

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

by

Services' Ornithological Societies

13th Report

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John Hughes

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Expedition Report - Monitoring Sooty Terns on Ascension Island April 2003

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 thirteenth in a series of studies that span twenty one 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. The following process is carried out.

- Surveys of the breeding population are undertaken at regular intervals.
- 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.

Aims of the 2003 Expedition

The specific aims of the 16-26 April 2003 expedition were: (1) to determine using GPS equipment the area occupied in the current season by nesting Sooty Terns. (2) To calculate the density of the colony by measuring sample densities in 300 or more quadrats. (4) To calculate the total breeding population on the Island. (5) To record any cat predation and other perceived threats to the colony. (6) To monitor rat predation by repeating the rat index that was completed by Brian Bell at Mars Bay in May 1995. (7) To record Myna predation and determine more precisely egg survival rates. (8) To continue with the Sooty Tern ringing and to commence a re-trap programme. (9) To collect sample specimens of mites, ticks and lice from Sooty Terns for identification purposes.

Participants

John Hughes: Sooty Tern survey leader – Army Ornithological Society (AOS)
Colin Wearn: Ringer – (RAFOS)
Dave Boyle: Cat eradication team - Wildlife Management International Ltd
Lous Bell: Cat eradication team - Wildlife Management International Ltd
Major Andrew Bray: Expedition Leader for 2004 Field trip – (2 days) 21/22 April 03 – (AOS)

Population Levels

The population survey this season was carried out at the optimum time for maximum numbers and for direct comparison with previous seasons. The colony on Ascension is at its greatest 42-60 days after the first egg of the season is laid.

Timings

The first egg of this season was laid on 27 February 2003 and the survey undertaken between 17 and 25 April 2003. The survey took place between the 49 and 57 days after the first egg was laid. The laying period this season extended over 2 full months and was a little longer than normal probably due to the heavy rain on 24 & 25 March which washed away a few thousand

eggs. Chicks began to hatch on the biggest sub-colony on 18 April and the first chick at Mars Bay hatched on 25 April 2003. On 17 April there was a single sub-colony (0.36ha) number 2003/09 with a few hundred chicks 3 weeks old. On 17 April the number of three week old chicks was less than 0.005% of the number of eggs. Shortly after the expedition departed more birds started nesting at Mars Bay this was balanced by the complete desertion of sub-colonies 2003/08 and 2003/03.

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. It should be noted that the surveys in 1990, 1996 and 1998 were carried out using prismatic compass and tape/pace methods. The surveys in 2000 and 2001 were carried out using both GPS and compass & tape, there was no discrepancy between the two field techniques. In April 2003 two Garmin GPS 12XL numbers 35730910 and 35730925 with a position accuracy of 1-5 metres provided rapid, reliable and accurate results. The GPS were on loan from the army. Co-ordinates around the perimeter of each sub-colony at intervals of about 20 metres, were recorded and plotted to determine the area of the colony. The field surveys of the two largest sub-colonies at Waterside were repeated as a check. The colony this season was made up of 14 sub-colonies and as in previous years a “Fair Description Sheet” was completed for each sub-colony. The total area occupied in April 2003 was 10.46ha.

Nest Density

Nest densities were measured by counting all eggs that were passed over by a string, 1.78m long, rotating 360 degrees around a stick at random points within the sub-colonies. In total 5,558 eggs were counted in 379 quadrats giving an average density of 2.08 eggs per sq metre. Twenty three double clutches were recorded; each double clutch was counted as just one nest.

Population Size

A bootstrap procedure was used to determine the breeding population from the raw data in (Table 1). The breeding population in April 2003 was 183,000 +/- 6,000 pairs and was very similar to last season’s population of 185,000 pairs. The population was first calculated in 1990 and repeated in 1996, 1998, 2000, 2001, 2002 and now 2003 (Table 2). The highest breeding population (202,000 pairs) was measured in Oct 1996 and the lowest (75,000 pairs) in Nov 2000. Only adult breeding birds were surveyed. It has not been possible to determine numbers of non breeding adults and recruitment to the colony, immigration, emigration and adult mortality have not been measured.

Breeding Population April 2003 – Raw Data

Sub Colony	Area	No of Quadrats	No of Nests Counted	Average Density	Population Size Pairs
Waterside	6.86	226	4384	19.40	133,152
Mars Bay	3.60	153	2141	13.99	50,364
Total	10.46	379	6525	17.22	183,516

Table 1.

Survival Rates

A further 450 Sooty Terns were ringed by Colin Wearn this season bringing his total to 2,950. One hundred pulli were ringed. Adults caught at Mars Bay had red coloured rings fitted and at Waterside yellow rings. Biometric data was recorded for each adult ringed.

Retrapping Adults

The first serious attempt to re-trap ringed birds took place this season. In total 47 Sooty Terns were re-trapped including two controls. The re-trap data has provided significant new data on intra and inter colony movement. Two re-sighting of colour ringed birds were recorded. Both birds were in the same sub colony where they were ringed.

