



**Australian Government**

**Department of the Environment, Water, Heritage and the Arts**

**Marine and Tropical Sciences Research Facility (MTSRF)  
Milestone Report 10<sup>th</sup> June 2008**

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

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**Summary**

This project has progressed well with all milestones being achieved. The overall aim of the project is to provide a risk assessment for inshore ecosystems in the GBRWHA. The project is currently in the phase of gathering the appropriate data to undertake the risk assessment – collection of life history data on key species and those with data gaps, and the collection on information on the susceptibility of inshore species to commercial and recreational fishing. The first year of surveys of commercial and recreational catches are almost complete, and another years of data collection is scheduled. Biological samples for the determination of life history information are being collected as part of this survey process, and laboratory analysis of these samples has commenced.

This milestone report outlines the results of the first year of commercial fisheries observer surveys. In total 91 days of commercial inshore fishing was observed. The results indicate a wide range of shark and fish species are caught by commercial fishers. Key shark species include blacktip, spot-tail, scalloped hammerhead, milk and whitecheek sharks. All of these species are currently the focus of life history investigations by students as part of this project. Key fish species include grey mackerel, threadfins (blue and king), barramundi and many others.

**Project Results**

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 was published in the MTSRF GBR newsletter in December 2007, with another article describing project progress has been drafted and is scheduled to appear in the next MTSRF GBR newsletter in August 2008.

**2. *Report on first year of observer surveys***

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

**3. *Schedule for completion of observer surveys and boat ramp surveys***

The schedule for the completion of observer and boat ramp surveys for the second year of field study associated with this project are outlined in the Table below. The general principles followed in developing this schedule are for the completion of an average of 8 observer days and 2 boat ramp surveys per month. In addition to the boat ramp surveys carried out in the Townsville region CAPREEF also provide data from observer surveys carried out in the Rockhampton region.

<b>Month</b>	<b>Observer surveys (region and number of days)</b>	<b>Boat ramp surveys</b>
July 2008	Cairns (4 days) Townsville (4 days)	Townsville (National Park) Burdekin (Barrata's and Cromety Creeks)
August 2008	Far North (8 days)	Townsville (Bohle River) Lucinda (Dungeness)
September 2008	Townsville (4 days) Mackay (4 days)	Townsville (Coast Guard) Burdekin (Barrata's and Cromety Creeks)
October 2008	Far North (8 days)	Townsville (National Park) Lucinda (Dungeness)
November 2008	Cairns (4 days) Mackay (4 days)	Townsville (Bohle River) Burdekin (Barrata's and Cromety Creeks)
December 2008	Townsville (4 days) Mackay (4 days)	Townsville (Coast Guard) Lucinda (Dungeness)
January 2009	Cairns (4 days) Townsville (4 days)	Townsville (National Park) Burdekin (Barrata's and Cromety Creeks)
February 2009	Cairns (4 days) Mackay (4 days)	Townsville (Bohle River) Lucinda (Dungeness)
March 2009	Townsville (4 days) Mackay (4 days)	Townsville (Coast Guard) Burdekin (Barrata's and Cromety Creeks)
April 2009	Cairns (4 days) Townsville (4 days)	Townsville (National Park) Lucinda (Dungeness)
May 2009	Far North (8 days)	Townsville (Bohle River) Burdekin (Barrata's and Cromety Creeks)
June 2009	Cairns (4 days) Mackay (4 days)	Townsville (Coast Guard) Lucinda (Dungeness)

#### **4. Plan for collection of biological samples and key species**

Biological samples are collected during observer trips and also from samples collected from fish processors. These collections are ongoing and these will continue through the middle of 2009. The priority species for which samples are collected were determined at a project meeting in the first year of the project and from an analysis of data gaps (see Tables 2 and 3 below).

**Table 2.** Summary of known biological information for shark species identified as potential catch in the Queensland East Coast Inshore Finfish Fishery within the GBRWHA. Darker grey colours indicate greater need for collection of information. Catch (based on observer and CFISH data): 0, known to occur in region but not documented as catch; 1, limited amounts of catch; 2, substantial portion of catch. Priority (based on level of catch and knowledge gaps): 3, low; 2, medium; 1, high.

