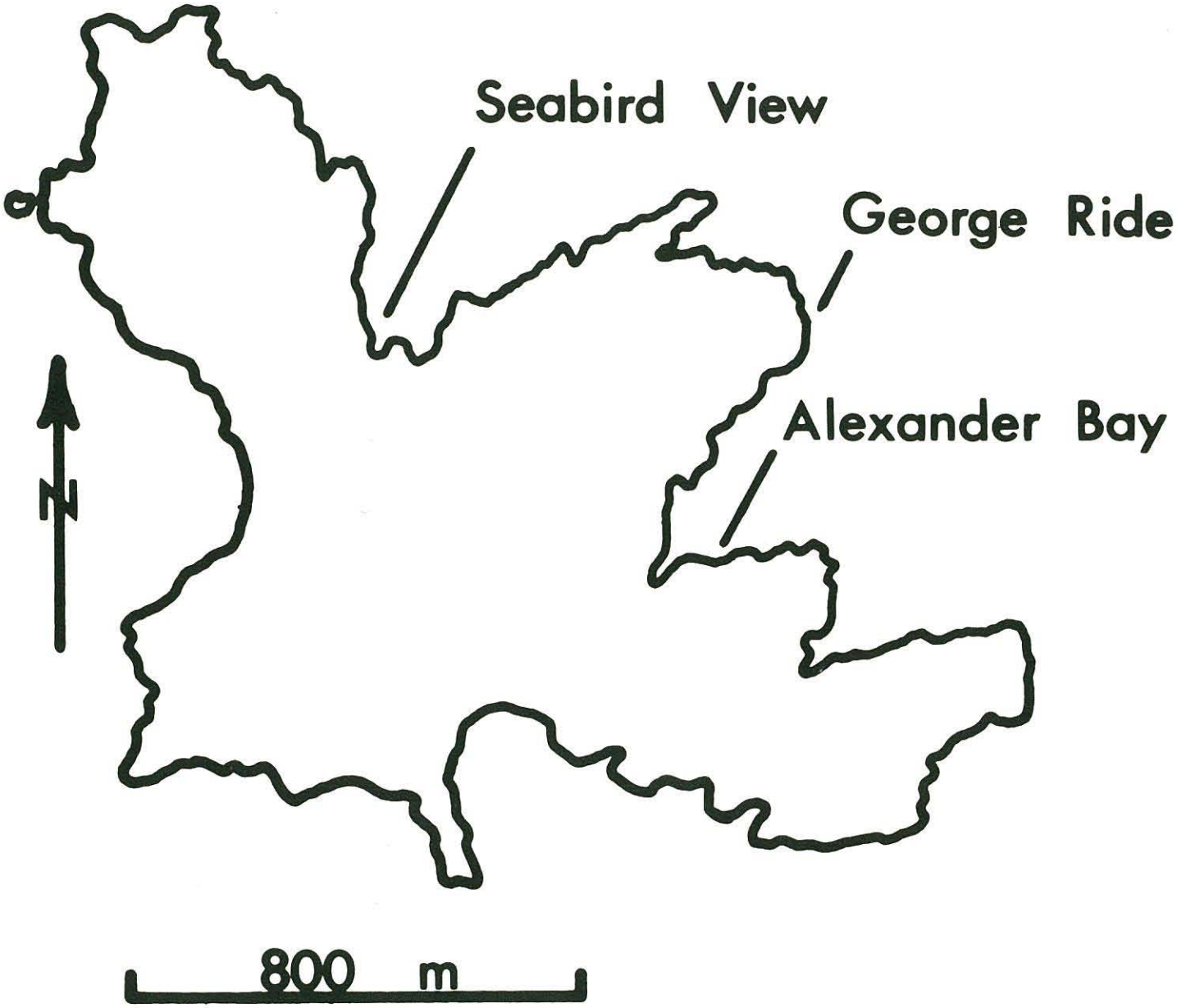


Seabird study areas on the island of Little Tobago.

# SEABIRDS OF LITTLE TOBAGO

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SUMMARY:

The minimum known hatching and fledging rates of four seabird species nesting on Little Tobago between December 1975 and July 1976 are presented. It is argued that illegal poaching activities occur on the island sanctuary which must be dealt with immediately by the responsible government agencies.

