

New Zealand sea lion/pakake/whakahao Auckland Islands CSP POP2023-05

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Table of Contents

1. Executive summary.....	2
2. Introduction	3
3. Trip logistics	4
4. Methods	5
4.1 Pup production estimates.....	5
4.1.1 Enderby Island.....	5
4.1.2 Dundas Island.....	6
4.1.3 Figure of Eight Island.....	7
4.1.4 Auckland Islands pup production estimate	7
4.2 Ivermectin programme	7
4.3 Pup tagging	8
4.3.1 Sandy Bay, Enderby Island.....	8
4.3.2 Dundas Island.....	8
4.3.3 Figure of Eight Island.....	8
4.4 Flipper tag and microchip resightings.....	8
4.5 Terrain trap mitigation	9
5. Results and Discussion.....	9
5.1 Pup production estimates.....	9
5.1.1 Enderby Island.....	9
5.1.2 Dundas Island.....	11
5.1.3 Figure of Eight Island.....	12
5.1.4 Auckland Islands pup production estimate	12
5.2 Pup tagging	14
5.2.1 Sandy Bay, Enderby Island.....	14
5.2.2 Dundas Island.....	14
5.2.3 Figure of Eight Island.....	14
5.3 Tag and microchip resightings.....	17
5.4 Terrain trap mitigation	17
6. Recommendations	17
7. Acknowledgements	18
8. References.....	19
9. Appendices	21
Appendix 1. Sandy Bay, Enderby Island daily direct counts.....	21
Appendix 2. Dundas Island direct counts and mark-recapture.....	22
Appendix 3. Figure of Eight direct counts.....	23
Appendix 4. Auckland Islands pup production estimates 1994/95 to 2025/26	24

1. Executive summary

This report summarises fieldwork undertaken by the Department of Conservation (DOC) Marine Bycatch and Threats team as part of Conservation Services Programme (CSP) project POP2023-05 'Auckland Islands New Zealand sea lions' (DOC 2024).

The DOC CSP-funded team spent a total of seven weeks at the Auckland Islands undertaking sea lion research and active management (8 December 2025 to 23 January 2026), which comprised six weeks at Enderby Island, three nights on Dundas Island, and one day on Figure of Eight Island. Direct counts of pups were undertaken each day at Sandy Bay, Enderby Island. At Dundas Island, the team conducted a mark-recapture survey and direct counts of pups. At Sandy Bay, Enderby Island, 297 pups were microchipped and 295 of those pups were also double flipper-tagged. At Dundas Island, 200 pups were double flipper-tagged, and 100 of those pups were microchipped. Female pups born at Sandy Bay, Enderby Island, were treated with a subcutaneous injection of ivermectin (a deworming medication) at approximately one week of age, in accordance with a veterinary operating instruction (VOI). A second DOC team, funded directly by DOC's Marine Bycatch and Threats team, were deployed to Enderby Island from 15 January to 12 March 2026 to conduct investigations into pup survivorship and mortality, and to continue the programme of active management to recover this population.

Resightings of marked animals of all age and sex classes were collected during daily dedicated surveys at Sandy Bay, Enderby Island, and opportunistically at other areas of the Auckland Islands, from November 2025 to March 2026. Total counts of pups, females, sub-adult males, and adult males were undertaken daily at Sandy Bay up to 16 January 2026, and weekly around accessible areas of Enderby Island.

New Zealand sea lion pup production at the Auckland Islands in 2025/26 was estimated as $1,425 \pm 30$ pups (mean ± 1 SE), which is higher than last year's estimate of 1,375 pups, but lower than the estimate of 1,457 pups in 2023/24 (Manno et al. 2024; Manno & Whyte 2025).

The drop in pup production over the past four years suggests a recent decline in survival or fecundity of this population of breeding females, which can be investigated using resighting and productivity information. DOC has recently reviewed management actions to recover the New Zealand sea lion population, and the decision to treat pups with ivermectin at Enderby Island is a direct result of that review. Further management actions will be considered by DOC in partnership with Te Rūnanga o Ngāi Tahu and Fisheries New Zealand.

The increase in the number of tourist vessel landings and numbers of passengers landed per day since 2016, in addition to the timing of landings at Enderby Island during periods critical for wildlife breeding and research, had substantial impacts on the team's ability to complete their work this year. The period between the cessation of pup birthing on and post-colonial movement away from the Auckland Islands harems is a narrow biological window of ten days (10 to 20 January annually). Changes to tourist vessel schedules, allowing access to Sandy Bay during the pup tagging period, resulted in difficulty achieving pup tagging, counts, and active management safely. A review of tourist access is required to ensure that conservation management activity is prioritised at these islands during critical time periods.

2. Introduction

The New Zealand sea lion/pakake/whakahao (*Phocarctos hookeri*), one of the world's rarest sea lions, is taonga to Ngāi Tahu, and currently classed as Nationally Endangered, with a total population estimate of 10,000 individuals breeding on the Auckland Islands/Maukahuka, Campbell Island/Motu Ihupuku, Stewart Island/Rakiura, and the South Island/Te Waipounamu (Baker et al. 2019; Lundquist et al. 2025; Roberts & Edwards 2023). As of 2025, approximately 70% of New Zealand sea lions breed at the Auckland Islands colonies, located at Dundas Island (52.2%), Enderby Island (14.9%), and Figure of Eight Island (3.0%) (DOC, unpublished data). The foraging distribution of New Zealand sea lions at the Auckland Islands overlaps with commercial trawl fishing activity, particularly in SQU6T (the southern squid trawl fishery) and SCI6A (the Auckland Islands scampi fishery), and Fisheries New Zealand (FNZ) report occasional incidental captures of sea lions in these fisheries (Chilvers et al. 2005; FNZ 2025). The known primary threats to the recovery of Auckland Islands sea lions are *Klebsiella pneumoniae* infection, direct mortality in commercial trawl fisheries, and limitations on food availability causing nutritional stress (Augé 2010; Large et al. 2019; Meyer et al. 2015; Michael et al. 2019; Roberts & Doonan 2016; Roberts et al. 2018; Roe et al. 2015).

The breeding population of Auckland Islands New Zealand sea lions was estimated to have declined by 40% between the late 1990s and 2008/09, leading to the development of the New Zealand sea lion Threat Management Plan (NZSL TMP) (DOC & MPI 2017). The NZSL TMP was an initiative led by the Department of Conservation (DOC) in partnership with Te Rūnanga o Ngāi Tahu and FNZ to halt the decline of the New Zealand sea lion. Both the NZSL TMP and the 'Operational Plan to manage the incidental capture of New Zealand sea lions in the southern squid trawl fishery' (Squid 6T Operational Plan) (FNZ 2019) set a minimum target of 1,575 pups born annually at the Auckland Islands to initiate reviews should this target not be met. In 2022, the use of Sea Lion Exclusion Devices (SLEDs) in the southern squid fishery was made mandatory and in 2024, FNZ decided to no longer produce the Squid 6T Operational Plan (FNZ 2024). Meanwhile, Auckland Islands sea lion pup production continued to decline below the target level of 1,575 pups, dropping to an historic low of 1,278 pups in 2022/23. The NZSL TMP has been reviewed and a new updated plan, developed by DOC in partnership with Te Rūnanga o Ngāi Tahu, FNZ, and stakeholders, will be released in 2026.

