

# **Suwarrow Seabird Survey**

An assessment of the numbers and age-stages of seabird chicks on the  
motus of Suwarrow atoll during July 2008

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Cook Islands Prime Ministers Office and Environment Service

## **Preface and Acknowledgment**

This document presents survey results collected for the Cook Islands Environment Service and provides continuing data for the Cook Islands National Biodiversity Strategy and Action Plan (NBSAP) initiated in 2000.

The author thanks the Cook Islands Government and the Cook Islands Environment Service for providing the necessary permits; John Samuela (Suvarrow caretaker) for his hospitality on Suvarrow; and Graham Wragg (Pacific Expeditions) for providing logistical support and passage aboard the RV Bounty Bay.

## Executive Summary

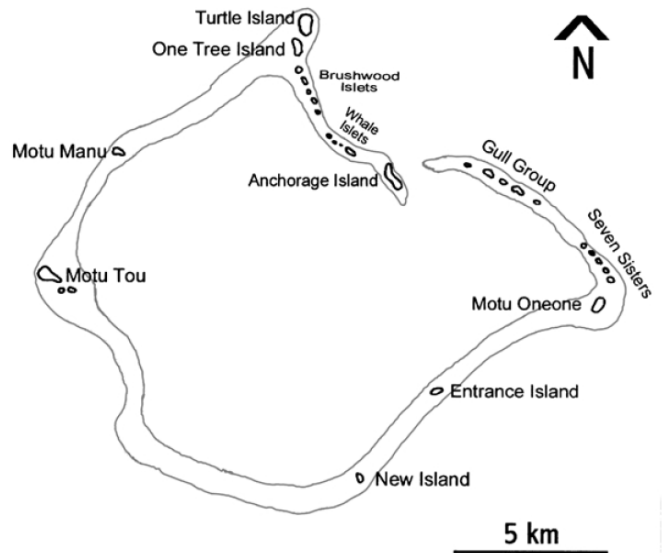
### Suwarrow Seabird Survey: An assessment of the numbers and age-stages of seabird chicks on the motus of Suwarrow atoll during July 2008

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Each Suwarrow motu was surveyed during July 2008 for seabird chick numbers and age-states using a simple sampling method used for a similar survey in August 2000. Totals for each species are presented in the Table below and detailed data for each motu can be found in the Results section. Overall, bird numbers appear to be similar or slightly lower than those recorded in 2000 (see Figure). It is not clear if the lower numbers reported represent any real shift from natural variation due to such factors as storm damage to breeding sites, however it is noted that when compared with earlier survey results (1972-1992) numbers of Sooty Tern, Red-tailed Tropicbird and Brown Booby have tended to trend downwards.

Sooty Tern chicks (41,243 total) tend to be spread across the more low-lying northern motu – particularly One-Tree Island, Motu Manu and Brushwood Islands (see Table below). Motu Manu and the Gull Group remain important breeding areas for Lesser Frigatebird (5509 total) and smaller colonies of Great Frigatebird (329 total) are located on Motu Kena (the two small islets next to Motu Tou), Brushwood and One-Tree islets. Red-tailed Tropicbird chicks (285 total) are spread across most motus with nearly half their number located on the small islets of Motu Kena, New and Entrance Islands. Red-Foot Booby chicks (559 total) are thinly spread across most motu with approximately half their number located on One-Tree Island. Masked Booby are maintaining a presence on the eastern motu of Motu One One, Seven Sisters and the Gull Group. One Black Noddy colony was observed on Turtle Island. Brown Noddy were not observed nesting.



Motu Tou has a rat infestation and nearly zero nesting birds, including the absence of a colony of Black Noddy observed in 2000.

Suwarrow appears to be very well managed by the current caretaker (John Samuela). John's attitude of (1) the environment comes first and (2) the birds were here before people, is garnering much respect from the international sailing community. His ability to function effectively would however be greatly enhanced if improved communication equipment were made available (e.g. a satellite phone) so that he could be more easily in touch with the authorities in Rarotonga. A year-round presence on Suwarrow is desirable to prevent illegal activities, such as fishing and taking of crabs, which are probably occurring on Suwarrow in the November-March period when the warden is in Rarotonga.

