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BIRDS OF MILMAN ISLAND

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Fourteen Queensland National Parks and Wildlife Service and Department of Environment surveys were made of Milman Island from 1985 to 1995. A total of 81 seabird and non-seabird species were observed. Numerous vegetation communities provide varied habitats and food sources for birds at the island. Seven non-seabird species were observed either in breeding plumage or breeding. Low-level human disturbance has little effect on nesting birds because of the remote location of the island. Predation by amethystine pythons and estuarine crocodiles has been recorded.

INTRODUCTION

The northern Great Barrier Reef (GBR) consists of many islands with diverse vegetation communities that are used by many migrating birds. Published reports on birds of the northern GBR have focused primarily on seabirds (e.g. King 1993; King and Limpus 1989; King *et al.* 1989; Limpus 1980; Limpus and Lyon 1981), although information on non-seabirds exists in unpublished reports and field notes. The purpose of the present report was to bring together observations on the birds of Milman Island, gathered between 1985 and 1995, as recorded by Queensland Department of Environment (DoE) officers.

STUDY SITE

Milman Island (11°10.3'S, 143°0.8'E, 22.7 ha, 2 396 m in circumference; 5 m high (ALS 1990)) is a densely wooded sand cay about 112 km south-east from Thursday Island, Torres Strait, 45 km north-east from Orford Ness, Queensland and approximately 28 km east of the mainland. There is beach rock along most of the western side of the cay and scattered outcrops along the northern end of the eastern side (Loop *et al.* 1995). During low tide, the reef flat completely drains and

the island is inaccessible except by direct approach on to the northern beach in winter months and by way of a sand spit on the north-western corner in summer months.

Vegetation

Milman Island vegetation is comprised of a number of different communities (Fig. 1, structural classification follows McDonald *et al.* 1990) which provides a variety of habitats and food sources for birds on the island. Approximately half of the island area is occupied by closed forest (10-12 m), characterized by large specimens of *Manilkara kauki*, *Erythrina insularis* and *Terminalia muelleri*. Many of these large trees have a diameter at breast height in excess of 50 cm. Other large trees contributing to the canopy of the closed forest are *Ficus* spp., *Guettarda speciosa*, *Ixora klanderiana* and *Mimusops elengi*.

The forest understorey is dense and difficult to walk through because of scrambling vines such as *Malaisia scandens*, dense patches of *Pleomele angustifolia* and thorny shrubs such as *Capparis* spp., *Carissa laxiflora* and *Jasminum simplicifolium*. Numerous saplings of *Diospyros maritima*, *D. compacta* and *Drypetes deplanchei* also contribute to the dense understorey.

Many of the species present in the closed forest also dominate the shrubland areas on the island. Other species which characterize these shrublands include *Canthium coprosmoides*, *Eugenia reinwardtiana*, *Exocarpos latifolius*, *Micromelum minutum* and *Pittosporum ferrugineum*. Many of

