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Seabirds Breeding on the Swain Reefs, Queensland

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In November 1976 ten species of seabirds were recorded breeding on eight coral cays in the Swain Reefs, south-eastern Great Barrier Reef. The available evidence suggests that the islands of this area are eroding and several have been lost in recent years.

The first account of birds from the Swain Reefs of the south-eastern Great Barrier Reef (approx. 21°00'-22°30'S., 151°30'-153°00'E.) was that of Gillett and McNeil (1959) (See Kikkawa 1976). These authors recorded an "enormous" colony of Brown Boobies *Sula leucogaster* on an uncharted cay approximately 40 km from Hixon Cay. In 1960 Gillett and McNeill (1962) encountered more widespread colonies of a greater range of species in this then uncharted reef complex. The islands of the Swain Reefs were the only islands of 'ornithological importance' in the area of the south west Coral Sea not visited by the HMAS *Gascogne* expeditions of 1960 and 1961 (Hindwood *et al* 1963).

In the course of long term studies of sea turtles in Queensland the cays of the Swain Reefs were surveyed during November 1976 to determine the status of breeding populations of sea turtles and seabirds. The results of the sea turtle studies will be presented elsewhere.

Methods

All cays except Hixon Cay were explored on 5-10 November 1976 from M.V. *Susan*, the master of which (Mr. R. Poulson) had been responsible for navigation during the two earlier surveys reported by Gillett and McNeill (*loc. cit.*). The location of each cay was plotted from available charts on the day visited and each was briefly described.

Where possible circumference at high water spring tide level and long and short axes were measured by pedometry. Cay names used are those accepted by the hydrographer, Royal Australian Navy, or proposed for ratification by the Queensland Place Names Board. Specimens collected are registered in the Queensland Museum (QM).

Birds were counted as breeding pairs — calculated from the numbers of occupied nests, nests with eggs or young and flightless young not at nests — and as non-breeding birds including immature birds in flight, usually in the vicinity of the beach or reef flat. Thus, for Gannet Cay "164 + 10" signifies 164 breeding pairs and 10 non-breeding individuals; while on Bell Cay "44 + ?" signifies 44 breeding pairs and an unknown number of non-breeding individuals present. Where absolute numbers were too large or dispersed to be counted, estimates were made. These are preceded by the symbols \approx (approximately), $>$ (greater than), or $<$ (less than).

Results

Recorded cays of the Swain Reefs and their descriptions are listed (Table 1). These islands lie 84-203 km from the mainland coast. Apart from seven coconut palms recently planted by tourists on Gillett Cay (5.11.76 only one palm surviving) none of these cays supported trees or shrubs. The climax vegetation was a dense

TABLE 1

Locations and nature of all cays and major sand banks on Swain Reefs, southern Great Barrier Reef, during seabird breeding stations survey November 1976. (* denotes "cay" reported by several charter-boat masters to be covered at high tide — not examined by authors; ** denotes Automatic weather station).

No.	Accepted Name	Previous Name (after Gillett and McNeill, 1962)	Co-ordinates (approximate)	Date surveyed	Dimensions (m) at mean			Vegetation Notes
					spring Circum- ference	high Long axis x Short axis	tide Altitude above HWS	
I	Hixon Cay	—	22°17'S., 152°43'E.	26.4.76	Nil	—	Nil	—
II	—	Capre Cay	22°11'S., 152°40'E.	*	—	—	Nil	—
III	—	Pam Cay	21°59'S., 152°34'E.	*	—	—	Nil	—
IV	Gannet Cay**	Poulson Cay	21°59'S., 152°28'E.	5.11.76	540	200x—	<2	<25% cover of herbs and grasses
V	—	Bowden Cay	21°55'S., 152°26'E.	*	—	—	Nil	—
VI	—	Moon Cay	21°54'S., 152°25'E.	*	—	—	Nil	—
VII	—	Bylund Cay	21°48'S., 152°25'E.	5-6.11.76	384	150x60	<2	<25% cover of scattered patches of herbs and grasses
VIII	—	Carruth Cay	21°47'S., 152°25'E.	5.11.76	Nil	—	Nil	—
IX	—	Price Cay	21°47'S., 152°27'E.	5.11.76	658	319x87	<2	25-50% cover of patches of herbs and grasses
X	Gillett Cay	Gillett Cay	21°45'S., 152°25'E.	5-6.11.76	780	350x84	2-3	50-75% cover, with almost continuous herbs and grasses over central platform; one introduced coconut palm still alive
XI	—	Thomas Cay	21°39'S., 152°22'E.	7.11.76	349	123x98	1-2	<25% cover of herbs
XII	—	Bacchi Cay	21°39'S., 152°23'E.	7.11.76	433	198x38	1-2	<25% cover of herbs and grasses
XIII	Tiny Cay	—	21°34'S., 152°01'E.	*	—	—	Nil	—
XIV	East Cay	—	21°29'S., 152°34'E.	*	—	—	Nil	—
XV	Mystery Cay	—	21°23'S., 152°02'E.	9.11.76	Nil	—	Nil	—
XVI	Centenary Cay	—	21°17'S., 152°18'E.	8.11.76	—	<100x—	<2	Nil
XVII	Twin Cays	Laver Cays	21°13'S., 151°59'E.	8.11.76	—	<50x—	1	Nil
			21°13'S., 151°59'E.	*	Nil	—	Nil	—
XVIII	Riptide Cay	—	21°14'S., 151°51'E.	9.11.76	261	110x43	1-2	Nil
XIX	Bell Cay	—	21°49'S., 151°14'E.	10.11.76	636	302x74	1-2	50-75% cover of herbs and grasses (90% on central platform)

