Reef and shore fishes of Sweers Island, Gulf of Carpentaria

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Abstract The fish fauna of inshore waters around Sweers Island was surveyed from 15 to 24 November 2002. 162 species were recorded. The main habitat types sampled included sandy beaches, rock pools, sparse mangrove foreshores, tidal and subtidal rocky reef, subtidal sand and rubble flats and degenerated coral reef. Lower tidal and subtidal reefs near the island were largely dominated by brown macroalgae, especially *Sargassum* and *Padina* spp. Scleractinian corals, reported as abundant at some sites in the 1970s, had long since died, and their remnants were largely covered in filamentous algae. Some comparisons are drawn with the fishes of North Bountiful Island, about 50 km to the north-east of Sweers, where brief sampling yielded 63 species. Direct comparison with surveys of other authors at Groote Eylandt and the outer Wellesley Islands is complicated by differing methods and focus of sampling.

Introduction

There is a considerable body of published works on demersal trawl (Blaber et al. 1990, 1990a; Harris & Poiner 1991; Blaber et al. 1994; Martin et al. 1995) and estuarine (Blaber et al. 1989, 1990, 1994, 1995) fish assemblages of the Gulf of Carpentaria, however information on non-commercial reef and shore fishes is scant. In particular, no serious attempts to document the fishes of Sweers Island had previously been made. Taylor (1964) produced descriptions of the marine, estuarine and freshwater fishes of Arnhem Land (from Port Darwin to Groote Eylandt), based on an American-Australian scientific expedition in 1948. This study included collecting sites near camps in the Gulf of Carpentaria, around Yirrkala, near Cape Arnhem and Umbakumba, Groote Eylandt. Unfortunately this report did not treat a number of the most speciose families that were collected, including the Gobiidae, Labridae and Blennidae, as well as a number of other smaller families. In total Taylor listed 325 species of marine and estuarine fishes, 167 from the Yirrkala sites and 114 from the Groote Eylandt sites. A number of others in the Gulf of Carpentaria were listed only from literature records. Of the latter, some species have subsequently been shown to have ranges well removed from this area.

Walker (1991) reported a composite list of 38 fishes taken by hook and line or net by Don Tuma from Sweers and Bentinck Islands, most of which were large and/or commercial species. Fourteen of these species were not recorded in the current study (Table 2, page 251).

Blaber et al. (1992) recorded 179 fish species from Groote Eylandt, sampling mainly seagrass and coastal soft-bottom habitats, using rotenone and large gill and seine nets. They recorded 67 of the 114 species found by Taylor (1964) in his Groote Eylandt sites. Most (29) of the additional 47 species found by Taylor were reef associated species.

Malcolm (1998) compiled a report on observations of non-cryptic reef fishes in the Wellesley Islands using visual census techniques during October 1997 and May 1998. The report presented detailed information on community structure and relative abundance across 15 sites, including four off Mornington Island, three at Rocky Island, three at Manowar Island, two at Pisonia Island, two at North Bountiful Island and one at South Bountiful Island. A total of 126 species was recorded. Some incidental observations were also made at Sweers and Bentinck Islands, however a composite list of only 22 species resulted. Of these, six were not recorded in the current survey (Table 2, page 251).

Materials and methods

Fishes were collected using rotenone, 15 m seine net, dipnets, and hook and line, and were

Table 1. Fishes recorded from Sweers and North Bountiful Islands. (Note that table runs continuously to page 250)

Family *Genus Species*	Study Sites 1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI	Overall Abundance	New Record
Carcharhinidae															
Carcharhinus amblyrhynchoides				X*			X*							common	
Negaprion acutidens												P		rare	
Ginglymostomatidae															
Nebrius ferrugineus												C*		rare	
Elopidae															
Elops hawaiiensis											X*			uncommon	
Clupeidae															
Herklotsichthys lippa		X				X				X	X			abundant	
Herklotsichthys quadrimaculatus	X*	X*								X*	X		X	abundant	
Nematalosa come											X			rare	
Spratelloides delicatulus	X													common	
Engraulidae															
Stolephorus carpentariae											X			common	
Chanidae															
Chanos chanos											X*			uncommon	
Ariidae															
Arius proximus											X			common	
Plotosidae															
Paraplotosus albilabris	X			X	X	X	X			X			X	common	
Synodontidae															
Synodus sp. (juv.)	X		X											common	
Harpadontidae															
Saurida argentea									X					uncommon	

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Table continued from previous page

Family / *Genus Species*	Study Sites													Overall Abundance	New Record
	1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI		
Trachinocephalus myops			X											uncommon	
Batrachoididae															
Batrachomoeus trispinosus					X									rare	
Halophryne diemensis				X			X							uncommon	
Bythitidae															
Diancistrus sp.	X	X	X	X	X		X			X			X	common	
Hemiramphidae															
Arrhamphus sclerolepis											X			common	
Hyporhamphus dussumieri									X		X			abundant	
Hyporhamphus quoyi												X		uncommon	
Belonidae															
Tylosurus gavialoides						X								common	
Atherinidae															
Atherinomorus endrachtensis	X	X					X*	X	X	X				abundant	
Craterocephalus mugiloides		X				X	X	X			X			abundant	
Hypoatherina temminckii								X						rare	X
Holocentridae															
Myripristis berndti													X	-	
Sargocentron rubrum	X		X	X	X								X	common	
Syngnathidae															
Choeroichthys brachysoma	X	X	X		X		X						X	common	
Halicampus dunckeri					X									rare	X
Lissocampus fatiloquus					X					X				rare	X