Annual monitoring of New Zealand sea lions at the Auckland Islands includes estimates of pup production (the number of pups born), as a proxy for the number of breeding females, supported by tagging and resightings of marked individuals using flipper tags and microchips for determining survival of specific age and sex classes. The collection of demographic data from the Auckland Islands is critical for assessments of the species overall population size and vulnerability to threats (Bowen 2012, Roberts & Edwards 2023).

Pup production at Dundas and Enderby Islands has historically been estimated using a range of methods including aerial surveys, ground-based mark-recapture, marking of all known individuals, and direct visual counts (Baker et al. 2012; Childerhouse 2012; Chilvers 2012). This year's CSP project objectives were to determine pup production at the Enderby Island, Dundas Island, and Figure of Eight Island colonies, to double-flipper tag, microchip, and measure a subset of pups, and to collect tag resightings to provide survivorship data for demographic modelling (DOC 2024). The team was also tasked with treating all female pups born at Enderby Island with a weight-appropriate dose of ivermectin (a deworming medication) at approximately one week of age, to increase pup survivorship (Michael et al. 2021). The DOC CSP team conducted drone surveys of Enderby, Dundas, and Figure of Eight Islands, as part of DOC's ongoing efforts to ensure accuracy of counts and to future-proof monitoring of the species.

A DOC-funded field team was deployed from 15 January to 12 March 2026 to assess pup mortality at the Sandy Bay colony, conduct daily resightings, monitor visitor impacts, monitor pup-dam suckling, match pup-dam pairs, undertake terrain trap mitigation, collect scat samples, and trial the use of lidar for

assessing sea lion body condition. In addition, this team assessed flipper tag and microchip retention rates of pups to three months of age. The results of this work are presented in separate reports.

3. Trip logistics

Passage to and from the Auckland Islands and staff time were shared across several DOC-led projects, including maintenance work, visitor impact monitoring, seabird research and tracking, and eradication planning.

Enderby Team 1A: 29 October 2025 – 19 November 2025

Jordana Whyte (Team Leader: Visitor Impact Monitoring), Sarah Irvine, Mel Young; Rob Miller (Team Leader: Maintenance), Lance Hay, Hayley Lister, Chris Bennett, Charles Barnett, Anton Keller, Kate Dobbie.

Enderby Team 1B: 20 November 2025 – 14 January 2026

Jordana Whyte (Team Leader: CSP sea lion team), Lance Hay, Shaun McConkey; Sarah Irvine, Hayley Lister (Visitor Impact Monitoring).

Enderby Team 2A: 6 – 21 January 2026

Mel Young (Team Leader: DOC sea lion team), Kat Manno, Kate Stevens West, Hannah Langsbury, Jessica McCutchan, Saskia Buhrs; Hayley Lister, Sarah Irvine (Visitor Impact Monitoring).

Dundas and Figure of Eight Team 2B: 15 – 20 January 2026

Jordana Whyte (Team Leader: CSP sea lion team), Joris Tinnemans, Lance Hay, Shaun McConkey.

Enderby Team 2C: 21 January – 12 March 2026

Mel Young (Team Leader: DOC sea lion team), Jessica McCutchan, Saskia Buhrs.

The schedule of fieldwork was as follows:

- 26 – 30 October 2025: Enderby Team 1A arrive in Invercargill for quarantine and biosecurity.
- 31 October – 2 November 2025: Enderby Team 1A transit from Bluff to Enderby Island.
- 2 November – 30 November 2025: Critical repairs and maintenance to Enderby Huts and visitor infrastructure. Visitor Impact Monitoring Project commences. Enderby Team 1A returned to Bluff on 19 November, leaving Enderby Team 1B on island until 14 January 2026.
- 1 December 2025 – 10 January 2026: Enderby Team 1B undertake daily direct counts of all sea lion sex and age classes, flipper tag/microchip resightings, capture of week-old pups (sexing, microchipping, capping, morphometrics, and ivermectin treatment of females), weekly round-the-island surveys, sea lion scat collection and processing.
- 10 January 2026 – 13 January 2026: Enderby Team 1B complete pup double flipper-tagging; weighing and measuring of 50 male and 50 female pups.
- 6 – 12 January 2026: Enderby Team 2A arrive in Invercargill for quarantine and biosecurity, and transit from Bluff to Enderby Island via Evohe.
- 15 January 2026: Enderby Team 2A arrive Enderby Island. Dundas and Figure of Eight Team 2B depart for weather-dependent landings at Dundas Island.

- 16 – 19 January 2026: Dundas and Figure of Eight Team 2B undertake direct counts of live and dead pups, double flipper-tagging 100 male and 100 female pups, collecting morphometrics and microchipping of 50 male and 50 female pups at Dundas Island. Mark-recapture, opportunistic resightings, and multiple drone flights are also completed. Transit to Carnley Harbour on 19 January 2026.
- 20 January 2026: Dundas and Figure of Eight Team 2B, with the assistance of Evohe crew, undertake direct counts of live and dead pups, opportunistic resightings, and drone flights at Figure of Eight Island.
- 21 January 2026: Stopover at Enderby Island to pick up personnel and return to Bluff. Enderby Team 2C remains at Enderby Island.
- 22 January – 12 March 2026: Enderby Team 2C conduct resightings of tagged animals, dead pup searches, necropsy all dead pups, assess tag retention, match pup-dam pairs, and continue terrain trap mitigation project at Sandy Bay.
- 13 March 2026: Enderby Team 2C depart Enderby Island for Bluff via Evohe.
- 15 – 17 March 2026: Demobilisation.

4. Methods

4.1 Pup production estimates

4.1.1 Enderby Island

Pup production on Enderby Island was measured using three methods: (1) daily direct pup counts, (2) marking of all known pups using double-flipper tags and microchips, and (3) weekly round-the-island surveys.

Daily direct counts were completed at Sandy Bay, Enderby Island, from 1 December 2025 to 20 January 2026, in the area shown in Figure 1. Direct counts were undertaken by team members walking through the colony using hand tally counters to estimate the total number of individuals in each of four defined age-sex classes: pups, females, sub-adult males (SAMs), and adult males. Counts were conducted between 09:00 – 12:00 NZDT to avoid disturbing the mass outgoing transit of hoiho across the sward and beach. As the breeding season progressed and the sea lion colony increased in size, each team member conducted two or more daily counts of females and pups. Counts were repeated until each team members' estimates agreed to within 10% and counts that fell outside this range and or that were disturbed were discarded. This method was used to ensure that 'disturbed counts', either from active harem activity making counts difficult, or from the observer having to relocate to remain safe while counting, did not result in inaccurate counts being included each day. Daily estimates for each age and sex class were determined by taking the mean of values from all observers that fell within the acceptable 10% range for each observer.

On days when cruise ships visited Sandy Bay, daily direct counts were delayed, occurring between 12:00 – 14:00 NZDT, depending on the numbers and movements of the visitors. Delayed direct counts were required to maintain the health and safety of the field team with up to 200 additional people surrounding the breeding area, and to limit stress on the animals.

All pups in the Sandy Bay colony were caught for microchipping and flipper tagging, either during ivermectin treatment at approximately one week of age, or during 10 to 15 January 2026. Given the closed population status, with no evidence of movement of pups in or out of the population before 31 January 2026, any additional untagged pups found within Sandy Bay after 16 January 2026 were considered to have been born non-colonially in this area.

