

Salvin's albatross: Bounty Islands population project

Ground component

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Prepared by:

Paul Sagar, NIWA
Matt Charteris, Waybacks Ltd
Graham Parker, Parker Conservation
Kalinka Rexer-Huber, Parker Conservation
David Thompson, NIWA

For any information regarding this report please contact:




David Thompson

Marine Ecology
+64-4-386 0582
david.thompson@niwa.co.nz

National Institute of Water & Atmospheric Research Ltd
Private Bag 14901
Kilbirnie
Wellington 6241

Phone +64 4 386 0300

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	Reviewed by:	Dr Scott Nodder
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Executive summary

The Department of Conservation commissioned NIWA to complete ground-based surveys of Salvin's albatrosses (*Thalassarche salvini*) that breed on the Bounty Islands. This fieldwork involved deploying transmitting Global Positioning System (GPS) tracking devices and geolocation data loggers (Global Location Sensing (GLS) tags) on breeding birds on Proclamation Island, Bounty Islands; banding and recapturing birds in a study area; completing counts of breeding and non-breeding birds along transects at various time of the day; and deploying automated time-lapse cameras that covered part of the study area. This report outlines the activities undertaken, data collected and a description of the methods used.

Landings were made on Proclamation Island, Bounty Islands, on 20, 21 and 22 October 2018. During this time 14 transmitting GPS and 54 GLS data loggers were deployed on breeding birds. In addition, 98 birds (including the birds fitted with GPS and GLS tracking devices) were fitted with a uniquely-numbered stainless steel leg band, with 97 of these birds also fitted with a red numeric plastic band to facilitate identification without the need for recapture. A total of 12 transect counts were undertaken to determine the proportion of breeding birds ashore. Finally, six time-lapse cameras were deployed so that they covered about 41 nests in the study area. Retrieval of the GLS devices is planned for November 2019.

1 Introduction

Salvin's albatross (*Thalassarche salvini*) is endemic to New Zealand, with the main breeding population at the Bounty Islands. These albatrosses have been recorded as bycatch in New Zealand trawl fisheries in relatively high numbers, and have been identified as at potential risk from the impacts of such commercial fisheries (Richard & Abraham 2015). Recent population estimates of Salvin's albatrosses at the Bounty Islands using ground and aerial methods found contrasting population trends (Baker et al. 2014, Sagar et al. 2015). Also, the at-sea foraging distribution of Salvin's albatrosses that breed at the Bounty Islands is described from only a small number of birds due to device failure (Thompson et al. 2014).

The conservation status of the species was upgraded in 2016 to 'Threatened - Nationally Critical' (Robertson et al. 2017) on the basis of its apparent population decline at the Bounty Islands and its potential high risk from commercial fishing impacts. The apparently declining population and high fisheries risk indicates the urgency of both repeating an aerial survey of the Bounty islands breeding population and estimating the at-sea distribution of Salvin's albatrosses to determine the timing and overlap with fisheries activities.

In response to this situation, the Department of Conservation commissioned NIWA to estimate the population size of Salvin's albatross at the Bounty Islands. The specific elements of the project to be undertaken by NIWA were:

- Global Location Sensing (GLS) tag deployments in year 1 (2018), with trial Platform Transmitting Terminal/Global Positioning System (PTT/GPS) transmitting device deployment.
- Retrieval of GLS devices and deployment of additional PTT/GPS devices in year 2 (2019).
- Band and re-sight birds with the potential to establish a study site area on Proclamation Island (which has the easiest access and the most data previously collected on the Bounty Islands).
- Targeted counts to ground-truth aerial survey (year 1)
- Deployment of time-lapse cameras to record activity in the Salvin's albatross study colony.

Aerial counts were made by another researcher contracted to the Department of Conservation.

This factual report details the deployment phase, initial banding and re-sighting, and targeted ground counts in year 1 of this project. Full details will be reported following the retrieval of GLS tags in year 2 (retrieval planned for November 2019).

2 Deployment of tracking devices

2.1 Timing and location

Landings were made on Proclamation Island, Bounty Islands, on three consecutive days: 20-22 October 2018. The same area where GLS tracking devices were deployed previously on Salvin's albatrosses in 2012 (Sagar & Charteris 2012) was chosen as the most appropriate location to deploy further tracking devices and establish a study colony. This area is on a broad geographically distinct ledge at the top of the eastern part of the island, centred on 47.74936° S 179.02776° E.