Table continues on following page

Table continued from previous page

Family / *Genus Species*	Study Sites													Overall Abundance	New Record
	1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI		
Scorpaenidae															
Paracentropogon vespa						X				X				rare	
Parascorpaena picta					X					X			X	common	
Synanceia horrida		X												rare	
Platycephalidae															
Cymbacephalus bosschei	X					X								uncommon	
Cymbacephalus nematophthalmus		X				X		X						common	
Cymbacephalus staigeri	X													uncommon	
Platycephalus endrachtensis								X	X					abundant	
Thysanophrys arenicola	X		X											rare	X
Latidae															
Lates calcarifer												P		uncommon	
Psammoperca vaigiensis	X		X		X	X				X			X	common	
Centrogenyiidae															
Centrogenys vaigiensis	X				X	X		X		X				common	
Serranidae															
Cephalopholis boenack	X									X			X	uncommon	
Cephalopholis cyanostigma													X	-	
Epinephelus areolatus													X	-	
Epinephelus coioides	X*	X	X*	X*	X*	X	X	X		X*		C*	X*	abundant	
Epinephelus corallicola				X		X	X						X	common	
Epinephelus fasciatus												X	X	rare	
Epinephelus fuscoguttatus	X		X*				X			X*			X*	common	
Epinephelus lanceolatus												P		rare	

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Family / *Genus Species*	Study Sites													Overall Abundance	New Record
	1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI		
Epinephelus polyphekadion	X			X			X			X*			X*	common	
Epinephelus quoyanus		X	X	X	X	X	X*			X			X*	common	
Plectropomus maculatus	X	X	X*	X	X*		X*			X*			X	common	
Pseudochromidae															
Congrogadus subducens	X	X	X	X	X	X	X			X				common	
Pseudochromis wilsoni	X		X	X	X		X			X			X	abundant	
Notograptidae															
Notograptus gregoryi					X									rare	X
Notograptus guttatus	X			X				X						uncommon	
Terapontidae															
Amniataba caudavittatus		X				X			X			X		common	
Helotes sexlineatus						X								common	
Pelates quadrilineatus						X		X						common	
Apogonidae															
Apogon brevicaudatus	X						X							uncommon	
Apogon doederleini	X			X	X									common	X
Apogon pallidofasciatus	X	X	X	X	X		X			X			X	abundant	
Apogon ruppellii		X												common	
Apogon trimaculatus													X	-	
Fowleria variegata	X			X	X								X	common	
Gymnapogon sp.	X			X						X				uncommon	?
Pseudamia nigra				X		X	X							rare	
Sillaginidae															
Sillago analis		X						X	X		X			abundant	

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Family / *Genus Species*	Study Sites													Overall Abundance	New Record
	1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI		
Sillago burrus	X		X					X	X		X			abundant	
Carangidae															
Alepes vari											X			uncommon	X
Carangoides fulvoguttatus													X*	-	
Carangoides orthogrammus													X*	-	
Caranx bucculentus												P		common	
Caranx ignobilis												P		common	
Caranx sexfasciatus													X*	-	
Gnathanodon speciosus	X*									X				common	
Scomberoides commersonianus									X			P		common	
Rachycentridae															
Rachycentron canadus												P		rare	
Leiognathidae															
Leiognathus decorus											X			common	
Leiognathus sp. (juv.)		X												common	
Leiognathus splendens											X			common	
Lutjanidae															
Lutjanus carponotatus	X		X	X	X	X	X			X			X*	abundant	
Lutjanus fulviflamma													X*	-	
Lutjanus johni												P		common	
Lutjanus malabaricus												P		common	
Lutjanus russelli		X		X*		X	X*	X					X	common	
Lutjanus sebae												P		common	

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Family ***Genus Species***	Study Sites **1**	**2**	**3**	**4**	**5**	**6**	**7**	**8-9**	**10**	**11**	**12**	**Inc**	**NBI**	**Overall Abundance**	**New Record**
Caesionidae															
Caesio cuning	X									X*			X	common	
Nemipteridae															
Pentapodus paradiseus	X*		X*											uncommon	
Scolopsis monogramma	X*												X	uncommon	
Scaevius milii	X	X	X	X		X	X	X		X*				abundant	
Gerreidae															
Gerres filamentosus									X					uncommon	
Gerres oyena								X					X*	common	
Gerres sp. (juv.)		X				X								common	
Gerres subfasciatus								X			X			abundant	
Haemulidae															
Diagramma pictum			X*				X*			X*				uncommon	
Plectorhinchus albovittatus						X								rare	X
Plectorhinchus gibbosus					X*		X*			X*				common	
Plectorhinchus multivittatum			X*		X*	X	X			X*			X*	abundant	
Lethrinidae															
Lethrinus laticaudis	X		X*	X	X*	X	X*	X		X*				abundant	
Sparidae															
Acanthopagrus latus		X				X	X*				X*			common	
Sciaenidae															
Protonibea diacanthus												P		common	
Mullidae															
Upeneus tragula	X		X					X						common	