## INTRODUCTION

From October 1975 to July 1976 I studied the breeding biology of four seabird species on Little Tobago, West Indies. The four species were Sooty Terns *(Sterna fuscata)*, Noddy Terns *(Anous stolidus)*, Laughing Gulls *(Larus atricilla)* and Brown Boobies *(Sula leucogaster)*. Several studies of tropical nesting seabirds are in the literature (e.g. Ashmole, 1963; Harris, 1969; Brown, 1973) however, no long-term investigation has been conducted on the seabirds of Little Tobago. Pertinent notes on the avifauna of the island, including the seabirds, are in Dinsmore (1972) and ffrench (1973). Some general aspects of the breeding regimes of Little Tobago seabirds will be reported here while a more detailed report will appear elsewhere.

## METHODS

The three areas selected for study were Seabird View, George Ride and Alexander Bay (Fig. 1). Brown Boobies nested at George Ride and Alexander Bay while Laughing Gulls nested only at the latter site. Sooty Terns and Noddy Terns nested at all three locations.

I visited Little Tobago 21 times between October 1975 and July 1976. Individual visits lasted from 1 to 3 days with an interval between visits of from 5 to 35 days. The average interval separating visits during the main breeding season of terns and gulls (10 Feb. — 30 June, 1976) was 9.58 days. At each visit records were kept of new nest starts, eggs laid and lost, hatching success and subsequent fate of chicks. Nests were individually numbered with wooden tongue depressors and eggs numbered with non-toxic pencils. Chicks of all species except Laughing Gulls were banded within a few days of hatching. Chicks were recaptured on each visit (whenever possible) and changes in weight and bill length recorded.

## RESULTS

*Nest Start Distribution*

Brown Boobies were nesting on the island during my first visit of 15 October, 1975. The first Sooty Terns were seen on 28 January, 1976 and their numbers were greatly increased by 10 February when the first egg was found (Table 1). The first Noddy Terns were seen on 17 February, 1976 at a nest site containing an egg and many adults were present one week later. Laughing Gulls were first sighted on 26 February, 1976 although the first eggs were not found until 21 April, 1976.

Sooty Terns initiated and completed nesting in advance of Noddy Terns (Table 1). Sooty Terns experienced a small second peak of new nest starts in early April whereas, Noddy Tern nest starts declined from a peak in late March. The distribution of Laughing Gull nest starts was more tightly synchronized than either Tern species with a large peak between late April and early May. Brown Booby nest starts were clumped into two well defined peak periods (January 1976 and July 1976) although complete data for the second period are unavailable due to the termination of my visits (Table 1).

*Hatching Success*

Hatching success of the four species revealed a success rate of Brown Bobby → Laughing Gull → Noddy Tern →Sooty Tern (Table 2). The hatching success of Brown Booby eggs was adjusted by removing from the analysis 9 eggs which disappeared

TABLE 1

Temporal distribution of egg laying by the four seabird species.

| Species | Time Category* | First Egg Found | 50% Total Egg Production** | 90% Total Egg Production** | Last Egg Found |
|---|---|---|---|---|---|
| Sooty Tern | total season | 10 Feb. | 26 Feb. | 6 April | 12 May |
| Noddy Tern | total season | 17 Feb. | 15 Mar. | 10 April | 31 May |
| Laughing Gull | total season | 21 April | 5 May | 24 May | 15 June |
| Brown Booby | Dec/75-Mar/76 | 14 Dec. | 13 Jan. | 12 Feb. | 9 Mar. |

* all months 1976 except where noted

** estimates

 *Continued*

TABLE 2

Known hatching success of the four seabird species

| Species | Time Category (1976) | Nests (n) | Mean Clutch Size (± 1SE) | Eggs Laid (n) | Eggs Hatched (n) | Eggs Hatched per egg Laid |
|---|---|---|---|---|---|---|
| Sooty Tern | total season | 109 | 1.0 ± 0 | 109 | 7 | 0.071* |
| Noddy Tern | total season | 125 | 1.0 ± 0 | 125 | 32 | 0.274** |
| Laughing Gull | total season | 187 | 1.87 ± 0.04 | 349 | 125 | 0.358 |
| Brown Booby | Dec/75-Mar/76 | 38 | 1.82 ± 0.06 | 69(60)! | 29 | 0.483! |

* excludes 10 eggs removed for experimental purposes

** excludes 8 eggs removed for experimental purposes

! potentially hatchable; excludes 'poached' eggs (see text)

from the George Ride colony between 9 — 23 March, 1976. Five of these were between 12 — 15 days into incubation and the remaining two nests (4 eggs) should have contained young chicks by 23 March. The loss of these eggs and chicks coincided with large scale and sudden losses of the majority of Booby chicks from the George Ride colony by 23 March and from the Alexander Bay colony between 25 March and 6 April 1976. These losses were almost certainly the result of poaching activity (see below).

