery are authorised to use set mesh nets with a maximum net length of 1200 m. The commercial bait (11) fishery uses small-mesh (25–45 mm) set nets; there are restrictions on the length of net used.

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 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; the catch is solely for use by the community.

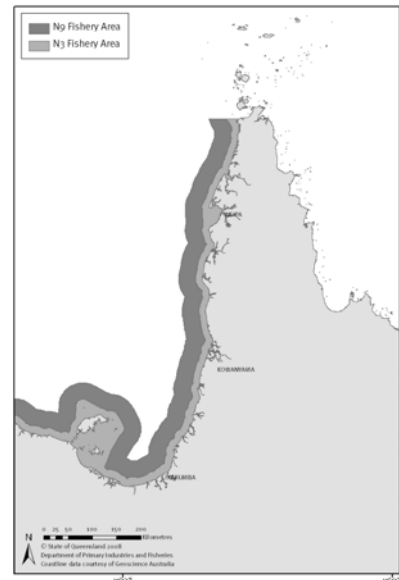


Figure 1: Map of Gulf of Carpentaria gillnet fishery.

Key Species

Barramundi

The barramundi (*Lates calcarifer*) is a large predatory fish species that can grow to 150 cm total length (TL), 60 kg and over 30 years of age. It is found in coastal regions of tropical Australia and throughout much of the Indo-West Pacific and is dependent on fresh and estuarine waters to complete its life cycle. The biology and genetic stock structure of barramundi in northern Australia, including the Gulf of Carpentaria are well understood. Generally, fish spawn around river mouths and the post larvae and juveniles migrate to nearby coastal swamps, lagoons and upstream freshwater areas that serve as protected, food rich additional nursery habitats to estuarine areas.

King threadfin

King threadfin (*Polydactylus macrochii*) is a large predatory fish species that can grow to 150 cm TL and 30 kg in weight, and is found in tropical estuarine and inshore waters around northern Australia. It is distributed throughout the Indo-Pacific region. The king threadfin starts life as a male, reaching sexual maturity at around 60–80 cm TL at 2–4 years of age, and changes to a female later in life at around 70–100 cm TL at 4–8 years of age. Recent research suggests king threadfin have localised separate genetic populations throughout its range.

Tropical sharks

Commercial harvest of tropical sharks consists mainly of whaler sharks, in particular the Australian blacktip

³ Excluding areas closed to commercial fishing.

whaler (*Carcharhinus tilston*) and spot-tail shark (*Carcharhinus sorrah*). The sharks that dominate the GOC fisheries generally attain sexual maturity at over 1m in total length at around 3–4 years of age. They are viviparous, generally producing three to five pups during summer months after a 7–12 month gestation. Tropical shark species in the GOC generally have an Indo-West Pacific distribution.

Grey mackerel

Grey mackerel (*Scomberomorus semifasciatus*) is a pelagic species endemic to waters across northern Australia and adjacent PNG and larvae and juveniles are dependent on estuarine and inshore habitats (Cameron & Begg 2002). They are a fast growing species with total length at first maturity for females of 75 cm TL and males of 65 cm TL at between one and two years of age.

Mangrove jack

Mangrove jack (*Lutjanus argentimaculatus*) are a by-product in the commercial line, net and trawl fisheries in the GOC. They have distinct inshore (juvenile) and offshore (adult) phases in the life histories and prefer complex habitats (reefs, shoals etc.) to open sand and mud areas. In Queensland, most mature at about 450 mm and 7 years for males and about 510 mm and 8 years for females. They can attain a maximum length greater than 650 mm and are long lived with some individuals estimated at 37 years old (Russell *et al.* 2003).

Genetic studies by Russell *et al.* (2003) suggest a high level of gene flow between Queensland east coast, GOC and northern Australia mangrove jack populations. It is likely that a single genetic stock exists across these areas.

Main management methods used

Fisheries Queensland manages the commercial, recreational and Indigenous components of the GOCIFFF through Queensland's *Fisheries Act 1994*, Fisheries Regulation 2008 and Fisheries (Gulf of Carpentaria Inshore Fin Fish) Management Plan 1999 (Gulf Management Plan). The harvest of grey mackerel, sharks and rays is managed jointly between the State and the Commonwealth through the Queensland Fisheries Joint Authority (QFJA). The Gulf Management Plan is currently under review and it is expected that revised arrangements will be in place in 2011.

The GOCIFFF is managed to optimise sustainable fisheries production and protect 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.

Catch statistics

Commercial

Commercial net fishers are skilled at targeting particular species and are responsive to factors such as abundance and catchability, time of year and market demand.

Total commercial harvest in the GOC N3 and N9 gillnet fisheries reduced in 2009 compared to 2008 (Table 1) and slightly below the average annual catch of approximately 1917 tonnes (t) from 2003–08. The target species (barramundi, grey mackerel, king threadfin and black tip whaler sharks) comprised the majority of the increased catch (Table 2). The general trend in rising catch rates for barramundi since 2003 continued in 2009 (Figure 2) while catches and catch rates for king threadfin have been steady since 2005 (Figure 3).

Table 1: Total commercial catch (t) and effort (days) in the GOCIFFF 2003–08 (N3 and N9 combined) (Source: Fisheries Queensland CFISH database, 5 May 2010).

Year	2003	2004	2005	2006	2007	2008	2009
Total Catch (t)	1 998	2 147	1 812	1 829	1 652	2 063	1 867
Effort (days)	28 066	28 847	23 340	23 201	21 157	22 271	20 907

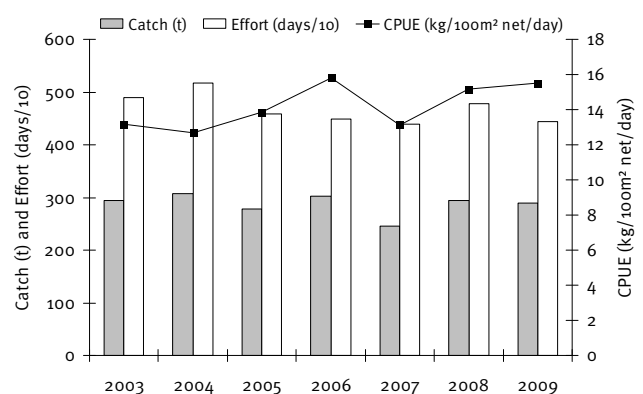


Figure 2: Barramundi—total reported commercial net harvest (t) and catch per unit effort (CPUE) in kg/100m²/day in the GOCIFFF 2003–09 (Source: Fisheries Queensland CFISH database, 14 May 2010).