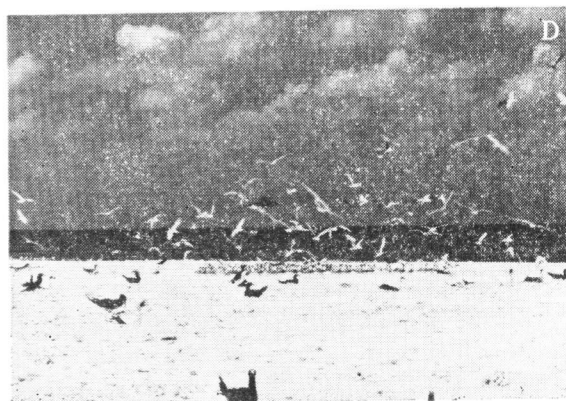
low grass and herb cover of the larger cays ranging to a sparse ground cover on the smaller cays. The three smallest cays were completely unvegetated (Figure 1).

Four unvegetated sand cays (Capre, Pam, Bowden and Moon) recorded by Gillett and McNeill (1962) were reported to be sandbanks submerging on the high tides in 1976 (R. Poulson pers. comm.) and were not seen from the upper bridge of M.V. *Susan*. In 1960 Curruth

Cay, a vegetated cay, could be seen from Bylund and Price Cays but it was no more than a sandbank in November 1976.

There was also considerably less vegetation cover on Gannet Cay in November 1976 compared with November 1960 (Figure 1 and Gillett and McNeill 1962).

The birds recorded are as follows (Roman numerals denote the islands as listed in Table 1):



• Figure 1. Five cays of the Swain Reefs showing variations in vegetation and seabird nesting. Photographs by C. J. Limpus.

- a. Gannet Cay: Sparse vegetation in areas of nesting Brown and Masked Boobies.
- b. Bylund Cay: One of the scattered patches of vegetation with nesting Black Naped Terns.
- c. Gillett Cay: Dense vegetation with nesting Bridled Terns and Common Noddies.
- d. Riptide Cay: Unvegetated coral rubble with nesting Masked and Brown Boobies and Crested Terns.
- e. Bell Cay: Least Frigatebird chicks in clear area around nest mounds in the otherwise dense vegetation with nesting Common Noddies.

SYSTEMATIC LIST

Shearwater sp *Puffinus sp.*

IV, VII, X abundant feeding at sea; several thousand in rafts just outside reef edge at dusk; XI, XII, commonly feeding around the reef; XVI several off shore. No evidence of recent or old burrows on any island.

Australian Pelican *Pelicanus conspicillatus*

XIX one dead bird on water line.

Masked Booby *Sula dactylatra*

IV (164 + ~10), VII (8 + 0), IX (13 + ~20), X (34 + ~10), XI (15 + 0), XII (2 + 0), XVIII (20 + 0), XIX (2 + ~10). All reproductive stages present from eggs to immature birds ready to fly. Some immature birds in flight.

Brown Booby *S. leucogaster*

IV (360 + ~200), VII (0 + 5), IX (37 + ~100), X (14 + ~100), XI (28 + ~40), XII (0 + ~50), XVI (0 + ~60), XVII (0 + 1), XVIII (80 + ~10), XIX (5 + ~20). All reproductive stages present from eggs to immature birds ready to fly. Some immature birds in flight.

Least Frigatebird *Fregata ariel*

IV (0 + 2), XVII (0 + 1), XIX (44 + ?). On Bell Cay (XIX) the 44 immature birds appeared to be fully feathered and almost ready to fledge. Numerous immature birds also hovering over the island at dusk. Old nest mounds present.

