Conservation Services Programme (CSP)

Gibson's wandering albatross demography and population estimate 2026

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Executive Summary

Gibson's albatross (*Diomedea antipodensis gibsoni*) has been in decline since 2005. Research into the causes of and solutions to the falling numbers of Gibson's wandering albatross includes an annual visit to the main breeding grounds on Adams Island, and this report describes the results of the field programme in the 2025/2026 breeding season. Breeding success in 2025 was 60%, with 83 chicks produced in the study area, all of which were banded before fledging. Mean adult female survival in 2014-2024 at 93% remains slightly lower than the mean 95% before the 2005 population crash. To increase the proportion of the total breeding population ground-counted annually, a new census block was demarcated and counted in 2026: Turbott Square, within the high-density Fly Basin colony. This brings the proportion of the total Adams Island breeding population ground-counted annually to 12.4% rather than 10% counted formerly. A total of 5,032 pairs were estimated to be breeding on Adams Island in 2026, comparable to 2025 (4,865 pairs). The total number of Gibson's albatross breeding pairs remains half the size of the pre-crash nesting population.

Introduction

Gibson's wandering albatrosses *Diomedea antipodensis gibsoni* are long-lived, slow-breeding seabirds, vulnerable to bycatch in commercial fisheries. As such, the species is of high conservation concern (Birdlife International 2018; Robertson et al. 2021). Assessments of the risk of commercial fisheries to seabird populations (Edwards et al. 2023) can be profoundly affected by uncertainty in population size and uncertainty in demographic rate estimates, particularly adult survival (Walker et al. 2015). To reduce uncertainty or bias in estimates of risk from fishing, robust information is needed on key aspects of biology (survival, productivity, recruitment, population size and trends). This is the focus of this report.

Gibson's albatrosses are endemic to the Auckland Island group. Most (94%) of the population breed on Adams Island, about 5% on Disappointment Island and a few scattered pairs (1%) on main Auckland Island make up the remainder (Elliott et al. 2020). They forage largely in the Tasman Sea, but also along the continental shelf off southern and southeastern Australia and off eastern New Zealand (Walker & Elliott 2006; Elliott et al. 2025).

Gibson's albatross survival, productivity, recruitment, and population trends have been monitored during annual visits to Adams Island since 1991. In the 1990s, the population slowly increased following a major, presumably fisheries-induced, decline during the 1980s (Walker & Elliott 1999; Elliott et al. 2020). However, between 2004 and 2006 there was a sudden drop in the size of the breeding population, from which recovery has been very slow (Elliott et al. 2020). The Gibson's albatross population is still less than half of its estimated size in 2004, having lost the gains slowly made through the 1990s (Rexer-Huber et al. 2020).

This report summarises work undertaken during two overlapping field trips to Adams Island. The first trip between 29th November 2025 and 18th January 2026 was a private trip undertaken by Albatross Research (GE and KW), and the second trip between 14th January and 3rd February 2026 was undertaken by the Department of Conservation (JC and JW) as part of its 2025-26 Conservation Services Programme (CSP; project POP2025-04).

Project Objectives

The main objectives as per the CSP annual plan 2025/26 were:

- To monitor the key demographic parameters of Gibson's albatross to reduce uncertainty or bias in estimates of risk from commercial fishing.
- To estimate the annual population size of Gibson's albatross.

In addition to these CSP objectives on Gibson's albatrosses, a small amount of light-mantled sooty albatrosses (*Phoebetria palpebrate*) work was undertaken (counts at long-term count blocks and the deployment of two satellite tracking devices).

Methods

Mark-recapture study

A 61ha study area on Adams Island (Fig. 1) has been visited repeatedly during each season since 1991 to leg-band nesting birds and collect re-sightings of previously banded birds. The wider areas around the study area (within a kilometre) were visited less frequently and any banded birds were recorded. All birds found nesting within the study area have been double banded with individually numbered metal bands and large coloured plastic bands, and since 1995 most of each year's chicks have also been banded. The proportion of chicks that were banded each year depended on the timing of the research field trips which in turn is dependent on the availability of transport. In 28 of the last 36 years researchers have arrived just before (including this season), or soon after, the time at which the first chicks fledge and more than 90% of the chicks were still present and banded. In the other eight years researchers either did not arrive (2021) or arrived late when most chicks had already fledged and were therefore not banded.

