Australian Government
Department of the Environment, Water, Heritage and the Arts

Marine and Tropical Sciences Research Facility Milestone Report, December 2007

Program 8: **Sustainable Use and Management of Marine Resources of the Great Barrier Reef**

Project 4.8.4: **Evaluation of the impacts from industry and community uses on inshore biodiversity**

Project Leader: **Dr Ashley Williams, James Cook University**

Summary

This project has progressed well with all milestones being achieved. No problems with achieving subsequent milestones are foreseen. A report describing preliminary findings from initial observer surveys is included in this report. The preliminary report describes the species composition and length distribution of shark and fish species caught by commercial net fishers within the Great Barrier Reef World Heritage Area from Princess Charlotte Bay to Gladstone.

Project Outputs / Milestones

Objective	Targeted Activity	Due Date
a	MTSRF GBR newsletter article – update on project progress.	1 December 2007
b	Report describing preliminary findings from initial observer surveys. Summary of species composition and biological samples collected from observer trips.	1 December 2007
c	Plan of communication outputs and products for Year 2 and summary of any communication activities undertaken to date, including minutes of meetings / workshops if applicable.	1 December 2007

Project Results

Description of the results achieved for this milestone

This project is currently on track and no problems with achieving subsequent milestones are foreseen.

1. Newsletter article

An article describing progress with fieldwork for this project has been drafted and will appear in the next MTSRF GBR newsletter in December 2007.

2. Preliminary report on observer surveys

A preliminary report on the data collected from observer surveys to date is attached to this milestone report.

3. Summary of communication activities to date

Regular meetings are scheduled weekly for JCU staff involved in the fieldwork components of this project. A running action list is maintained from these meetings. Phone conferences for the entire project team (fourteen people) occur bi-monthly, which provides an opportunity for managers and scientists from the GBRMPA and QDPI&F to be updated with progress. Minutes and action items are drafted and circulated to the entire project team after each meeting.

A monthly summary of field activities is circulated to the QDPI&F Long Term Monitoring Program (LTMP) and Fishery Observer Program staff at the Northern Fisheries Centre in Cairns. This ensures that the project activities complement rather than duplicate those QDPI&F ongoing program's activities.

An article introducing this project was published in the first issue (May 2007) of the MTSRF Program 8 newsletter and also in the April edition of the Queensland Fisherman magazine.

A two-page colour flyer has been produced that provides an overview of the project. This flyer has been distributed to commercial fishers during observer surveys, recreational fishers during boat ramp surveys and seafood processors that have been assisting with collection of biological samples.

A second newsletter article has been drafted and will be published in the December edition of the MTSRF GBR newsletter.

4. Plan of communication outputs and products for Year 2

An article updating project progress will be published in the Fishing and Fisheries Research Centre newsletter.

A similar article will be published in the Queensland Fisherman and the QDPI&F Inshore Fisheries newsletter.

Report on preliminary data from observer surveys: Species composition and length frequency distribution of the catch

Introduction

Fishing is one of the most important commercial and recreational activities in inshore waters of the Great Barrier Reef World Heritage Area (GBRWHA). A large number of fish and shark species are captured in inshore waters of the GBRWHA, although the composition of the catch is poorly known. Some preliminary data on species composition of the commercial catch was collected during four observer trips on board commercial net fishing boats in the northern region of the GBRWHA (Rose *et al.* 2003, Hyland 2006). To date, these data remain limited due to the small sample size and the limited spatial coverage of the area in which the fishery operates.

One of the objectives of MTSRF Project 4.8.4 was to significantly expand the existing knowledge of the species composition of the commercial catch within the East Coast Inshore Finfish Fishery (ECIFF). To ensure adequate coverage of the commercial fishery, an observer program was developed to cover the area from Princess Charlotte Bay to the southern border of the GBRWHA. This report describes preliminary data on species composition and length distribution of key species collected during observer surveys in 2007.

