Kororā monitoring and research

at Pohatu/Flea Bay

2024-2025 Annual Report

Prepared by Dr. Rachel Hickcox

30 April 2025



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1 Overview

This report summarises the monitoring and research activities conducted at the Pohatu/Flea Bay kororā/little penguin colony from 1 September 2024 to 30 April 2025. It includes information on the kororā/little penguin monitoring program, tracking at sea, and rehabilitation as well as predator trapping and community outreach and education.

2 Permits

94750-FAU Wildlife Authority issued to the **Helps Pōhatu Conservation Trust**, 20 October 2021-29 September 2031.

96058-FAU Rehabilitation Authority issued to the **Helps Pōhatu Conservation Trust**, 1 November 2021-31 October 2026

103681-FAU Wildlife Authority issued to the **University of Canterbury**, 7 March 2024-6 March 2034.

3 Health and Safety, Standard Operating Procedures

A health and safety plan and standard operating procedures for research and monitoring were written in 2023. These are provided to all trustees, students, researchers, and long-term volunteers and outline the expectations and guidelines that must be followed while on Pōhatu property and within the colony. They can be supplied on request.

In addition, a Highly Pathogenic Avian Influenza (HPAI) Site Specific Response Plan was written for when HPAI arrives in New Zealand territories. This plan provides direction for Pōhatu Penguins staff and the Helps Pōhatu Conservation Trust (HPCT) to manage the little penguin/kororā colony at Pōhatu/Flea Bay during stage two and three responses to HPAI. This document was sent to all Trustees and Pōhatu Penguins staff and will be reviewed annually to ensure it is up to date.

4 Funding

Table 1. Financials for the Helps Pohatu Conservation Trust from 1 April 2024 – 31 March 2025.

Activities/gear	Total received	Reporting				
Helps Pōhatu Conservation Trust, Adopt a Penguin						
Scientist wage	- \$48,975	HPCT financial report				
Trapper wage	- \$8,455					
Equipment	- \$2,372					
Adopt-a-penguin costs	- \$1,614					
Adopt-a-penguin, donations	+ \$71,181					
International Antarctic Centre donation	IS					
Boxes of fish	3	n/a				
Donation	+ \$6,734					
University of Canterbury (in-kind)						
250 transponders	+ \$2,000	n/a				
Pōhatu Penguins/Plunge (in-kind)						
Transportation	- \$5,320	n/a				
Gear	- \$2,070	n/a				
Trapper wage	- \$3,425	n/a				
Rehabber wage	- \$10,000	n/a				
Pacific Development Conservation Trus	t, Department of Inte	ernal Affairs				
VR world development and mapping	+ \$10,000	Report by Blue Cradle				

We would like to take this opportunity to thank everyone who adopted a penguin or donated to the Trust, without your ongoing support none of the following projects or season successes would be possible.

5 Pohatu quadrennial survey

This year, the quadrennial Pōhatu survey took place, where the entire bay is surveyed from October-December 2024. It took 19 survey days and 66 people to survey the bay, which equates to an estimated 626 total volunteer hours (number of volunteers*hours per day). This does not include transportation time to and from the bay.

The methods were similar to the 2020 survey. A health and safety talk and a brief training discussion on how to identify nests, use the app, record data, and transect survey were provided at the beginning of the day. A modified version of the Kobo Toolbox app was used to record the data on personal smartphones, and nests coordinates were determined using handheld GPS units (on loan from the University of Canterbury). Paths were tracked for one person in a pair, where possible. A burrowscope was used to identify nest activity in difficult to access nests.

Table 2 shows the nests counts per section from the 2000, 2004, and 2024 surveys and total nest counts for the other quadrennial surveys. Due to considerable vegetation growth in some survey sections and overall varying levels of surveyor effort, the 2024 count is incomplete. For instance, **Figure 1** shows a map of the tracked paths of a subset of surveyors. Note the large areas of sections Q3.15, Q.8, Q.10, and Q.4 that were not surveyed. Overall, 592 nests were counted, compared to 928 in 2020 and 717 in 2000. However, if section Q3.15 is not included, there were 429 nests in 2024, 578 in 2020, and 333 in 2000. Just for these sections, there has been an apparent increase in numbers since 2000 (28.8%) but a marked decrease since 2020 (25.8%). This decrease could be attributed to several floods and the prolonged La Nina in 2022 which resulted in a significant increase in starvation and mass chick abandonment.

It should also be noted that some sites were surveyed earlier in October than the last survey, which could also have influenced observable nests since this is early in the incubation/chick guard stage. For instance, Section 7 has been surveyed every year since 2000. This year, section 7 was surveyed twice. The first count on 14 October 2024 resulted in 98 nests, while the second count on 11 December 2024 resulted in 130 nests.

There were some evident challenges that were identified that need to be addressed in future. There are several areas that are no longer accessible. While using volunteers provides additional resources and the ability to survey large areas in a short timeframe, there was a large difference in the abilities of volunteers to ID nests, maintain transects, and record data. There were also logistical and scheduling difficulties. A change in methods for 2025 survey will be discussed, which could include a yearly survey of 2-3 sections to generate population estimates for the entire bay.