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Family ***Genus Species***	Study Sites **1**	**2**	**3**	**4**	**5**	**6**	**7**	**8-9**	**10**	**11**	**12**	**Inc**	**NBI**	**Overall Abundance**	**New Record**
Monodactylidae															
Monodactylus argenteus													X*	-	
Pempheridae															
Pempheris ypsilychnus			X		X									common	
Ephippidae															
Platax teira							X*							rare	
Zabidius novemaculeatus												P		rare	
Chaetodontidae															
Chaetodon aureofasciatus													X	-	
Chelmon marginalis	X	X	X	X	X	X	X			X				abundant	
Chelmon muelleri		X		X	X	X	X			X				common	
Parachaetodon ocellatus								X						rare	
Pomacanthidae															
Chaetodontoplus duboulayi	X*									X				uncommon	
Pomacanthus semicirculatus													X*	-	X
Pomacentridae															
Abudefduf bengalensis		X	X	X	X	X	X			X				common	
Pomacentrus adelus													X	-	X
Pomacentrus littoralis				X										abundant	
Pomacentrus milleri	X		X	X	X		X			X			X	abundant	
Stegastes obreptus	X				X								X	common	
Mugilidae															
Liza vaigiensis						X			X					common	
Valamugil buchanani		X*											X*	common	

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Family / *Genus Species*	Study Sites													Overall Abundance	New Record
	1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI		
Valamugil georgii											X			common	
Valamugil seheli									X					common	
Sphyraenidae															
Sphyraena flavicauda			X											uncommon	
Sphyraena obtusata		X				X							X	uncommon	
Labridae															
Choerodon cephalotes			X					X						common	
Choerodon cyanodus	X		X	X	X	X	X			X			X	abundant	
Choerodon schoenleinii	X		X	X*	X	X	X*			X			X	abundant	
Halichores marginatus													X*	-	
Halichoeres nigrescens	X	X	X	X	X	X	X	X		X			X	abundant	?
Thalassoma lunare													X*	-	
Scaridae															
Scarus ghobban				X*			X*							common	
Scarus sp.				X*										rare	
Blenniidae															
Cirripectes filamentosus													X	-	
Istiblennius meleagris		X				X	X							common	
Laiphognathus multimaculatus	X									X			X	common	X
Omobranchus germaini			X							X			X	common	X
Omobranchus lineolatus		X				X								uncommon	
Omobranchus punctatus		X					X							common	
Omobranchus rotundiceps	X	X				X	X						X	abundant	

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Family / *Genus Species*	Study Sites													Overall Abundance	New Record
	1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI		
Tripterygiidae															
Enneapterygius gracilis	X		X	X	X	X	X			X			X	abundant	
Enneapterygius sp.	X	X												uncommon	
Callionymidae															
Calliurichthys cf *afilum* (juv.)													X	-	
Calliurichthys sp.								X						rare	
Dactylopus dactylopus								X						rare	
Gobiidae															
Amblygobius bynoensis		X			X	X	X							abundant	
Bathygobius fuscus		X	X			X	X							common	
Bathygobius laddi	X		X	X	X					X			X	abundant	
Bathygobius sp. 1	X												X	uncommon	
Cryptocentrus leptocephalus								X						common	X
Cryptocentrus strigilliceps								X				X		common	X
Drombus cf *triangularis*		X				X		X				B		abundant	
Eviota queenslandica	X		X	X	X		X			X			X	abundant	X
Eviota zebrina	X			X	X									common	X
Favonigobius melanobranchus		X				X		X						abundant	
Gnatholepis sp.	X												X	rare	
Gobiodon quinquestrigatus													X	-	
Gobiopsis aporia	X			X									X	uncommon	X
Istigobius nigroocellatus	X	X	X	X	X		X	X		X				common	X
Istigobius sp.													X	-	
Palutrus sp.	X						X			X				uncommon	X

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Family / *Genus Species*	Study Sites													Overall Abundance	New Record
	1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI		
Priolepis nuchifasciatus	X	X			X		X			X			X	common	
Silhouettea evanida								X						common	
Yongeichthys nebulosus		X				X	X							common	
Valenciennea alleni	X													common	
Valenciennea muralis		X												rare	X
Periophthalmus argentilineatus												A,B		common	
Microdesmidae															
Parioglossus philippinus													X	-	X
Acanthuridae															
Acanthurus grammoptilus	X		X*	X*	X*	X	X*			X*				common	
Siganidae															
Siganus corallinus													X	-	
Siganus fuscescens	X*		X	X*	X	X	X*	X		X				abundant	
Siganus lineatus							X*							uncommon	
Scombridae															
Scomberomorus commerson												P		common	
Scomberomorus semifasciatus											X			common	
Thunnus tonggol												P		common	
Bothidae															
Engyprosopon grandisquama									X					common	
Paralichthyidae															
Pseudorhombus arsius								X	X					common	
Pseudorhombus quinquocellatus			X					X						rare	X