Survival rates were estimated from re-sightings of the banded birds using maximum likelihood mark-recapture statistical methods implemented in the software package MARK via the R package RMark (White & Burnham 1999; Laake 2013; R Core Team 2023). A multi-state model was used (Brownie et al. 1993) in which adult birds were categorised by sex and by breeding status: non-breeders, successful breeders, failed breeders, and sabbatical birds taking a year off after a successful breeding attempt. Birds in each of these classes have different detection probabilities and survival rates which were estimated by the model. In addition, the model estimated the probabilities of transition between the strata, for example the probability of being a non-breeder one year and then a breeder in the following year. Some transition probabilities in this model were specified rather than estimated. In particular: birds may not change sex; after successful breeding birds invariably become "sabbatical" birds; and they may not transition to "sabbatical" from any stratum other than "successful breeder". Although detection and transition probabilities were estimated for all strata, for estimation of survival, failed and successful breeders were combined into a breeding stratum, and non-breeders and sabbatical birds were combined into a non-breeding stratum. This is done because the more complex model produces survival estimates with very large standard errors.

In this model the notation of R is specified by:

Survival S ~ year * breeding * sex
Detection probability *p* ~ year * stratum * sex
Transition probability *psi* ~ year * stratum * sex
$psi_{(\text{successful breeding to sabbatical})}=1$
$psi_{(\text{failed breeding to sabbatical})}=0$
$psi_{(\text{non-breeding to sabbatical})}=0$
$psi_{(\text{sabbatical to sabbatical})}=0$

Population size was estimated by dividing the actual counts of birds in each class (except sabbatical birds) by the resighting probability produced when estimating survival. Counts of sabbatical birds were always very low, so the number of sabbatical birds was estimated by multiplying the number of successful breeders in the previous season by their estimated survival. The survival estimates assumed no emigration and thus underestimated survival as birds that emigrated were treated as if they died. However, wandering albatrosses have strong nest site fidelity, and a pair's separate nesting attempts were rarely more than a few hundred metres apart, and birds nesting at new sites within a few hundred metres of the study area were usually detected during the census of surrounding country (Walker & Elliott 2005). In other words, the under-estimate was small, unquantified but consistent from year to year.

Nest counts in representative census blocks

Since 1998, all the nests in three census blocks (Fig. 1) representative of low (Rhys's Ridge), medium (A-A) and high (Fly Square) density have been counted each year, apart from 2021 when the island was not visited. Counts were carried out between 23–31 January just after the completion of laying, and as close as possible to the same date at each place in each year. A transect search method was used where observers walk back and forth across the area to be counted, each within a GPS-defined 25m wide transect. Observers searched for albatrosses sitting on nests within the transect. Every bird on a nest was checked for the presence of an egg, and each nest found with an egg was marked with a dot of spray paint, recorded on the GPS, and counted. All birds whether on a nest or just on the ground were also counted. All birds were checked for leg bands, the number and location of which were recorded.