The round-the-island survey was undertaken by two to five observers walking the Enderby Circuit route once per week from 1 December to check for pups born at other areas of Enderby Island. Total counts of sea lions by age-sex class and incidental tag resightings were recorded for each segment of the track.

Within the Sandy Bay colony throughout the observation period from 1 December 2025 to 16 January 2026, dead animals were counted, and where possible, dead pups were moved out of the colony to the far end of the beach to avoid double-counting. Pups that died before they reached tagging age were added to the count of tagged and untagged live pups to arrive at the pup production estimate.



Figure 1. Satellite imagery of Sandy Bay, Enderby Island. Direct counts of defined age-sex classes of New Zealand sea lions (*Phocarctos hookeri*) were undertaken in the yellow shaded area, including the beach and open coastal swardlands.

4.1.2 Dundas Island

Pup production on Dundas Island was measured using two methods: (1) mark-recapture and (2) direct counts.

Dundas Island pup production was estimated using the mark-recapture method as outlined in Chilvers (2012). A total of 300 white 5cm-diameter cotton canvas caps ([plain cotton canvas, 375GSM](#) purchased at Spotlight, New Zealand, cut into round caps by field team) were glued to the heads of pups using [Loctite® 454™ glue](#) (Henkel AG & Co. KGaA, Düsseldorf, Germany), as per the New Zealand sea lion and fur seal pup tagging SOP ([DOC-5993453](#)). Caps were applied to the heads of 300 live pups on the afternoon of 16 January 2026. The caps were glued to the heads of pups distributed around the entire island. Two observers walked across the study area on the morning of 17 January 2026 to search for lost caps and dead capped pups prior to commencing mark-recapture counts.

Mark-recapture observations were undertaken on the morning of 17 January 2026, with each observer collecting four replicate counts of capped and uncapped pups using hand tally counters ($n = 16$ counts total). Only pups with heads fully visible were counted. Mark-recapture estimates and standard error ($\pm 1SE$) for the Dundas Island colony were calculated using the Lincoln-Petersen estimator (Chapman 1952), as outlined by Chilvers (2012). To ensure accuracy, any disturbed counts were discarded, and a new count started.

Direct counts of live pups at Dundas Island were conducted on the afternoon of 17 January 2026 by four observers, with four repetitions per observer. Counts were undertaken independently by each observer walking through the colony with hand tally counters. The total direct count estimate was derived by calculating the mean \pm 1 SE of all individual estimates. To ensure accuracy, any disturbed counts were discarded, and a new count started.

Dead pups were counted and marked by two observers using Donaghy's Sprayline® (Donaghy's Ltd., Christchurch) on the morning of 17 January 2026 to calculate one cumulative dead pup count estimate. For both the mark-recapture estimate and the direct count estimate, the total number of dead pups was added to the live pup estimates to arrive at total pup production.

No other age-sex classes were surveyed at Dundas Island.

4.1.3 Figure of Eight Island

Five observers conducted direct counts of pups at Figure of Eight Island on 20 January 2026. Each observer conducted independent counts, but the team moved together throughout the colony to ensure their safety in dense forest and scrub. Observers recorded total numbers of live and dead pups, and dead pups were marked using Donaghy's Sprayline® (Donaghy's Ltd., Christchurch) to avoid double-counting. The total direct count estimate was derived by calculating the mean \pm 1 SE of all individual estimates of live and dead pups.

No other age-sex classes were surveyed at Figure of Eight Island.

4.1.4 Auckland Islands pup production estimate

Estimates of pup production for each of the colonies were added together to calculate the total estimate of sea lion pup production for the Auckland Islands for 2025/26. Methods for pup production estimation differed between each colony but the methods used for each location remained consistent with historic datasets.

Standard error in the difference of means ($SEDM = \sqrt{(SE1)^2 + (SE2)^2}$) was used to calculate overall standard error for pup counts summed across all islands, as outlined by Chilvers (2012).

4.2 Ivermectin programme

From 20 December 2025 to 13 January 2026, the team treated female pups born at Sandy Bay with the deworming medication ivermectin. Pups were captured at approximately one week of age and sexed on capture. Female pups were weighed to determine the ivermectin dosage given by a subcutaneous injection, microchipped, and marked on the head with a 5cm white cotton canvas cap bearing a unique number attached using Loctite. Male pups were microchipped and marked on the head with a 5cm blue cotton canvas cap bearing a unique number. The first 50 pups of each sex were also weighed to the nearest 0.2kg and measured for total length and axillary girth to the nearest centimetre. Data were recorded in a paper logbook and entered into a spreadsheet daily. All work was done in accordance with the subcutaneous injection protocol in the New Zealand sea lion and fur seal pup tagging and sampling SOP ([DOC-5993453](#)).

4.3 Pup tagging

4.3.1 Sandy Bay, Enderby Island

The team followed the methods described in the New Zealand sea lion and fur seal pup tagging and sampling SOP ([DOC-5993453](#)) to double-flipper tag and microchip all pups at Sandy Bay from 10 to 13 January 2026 using laser-printed yellow Allflex® Male-Female 29mm Button tags (Allflex, Palmerston North) and Trovan® ID-162C FDX-B 11.5mm microchips (Trovan Ltd., United Kingdom). All microchips were scanned before and after implantation, using an Allflex® RS420 Stick Reader (Allflex®, Palmerston North). Readers were fully charged each day to ensure optimal operation in the field. Pups that had not yet been handled and microchipped for ivermectin treatment were microchipped at the time of flipper tagging. The first 50 pups of each sex tagged were weighed to the nearest 0.2kg and measured to the nearest centimetre for total length and axillary girth.

The increase in the number of tourist vessel landings and numbers of passengers landed per day since 2016, in addition to the timing of landings at Enderby Island during periods critical for wildlife breeding and research, had substantial impacts on the team's ability to complete their work this year. The period between the cessation of pup birthing on and post-colonial movement away from the Auckland Islands harems is a narrow biological window of ten days (10 to 20 January annually). Changes to tourist vessel schedules, allowing access to Sandy Bay during the pup tagging period, resulted in difficulty achieving pup tagging, counts, and active management safely. A review of tourist access is required to ensure that conservation management activity is prioritised at these islands during critical time periods.

4.3.2 Dundas Island

The CSP Team double flipper-tagged a total of 200 pups at the Dundas Island colony on 17 and 18 January 2026 using laser-printed yellow Allflex® Male-Female 29mm Button tags (Allflex, Palmerston North) following the methods described in the New Zealand sea lion and fur seal pup tagging and sampling SOP ([DOC-5993453](#)). Pups were selected opportunistically for tagging, with the team spreading selection effort through the colony as much as possible. The first 50 pups of each sex tagged were weighed to the nearest 0.2kg and measured to the nearest centimetre for total length and axillary girth. Measured pups were also microchipped with Trovan® ID-162C FDX-B 11.5mm microchips (Trovan Ltd., United Kingdom). All microchips were scanned before and after implantation using an Allflex® RS420 Stick Reader (Allflex®, Palmerston North).

4.3.3 Figure of Eight Island

No pups were tagged, microchipped, or measured at Figure of Eight Island.