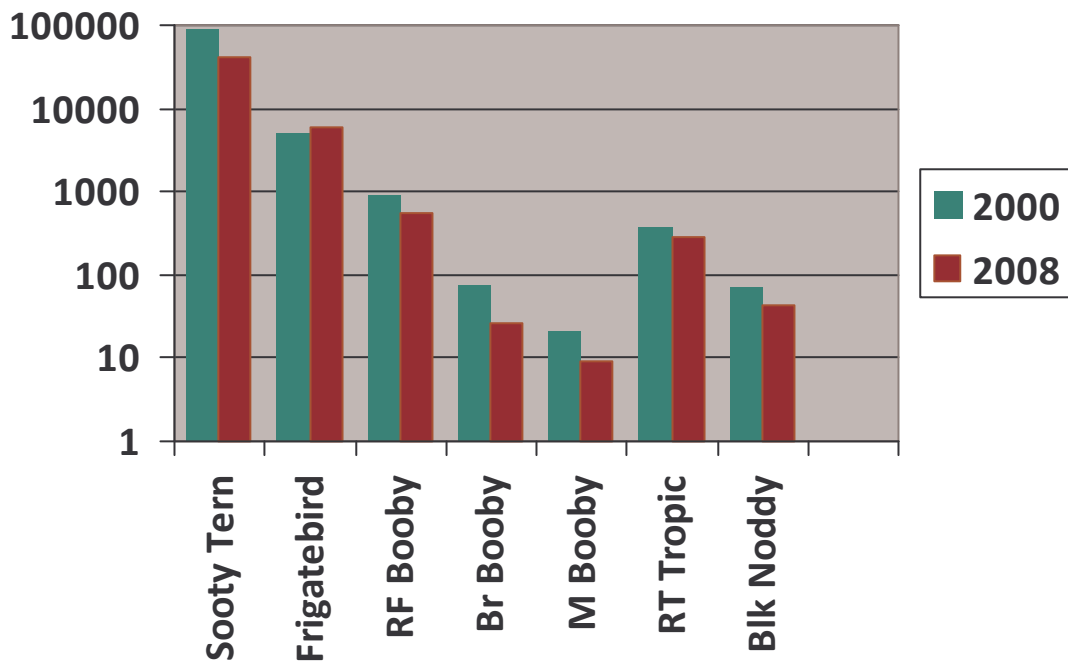
A paper presenting the data from this report will be submitted for publication to the journal Bird Conservation International. Copies will be forwarded to the CI Prime Ministers department when they become available.

Seabird chick numbers – Suwarrow, July 2008

Species	Total	Motu												
		Turtle	One Tree	Brushwood 1	Brushwood 2-6	Whale	Manu	Tou	Kena	New / Entrance	OneOne	Seven Sisters 2-6	Gull Group	Anchorage
Red-tailed Tropicbird	285	4	10	25	31	9	12	0	52	85	14	16	24	3
Red-Foot Booby*	559	2	295	5	33	19	26	6	41	8	66	14	44	0
Brown Booby	26	0	0	2	0	0	0	0	4	0	11	9	0	0
Masked Booby	9	0	0	0	0	0	0	0	0	0	1	6	2	0
Black Noddy	42	42	0	0	0	0	0	0	0	0	0	0	0	0
Great Frigatebird	329	6	100	4	103	11	1	2	92	0	0	0	10	0
Lesser Frigatebird	5509	0	25	0	0	0	3126	0	0	0	0	0	2321	0
Sooty Tern	41243	0	17800	2650	8292	0	10137	0	0	0	0	182	2182	0

\*combined total for both morphs

Seabird chick numbers on Suwarrow - 2008 vs 2000 data.



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## **Introduction**

Suvarrow is a major sea-bird breeding site in the central Pacific Ocean. Several species breed in large numbers and are important for maintaining and restocking populations on other islands. In particular, significant proportions of the world's Red-tailed Tropicbird and Lesser Frigatebird breed on Suvarrow.

Although undeveloped, Suvarrow is frequently visited by people, and many bird species that breed there are known to be negatively impacted by human activity. Suvarrow was declared (by the Cook Islands Parliament) a National Park, about thirty years ago - however such protection needs strengthening by further legislation and more effective management. To better understand natural variations in bird numbers and to gauge the effect of human activity on the natural environment it is important that Suvarrow birds be periodically surveyed. The following results represent the findings of a chick survey conducted during July 2008 and builds on data collected in 2000.

## **Methods**

### **Transport**

From Aitutaki to Suvarrow and then to Apia aboard the RV Bounty Bay.

### **Survey Techniques**

Larger motus (ie. Anchorage, One Tree, Turtle, Manu, Tou) were sampled by pacing out 100m intervals on a compass bearing and then counting chicks contained within a 20m-wide transect running at right-angles to the compass bearing and contained within the interval. For most of the larger motus transects ran east-west of a north-south line and sampled 20% of the area. Other motus were small enough to be surveyed in their entirety.

Chicks were counted and age-states determined using a system supplied by the CINHT. Briefly, feather development was determined from charts as being one of the following stages: Egg, Naked, Down, Scapulars, Wings/Tail or Juvenile. The system was modified slightly: Juvenile Sooty Tern were split into two groups 'Downy Juvenile' and 'Juvenile' to distinguish between fully feathered juveniles that had no down (many of which were flying) and juveniles with some down remaining about the belly and flanks. Black Noddy were recorded as 'Egg' when birds were observed high up in trees and consequently it was not possible to see easily into nests. Red-Foot Booby counts are presented in this report as combined counts for brown and white and intermediate morphs. Separated morph data is available if required.

Sooty Tern chicks were highly mobile and were often present in large numbers. Counts were made by standing still and choosing a landmark (eg a tree) beyond a field of chicks. Chick numbers within the field between observer and landmark were then counted. The observer then walked through the field to the next landmark repeating the process until the study area had been traversed. Other ground-based chicks (Tropicbird, Masked and Brown Booby) were present in numbers small enough to be easily counted directly. Tree dwelling species (Red-Foot Booby, Frigatebird, Black Noddy) were counted directly.