Catches for grey mackerel were lower than the previous years record high catches (Figure 4). There was a drop in effort for grey mackerel and tropical shark species in the N9 fishery due to the retirement of a long term, skilled fisher for these species.

Recent research suggests there is a single genetic stock for grey mackerel in the GOC that is shared between Queensland and Northern Territory jurisdictions (Welch *et al.* 2009). Increases in catches for grey mackerel will be monitored closely in relation to catches in the Northern Territory which averaged about 74 t from 2005–08.

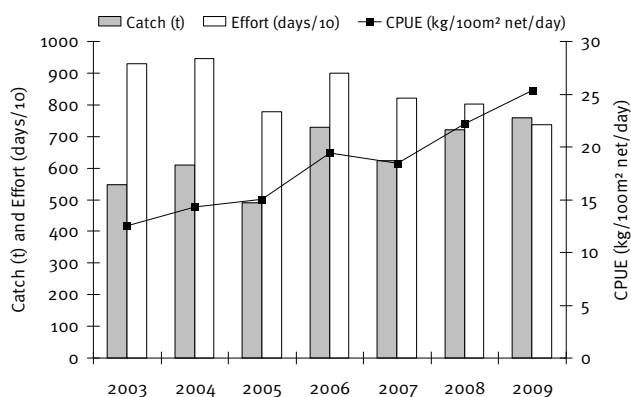


Figure 3: King Threadfin—total reported commercial net harvest (t) and catch per unit effort (CPUE) in kg/100m²/day in the GOCIFFF 2003–09 (Source: Fisheries Queensland CFISH database, 14 May 2010).

Table 2: Species composition of the commercial catch (t) in the GOCIFFF 2003–09 (N3 and N9 combined). Values in brackets represent catches made using line from other Queensland managed fisheries in the GOC (Source: Fisheries Queensland CFISH database, 14 May 2010).

Group	2003	2004	2005	2006	2007	2008	2009
Barramundi	549 (-)	610 (-)	492 (-)	728 (-)	622 (-)	720 (-)	758 (-)
King threadfin	295 (κ1)	308 (-)	278 (-)	302 (-)	246 (-)	294 (κ1)	289 (κ1)
Mackerel–grey	379 (κ1)	468 (2)	394 (2)	382 (8)	434 (11)	613 (9)	409 (3)
Blue threadfin	105 (κ1)	125 (κ1)	79 (κ1)	65 (-)	58 (-)	74 (-)	62 (κ1)
Shark–blacktip	(-)	(-)	(-)	13 (κ1)	45 (κ1)	132 (κ1)	161 (κ1)
Shark–hammerhead	(-)	(-)	(-)	(-)	4 (κ1)	7 (κ1)	12 (κ1)
Shark–scalloped hammerhead	(-)	10 (-)	(-)	6 (-)	(-)	(-)	(-)
Shark – unspecified*	474 (3)	365 (1)	396 (1)	158 (4)	82 (κ1)	47 (-)	25 (κ1)
Shark–whaler unspecified*	(-)	55 (-)	(-)	47 (-)	8 (-)	(-)	(-)
Catfish*	6 (1)	13 (κ1)	7 (-)	8 (1)	4 (κ1)	1 (-)	(κ1)
Cobia	2 (κ1)	2 (κ1)	3 (κ1)	2 (κ1)	2 (κ1)	2 (κ1)	2 (κ1)
Fish – unspecified*	53 (κ1)	30 (-)	33 (κ1)	35 (κ1)	40 (κ1)	38 (κ1)	41 (κ1)
Grunter*	31 (κ1)	51 (κ1)	26 (κ1)	19 (κ1)	21 (κ1)	29 (κ1)	11 (κ1)
Guitarfish*	(-)	(-)	(-)	κ1 (-)	2 (κ1)	5 (κ1)	2 (κ1)
Jewel fish	50 (κ1)	52 (-)	33 (κ1)	39 (κ1)	38 (-)	26 (-)	26 (-)
Jewfish–black	3 (-)	5 (-)	2 (-)	κ1 (-)	(-)	(-)	(-)
Jewfish – unspecified*	3 (-)	4 (-)	2 (-)	2 (κ1)	7 (-)	5 (-)	9 (-)
Queenfish*	23 (7)	34 (κ1)	17 (κ1)	14 (2)	16 (κ1)	31 (κ1)	18 (κ1)
Ray – unspecified*	15 (-)	2 (-)	(-)	1 (-)	(-)	(-)	(-)
Other fish*	7 (3)	5 (κ1)	2 (κ1)	3 (1)	κ1 (10)	(κ1)	κ1 (κ1)

* This grouping may contain multiple species

Blacktip whaler sharks (Australian blacktip *Carcharhinus tilstoni/limbatus* and spot-tail *C. sorrah*) catches and catch rates rose in 2009 (Figure 5) although this may be an artefact of improved level of reporting at the species level (see below and Figure 7). Catches of shark species other than blacktip whaler sharks have been declining since 2005 (Figure 6). The commercial catch rate for all tropical sharks has fluctuated between 7–38 kg/100m² net/day since 2004 (Figures 5 and 6). Total effort expenditure (days fished) for all shark species has decreased by approximately 41% since 2004 and is likely to have contributed to the overall reduction in the tropical shark catch. It is difficult to assess trends in shark catches with any degree of certainty as detailed reporting of specific shark species in commercial logbooks only commenced in 2006 in the N3 fishery and in 2007 in the N9. There is likely to be a period of adjustment in reporting until Fisheries Queensland can reliably assess shark catch trends at the species/species group level in the GOCIFFF. However, fishers' discrimination of species in their catch records has greatly improved since 2003. Figure 7 clearly demonstrates this improvement by showing that the reported shark catch in 2009 has changed from being dominated by unspecified sharks to catch dominated by the Australian blacktip shark.

Fisheries Queensland monitors annual catch and catch rate trends (validated by observers) of eighteen sharks species and groups in the GOCIFFF to ensure that risks to the sustainability of these species are identified. These include non-listed shark species identified as 'least sustainable' in the Northern Australian Sharks and Rays Phase II project (FRDC Project number 2002/064). These species include:

- Pigeye shark—*Carcharinus amboinensis*
- Bull shark—*Carcharinus leucas*
- Blacktip shark—*Carcharinus limbatus*
- Australian blacktip shark—*Carcharinus tilstoni*
- Snaggletooth shark—*Hemipristis elongata*
- Great hammerhead shark—*Sphyrna mokarran*
- Giant shovelnose ray—*Rhinobatos typus*.