In all four seabird species, the number of eggs which failed to hatch exceeded the number which hatched and in the two tern species, the failure rate was substantial (Table 2). The most common cause of egg failure was disappearance from the nest between visits (Table 3). The remaining categories varied among the species but in all cases, egg failure due to them was below that resulting from disappearance. The frequency of egg age at disappearance was estimated by assuming a laying date and disappearance date half-way between visitation periods. On the basis of these estimates, the majority (→ 50%) of Sooty Terns eggs which disappeared were lost in the first few days after laying whereas, the majority (→ 50%) of Noddy Tern eggs disappeared during the middle stages of incubation. The majority ( 60%) of Brown Booby eggs which disappeared were lost from nests containing a very young chick.

*Fledging Success and Total Reproductive Success*

A summary of breeding data for the four seabird species shows several marked differences among them (Table 4). Despite assumed human interference in the form of poaching, Brown Boobies realized a more successful breeding season than any of the other species. Indeed, of the ten chicks remaining following the sudden catastrophic losses at both colonies, nine survived to the fledging stage. Noddy Tern eggs had a hatching rate almost four times that of Sooty Terns eggs and the low fledging rate of Noody Tern chicks alos exceeded that of Sooty Terns (Table 4). None of the seven Sooty Tern chicks known to have hatched from marked eggs survived more than 7 days. During all of my visits to the island, I saw only one fledged Sooty Tern chick, presumably recruited from an unmarked nest.

Many chicks of all four species died (or disappeared) between hatching and fledging (Table 4). I estimated the maximum age at which chicks disappeared by assuming that a chick was present in a nest until the day before my next visit to the colonies. The estimated loss distribution in both Tern species and in Laughing Gulls was as normally expected in many biological species; that is, heavy losses during the early post-hatch period when chicks are most vulnerable. The loss distribution of Brown Booby chicks provides additional evidence of poaching activity. Two-thirds (66.7%) of the Booby chicks older than 2 weeks which suddenly disappeared from the colonies between the dates noted above, were among the heaviest and oldest chicks in the colonies. The maximum possible age of the oldest chick was 62 days, at least one month before chicks of this species normally fledge (ffrench, 1973).

## DISCUSSION

The breeding chronology of the four seabird species on Little Tobago generally agrees with that of Dinsmore (1972) although in the 1976 breeding season terns and gulls arrived and began breeding one week (gulls) to eight weeks (Noddy Terns) earlier than during the 1966 breeding season. My data also confirm Dinsmore's report of two definite peaks in egg-laying by Brown Boobies separated by an interval of about six months.

The very poor reproductive success of Sooty Terns is, to

TABLE 3

Egg failure categories for the four seabird species. The percent of total is in parenthesis.

| Category | Species | | | |
|---|---|---|---|---|
| | Sooty Tern | Noddy Tern | Laughing Gull | Brown Bobby |
| Disappeared | 86 (93.4) | 81 (95.3) | 161 (71.9) | 29 (72.5)* |
| Addled | 3 (3.3) | 1 (1.2) | 31 (13.8) | 5 (12.5) |
| Peck hole** | 3 (3.3) | 0 | 14 (6.3) | 0 |
| Rolled out | 0 | 3 (3.5) | 7 (3.1) | 6 (15.0) |
| Cracked/Dented | 0 | 0 | 7 (3.1) | 0 |
| DWP! | 0 | 0 | 4 (1.8) | 0 |