Genus	Species	Reproductive biology	Age and growth	Demography	Catch	Priority
<i>Brachaelurus</i>	spp.	Limited <sup>1</sup>	None <sup>1</sup>	None	0	2
<i>Carcharhinus</i>	<i>albimarginatus</i>	Good (OS)	None	None	0	2
<i>Carcharhinus</i>	<i>amblyrhynchoides</i>	Good (Aust)	None	None	1	1
<i>Carcharhinus</i>	<i>amblyrhynchos</i>	Good (Qld)	Good (Qld)	Good (Qld)	1	3
<i>Carcharhinus</i>	<i>amboinensis</i>	Good (Aust)	None	None	2	1
<i>Carcharhinus</i>	<i>brevipinna</i>	Good (Aust)	Good (OS)	Limited	2	2
<i>Carcharhinus</i>	<i>cautus</i>	Good (Aust)	Good (Aust)	None	2	2
<i>Carcharhinus</i>	<i>dussumieri</i>	Good (Aust)	None	None	2	1
<i>Carcharhinus</i>	<i>falciformis</i>	Good (Aust)	Good (OS)	None	1	2
<i>Carcharhinus</i>	<i>fitzroyensis</i>	Good (Aust)	None	None	2	2
<i>Carcharhinus</i>	<i>leucas</i>	Good (OS)	Good (OS)	Limited	2	2
<i>Carcharhinus</i>	<i>limbatus</i>	Good (OS)	Good (OS)	Limited	2	2
<i>Carcharhinus</i>	<i>macloiti</i>	Good (Aust)	None	None	2	1
<i>Carcharhinus</i>	<i>melanopterus</i>	Good (Aust)	None	None	2	1
<i>Carcharhinus</i>	<i>obscurus</i>	Good (Aust)	Good (Aust)	Good (Aust)	1	3
<i>Carcharhinus</i>	<i>plumbeus</i>	Good (Aust)	Good (Aust)	Good (Aust)	1	3
<i>Carcharhinus</i>	<i>sorrah</i>	Good (Aust)	Good (Aust)	None	2	2
<i>Carcharhinus</i>	<i>tilstoni</i>	Good (Aust)	Good (Aust)	None	2	2
<i>Galeocerdo</i>	<i>cuvier</i>	Good (Qld)	Good (OS)	Good (OS)	2	2
<i>Glyphis</i>	sp. A	None	None	None	1	1
<i>Loxodon</i>	<i>macrorhinus</i>	Good (Aust)	None	None	1	1
<i>Negaprion</i>	<i>acutidens</i>	Good (OS)	None	None	2	1
<i>Rhizoprionodon</i>	<i>acutus</i>	Good (Aust)	Limited	Limited	2	1
<i>Rhizoprionodon</i>	<i>taylori</i>	Good (Qld)	Good (Qld)	Good (Qld)	2	3
<i>Triaenodon</i>	<i>obesus</i>	Good (Qld)	Good (Qld)	Good (Qld)	1	3
<i>Nebrius</i>	<i>ferrugiensis</i>	Limited	None	None	1	2
<i>Hemigaleus</i>	<i>australiensis</i>	Good (Aust)	None	None	2	1
<i>Hemipristis</i>	<i>elongatus</i>	Good (Aust)	None	None	1	2
<i>Chilosyllium</i>	<i>punctatum</i>	None <sup>2</sup>	None <sup>2</sup>	None	1	2
<i>Carcharias</i>	<i>taurus</i>	Good (Aust)	Good (OS)	None	1	2
<i>Eucrossorhinus</i>	<i>dasyopogon</i>	None	None	None	0	2
<i>Orectolobus</i>	<i>wardi</i>	None	None	None	1	1
<i>Eusphyrna</i>	<i>blochii</i>	Good (Aust)	None	None	2	1
<i>Sphyrna</i>	<i>lewini</i>	Good (Aust)	Good (OS)	Limited	2	1
<i>Sphyrna</i>	<i>mokarran</i>	Good (Aust)	None	None	2	1
<i>Sphyrna</i>	<i>zygaena</i>	Good (Aust)	None	None	1	1

<sup>1</sup> work currently being undertaken by Peter Kyne at University of Queensland

<sup>2</sup> work currently being undertaken by Joanna Stead at University of Queensland

**Table 3.** Summary of known biological information for ray species identified as potential catch in the Queensland East Coast Inshore Finfish Fishery within the GBRWHA. Darker grey colours indicate greater need for collection of information. Catch (based on observer and CFISH data): 0, known to occur in region but not documented as catch; 1, limited amounts of catch; 2, substantial portion of catch. Priority (based on level of catch and knowledge gaps): 3, low; 2, medium; 1, high.