Methods

We commenced placing observers on board commercial net boats in April 2007 in an attempt to refine data collection techniques before the observer program was expanded. Since then, 72 days of fishing have been observed from thirty surveys between Princess Charlotte Bay and Gladstone (Table 1). To spread observer coverage throughout the GBRWHA, five regions were identified (Figure 1). Observers were placed on commercial fishing vessels on an opportunistic basis, as it was not possible to develop a detailed schedule for the observer surveys due to the unpredictable nature of the commercial fishery.

Table 1: Number of fishing days observed and number of observer trips in each region within the GBRWHA (see Figure 1) from April to November 2007.

Region	Number of trips	Days of fishing observed
Far North	1	8
Cairns	17	34
Townsville	9	24
Mackay	2	3
Capricorn	1	3
Total	**30**	**72**

During each trip, observers recorded data on the time spent fishing, location, depth, habitat, species composition of the harvest and bycatch, lengths of all species caught and condition of discards. Biological samples from key species have also been collected. In this report, we describe the species composition of the commercial catch and the length distribution of the

most common species caught for which greater than sixty samples have been measured. The distribution of lengths of each species in the catch is particularly important for determining the selectivity of the fishing gear and the component (e.g. adult, juvenile) of the population that is caught by the fishery.

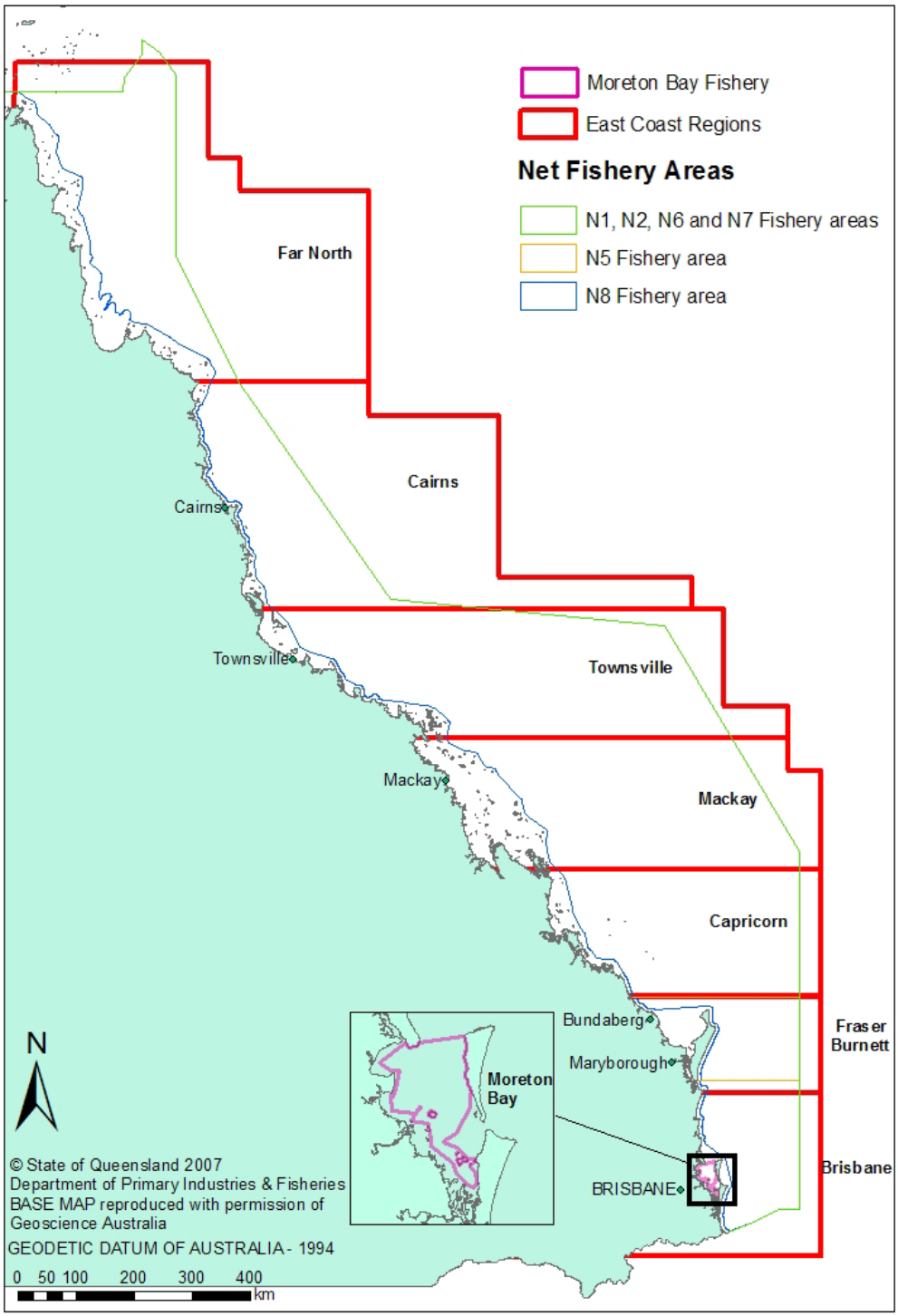

Figure 1: Map of Queensland east coast indicating regions identified for structuring observer surveys on commercial net boats.

Results and Discussion

Catch composition

A total of 1,056 sharks and rays from 22 species (Table 2) and 2,635 fish from 49 species (Table 3) were recorded in the catch of commercial net fishers. Most of the catch of fish was recorded from the Cairns and Townsville regions, most likely due to the greater observer coverage in these regions. However, the number of sharks and rays recorded was greater in the far north than in the Cairns region. This is due to differences in the