Silver Gull *Larus novaehollandiae*

IV (4 + 9), VII (0 + 2), IX (3 + ~40), X (0 + ~10), XI (0 + ~10), XII (0 + ~10), XVI (0 + 10), XVIII (0 + 15), XIX (1 + 6). Eggs, downy chicks in nests and chicks wandering the beaches present.

Roseate Tern *Sterna dougallii*

IV (0 + 100 — 200), VII (2 + ~200), X (0 + 200 — 300), XI (0 + ~150), XII (0 + ~300).. Only eggs present. Several additional adults in breeding plumage on VII.

Black-naped Tern *S. sumatrana*

IV (0 + 50 — 100), VII (~200 + ~100), IX (0 + 50 — 100), X (0 + ~100), XI (0 + ~150), XII (0 + 200 — 250), XVI (0 + ~200), XVIII (0 + 200 — 300). Only eggs present. Specimen QM 0 16858) collected on VII.

Bridled Tern *S. anaethetus*

IV (~150 + ?), IX (50 — 100 + ?), IX (0 + ~200), X (> 200 + ?), XIX (300 — 500 + ~200). On islands IV, IX, X, only eggs seen. On XIX, mostly chicks in nests with only a few eggs present. Specimen (QM 0 16859) collected on XIX.

Crested Tern *S. bergii*

IV (0 + ~10), VII (0 + < 10), IX (~500 + ?), X (0 + < 10), XI (0 + ~10), XII (0 + < 10), XVIII (~400 + ?), XIX (82 + ~200). All reproductive stages present from eggs to fledging chicks.

Lesser Crested Tern *S. bengalensis*

IV (0 + 2), VII (0 + 2), IX (9 + ?), X (0 + 2), XI (0 + 2), XII (0 + 20 — 25). Only eggs present. The nesting colony was situated in a large Crested Tern colony.

Common Noddy *Anous stolidus*

IV (300 — 600 + ~500), VII (0 + 1), IX (20 + ~50), X (> 200 + ~100), XI (0 + 2), XII (0 + 40), XVI (0 + ~100), XVIII (0 + ~100), XVIII (0 + ~100), XIX (~400 + ~800). Only XIX (~400 + ~800). Only eggs present in all colonies. Specimen (QM 0 16860) collected on XIX.

Discussion

Of the ten species of seabirds recorded nesting on the Swain Reef Cays in November 1976, three (Crested Tern, Black-naped Tern, Common Noddy) nest widely throughout the Great Barrier Reef and the Coral Sea, four (Lesser Crested Tern, Bridled Tern, Roseate Tern, Silver Gull) nest widely throughout the Great Barrier Reef but have not been recorded breeding on the Coral Sea cays and three species (Brown Booby, Masked Booby, Least Frigatebird) nest widely throughout the Coral Sea and on only a few of the outer cays of the Great Barrier Reef (Kikkawa 1976). The composition of the avifauna of the Swain Reef Cays is approximately intermediate to those of the more inshore Barrier Reef cays and the Coral Sea cays. The Swain Reef Cays and the sand cays of the outer Barrier Reef north of Princess Charlotte Bay (No. 7 Sandbank, No. 8 Sandbank, Raine Island, Pandora Cay) appear to be ecologically similar, being coral sand cays lacking trees and close to oceanic water.

Two notable absences from the Swain Reefs avifauna are shearwater colonies and Buff-banded Rails, *Rallus philippensis*, both of which occur on the inshore and the outer islands of the Great Barrier Reef and on the remote Coral Sea cays.

In contrast with observations made during previous expeditions to the Swain Reefs, during November 1976 no Sooty Terns (cf. Bennett 1971) were recorded and no frigatebirds or their nest mounds were found on Gillett Cay (cf. Gillett and McNeill 1962). As there have been no previous reports of the avifauna of Bell Cay it is not possible to determine whether frigatebirds nest regularly on Bell Cay or whether the Bell Cay population is the same as the one from Gillett Cay which might breed on different cays in different years.

The boobies have an extended breeding season in the Swain Reefs. Photographs of Gannet Cay, taken by Neville Coleman in May 1976, showed a similar species composition and nest-

ing density for the Brown and Masked Boobies as was recorded in November 1976. A different community of terms could breed on these cays during the mid year.

Comparison of the dimensions of Gannet, Bylund, Price, Gillett, Thomas and Bacchi Cays in October-November 1960 (Gillett and McNeill 1962) and in November 1976 suggests that there has been a reduction in the area of these islands.

Fluctuations in cay size, shape and vegetation cover occurs through erosion and accretion of sediments through the action of winds, currents, waves and tide. The amount of seabird breeding, the number of diversity of species utilising particular cays and colony size will be greatly affected by changes to the cays on which they breed.

Reproduction strategies of the breeding colonies of seabirds of the Swain Reefs would certainly be related to the long term stability of the cays.

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