The location of the study colony is indicated in Figure 1. In this area breeding Salvin's albatrosses were most abundant in the relatively open areas between boulders, while erect-crested penguins (*Eudyptes sclateri*) usually nested closer to the boulders (Figure 2). There were fewer New Zealand fur seals (*Arctocephalus forsteri*) in this area, and so our activities caused less disturbance to these protected animals.

At the Bounty Islands, egg-laying of Salvin's albatrosses occurs from the end of August, with peak hatching in mid-November (Robertson & van Tets 1982), and so during our visit breeding albatrosses were incubating their single egg.



Figure 1: Eastern end of Proclamation Island, Bounty Islands, taken from Bucket Cove. The red line shows the approximate extent of the study area.



Figure 2: View of the study colony from above. This photograph was taken on 20 October 2018 from approximately the highest point above the study colony shown in Figure 1.

2.2 Deployment of GPS and GLS tracking devices

On 20 October, 14 transmitting GPS devices were deployed on breeding birds, with each of these birds also fitted with a GLS device, numeric plastic band and numbered stainless steel metal band (Table 1). The GPS devices were of two types – Wildlife Computer Rainier-S20 solar-powered transmitting GPS tags and Lotek PinPoint Argos transmitting GPS tags. Each GPS device was attached to a pre-cut baseplate made of PVC guttering. Briefly, the process of attaching the devices was as follows. First, the base plate was attached with Tesa tape to back feathers over the spine of the bird, in line with the leading edge of the wings. Second, the device was attached to the base plate and feathers with a combination of Tyrap cable ties with metal pawl, Tesa tape, and araldite glue. An example of each type of GPS device deployed on separate birds is shown in Figure 3 and Figure 4 respectively.

Table 1: Metal band, plastic band, GPS and GLS tag numbers and bill measurements (in millimetres) of 14 Salvin's albatrosses, Proclamation Island, Bounty Islands, 20 October 2018.

Metal band #	Plastic band #	GPS tag #	GLS tag type	GLS tag #	Bill length (mm)	Max bill depth (mm)	Min bill depth (mm)
O-38001	001	18B0075	Biotrack MK3006	B4096	132.0	49.6	28.4
O-38002	002	18B0049	Migrate C330	BP906	132.4	48.9	27.5
O-38003	003	18B0084	Migrate C330	BP898	140.4	53.3	30.0
O-38004	004	18B0010	Migrate C330	BP902	131.8	51.0	29.6
O-38005	005	18B0078	Migrate C330	BP897	127.0	49.5	27.2
O-38006	006	18B0079	Migrate C330	BP899	138.6	50.5	27.3
O-38007	007	18B0055	Migrate C330	BP912	130.4	48.0	29.2
O-38008	008	43188	Migrate C330	BP905	137.3	52.1	29.8
O-38009	009	43184	Migrate C330	BP915	129.0	50.1	28.9
O-38010	010	43182	Migrate C330	BP909	126.4	49.9	28.6
O-38011	011	43186	Migrate C330	BP910	134.2	49.2	29.1
O-38012	012	43185	Migrate C330	BP911	127.7	49.2	29.4
O-38013	013	43187	Migrate C330	BP916	136.4	51.6	30.5
O-38014	014	43183	Migrate C330	BP914	128.4	49.7	29.0



Figure 3: Salvin's albatross fitted with Wildlife Computers Rainier S-20 solar-powered transmitting GPS tag.



Figure 4: Salvin's albatross fitted with Lotek PinPoint Argos transmitting GPS tag.

As well as the GPS device, each of these 14 birds was fitted with a GLS logger (attached by Tyrap cable ties to a uniquely-numbered stainless steel band) and a uniquely-numbered red plastic band (Figure 5).