target species between regions. The single observer trip in the far north was on a large net reel vessel that was specifically targeting shark. Nearly all of the trips in the Cairns region were on vessels targeting fish and on which sharks were an incidental catch. Low numbers of sharks and fish were recorded from the Mackay and Capricorn regions, due to the limited observer coverage in these regions to date. Future observer effort will be focussed in these regions.

Table 2: Number of each species of shark and ray recorded in the commercial net catch during observer trips in five regions of the GBRWHA from April to November 2007.

Species Name	Common Name	Region					
		Far North	Cairns	Townsville	Mackay	Capricorn	Total
Carcharhinus amboinensis	Pigeye Shark		2	18		9	**29**
Carcharhinus brevipinna	Spinner Shark	6		3			**9**
Carcharhinus cautus	Nervous Shark	1				2	**3**
Carcharhinus dussumieri	Whitecheek Shark	1	1	21	1	7	**31**
Carcharhinus fitzroyensis	Creek Whaler	2		17			**19**
Carcharhinus leucas	Bull Shark		3				**3**
Carcharhinus macloti	Hardnose Shark	4		39			**43**
Carcharhinus sorrah	Spot-tail Shark	69		77	2		**148**
Carcharhinus tilstoni/limbatus	Blacktip Shark	175	47	173		3	**398**
Rhizoprionodon acutus	Milk Shark	86	12	28		1	**127**
Rhizoprionodon taylori	Australian Sharpnose Shark	1	1	27	13	3	**45**
Unknown *Carcharhinus*	Shark			11			**11**
Eusphyra blochii	Winghead Shark	2		2		1	**5**
Sphyrna lewini	Scalloped Hammerhead	15	41	71	2		**129**
Sphyrna mokarran	Great Hammerhead	2	2	8	9		**21**
Himantura toshi	Blackspotted Whipray		1				**1**
Aetobatus narinari	Whitespotted Eagle Ray		1	1			**2**
Aetomylaeus niehofii	Banded Eagle Ray			1			**1**
Rhinoptera neglecta	Australian Cownose Ray				3		**3**
Anoxypristis cuspidata	Narrow Sawfish		1	7		1	**9**
Rhynchobatus australiae	Whitespotted Guitarfish		3	3		1	**7**
Rhinobatos typus	Giant Shovelnose Ray		8	1		1	**10**

Species Name	Common Name	Region					
		Far North	Cairns	Townsville	Mackay	Capricorn	Total
Unknown Ray	Ray	1		1			**2**
	Total	**365**	**123**	**509**	**30**	**29**	**1056**

Table 3: Number of each species of fish recorded in the commercial net catch during observer trips in five regions of the GBRWHA from April to November 2007.