4.4 Flipper tag and microchip resightings

When conditions allowed between the hours of 10:00 and 22:00 NZDT, team members walked the length of Sandy Bay beach and swardlands multiple times each day to collect tag resightings of marked sea lions using binoculars, a DSLR camera, and a close-range monocular. As the majority of dual-marked animals have been marked with a TrovanUniqueID microchip, resightings were collected using either a Trovan GR-250 or GR-251 microchip scanner. When no microchip could be detected with a GR-series scanner, young animals (<4 years) were opportunistically scanned with an Allflex RS420 scanner to detect an FDX-B microchip.

For resightings, team members walked systematically through the colony, scanning sedentary animals for microchips, and recording flipper tag alphanumeric and apparent colours, tag shape, left/right flipper tag presence, sex, and age class for each marked animal. Marked adult females were targeted as a priority for resighting over other age and sex classes. Where possible, animals were checked for dual

marks and were matched in the New Zealand sea lion database. The team did not move through the colony to collect resightings when cruise ship visitors were present on the island, rather, cameras and binoculars were used from the edges of the colony to preserve team safety and limit disruption to the animals.

Photographs and field notes were reviewed after each resighting session, and each record was checked and verified against the New Zealand sea lion database before entry into the spreadsheet. Where flipper tags/microchips were repeatedly and consistently observed in the colony, but did not match existing database records, these entries were flagged for correction in the database.

Images of worn flipper tags were collected and catalogued to understand the impact of weathering, retention, and tag type on demographic information as part of a research collaboration between the University of Otago and DOC. Photographs of flipper tags were labelled with the age, tag make, tag model, tag shape, number of printed facings, and original colour of the tag.

At the cessation of colonial breeding, effort was focused on identification of all females and determination of pup-dam pairings. Pup flipper tag and microchip retention were assessed through concerted resighting effort where each pup was checked for tags on the left and right flippers and scanned for microchips using an Allflex RS420 scanner.

Opportunistic flipper tag resightings were collected when the team was ashore at other sites around the Auckland Islands, however this was not the focus of these visits, and scanners were not carried to check for microchips.

4.5 Terrain trap mitigation

All known terrain traps at Sandy Bay were surveyed and assessed from 21 January to 11 March 2026. Where deemed necessary, pups were extracted from new or known terrain traps when safe to do so, and additional self-rescue ramps were installed where appropriate.

Self-rescue ramps were not checked at Dundas Island due to time restrictions.

5. Results and Discussion

5.1 Pup production estimates

5.1.1 Enderby Island

Daily counts at Sandy Bay, Enderby Island followed historic trends throughout December 2025 and January 2026, indicating no apparent change in breeding phenology this season. The highest count of live pups plus cumulative dead pups found at the colony was 308 on 16 January 2026. Female colony attendance, which is traditionally at its highest between 26 December and 2 January annually during the 'peak pupping period', appeared to be several days later than usual, reaching a peak on 4 January and falling off after 8 January 2026 (Figure 2).

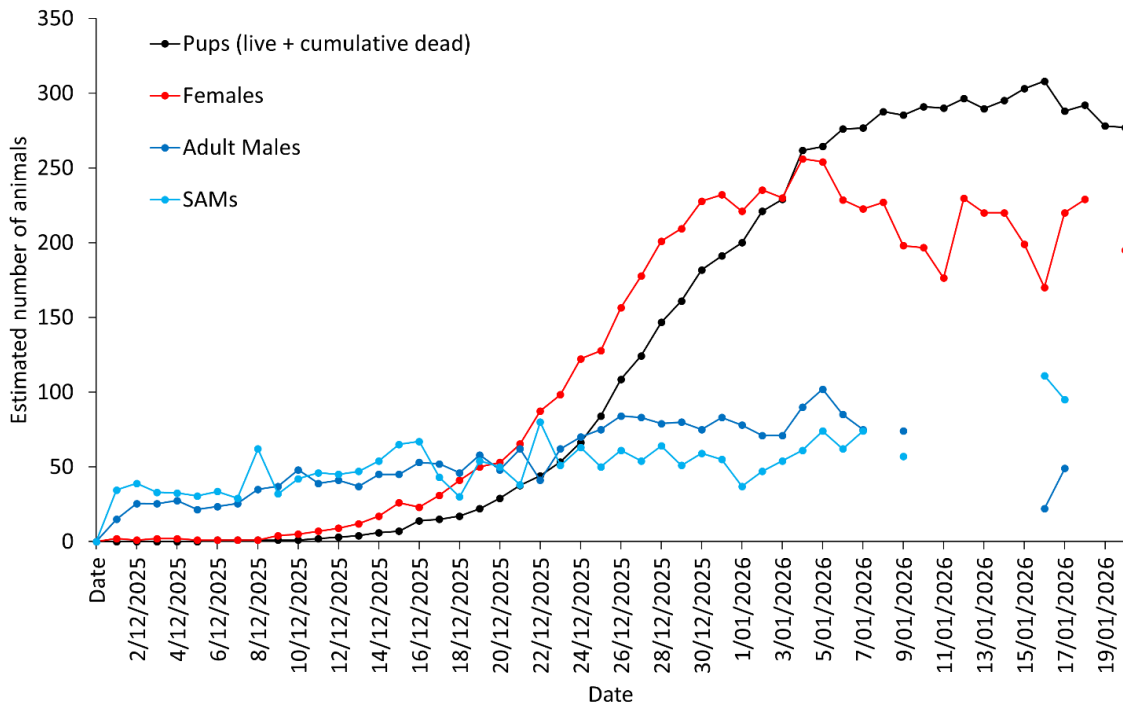


Figure 2. Mean daily counts of New Zealand sea lions at Sandy Bay, Enderby Island, by age and sex class (SAM = subadult male), in 2025/26 (beach and sward combined).

A total of 297 pups were microchipped at Sandy Bay and 295 of those pups survived to flipper-tagging age. A cumulative total of 12 pups died at the colony prior to flipper-tagging. In addition, four untagged pups were regularly resighted, assumed to be born non-colonially in the bush areas surrounding Sandy Bay, from 10 January to 31 January 2026, prior to any apparent migration of females with pups. Total estimated pup production for Sandy Bay, Enderby Island was 311 pups (299 live plus 12 dead pups).

No pups were found on the weekly round-the-island surveys in December 2025 and January 2026, although the CSP Team did not have capacity to search the island thoroughly, focusing effort on open swardlands and grasslands, and not undertaking any survey effort in bush or scrub. When compared with recent years, an unusually high number of females were seen outside of Sandy Bay on the round-the-island surveys, with most of these resightings at Derry Castle Reef, but some in other areas of Enderby Island (Table 1).

Table 1. Female counts from round-the-island surveys at Enderby Island in December and January (2022/23 – 2025/26).

Season	Cumulative count of females	Number of surveys	Number of females per survey (lowest – highest count)
2022/23	11	4	1 – 6
2023/24	17	6	1 – 4
2024/25	13	7	0 – 8
2025/26	42	6	1 – 14

When compared with previous years, the daily counts of females ashore in 2025/26 at Sandy Bay, Enderby Island, was low. During the peak pupping period, at which time the maximum number of females are found ashore (27 December – 2 January, Chilvers et al. 2007), the mean number of females counted at Sandy Bay this year was the third lowest ever recorded in the history of this dataset (Table 2).

The peak observed on 4 January 2026 was however comparable with counts undertaken over the past 15 seasons (Figure 2; Table 2), suggesting that female colony attendance might have been influenced by local factors.

The raw Enderby Island daily count data are available in Appendix 1 (Table A1.1).