Immigration

The first evidence that immigration to the Ascension Island colony does occur was gathered this season. Two re-trap birds provided the proof. One bird had a Brazilian ring and the other an American ring. We await full details from the BTO. In 2002 a bird with an American ring was re-trapped but the tern had been ringed on Ascension in 1975. We have no record of any Brazilian ringers on Ascension.

Inter Colony Movement

Three birds which were ringed previously at Waterside were breeding at Mars Bay and three birds that were ringed at Mars Bay were now breeding at Waterside. The data collected this season clearly shows that inter colony movement on Ascension does occur.

Dave Boyle visited Boatswain Bird Island (BBI) and reported that no Sooty Terns were breeding on the rock. A small colony of a couple of dozen pairs has traditionally bred on BBI but in the last 10 years the number has decreased to one or two pairs. This sub-colony is the oldest on the Island and has been occupied since at least 1876. It is interesting to note that BBI is free of both rats and cats.

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 17-25 April and searched for signs of cat predation. A total of six dead adult Sooty Terns were found, three at Mars Bay and three at Waterside. There was no evidence of cat predation on four of the corpses; however, two of the corpses collected from the east side of Waterside could have been killed by a cat. Both of these corpses were about a month old. The head of one was separate from the body, a clear sign of cat predation. No recently killed Sooty Tern corpses were found. One feral cat was killed at the NASA site three weeks after we left on 22 May 2003. Cat predation on Sooty Terns this season is virtually 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 and Waterside. Field techniques prescribed by Wildlife Management International were used. A rat index lines was maintained at Mars Bay during the period 17 to 21 April and at Waterside during the period 23 to 25 April. Only Black Rats *Rattus rattus* were trapped. The traps were sighted in pairs, thirty two traps were used and the co-ordinates of each site established with GPS. At Mars Bay in addition to rats 8 House Mice *Mus musculus* were trapped. At Waterside Landcrabs

Gecarcinus lagostoma and brightly coloured shore crabs took most of the bait. Landcrabs partly devoured one of the rats caught at Waterside. The stomach content of the trapped rats was examined but no evidence of predation on Sooty Terns or their eggs was found. The index for Mars Bay was 5 rats per 100 corrected trap nights and at Waterside 3 rats per 100 corrected trap nights. Brian Bell recorded 6 rats per 100 corrected trap nights at Mars Bay in 1995. Plan exists for this rat index to continue.

Myna 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. 730 nest days were recorded this season bringing the overall total over the last 5 years to 3,640. Sufficient data now exists to determine the nest survival rate and the extent of Myna predation, paper in preparation.

Parasites

Parasites are frequently seen on Sooty Terns. The number appears to vary from season to season. During day light hours parasites are seen on the web and feet of Sooty Terns. They are frequently seen by ringers while taking biometric measurements and on occasions they have transferred themselves to the ringer. At night parasites are much more in evidence and can be seen on the back and head of the majority of the birds in the colony. To date these parasites have not been identified. Thirteen parasites were collected and stored in vials of ethanol and mailed to Dr Vince Smith, University of Glasgow for identification. The three specimens of lice collected have been identified as a male and female *Saemundssonina albermarlensis* and one male *Austromenopon atrofulvum*. Ten tick specimens were also collected and await identification now scheduled for August 2003.

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 thorn bushes in the close vicinity of the nest sites were recorded in Nov 2000, June 2002 and again in April 2003. This season only four bushes are left at Mars Bay following sterling work by Richard White and Tara George who cleared the majority of the site. Unfortunately the remaining bushes are thriving and have finished flowering and seed pods litter the surrounding ground. At Waterside the problem is greater and the plants are spreading to the colony from the north and west.

Future Work

The date of the next military ornithological expedition to Ascension is scheduled for the second week in February 2004. The expedition will consist of 8 to 10 members and last for two weeks. The team will include military surveyors to carry out the GPS survey and two ringers. The main aims are to monitor predation, evaluate the success of the cat eradication programme, to repeat the population survey and to ring 2,000 pulli.

The long term aim is to record all the data collected (Table 3) onto a Geographical Information System (GIS) and to provide user access via the internet.

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The success of the 2003 project would not be possible without the excellent assistance provided by Lous Bell and Dave Boyle. We are grateful for the loan of equipment from the army, for the travel grant provided by the RSPB and for help from Dr Vince Smith Glasgow University with identification of parasites.