Species Name	Common Name	Region					
		Far North	Cairns	Townsville	Mackay	Capricorn	Total
Arius spp.	Catfish – Unspecified	3	23	11	1	2	**40**
Alectis indica	Diamond Trevally			1			**1**
Carangoides fulvoguttatus	Turrum			12			**12**
Caranx ignobilis	Giant Trevally		6	4			**10**
Decapterus spp.	Scad - unspecified	3					**3**
Gnathanodon speciosus	Golden Trevally			1			**1**
Megalaspis cordyla	Finny Scad			1			**1**
Parastromateus niger	Black Pomfret	1		10	8		**19**
Scomberoides commersonianus	Giant Queenfish		32	170	4		**206**
Scomberoides lysan	Lesser Queenfish		1				**1**
Trachinotus blochii	Snubnose Dart		5				**5**
Unknown Carangid	Trevally			2			**2**
Chanos chanos	Milkfish			113			**113**
Chirocentrus dorab	Dorab Wolf Herring		1	7			**8**
Echeneis naucrates	Sharksucker				1		**1**
Elops hawaiensis	Hawaiian Giant Herring		2	1			**3**
Drepane punctata	Sicklefish		8				**8**
Platax spp.	Bat Fish			1			**1**
Diagramma spp.	slatey bream			1			**1**
Plectorhinchus gibbosus	Brown Sweetlips		3				**3**
Pomadasys argenteus	Silver Javelin		2				**2**
Pomadasys kaakan	Barred Javelin			25			**25**
Hemiramphus spp.	garfishes			1079			**1079**
Lates calcarifer	Barramundi		52	6	3		**61**
Leptobrama mulleri	Steelback / Beach Salmon			2			**2**
Lethrinus laticaudis	Grass Emperor			1			**1**
Lobotes surinamensis	Tripletail		3	1			**4**

Species Name	Common Name	Region					
		Far North	Cairns	Townsville	Mackay	Capricorn	Total
Lutjanus argentimaculatus	Mangrove Jack		2				**2**
Lutjanus johnii	Golden Snapper		6				**6**
Sphyraena fulvus	Barracuda	3	1				**4**
Megalops cyprinoides	Oxeye Herring		11	2			**13**
Liza vaigiensis	Diamondscale Mullet		1	1			**2**
Mugil cephalus	Sea Mullet		1	6			**7**
Platycephalus fuscus	Dusky Flathead		5				**5**
Eleutheronema tetradactylum	Blue Threadfin	1	182	53		14	**250**
Polydactylus macrochir	King Threadfin		21	2	3		**26**
Psettodes erumei	Australian Halibut		1				**1**
Rachycentron canadum	Cobia			1			**1**
Scatophagus argus	Spotted Scat		4				**4**
Nibea soldado	Silver Jewfish		21	1			**22**
Protonibea diacanthus	Black Jewfish				2		**2**
Thunnus tonggol	Northern Bluefin Tuna	55					**55**
Rastrelliger kanagurta	Mouth Mackerel			19			**19**
Scomberomorus commerson	Spanish Mackerel	10		1			**11**
Scomberomorus munroi	Spotted Mackerel			2			**2**
Scomberomorus queenslandicus	School Mackerel	2					**2**
Scomberomorus semifasciatus	Grey Mackerel	122		446	12		**580**
Sillago ciliata	Sand Whiting		2				**2**
Arothron spp.	Unknown Toadfish		6				**6**
	Total	**200**	**402**	**1983**	**34**	**16**	**2635**

The dominant species of sharks and rays recorded by number were Blacktip, Spot-tail, Scalloped Hammerhead and Milk sharks (Figure 2). These four species comprised greater than 76% of the shark catch. The species composition of sharks and rays from these observer surveys is in general agreement with data from previous surveys (Hyland 2006).