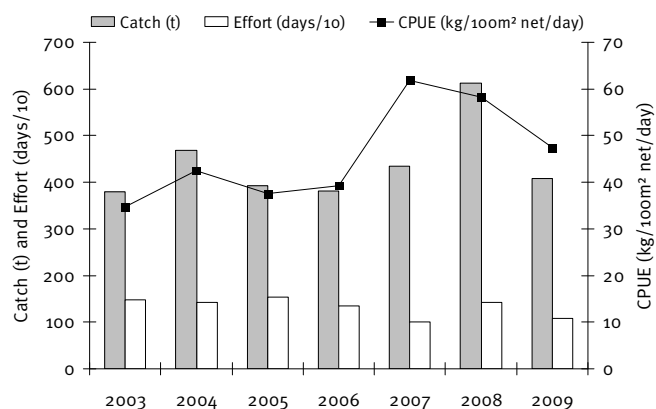


Figure 4: Grey mackerel—total commercial net harvest (t) and catch per unit effort (CPUE) in kg/100m²/day in the GOCIFFF 2003–09 (Source: Fisheries Queensland CFISH database, 14 May 2010).

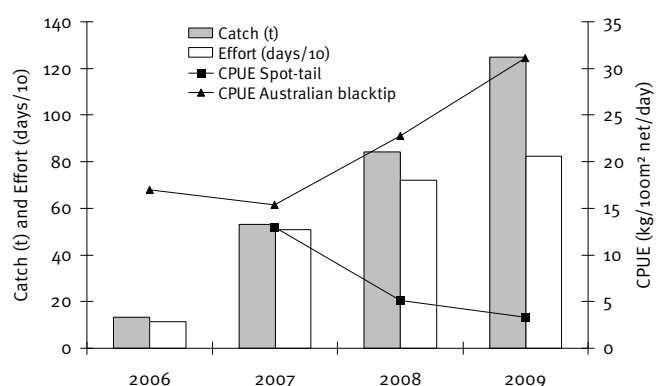


Figure 5: Blacktip whaler sharks—total commercial net harvest (t) and catch per unit effort (CPUE) in kg/100m²/day in the GOCIFFF 2006–09 (Source: Fisheries Queensland CFISH database, 14 May 2010).

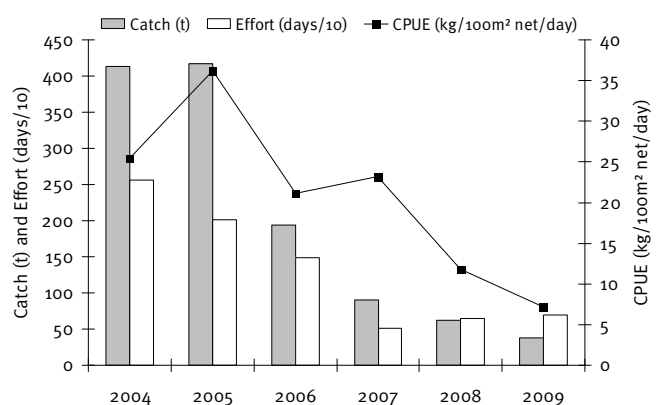


Figure 6: Other sharks—total commercial harvest (t) and catch per unit effort (CPUE) in kg/100m²/day in the GOCIFFF 2004–09 (Source: Fisheries Queensland CFISH database, 14 May 2010).

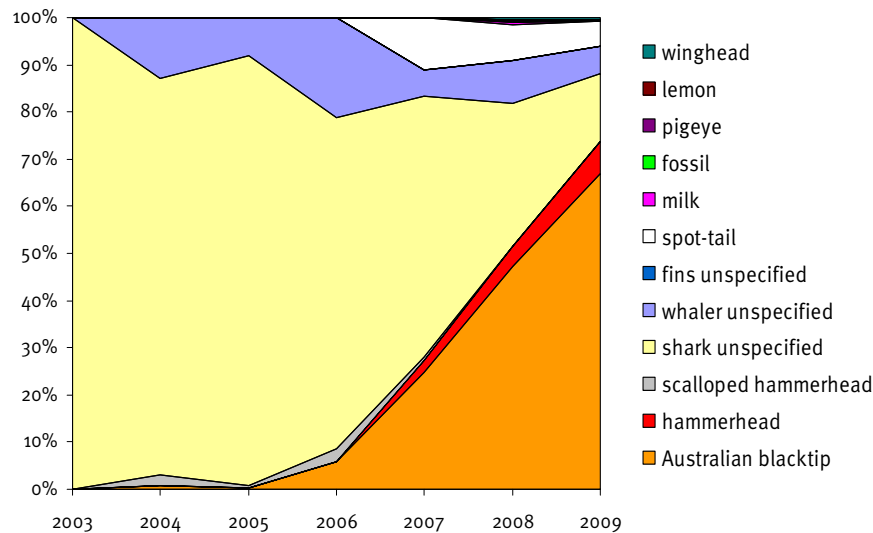


Figure 7: Changes in recording of shark species in commercial net fisher logbooks from 2003 to 2009 (Source: Fisheries Queensland CFISH database, 14 May 2010)

Catches of blacktip and spot-tail sharks are reported above. Fisheries onboard observers report that no snaggletooth sharks were interacted with in the N₃ fishery in 2009. The catch of great hammerhead sharks is reported in Table 3, however individual harvest of the remaining shark species cannot be reported due to data confidentiality reasons with fewer than five licences reporting their catch. Although reporting of shark species has improved, the same caveats on interpretation of catch trends apply here. Some shark species are difficult to identify accurately in the field and it is likely a period of adjustment is required before the reported levels accurately represent the catch. Fisheries onboard observers provide education to fishers in species identification which should accelerate improvements in reporting.

Table 3: Catch of shark species in the GOCIFFF identified as 'least sustainable' in the Northern Australian Sharks and Rays Phase II project from 2007–2009 (Source: Fisheries Queensland CFISH database, 14 May 2010).