Genus	Species	Reproductive biology	Age and growth	Demography	Catch	Priority
<i>Dasyatis</i>	<i>annotata</i>	Limited	None	None	0	2
<i>Dasyatis</i>	<i>fluviorum</i>	Limited	None	None	0	2
<i>Dasyatis</i>	<i>kuhlii</i>	Limited	None	None	0	2
<i>Dasyatis</i>	<i>leylandi</i>	Limited	None	None	0	2
<i>Himantura</i>	sp A	Limited	None	None	0	2
<i>Himantura</i>	<i>fai</i>	Limited	None	None	0	2
<i>Himantura</i>	<i>granulata</i>	Limited	None	None	0	2
<i>Himantura</i>	<i>toshi</i>	Limited	None	None	0	2
<i>Himantura</i>	<i>uarnak</i>	Limited	None	None	0	2
<i>Himantura</i>	<i>undulata</i>	Limited	None	None	0	2
<i>Pastinachus</i>	<i>sephen</i>	Limited	None	None	0	2
<i>Taeniura</i>	<i>lymma</i>	Limited	None	None	0	2
<i>Taeniura</i>	<i>meyeni</i>	Limited	None	None	0	2
<i>Urogymnus</i>	<i>asperrimus</i>	Limited	None	None	0	2
<i>Gymnura</i>	<i>australis</i>	Limited	None	None	0	2
<i>Manta</i>	<i>birostris</i>	Limited	None	None	0	2
<i>Mobula</i>	<i>eregood-ootenkee</i>	Limited	None	None	0	2
<i>Aetobatus</i>	<i>narinari</i>	Limited <sup>1</sup>	Limited <sup>1</sup>	None	0	2
<i>Anoxypristis</i>	<i>cuspidata</i>	Good (Qld)	Good (Qld)	None	2	1 <sup>2</sup>
<i>Pristis</i>	<i>clavata</i>	Good (Qld)	Good (Qld)	None	1	1 <sup>2</sup>
<i>Pristis</i>	<i>microdon</i>	Good (Qld)	Good (Qld)	None	1	1 <sup>2</sup>
<i>Pristis</i>	<i>zijsron</i>	Good (Qld)	Good (Qld)	None	1	1 <sup>2</sup>
<i>Rhinobatos</i>	<i>typus</i>	Limited	None	None	2	1
<i>Rhinoptera</i>	<i>neglecta</i>	Limited	None	None	1	2
<i>Rhina</i>	<i>anclyostoma</i>	Limited	None	None	0	2
<i>Rhynchobatus</i>	<i>australiae</i>	Limited	None	None	2	1

<sup>1</sup> work currently being undertaken by Vera Schluessel at University of Queensland

<sup>2</sup> sawfish were given elevated priority due to their high conservation value (ie all species are listed as critically endangered by the IUCN Red List) and thus the need to complement the current state of knowledge which is based primarily on the Gulf of Carpentaria.

**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 4 observer trips on board commercial net fishing boats in the northern region of the GBRWHA (Rose et al. 2003). 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 expand significantly 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 and 2008.