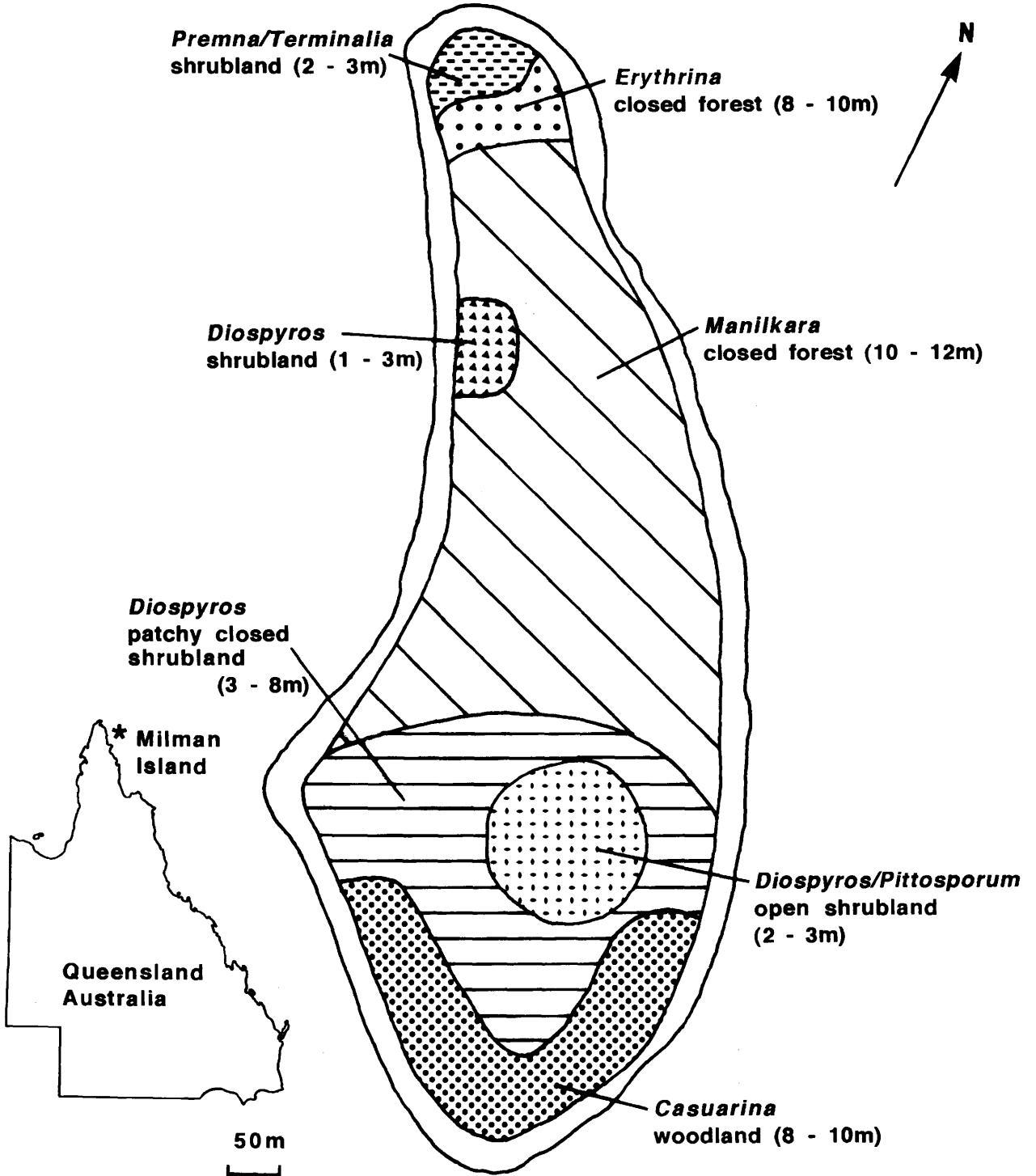


Figure 1. Principle vegetation communities on Milman Island. Structural classification according to McDonald et al. (1990).

these species have soft, fleshy fruits that are known to be dispersed by frugivorous birds (Ridley 1930; Crome 1975; Frith 1982).

At the southern end of the island is a *Casuarina equisetifolia* woodland (8–10 m) with scattered understorey species. The littoral fringe of island vegetation is characterized by *Premna serratifolia*, *Guettarda speciosa*, *Pemphis acidula* and large overhanging *Manilkara kauki* trees.

METHODS

Bird lists from 14 Queensland National Parks and Wildlife Service and Queensland Department of Environment surveys (1985–1995) were compiled for Milman Island. Bird identifications were made using Pizzey (1989), Simpson and Day (1984) and Slater *et al.* (1986). Common and scientific names follow those used by Christidis and Boles (1994). Data were collected by 10 primary observers. Duration of the visits lasted from 0.5 hours to 82 days and comprised all seasons excluding Spring. Surveys covering more than a day were conducted as part of DoE sea turtle studies. Although bird observations were conducted almost daily during these longer surveys (range = 0–5 hours/day), the total number of hours spent observing birds is unknown. No bird banding has occurred on the island. If the original survey list contained generic terms like 'terns' or 'shorebirds', these were excluded from the compiled list because they could not be assigned to a species.

