

**Sooty Terns on Ascension Island South Atlantic
Integrated Population Monitoring Programme**

by

Army Ornithological Society

14th Report

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Expedition Report - Monitoring Sooty Terns on Ascension Island Feb. 2004

Summary: *The expedition was on Ascension Island from 8-28 Feb 2004. The team consisting of ten members completed a full census of the Sooty Terns. The colony size on 24 Feb 04 was 169,370 pairs (LCI = 160277; UCI = 178583). Predatory activities on our three study sites were recorded, no evidence of predation by feral cats was found. A further 2000 Sooty Terns were ringed and 163 were re-trapped. The team provided ringing training to members of the Ascension Island Conservation Office and a ringing policy for the Island was formulated. Studies of Sooty Terns ariel drinking and dipping were carried out and also the activities of the birds at night were recorded. A population survey of Fairy Terns and land-birds was completed. Clear evidence of attempts by eight pairs of Brown Noddy to breed in the Sooty Tern colony on the mainland was recorded. Guano deposits from Letterbox and DNA samples from three more avian species were collected. A list of data based maintained by Service Ornithological societies was compiled.*

British military ornithological societies have monitored the colony of Sooty Terns on Ascension Island since 1987. A baseline population survey was completed in 1990. This report contains the findings of the latest field trip and is the fourteenth in a series of studies that span twenty two Sooty Tern breeding seasons. The longitudinal study has concentrated on establishing trends in the breeding population, identifying and recording levels of predation and investigating nest and adult survival rates.

Terms of Reference: The aim of the study is to facilitate the expansion of the breeding population by identifying and reducing threats to the Sooty Tern colony. During each field season the following procedures are carried out:

- Surveys of the breeding population are undertaken.
- The levels of predation in the colony are measured and recorded.
- A ringing and re-trap programme is maintained so that inter and intra colony movements can be monitored and survival rates determined.
- Perceived threats to the colony are investigated.
- Long term, quantifiable data that can be used as evidence for making conservation management decisions is collected and made available to interested parties.

Data Bases: Service Ornithological societies have collected data on the avifauna of Ascension for more than 16 years. Each season new data is collected and added to the data bases. A list of the data bases maintained by Service Ornithological societies is at Annex A.

Population Levels

The population survey this season was carried out at the optimum time for maximum numbers and for direct comparison with previous seasons. Chicks were found in the Waterside colony on 10 Feb 2004 the day we arrived. The first chick to hatch at Waterside was recorded in colony number 02/2004 on 8 Feb 2004. The colony on Ascension is at its greatest 14-32 days after the first chicks of the season hatch.

Timings: I am grateful to Tara George for provided the following information. This season the first egg was laid at Waterside Fairs between 5 Jan (0 eggs) and the 12 Jan (2,000 birds on eggs) and at Mars Bay between 19 Jan (0 eggs) and 22 Jan (500 eggs). Mike Bell reported “The Sooties are down laying now, went out on Thursday last week (22 Jan) around 1/3 of the Waterside birds seem to be down and 1000 at Mars Bay again a few weeks behind Waterside.” The first egg of last season was laid on 27 Feb 2003 and the survey undertaken between 17 and 25 Apr 2003. The normal interval between seasons is approximately 295 days. In Feb 2004 the birds arrived some 3 weeks later than expected. The length of time between this season and the previous season was 316 days. This information provides further evidence that the time between successive breeding seasons is increasing.

Survey: The area of the colony was determined from GPS observations and then plotted to scale onto Chartwell graph paper. The area was surveyed using similar techniques to those used on the previous seasons. Three Garmin GPS 12XL numbers 35730910, 35527483 and 35730974 and one GPS 12 number 36155001 were used for the survey. These instruments have a position accuracy of 1-5 metres and provide rapid, reliable and accurate results. The GPS 12XL were on loan from the army. Co-ordinates around the perimeter of each sub-colony at intervals of about 20 m were recorded and plotted to determine the area of the colony. The colony, this season, was made up of 15 sub-colonies and as in previous years a “Fair Description Sheet” was completed for each sub-colony. The total area occupied on 24 Feb 2004 was 9.97ha.

Nest Density: Nest densities were measured by counting all eggs that were passed over by a string, 1.784m long, rotating 360 degrees around a stick at random points within the sub-colonies. In total 6,873 AONs (Table1) were counted in 365 quadrats giving an average

density in Feb 2004 of 1.89 eggs/m². Twenty double clutches were recorded; each double clutch was counted as just one nest. The average density in May 2003 was 1.94 eggs/m². It is interesting to note that on the Seychelles (Feare 2003) obtained an average density of 4.41 eggs/m² (N=30). On Ascension the density of nests is consistency lower than on the Seychelles Annex B.