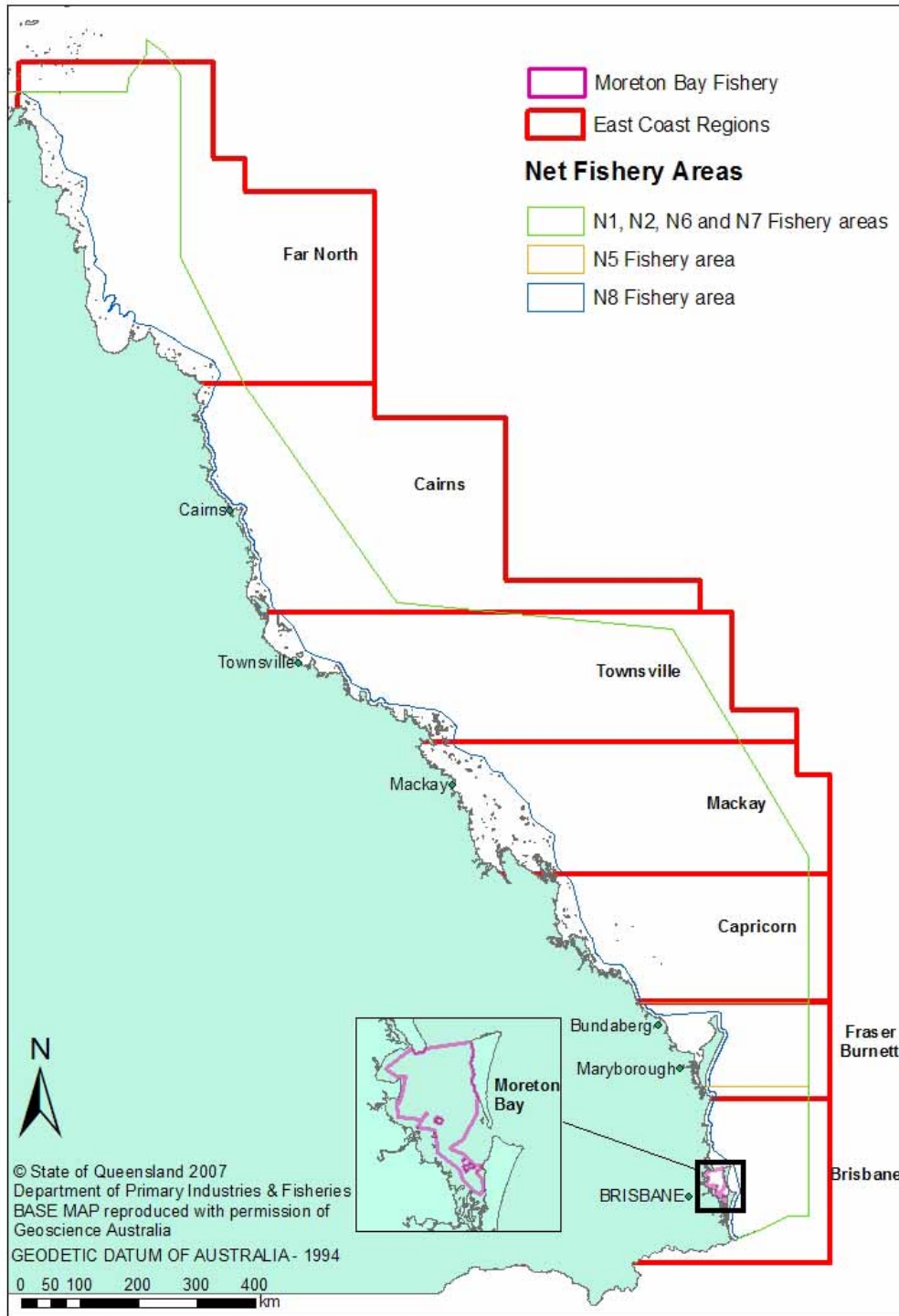
### ***Methods***

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, 91 days of fishing have been observed from 37 surveys between Princess Charlotte Bay and Hervey Bay (Table 1). To spread observer coverage throughout the GBRWHA, five regions were identified (Fig. 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. An observer survey was also opportunistically conducted in the Fraser-Burnett region despite it being outside of the GBRWHA.

**Table 1.** Number of fishing days observed and number of observer trips in each region within the GBRWHA (see Fig. 1) from April 2007 – May 2008.

Region	Number of trips	Days of fishing observed
Far North	1	8
Cairns	20	40
Townsville	11	31
Mackay	2	3
Capricorn	2	8
Fraser-Burnett	1	1
<b>Total</b>	<b>37</b>	<b>91</b>

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 60 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.



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

## ***Results & Discussion***

### **Catch composition**

A total of 1518 sharks and rays from at least 25 species (Table 2) and 2947 fish from at least 54 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 on which sharks were an incidental catch. Low numbers of sharks and fish were recorded from the Mackay, Capricorn and Fraser-Burnett regions, due to the limited observer coverage in these regions to date. Future observer effort will be focussed in the Mackay and Capricorn 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 2007 – May 2008.

Species Name	Common Name	Region					Fraser-Burnett	Total
		Far North	Cairns	Townsville	Mackay	Capricorn		
<i>Carcharhinus amboinensis</i>	Pigeye Shark		2	19		9		<b>30</b>
<i>Carcharhinus brevipinna</i>	Spinner Shark	6		79				<b>85</b>
<i>Carcharhinus caudus</i>	Nervous Shark	1				2		<b>3</b>
<i>Carcharhinus dussumieri</i>	Whitecheek Shark	1	1	83	1	7		<b>93</b>
<i>Carcharhinus fitzroyensis</i>	Creek Whaler	2		17				<b>19</b>
<i>Carcharhinus leucas</i>	Bull Shark		3			7		<b>10</b>
<i>Carcharhinus limbatus</i>	Common Blacktip Shark			6				<b>6</b>
<i>Carcharhinus macloti</i>	Hardnose Shark	4		39			5	<b>48</b>
<i>Carcharhinus sorrah</i>	Spot-tail Shark	69		147	2			<b>218</b>
<i>Carcharhinus tilstoni/limbatus</i>	Blacktip Shark	175	48	298		3		<b>524</b>
<i>Galeocerdo cuvier</i>	Tiger Shark			5				<b>5</b>
<i>Rhizoprionodon acutus</i>	Milk Shark	86	22	28		1		<b>137</b>
<i>Rhizoprionodon taylori</i>	Australian Sharpnose Shark	1	1	27	13	3		<b>45</b>
Unknown <i>Carcharhinus</i>	Shark			11				<b>11</b>
<i>Nebrius ferrugineus</i>	Tawny Shark			1				<b>1</b>
<i>Hemipristis elongata</i>	Fossil Shark	1		2				<b>3</b>
Unknown Weasel Shark	Weasel Shark						3	<b>3</b>
<i>Eusphyra blochii</i>	Winghead Shark	2		2		1		<b>5</b>
<i>Sphyrna lewini</i>	Scalloped Hammerhead	15	42	138	2			<b>197</b>
<i>Sphyrna mokarran</i>	Great Hammerhead	2	2	11	9			<b>24</b>
<i>Stegostoma fasciatum</i>	Zebra Shark			2				<b>2</b>
<i>Himantura toshi</i>	Blackspotted Whipray		1					<b>1</b>
<i>Aetobatus narinari</i>	Whitespotted Eagle Ray		4	1				<b>5</b>
<i>Aetomylaeus nichofii</i>	Banded Eagle Ray			1				<b>1</b>



Species Name	Common Name	Region						Total
		Far North	Cairns	Townsville	Mackay	Capricorn	Fraser-Burnett	
<i>Anoxypristis cuspidata</i>	Narrow Sawfish		1	10			1	12
<i>Rhynchobatus australiae</i>	Whitespotted Guitarfish		4	7			1	12
<i>Rhinobatos typus</i>	Giant Shovelnose Ray		10	1			1	12
<i>Rhinoptera neglecta</i>	Australian Cownose Ray					3		3
Unknown Ray	Ray	1		2				3
<b>Total</b>		<b>366</b>	<b>141</b>	<b>937</b>	<b>30</b>	<b>36</b>	<b>8</b>	<b>1518</b>