Table 2. Mean, minimum, and maximum numbers of females counted daily at Sandy Bay, Enderby Island, between the peak pupping period from 27 December – 2 January 1997/98 to 2025/26 (1997 – 2012 data from Louise Chilvers, Department of Conservation; 2015 – 2017 data from Simon Childerhouse, Blue Planet Marine; 2018 data from Sarah Michael, University of Sydney).

Season	Mean # females at Sandy Bay	Minimum	Maximum
1997/98	368	355	388
1998/99	342	300	393
1999/00	390	374	413
2000/01	320	303	352
2001/02	316	303	352
2002/03	363	326	388
2003/04	372	335	389
2004/05	294	226	337
2005/06	325	253	355
2006/07	307	289	337
2007/08	308	283	340
2008/09	209	190	225
2009/10	290	264	317
2010/11	318	285	358
2011/12	290	259	325
2015/16	196	186	211
2016/17	258	193	282
2017/18	259	244	278
2022/23	206	162	231
2023/24	221	212	235
2024/25	229	189	248
2025/26	215	178	235

5.1.2 Dundas Island

After the addition of 39 pups found dead prior to the survey, the mark-recapture at Dundas Island yielded an estimate of 1059 ± 30 pups. No dropped caps were found, and no capped pups were found dead prior to the mark-recapture counts. Mean direct counts at the Dundas Island colony produced a total estimate of 1070 ± 11 pups (mean ± 1 SE). The raw data from Dundas Island counts are available in Appendix 2 (Tables A2.1 and A2.2).

5.1.3 Figure of Eight Island

The mean pup production at Figure of Eight Island was calculated as 55 ± 1 pups (mean \pm 1 SE) from 11 counts by five observers. This count included one dead pup. The raw data from Figure of Eight Island are available in Appendix 3 (Table A3.1).

5.1.4 Auckland Islands pup production estimate

The total New Zealand sea lion pup production estimate for the Auckland Islands in 2025/26 was $1,425 \pm 30$ pups (mean \pm 1SE, Table 3), which falls between the pup production estimates for 2023/24 and 2024/25 (Manno et al. 2024, Manno & Whyte 2025).

Table 3. Auckland Islands pup production estimates for 2025/26 including standard error (\pm 1SE).

Location	Method	Date	Number of counts (observers)	Cumulative dead pups prior to counts	Live pup estimate \pm 1 SE
Sandy Bay, Enderby Island	Count of pups tagged and untagged pups born in the bush near Sandy Bay	10 - 15 Jan	1 (8)	12	299 ¹
Enderby Island (other)	Mean direct count	4 Dec - 17 Jan	6 (2 – 7)	0	0
Dundas Island	Mark-Recapture	17 Jan	16 (4)	39	1020 \pm 30
Figure of Eight Island	Mean direct count	20 Jan	3 (5)	1	54 \pm 1
Dead and live estimates				52	1373 \pm 30
Total pups²				1425 \pm 30 pups	

For the fourth year in a row, the Auckland Island pup production estimate has fallen below the trigger for review of the [New Zealand sea lion Threat Management Plan](#) (1,575 pups, DOC & MPI 2017) (Figure 3).

Table A4.1 in Appendix 4 summarises the historic pup production estimates from the Auckland Islands since 1994/95. Raw count data from 2025/26 are stored in [DOC-10939502](#).

¹ Includes four pups born outside the colony in the immediate vicinity of Sandy Bay that were not tagged or microchipped.

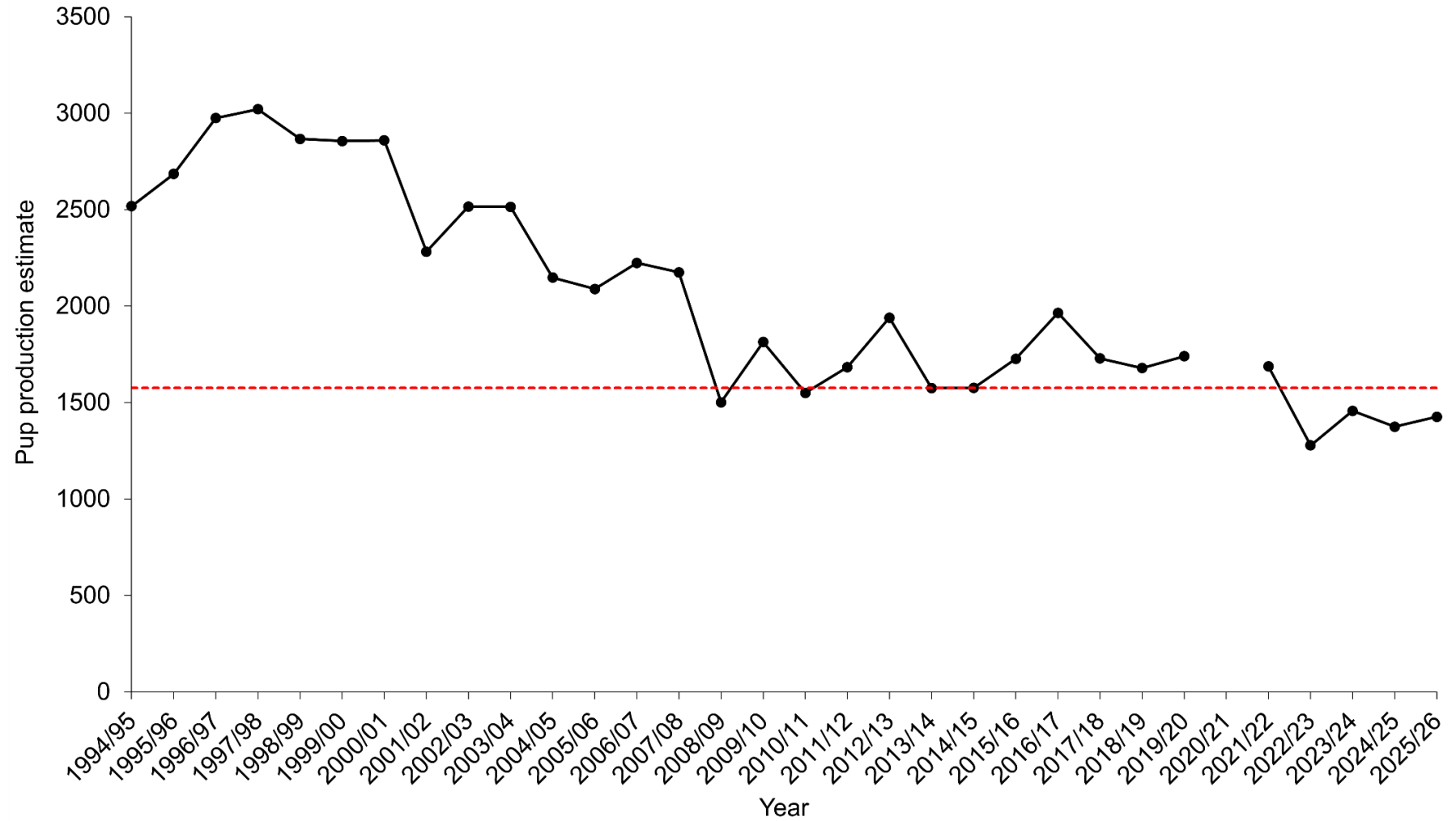


Figure 3. Auckland Islands total New Zealand sea lion pup production estimates 1994/95 – 2025/26. The red dashed line represents the minimum count of 1,575 pups previously set to trigger review of the New Zealand sea lion Threat Management Plan (DOC & MPI 2017).