Population Size: The breeding population in Feb 2004 was 175,000 pairs. The statistics were calculated using a bootstrap method and the results were 174,657 pairs (LCI = 165280; UCI = 184157). Only adult pairs of breeding birds were surveyed. On Ascension the highest breeding population (202,000 pairs) was measured in Oct 1996 and the lowest (75,000 pairs) in Nov 2000.

Table 1. Breeding Population Feb 2004 – Raw Data

| Sub Colony | Area Hectares | No of Quadrats | No of Nests Counted | Av. Density Per sq. m | Population Size Pairs |
|-------------------|--------------------------|---------------------------|--------------------------------|----------------------------------|----------------------------------|
| Waterside | 6.62 | 287 | | 1.89 | 125,000 |
| Mars Bay | 2.63 | 75 | | 1.89 | 50,000 |
| Total | 9.25 | 365 | 6873 | 1.89 | 175,000 |

Study Sites

As our research on Ascension progresses the three study sites at Letterbox, Mars Bay and Waterside that we established in 1990 take a more prominent role. Once again, all bird species attempting to breed on the three study sites were noted (Table 2). In addition we were able to tackle a number of other research projects during this field season. At Letterbox we collected mineral samples for analysis. At Mars Bay we observed Sooty Terns at night through high intensity night vision glasses and during the day we investigated their dipping and drinking behaviour. We also completed a rat index in the Mars Bay study area. While at Waterside we collected comprehensive information on the Brown Noddies that had started to nest amongst the Sooty Terns.

Table 2. Summary of Breeding Pairs in Study Areas – Feb 2004

| Species | Waterside | Mars Bay | Letterbox |
|--------------|--|----------|-----------|
| Sooty Terns | © 125,000 | © 50,000 | Nil |
| Masked Booby | Nil | Nil | Nil |
| Tropicbirds | 1 yellow billed at Fence-end | Nil | Nil |
| Brown Noddy | 8 pairs prospecting on 18 Feb. First egg laid 8 Mar 04 | Nil | Nil |
| Frigates | Nil | Nil | Nil |
| Myna | 2 pairs | Nil | Nil |
| Others | Nil | Nil | Nil |

Mars Bay: Because of security consideration and ease of access all of our nocturnal observations were conducted at Mars Bay the smaller of the two main colonies on Ascension. Right from the start of our field work we have attempted to measure and record the nocturnal activities of Sooty Terns. We visited the breeding colony during hours of darkness to record the activities of Feral Cats in 1994, to observe night-clubbing, to look for tick infestation and most recently in Feb 2004 to observe the activities of the Sooty Tern itself. During this field trip nocturnal activity was observed and recorded for four hours at last light and for four hours at first light. The team was divided into pairs and each drew lots to select two (2 hours) watches. The evening watch started on 1800hrs with a change over at 2000hrs and ended at 2200hrs and the morning watch from 0400hrs to 0600hrs and then to 0800hrs (table 3). The dawn/dusk watches took place on 16, 17 & 18 Feb and a total of 32 man hours of observations were recorded. To assist with the observations the team uses Goggles Image Intensified, General Purpose L4A2x2 with a field view of 40° on loan from the army. A common observation point was selected some 25 metres from the edge of the colony from which to watch proceedings.

Dipping and ariel drinking: Mars Bay provides an ideal venue for observing Sooty Terns when they leave their egg unprotected to fly out to sea. The bay is confined and sheltered. The surface of the sea is generally calm and the activities of Sooty Terns can easily be observed from the shore. The nesting colony lie 100 -1000m from the coast and the birds fly off-shore 50 – 100m. There is a clear pattern to the Sooty tern activity. The birds fly low and

rapidly from the nest, and appear to dip and or drink in the bay and then return quickly to the nest. The complete cycle takes less than a minute and birds are over the sea for less than half a minute. The number of birds taking part in the activity varies throughout the day. Detailed examination of these movements commenced during the Jan 2004 field trip.

On the Dry Tortugas (Dinsmore 1972) noticed and measured similar activities by counting the number of Sooty Terns over the dipping area at any one moment of time. We also used this method at Mars Bay. Our preliminary results indicate that the activity peaks at mid-day as it did on the Dry Tortugas. To obtain an estimate of the numbers of Sooty Terns taking part in this activity we counted the number of terns flying towards the dipping site and passing a fixed point during time intervals of one minute.