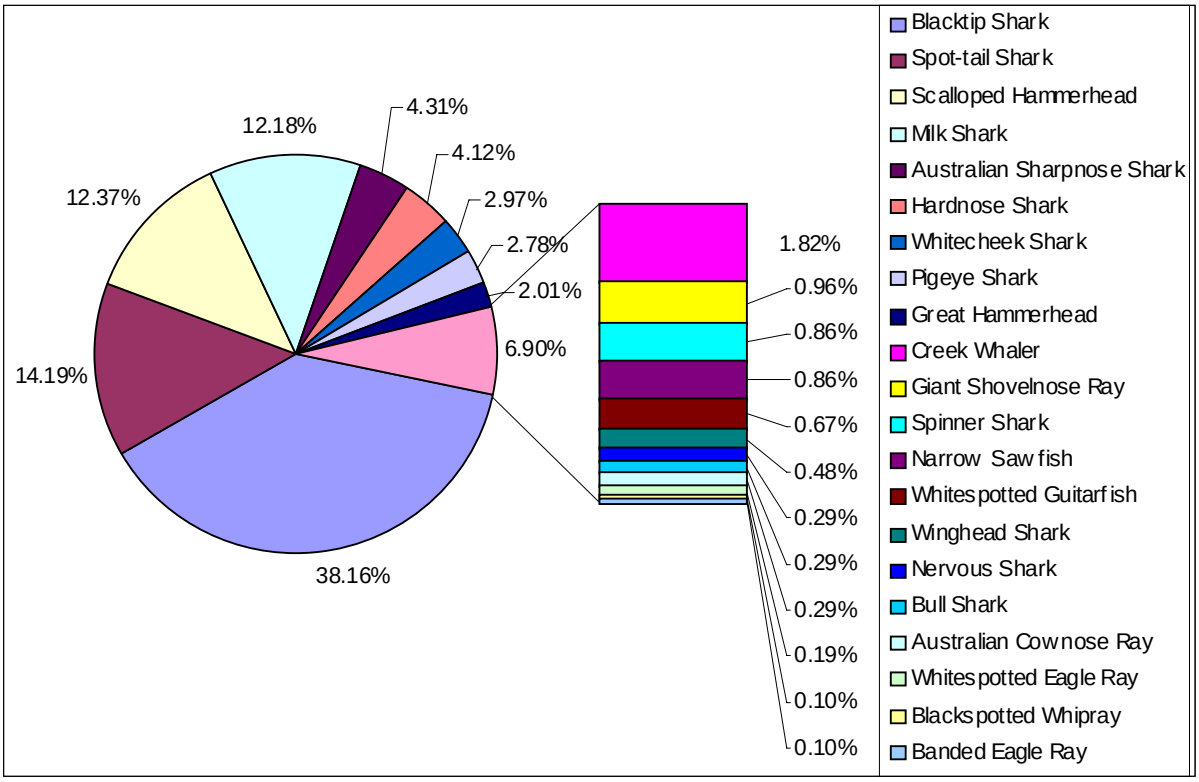

Figure 2: Percent composition of sharks and rays by number recorded in the commercial net catch during observer trips in five regions of the GBRWHA from April to November 2007.

The large number of garfishes recorded was all caught from a single trip where the fisher was targeting bait fish. Garfish were excluded from the analysis of fish species composition to examine the species composition of the catch for trips when fishers were targeting product other than bait. In addition, the analysis of species composition was limited to those species that contributed greater than 0.5% to the fish catch, as there were a large number of fish species recorded. This limited the analysis to eighteen species of fish which contributed to 95% of the fish catch. Similar to the species composition of sharks, four species of fish comprised approximately 75% of the fish catch (Figure 3). These species included grey mackerel, blue threadfin, giant queenfish and milkfish.