Group	2007	2008	2009
Shark - hammerhead	3 743	6 704	11 892
Other shark species	-	63	-

Fisheries Queensland, through the Queensland Fisheries Joint Authority, also permits a limited level of net harvest outside of the fishery area managed under the Gulf Management Plan (i.e., beyond 25 nm from the coastline). Fishers operating under these permits tend to target grey mackerel and shark species. This permitted catch has not been reported in previous GOCIFFF Annual Status Reports as the operations are not specifically described in the fishery management arrangements. However it has been proposed that they will be incorporated in future management

arrangements following the review of the Gulf Management Plan.

Recreational

Fisheries Queensland conducted surveys to estimate catches of key species by recreational fishers in Queensland as part of the RFISH program in 1997, 1999, 2002 and 2005. These were reported in the Annual Status Report for 2006 (Fisheries Queensland 2007). From this data, an estimated 101 t of GOCIFFF-related species were harvested recreationally (retained) in 2005.

Fisheries Queensland will commence a new statewide recreational fishing survey in 2010. This survey will provide current and robust data about the recreational harvest of GOCIFFF species and other species by Queensland residents. The results of this survey are expected to be available by the end of 2011.

Charter

Total harvest in the charter sector in 2009 was lower than previous years (Table 4). There have been fewer boats reporting harvest in recent years and is the likely reason for the lower catches (Table 4). Blue threadfin is the most commonly caught species (Table 5). Barramundi remains a popular target species although reported harvest decreased in 2008 and 2009 compared with previous years.

Table 4: Total retained catch (t) and number of operators in the charter sector of the GOC 2003–09 (Source: Fisheries Queensland CFISH database, 14 May 2010).

Year	2003	2004	2005	2006	2007	2008	2009
Retained Catch (t)	19	20	23	29	26	23	17
No. of operators	43	41	37	28	30	25	18

Table 5: Retained catch in kilograms and released catch in numbers (in parenthesis) of target and by-product species for charter operators in the GOCIFFF 2004–09 (Source: Fisheries Queensland CFISH database, 14 May 2010). NA denotes catch reported by fewer than five licences that cannot be displayed for confidentiality reasons.

Group	2004	2005	2006	2007	2008	2009
Barramundi	1858 (9880)	1304 (6393)	1581 (4121)	1018 (5033)	396 (2278)	400 (818)
Blue threadfin	7121 (739)	7868 (747)	12293 (1021)	9295 (165)	11097 (923)	8075 (106)
King threadfin	684 (359)	793 (235)	485 (155)	751 (41)	434 (58)	NA
Threadfin	72 (340)	63 (260)	40 (166)	171 (1359)	NA	180 (290)
Grunter	1958 (683)	2288 (706)	1619 (538)	871 (416)	401 (199)	425 (66)
Mackerel–grey	143 (284)	145 (546)	680 (251)	244 (166)	NA	NA
Mackerel–school	782 (303)	1422 (610)	2511 (946)	3014 (1538)	2197 (45)	1865 (79)
Mackerel–spotted	NA	NA	NA	4050 (141)	NA	NA
Mackerel–unspecified	516 (618)	766 (272)	338 (239)	561 (828)	103 (432)	153 (243)
Queenfish	2386 (8002)	2786 (6876)	2065 (6907)	2131 (5664)	1807 (3187)	1082 (1636)
Shark–unspecified	1097 (1181)	1939 (1085)	NA	NA	NA	1125 (911)
Trevally	723 (5940)	1052 (6466)	395 (4324)	315 (4091)	185 (2104)	149 (1429)
Bream	2226 (1446)	1866 (796)	1659 (696)	1647 (661)	1795 (611)	1231 (182)
Barracuda	90 (706)	59 (636)	42 (661)	30 (456)	6 (218)	20 (320)
Catfish	81 (486)	NA	NA	NA	NA	NA
Cobia	110 (46)	133 (70)	170 (79)	64 (39)	NA	100 (6)
Cod–unspecified	287 (906)	175 (745)	86 (774)	81 (702)	147 (506)	NA
Fish–unspecified	23 (1055)	49 (634)	37 (553)	112 (1009)	NA	NA
Flathead	6 (10)	NA	NA	NA	NA	NA
Jewfish–black	143 (39)	143 (98)	NA	282 (141)	90 (67)	NA
Jewfish–unspecified	64 (11)	NA	NA	NA	NA	NA
Tuna	NA	42 (59)	NA	NA	NA	–

Indigenous

Harvest by Indigenous fishers within the bounds of the GOCIFFF has not been estimated. Fisheries Queensland is working to develop data collection systems to fill this information gap.

The most recent data were collected during the 2000–01 National Recreational and Indigenous Fishing Survey (NRIFS) across northern Australia. This was reported on in the Annual Status Report for 2007 (Fisheries Queensland 2009).

Possession and size limits do not apply to traditional and customary fishing. However, amendments to the *Fisheries Act 1994* in October 2008 include the restriction of traditional and customary fishing to:

- personal, domestic and non-commercial communal use only
- recreational fishing or prescribed traditional apparatus (such as fish traps).

Indigenous people can apply for a general fisheries permit to use large fishing nets for cultural and ceremonial events.

Spatial issues / trends

Approximately 35% of the total barramundi catch in 2009 was harvested from three 30 nm grids along the Mitchell, Norman and Flinders Rivers. This is marginally lower than historical catches. These same grids have produced between 36 and 48% of the annual barramundi harvest since 2003. The rest of the harvest was reasonably spread along the coast with the exception of the Gilbert River where the proportion of total barramundi catch rose from a five year average of 6% to 10%.

Catches of grey mackerel in 2009 were spread from Karumba through to the tip of Cape York however there were a few changes in the highest producing 30 nm grids since 2008. Waters offshore of the Staaten River and Aurukun provided marginally more of the total grey mackerel harvest than previously while the grid offshore of Pormpuraaw produced less.

Socio-economic characteristics and trends

The fishery was worth about \$11.8 million in GVP in 2009. This is similar to the average GVP for the last ten years of \$11.2 million.

Biological and ecological information

Monitoring programs

Fishery Dependent Sampling

Fisheries Queensland has collected biological information on barramundi from the GOCIFFF since 2000. The objective of this routine monitoring is to collect length, age and sex data representative of the retained commercial, recreational and charter boat catches of barramundi from the south-east Gulf of Carpentaria stock. Sampling methods include measuring commercially caught fish at seafood wholesalers and retailers, measuring recreationally caught fish at boat ramps, conducting a keen angler program, in which recreational fishers can donate fish frames, and asking charter operators to measure fish caught by their clients. Prior to 2006, sampling included collection of data and samples from onboard commercial vessels and fishery independent research data. Length and age frequencies are derived for the retained catch for each sector and used to calculate an index of the mortality rate in the population.