5.2 Pup tagging

All 2025/26 pup tagging data are stored in [DOC-10939506](#).

5.2.1 Sandy Bay, Enderby Island

A total of 297 pups were microchipped at one week of age at Sandy Bay, Enderby Island; 295 of those pups survived and were double flipper-tagged between 10 – 13 January 2026. The sex ratio of pups marked at the colony was skewed towards males, at 138 female : 159 male. All pups born at the colony that survived to one week of age were microchipped.

The first 50 pups of each sex were weighed and measured at the time of flipper tagging on 10 and 11 January 2026. The mean mass of pups at Sandy Bay was comparable with the lower range of the historical pup mass dataset (Table 4; Figure 4).

Table 4. Mean mass (mean \pm 1 standard deviation) of 50 male and 50 female pups tagged at Enderby and Dundas Islands in January 2026.

Island	Female pup mass in kg (mean \pm 1SD)	Number of female pups measured	Male pup mass in kg (mean \pm 1SD)	Number of male pups measured
Sandy Bay, Enderby Island	11.2 \pm 1.7	51	12.0 \pm 2.0	49
Dundas Island	10.9 \pm 2.0	50	11.9 \pm 1.8	50
Auckland Islands	11.0 \pm 1.7	101	11.9 \pm 1.9	99

5.2.2 Dundas Island

A total of 200 pups (100 female and 100 male) were double flipper-tagged at Dundas Island on 17 and 18 January 2026. The first 50 pups of each sex were microchipped, weighed, and measured at the time of tagging (Table 4). The mean mass of pups was low, but within the range of historical measurements at this colony (Figure 5).

5.2.3 Figure of Eight Island

No pups were tagged, microchipped, or measured on Figure of Eight Island in 2025/26.

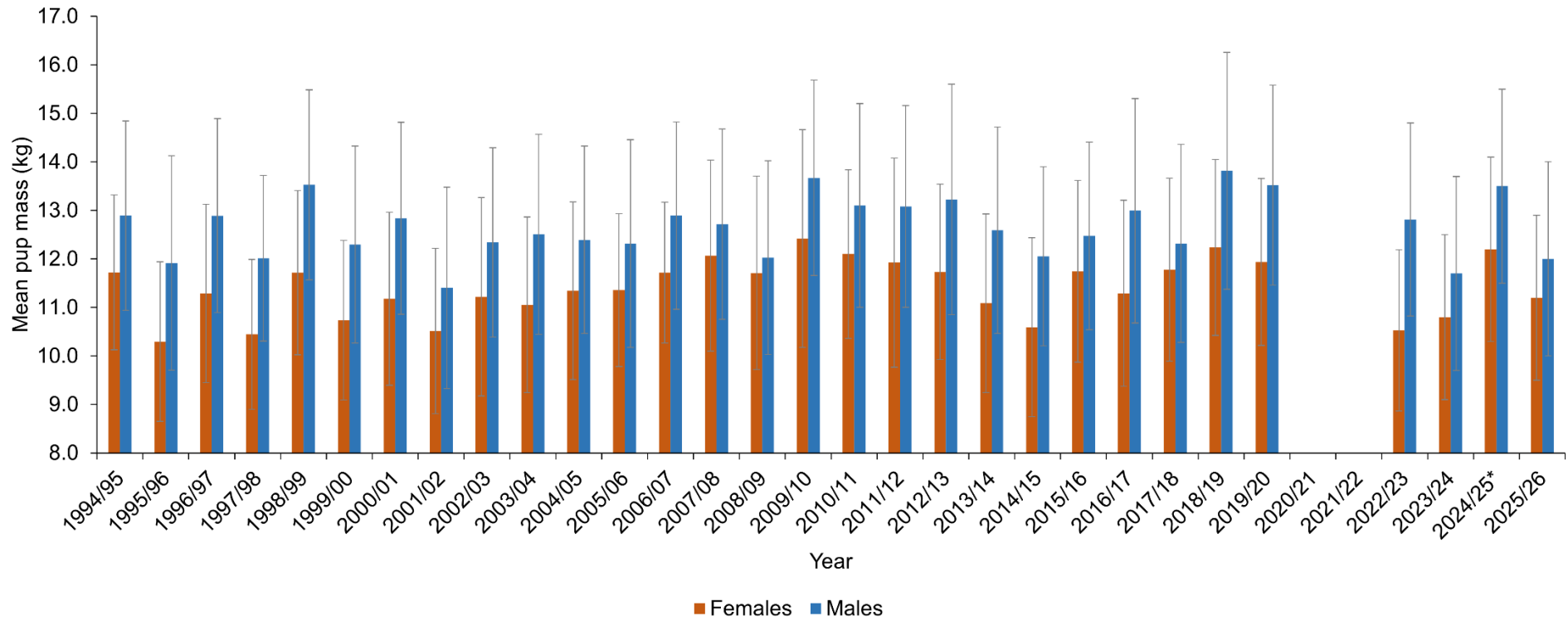


Figure 4. Mean pup mass at tagging (kg) for Sandy Bay, Enderby Island female and male pups (1994/95 – 2025/26). Error bars represent the standard deviation of the mean \pm 1SD. *Note that a deviation in the method in 2024/25 skewed the sample to older pups.

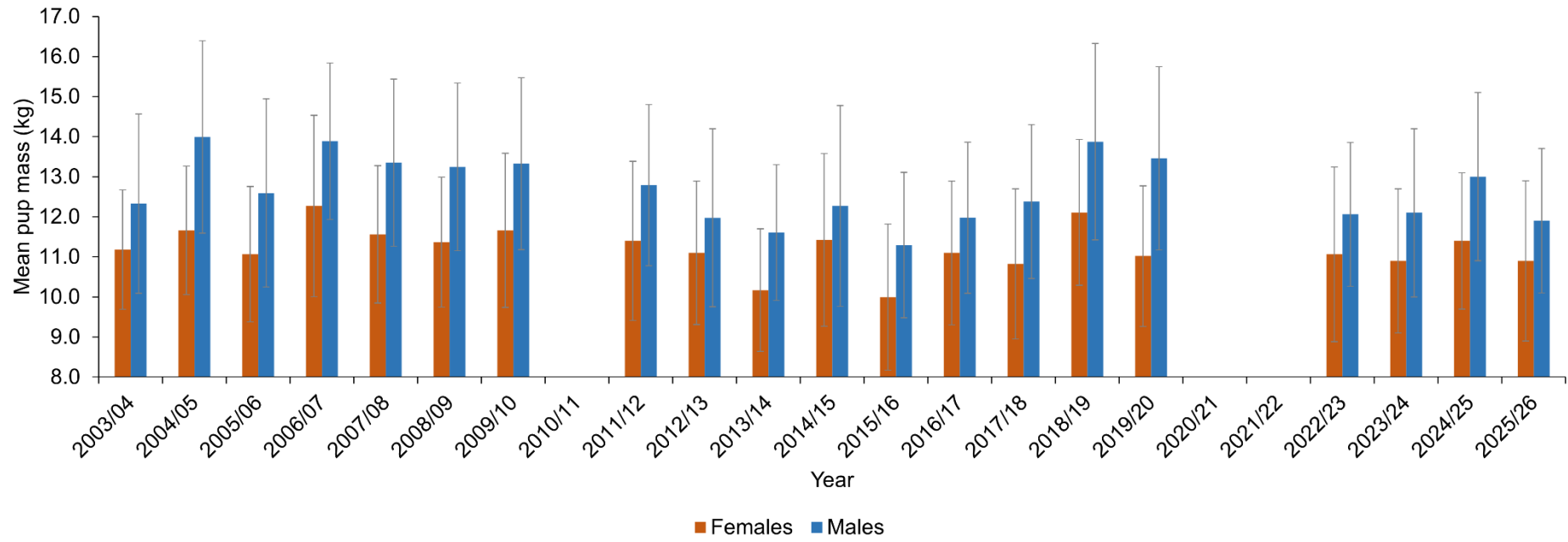


Figure 5. Mean pup mass at tagging (kg) for Dundas Island female and male pups (2003/04 – 2025/26). Error bars represent the standard deviation of the mean \pm 1SD.