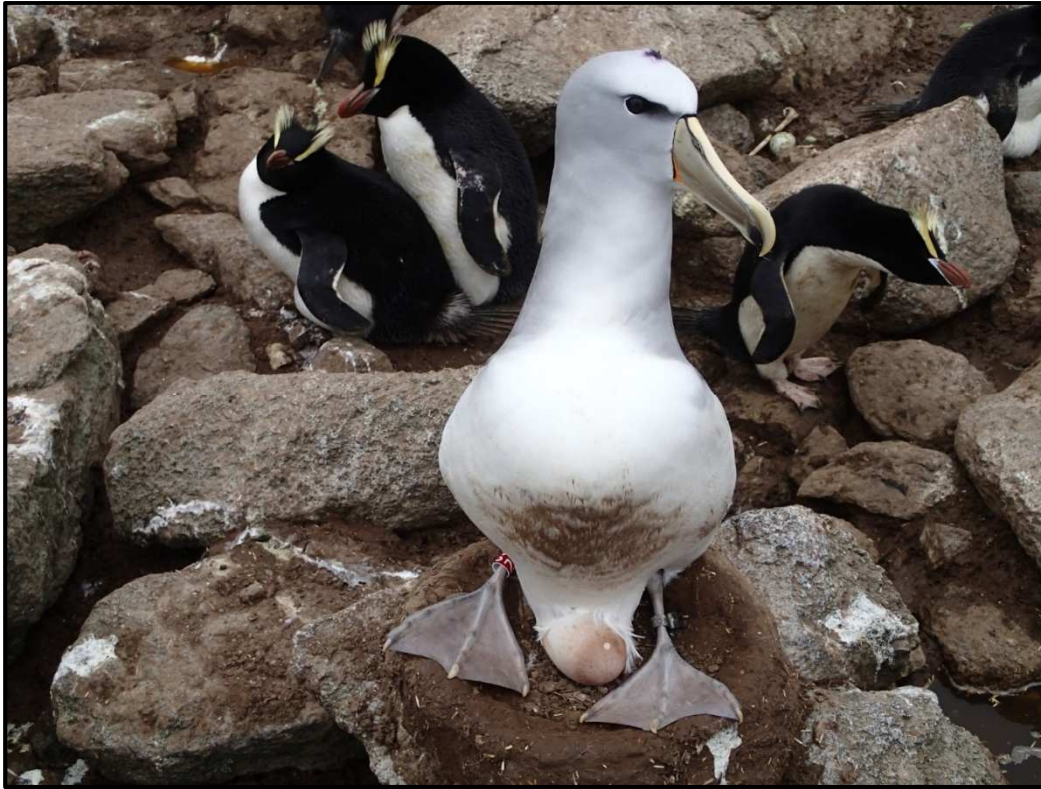


Figure 5: Salvin's albatross with a GLS tag attached to the stainless steel band on its left leg, and a numbered plastic band on the right leg.

A further 40 birds were each banded with a uniquely numbered stainless steel leg band and fitted with both a GLS logger and a uniquely numbered plastic band (Table 2).

Details of band numbers, GPS model and serial numbers, and GLS model and serial numbers, and measurements of each bird are given in Table 1 and Table 2.

Table 2: Metal band, plastic band, GLS tag numbers and bill measurements (in millimetres) of 40 Salvin's albatrosses, Proclamation Island, Bounty Islands, 21 October 2018.

Metal band #	Plastic band #	GLS tag type	GLS tag #	Bill length (mm)	Max bill depth (mm)	Min bill depth (mm)
O-37157	016	Migrate C330	BP896	135.7	52.4	30.0
O-38015	015	Migrate C330	BP904	131.3	51.2	30.0
O-38016	017	Migrate C330	BP900	135.6	51.0	29.6
O-38017	018	Migrate C330	BP901	133.0	50.8	28.7
O-38018	019	Migrate C330	BP903	134.1	48.3	30.0
O-38019	020	Migrate C330	BP908	127.1	47.4	27.6
O-38020	021	Migrate C330	BP917	139.0	50.4	28.6
O-38021	022	Migrate C330	BP860	129.3	51.0	28.1
O-38022	024	Migrate C330	BP814	131.0	49.7	28.7
O-38023	025	Biotrack MK3006	B4090	131.5	50.5	30.7
O-38024	051	Migrate C330	BP836	135.2	51.7	29.5
O-38025	052	Biotrack MK3006	B4098	128.7	49.4	29.0
O-38026	053	Migrate C330	BP832	135.0	52.0	29.6
O-38027	054	Migrate C330	BP913	127.3	51.3	28.4
O-38028	055	Migrate C330	BP858	134.0	51.8	29.3