RESULTS

The date of trip, primary observer and the amount of time spent on the island are listed in Table 1. The 81 species observed at Milman Island are listed by trip in Table 2. A skilled observer (e.g. J. Cornelius, Table 1) observed 17

species in 1.75 h in summer, but only eight species in 2.3 h in winter, implying the number of birds seen on the island varies between seasons. Not every species was recorded on every trip, regardless of the duration or season of the trip. Seven species (8.6% of total) were observed during the shortest duration visit (0.5 h) in summer; in contrast 47 species (58%) were observed on the longest trip (82 days) which also occurred in summer. The greatest number of birds ($n = 61$ species) were seen on a 74 day-long survey during summer and autumn. The fewest number of birds observed on any visit was six (Table 1).

Sixteen (19.8%) of 81 bird species observed were seen only once (Table 2); all single record observations occurred during long duration surveys (15–82 days). All other species were recorded during at least two different surveys; however, no species was recorded on every visit. The longer the survey, the greater the likelihood of observing singular bird species (Table 2). Approximately 40% of the 81 species were recorded on two ($n = 10$ species), three ($n = 17$ species), or four ($n = 8$ species) visits. The remaining approximately 40% of species were observed on five or more visits including two species (Eastern Reef Egret *Egretta sacra*, Silver Gull *Larus novaehollandiae*) recorded on 12 of 14 visits. Additional notes on seabirds are presented in Loop *et al.* (1996).

TABLE 1

Number, percentage of bird species recorded, duration of visit and season for each visit to Milman Island. Duration of visit: h = hour, d = days. * = Not available. Total number of species observed = 81.

Date of visit	Primary observer	Duration (h, d)	Season	No. bird species observed	% of total species observed
7 Dec. 85	B. King	4h	Summer	27	33.3
3 Apr. 86	*	*	Autumn	14	17.3
4 Dec. 87	J. Cornelius	1.75h	Summer	17	21.0
18 July 88	J. Cornelius	2.33h	Winter	8	9.9
14 Dec. 88	J. Hicks	0.5h	Summer	7	8.6
3 Dec. 89	F. Muir	1.5h	Summer	6	7.4
10 June 90	J. MacFarlane	*	Winter	6	7.4
11 Jan.–25 Mar. 91	M. Mather	74d	Summer/Autumn	61	75.3
19 June 91	J. MacFarlane	1.08h	Winter	11	13.6
12 Dec. 91	J. Alder	*	Summer	16	19.8
3–18 Feb. 92	J. Miller	15d	Summer	40	49.4
12 Feb.–28 Mar. 93	J. Haselmayer	44d	Summer/Autumn	57	70.4
14 Jan.–23 Mar. 94	K. Loop	68d	Summer/Autumn	41	50.6
25 Nov. 94–15 Feb. 95	K. Loop	82d	Summer	47	58.0

TABLE 2

Summary of bird species observed on Milman Island. A = Adult, Br = Breeding, C = Count, D = Dead, E = Estimate, F = Female, Fd = Feeding offshore, G = Grey morph, J = Juvenile, M = Male, Nb = Nonbreeding, R = Roosting, Sa = Subadult, X = Present, W = White morph.