The activity of the Sooty Terns over the sea was closely observed and four distinctly different movements were identified. The birds were seen drinking - skimming across the surface with bottom mandible open taking in salt water. The terns occasionally dipped their feet while gliding fairly rapidly across the surface – lowering their legs and allowing their webs to enter the water. More frequently they dipped their breast and or belly while skimming across the surface and some times belly flopped. The terns were observed vigorously shaking for a second or two while flying back to the colony. Brown Booby feed in the bay but no feeding activity by terns was observed. The dipping activity is completed in one circuit of the bay. Only two birds were seen to circuit more than once. We monitored 109 flights and recorded the duration of flight from leaving to returning to land and the number of time each bird drank, dipped feet or breast/belly and shook. We plan to continue with the monitoring of this activity for a few more seasons before drawing any conclusions.

Table 3. Record of Nocturnal Observations

| Date | Time | Observers | Noteworthy Sightings |
|--------|--------|----------------|--|
| 2004 | | | |
| 16 Feb | 6-8pm | Colin H & Mike | Myna predating at last light |
| 16 Feb | 8-10pm | Dave & Mark | Nothing unusual as per day |
| 17 Feb | 4-6 am | Dave & Mark | Nothing unusual as per day |
| 17 Feb | 6-8 am | Colin W & John | 5,000 new terns arrived during the night probably at 1930hrs |
| 17 Feb | 6-8pm | Roger & Andrew | Myna predating again at dusk |
| 17 Feb | 8-10pm | Colin & Mike | It rained |
| 18 Feb | 4-6 am | Roger & Andrew | Nothing unusual |
| 18 Feb | 6-8 am | Colin W & John | 6 Myna in colony by 0700hrs |

The main findings of these observations were:

- Comings and goings of Sooty terns are the same at night as during the day. Noise levels are the same. Birds arrive and leave the colony in about equal number.
- Despite 32 man hours of observation no predation by rats or land crabs were seen. One mouse was seen.
- Mynas were seen arriving on the fairs at first light 0700hrs and were still predating eggs at 1900hrs.
- At first light Sooty Terns are more active than at any other time during the day or night. They preen and exercise their wings (noise from beating wings is audible). They fly off their nest for a metre or two and re-alight.
- The Sooty Terns incubate throughout the night.
- Ticks were not evident on the birds this season. Only one tick was seen on one bird and no foot tapping was observed.

Waterside: Eight pairs of Brown Noddy were prospecting inside the Sooty Tern colony on 18 Feb 04 (Photo 3). The first egg of the season was laid shortly before 8 Mar 04. Mar is one of two peak laying months for Brown Noddy (Dorward & Ashmole 1963). On 7 Apr 04 Dave Boyle found 7 nests of which 2 were abandoned the remaining 5 were sitting on eggs. On 18 May one bird was still incubating but all the others failed – mainly losing small chicks. It is unlikely that any Brown Noddy chicks fledged this season although it was a good season for Sooty Terns.

Letterbox: Satellite photography clearly shows areas of Guano on Ascension. Much of the northwest corner of the island where the English Bay company set up base in the 1920s to extract guano is a pale shaded of white. Boatswain Bird Island (BBI) from where hundreds of tons of guano were exported shows up brilliantly white on the photograph. We have collected guano samples from the lava flow on the eastern edge of our Mars Bay study site. This area is also a pale shade of white on the photograph similarly to the lava fields around English Bay. On closer examination of the aerial photograph three further guano fields can be seen on the eastern side of the island at Pumice Cove, Wigg Hill and on our Letterbox study site. At Letterbox the guano deposits appear to cover the southern half of the peninsula which contains a strip of very rough lava 4 or 5 metres high and about 50m wide. Elsewhere in the

southern half there are steep sided valleys and 40 or 50 hectares of open flat ground where Masked Boobies have nested. Fourteen samples of guano and or pale mineral deposits were collected from Letterbox on 13 Feb 2004. The location of each specimen site was recorded using GPS. Where the guano was in powder form the depth was noted. One site close to the southern edge of the peninsula contained guano to a depth of 30cms. The specimens await X-ray florescence spectrometry analysis before any results can be confirmed.

Population Surveys – Fairy Terns and Land Birds

In addition to the seasonal survey of Sooty Terns population surveys of Fairy Terns (headed up by Mark Easterbrook) and land birds (headed up by Roger Dickey) were completed.