O-38029	056	Migrate C330	BP826	128.4	49.8	29.0
O-38030	057	Migrate C330	BP854	134.4	53.1	31.4
O-38031	058	Migrate C330	BP839	138.7	54.1	32.6
O-38032	059	Migrate C330	BP853	130.1	51.6	29.8
O-38033	061	Migrate C330	BP844	135.0	55.1	32.5
O-38034	045	Biotrack MK3006	B4078	133.6	52.3	29.9
O-38035	062	Migrate C330	BP855	129.6	49.0	29.4
O-38041	026	Biotrack MK3006	B4080	128.8	51.9	28.1
O-38042	028	Biotrack MK3006	B4079	130.1	52.2	28.9
O-38043	029	Biotrack MK3006	B4093	137.2	55.2	31.0
O-38044	030	Biotrack MK3006	B4089	128.9	52.5	28.9
O-38045	031	Biotrack MK3006	B4084	132.2	48.9	30.3
O-38046	032	Biotrack MK3006	B4087	128.3	51.2	31.0
O-38047	033	Biotrack MK3006	B4094	139.1	55.7	30.4
O-38049	034	Biotrack MK3006	B4086	133.1	52.4	31.0
O-38050	035	Biotrack MK3006	B4095	136.0	52.0	28.2
O-38051	036	Biotrack MK3006	B4082	133.7	54.0	32.5
O-38052	037	Biotrack MK3006	B4091	128.4	52.0	30.4

O-38053	038	Biotrack MK3006	B4077	119.5	50.4	27.1
O-38054	039	Biotrack MK3006	B4081	133.0	49.7	31.0
O-38055	040	Biotrack MK3006	B4092	131.2	51.5	29.9
O-38056	041	Biotrack MK3006	B4083	130.7	48.9	28.0
O-38057	042	Biotrack MK3006	B4099	129.0	50.4	30.3
O-38058	043	Biotrack MK3006	B4088	129.7	52.7	29.5
O-38060	044	Biotrack MK3006	B4097	128.7	52.4	28.7

Table 3: Metal band and plastic band numbers, and bill measurements (in millimetres) of 45 Salvin's albatrosses, Proclamation Island, Bounty Islands, 21-22 October 2018. *, metal band only.

Metal band #	Plastic band #	Bill length (mm)	Max bill depth (mm)	Min bill depth (mm)
O-38036	063	126.5	49.1	29.1
O-38037	064	130.6	52.3	33.5
O-38038	065	131.8	51.9	28.1
O-38039	066	128.4	53.7	29.4
O-38040	067	127.8	49.9	28.7
O-38061	068	134.6	53.7	30.3
O-38062	069	136.2	52.4	29.5
O-38063	070	132.2	53.0	29.9
O-38064	071	130.0	51.3	29.1
O-38065	072	137.9	52.2	31.7
O-38066	073	130.5	53.4	30.4
O-38067	074	132.9	52.7	30.7
O-38068	075	127.0	53.4	29.1
O-38069	076	131.9	50.1	30.4
O-38070	046	131.0	52.4	29.4
O-38071	047	128.9	51.0	28.4
O-38072	048	133.2	48.6	29.7
O-38073	049	136.7	51.8	30.9
O-38074	050	123.4	47.8	28.2
O-38075	077	124.0	51.0	29.0
O-38076	078	135.5	50.8	29.7

O-38077	079	138.8	50.6	29.6
O-38078	081	135.7	50.0	29.1
O-38079	082	132.6	52.5	32.0
O-38080	083	128.7	52.6	32.5
O-38081	084	132.7	49.9	31.2
O-38082	085	118.8	47.8	27.6
O-38083	086	130.3	50.5	30.1
O-38084	087	132.5	54.2	31.4
O-38085	088	128.9	49.4	26.1
O-38086	089	131.4	53.4	28.7
O-38087	091	138.4	51.5	30.3
O-38088	092	130.4	51.5	30.1
O-38089	093	131.4	50.9	29.4
O-38090	094	130.7	49.6	27.3
O-38091	095	127.3	49.2	29.4
O-38092	096	133.2	54.9	30.8
O-38093	097	122.9	48.9	28.4
O-38094	098	133.9	55.1	30.1
O-38095	099	135.7	52.7	28.1
O-38096	100	137.6	53.0	31.1
O-38097	101	130.5	48.9	27.4
O-38098	102	129.4	52.3	31.0
O-38099	103	133.0	50.9	29.7
O-38100	*	127.6	50.0	29.0