COMMON NAME	SCIENTIFIC NAME	7-Dec-85	3-Apr-86	4-Dec-87	18-Jul-88	14-Dec-88	3-Dec-89	10-Jun-90	11/Jan-25/Mar-91	19-Jun-91	12-Dec-91	3-18/Feb-92	12/Feb-28/Mar-93	14/Jan-23/Mar-94	25/Nov-15/Feb-95
Australian Pelican	<i>Pelecanus conspicillatus</i>								1Nb				X	2C	X
Bar-shouldered Dove	<i>Geopelia humeralis</i>	5C							30E			X	X	X	X
Bar-tailed Godwit	<i>Limosa lapponica</i>	10+35							9C				X	X	X
Beach Stone-curlew	<i>Esacus neglectus</i>	2C	2C	2C	2C	1C			3Nb	4C		X	4-8C	3C	X
Black Noddy	<i>Anous minutus</i>								2Nb				X	X	X
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>														JX
Black-faced Monarch	<i>Monarcha melanopsis</i>								5C				X		X
Black-naped Tern	<i>Sterna sumatrana</i>	Br,130E				45C			30Nb		20+E	X	X		XBr
Brahminy Kite	<i>Haliastur indus</i>								2C					1C	
Bridled Tern	<i>Sterna anaethetus</i>								30Nb		1C		1C		
Brown Booby	<i>Sula leucogaster</i>												1Fd, 2D	4Fd	
Brown Cuckoo-Dove	<i>Macropygia ambionensis</i>		11C						X			X			
Brush Cuckoo	<i>Cacomantis variolosus</i>												1C		
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>												X		X
Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>								1C						
Collared Kingfisher	<i>Todiramphus chloris</i>								1C					X	
Common Bronzewing	<i>Phaps chalcoptera</i>											X			
Common Greenshank	<i>Tringa nebularia</i>	5C	1C						35C			X	X	X	X
Common Koel	<i>Eudynamis scolopacea</i>								1Pr				X		X
Common Noddy	<i>Anous stolidus</i>								2Nb		1C		X		X
Common Sandpiper	<i>Actitis hypoleucos</i>									6C				X	X
Common Tern	<i>Sterna hirundo</i>								X			X		X	
Crested Tern	<i>Sterna bergii</i>	1C		2C		3C	10Nb		25Nb	33C	30+E	X	X	3Br	X
Curlew Sandpiper	<i>Calidris ferruginea</i>										12C		X	X	
Dollarbird	<i>Eurystomus orientalis</i>								30C				X	2C	X
Double-banded Plover	<i>Charadrius bicinctus</i>								1C						
Eastern Curlew	<i>Numenius madagascariensis</i>			12C			X		8C		1C	X	X		X
Eastern Reef Egret	<i>Egretta sacra</i>	5W,1G		12W,1G	5W		XNbW&G	1W,1G	X	7W,5G	1C	X	X	WX, GX	WX, GX
Emerald Dove	<i>Chalophaps indica</i>											X			
Figbird	<i>Specotheres viridis</i>											X			
Forest Kingfisher	<i>Todiramphus macleayii</i>														X
Fork-tailed Swift	<i>Apus pacificus</i>								150C				20E		
Great Knot	<i>Calidris tenuirostris</i>								X				X		X
Greater Frigatebird	<i>Fregata minor</i>							1X	30-40Nb	1C		X	X,1F	3Nb	X
Grey Plover	<i>Pluvialis squatarola</i>	2C		1C					6E			X	X		
Grey-tailed Tattler	<i>Heteroscelus brevipes</i>	1C	6C	25C	48C				80-100C			X	X	X	X
Gull-billed Tern	<i>Sterna nilotica</i>													X	
Horsfield's Bronze Cuckoo	<i>Chrysococcyx basalis</i>								1C						
Intermediate Egret	<i>Ardea intermedia</i>														X
Greater Sand Plover	<i>Charadrius leschenaultii</i>	20+2+1		8C					40E			X	X		

Table 2 — continued.