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Table continued from previous page

Family ***Genus Species***	Study Sites 1	2	3	4	5	6	7	8-9	10	11	12	Inc	NBI	Overall Abundance	New Record
Soleidae															
Aseraggodes sp. (juv.)				X										rare	
Soleichthys sp. (juv.)													X	-	
Cynoglossidae															
Paraplagusia bilineata								X						rare	
Monacanthidae															
Monacanthus chinensis			X		X	X	X	X		X			X	common	
Tetraodontidae															
Torquigener whitleyi						X			X					rare	
Diodontidae															
Diodon hystrix							X*							rare	

Key: X = present; Inc = incidental record; NBI = North Bountiful Island; * = sight record only, or specimen caught but not retained; A = Station 13; B = Station 14; C = Station 15; P = photograph at Sweers Island Fishing Lodge; New Record = not previously recorded from Gulf of Carpentaria.
Twenty additional species are listed from unpublished incidental surveys by Walker (1991) and Malcolm (1998), in Table 2 below. At least two of these (see footnotes) are probable misidentifications of species contained in Table 1.

Table 2. Fishes reported from Sweers Island* that were not recorded in this study.

Family *Genus species*	Walker (1991)	Malcolm (1998)
Carcharhinidae		
Carcharhinus melanopterus		X
Rhinobatidae		
Rhinobatos sp.		X
Dasyatididae		
Taeniura lymma		X
Ariidae		
Arius thalassinus	X	
Belonidae		
Strongylura leiura	X	
Tylosurus crocodilus	X	
Platycephalidae		
Platycephalus indicus	X	
Serranidae		
Cephalopholis miniatus	X	
Terapontidae		
Terapon jarbua	X	
Sillaginidae		
Sillago sihama	X	
Carangidae		
Carangoides ferdau		X
Carangoides gymnostethus	X	
Scomberoides lysan		X
Lutjanidae		
Lutjanus vitta	X	
Haemulidae		
Plectorhinchus flavomaculatus[1]	X	
Lethrinidae		
Lethrinus nebulosus	X	
Lethrinus genivittatus	X	
Sphyraenidae		
Sphyraena barracuda	X	
Labridae		
Coris caudimacula (?) [2]		X
Opistognathidae		
Opistognathus papuensis	X	

* Records from Sweers and Bentinck Islands were not listed separately by Walker or Malcolm.
[1] probable misidentification of *P. multivittatum*, a species abundant in this area.
[2] almost certainly a misidentification of *Halichoeres nigrescens*, a locally abundant but somewhat inconspicuous species that did not feature in Malcolm's report.

recorded from underwater observations. Several large species were recorded only from photographs held by the Sweers Island Fishing Lodge. All specimens collected are registered and housed in the collections of the Queensland Museum. Relative abundance of species was based on a combination of indicators, including number of individuals collected and retained, those caught and released, and those observed and positively identified whilst underwater. The abundance of species known only from photographs held by the Sweers Island Fishing Lodge was assessed from discussions with lodge staff experienced with fishing around the island. Observations of very small and cryptic species were not recorded and were not included in abundance assessments. Abundance is presented according to the following criteria: rare—1 to 3 records, uncommon—4 to 9 records, common—10 to 100 records, abundant more than 100 records. Due to the limited number of sampling stations, records from both sites on North Bountiful Island were lumped together and assessments on abundance were not made.

Results

Survey sites

The following are descriptions of the sites (Figure 1, page 252) surveyed during the study.

Sweers Island

Site 1. 15 November 2002. About 400 m south of the centre of the southern end of the island, 17º08.58'S, 139º36.21'E, 2.0–3.5 m. Rocky reef, large caves, slabs of dead coral, surrounded by isolated rubble, silty sand and sparse seagrass. Brown macroalgae on rocks, mostly *Padina* sp. Rotenone.

Site 2. 15 November 2002. Rockpools on south-west side of tidal reef at south-east tip of the island, 17º08.56'S, 139º36.75'E, 0.1–1.0 m. Large tidal rock formations with deep crevices and underhangs, containing a few ascidians and hydroids. Coarse sand and silt substrate. Bottom of tidal range. Rotenone.

Site 3. 16 November 2002. About 400 m south of the south-west tip of the island, 17º08.41'S, 139º35.67'E, 0.5–2.0 m. Rocky reef consisting mainly of large flattened slabs, with deep fissures and underhangs. Rocky areas interspersed by coarse sand, some silty flats on seaward side. Brown macroalgae on rocks, mostly *Padina* sp. Rotenone.