# Results

## 1. Turtle Island

Turtle Island is a large motu with a dampish interior. It is relatively exposed. In the 2000 survey the northern shoreline was reported as littered with a large amount of flotsam, mainly consisting of inert items such as intact light-bulbs, fluorescent tubes, polystyrene floats, rubber jandals etc. This time there did not appear to be so much of the smaller items but there were a number of large items, including planks of wood and what looked to be a wooden power-pole. Mosquitos were present. Coconut crabs appeared abundant in the interior and appeared to be more abundant than on other motu. One reason for this might be the relative difficulty for harvesters of coconut crab in reaching Turtle Island by dinghy considering it's location across a wide and relatively shallow part of the lagoon.

As discovered in the 2000 survey, Turtle Island contains relatively few nesting birds, limited this time to less than 10 each of Great Frigatebird, Red-Foot Booby and Red-tailed Tropicbird nesting under Ngangie bushes. Additionally, a colony of 42 Black Noddy nesting high in a grove of Pukatea trees on the eastern side of the motu suggests the two nests observed in 2000 may have developed into a larger colony. Throughout Turtle Island White Terns were flying about. Bristle-Thighed Curlew and Wandering Tattler were occasionally seen along the shoreline.

### Chick Numbers

Turtle Island was surveyed using seven transects and was found to contain no nesting birds within the interior. Nesting birds were therefore counted in total by walking around the island and counting all birds nesting within the first coastal vegetation fringe. Total counts (including age states for each species) for Turtle Island are presented in Table 1:

**Table 1 - Chick numbers for Turtle Island**

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	4	4						
Red-Foot Booby*	2				1	1		
Brown Booby	0							
Masked Booby	0							
Brown Noddy	0							
Black Noddy	42	42**						
Great Frigatebird	6	3				3		
Lesser Frigatebird	0							
Sooty Tern	0							

\*all morphs

\*\*assumed

## 2. One Tree Island

One Tree Island is low and contains a lot of vegetation including pemphis and heliotrope. The vegetation did not appear to be as dense as in 2000 and scattered coral and flotsam in the motu's interior suggests that storm and sea damage may have penetrated the island recently. Bird populations (mostly Red-Foot Booby and Sooty Tern) were mostly concentrated around the southern half of the motu. Many Sooty Tern were observed to be incubating eggs and large numbers of very small (downy) chicks were running about. Two Bristle-thighed Curlew and pairs of Brown Noddy were seen near the water's edge. Coconut crabs were not seen. One Tree Island was surveyed using 5 transects.

### Chick Numbers

Total counts (including age states for each species) are presented in Table 2:

*Table 2 - Chick numbers for One Tree Island*

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	10	10						
Red-Foot Booby*	295	100		85	5	40		65
Brown Booby	0							
Masked Booby	0							
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	100	70			5	25		
Lesser Frigatebird	25				10	15		
Sooty Tern	17800	45		1500			5525	10730

\*all morphs

## 3. Brushwood Island 1

Brushwood 1 is smaller, but of a similar terrain to One Tree Island. Of note were a colony of Sooty Terns containing late-juvenile chicks (ie flying). Sooty's were not observed on Brushwood I during the 2000 survey. A number of new-looking but unoccupied Brown Booby nests were observed on the lagoon-side. Coconut crabs were not seen. The motu was surveyed using one transect.

### Chick Numbers

Brushwood I was surveyed whole. Total counts (including age states for each species) are presented in Table 3:



**Table 3 - Chick numbers for Brushwood 1**

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	25	15		1		2		7
Red-Foot Booby*	5	3		1		1		
Brown Booby	2	2						
Masked Booby	0							
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	4	1			1	2		
Lesser Frigatebird	0							
Sooty Tern	2650							2650

\*all morphs

#### 4. Brushwood Islands 2-6

Brushwood Islands 2-6 are small low islets predominantly exposed as cemented platform or covered in low pemphis. Each islet is separated from each other and from Whale and Brushwood 1 islands by shallow channels crossable at low tide. Compared to when the 2000 survey was performed, the amount of vegetation on the Brushwood Islands was visibly less and the islets had a 'swept appearance'. This is likely to have been caused by recent cyclone activity and this view is supported by the observations of divers who report large amounts of bush and trees at the bottom of the lagoon adjacent to the low-lying and exposed (NE) islets of Brushwood, Whale, Gull and Seven Sisters. Coconut crabs were not seen.

These islets were small enough to survey whole. As noted in 2000, Brushwood 4 islet contained no birds and appeared to be composed of a small patch of cemented platform.

#### Chick Numbers

Combined islet chick counts for Brushwood 2-6 are presented in table 4:

**Table 4 - Chick numbers for Brushwood Islands 2-6**

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	31	25		1				5
Red-Foot Booby*	33	5		16	1	9		2
Brown Booby	0							
Masked Booby	0							
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	103	16		6	6	44	31	
Lesser Frigatebird	0							
Sooty Tern	8292						42	8250

\*all morphs

## 5. Whale Island

Like Brushwoods 2-6, Whale Island consists of a string of smaller islets exposed as larger masses at low tide. Also like Brushwood islets, Whale Island was relatively bare of vegetation compared to 2000. Two remaining coconut palms show obvious storm damage. In addition to the surveyed birds, White Terns were flying about and Reef herons were observed near the waters edge. Coconut crabs were not seen.

### Chick Numbers

Counts for chick age-states of each species are presented in Table 5.