The higher number of samples from 2008 and 2009 compared with 2007 reflects the continued strong level of stakeholder support for the monitoring program (Table 5). The monitoring provides a quality dataset for assessing the status of barramundi stocks. An assessment of the barramundi stocks in Gulf of Carpentaria is scheduled for 2012.

The length frequency of barramundi sampled in the commercial and recreational fishery has been consistent for the last three years (Figure 8). However, the size range of barramundi harvested by the two sectors appears slightly different. The commercial fishery tends to catch more barramundi in the 650–750 mm size range while the recreational fishery harvests smaller barramundi in the 600–700 mm size range.

Overall, 801 barramundi otoliths were collected during the 2009 fisheries-dependent barramundi surveys in the Gulf of Carpentaria sampling area (Table 6). These otoliths will provide important information for future age-based fishery assessment. These fishery assessments will be based on ageing data obtained by interpreting the otolith structure.

Table 6: The number of representative catches sampled, barramundi measured and otoliths collected during Fisheries Queensland monitoring in the south-east Gulf of Carpentaria (Source: Fisheries Queensland Fisheries Resource Monitoring database, extract 12 May 2010).

Year	Number of catches sampled			Number of fish measured			Number of otoliths collected
	Commercial	Recreational	Charter	Commercial	Recreational	Charter	
2007	70	73	15	787	121	24	435
2008	43	109	33	1487	193	69	723
2009	74	162	1	1328	185	22	801

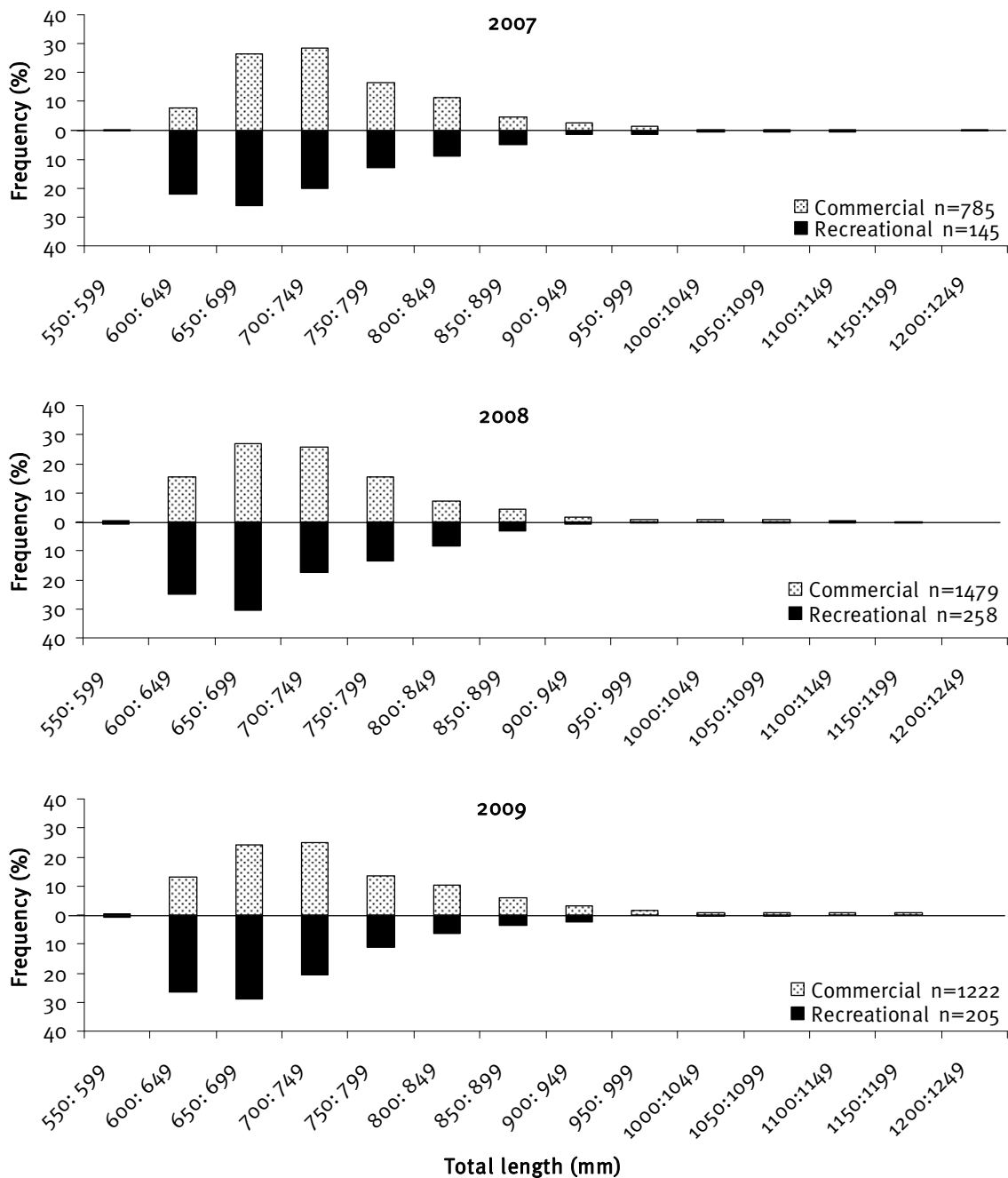


Figure 8: Length frequency (total length, mm) of barramundi sampled from the commercial and recreational fishery in the Gulf of Carpentaria.

Fisheries Observer Program

There was above target coverage in the GOCIFFF for the 2009 fishing year with seven observer surveys conducted within the inshore barramundi (N₃) subfishery, totalling 61 days (target of 50). No observations occurred in the offshore grey mackerel / tropical shark (N₉) fishery. The N₃ fishery surveys were from the river (57%) and foreshore (43%) areas, where barramundi and king threadfin were targeted; no offshore (deeper than 2 m at low tide) surveys were conducted.

The most common fishing apparatus observed was 165 mm mesh size, 33 mesh drop with a line ply of 70 and a median net length of 55 m. From the 512 net sets observed (40.5 km of net set, 3250 fishing hours), 57 different species interactions were observed; with barramundi being the most common contributing 25% (93% utilised, discards mainly undersized) of the observed catch by number; followed by king threadfin, 19% (92% utilised, discards mainly undersized) and blue threadfin, 15% (54% utilised, retention varied among fishers). The median net soak time was 5.5 hours, which was predominantly linked to the distinct

diurnal tides in the southern Gulf; where the fishing pressure was the greatest and thus observer surveys concentrated.