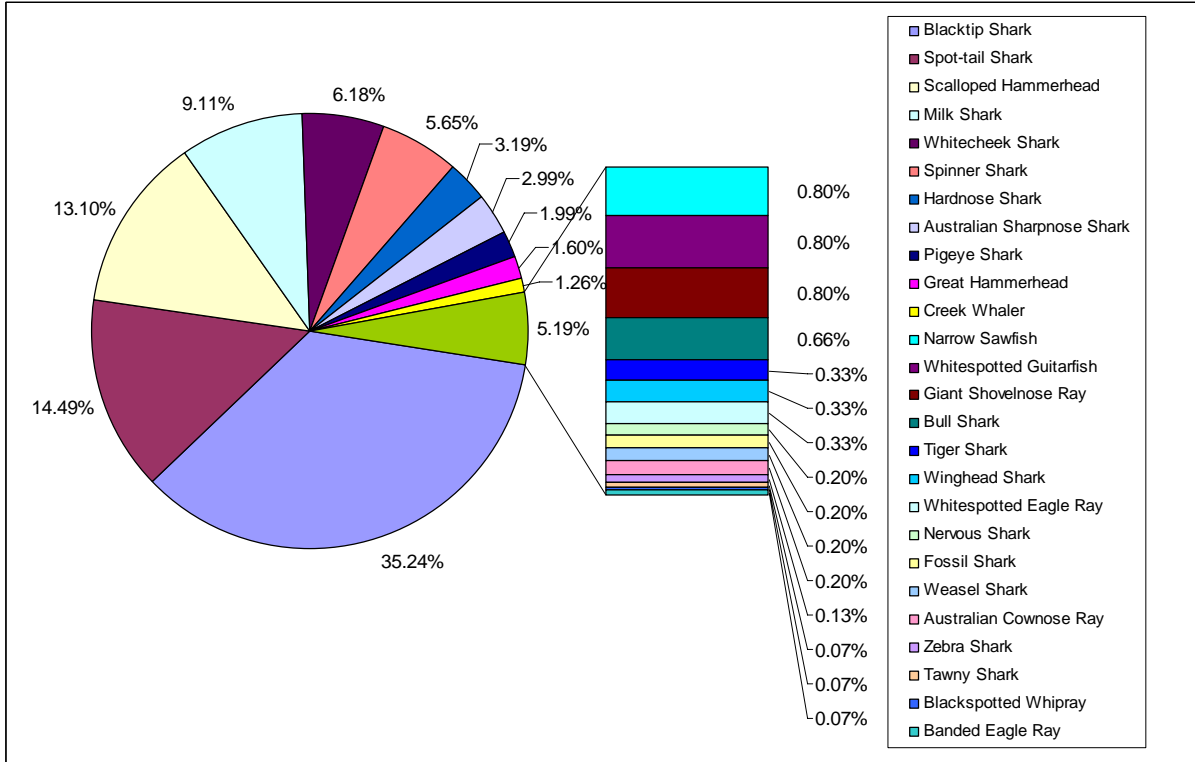
**Table 3.** Number of each species of fish recorded in the commercial net catch during observer trips in five regions of the GBRWHA from April 2007 – May 2008.

Species Name	Common Name	Region						Total
		Far North	Cairns	Townsville	Mackay	Capricorn	Fraser-Burnett	
<i>Arius spp.</i>	Catfish	3	33	15	1	35		87
<i>Alectis indica</i>	Diamond Trevally			1				1
Unknown Scad	Scad	3	4	3			5	15
<i>Carangoides fulvoguttatus</i>	Turrum			12				12
<i>Caranx ignobilis</i>	Giant Trevally		6	4				10
<i>Gnathanodon speciosus</i>	Golden Trevally			1				1
<i>Megalaspis cordyla</i>	Finny Scad			18				18
<i>Parastromateus niger</i>	Black Pomfret	1		11	8			20
<i>Scomberoides commersonianus</i>	Giant Queenfish		38	178	4			220
<i>Scomberoides lysan</i>	Lesser Queenfish		1					1
<i>Trachinotus blochii</i>	Snubnose Dart		6					6
Unknown Trevally	Unknown Trevally		2	2				4
<i>Chanos chanos</i>	Milkfish		4	113				117
<i>Chirocentrus dorab</i>	Dorab Wolf Herring		1	10				11
<i>Anodontostoma chacunda</i>	Gizzard Shad		1	3				4
<i>Drepane punctata</i>	Sicklefish		8					8
<i>Echeneis naucrates</i>	Slender Remora				1			1