**Table 5 - Chick numbers for Whale Island**

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	9	8			1			
Red-Foot Booby*	19	5		10		1		3
Brown Booby	0							
Masked Booby	0							
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	11	1		1	3	6		
Lesser Frigatebird	0							
Sooty Tern	0							

\*all morphs

## 6. Motu Manu

Motu Manu is an exposed islet on the north-western rim of Suwarrow. At the western end is a large flat area of cemented platform covered with low pemphis. This section was very rich in bird-life – especially Frigatebird and Sooty Tern. The eastern (lagoon) section is separated from the western end by a raised channel and is composed of cemented platform with patches of pemphis gradually changing to high pemphis, heliotrope and a few young coconuts toward the eastern end. The central area of the eastern end is also quite dense with Pukatea trees and Canavalia vines (jack bean). As noted in the 2000 survey, much rubbish, including plastic rope, floats, glass and plastic bottles, pieces of wood, rubber jandals and shoes, litters the eastern shoreline as well as some of the interior. Most of the rubbish appears as if it has originated from fishing boats – possibly of asian origin from the labels of most of the bottles and jars seen. Also observed during the 2000 survey was evidence of recent rubbish fires. Bristle-Thighed Curlew were observed near the shoreline and Brown Noddy were flying about in pairs (none observed nesting). Coconut crabs were not seen.

As with the 2000 survey, the western section of Motu Manu was surveyed using three transects and the eastern section was surveyed in its entirety.

### Chick Numbers

Total counts (including age states for each species) for Motu Manu are presented in Table 6:

**Table 6 - Chick numbers for Motu Manu**

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	12	11						1
Red-Foot Booby*	26	8		4		3		11
Brown Booby	0							
Masked Booby	0							
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	1					1		
Lesser Frigatebird	3163	1797			700	666		
Sooty Tern	10126						1256	8870

\*all morphs

## 7. Motus Tou and Kena

### Motu Tou

Motu Tou is one of the largest islets and also one of the most wooded. Some very high trees were seen in the interior. In one area *Cordia* trees were estimated at over 30 metres tall and in 2000 were observed to contain a large Black Noddy colony. Although Black Noddy were seen flying about Motu Tou during the latest survey no nests were seen. In fact, after examining transects and surveying the entire shoreline of Motu Tou, only 8 chicks of all bird kinds were observed; and these were all high nests along the shoreline trees. The chick population consisted of: 2 Great Frigatebird (1x Juvenile and 1x Wing/Tail) and 6 Red-Foot Booby (3x Egg, 1x Downy, 1x Wing/Tail and 1x Juvenile). No ground-nesting birds were observed on Motu Tou. This appeared unusual considering the size and apparent suitability of parts of Motu Tou for such birds as Tropicbird, Sooty Tern and Brown Booby – in fact several un-occupied Brown Booby nests in otherwise good condition had been built on the southern side of the island. However, Motu Tou also appears to be heavily invested with rats. Without actually looking for any the author saw at least 4 rats hopping about the foreshore on the south side of the island, and more were seen by John Samuela's family when they visited a few days later. The rats are the Pacific Rat or Kiore (Wragg and Saul pers comm.). Coconut crabs were observed in the interior of Motu Tou.

### Motu Kena

Relative to their size, the two small islets of Motu Kena on the lagoon-side of Motu Tou were found to be rich in birdlife, including a reasonable-sized Great Frigatebird colony on the inner motu. Motu Kena was surveyed in their entirety and the results are presented in Table 8. No rats were observed on Motu Kena.

**Table 8 - Chick numbers for Motu Kena**

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	52	18		4	1	1		28
Red-Foot Booby*	41	17		1	1	5		17
Brown Booby	4	1		2		1		
Masked Booby	0							
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	92	9		1	24	42		16
Lesser Frigatebird	0							
Sooty Tern	0							

\*all morphs

## 8. New and Entrance Islands

New Island is composed of a longish strip of rubble with a small amount of vegetation including coconut, heliotrope Pukatea. For their sizes, New and Entrance Islands are well endowed with nesting Red-tailed Tropicbird. As with the 2000 survey, white terns were observed breeding on New Island. Reef Herons were seen on the reef near New Island and a Hawkesbill turtle was seen swimming near New Island. Of interest was the discovery of a section of whale backbone, consisting of 4 still-connected vertebrae) high on the beach of New Island. These appeared similar to a longer section of vertebrae laying on Motu OneOne.

### Chick Numbers

Both New and Entrance Islands were surveyed in their entirety. Results were combined and are presented in Table 9.

**Table 9 - Chick numbers for New and Entrance Islands**

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	85	23		6	9	14		33
Red-Foot Booby*	8	2		4		1		1
Brown Booby	0							
Masked Booby	0							
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	0							
Lesser Frigatebird	0							
Sooty Tern	0							

\*all morphs

## 9. Motu OneOne

Motu OneOne lies on the eastern flank of the Suwarrow reef. Some storm damage was apparent at the northern end of the island with sand and coral rubble having spread into the central part of the island in comparison with the findings of the 2000 survey. A small unvegetated coral cay observed between Motu OneOne and the Seven Sisters group in 2000 now appears to have gone – probably washed away by storm surge. White Tern were seen flying about the interior of Motu OneOne. Wandering Tattler and Bristle-Thighed Curlew were seen walking near the water's edge. Long-tailed Cuckoo were heard in the interior. Coconut crabs were observed in the interior. A length of whale vertebrae were seen on the Southern beach.