Site 4. 17 November 2002. About 300 m north-east of the foreshore below Inscription

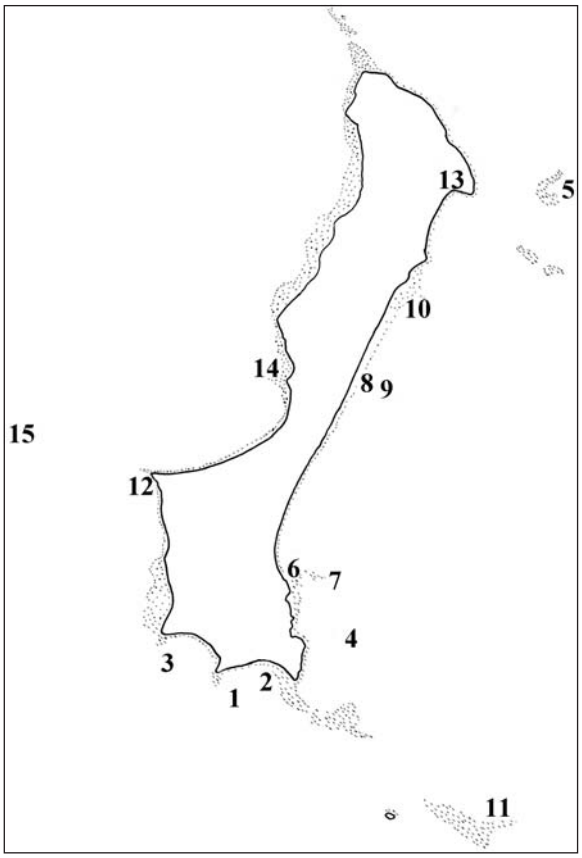

Figure 1. Map of Sweers Island, showing the 15 survey sites.

Hill, 17º07.76'S, 139º37.27'E, 1.5–2.5 m. Degenerated massive coral bommies, covered in filamentous algae and smaller amounts of brown macroalgae. Rubble and coarse sand substrate. Rotenone.

Site 5. 18 November 2002. About 800 m off north-east corner of island, 17º05.26'S, 139º38.77'E, 0.5–3.0 m. Large rocky outcrop with steep sides and shallow caves, containing hydroids and a few gorgonians. Thick brown macroalgae on top of and around shallower sections of outcrop, mostly *Sargassum* sp. Coarse sand substrate. Rotenone.

Site 6. 19 November 2002. Large semi-enclosed rockpool north of Inscription Hill, 17º07.9'S, 139º36.94'E, 0.1–1.0 m. Low relief rocky reef with some deep underhangs surrounding silty pool of about 30 m diameter. Scattered green and brown macroalgae in pool. Bottom of tidal range. Rotenone. (Plate 1, page 252)

Site 7. 21 November 2002. Seaward end of tidal rocky spur, north north-east of Inscription Hill, 17º07.58'S, 139º37.13'E, 0.1–1.5 m. Prominent rocky reef with some caves, deep fissures and penetrated by some narrow sandy gutters. Thick stands of brown macroalgae, mostly *Sargassum* sp. near outer margin of reef. Bottom of tidal range. Rotenone.

Plate 1. South-eastern edge of Sweers Island, overlooking site 6, where a large semi-enclosed rock pool was sampled at low tide.

Plate 2. Site 11, looking north-west toward Sweers Island. This tidal rocky outcrop, east of Locust Rock, was exposed only at low tide.

Site 8. 23 November 2002. Shallow sandy gutter/depression at the foot of the beach at the centre of eastern side of the island, 17º06.63'S, 139º37.16'E, 0–0.2 m. Fine sand, no cover. Bottom of tidal range. Rotenone.

Site 9. 23 November 2002. About 150 m east of foreshore at Site 8, 0.3–0.5 m. Subtidal clean sandy lagoon/reef flat with scattered rubble, chunks of dead coral and sparse brown macroalgae, especially *Sargassum* and *Padina* spp. Rotenone, hook and line.

Site 10. 23 November 2002. Beach at north-east side of island, 17º06.08'S, 139º37.54'E, 0.1–1.0 m. Very fine silty sand. Seine net.

Site 11. 24 November 2002. About 800 m east of Locust Rock, 17º09.67'S, 139º38.41'E, 0.1–2.0 m. Large rocky outcrop with deep caves and underhangs, containing hydroids and some gorgonians. Thick stands of brown macroalgae, especially *Sargassum* sp. Coarse sand and rubble substrate. Rotenone. (Plate 2, page 253)

Site 12. Beach at southern edge of Inscription Point, 17º06.81'S, 139º35.77'E, 0–1.5 m. Mud and fine sand. Seine net.

Site 13. Small tidal creek draining broad dry saltmarsh area near north-east corner of island, 17º04.67'S, 139º38.26'E, 0–0.1m. Muddy marine intrusion with large flat slabs of beachrock. Dipnet.

Site 14. Mangrove foreshore at centre of western side, south of Red Cliffs, 17º06.09'S, 139º36.87'E. Tidal mudflat, mangrove trees, scattered oyster encrusted rocks. Hand collecting.

Site 15. 15 November 2002. 'Cod Hole', near Bentinck Island, west north-west of Inscription Point, 5–25 m. Hook and line.