The bycatch comprised 44% by number of the total catch, and consisted of 49 species, of which 17% were released alive. The three largest contributors to the bycatch were blue threadfin (19%), winged hammerhead shark (18%) and catfish (10%); all other species were observed to occur at much lower levels.

Interactions with shark and ray species included:

- 18 Pigeye shark (50% utilised and 17% returned alive)
- 221 Bull shark (9% utilised and 20% returned alive)
- 77 Blacktip shark complex (0% utilised and 22% returned alive)
- zero snaggletooth sharks
- 1 Great hammerhead shark (returned deceased)
- 16 Giant shovelnose ray (0% utilised and 94% returned alive)
- 9 Whitespotted guitarfish (56% utilised and 44% returned alive).

Future directions

The Fisheries Observer Program functions on a voluntary basis within this fishery. Vessels are contacted and encouraged to participate in the program. No observations in 2010 are scheduled in the GOCIFFF.

Bycatch

Interactions with protected species

A total of 21 interactions with protected species were reported through the SOCI logbook in 2009 (Table 6). Approximately 67% of those species interacted with were released alive. SOCI interactions reported by the FOP in 2008 included three bottlenose dolphins, one freshwater crocodile and one saltwater crocodile (all released dead).

Observed interactions with protected species during 2009 included:

- 1 dwarf sawfish (returned alive)
- 20 freshwater sawfish (90% returned alive)
- 1 green sawfish (returned alive)
- 88 narrow sawfish (68% returned alive)
- 4 speartooth shark (25% returned alive)
- 1 green turtle (returned alive)
- 8 saltwater crocodile (50% returned alive).

Table 6: Interactions with protected species in 2009 reported in the Species of Conservation Interest Logbook.

Species	No. of interactions	Fate of interaction
Sawfish–freshwater	12	11 released alive 1 released dead
Sawfish–dwarf	2	2 released alive
Saltwater crocodile	7	6 released alive 1 released dead

Fisheries Queensland provides education material to fishers on up to date, best practice handling and release techniques for SOCI to maximise fisher safety and SOCI post-handling survival. The FOP extends the educational benefits of this material by providing on board tuition in the application of these methods to fishers.

Ecosystem impacts

Fisheries Queensland reviewed the 2004 Ecological Risk Assessment (ERA) of the fishery (Zeller and Snape 2006) in 2010 to identify species and issues requiring an update to their level of risk due to changes in management of the fishery or new research. Commercial net fishing, recreational line fishing and Indigenous fishing activities are essentially passive fishing methods that have little effect on the ecosystem and the more general environment. 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 (such as trawl fishing) (Halliday *et al.* 2001).

Illegal, Unreported and Unregulated (IUU) fishing vessel incursions are a recognised threat to the sustainability of northern Australian fisheries. The rate of IUU incursions in Australia has declined dramatically since 2006 and this trend has also continued in the Gulf of Carpentaria. In 2009 only one apprehension was recorded by the Australian Fisheries Management Authority in the Gulf of Carpentaria. The vessel was a Type 3 Shark boat (timber construction, ~15 m in length) originating from Merauke, Indonesia. The vessel was equipped with a 2000 m gillnet, but had not commenced fishing operations. It was assessed that the vessel was going to target shark. Incursions in the Gulf of Carpentaria continue to remain at very low levels. (Ravanello, P., *pers. comm.*).

Sustainability Assessment

Performance against fishery objectives

The Performance Management System (PMS) for the GOCIFF (Fisheries Queensland 2008) provides a series of measures against which the performance of the fishery can be assessed and reported (Table 7). Full details of the PMS can be found at http://www.dpi.qld.gov.au/documents/Fisheries_SustainableFishing/GOC-PMS-09.pdf

Table 7: Performance against the review events in the GOCIFF Performance Measurement System.

Performance Measure	Performance										
<p>Barramundi (<i>Lates calcarifer</i>)</p> <p>The standardised commercial catch rate declines by more than 30% over a three period.</p>	<p><i>Not triggered</i></p> <p>CPUE (kg/100m² net/day) for barramundi increased in 2009.</p> <table border="1"> <thead> <tr> <th>2005</th> <th>2006</th> <th>2007</th> <th>2008</th> <th>2009</th> </tr> </thead> <tbody> <tr> <td>15</td> <td>19</td> <td>18</td> <td>23</td> <td>25</td> </tr> </tbody> </table>	2005	2006	2007	2008	2009	15	19	18	23	25
2005	2006	2007	2008	2009							
15	19	18	23	25							
<p>King threadfin (<i>Polydactylus macrochii</i>)</p> <p>The standardised commercial catch rate declines by more than 30% over a three period.</p>	<p><i>Not triggered</i></p> <p>King threadfin catch rates (kg/100m² net/day) have been stable since 2005.</p> <table border="1"> <thead> <tr> <th>2005</th> <th>2006</th> <th>2007</th> <th>2008</th> <th>2009</th> </tr> </thead> <tbody> <tr> <td>14</td> <td>16</td> <td>13</td> <td>16</td> <td>16</td> </tr> </tbody> </table>	2005	2006	2007	2008	2009	14	16	13	16	16
2005	2006	2007	2008	2009							
14	16	13	16	16							
<p>Grey mackerel (<i>Scomberomorus sexfasciatus</i>)</p> <p>Until a sustainable yield estimate is determined, the annual limit reference points for catch of this species exceeds:</p> <p>A. \pm 30% of the average annual commercial <i>catch</i> for the previous five years; and</p> <p>B. \pm 30% of the average annual standardised commercial <i>catch rate</i> for the previous five years.</p>	<p>A. <i>Not triggered—annual catch</i></p> <p>Catches decreased by approximately 10% in 2009 compared to the five year average (2004–08).</p> <p>B. <i>Not triggered—catch rate</i></p> <p>Catch rates (kg/100m² net/day) in 2009 were within 1% of the five year average (2004–08).</p>										
<p>Whaler and hammerhead sharks</p> <p>A. Standardised commercial catch rate for whaler sharks or hammerhead sharks declines by more than 30% over a three year period.</p> <p>B. Any increase in the number of licences for which shark catches exceed 20% of the total catch of the licence (this is an interim measure pending review of the <i>Fisheries (Gulf of Carpentaria Fin Fish) Management Plan 1999</i>).</p>	<p>A. <i>Not triggered</i></p> <p>Catch rates increased for both whaler and hammerhead sharks in 2009. No declining trends were evident.</p> <p>B. <i>Not triggered</i></p> <p>The number of licences decreased from 2007 to 2008</p> <table border="1"> <thead> <tr> <th>Year</th> <th>No. of Licences</th> </tr> </thead> <tbody> <tr> <td>2006</td> <td>10</td> </tr> <tr> <td>2007</td> <td>8</td> </tr> <tr> <td>2008</td> <td>6</td> </tr> </tbody> </table>	Year	No. of Licences	2006	10	2007	8	2008	6		
Year	No. of Licences										
2006	10										
2007	8										
2008	6										
<p>Guitarfish (<i>Rhynchobatus</i> spp) and shovelnose rays (<i>Rhinobatos</i> spp)</p> <p>No reference point has been assigned to this performance measure. The indicator will be monitored annually, however a minimum of three years of data are required to measure performance of the indicator. In the interim, a decreasing trend in mortality during the most recent three year period as reported by observers and/or SOCI logbooks is acceptable for the sustainability of guitarfish and shovelnose rays.</p>	<p><i>Not measured—three years of data are required</i></p> <p>No interactions were reported through the SOCI logbooks during 2009.</p> <p>The Fisheries Observer Program observed 16 giant shovelnose ray (0% utilised and 94% returned alive) in the N3 fishery in 2009.</p>										