Several transects were assessed without observing birds in the interior of Motu OneOne, so the islet was surveyed in its entirety by walking around the islet and counting populations within the coastal fringe. Chick numbers and age states are presented in Table 10.

*Table 10 - Chick numbers for Motu OneOne*

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	14	14						
Red-Foot Booby*	66	6		6		2		6
Brown Booby	11	7	1	1				2
Masked Booby	1	1						
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	0							
Lesser Frigatebird	0							
Sooty Tern	0							

\*all morphs

## 10. Seven Sisters 2-6

As with the the other northerly low-lying motu, the Seven Sisters showed many signs of recent storm damage. Compared to the 2000 survey, the islets were relatively devoid of vegetation and had a 'swept' appearance. A few battered coconut trees were present as well as areas of regenerating pemphis and Pukatea, and areas of stripped heliotrope. Some large areas of portulaca were seen growing. Coconut crabs were not seen.

Each motu was surveyed for chicks in its entirety. Combined totals for all Seven Sisters motu are presented in Table 11.

*Table 11 - Chick numbers for Seven Sisters 2-6*

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	16	16						
Red-Foot Booby*	14	4		6		2		2
Brown Booby	9	6				3		
Masked Booby	6							
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	0							
Lesser Frigatebird	0							
Sooty Tern	182						22	160

\*all morphs

## 11. Gull Group

Similar in size to Seven Sisters 2-6 the four islets of the Gull Group lie on the north-eastern rim of Suvarrow adjacent to the passage. As with the Seven Sisters, Brushwood and Whale motu, extensive storm damage including lost sand and vegetation compared to the 2000 survey was observed. Bristle-Thighed Curlew were observed on the reef.

Each of the four islets of the Gull Group were surveyed in their entirety and results are presented in Table 11.

*Table 11 - Chick numbers for Gull Group*

Species	Total	Chick Age-state						
		Egg	Naked	Downy	Scapular	Wing-Tail	Downy-Juvenile	Juvenile
Red-tailed Tropicbird	24	19		3				2
Red-Foot Booby*	44	9		30		3		2
Brown Booby	0							
Masked Booby	2	2						
Brown Noddy	0							
Black Noddy	0							
Great Frigatebird	10	1			3	6		
Lesser Frigatebird	2321	1136			399	786		
Sooty Tern	2182	11					19	2152

\*all morphs

## 12. Anchorage Island

As described in the 2000 survey, Anchorage is the largest motu and also the most impacted by human activity. Several major differences were noted between Anchorage today and that of the 2000 survey:

1. A cyclone shelter has been built (2001) next to the old coast-watcher building.
2. A caretaker (John Samuela) and his family were in residence this year whereas no caretaker had been appointed for 2000.
3. Vegetation is less dense due to storm activity and human clearing over the last 8 years.
4. The areas near the beach and house were not as rubbish-free as they were in 2000, probably due to current habitation and increased frequency of boat visits? However, general rubbish around the beaches was less, probably assisted by regular cleaning by the caretaker.

Anchorage was surveyed using 10 transects and although birds were not observed nesting in the interior, three pairs of Red-tailed Tropicbird were observed nesting under pemphis bushes at the north end of Anchorage Island. This is encouraging considering no birds were observed nesting on Anchorage in 2000. However, as observed in 2000 there was a domestic cat living on Anchorage (a different cat, left by a previous caretaker apparently). Long-Tailed Cuckoo were regularly heard and one observed feeding in a breadfruit tree. One White-Tailed Tropicbird was also observed – flying in and out of the crown of a coconut tree. Brown Noddys were flying about in substantial numbers. Rats were not seen and the caretaker commented that mice had not been seen for some time. Coconut crabs were observed and some large specimens were produced by the caretakers children.

## Discussion

As found during the 2000 survey, Sooty Tern were the most numerous birds observed breeding on Suvarrow during July 2008 (41,243 chicks – Table 12). However, the numbers counted were approximately half of those counted in 2000 (88,044 – Fig. 1). The reason for the lower numbers and whether it represents something other than natural variation is unclear. It may have been influenced by some of the Sooty Tern breeding areas having been recently impacted by storm damage (especially the loss of vegetation cover on the northern motu. In particular, One Tree Island was found to contain over 30,000 fewer Sooty Terns in July 2008 than in July 2000. The difference of one month in the survey timing may also have influenced the results with many Sooty Tern still laying eggs on One Tree Island in July this year, suggesting chick numbers may be higher for August – the month surveyed in 2000. On the other hand, the great majority of Sooty Tern chicks counted on One-Tree Island in August 2000 were juvenile stage so would have been represented in the July 2008 survey at an earlier chick stage if breeding patterns had been similar.