Species Name	Common Name	Region					Total
		Far North	Cairns	Townsville	Mackay	Capricorn	
<i>Elops hawaiiensis</i>	Giant Herring		2	1			<b>3</b>
<i>Platax spp.</i>	Bat Fish			1			<b>1</b>
<i>Diagramma spp.</i>	slatey bream			1			<b>1</b>
<i>Plectorhinchus gibbosus</i>	Brown Sweetlips		5				<b>5</b>
<i>Pomadasys argenteus</i>	Silver Javelin		2				<b>2</b>
<i>Pomadasys kaakan</i>	Barred Javelin		2	27			<b>29</b>
Unknown Garfish	Garfishes			1079			<b>1079</b>
<i>Lates calcarifer</i>	Barramundi		53	9	3	74	<b>139</b>
<i>Leptobrama muelleri</i>	Beach Salmon			2			<b>2</b>
<i>Lethrinus laticaudis</i>	Grass Emperor			1			<b>1</b>
<i>Lobotes surinamensis</i>	Tripletail		3	1			<b>4</b>
<i>Lutjanus argentimaculatus</i>	Mangrove Jack		2				<b>2</b>
<i>Lutjanus johnii</i>	Golden Snapper		6	2			<b>8</b>
<i>Megalops cyprinoides</i>	Oxeye Herring		11	4			<b>15</b>
	Diamondscale						
<i>Liza vaigiensis</i>	Mullet		1	1			<b>2</b>
<i>Mugil cephalus</i>	Sea Mullet		4	6			<b>10</b>
<i>Platycephalus fuscus</i>	Dusky Flathead		5				<b>5</b>
<i>Eleutheronema tetradactylum</i>	Blue Threadfin	1	212	54		14	<b>281</b>
<i>Polydactylus macrochir</i>	King Threadfin		23	2	3	49	<b>77</b>
Unknown Angelfish	Angel fish		1				<b>1</b>
<i>Psettodes erumei</i>	Australian Halibut		1	2			<b>3</b>
<i>Rachycentron canadum</i>	Cobia			3			<b>3</b>
<i>Scatophagus argus</i>	Spotted Scat		4	1		1	<b>6</b>
<i>Nibea soldado</i>	Silver Jewfish		21	2			<b>23</b>
<i>Otolithes ruber</i>	Silver Teraglin		2				<b>2</b>
<i>Protonibea diacanthus</i>	Black Jewfish				2		<b>2</b>
	Jewfish and						
Unknown Croaker and Jewfish	Croakers			2			<b>2</b>
<i>Rastrelliger kanagurta</i>	Mouth Mackerel			19			<b>19</b>
<i>Scomberomorus commerson</i>	Spanish Mackerel	10		3		4	<b>17</b>
<i>Scomberomorus munroi</i>	Spotted Mackerel			2			<b>2</b>

Species Name	Common Name	Region						Total
		Far North	Cairns	Townsville	Mackay	Capricorn	Fraser-Burnett	
<i>Scomberomorus queenslandicus</i>	School Mackerel	2					1	3
<i>Scomberomorus semifasciatus</i>	Grey Mackerel	122	1	457	12		1	593
<i>Thunnus tonggol</i>	Longtail Tuna			1				1
Unknown Tuna	Tuna - Unspecified	55						55
<i>Sillago ciliata</i>	Sand Whiting		2					2
<i>Sphyrna barracuda</i>	Great Barracuda	3	1					4
Unknown Toadfish	Unknown Toadfish		6				1	7
<b>Total</b>		<b>200</b>	<b>474</b>	<b>2054</b>	<b>34</b>	<b>173</b>	<b>12</b>	<b>2947</b>