North Bountiful Island

Site 1. Off south-east edge of rock spit on north-east side, 16º38.5'S, 139º53.5'E, 2–4 m. Large massive coral bommies, with branching and plate corals near base. Some scattered brown macroalgae, mostly *Padina* sp. Rubble and very fine silt substrate. Rotenone.

Site 2. About 100 m off beach, inside area sheltered by rock spit at north-east side of the island, 16º39'S, 139º53'E, 0–3.5 m. Rocky reef with steep ledge, fissures and holes. Few branching and plate corals and stands of brown macroalgae, *Sargassum* sp. Rotenone.

Species and abundance

A total of 162 fish species was collected or recorded from observations at Sweers Island. Eighty-six of these are regarded as strongly reef associated. Limited sampling at North Bountiful Island produced 63 species, including 50 reef species. Dominant reef fishes at Sweers Island were the Serranidae (especially *Epinephelus coioides* and *Plectropoma maculatus*), *Apogon pallidofasciatus*

(Apogonidae), *Lutjanus carponotatus* and *L. russelli* (Lutjanidae), *Scaevius milli* (Nemipteridae), *Plectorhinchus multivittatum* (Haemulidae), *Lethrinus laticaudus* (Lethrinidae), *Chelmon marginatus* (Chaetodontidae), *Pomacentrus milleri* and *P. littoralis* (Pomacentridae), *Choerodon cyanodus*, *C. schoenleinii* and *Halichoeres nigrescens* (Labridae), *Scarus ghobban* (Scaridae), *Acanthurus grammoptilus* (Acanthuridae) and *Siganus fuscescens* (Siganidae). Families conspicuous by their absence for rocky reefal habitats were the Muraenidae (moray eels) and Scorpaenidae (scorpionfishes), with none and only 3 species collected respectively. Species of these families are very commonly collected in rotenone stations in east and west Australian coastal waters, but as in previous surveys of the Gulf of Carpentaria, were poorly represented. Diversity of the butterflyfishes (Chaetodontidae) and damselfishes (Pomacentridae) was very low, however species of these families have been recorded in much larger numbers elsewhere in the Gulf of Carpentaria, where coral communities are more abundant. Species lists for all the sites, and their overall abundance at Sweers Island, are presented in Table 1 (starting at page 240).

Discussion

The results of studies by Blaber et al. (1992) at Groote Eylandt and Malcolm (1998) at the outer Wellesley Islands are not directly comparable with those found here due to significantly differing sampling methodologies. The omission of a number of large families of reef and shore fishes by Taylor (1964) also complicates comparisons with his results from Yirrkala and Groote Eylandt.

Many large motile open water species recorded by Blaber et al. (1992), especially of the families Carcharhinidae, Belonidae and Carangidae, are poorly represented in this study. Species of these families are also likely to be present around Sweers Island, but unlike in the Groote Eylandt studies, methods conducive to their capture (gill nets and large seine nets) were not employed in this area. Conversely, numerous small reef associated fish species recorded at Sweers Island were not taken by Blaber et al., as they largely ignored reef habitats, and made no collections on SCUBA. They recorded 21 species of reef fishes not recorded at Sweers Island (Table 3, page 255), 27 species were common to both surveys, and 59 were exclusive to the Sweers survey.

The results of Malcolm (1998) provide a more useful basis for comparison, despite the lower efficiency of visual techniques in recording very small and cryptic reef fishes. The reef fish fauna of the outer Wellesley Islands, as described by Malcolm, is significantly more diverse than that of Sweers Island. He recorded a total of 124 species, 63 of which were not found at Sweers Island. Fifty-two of these were reef associated species (Table 3, page 255), while 33 reef species were common to both surveys, and 52 were exclusive to Sweers Island. Our limited surveys at North Bountiful Island also produced 21 species not found at Sweers Island. It is envisaged that most of the reef fish species currently recorded only from Sweers Island would also be found in the outer Wellesley Islands if rotenone collections targeting small and cryptic species were made in this area.

Many strongly coral associated species found in the northern and outer Wellesley Islands were absent around Sweers due to the depauperate nature of coral assemblages. Only several very small colonies of live corals were noted off Sweers Island during November 2002. Peter Saenger (pers. comm, 2002) reported that during underwater surveys of seagrass beds in the early 1970s he noted large stands of coral off the south-eastern side of the island. Remnants of these were located in 2002, but they were in an advanced stage of degeneration and had become heavily encrusted with algae. The reason for the long-term demise and subsequent lack of regeneration of corals off Sweers Island is unlikely to be significantly related to turbidity and siltation. Water clarity off the south-east side of the island is relatively good for the southern Gulf of Carpentaria region, and exposure to prevailing south-east to north-east winds ensures low settlement and retention of sediments in the area. In contrast, observations were made at North Bountiful Island (site 1) of numerous large colonies of live massive, plate and branching corals, all of which in very turbid conditions with a heavy load of fine silt on the substrate. No information on coral bleaching events in the region was available, and further studies would be necessary to determine if this may have been a factor in localised loss of corals.