2.3 Banding and recaptures

During March 1985, C.J.R. Robertson banded 590 well-grown Salvin's albatross chicks on Proclamation Island and the recaptures of some of these birds during visits in 1997, 2004, 2011, 2012 and 2013 enabled an estimate of survival to be calculated (Sagar et al. 2015). Subsequent to 1985, the only Salvin's albatrosses banded on Proclamation Island were 50 breeding adults in 2012 (Sagar & Charteris 2012).

The 50 breeding birds banded in 2012 were in the well-defined area used during the current visit, and so this formed the basis of the area where we undertook further banding of breeding birds (Figure 1). In addition, all band numbers of previously banded birds were recorded and the bird sprayed with a spot of stock marker so that it was not recaptured during the same visit.

During the current visit 98 breeding birds were banded with uniquely numbered stainless steel bands and 97 of these were also fitted with a uniquely numbered red plastic band (Table 1, Table 2 and Table 3). In addition, recaptures were made of six birds from the 1985 cohort and eight birds from 2012. All these banding and recapture records were submitted to the New Zealand Bird Banding Scheme on 19 November 2018.

2.4 Ground-truthing for aerial counts

Ground counts of Salvin's albatrosses were completed on Proclamation Island on 22 October 2018 to determine the proportion of nests containing eggs and non-breeding birds present. Four transects were completed on three occasions. The process involved an observer walking along counting birds on nests with an egg, birds on an empty nest and loafers (birds not associated with a nest), all within 1 m either side of the line being walked. The length of each transect was determined by the density of nests and the level of disturbance observed – an attempt was made to count at least 30 active nests per transect, but the count was terminated if loafers became disturbed and began to walk ahead of the observer. Transects were undertaken at 10:25, 12:15, and 13:30 hours with each of the 12 transects (three time periods x four observers) being unique.

These ground counts indicated that the mean proportion of breeding birds on Proclamation Island between 10:25 and 13:30 h was 0.47 (range 0.41-0.52); Table 4.

Table 4 Ground counts of Salvin's albatross at Proclamation Island . Nesting status of birds encountered along 2m wide transects over three time periods, 22 October 2018.

Time	Transect	Nest with egg	Empty nest with bird on	Loafers	Total birds	Proportion of birds breeding
10:25	1	42	7	39	88	0.48
	2	50	20	31	101	0.49
	3	47	20	37	104	0.45
	4	26	16	16	58	0.45
12:15	1	43	19	23	85	0.50
	2	33	16	14	63	0.52
	3	32	12	28	72	0.44
	4	30	14	26	70	0.43
13:30	1	38	6	31	75	0.51
	2	32	5	25	62	0.52
	3	36	22	30	88	0.41
	4	30	12	31	73	0.41

2.5 Deployment of cameras

Six nest cameras were deployed on Proclamation Island on 21 October 2018. Each was mounted on small vertical sections of rock, out of the way of wildlife traffic, using rock bolts and customised aluminium mounts. The cameras were positioned to take images of about 41 nests that were active at the time of our visit, and were started between 15:00 and 17:25 h. Each camera was set to take time-lapse photographs at hourly intervals during daylight. The cameras are designed to be weather-tight but for further protection from the elements Tesa tape, overlain with a layer of self-amalgamating tape, sealed the join in the waterproof case. The positions of the cameras are given in Table 5.

Table 5: Locations of six time-lapse cameras deployed on Proclamation Island, Bounty Islands, 21 October 2018.

Name	Latitude (°S)	Longitude (°E)	Elevation (m)
CAM1A BOUNTY	-47.7494	179.02771	44.853
CAM1B BOUNTY	-47.7496	179.02758	43.809
CAM2A BOUNTY	-47.7494	179.02757	49.325
CAM2B BOUNTY	-47.7494	179.02768	44.192
CAM3A BOUNTY	-47.7494	179.02763	49.711
CAM3B BOUNTY	-47.7497	179.02752	47.128

3 Acknowledgements

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