Ascension Island - Sooty Tern Population - Adult Breeding Pairs (1942 – 2003)

Year/Surveyed by	Population Size Pairs	Lower 95% CI	Upper 95% CI	Mars Bay Area hectares	Total Area hectares
1942 (Chapin)	<500 000 estimate	“..it is my belief that in 1942 there may possibly have been a million” This statement refers to all Sooty Terns and presumably includes none breeders as well as breeding pairs.			
1958 (Ashmole)	<380 000 estimate	“I would <u>guess</u> that the total population is in the order of three-quarters of a million birds.”			
Feb 1987 (RAFOS)	50 000 estimate				
1990 (AOS Survey)	176 000	155 000	198 000	1.50	9.63*
1994 (AOS)	90 000 estimate				
1996 (AOS Survey)	202 000	188 000	216 000	1.77	9.67
1997 (RSPB Survey)	151 000	143 000	158 000	2.04	9.12
1998 (AOS Survey)	207 000	197 000	219 000	1.59	10.33
Jan 2000 (R. Dickey)	90 000 estimate				
Nov 00 (AOS Survey)	75 000	70 000	80 000	Not surveyed approx 0.2ha	3.63
Sept 2001 (RSPB/AOS)	150 000	146 000	154 000	1.81	6.90
Jun 2002 (AOS Survey)	185 000	180 000	191 000	3.24	9.62
Apr 2003 (AOS/RSPB)					
Waterside (3.60 ha)	133 000	128 000	139 000	3.60	10.46
Mars Bay (6.86 ha)	50 000	46 000	54 000		
Total	183 000	177 000	190 000		

- This figure has been adjusted to allow a more realistic comparison with other seasons. In 1990 one sub-colony (5.46 ha) contained numerous small pockets of birds but much of the area was un-occupied.

Table 2

Sooty Tern – Ascension Island - Long Term Monitoring Programme

Season	Reference	Date First Chick Hatched Waterside	Field Observations and Population estimate.
1	Blair 1987 Report 1	?? Dec 86	9 - 25 Feb 87 RAFOS estimates 50,000 pairs
2		?? Oct 87	No field records
3	Osborn 1994 Report 2	?? Jul 88	Ex Booby I 2,500 terns at Mars Bay 11 Nov. Numbers reducing daily.
4		?? May 89	No field records
5	Hughes 1991 Report 3	12 Mar 90	Field Obs by EX Booby 2 and P. Ashmole. Population 176,000 pairs
6		?? Dec 90	3 Feb large thriving fairs at Mars Bay & Waterside N.S-B
7	Walmsley 1992 Hughes 1992 Report 4 & 4a	?? Oct 91 Eggs but no chicks at Mars Bay 2 Jan	Terns about in Oct N.S-B 44,300 abandoned eggs recorded by Booby 3 Field Notes by Newlyn Browne - First egg 22 Sept Bill Bourne
8	Field Notes by Newlyn Browne	9 Sept 92	30 June – 8 July 92 Booby 3 2,500 tern and eggs found at Waterside Fair 11 Aug. N.S-B Incubating period of 29 days added
9	K. Simmons	02 Jun 93	Simmons visited in 1993 Estimate Sept /Oct 93 Simmons 100,000 chicks & sitting adults a very successful season Simmons Letter 14 Dec 93 & 10 May 95 Ibis 136 258-259
10	Hughes 1994 Report 5	15 May 94	Booby 4 12-23 April 94 First egg of season 16 April 94 at Little John Waterside Fair 29 days incubation added. Estimate 90,000 pairs
11		?? Jan 95	No field records
12	Letter Simmons 22 Mar 96	23 Jan 96	Simmons visited in 3 -31 Jan 96 5 Jan 96 first eggs at Mars Bay 23 Jan new-hatched chicks Waterside Fair 23 Jan 96 Ibis 139 433-434
13	Hughes 1997 Report 6	28 Oct 96	Booby 5 28 Oct – 9 Nov 96 Population 202,000 pairs
14	Ratcliffe et al 1999 Report 7	7 Sept 97	RSPB Expedition Population 151,000 pairs First Chick waterside Fair 7 Sept 97. Simmons Expedition 6 Oct – 5 Nov 97 Simmons 1998
15	Hughes 1999 Report 8	1 June 98	Booby 6 22 Jun – 5 July 98 Population 207,000 pairs
16	Nash 2000 AOS Bulletin 1/2000	23 March 99	RHJ Nash saw juvenile Sooty Terns off Portland Point July 99 Neil Mc Falls letter Jan 2001
17	R. Dickey Report 9 Unpub	19 Jan 00 at 1000 hrs	Recce R. Dickey 18/19 Jan 00 Estimate 90,000 pairs
18	Hughes 2002 Report 10	19 Nov 00	Booby 7 7 – 22 Nov 2000 Population 75,000 pairs
19	Hughes Report 11 Unpub.	23 Aug 01	RSPB expedition 4 -21 Sept 01 Population 150,000 pairs
20	Hughes Report 12 Unpub.	12 June 02	Booby 8 16 – 27 June 2002 Population 185,000 pairs
21	Hughes Report 13 Unpub.	27 March 03	RSPB sponsored expedition Population 183,000 pairs
22		Early Feb 04	Booby 9

Table 3