COMMON NAME	SCIENTIFIC NAME	7-Dec-85	3-Apr-86	4-Dec-87	18-Jul-88	14-Dec-88	3-Dec-89	10-Jun-90	11/Jun-25/Mar-91	19-Jun-91	12-Dec-91	3-18/Feb-92	12/Feb-28/Mar-93	14/Jun-23/Mar-94	25/Nov-15/Feb-95
Leaden Flycatcher	<i>Myiagra rubecula</i>												X		X
Lesser Crested Tern	<i>Sterna bengalensis</i>	6C							15Nb			X	X	1Br	
Lesser Frigatebird	<i>Fregata ariel</i>	1F			2F,2D	1F			40-50Nb		6C	X	X	5Nb	X
Lesser Sand Plover	<i>Charadrius mongolus</i>	11+153	7C	10C					200E			X	X	X	X
Little Tern	<i>Sterna albifrons</i>								50Nb				X	X	
Orange-footed Scrubfowl	<i>Megapodius reinwardt</i>	1C							2C			X			
Oriental Cuckoo	<i>Cuculus saturatus</i>														X
Osprey	<i>Pandion haliaetus</i>								1Pr				X		X
Pacific Golden Plover	<i>Pluvialis fulva</i>	2C	3,2Br	3C					20E			X	X	X	X
Pied Heron	<i>Ardea picata</i>													1C	X
Pied Imperial-Pigeon	<i>Ducula bicolor</i>	Br,707C	2C	200BrPr		10C	100+E		60Nb			X	X	X	Br,X
Pied Oystercatcher	<i>Haematopus longirostris</i>	2C		22C	2C				40Nb		1C	X	X	13C	X
Purple Swamphen	<i>Porphyrio porphyrio</i>												X		
Rainbow Bee-eater	<i>Merops ornatus</i>		4C						3C			X	X	X	X
Red Knot	<i>Calidris canutus</i>								4C			X	1C		X
Red-backed Button-quail	<i>Turnix maculosa</i>	1C										X	X		
Red-necked Stint	<i>Calidris ruficollis</i>	4C									30+E				X
Rose-crowned Fruit-Dove	<i>Ptilinopus regina</i>							1C	X				X		
Roseate Tern	<i>Sterna dougalli</i>								20Nb			X	X	X	
Ruddy Turnstone	<i>Arenaria interpres</i>	7+20+100	3C	40C		2C			150Nb		1C	X	X	X	X
Rufous Fantail	<i>Rhipidura rufifrons</i>								1C				1C		X
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	1C		8C			2Nb	1C	4Br			X	X	X	X
Sacred Kingfisher	<i>Todiramphus sanctus</i>							3C	1C	2C			X		
Sanderling	<i>Calidris alba</i>													X	X
Satin Flycatcher	<i>Myiagra cyanoleuca</i>								6C				X	1C	
Shining Bronze Cuckoo	<i>Chrysococcyx lucidus</i>		1C						X				1C		
Silver Gull	<i>Larus novaehollandiae</i>	20C	11C	12A,3J	3A	4C			75Nb	6C	8C	X	X	X	X
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>			2C	3C				35Nb	4C		X	X	15C	X
Sooty Tern	<i>Sterna fuscata</i>								10Nb			X?			
Spangled Drongo	<i>Dicrurus bracteatus</i>								2C		1C		X	X	X
Spectacled Monarch	<i>Monarcha trivirgatus</i>								3C					X	X
Striated Heron	<i>Butorides striatus</i>								6R						
Superb Fruit-Dove	<i>Ptilinopus superbis</i>	1C							6C/2Pr			X	X		
Terek Sandpiper	<i>Xenus cinereus</i>		1C						7C			X	X		X
Tree Martin	<i>Hirundo nigricans</i>												X		
Varied Honeyeater	<i>Lichenostomus versicolor</i>								X	4C	3C	X	X	X	
Whimbrel	<i>Numenius phaeopus</i>	8C		1C	13C				15E	1C		X	X	X	X
Whistling Kite	<i>Haliastur sphenurus</i>											X			
White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>	2C	2A						2A,1Sa		1C	X	1A,1J	1A,1J	1A, 3J
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	2C		1C			X		60E	15C	3C	X	30E	X	X
Yellow-bellied Sunbird	<i>Nectarinia jugularis</i>	2/1M	4/3M					3C	50-100E			X	20-30E	XBr	XBr

Notes on breeding non-seabirds and their status

Four Nankeen Night Herons *Nycticorax caledonicus* in breeding plumage were seen in the summer of 1991. On 7 December 1985, an estimated 707 Pied Imperial-Pigeons *Ducula bicolor* were on Milman Island; less than ten nests were recorded, all with eggs. Approximately 200 breeding pairs were recorded on 4 December 1987. Two of three Pacific Golden Plovers *Pluvialis fulva* seen on 3 April 1986 were in breeding plumage. Two Ospreys *Pandion haliaetus* were seen in courtship flight during the summer of 1991. Two White-bellied Sea-eagles *Haliaeetus leucogaster* were seen in courtship flight during the summer of 1991 and a nest was seen in a large *Manilkara kauki* tree on the south-eastern end of the island. Two to three pairs of Varied Honey-eaters *Lichenostomus versicolor* were seen in breeding plumage on 16 February 1993. Three Yellow-bellied Sunbird *Nectarinia jugularis* nests were counted during the summer of 1991; one nest contained two chicks. During the summer of 1993, three nests were counted, one with two chicks, and 20–30 pairs were observed. In February 1995, one nest was found that contained two chicks.