Future observer surveys will further refine the species composition of sharks and fish in the commercial fishery and allow for a comparison among regions of the GBRWHA.

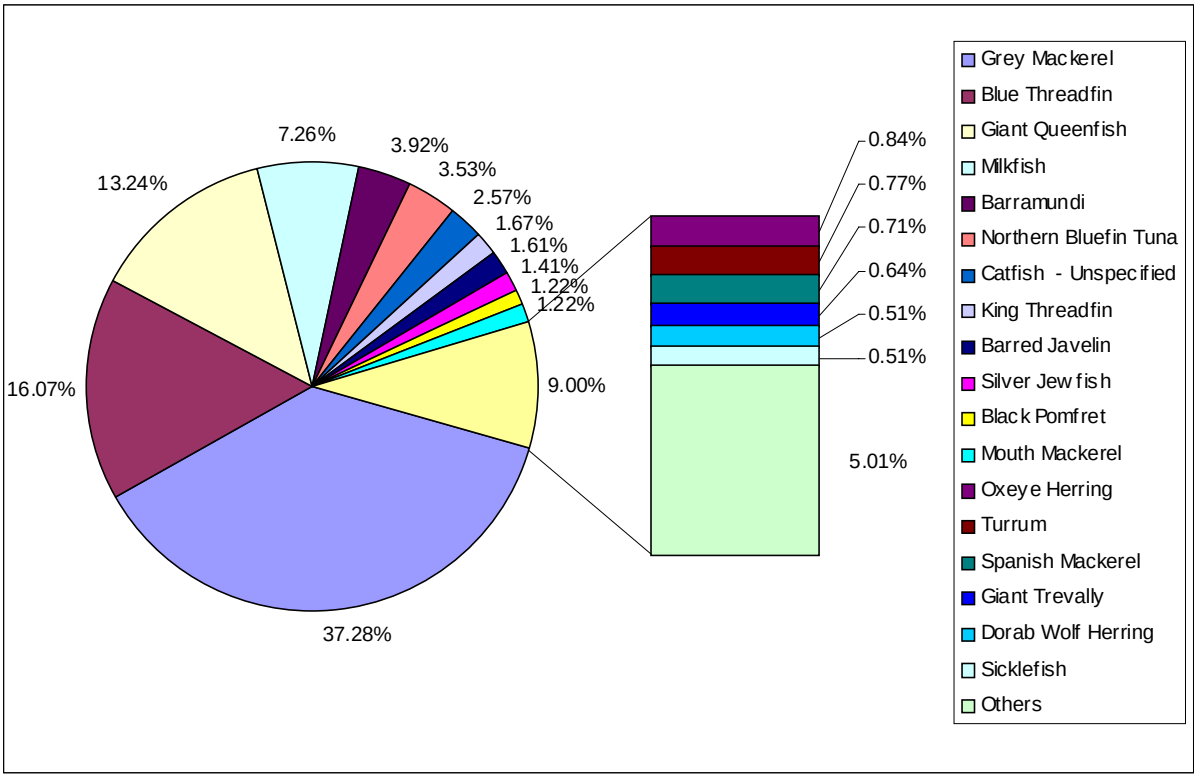

Figure 3: Percent composition of fish by number recorded in the commercial net catch during observer trips in five regions of the GBRWHA from April to November 2007.

Length frequency distributions

Length was measured for as many sharks, rays and fish as possible. As a result, not all of the catch was always measured. Here we present the length frequency of the most common species in the catch for which greater than sixty samples were measured. These include four shark species; Blacktip, Milk, Scalloped Hammerhead and Spot-tail sharks, and three fish species; Blue Threadfin, Giant Queenfish and Grey Mackerel.

There was a wide range of lengths for each species of shark (Figure 4), but the larger individuals of each species were not sampled, particularly the Scalloped Hammerhead which can reach over three meters. There were strong modes in the length frequency distributions of each species, suggesting strong selectivity of the gear or availability of specific sized individuals. The catch of each species was dominated by juveniles, particularly the Blacktip and Scalloped Hammerhead sharks (Figure 4).