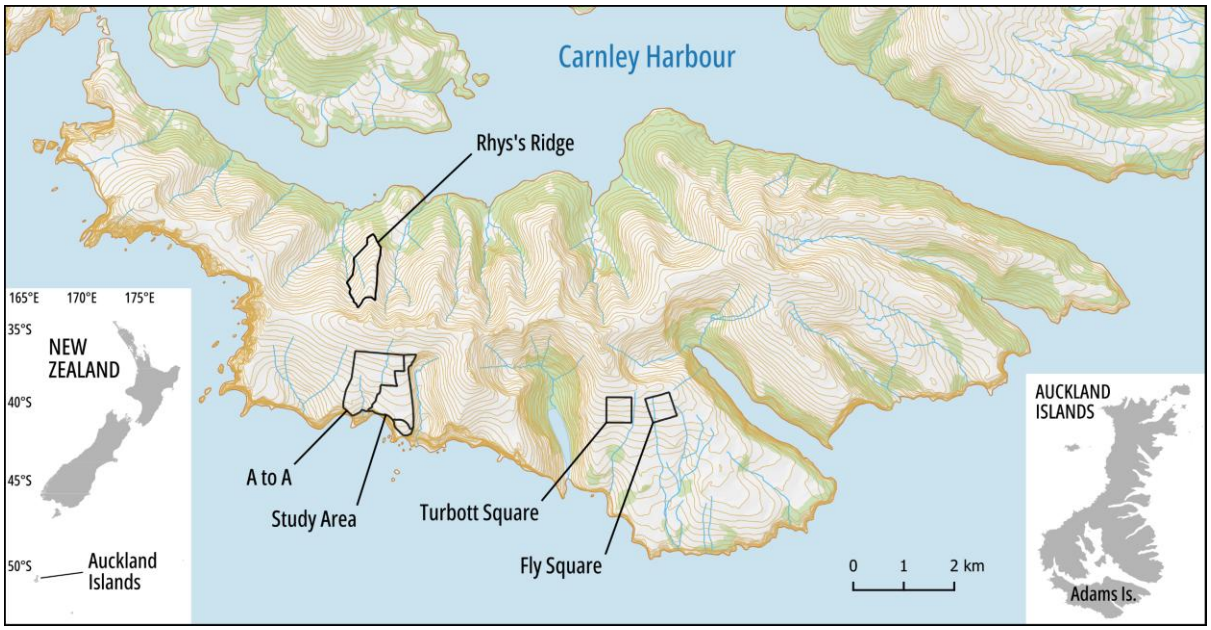

Figure 1. Adams Island, showing the Study Area (61ha); the three census blocks in which counts of breeders have historically been made: Amherst to Astrolabe (A to A; 101ha), Rhys's Ridge (67ha), and Fly Square (25ha); and the fourth census block added in January 2026: Turbott Square (25ha).

Once the whole block had been counted, the accuracy of the count was checked by walking straight transects at right angles to the original transects, checking all nests within 10–15m of the transect for paint marks indicating the nest had been counted. The accuracy of block *i* (A_i) was calculated as the proportion of marked nests (n_{M_i}) relative to the total number of nests detected on accuracy transects including both marked and unmarked nests (n_{U_i}):

$$A_i = \frac{n_{M_i}}{n_{M_i} + n_{U_i}}$$

Counts were corrected to take account of any eggs not yet laid or any failed nests at the time of counting using data from the repeatedly monitored study area which was monitored from early December to late January in 2026. A time-varying correction factor, denoted C_t, was derived from the repeatedly monitored study area data. It was calculated as the ratio of the total number of eggs laid in the study area (E_{max}) to the number of active nests on monitoring date *t*, where active nests were defined as the number of eggs laid by date t (E_t) minus the number of failed nests by date *t* (F_t).

$$C_t = \frac{E_{max}}{E_t - F_t}$$

For dates between study area surveys, the correction factor was linearly interpolated between the previous and next survey. Each census block i was surveyed on a single date t_i, and the corresponding

correction factor C_{t_i}, as well as the inverse of the accuracy A_i, were applied to the observed count N_i to obtain the corrected number of nests in block *i*, denoted $\widehat{N}_i$:

$$\widehat{N}_i = N_i C_{t_i} \frac{1}{A_i}$$

Rhys's Ridge, which is the smallest of the representative census blocks and the most difficult to count accurately due to its deep scrub, was counted in 2023, 2024, and 2025 using aerial photos taken by drone. In 2026, it was counted from the ground following the method described above.

In 2026, following results from the island-wide drone surveys done in 2024 and 2025 which provided detailed insights into the spatial distribution of breeding albatrosses (Elliott et al. 2025), a new census block was counted to increase the proportion of the total Adams Island breeding population which is counted annually. This new block, named Turbott Square (25ha), is located west of Fly Square, between Lake Turbott and Fly Square in a part of Adams Island with the highest density of Gibson's albatross nests (Table 1, Fig. 1). This new block was counted following the method described above for the other blocks.

Table 1. Coordinates of the corners of the new census block, Turbott Square.

Corner	Latitude	Longitude
Northwest	-50.899961	166.059366
Northeast	-50.899973	166.066473
Southwest	-50.904456	166.059346
Southeast	-50.904468	166.066454

Estimating total breeding pairs on Adams Island from census blocks

In 1997 the three census blocks on Adams Island were estimated to hold approximately 10.7% of the nesting pairs on Adams Island, and 10.1% of all nesting pairs (i.e. the combined total on Adams, Disappointment and Auckland Islands). The 2024 and 2025 island-wide census of Adams Island nests updated the percentage of the pairs nesting on Adams Island which are in the three census blocks to 9.2% (2024) or 9.7% (2025).