5.3 Tag and microchip resightings

Targeted resightings of marked animals of all age and sex classes were undertaken between 1 December 2025 and 12 March 2026 at Enderby Island, primarily at Sandy Bay. A total of 1,493 resighting events of approximately 511 uniquely marked New Zealand sea lions aged 1+ years (294 females : 217 males) were collected.

On Dundas Island, a total of 50 flipper tags of uniquely marked animals were resighted during opportunistic surveys and no animals were scanned for microchips. No legible flipper-tagged animals were seen on Figure of Eight Island and no microchip scanning occurred. Four flipper tag resightings were recorded opportunistically on Rose Island, and although male and female sea lions were sighted opportunistically on Ewing Island, none had flipper tags and the animals were not scanned for microchips. Resighting data are stored in [DOC-10939504](#).

Data management over the last five seasons has seen an improvement in recording the methods and success of resightings for dual-marked individuals. The use of two older-style GR-250 and GR-251 Trovan microchip readers was hampered by poor weather, with both of these devices lacking weatherproofing and regularly requiring maintenance or breaks in the frequent inclement weather from January to March 2026. The resighting of flipper tags was also hampered by posturing and grouping of individual animals during inclement weather, making it difficult to read flipper tags when tucked under the body or under other animals when grouped. DSLR cameras with zoom lenses were used with good success to enhance the readability of flipper tags, and a close-range monocular was a helpful tool for viewing tags at close range in addition to binoculars. Monoculars are recommended for future use in this project.

There were a large number of worn and warped flipper tags at the Sandy Bay colony. The preliminary analysis of tag photographs noted a significant number of tags that were still attached to animals (i.e. both sides and post in place) but were the flipper tags were unreadable, which may have implications for demographic modelling. Subsequent pairing of illegible tag observations with microchip scans will allow for the assessment of tag readability and retention, which is actively being investigated as part of a University of Otago and DOC collaborative study (*sensu* Chilvers & Mackenzie 2010).

5.4 Terrain trap mitigation

Three new terrain traps were identified at Sandy Bay, and mitigation structures were placed at these to allow for self-rescue. Four pups were assisted out of three bogs prior to the installation of three new ramps. High rainfall resulted in backfilling of previously problematic terrain traps with fresh water, allowing for self-rescue. More materials are required for customisation of mitigation structures if this project is to continue. This project will be reported on separately.

6. Recommendations

- Analyse tag resight data to investigate any changes in breeding rate or demographics of female New Zealand sea lions observed at Sandy Bay.
- Repeat this population survey annually, with continued emphasis on tag resightings to provide quality data for demographic modelling.
- Limit cruise ship traffic to Enderby Island during the breeding season, especially during critical periods of activity (e.g. peak pupping period when active management occurs to reduce pup mortality, pup tagging from 10 – 20 January annually) and disallow back-to-back landings to lessen the impact on the island's wildlife. Continue to support targeted Visitor Impact Monitoring to

determine impacts on hoiho and sea lions at Enderby Island where significant populations of both endangered species exist.

- Repeat ivermectin treatment program annually to enhance survivorship of female sea lion pups and consider extending treatment to male pups, and to Dundas Island once infrastructure is in place. Support the ivermectin programme with a dedicated pinniped pathologist undertaking post-mortems at Enderby Island from January to March 2027. Assess the environmental impact of ivermectin treatment after three years of active management, by taking environmental and sea lion-specific samples in 2027.
- Investigate links between the continued low levels of pup production, diet and dietary quality change, oceanographic conditions, and fisheries patterns. Support passive research to determine body condition of female sea lions using lidar and drone imagery.
- Conduct winter tracking of female New Zealand sea lions at Auckland Islands, to provide insights into the observed decline in pup production.
- Research cohort effects of tag loss and readability on demographic modelling using the dual-marked Enderby Island population in the latter part of the breeding season.
- Incorporate new information on population size and trajectory into assessment of threats and threat mitigation measures for New Zealand sea lions.
- Introduce further management actions to reverse the decline of New Zealand sea lions at the Auckland Islands.

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9. Appendices

Appendix 1. Sandy Bay, Enderby Island daily direct counts

Table A1.1 Daily mean direct counts for all age-sex classes of New Zealand sea lions at Sandy Bay, Enderby Island in 2025/26. Means were calculated from one to five observers undertaking multiple replicate counts.

Date	Adult Males	SAMs	Females	Live pups	Cumulative dead pups	# Observers (# counts)
1/12/2025	15	35	2	0	0	2(1)
2/12/2025	26	39	1	0	0	2(1)
3/12/2025	25	33	2	0	0	3(1)
4/12/2025	28	33	2	0	0	2(1)
5/12/2025	22	31	1	0	0	2(1)
6/12/2025	24	34	1	0	1	2(1)
7/12/2025	26	29	1	0	1	2(1)
8/12/2025	35	62	1	0	1	1(1)
9/12/2025	37	32	4	0	1	1(1)
10/12/2025	48	42	5	0	1	1(1)
11/12/2025	39	46	7	1	1	1(1)
12/12/2025	41	45	9	2	1	1(1)
13/12/2025	37	47	12	3	1	1(1)
14/12/2025	45	54	17	5	1	1(1)
15/12/2025	45	65	26	6	1	2(1)
16/12/2025	53	67	23	12	2	1(1)
17/12/2025	52	43	31	13	2	1(1)
18/12/2025	46	30	41	15	2	1(1)
19/12/2025	58	54	50	20	2	1(1)
20/12/2025	48	50	53	27	2	1(1)
21/12/2025	62	38	65	36	2	1(3)
22/12/2025	41	80	87	42	2	2(1 – 4)
23/12/2025	62	51	98	51	2	2(1 – 3)
24/12/2025	70	63	122	64	2	1(4)
25/12/2025	75	50	128	80	4	1(4)
26/12/2025	84	61	157	105	4	1(5)
27/12/2025	83	54	178	120	4	2(1 – 3)
28/12/2025	79	64	201	142	5	1(3)
29/12/2025	80	51	209	155	6	2(1 – 3)
30/12/2025	75	59	228	176	6	2(1 – 4)
31/12/2025	83	55	232	185	6	2(1 – 5)
1/01/2026	78	37	221	194	6	2(1 – 3)
2/01/2026	71	47	235	214	7	2(1 – 4)
3/01/2026	71	54	230	221	8	2(1 – 3)
4/01/2026	90	61	256	254	8	3(1 – 4)