Similar to the catch of sharks, there was a wide length range of fish caught (Figure 5). However, in contrast to the sharks, the larger individuals were better represented in the catch of fish. The catch of Grey Mackerel and Giant Queenfish was almost exclusively comprised of adult fish. Blue Threadfin are protandrous hermaphrodites (change sex from male to female) and the length range sampled covered the range of adult males and females.

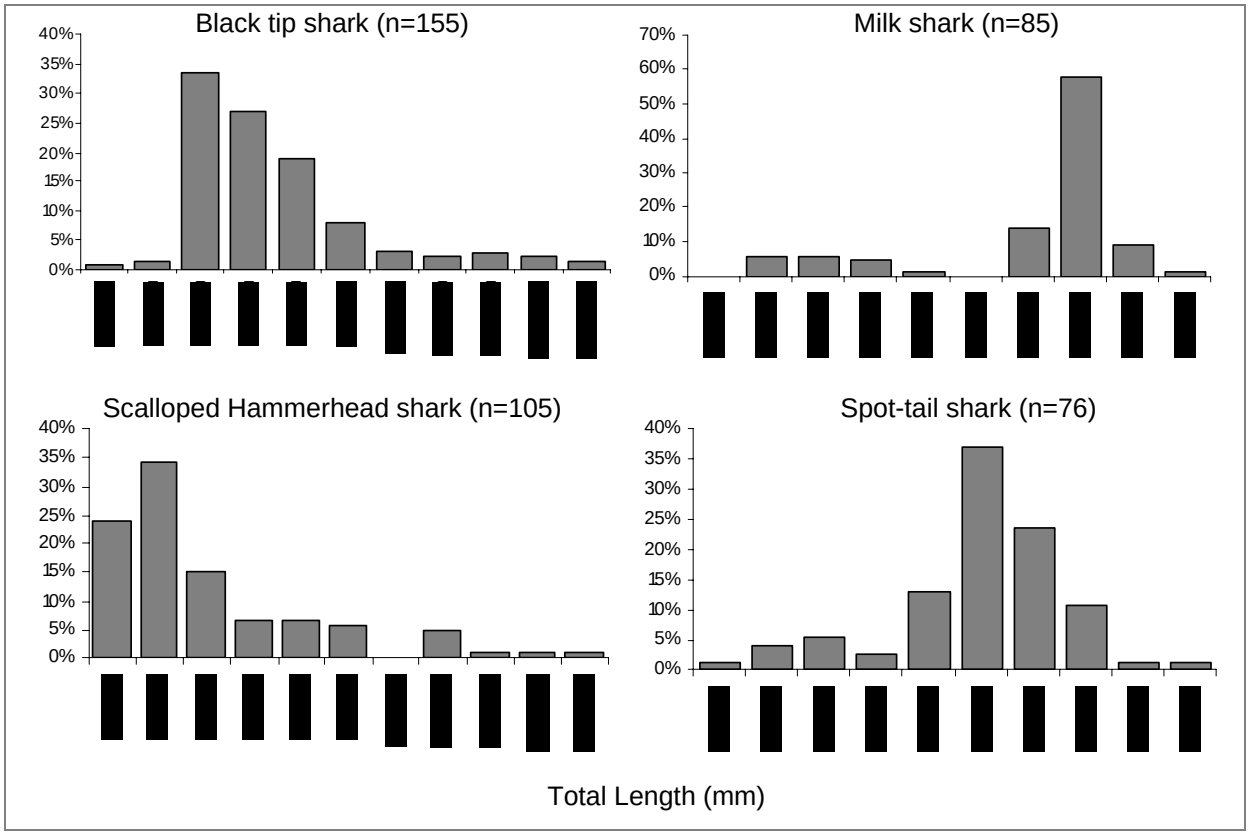

Figure 4: Length frequency distributions of the four most common species of shark observed in the catch.