Factors affecting status

There is a low level of human disturbance to nesting birds because of the island's remote location, although people from pleasure crafts and trawlers do land on the island occasionally. Few aircraft fly over the island but they may affect nesting and roosting seabirds, if the planes are too low (Hicks *et al.* 1987). Research teams camped on the island studying the nesting biology of sea turtles (Loop *et al.* 1995) interfere minimally with roosting and nesting birds because the primary human activity occurs on the beach at night and away from bird nesting areas. Nesting by Hawksbill *Eretmochelys imbricata*, Green *Chelonia mydas* and Flatback *Natator depressus* sea turtles does not disturb birds roosting or nesting in trees; however, turtles may disturb ground nesting birds (Loop *et al.* 1996).

Bird predation

Amethystine Pythons *Morelia amethystina* are found throughout the entire island. These nocturnal, arboreal snakes are known to feed on birds and mammals (Wilson and Knowles 1988).

On two occasions in March 1994, a python was observed eating Rainbow Bee-eaters *Merops ornatus* (Loop *et al.* 1996a); the snakes probably feed on several species of birds and their chicks throughout the year.

A 1.2 m Estuarine Crocodile *Crocodylus porosus* was found on Milman Island with tern feathers in its stomach in February 1992. The 'sit-and-wait-at-the-edge-of-the-water' feeding behaviour (Webb and Manolis 1989) used by small crocodiles provides for the occasional opportunity to grab shorebirds, tern chicks or other roosting birds. How often this occurs is unknown; certainly the behaviours of both animals occasionally bring them together at the edge of the island.

DISCUSSION

Milman Island is not a major nesting site for seabirds, although it is used by Black-naped Terns *Sterna sumatrana* and Pied Oystercatchers *Haematopus longirostris* occasionally and other species (Crested Tern *Sterna bergii*, Lesser Crested Tern *Sterna bengalensis*) have been observed in breeding plumage (Loop *et al.* 1996). Black-naped Terns, Crested Terns and Lesser Crested Terns are nomadic breeders, varying their breeding sites from year to year (King 1993). Nankeen Night Herons have only been recorded in breeding plumage during the summer, coinciding with peak sea turtle nesting and hatchling emergence. The herons are thought to time their breeding with food source abundance (King 1993).

In contrast, Milman Island is a significant rest stop for many migratory and Australian-breeding non-seabird species, at least a few of which breed on the island. King (1990) classified Milman Island as a small Pied Imperial-Pigeon colony; the area between Cooktown and Cape York supports the largest population of breeding Pied Imperial-Pigeons in tropical Australia. The numbers and composition of non-seabird species varies as the seasons change. The well-developed forest and the proximity to the mainland may be factors attracting the birds. The forest also provides shelter and food for the migratory birds, some of which are only present for a day or two. The low level of human activity ensures that the breeding birds are not regularly disturbed.

Three factors affected the number of bird species observed on a given trip to Milman Island: (1) the duration of survey at the island, (2) the observer's skill at bird identification, and (3) the season of the year. Short-duration visits provided positive identifications of a few species, but did not provide extensive lists of birds utilizing the island; whereas longer trips provided longer species lists. Single observations of species occurred when the presence of a species (e.g. swamphen, figbird) could not be confirmed on a subsequent visit. Because of seasonality in bird movements, more migrants were recorded when observations were made over longer periods of time (e.g. weeks to months), whereas the list of regularly-sighted birds (seen on five or more visits) was not increased notably.

Earlier survey work has shown that the three aforementioned factors, as well as time of day and height of tide, will dramatically effect the number of species observed when surveying an island. Ideally, transect counts provide the most easily replicated form of census data (Bell and Ferrier 1985; Kavanagh and Recher 1983; Recher *et al.* 1983; Shields and Recher 1984). Because these factors affect the usefulness of the data, it is essential they be recorded in the field notes supporting the survey. Clearly, short duration, single surveys, can not provide a complete list of bird species utilizing an island; therefore, it is recommended species lists be based on multiple surveys, preferably spaced throughout the season, to provide a more comprehensive inventory of birds utilizing the island.

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