

Salvin's albatross population trend at the Bounty Islands, 1997-2011

POP2012-06

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POP2012-06 – Salvin's albatross population
data review

To determine the population size and trend
of Salvin's albatross at the Bounty Islands, to
the extent possible using historic data



Salvin's albatross – *Thalassarche salvini*

- Endemic species – breeds mainly on Bounty Islands & Snares Western Chain
- Annual breeder
- At breeding colonies August-April
- During the breeding season foraging extends primarily west to Australia and due south to about 60°S
- After breeding, most of the population migrates to the Humboldt Current off Peru and Chile, although some spend that time off eastern Tasmania
- Recorded as bycatch in NZ trawl fisheries in relatively high numbers and identified as at potential risk from impacts of commercial fisheries

Background

- In Nov 1978 the 1st scientific expedition to camp on the Bounty Islands reported that Salvin's albatrosses were nesting on 8 islands in the group.
- A total population of 76,352 breeding pairs was derived by estimating the nesting density and multiplying by the area of the islands covered by nests.
- Subsequent expeditions camped on the islands in 1997, 2004 & 2011 – data from these trips form the basis of this talk



Dates	Salvin's Albatross work undertaken
7 - 20 Nov	Population estimate - density based
31 Oct - 17 Nov	Attempt to repeat 1978 counts
9 Dec - 6 Jan	Proclamation Island 8-block count
	Nest monitoring in study area (hatch date, egg loss)
	Investigator disturbance
12 - 17 Nov	Proclamation Island 8-block count
	Depot Island count
	Funnel Island count
11 - 14 Nov	Proclamation Island 8-block count
	Depot Island count



Methods – ground counts (1)

- The methods used by the 1978 expedition were not recorded in sufficient detail to allow them to be repeated from 1997
- Therefore, on Proclamation Island a whole-island count was completed to remove the variability in density caused by edge effects
- In 1997, 2004 and 2011 Proclamation Island was divided into the same 8 blocks based on natural geographical features and the boundaries marked for the duration of each expedition
- All nesting Salvin's albatrosses within the 8 blocks were counted, except in 20011 when block 8 was not counted due to weather constraints
- In 2004 additional study sites were established on Depot and Funnel Islands, the study site on Depot Island was visited again in 2011.
- All field work completed 1997-2011 was lead by Jacinda Amey

Proclamation Island 8 blocks, plus study area and control area



Methods – ground counts (2)

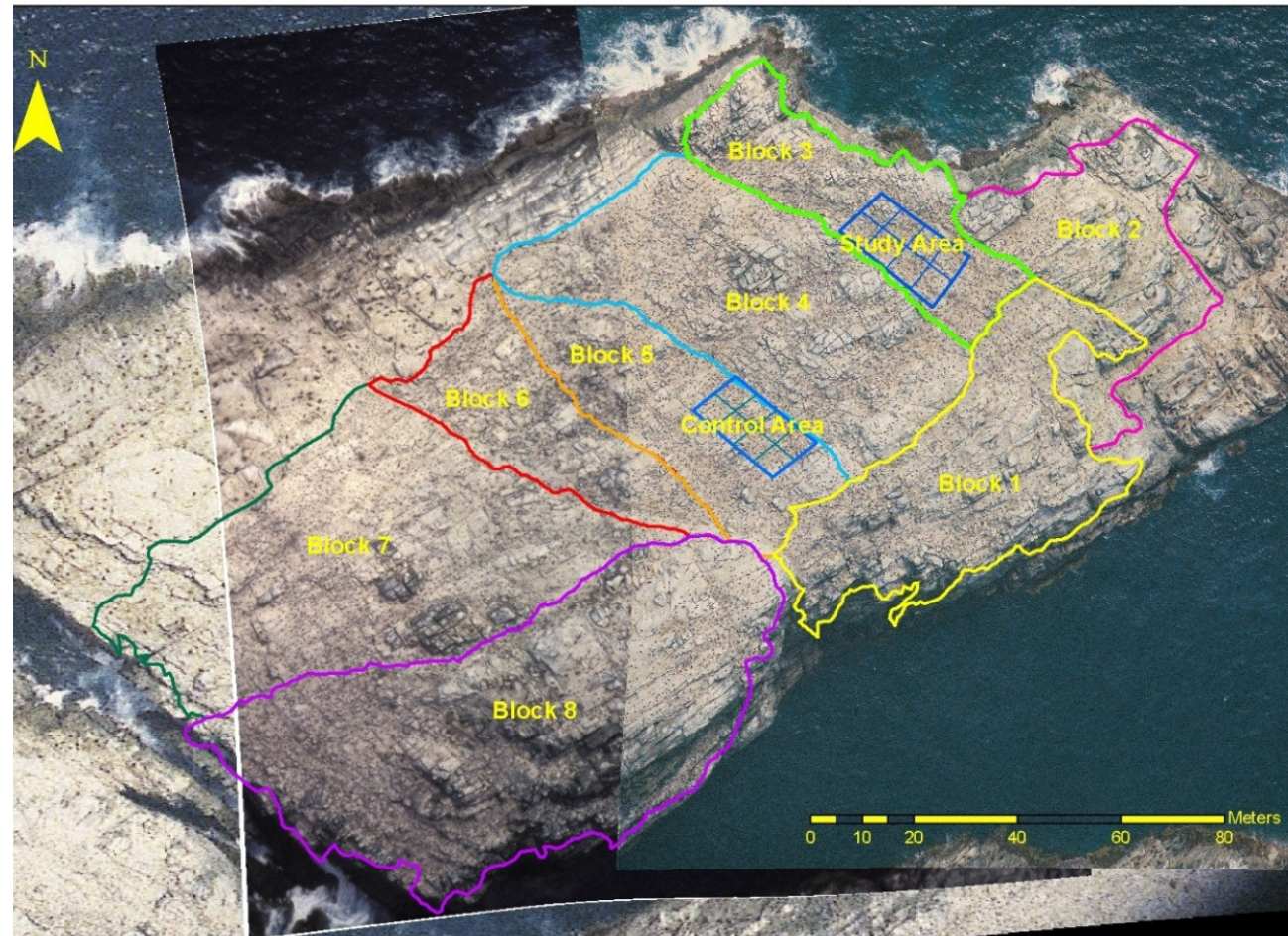
- Each block was systematically searched for the presence of a Salvin's albatross nest containing an egg or chick
- Salvin's albatross nests were counted where an albatross (with or without partner) was incubating an egg or brooding a chick
- After counting, each nest was marked with a spot of stocker marker
- To obtain an estimate of the number of nests missed or double counted in each block on completion of the block count another observer walked transects at 90 degrees to the general count and checked albatross nests 2 m either side of the line walked
- This way, about 100 nests/block were checked and recorded as marked, unmarked or double marked
- The % of nests missed or double counted was used to give an adjusted total for each block