Fairy Terns *Gygis alba*: The expedition was on the Island at the close to the peak of the Fairy Tern breeding season. Richard White (2002) estimated the population as 5,000 – 6,000 birds with the majority of these on BBI. Our survey of the Fairy Terns breeding on BBI was completed by observations from a boat circumnavigating the Island. Our count on 15 Feb 2004 was low 272-289 and high 316-322 AONs. This estimate is lower but fairly close to our survey in Mar 1990 (low 384 - high 398) and 16 Apr 1994 (440 AONs) but significantly different to the survey of Feb 1987 (2650 pairs). (AONs) were counted on the mainland and GPS co-ordinates of the nest sites were recorded (Photo 4). Our estimate of Fairy terns on the mainland in Feb 2004 was low 368 – high 385 AONs. Our data appears to show a rise in the number of birds breeding on the mainland from 1957/59 (200), Feb 1987 (225), part count in Mar 1990 (181) and part count in Apr 1994 (60 pairs). A full report of the Fairy Tern Survey has been prepared and published by Mike Easterbrook.

Land Bird Survey: Members of the expedition visited each grid square on the island to record the numbers of land birds seen and heard. The aim was to repeat the 1994 land bird survey and to produce dot diagrams of abundance and an overall population figures for Canary, Waxbill, Myna, Red-throated Francolin and House Sparrow. A detailed report is being prepared.

Invasive Species Report: All the land birds on Ascension are introduced species. Results from the AOS land bird survey of 1994 were provided to Karen Varnham for inclusion in the

Invasive species in the UKOTs database project. The recent extinction of the House Sparrow in Georgetown was evidenced from our records.

Ringling Training: The team provided a programme of ringing training for conservation officers from Ascension and St Helena. Colin Wearn (programme leader) and Pete Carr were the instructors. The training commenced at Mars Bay on 11 Feb 04 with ringing of Sooty Terns at Mars Bay and continued to 28 Feb 04. While undergoing training the team ringed a Red Footed Booby *Sula sula* on Stack 5. As a result of the training British Trust for Ornithology (BTO) ringing licences were awarded to Tara George, Stedson Stroud - conservation officers on Ascension Is and to Emma Fowler who monitors the seabirds on St Helena.

Ringling Policy for Ascension: A meeting to formulate a ringing policy for the Island was held on the 25 Feb 2004. Tara George, Mike Bell, Colin Wearn and John Hughes attended the meeting. As a result of the discussions it was agreed that all future ringing on the Island should be co-ordinated through the Conservation Office and ringers should abide by the following guidelines: The Ascension Is. Conservation Office should be informed before any ringing takes place on the Island. At the end of the programme a copy of the ringing log should be deposited with the Conservation Office.

Survival Rates

The Sooty Tern season in Feb 2004 started about three weeks later than expected so we were unable to ring 2,000 pulli as planned instead our ringing effort concentrated on ringing adults and re-trapping.

Ringling: Two thousand adults were ringed by Colin Wearn and Pete Carr during the period 8–28 Feb 2004. The ringer used the ring and fling technique with birds caught on the nest by expedition members using hand nets. Random points around the perimeter of the colony were selected and 50-100 birds were caught at each point. 800 birds were ringed in one day on 12 Feb 2004 (Photo 2). A total of 1463 birds were ringed at the bigger colony at Waterside and a further 537 at Mars Bay. This season colour rings were not fitted and biometric information was not recorded. This brings the total number of Sooty Terns ringed on Ascension in recent years to 5,524. A copy of the ringing log for the season is at Annex B.

Re-trapping Adults: This season we continue with our re-trapping adults for survival programme that commenced in Apr 2003. We spent 64 man hours and re-trapped 163 birds this represents 4.4% of the ringed population. The catch rate works out at 2.5 birds per hour of effort. Re-trapping took place at both fairs. None of the re-traps were controls. We enhanced our re-trapping technique this season by recording the re-trap location more precisely using GPS. In the previous season just the general location of the colony either Waterside or Mars bay was recorded.

DNA: This season we added three more new species to the DNA data base for the Island. On 13 Feb a juvenile Red billed Tropic Bird *Phaethon aethereus aethereus* was ringed and a blood sample collected at Cocoanut Bay. On 19 Feb a Red-footed Booby *Sula sula* was netted on stack 5 during ringing training and a blood sample collected. A fresh car kill Red-throated Francolin *Francolinus afer* was found on the road near the sewerage farm just west of Two Boats and a tissue sample collected. In addition another sample from a Yellow-billed Tropic Bird *Phaethon lepturus* was collected. As with previous samples the vials containing DNA material from the four species were forwarded to the Tissue Collection at the Zoological Museum Copenhagen.

Parasites: We did not check chicks for parasites (aim 8) or measure their weight (aim 9) because they were so young and it would cause too great of a disturbance. Very little infestation by ticks were seen this season only one tick on one bird.

Breeding Success

Exposure to predation and habitat studies were conducted to ascertain breeding success.