The total number of nests on Adams Island in 2026 (N_{tot}) was estimated by summing the corrected nest counts across the three historical census blocks and scaling by the inverse of each block's mean proportion (*P*) of the total number of pairs on Adams Island, which was based on the 2024 and 2025 island-wide surveys (*P* = 0.095, comprising 0.8% on Rhys's Ridge, 5.9% in Amherst to Astrolabe, 2.7% in Fly Square):

$$N_{\text{tot}} = \frac{1}{P} \sum_{i=1}^{3} \widehat{N}_i$$

The proportion of the Adams Island total which was in the new census block Turbott Square (P_{TS}), was back calculated from the estimated total number of nests on Adams Island (N_{tot}) using the corrected number of nests in Turbott Square ($\widehat{N}_{\text{TS}}$):

$$P_{\text{TS}} = \frac{\widehat{N}_{\text{TS}}}{N_{\text{tot}}}$$

Light-mantled sooty albatross at-sea distribution

Two non-breeding adult light-mantled sooty albatrosses were tagged on 21st January 2026 at the species breeding grounds on Adams Island, specifically along the cliffs southeast of the Gibson's albatross study area. Gaming birds were caught by hand and Telonics TAV2630 Argos PTTs were taped to the birds four central tail feathers using Tesa tape.

Light-mantled sooty albatross breeding population size

On Adams Island, light-mantled sooty albatrosses nest mainly on the steep southern cliffs, making monitoring difficult. Since 1999, nests of light-mantled sooty albatrosses have been counted in two areas from vantage points on the cliffs below Mt Dick; a large colony just east of Amherst Stream dubbed "Amherst" and a much smaller colony further eastward dubbed "the Gut". Nests at the Gut were counted from a single vantage point on 30th December 2025 and at the Amherst from three vantage points on 20th January 2026. Only birds apparently sitting on eggs or chicks were counted. Due to the difficult terrain nests were not accessed, so some uncertainty exists as to whether all birds sitting on nests were breeding birds.

Results

Capture-mark-recapture in the study

Between 29th November 2025 and 3rd January 2026, 83 chicks from the 2025 season were banded, 14 rounds of study area nest checks were made and potential nests marked, 117 eggs were laid, 345 banded birds were resighted, and 46 new breeding adult birds were banded.

Population size from mark-recapture

The size of the breeding population in the study area estimated by mark-recapture was increasing up until 2004, but between 2005 and 2008 fell precipitously, particularly the number of females. Between 2008 and 2014 females appeared to increase slightly in abundance while males remained stable. Since 2020, the slow improvement in numbers of both sexes seemed to have reversed. However, given the uncertainty which surrounds mark recapture estimates in the recent past, a trend in population size (Fig. 2) cannot be confirmed.

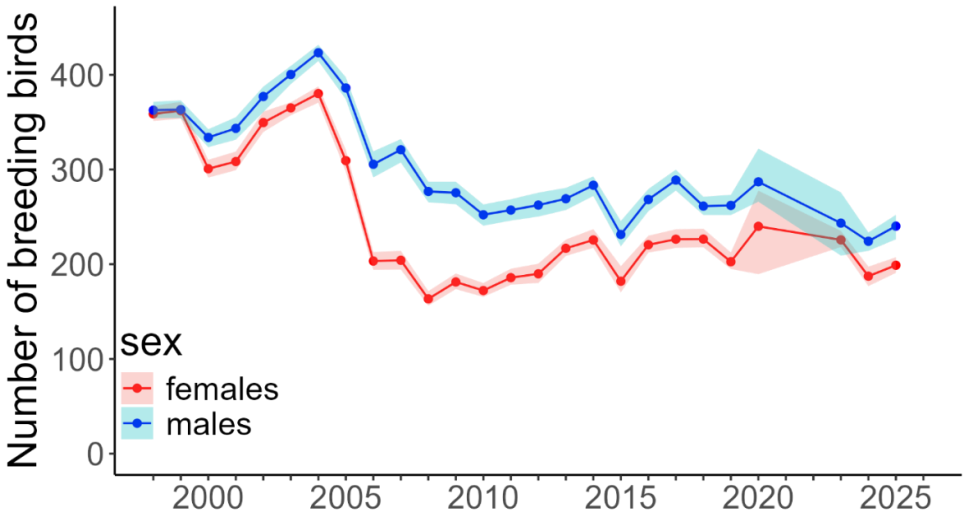

Figure 2. The number of breeding Gibson's albatrosses in the Adams Island study area between 1998 and 2025 estimated by mark-recapture. Shaded areas are 95% confidence intervals.