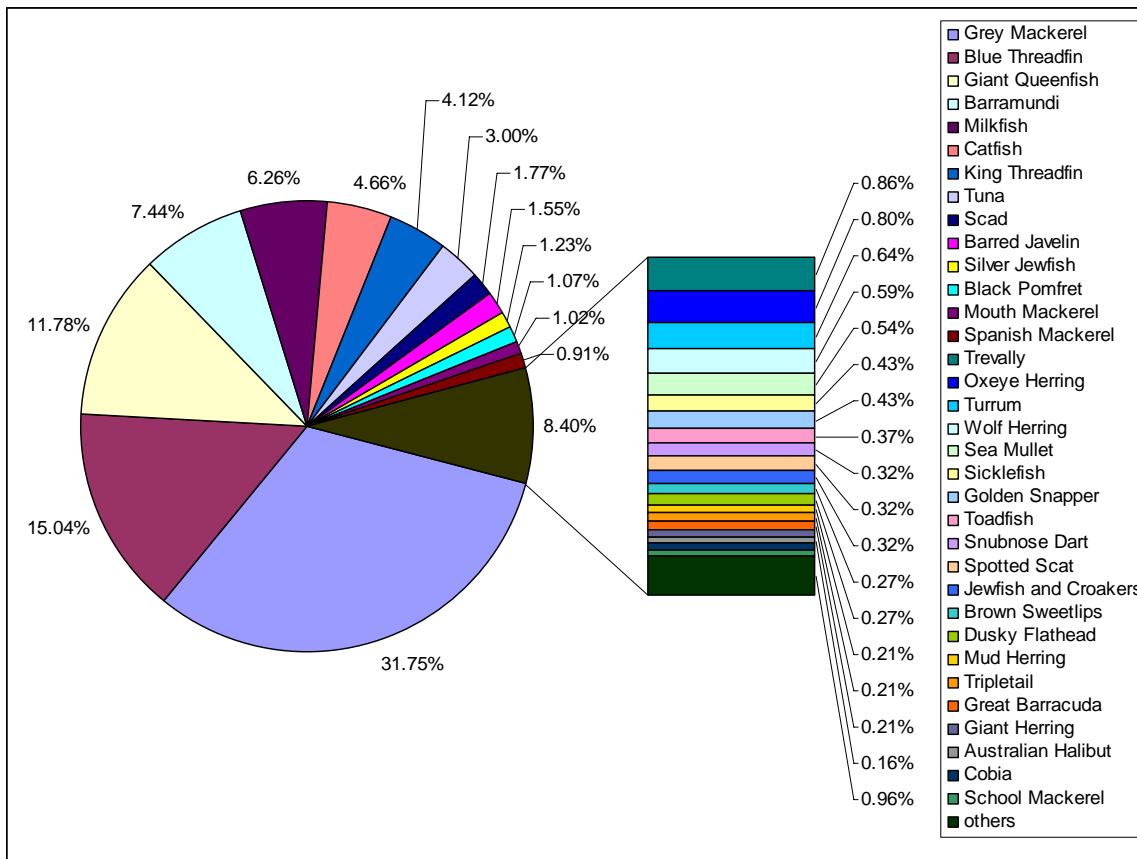
The dominant species of sharks and rays recorded by number were Blacktip, Spot-tail, Scalloped Hammerhead and Milk sharks (Fig. 2). These 4 species comprised greater than 70% of the shark catch. The species composition of sharks and rays from these observer surveys is in general agreement with previous data collected by Rose et al. (2003).



**Fig 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 2007 – May 2008.

The large number of garfishes recorded were 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 0.15% to the fish catch, as there were a large number of fish species recorded. This limited the analysis to 34 species of fish which contributed to 99% of the fish catch. Similar to the species composition of sharks, four species of fish comprised approximately 65% of the fish catch (Fig. 3). These species included grey mackerel, blue threadfin, giant queenfish and barramundi.

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.



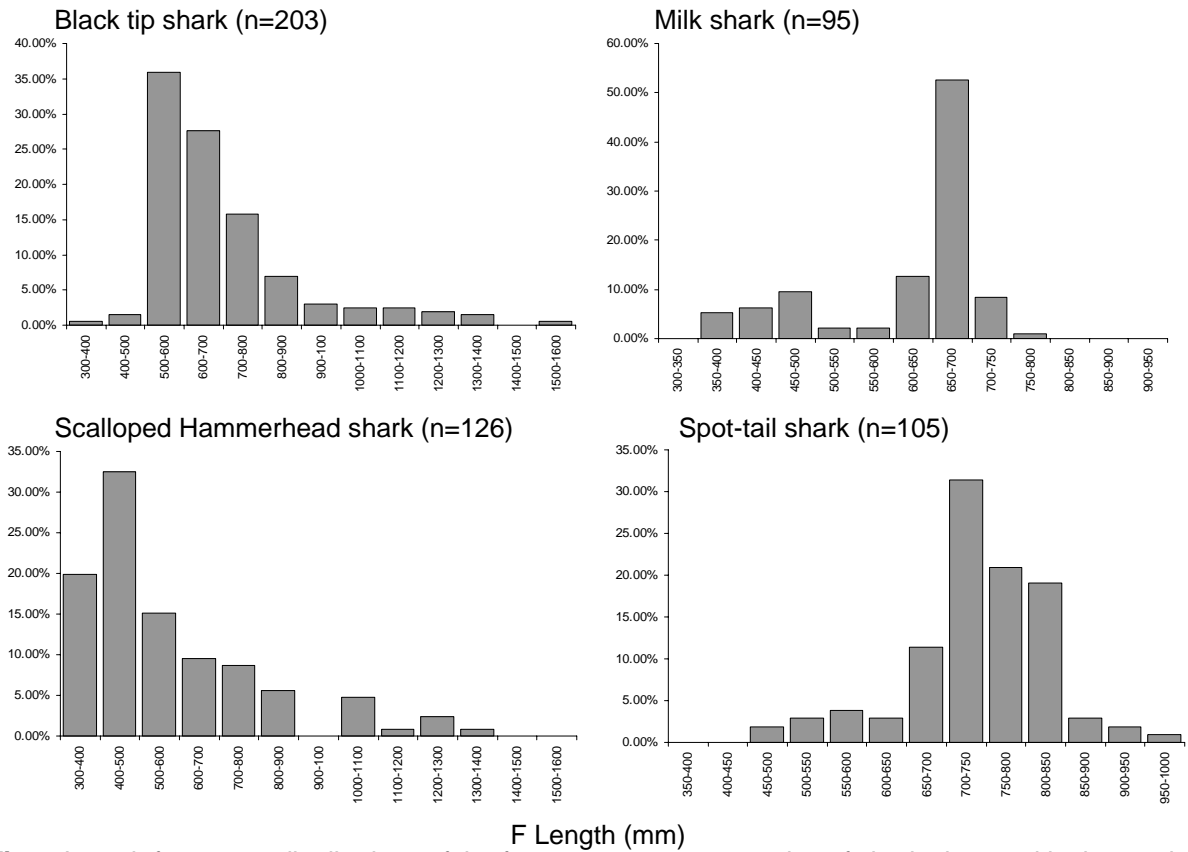
**Fig 3.** Percent composition of fish by number recorded in the commercial net catch during observer trips in five regions of the GBRWHA from April 2007 – May 2008.