Part of Block 2 – Proclamation Island



Study & Control Areas

- In 1997 a study area and a control area, established, each 20 m x 10 m
- When established the study area contained 86 nests and each was marked with a numbered tag. A subset of 70 of these was monitored daily from 31 Oct to 17 Nov to record hatching dates and failure rate
- The control area was established to monitor the impact of investigator disturbance, and so just 3 visits were made – 5 & 14 Nov 1997 & 3 Jan 1998



Proclamation Island ground counts, 12-16 Nov 1997

	Ground count		Transect count		TOTAL
	Total Nests	Total Loafers	Un-marked	Marked	Adjusted nest total
1	344	308	0	120	344
2	150	131	1	99	152
3	413	105	0	98	413
4	406	185	1	100	410
5	332	75	1	100	335
6	289	114	1	100	292
7	697	382	1	103	704
8	420	218	-1	107	416
TOTAL (Blocks 1-8)	3051	1518	4	827	3065

Proclamation Island ground counts, 16-23 Nov 2004

Proclamation blocks	Ground count		Transect count		TOTAL
	Total Nests	Total Loafers	Un-marked	Marked	Adjusted nest total
1	263	398	1	120	265
2	99	130	0	28	99
3	414	176	1	82	419
4	312	408	2	100	318
5	253	263	1	100	256
6	216	136	0	100	216
7	400	249	-1	103	396
8	665	156	0	107	665
TOTAL (Blocks 1-8)	2622	1916	4	740	2634

Proclamation Island ground counts, 14 Nov 2011

Proclamation block	Ground count		Transect count		TOTAL
	Total Nests	Total Loafers	Un-marked	Marked	Adjusted nest
1	285	271	0	38	285
2	84	55	1	25	87
3	311	120	1	39	319
4	295	129	0	52	295
5	235	113	0	48	235
6	147	79	0	100	147
7	336	280	3	59	352
TOTAL (Blocks 1-7)	1693	1047	5	361	1720

Counts on Funnel (2004) & Depot (2004 & 2011) Islands

	Date	Ground count		Transect count		TOTAL
		Total Nests	Total Loafers	Un-marked	Marked	Adjusted nest
Funnel Is.	22/11/2004	1206	579	0	107	1206
Depot Is.	21/11/2004	720	465	0	100	720
Depot Is	11/11/2011	641	203	2	194	648

Comparisons of adjusted totals on Proclamation and Depot Islands

Block	1997	2004	2011	Difference between 1997 & 2004		Difference between 2004 & 2011		Difference between 1997 & 2011	
				n	%	n	%	n	%
Depot I		720	648			-72	-10		
Proclamation I									
1	344	265	285	-79	-23	20	8	-59	-17
2	151	99	87	-52	-34	-12	-12	-64	-42
3	413	419	319	6	1	-100	-24	-94	-23
4	410	318	295	-92	-22	-23	-7	-115	-28
5	335	256	235	-79	-24	-21	-8	-100	-30
6	292	216	147	-76	-26	-69	-32	-145	-50
7*	704	396	353	-59	-5	-43	-11		
8*	416	665							
TOTAL 1-6	1945	1573	1368	-372	-19	-205	-13	-577	-30
TOTAL 1-7		1969	1721			-248	-13		
TOTAL 1-8	3065	2634		-431	-14				
Total Depot and Proclamation(1-7)		2689	2369			-320	-10		