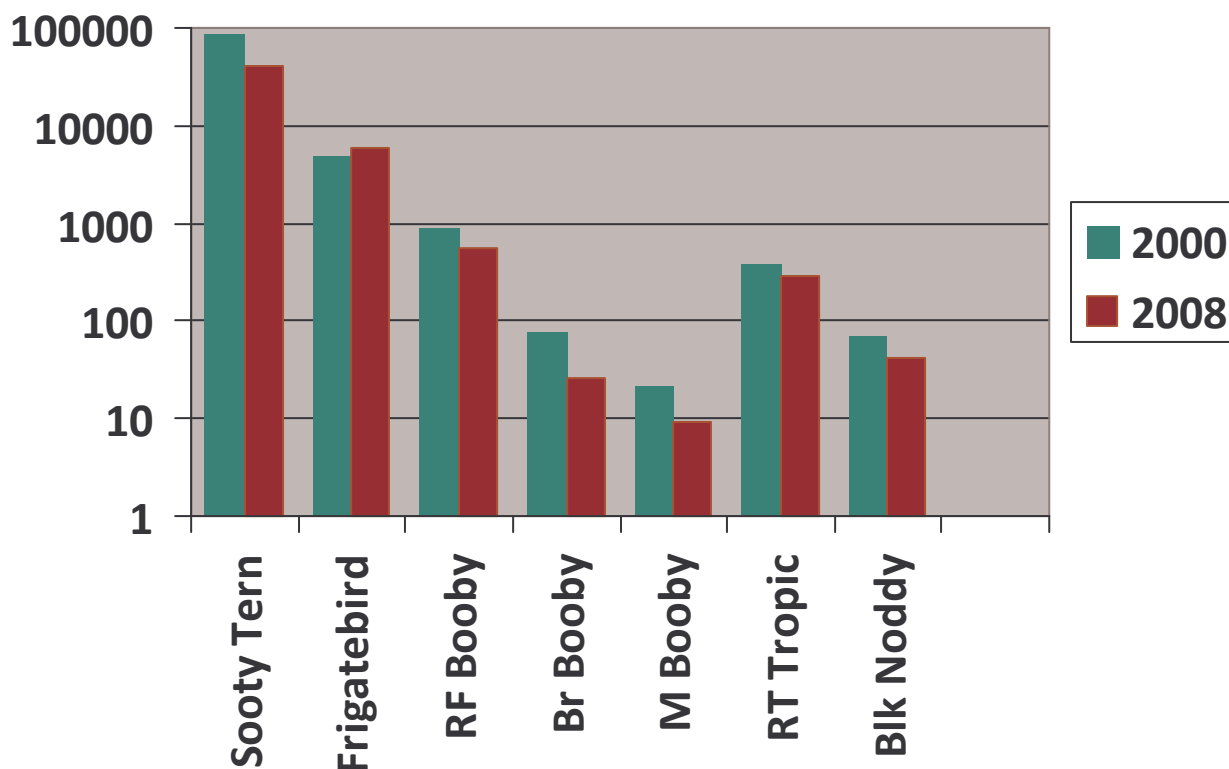
**Table 12 - Seabird chick numbers – Suvarrow, July 2008**

Species	Total	Motu												
		Turtle	One Tree	Brushwood 1	Brushwood 2-6	Whale	Manu	Tou	Kena	New / Entrance	OneOne	Seven Sisters 2-6	Gull Group	Anchorage
Red-tailed Tropicbird	285	4	10	25	31	9	12	0	52	85	14	16	24	3
Red-Foot Booby*	559	2	295	5	33	19	26	6	41	8	66	14	44	0
Brown Booby	26	0	0	2	0	0	0	0	4	0	11	9	0	0
Masked Booby	9	0	0	0	0	0	0	0	0	0	1	6	2	0
Black Noddy	42	42	0	0	0	0	0	0	0	0	0	0	0	0
Great Frigatebird	329	6	100	4	103	11	1	2	92	0	0	0	10	0
Lesser Frigatebird	5509	0	25	0	0	0	3126	0	0	0	0	0	2321	0
Sooty Tern	41243	0	17800	2650	8292	0	10137	0	0	0	0	182	2182	0

\*combined total for all morphs

Large populations of Lesser Frigatebird chicks (5509) were counted during the current survey, as well as smaller numbers of Red-Foot Booby (559), Great Frigatebird (329), Red-tailed Tropicbird (285), Black Noddy (42), Brown Booby (26) and Masked Booby (9) - Table 12. With the exception of Frigatebirds, all populations were slightly lower than those observed in August 2000 (Fig. 1). The reason for the lower numbers is unclear but as suggested for Sooty Tern, environmental damage from storms and the slightly earlier timing of the 2008 survey may have influenced numbers. Nevertheless, chick numbers for most species appear to have been dropping since the time of earlier surveys conducted between 1972 and 1992. For example, a total of 285 Red-tailed Tropicbird were observed nesting on Suwarrow during the current survey. This is slightly lower than the 382 observed in 2000 and lower again when compared with survey data collected in 1992 (400) and 1985 (500) – CINHT data. This may be of concern considering that Suwarrow is viewed as a significant repository for this species. Similarly, 26 Brown Booby chicks recorded in the latest survey is lower than 75 observed in 2000, and if the survey methods are equivalent is lower again than 95 reported in 1992 and approx 500 counted in 1972.