Adult survival

Adult survival varied around a mean of about 96% up until 2004 and during this period male and female survival were similar (Fig. 3). Survival dropped substantially after 2005, with female survival reaching catastrophically low levels in 2005 and 2007. Female survivorship had improved by 2010 but still remains lower than before the crash, at a mean 93% between 2014 and 2024 (Fig. 3). The confidence in these survival estimates for both males and females is also lower than it was before 2005 as the crash effectively halved the size of the population so there are fewer banded birds to sample.

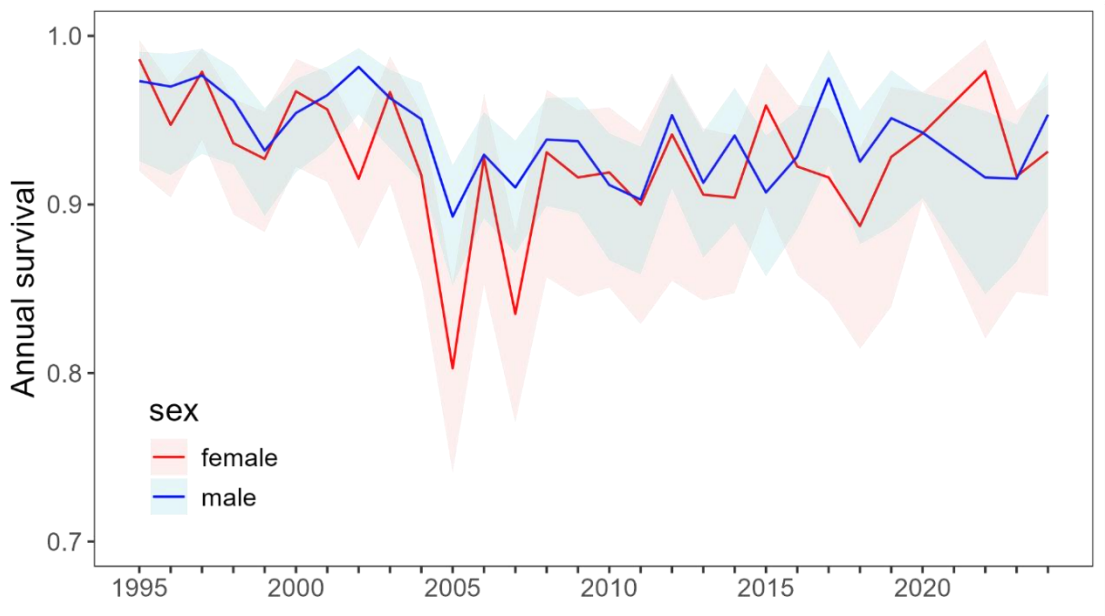

Figure 3. Annual survival of Gibson's wandering albatross in the Adams Island study area since 1995, estimated by mark-recapture. Shaded areas are 95% confidence intervals.

Productivity

Breeding success was 60% in 2025 (Fig. 4, blue line); a recovery from the low breeding success in 2024 and similar to the pre-crash breeding success. Despite the improved breeding success, the number of chicks produced remains small compared to pre-crash numbers because of the reduced size of the breeding population (Fig. 4, red line).

Figure 4. Gibson's wandering albatross nesting success and the number of chicks fledged from the study area on Adams Island since 1991.

Number of pairs nesting in representative blocks and total breeding pairs

Accuracy of nest counts in census blocks was estimated only for A to A, Fly Square, and Turbott Square, and was 100% (i.e., no unmarked nests were found during the accuracy check). The number of Gibson's albatross pairs nesting in the three representative census blocks in 2026 was close to the 2025 number (only 4.2% higher) and close to the average count over the last 15 years (Fig. 5). The total number of nests on Adams Island in 2026 estimated from the number of nests with eggs in these three blocks, corrected for already failed and eggs still to be laid, was 5,032 (Table 2, Fig. 5).