* including 9 'poached'
** egg holed open; contents uneaten
! died while pipping

my knowledge, the lowest reported in the literature although Ashmole (1963) estimated a fledging success of from 0 to 1.7% (chicks fledged per egg laid) from several of his colonies on Ascension Island. In these colonies, heavy losses were due to predation of eggs and chicks by cats and Frigate Birds *(Fregata aquila)* and to starvation of chicks. Schreiber and Ashmole (1970) also reported a lack of successful breeding by Sooty Terns at several colonies on Christmas Island. The principal factors contributing to egg and chick loss there were predation by Frigate Birds *(F. minor)* and feral cats and to widespread egg-collecting by local residents (estimated at 250,000 eggs from one colony in May-June, 1967). On Little Tobago, mammalian predators are absent and I never saw Frigate Birds *(F. magnificens)* land on the island although they were frequently seen flying over it. On Christmas Island, "many thousands of Sooty Tern chicks" apparently fledge yearly from two colonies where the adults nested under heavily canopied vegetation (Schreiber and Ashmole, 1970: 379). As the ground vegetation on Little Tobago in the areas where Sooty Terns were nesting usually formed a heavy cover over the nests, it is doubtful that Frigate Bird predation was a significant loss factor there.

It is possible that residents of villages at the north end of Tobago were removing Sooty Tern eggs from the colonies as this practice has been observed previously at Little Tobago and at other colonies around the islands (R. ffrench, pers. comm.). However, one would expect poachers to remove Noddy Tern eggs as well as those of Sooties as both species were nesting in the same areas, and as nests of both were readily accessible. Although many Noddy Tern eggs also disappeared, the hatching rate (eggs hatched per egg laid) of Noddies was four times that of Sooties which would not be expected if poaching was severe. Tentative evidence suggests that the difference in hatching and fledging rates of the two tern species was related to differences in their feeding behaviour and ecology and that the low overall reproductive success in 1976 may have been a result of inadequate or inaccessible food supplied. Further information on this possibility will be reported elsewhere.

The most discouraging aspect of the study is the almost certain conclusion that heavy poaching occurred at the Brown Booby colonies. Although I have been unable to confirm it directly, the practice apparently is an annual event related to local "harvest" festivities in Tobago where Booby meat is used as part of the celebrations. An indication of the effect of these procedures on the Little Tobago Booby population is suggested from a comparison between the number of Booby nests present in 1966 and numbers noted ten years later. During the course of his principal work on the ecology of the Bird of Paradise *(Paradisaea apoda)*, Dinsmore (1972) located 220 Booby nests around the perimeter of the island. The George Ride and Alexander Bay colonies which I studied produced only 62 nests from late December, 1975 to late July, 1976. As these two colonies were the largest concentrations of Boobies on the island, and as the study interval included both nesting peaks, it seems reasonable to suggest that the total nest production on Little Tobago from August, 1975 to August, 1976 could not have exceeded, at most, 100 nests. This represents a considerable decline in Booby nest pro-


*Continued*

TABLE 4

The total reproductive success of the four seabird species

| Species | Total Nests (n) | Known Eggs Hatched (n) | Eggs Hatched per Egg Laid | Known Chicks Fledged (n) | Chicks Fledged per Egg Hatched | Chicks Fledged per Egg Laid |
|---|---|---|---|---|---|---|
| Sooty Tern | 109 | 7 | 0.071 | 0 | 0 | 0 |
| Noddy Tern | 125 | 32 | 0.274 | 8 | 0.250 | 0.068 |
| Laughing Gull | 187 | 125 | 0.358 | 31* | 0.248 | 0.089 |
| Brown Booby | 38** | 29 | 0.483 | 9 | 0.310 | 0.131! |

* tentative estimate

** December, 1975 to March, 1976 laying

! including 9 eggs 'poached'; see Table 2

duction since 1966 and should be viewed with concern.

In the recent past, the principal tourist attraction of Little Tobago has been the Bird of Paradise population there. The original introduced population of 48 — 49 birds declined to 7 by 1966 (Dinsmore, 1972) and the current known population is probably not more than 3 individuals (pers. observations and N. George, pers. comm.). It appears certain that the species will be extinct on the island shortly and it seems unlikely that more will be introduced. Biological, legal and moral issues aside, it is essential that every effort be made by local government ministries to recognize the tourist potential of the other attributes of Little Tobago (Morris, 1976) and to take whatever steps may be necessary to preserve and protect the seabird (and other avifauna) species which nest there.

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