*Fig. 1 Seabird chick numbers - 2008 vs 2000 data.*



In 2000, Frigatebirds were counted as one population (4,971). In 2008, Greater and Lesser species were counted separately and when numbers are combined a slightly higher population (5,838) was observed than in 2000 (Fig. 1). The 329 Great Frigate chicks counted in 2008 represents a slight increase in numbers from surveys completed in 1985 and 1992 (100 and 250 chicks respectively assuming equivalency in survey methods). Chicks counted in 2008 were mostly from three colonies of approximately 100 birds each on One-Tree Island, Brushwood 2-6, and Motu Kena. While the Lesser Frigatebird chick population (5509- Table 12) is slightly higher than the total Frigatebird chick population measured in 2000, it is less than 8,500 Lesser Frigatebirds counted in 1992. In



2008 the Lesser Frigatebird population is largely made up of two colonies based on the Gull Group (2321) and Motu Manu (3163). In 2000, large 'Frigatebird' colonies were noted on Motu Manu (3406) and the Gull Group (1344). In the light of the 2008 data it is not unreasonable to speculate that the 2000 Manu and Gull colonies were composed of the lesser species. If so, Lesser Frigatebird populations have remained at about the same numbers since the 2000 survey. Similarly, 'Frigatebird' chick colonies of 122 and 33 individuals observed on Brushwood 2-6 and Motu Kena in 2000 were likely to have been composed of the Great species, considering populations of 103 and 92 respectively were recorded in 2008. If so, then Greater Frigatebird numbers have also remained relatively constant since 2000.

The presence of a large rat population on Motu Tou is the likely reason for nearly no birds observed breeding there. A Suwarrow-wide eradication programme was carried out in 2003 however was not completed on Motu Tou due to a shortage of materials (G. Wragg – pers. Comm.) An eradication programme is now required on Motu Tou to allow birds to return there as well as to protect other motu from re-invasion.

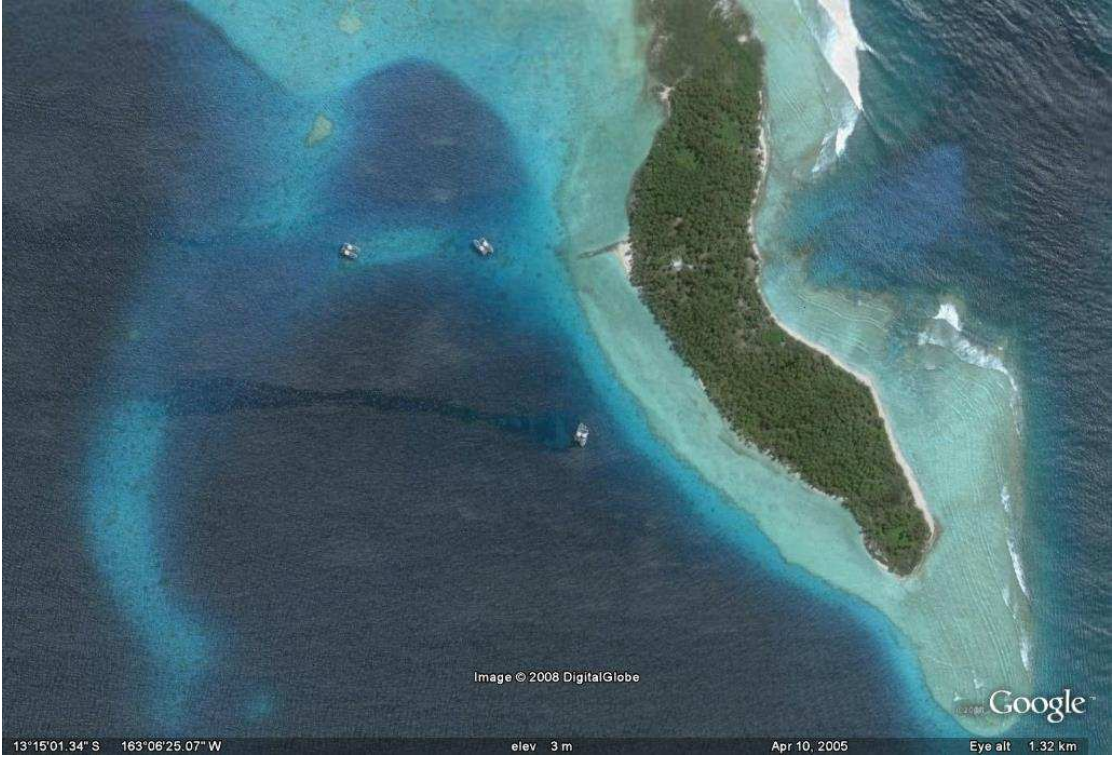
It is encouraging to see Red-tailed Tropicbird breeding on Anchorage Island (no birds were seen breeding there in 2000). White-Tail Tropicbird, Long Tail Cuckoo and Brown Noddy were also frequent visitors to Anchorage Island. A great deal of credit for this must go to the Environment Service for their appointment of John Samuela as caretaker. John has a firm commitment to the environment of Suwarrow. He has a great awareness of the breeding cycles of each bird species on the different motu and is careful to restrict visitor access to sensitive areas so that nesting birds have the minimum disturbance. There is anecdotal evidence that many coconut crab were eaten in the years before John's appointment as the Suwarrow caretaker in 1995. Consequently, John actively discourages the taking of this species and this probably assists in healthy populations being maintained or hopefully increased.