Cat Predation: The two main sub colonies at Waterside and Mars Bay were visited on alternative days during the period 9 – 28 Feb 04 and searched for signs of cat predation. A total of ten dead adult Sooty Terns were found. There was no evidence of cat predation on any of the corpses. Cat predation on Sooty Terns this season was nil.

Rat Index: To monitor the possibility of an increase in rat predation on Sooty Terns as a result of the eradication of Feral Cats a rat index was undertaken at Mars Bay. Field techniques

prescribed by Wildlife Management International were used. We are grateful to Charles from the Environmental Health Dept for his assistance. A rat index lines was maintained at Mars Bay during the period 23 - 26 Feb 04 and 150 trap nights were recorded. The index for Mars Bay was 7 rats per 100 corrected trap nights. Brian Bell recorded 6 rats per 100 corrected trap nights at Mars Bay in 1995 and the AOS recorded 5 rats per 100 corrected trap nights in Apr 2003. Unfortunately we had insufficient time to conduct an index at Waterside Fair. Plan exists for this rat index to continue.

Egg Predation: Mynas predate on Sooty Tern eggs. Mynas prick and destroy many more eggs than they devour. Nests were marked and egg survival rates measured. Mynas were seen on the breed colony most days we visited. An indication of their abundance and the predatory determination can be gauged from the fact that two Myna were caught in the rat traps and two pairs were nesting on Waterside Fair. 1229 nest days were recorded this season bringing the overall total over the last 6 seasons to 4,867. The nest survival rate this season was 44.3%. From our sample 34 eggs failed, nine were attributed to Myna predation, ten eggs disappeared, 14 were deserted and the reason why one egg failed was not established.

Mexican Thorn: The spread of Mexican Thorn *Prosopis juliflora* to the edge of the Sooty Terns colonies was first recorded in 1998. Since that date the steady but relentless progress of encroachment by this plant onto the nesting ground has been mapped using GPS. The height, spread and co-ordinates of 72 thorn bushes in the close vicinity of the nest sites were recorded. No significant change in the availability of nest sites for Sooty Terns was recorded this season.

Human Disturbance: During the expedition three vehicles were observed going down Mars Bay to the edge of the fairs and in one case into the colony. A courting couple drove into the colony on 17 Feb at 8pm and were only stopped by mine tape across the path place by our team. Two fishermen also drove half way down the valley but stopped and parked up well short of the colony on 22 Feb at 9.30am. . A set of fresh type tracks going into the colony was observed on Sunday 22 Feb. The vehicle appeared to turn back once it had reached the mine tape. Human disturbance is a real threat to the sub-colony at Mars Bay. The area was used as a live firing range during the build up to the Falklands War.

Survey Effort

Long term monitoring programmes are an expensive business. We are fortunate to have a dedicated team that has been willing to self fund to ensure continuation of the project. The majority of the funding has come from the MoD largely through their adventure training budget. Expedition costs are calculated using standard cost figures. Food and accommodation on Ascension is costed at £26.43 per person per day, vehicle hire or use on Ascension at £20 per day, travel costs including flights to and from Ascension at £900 per person and daily field work at £250 per day. The survey effort of this expedition was 112 man days at a cost £39,980. The breakdown of the costs are MoD £25,110, self funded £12,780, RSPB £1,870 and AOS for rings £120. Wideawake Surveys are very grateful to the RSPB for their continuous support for this programme and to the AOS for paying the cost of rings. The total survey effort of this long term monitoring programme now stands at 1132 man days at a total cost of £406,181.

Acknowledgements

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Annexes:

- A. Monitoring of Birds and species that threaten Sea-birds on Ascension - List of Schemes
- B. Summary of Nesting Density on Ascension Island
- C. Summary of Sooty Tern ringing effort – Feb 2004

Highlights of Feb 2004 Expedition

Sooty tern Double Clutch with Chick and Egg



800 Adult Sooty Terns Ringed at Waterside on 12 Feb 2004



One of the eight pairs of Brown Noddy to lay in the Sooty tern colony



Fairy Tern Survey of AON completed in Feb 2004



Bibliography

- Dinsmore, J. J. 1972 Sooty tern behaviour. *Bulletin Florida State Museum Biological Science* **16**, 129-179.
- Dorward, D. F. & Ashmole, N. P. 1963 Notes on the biology of the Brown Noddy *Anous stolidus* on Ascension Island. *The Ibis Journal of the British Ornithologists' Union* **103b**, 447-457.
- Feare, C. J. 2003 The Sustainable Exploitation of Sooty Tern Eggs in the Seychelles. In *Seychelles Field reports*.