*Different block boundary used in 1997 - combine blocks 7 & 8 for comparisons

Hatching dates of 48 Salvin's Albatross chicks, 1997

	Pipping date	Hatch date	Time to hatch (days)
n	48	48	31
mean	11/11/97	14/11/97	4
min	31/10/97	2/11/97	1
max	22/11/97	26/11/97	5

Numbers of active nests in the study and control areas

		1/11	5/11	31/10	1/11	5/11	14/11	17/11	3/01	3/01
Block	5 x 5	Nests	Nests	Nests	Nests	Nests	Nests	Nests	Nests	%
Study	A	13		11	9	8	7	6		
Study	B	15		14	13	13	12	12		
Study	C	8		7	7	5	5	5		
Study	D	14		12	11	10	9	8		
Study	E	14		12	12	11	8	8		
Study	F	17		14	12	10	9	9		
TOTAL		81		70	64	57	50	48	43	61.4%
Control	I		19			13	12			
Control	J		15			7	6			
Control	K		16			11	11			
Control	L		12			6	6			
Control	M		7			6	3			
Control	N		8			5	5			
Control	O		9			9	6			
Control	P		8			7	5			
TOTAL			94			64	54		46	71.9%

Estimated daily loss of active nests in study area on Proclamation Island, 1997 & 2011

Date	Salvin's Albatross nests in study area on Proclamation Island						
	Egg	Pipped egg	Chick	Active nests (study squares G & H)	TOTAL	Empty nest	Nest loss/day from 14 Sept
14 Nov 1997	16	13	21	13	64	39	0.62%
14 Nov 2011	43	15	40	0	98	26	0.34%

Discussion – Ground counts

- Overall, on Proclamation I numbers of breeding Salvin's albatrosses declined by an estimated 30% between 1997 & 2011, and by 10% on Depot Island between 2004 & 2011
- Main potential errors include missing or double counting of nests, counting of loafers, and different rates of egg/chick loss between years
- Missing or double counting of nests were accounted for by subsequent transect counts
- A check was made for the presence of an egg or chick for each bird recorded on a nest, so counts of loafers were recorded separately and not used in estimating breeding population
- Rates of nest loss before each count are not known. However, assuming that empty nests = failed breeding the estimated failure rate in 1997 was almost twice that of 2011, and so would result in an even higher estimated overall population decline.

Previous estimates – 1

- During Nov 1978 the density of Salvin's albatross nests on Proclamation Island was estimated to be $0.5/\text{m}^2$. The breeding area of birds on each of the islands was then plotted from visual mapping and aerial photos and from these the total population was estimated to be 76,352 pairs (Robertson & van Tets 1982).
- The Nov 1997 ground count on Proclamation Island estimated 3065 pairs, compared to the 8656 nests there in 1978. In addition, by multiplying the estimated area of suitable nesting habitat ($139,780\text{m}^2$) by the average nest density ($0.22/\text{m}^2$), the total population on the Bounty Islands in 1997 was estimated at 30,752 pairs (Taylor 2000).
- Unfortunately, the 1978 and 1997 expeditions used different base maps in calculating the areas of the islands (Taylor 2000) and the methods used in 1978 are insufficiently known to be replicated. Therefore, direct comparisons between the two estimates cannot be supported.

Previous estimates - 2

- On 12 October 2010 digital photographs were taken during an aerial survey of the Bounty Islands and from these an estimated 41,100 Salvin's albatrosses were counted, with 2,851 of these on Proclamation (Baker et al 2012).
- However, many albatross nests have no substantial pedestal, so in many cases it wasn't possible to determine if birds were breeding or not.
- Therefore, the estimated total included an undetermined proportion of loafers, and so it is not appropriate to compare the ground counts with the aerial counts.



Conclusions

- With an estimated 1100-1200 breeding pairs at the Snares Western Chain in 2008-2010 and an estimated 30,752 breeding pairs at the Bounty Islands in 1997, the total population of the Salvin's albatross is about 31,900 breeding pairs
- Therefore, the Bounty Islands support an estimated 98.5% of the total population of this endemic species.
- There was an estimated 30% decline in the numbers of breeding pairs on Proclamation Island from 1997 to 2011, and an estimated 10% decline in numbers breeding on Depot Island from 2004 to 2011
- This scale of change requires urgent investigation of the population and foraging biology of this nationally vulnerable endemic species

Acknowledgements

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