Performance Measure	Performance
<p>Bycatch Species</p> <p>A. The proportion of bycatch in the total catch should not increase above the average of the previous five years (No reference point has been assigned to this performance measure. The indicator will be monitored annually. Six years of data are required to measure performance of the indicator).</p> <p>B. The number of bycatch species increases by more than 10% over a five year period.</p> <p>C. The numerical abundance of any category of bycatch relative to the total numerical abundance of bycatch increases by more than 50% over the previous five year period.</p>	<p><i>A. N₉</i>—Not measured in 2009 Fisheries observations did not extend in to the N₉ fishery in 2009.</p> <p><i>A. N₃ = 44% bycatch (by number)</i>— Not measured Bycatch contributed 44% to the total number of captured fish in the N₃ fishery, and comprised 49 species from which 17% were released alive. This is greater than previous surveys although more observations are required to set a realistic baseline level to measure against. Halliday et al. (2001) observed 13% bycatch in 1998 (see).</p> <p><i>A. Combined net fisheries</i>—Not measured. There is no comparable figure to measure this against. A baseline average for this measure will be commenced in 2008 to remove potential bias in previous data that was based on the offshore N₉ fishery only.</p> <p><i>B. Not measured</i> Information has not been collected for this measure. Fisheries Queensland plan to review this measure post implementation of the revised management arrangements for the fishery.</p> <p><i>C. Not measured</i> Bycatch categories have not been defined. Changes to this measure will be considered following the review of the GOC ERA in 2010.</p>
<p>Protected species</p> <p>A. The annual rate of interactions recorded in SOCI logbooks should not exceed the historical maximum annual rate of interactions recorded for the N₃ and N₉ components of the fishery:</p> <p>N₉—the annual rate of interactions should not exceed the maximum annual rate of interactions recorded by fisheries observers between 2000 and 2005.</p> <p>N₃—Maximum annual rate not yet set. SOCI logbooks represent the first systematic recording of protected species interaction levels for the N₃ component of the fishery and will be used to set the reference limit. A determination of the maximum interaction rate will be made after assessment of variability in three years of SOCI logbook data. A preliminary benchmark will be set after the end of 2007 following one year of SOCI logbook data collection.</p>	<p>A. N₉: The maximum annual rate (interactions/year) expanded data for the major SOCI animals in the N₉ fishery from 2000 to 2005 were as follows:</p> <ul style="list-style-type: none"> • Green turtle—21 • Flatback turtle—24 • Indo-Pacific humpbacked dolphin—13 • Indian Ocean Bottlenose Dolphin—48 <p><i>Not triggered for N₉</i> The maximum levels were not triggered. No interactions with protected species were reported through SOCI logbooks in the N₉ fishery in 2009.</p> <p>N₃: Maximum levels have been set based on the number of interactions recorded in SOCI logbooks for 2007 in the N₃ fishery. No interactions with bottlenose dolphins were reported through SOCI logbooks and the Fisheries Observer Program in 2009.</p> <p><i>Crocodiles (>1)</i>—Triggered The fishery recorded seven interactions with crocodiles in 2009. Six of these were Released Alive (RA). It is likely that an interaction rate of one is too low for this fishery as a benchmark level. Fisheries Queensland aims to review the PMS for the GOCIFFF post implementation of new management arrangements.</p> <p><i>Sawfish (>1)</i> —Triggered Twelve freshwater sawfish (11 RA, 1 RD) and two dwarf sawfish (all RA) were reported in SOCI logbooks interacting with N₃ fishing activities in 2009. The FOP observed the 110 interactions with sawfish in 2009 in the N₃ fishery:</p> <ul style="list-style-type: none"> • 1 dwarf sawfish (100% Released Alive) • 20 freshwater sawfish (90% RA) • 1 green sawfish (100% RA) • 88 narrow sawfish (68% RA)

Performance Measure	Performance
<p>B. The conservation status under the EPBC Act changes for species with which the fishery interacts.</p>	<p>No further interactions with protected species were reported. Interaction with species of conservation interest is being addressed through a review of the fishery that commenced in October 2009.</p> <p>B. <i>Not triggered</i></p>

Current sustainability status and concerns

Fisheries Queensland successfully trialled a new framework for assessing stock status of key fisheries species in 2009. The Framework for Defining Stock Status, which outlines the new assessment process, is now available on the DEEDI website (http://www.dpi.qld.gov.au/documents/Fisheries_SustainableFishing/Framework-Defining-Stock-Status.pdf). A workshop was held in May to assess the exploitation status for key net caught species in the GOCIFFF. The fishery profile table provides a summary of the status determinations. The program will continue to be rolled out in 2010 to include all key species captured in Queensland's fisheries.