A total of 132 nests were found in the new count block Turbott Square, a similar density to that in the same-sized block nearby, Fly Square. After applying the correction factor there were an estimated 144 nests in Turbott Square in 2026. The back calculated proportion of the whole population held in Turbott Square (R_{TS}) is 2.86%, bringing the cumulated proportion of the four count blocks to c. 12.4% of the total Adams Island Gibson's albatross breeding population.

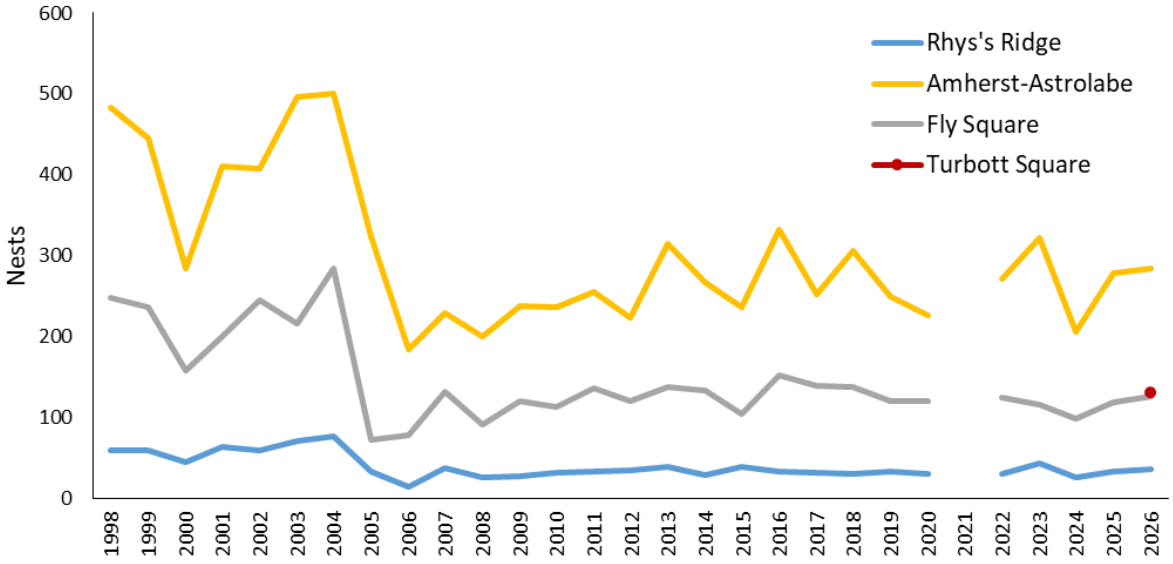

Figure 5. The number of Gibson's albatross nests counted in three census blocks on Adams Island 1998-2026, plus the new census block, Turbott Square.

Table 2. Gibson's albatross nests with eggs in late January in three census blocks on Adams Island, 1997–2026. Corrected total is the estimated number of nests in the three blocks taking account of the number of failed nests and unlaid eggs at the time of counting (i.e., after applying the correction factor, see methods). Estimated Adams Island Total is the estimated number of nests on the whole of Adams Island based on the mean (9.5%, comprising 0.8% on Rhys's Ridge, 5.9% Amherst to Astrolabe, 2.7% in Fly Square) of the proportion nesting in the three counted blocks in 2024 (9.2%) and 2025 (9.7%). *= drone-based estimate.

Year	Rhys's Ridge	Amherst-Astrolabe	Fly Square	Total nests counted	Total corrected for unlaid eggs and failed nests	Estimated Adams Island Total
1997					796	8,414
1998	60	483	248	791	798	8,436
1999	60	446	237	743	746	7,886
2000	45	284	159	488	497	5,254
2001	64	410	201	675	706	7,463
2002	60	408	246	714	740	7,822
2003	71	496	217	784	791	8,362
2004	77	501	284	862	884	9,345
2005	34	323	72	429	452	4,778
2006	15	185	79	279	341	3,605
2007	38	230	132	400	430	4,545
2008	26	201	91	318	341	3,605
2009	28	238	120	386	426	4,503
2010	32	237	114	383	392	4,144
2011	33	255	137	425	438	4,630
2012	35	224	120	379	418	4,419
2013	39	315	138	492	519	5,486
2014	29	267	134	430	473	5,000
2015	39	237	105	381	406	4,292
2016	34	332	153	519	545	5,761
2017	32	252	140	424	448	4,736
2018	31	306	138	475	489	5,169
2019	33	249	121	403	423	4,471
2020	30	226	120	376	391	4,133
2021	No count					
2022	31	272	125	428	449	4,746
2023	43	322	116	481	501	5,296
2024	26	206	99	331	380	4,130*
2025	33	278	119	430	472	4,865*
2026	37	284	127	448	478	5,032