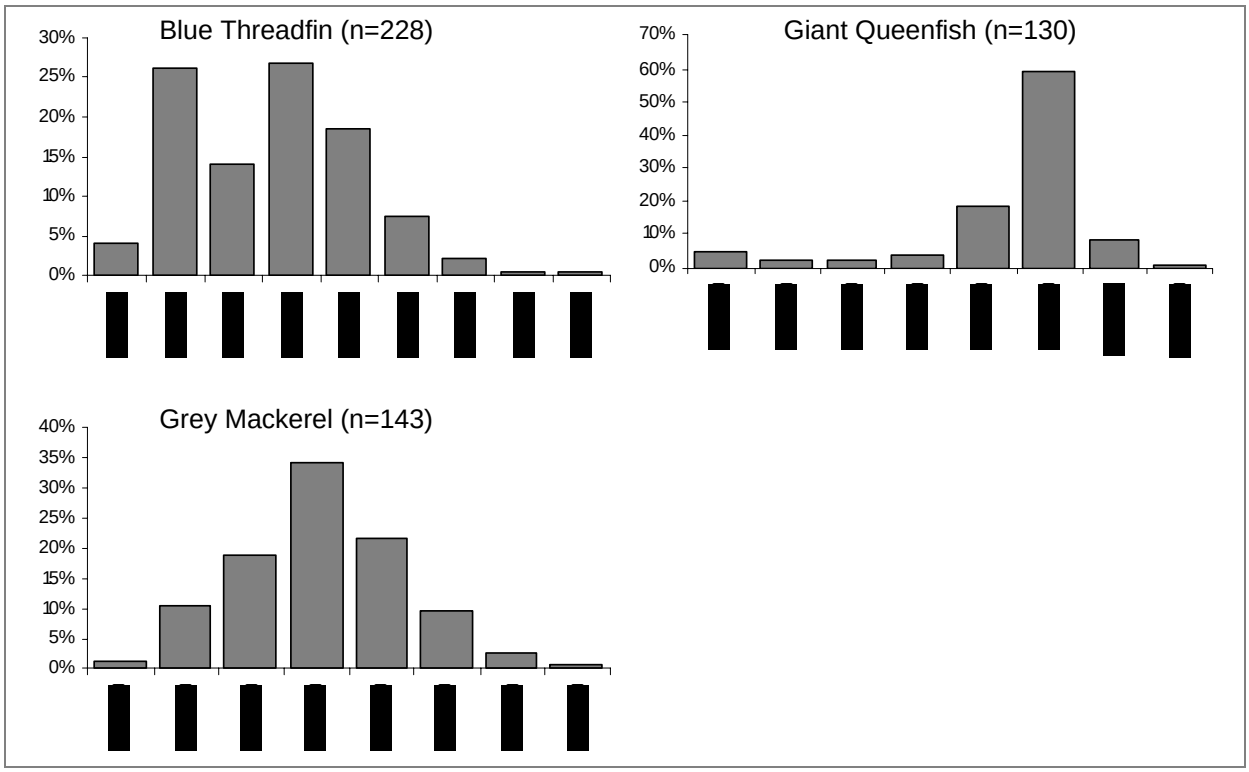

Figure 5: Length frequency distributions of the three most common species of fish observed in the catch.

References

Hyland, S. J. (2006) *Coastal fisheries resource monitoring in the Great Barrier Reef World Heritage Area.* CRC Reef Research Centre Project B4.5. Progress Report to CRC Reef Research Centre, Townsville.

Rose, C, Williams, L, Gribble, N, Garrett, R and Stapley, J. (2003) *Queensland east coast shark catch; extracted from Northern Australian sharks and rays: sustainability of target and bycatch fisheries, Phase 1.* FRDC 2001/077. With additional data from QFS condition and trend, and CRC Reef task B4.5. Department of Primary Industries and Fisheries, Queensland QI03020.