The review of the 2004 ERA (Zeller & Snape 2006) identified a total of 22 species/issues requiring a risk update. Notable changes included: downgrading of risk from high to low for guitarfish in the N3 fishery due to new in-possession limits and finning restrictions; upgrading the risk to sawfish (other than narrow sawfish) to high for the N3 fishery; and downgrading of the grey mackerel from high to moderate risk due to the outcomes of research on the stock differentiation across northern Australia. The impacts of the N3 and N9 net fisheries on breeding stocks of target shark species, barramundi and king salmon remain ranked as moderate. No other retained commercial GOCIFFF species received a risk ranking above 'low'.

The recent FRDC project found some evidence, although inconclusive, that there may be the existence

of multiple localised adult sub-stocks of grey mackerel (meta populations) within the Gulf of Carpentaria. Anecdotaly there is evidence of local seasonal declines in grey mackerel elsewhere supporting the potential for meta populations. The project authors recommended that in the Gulf grey mackerel fisheries should be monitored at regional scales dictated by

fishing effort, as a precautionary measure. Issues surrounding grey mackerel fisheries and that were identified as research priorities include: no information on status of any stocks, limited/nil monitoring data that may inform fishing impacts, no reliable indicator of relative stock abundance.

Research

Recent research and implications

A baseline assessment of the fisheries resources in Port Musgrave (north of Weipa) is currently underway as part of the Environmental Impact Statement for the proposed Cape Alumina bauxite mining venture. The project involves a fishery independent assessment of fishery resources in the region with a focus on species of conservation interest. The assessment also works closely with the Mapoon community and will provide a first time inventory of fish species of importance to the regional Indigenous community.

The NHT funded research project 'A pilot study to develop methodology to determine Indigenous fishing impacts on Sharks and Rays in the NT' was completed in 2009. The project had two aims:

- Develop a best practice model for engaging Indigenous communities in surveys relating to subsistence fishing study; and
- Determine the Indigenous harvest of sharks and rays conducted in the Groote Eylandt region of NT.

Fisheries Queensland will consider the project outcomes in the future development of data collection systems for Indigenous fishing in Queensland.

The Fisheries Queensland led, DEWHA funded, Tropical Resources and Coastal Knowledge (TRaCK) project is currently underway for the Mitchell and Flinders Rivers in the GOC and the Roper and Daly Rivers in the Northern Territory. The project aims to increase our detailed understanding of how freshwater flows affect some key estuarine species and support sustainable

fisheries by assisting in the valuations of the ecological assets of estuaries and freshwater related processes. The project will collect fish samples from all sectors that access the rivers systems being investigated. More information on the project can be found on the [TRaCK](#) website.

Collaborative research

Fisheries Queensland collaborated on a multi-jurisdiction, multi-agency and multi-technique Fisheries Research and Development Corporation (FRDC) funded project determining stock boundaries for grey mackerel across northern Australia (FRDC 2005/010) (Welch et al. 2009). The project identified at least five separate stocks (management units) of adult grey mackerel across northern Australia that included a separate single GOC stock. The project concluded that the entire GOC should be treated as a single management unit and recommended that catches continue to be monitored spatially within the GOC.

Fishery management

Compliance report

During 2009, 93 units were inspected in the Gulf of Carpentaria Inshore Fin Fish Fishery. Of these, 85 were commercial vessel inspections.

During this period, five offences were detected in association with four inspections, corresponding to a compliance rate of 96% on units inspected. This does not include offences relating to unattended, incorrectly marked equipment. A summary of offences is provided in Table 8.

Offences are reported as either a Fisheries Infringement Notice (FIN); Caution (FIN Caution or official written caution); or Prosecution (to proceed by complaint summons).

In addition to the above inspections and offences, two nets were seized from tidal waters in the Gulf of Carpentaria during 2009.

Table 8: Offences recorded in the GOCIFFF (2009).

OFFENCE	FIN	Prosecution	Caution
Take, possess or sell fish regulated by form	1		
Contravened a condition of an authority involving fishing apparatus	1		
Failed to comply with a regulated fishing apparatus declaration			1
Unlawfully did an act that may only be done by the holder of an authority		2	
TOTAL	2	2	1

Changes to management arrangements in the reporting year

A review of Queensland fin fish fisheries in the Gulf of Carpentaria commenced mid 2009. Fisheries Queensland released an options paper in September 2009 and facilitated public and industry meetings to discuss these options in October 2009. The primary focus of the review related to the provisions in the Gulf of Carpentaria Fin Fish Fishery Management Plan. However, several Joint Authority fisheries currently covered by permit arrangements were also covered by the review.

It was highlighted through the first phase of the review that grey mackerel and shark require additional management to ensure sustainability and fair access. Consequently, proposed arrangements for these species are contained in a draft Regulatory Impact Statement (RIS) which will be considered by government in the near future. It is expected that a RIS will be ready for release in June/July 2010.

Given that Gulf of Carpentaria Fin Fish Fishery Management Plan expires on 1 September, and that it is highly unlikely for new measures to be introduced prior to that time, Fisheries Queensland is seeking an extension of another year for the current plan. This does not mean that new arrangements for Gulf of Carpentaria Finfish Fishery will not be in place until 1 September 2011. Fisheries Queensland will progress implementation of the changes as soon as the legislative process allows.

Communication and education

The Gulf Management Plan is currently under review. The review includes a broad stakeholder consultation and feedback process. Public comments will be considered by a Stakeholder Working Group that will inform Fisheries Queensland on future management arrangements for the fishery. The review is expected to be finalised by mid 2010.

Future consultation with stakeholders in this fishery will occur through many mechanisms:

- On a strategic level the Queensland Fisheries Management Advisory Committee (QFMAC) shall consider the GOCIFFF in the context of all Queensland fisheries and prioritises issues associated with it accordingly. Once fisheries management priorities have been determined, the department may establish a small number of Technical Advisory Groups (TAGs) to provide technical information that will assist QPI&F to pursue these priorities (which may or may not impact the GOCIFFF).
- The Department may also establish technical working groups to generate information upon which to base decisions. These groups may be permanent or ad hoc, and can be fishery-specific or broader. They may be established to provide advice to the Department or to inform the decisions of a body such as a QFMAC.
- The department consults directly with industry members through attendance at industry association meetings, port visits, newsletters and other means.
- There are also legislated requirements for consultation; such as Regulatory Impact Statements (RIS) that ensure stakeholders in the fishery are consulted about significant changes in management arrangements.

Complementary management

Fisheries researchers and managers from Queensland, the Northern Territory and Western Australia and the Commonwealth 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.

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