Reef fish species were extracted from Taylor (1964), for both the Yirrkala and Groote

Table 3. Reef associated fishes recorded in other surveys* in the Gulf of Carpentaria, but not at Sweers Island in the current study. (Note that table runs continuously to page 258.)

Family ***Genus species***	**Malcolm (1998)**	**Taylor (1964 Y)**	**Taylor (1964 GE)**	**Blaber et al. (1992)**
Hemiscylliidae				
Chiloscyllium punctatum				X
Hemiscyllium trispeculare		X		X
Stegastomatidae				
Stegastoma fasciatum	X			
Carcharhinidae				
Triaenodon obesus	X			X
Dasyatidae				
Dasyatis kuhlii	X	X		X
Taeniura lymna	X	X		X
Muraenidae				
Uropterygius concolor		X		
Gobiesocidae				
Diademichthys lineatus	X			
Syngnathidae				
Micrognathus brevirostris		X		
Holocentridae				
Myripristis hexagona		X		
Scorpaenidae				
Scorpaenopsis diabolus				X
Scorpaenopsis venosa		X		
Serranidae				
Anyperodon leucogrammicus		X		
Cephalopholis argus		X		
Cephalopholis cyanostigma	X			
Epinephelus malabaricus				X
Epinephelus ongus		X		
Epinephelus tauvina[1]				X
Diploprion bifasciatum			X	
Apogonidae				
Cheilodipterus quinquelineata		X		
Fowleria aurita[2]		X	X	
Apogon angustatus[3]		X	X	
Apogon cookii[3]		X	X	
Apogon opercularis		X		
Apogon timorensis		X	X	
Apogon unicolor		X		

Continued on next page

Table 3 continued from previous page

Family *Genus species*	Malcolm (1998)	Taylor (1964 Y)	Taylor (1964 GE)	Blaber et al. (1992)
Hemiscylliidae				
Apogon sp.(*crassiceps*?)		X		
Apogon sp.(*talboti*?)		X		
Archamia melasma		X		
Lutjanidae				
Lutjanus argentimaculatus	X	X	X	X
Lutjanus fulviflamma	X	X	X	
Lutjanus erythropterus		X	X	
Lutjanus lutjanus		X		
Lutjanus quinqelineatus		X		
Lutjanus vitta		X		
Symphorus nematophorus	X			
Caesionidae				
Caesio caerulaurea	X			
Caesio teres	X			
Pterocaesio marri	X			
Nemipteridae				
Scolopsis bilineata	X			
Scolopsis vomeri		X		
Haemulidae				
Plectorhinchus chaetodonoides	X			
Plectorhinchus flavomaculatus[4]				X
Plectorhinchus polytaenia			X	X
Plectorhinchus unicolor		X		
Lethrinidae				
Lethrinus lentjan	X	X		X
Lethrinus nebulosus	X			X
Lethrinus olivaceus	X			
Lethrinus ornatus		X		
Pempheridae				
Pempheris oualensis		X		
Kyphosidae				
Kyphosus vaigiensis	X			
Ephippidae				
Platax batavianus		X	X	X
Platax orbicularis			X	
Platax pinnatus	X			
Chaetodontidae				
Chaetodon aureofasciatus	X	X		

Continued on next page

Table 3 continued from previous page

Family *Genus species*	Malcolm (1998)	Taylor (1964 Y)	Taylor (1964 GE)	Blaber et al. (1992)
Hemiscylliidae				
Heniochus acuminatus	X	X		
Pomacanthidae				
Pomacanthus sexstriatus	X			
Pomacentridae				
Amphiprion clarki(?)[5]			X	
Amphiprion ephippium		X		
Amphiprion percula		X	X	
Amphiprion polymnus			X	
Abudefduf saxatilis		X		
Abudefduf sexfasciatus	X	X		
Abudefduf sordidus		X	X	
Abudefduf vaigiensis	X			
Acanthochromis polyacanthus	X			
Amblyglyphidodon aureus		X		
Cheiloprion labiatus		X		
Dischistodus fasciatus		X		
Neoglyphidodon melas	X	X		
Neoglyphidodon nigroris		X		
Neopomacentrus azysron	X			
Neopomacentrus bankieri	X	X		
Neopomacentrus cyanomos	X			
Pomacentrus coelestis	X			
Pomacentrus lepidogenys	X			
Pomacentrus nagasakiensis	X			
Pomacentrus nigromanus	X	X		
Stegastes apicalis		X		
Sphyraenidae				
Sphyraena barracuda	X	X	X	X
Sphyraena jello		X		X
Sphyraena putnamiae				X
Sphyraena qenie				X
Labridae				
Anampses lennardi	X			
Coris caudimacula(?) [6]	X			
Halichores melanurus	X			
Halichoeres melanochir	X			
Hemigymnus melapterus	X			
Labroides dimidiatus|*Labroides dimidiatus*	X			