At sea distribution of juvenile Gibson's wandering albatross

Satellite tags attached to 16 chicks ready to fledge from the Adams Island study area in December 2024 (Elliott et al. 2025) transmitted for a mean 238 days, with the earliest stopping only a few weeks after the chick fledged, and the latest on 18 February 2026, 13.5 months after fledging.

The heavier (35g) battery powered Telonics TAV 2360 transmitters stopped transmitting sooner (mean = 190 days) than did the lighter solar powered (25g) Druid Technologies Yawl C2 transmitters (mean = 287 days) (Table 2), presumably due to the extra strain heavier weight put on the feathers to which the tags were taped. The Druid tags also provided far more locations per day than the TAVs (on average 66 from Druids and 6 from TAV's).

Table 3. Length of attachment of 16 satellite transmitters of two different types attached to 8 male and 8 female juvenile Gibson's wandering albatross in December 2024.

	Sex	Transmitter type	Deployed	Stopped transmitting	Days attached
Black-50k	Female	Druid, Yawl C2	15/12/2024	13/09/2025	272
Black-51k	Male	Druid, Yawl C2	16/12/2024	10/12/2025	359
Black-58k	Female	Druid, Yawl C2	10/12/2024	18/02/2026	435
Black-69k	Male	Druid, Yawl C2	10/12/2024	24/01/2026	410
Black-80k	Male	Druid, Yawl C2	10/12/2024	25/09/2025	289
Black-83k	Female	Druid, Yawl C2	10/12/2024	06/02/2025	58
Black-84k	Female	Druid, Yawl C2	16/12/2024	01/01/2026	381
Black-85k	Male	Druid, Yawl C2	16/12/2024	17/03/2025	91
Black-63k	Male	Telonics, TAV2360	13/12/2024	14/05/2025	152
Black-71k	Female	Telonics, TAV2360	13/12/2024	08/09/2025	269
Black-73k	Female	Telonics, TAV2360	10/12/2024	10/04/2025	121
Black-76k	Female	Telonics, TAV2360	13/12/2024	05/06/2025	174
Black-78k	Male	Telonics, TAV2360	10/12/2024	04/09/2025	268
Black-79k	Male	Telonics, TAV2360	10/12/2024	27/10/2025	321
Black-86k	Male	Telonics, TAV2360	10/12/2024	27/04/2025	138
Black-88k	Female	Telonics, TAV2360	13/12/2024	24/02/2025	73

Light-mantled sooty albatross at-sea distribution

The two light-mantled sooty albatrosses were successfully tagged, and as of 19th March 2026, the tags were still transmitting. Immediately after tagging, the birds flew south to the edge of the Antarctic continental shelf before moving predominantly east-west (Fig. 7). One individual undertook two long trips, with the second more directed south towards the Ross Sea and back. The second individual was still on its first trip and located in the Ross Sea at the time of writing, where it has remained for the past month.