Suwarrow is visited by many boats during the June-October period. In 2000 nearly all visiting vessels were small yachts. In contrast, a larger number of power-vessels were visiting during July 2008 and quite a few visitors appeared to be under the impression that access to Suwarrow was negotiable for sport-fishing and the taking of other wildlife. It would be helpful to the caretaker if a set of permanent rules underlining the no-take policy of Suwarrow could be well advertised to the boating community before they set out for Suwarrow. The taking of a fish from the lagoon for immediate personal consumption (excluding endangered species such as Napoleon Wrass) could be permitted, but not sports or freezer-filling ventures such as the taking of a large number of Grouper in one day by the crew of one powerboat in July 2008.

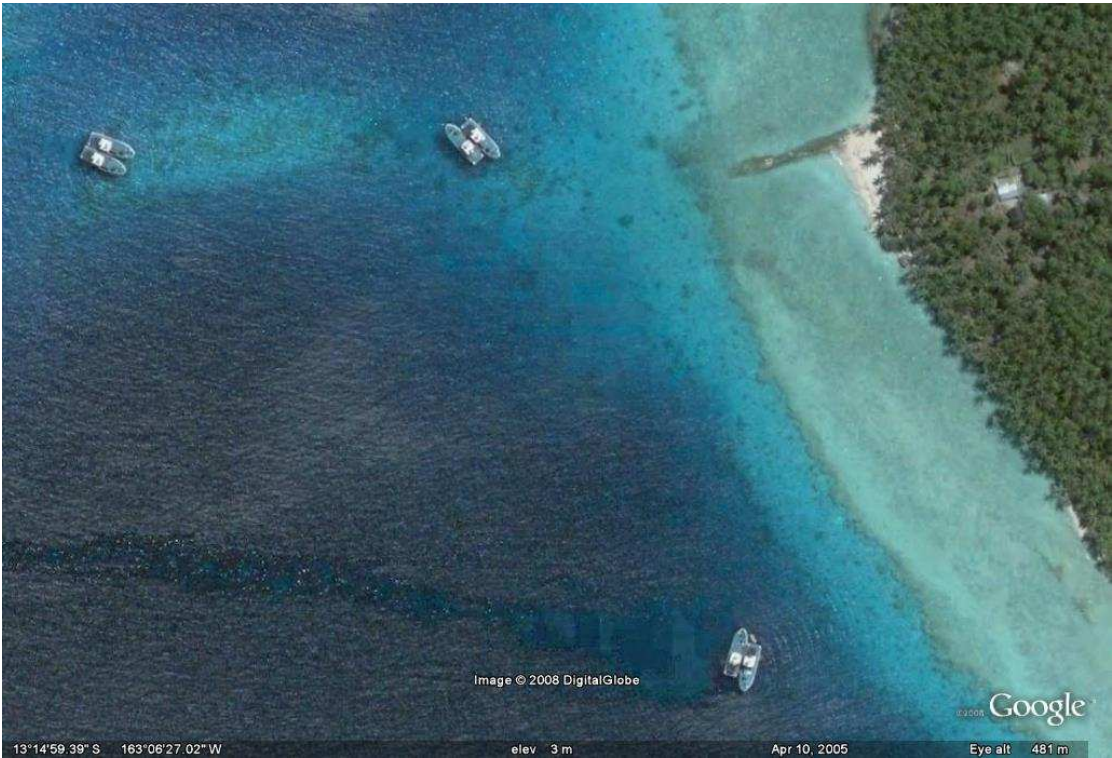
Suwarrow is managed for about 6 months of the year by the caretaker (currently John Samuela and his family). It would be an advantage if year-round management could be maintained to prevent unauthorized access to the atoll and its natural resources. There were possibly a lot more fish (especially sharks) in the lagoon in August 2000 than in July 2008, so the question arises of how much (if any) illegal fishing occurs in the lagoon and surrounding waters during the cyclone season? John Samuela recently discovered a large fish trap set across the Suwarrow passage and many fishing bouys (some with electronic locator beacons) have washed up on the Suwarrow coastline in recent years. Of particular interest is a Google-Earth satellite photo taken in early April, 2005 (see Fig. 2) showing what appears to be a number of large motor boats in the Suwarrow lagoon with the absence of other boats or the caretaker. The activities of such vessels is unclear and it seems desirable that some sort of year-round surveillance is undertaken. This would also allow the maintenance of gardens to provide fresh food for the caretakers thus alleviating some of the necessity to dispose of cans and other food packaging items, as well as allowing maintenance programmes of buildings and equipment to be performed during the quieter period. Part of this work could include the preservation of an important historic site - the original World-War 2 coast

watchers building. It would also be desirable for the caretaker to have improved communications with Rarotonga (eg Iridium satellite phone – which has free texting) so that timely communications and instructions can be received in the event of problems.

*Figure 2 (a) Satellite photo (Google Earth) of motor boats at Suwarrow in early April, 2005.*



*Figure 2 (b) Close-up of Fig. 2(a)*



## **Conclusions and Recommendations**

1. Seabird levels in 2008 are similar or slightly lower than those measured in 2000. Historic data suggests some downtrend in numbers.
2. Breeding numbers on Motu Tou should increase after rat eradication.
3. Bird populations need to be continually monitored to determine long-term trends.
4. The current caretaker is doing an excellent job and needs continued support.
5. Year-round manning would help supervise un-authorised activities on Suwarrow.