Continued on next page

Table 3 continued from previous page

Family *Genus species*	Malcolm (1998)	Taylor (1964 Y)	Taylor (1964 GE)	Blaber et al. (1992)
Hemiscylliidae				
Thalassoma lunare	X			
Scaridae				
Scarus microrhinos	X			
Scarus rivulatus	X	X	X	
Scarus rubroviolaceus		X	X	
Opistognathidae				
Opistognathus darwiniensis		X		
Blenniidae				
Meiacanthus grammistes	X			
Gobiidae				
Cryptocentrus octofasciatus	X			
Ctenogobius pomastictus	X			
Microdesmidae				
Gunnellichthys monostigma	X			
Ptereleotris microlepis	X			
Acanthuridae				
Acanthurus xanthopterus [7]	X			
Siganidae				
Siganus doliatus	X	X		
Siganus javus	X			X
Siganus puellus				X
Siganus punctatus	X			X
Siganus virgatus		X	X	X
Soleidae				
Pardachirus pavoninus		X		
Phyllichthys sclerolepis		X		
Balistidae				
Abalistes stellaris		X		
Monacanthidae				
Acreichthys tomentosus				X
Diodontidae				
Diodon liturosus	X			

(Malcolm (1998) = Outer Wellesley Islands; Taylor (1964 Y) = Yirrkala area; Taylor (1964 GE) = Groote Eylandt; Blaber et al. (1992) = Groote Eylandt)

[1] probable misidentification of *E. malabaricus* or *E. coioides*.
[2] probable misidentification of *F. variegata*
[3] species frequently confused with young of *A. pallidofasciatus*.
[4] probable misidentification of *P. multivittatum*, a species common throughout the region but not listed by Blaber et al.
[5] reported as *A. bicinctus*, a species only known from the Western Indian Ocean.
[6] probable misidentification of *Halichoeres nigrescens*, a species common throughout the region but not listed by Malcolm.
[7] possible misidentification of *A. grammoptilus*, a species common to other surveys in the region, but not listed by Malcolm.

Plate 3. Target Shrimpgoby, *Cryptocentrus strigilliceps*, from site 9. This species was common in burrows in the lagoon off the south-eastern side of the island.

Eylandt sites in the Gulf of Carpentaria, and these compared to those recorded in the current study. The Groote Eylandt sites yielded only 17 species not found at Sweers (Table 3, page 255). With the additional 21 species found by Blaber et al. (1992) at this location, a cumulative total of 33 reef fishes not recorded from Sweers Island is known from Groote Eylandt. Thirty-four species were common to both Taylor's Groote Eylandt surveys and the current Sweers Island study, and 51 were found at Sweers Island but not Groote Eylandt. In contrast, the ichthyofauna of the reefs in the Yirrkala area is far more diverse. About 55 species not listed for Sweers Island were collected (Table 3, page 255), 42 were common to both localities, and 44 were found at Sweers but not Yirrkala. Twenty of the species exclusive to Sweers Island were from the Synodontidae, Labridae, Tripterygiidae, Gobiidae and Blennidae, families not treated by Taylor.

Of the 86 reef fish species recorded from Sweers Island, only 28 were not recorded by Taylor (1964), Blaber et al. (1992), or Malcolm (1998). Discounting the Blennidae, Tripterygiidae and Gobiidae, which were not listed by Taylor, and not targeted by the other authors, there were only 14 species unique to the Sweers Island survey. The reef fish fauna of Sweers Island seems to have closer affinities to Groote Eylandt than either Yirrkala or the outer Wellesley Islands, which have significantly greater species richness. These areas are much more strongly represented by the families Pomacentridae (additional 20 species), Lutjanidae (additional 7 species), Labridae (additional 6 species), Scaridae and Siganidae. Further studies will almost certainly widen the gap in species numbers, especially with the Gobiidae and Blennidae.

New records

About 22 species are recorded in the Gulf of Carpentaria for the first time (Table 1, page 240) (Plate 3, page 259 and Plate 4, page 259). The most significant extension of range is for the pipefish, *Lissocampus fatiloquus*, which was previously known only from Western Australia, between Rottnest Island and Cape Leveque. Two individuals from separate sites were collected at Sweers Island, both from subtidal offshore rocky outcrops, with a heavy growth of brown macroalgae. The eel-blenny, *Notograptus gregoryi*, was known from only a few specimens between Shark Bay and Cape

Plate 4. Pink Shrimpgoby, *Cryptocentrus leptocephalus*, from site 9. Both this species and the Target Shrimpgoby (Plate 3, page 259) had not previously been recorded from the Gulf of Carpentaria.

Preston, WA. The pipefish *Halicampus dunckeri* and flathead *Thysanophrys arenicola* are widespread but rare species. Occurrence of the other new records for this area is more a function of the previous lack of collecting in suitable habitats, rather than an extension of range, as they are known in Australian waters to both the east and west, outside of the Gulf of Carpentaria. The cardinalfish, *Pseudamia nigra*, collected at three sites at Sweers Island, was previously only known from the King George River Gorge, WA to the Cobourg Peninsula, NT, and from one lot near the Holroyd River, Cape York Peninsula, Q.

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