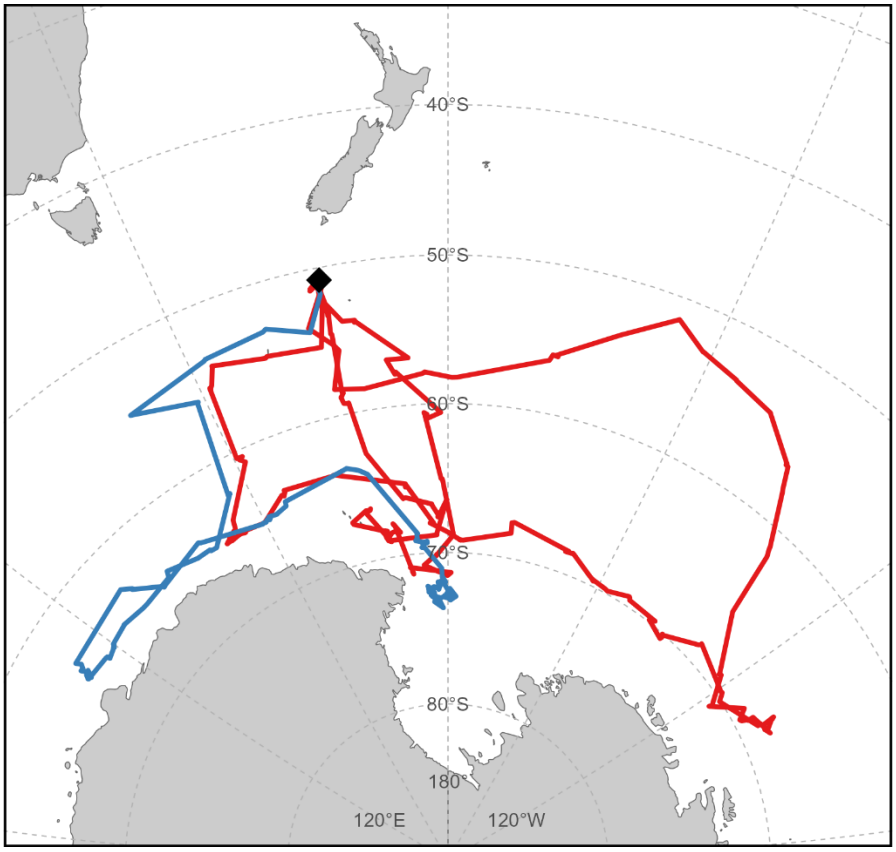

Figure 7. Tracks of the two light-mantled sooty albatrosses tagged on Adams Island in January 2026 (as of 19th March 2026). Black diamond = Adams Island.

Counts of light-mantled sooty albatross nests in long-term count areas

Figure 8. Count of light-mantled sooty albatross apparently occupied nests (i.e., adults sitting on nests + chicks alone) at two sites on Adams Island between1998 and 2026.

Table 4. Counts of light-mantled sooty albatross apparently occupied nests (i.e., adults sitting on nests + chicks alone) in the long-term count areas on Adams Island.

Year	Date	Amherst	Gut	Total
1999	03/02/1999	34	1	35
2000	01/02/2000	12	3	15
2001	02/02/2001	36	11	47
2003	15/01/2003	43	9	52
2004	01/02/2004	27	2	29
2005	03/02/2005	22	7	29
2006	13/01/2006	23	5	28
2007	05/02/2007	28	5	33
2008	13/01/2008	33	2	35
2009	22/01/2009	19	8	27
2010	02/02/2010	11	0	11
2011	09/02/2011	13	2	15
2012	06/02/2012	10	2	12
2013	11/02/2013	15	0	15
2014	04/02/2014	17	2	19
2015	31/01/2015	7	4	11
2016	12/02/2016	16	10	26
2017	04/02/2017	13	6	19
2018	31/12/2017	43	9	52
2019	30/01/2019	23		
2020	02/02/2020	26	5	31
2022	09/02/2022	15	4	19
2023	07/01/2023	31	8	39
2025	31/12/2024	21	15	36
2026	30/12/2025	33	7	40

Discussion

The estimated total number of Gibson's albatross nests on Adams Island and the mark-recapture estimate of population size was only slightly higher in 2026 than 2025 and was broadly comparable to the average over the past 15 years. Although nest numbers in 2024 reached their lowest level since 2008, the 2025 results suggested that this dip did not mark the onset of a population decline, but rather reflected other factors, such as foraging and/or nesting conditions. This interpretation is further supported by the 2026 results. Nonetheless, the island-wide number of nests remains considerably lower than the pre-crash population, reflecting the lingering effects of low recruitment since the 2005-06 crash, which has increased only slowly since and remains subject to high interannual variability.

Following recommendations from the island-wide surveys conducted over the past two years, a new census block (Turbott Square) was surveyed this year in addition to the three historical census blocks, increasing the overall proportion of the total population counted annually. In future censuses Turbott Square will contribute directly to the estimation of the island-wide total. Given the proximity of this new block to Fly Square, and as Fly Square is already the furthest census block from McLaren Bay hut, it is recommended that in the future these two blocks be counted over two consecutive days, weather permitting, and camping nearby overnight, to minimise the extra effort required to increase the proportion of the total population counted.

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