Date	Adult Males	SAMs	Females	Live pups	Cumulative dead pups	# Observers (# counts)
5/01/2026	102	74	254	256	8	3(1 – 3)
6/01/2026	85	62	229	267	9	3(1 – 3)
7/01/2026	75	74	223	268	9	3(1 – 4)
8/01/2026	-	-	227	278	10	2(3)
9/01/2026	74	57	198	275	10	3(1 – 3)
10/01/2026	-	-	197	281	10	2(3)
11/01/2026	-	-	176	278	12	2(3)
12/01/2026	-	-	230	284	12	2(3)
13/01/2026	-	-	220	278	12	1(3)
14/01/2026	-	-	220	283	12	2(3)
15/01/2026	-	-	199	291	12	1(3)
16/01/2026	22	111	170	296	12	2(1)
17/01/2026	49	95	220	276	12	1(1)
18/01/2026	-	-	229	280	12	2(1)
19/01/2026	-	-	-	266	12	1(1)
20/01/2026	-	-	195	265	12	1(1)

Appendix 2. Dundas Island direct counts and mark-recapture

Table A2.1 Direct counts of pups at Dundas Island in 2025/26 (four observers, four replicate counts).

Date	Live pups	Cumulative dead pups	Total pups	Observer # (count #)
17/01/2026	1045	39	1084	1(1)
17/01/2026	1006	39	1045	1(2)
17/01/2026	1019	39	1058	1(3)
17/01/2026	1012	39	1051	1(4)
17/01/2026	1024	39	1063	2(1)
17/01/2026	1067	39	1106	2(2)
17/01/2026	1053	39	1092	2(3)
17/01/2026	1032	39	1071	2(4)
17/01/2026	1064	39	1103	3(1)
17/01/2026	1111	39	1150	3(2)
17/01/2026	1058	39	1097	3(3)
17/01/2026	1097	39	1136	3(4)
17/01/2026	957	39	996	4(1)
17/01/2026	1000	39	1039	4(2)
17/01/2026	963	39	1002	4(3)
17/01/2026	992	39	1031	4(4)

Table A2.2 Mark-recapture counts of pups at Dundas Island in 2025/26 (four observers, four replicate counts). A total of 300 pups were capped at the colony on 16 January 2026.

Date	CAPPED	UNCAPPED	Observer # (count #)
17/01/2026	163	327	1(1)
17/01/2026	178	361	1(2)
17/01/2026	174	348	1(3)
17/01/2026	193	414	1(4)
17/01/2026	142	359	2(1)
17/01/2026	181	418	2(2)
17/01/2026	163	531	2(3)
17/01/2026	156	474	2(4)
17/01/2026	109	220	3(1)
17/01/2026	106	271	3(2)
17/01/2026	133	363	3(3)
17/01/2026	152	415	3(4)
17/01/2026	89	222	4(1)
17/01/2026	83	214	4(2)
17/01/2026	88	201	4(3)
17/01/2026	100	189	4(4)

Appendix 3. Figure of Eight direct counts

Table A3.1 Direct counts of pups at Figure of Eight Island in 2025/26 (five observers; one to four replicate counts each).

Date	Live pups	Cumulative dead pups	Total pups	Observer # (count #)
20/01/2026	59	1	60	1(1)
20/01/2026	57	1	58	1(2)
20/01/2026	56	1	57	1(3)
20/01/2026	55	1	56	4(1)
20/01/2026	53	1	54	5(1)
20/01/2026	57	1	58	2(1)
20/01/2026	55	1	56	2(2)
20/01/2026	52	1	53	2(3)
20/01/2026	48	1	49	3(1)
20/01/2026	56	1	57	3(2)
20/01/2026	51	1	52	3(3)

Appendix 4. Auckland Islands pup production estimates 1994/95 to 2025/26

Table A4.1 Pup production estimates for Auckland Islands New Zealand sea lion colonies 1994/95 – 2025/26. Table copied from Melidonis & Childerhouse (2020). Data prior to 2012/13 from Chilvers (2012), data prior to 2018 from Childerhouse et al. (2018); 2018 – 2023 data from the Conservation Services Programme.

Year	Sandy Bay Enderby Island			Dundas Island			Figure of Eight Island			Enderby Island (other)			Auckland Islands		
	Total pups	Live	Dead	Total pups	Live	Dead	Total pups	Live	Dead	Total pups	Live	Dead	Total pups	Live	Dead
1994/95	467	421	46	1837	1603	234	143	123	20	71	59	12	2518	2206	312
1995/96	455	417	38	2017	1810	207	144	113	31	69	49	20	2685	2389	296
1996/97	509	473	36	2260	2083	177	143	134	9	63	39	24	2975	2729	246
1997/98	477	468	9	2373	1748	625	120	97	23	51	37	14	3021	2350	671
1998/99	513	473	40	2186	1957	229	109	100	9	59	42	17	2867	2572	295
1999/00	506	482	24	2163	2039	124	137	131	6	50	37	13	2856	2689	167
2000/01	562	527	35	2148	1802	346	94	92	2	55	47	8	2859	2468	391
2001/02	403	320	83	1756	1395	361	96	90	6	27	21	6	2282	1826	456
2002/03	489	408	80	1891	1555	336	94	89	5	43	26	17	2516	2078	438
2003/04	507	473	34	1869	1749	120	87	86	1	52	39	13	2515	2347	168
2004/05	411	411	30	1587	1513	74	83	79	4	37	31	6	2148	2034	114
2005/06	422	383	39	1581	1349	232	62	55	7	24	20	4	2089	1807	282
2006/07	437	414	23	1693	1587	106	70	67	3	24	19	5	2224	2087	137
2007/08	448	425	23	1635	1512	123	74	72	2	18	13	5	2175	2022	153
2008/09	301	289	12	1132	1065	67	54	48	6	14	8	6	1501	1410	91
2009/10	385	364	21	1369	1218	151	55	48	7	5	1	4	1814	1631	183
2010/11	378	359	19	1089	952	137	79	71	8	4	2	2	1550	1384	166
2011/12	361	343	18	1248	1189	59	74	72	2	1	0	1	1684	1604	80
2012/13	374	357	17	1491	1364	127	75	70	5	0	0	0	1940	1791	149
2013/14	290	284	6	1213	1141	72	72	62	10	0	0	0	1575	1487	88
2014/15	286	279	7	1230	1163	67	60	47	13	0	0	0	1576	1489	87
2015/16	321	308	13	1347	1221	126	59	53	6	0	0	0	1727	1582	145
2016/17	349	328	21	1549	1415	134	67	52	15	0	0	0	1965	1795	170
2017/18	332	309	23	1397	1340	57		NA	NA	0	0	0	1729	1649	80
2018/19	319	312	7	1295	1240	55	65	60	5	0	0	0	1679	1612	67
2019/20	289	285	4	1398	1353	45	53	27	26	0	0	0	1740	1665	75
2020/21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2021/22	341	336	5	1284	1253	31	61	52	7	1	1	0	1686	1643	43
2022/23	268	258	10	960	911	49	51	50	1	0	0	0	1278	1218	60
2023/24	318	297	21	1107	996	111	32	26	6	0	0	0	1457	1319	138
2024/25	292	280	12	1024	1003	21	59	52	7	0	0	0	1375	1335	40
2025/26	311	299	12	1059	1020	39	55	54	1	0	0	0	1425	1373	52