**Length frequency distributions**

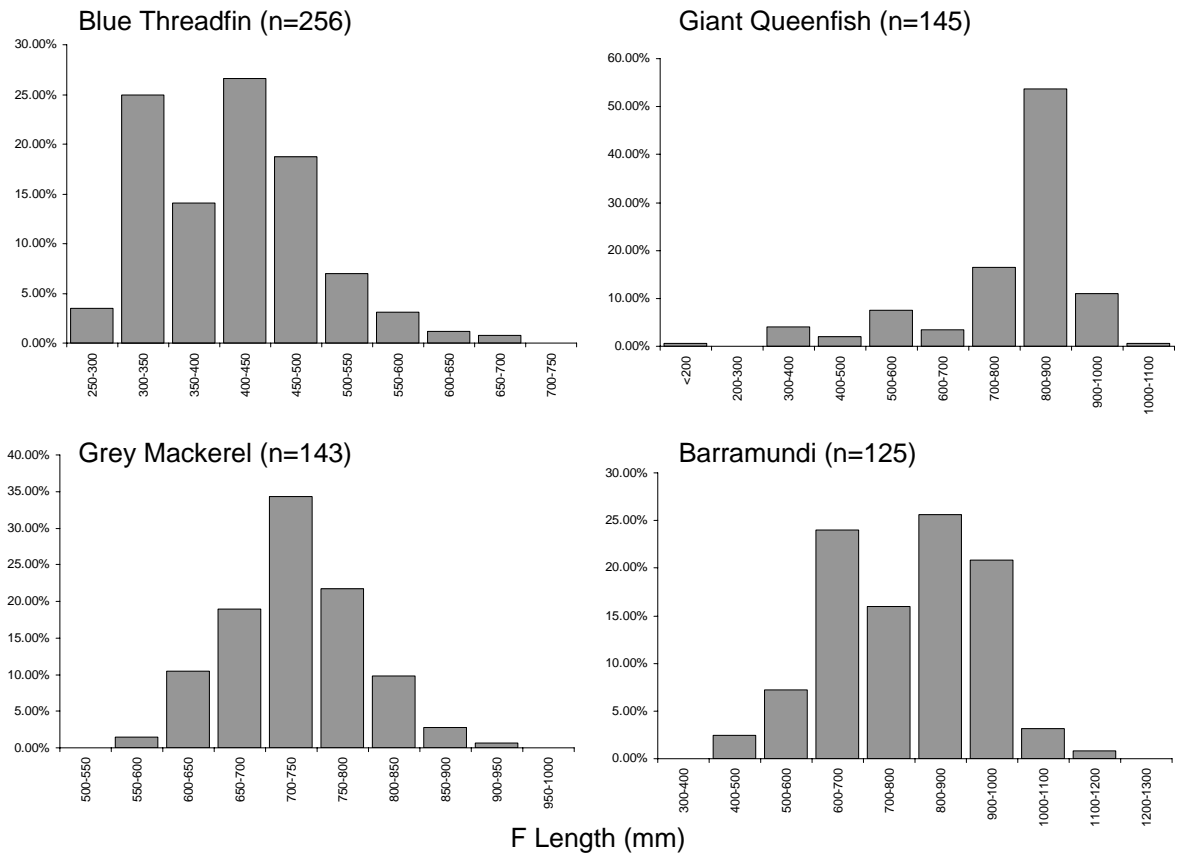
Length was measured for as many sharks, rays and fish as possible. As a result, not all of the catch was always measured. Here we present the length frequency of the most common species in the catch for which greater than 60 samples were measured. These include 4 shark species; Blacktip, Milk, Scalloped Hammerhead and Spot -tail sharks, and 4 fish species; Blue Threadfin, Barramundi, Giant Queenfish and Grey Mackerel.

There was a wide range of lengths for each species of shark (Fig.4), but the larger individuals of each species were not sampled, particularly the Scalloped Hammerhead which can reach over 3 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 (Fig.4).

Similar to the catch of sharks, there was a wide length range of fish caught (Fig. 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. Barramundi and Blue Threadfin are protandrous hermaphrodites (change sex from male to female) and the length range sampled covered the range of adult males and females.



**Fig 4.** Length frequency distributions of the four most common species of shark observed in the catch.



**Fig 5.** Length frequency distributions of the three most common species of fish observed in the catch.

**References**

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