In April, we submitted a scientific paper presenting the results from the Horomaka/Banks Peninsula Korora Survey 2020-2021. This paper is under review for publication in the New Zealand Journal of Zoology. **Table 2.** Preliminary nest counts over time. Percent change was calculated as (nests 2024-nests 2000/nests 2000)*100 (or nests 2020) for each section and for the entire bay. Total^ counts included all sections. Since the 2024 survey was incomplete (inc), the second Total` is the sum of nests not including section Q3.15.

Section	2000	2004	2008	2012	2016	2020	2021	2022	2023	2024	% Change	% Change
											2000-2024	2020-2024
Q3.1	17	35				53				74	335.3	39.6
Q3.2	16	15				16				15	-6.3	-6.3
Q3.3	17	28				67				32	88.2	-52.2
Q3.4	30	53				57				49	63.3	-14.0
Q3.5	5	20				58				41	720.0	-29.3
Q3.6	12	21				30				18	50.0	-40.0
Q3.7	89	128				171	129	117	126	130	46.1	-24.0
Q3.8	11	26				15				11	0.0	-26.7
Q3.9	10	11				31				23	130.0	-25.8
Q3.11	78	105				29				18	-76.9	-37.9
Q3.12	48	64				51				18	-62.5	-64.7
Q3.15 (3.10)*	30	40				69				163	443.3	136.2
Q3.15 (3.13)*	107	110				142				Inc	Inc	Inc
Q3.15 (3.14)*	48	49				110				Inc	Inc	Inc
Q3.15*	199	183				29				Inc	Inc	Inc
Q3		4										
TOTAL [^]	717	892	1063	1304	1260	928				592	-17.4^	-36.2^
TOTAL` (not including Q3.15)	333	506				578				429	28.8`	-25.8`

* Section Q3.10, 3.13, and 3.14 were combined into Q3.15 for the 2024 survey

^ Includes section Q3.15

`Does not include section Q3.15



Figure 1. Map of surveyor tracks during the 2024 quadrennial Pohatu survey.

6 Monitoring program

6.1 Monitoring – breeding season

We monitored over 230 kororā nestboxes weekly from 1 September 2024-31 March 2025 and fortnightly thereafter until the start of the 2025-2026 breeding season. Like previous years, we used the Memento app to record the nest activity (breeding, non-breeding, moulting), occupancy (number of adults, eggs, or chicks), and general observations including chick age and body condition. **Table 3** shows breeding season statistics, and **Figure 2** shows a timeline of egg and chick counts.

This year, the first eggs were observed on 31 August, compared to 10 August in 2022-2023 and 23 August last year. Despite a later start to breeding, the mean hatch date was very similar across all three years. Due to the large numbers of chicks that required microchipping at the end of November and beginning of December, the colony was more in sync this year, with most of the hatching occurring over a three-week period (instead of 5 weeks like last year). Breeding season demographics are very similar to those reported by Allen et al. (2011)¹.

We resighted 162 breeding adults, 15 of which were first time 2-year-olds (recruitment rate ~ 9.4% out of the 159 chicks that were marked in 2022). See section 6.3 Marking for more details about marking totals.

¹ Allen, W. J., Helps, F. W., & Molles, L. E. (2011). Factors affecting breeding success of the Flea Bay white-flippered penguin (*Eudyptula minor albosignata*) colony. New Zealand Journal of Ecology, 35(3), 199–208.

Table 3. Breeding statistics for 2022-2023 and 2023-2024.

	2022	2023	2024
Nests/breeding pairs	178	180	169
Nestboxes	171	174	165
Nestboxes with multiple clutches	14	12	8
Failed nests	56	33	21
Nests with uplifted chicks	50	13	11
Nests with fledged chicks	72	134	137
Eggs laid	353	355	332
Single egg nests	3	5	6
Nests: no eggs hatched	28	21	10
Nests: one egg hatched	31	29	18
Nests: two eggs hatched	210	239	272
Chicks hatched	269	289	300
Chicks fledged	195	248	263
Natural	127	230	253
Assisted (rehab, SF)	68	18	10
Supplement fed (SF)	27	4	0
Hatching success (%)	76.2	81.4	90.4
Fledging success (%)	72.49	85.81	87.7
Natural fledging success (%)	47.21	79.58	84.3
Hatching Success (hatched chicks per pair)	1.51	1.61	1.78
Fledging Success (fledged chicks per pair)	1.1	1.38	1.56
Fledging Success (natural fledged per pair)	0.71	1.28	1.50
First lay date	10 Aug	23 Aug	20 Aug
Mean lay date	2 Oct	30 Sep	22 Sep
Last lay date	17 Dec	20 Dec	23 Dec
First hatch date	27 Sep	25 Sep	30 Sep
Mean hatch date	8 Nov	2 Nov	4 Nov
Last hatch date	1 Jan	12 Jan	30 Dec
First fledge date	15 Nov	20 Nov	2 Dec
Mean fledge date	1 Jan	30 Dec	28 Dec
Last fledge date	25 Feb	9 Feb	14 Mar
Marked breeding adults	104	116	155
Marked chicks	141	186	190



Figure 2. Breeding counts for the (A) 2022-2023, (B) 2023-2024, and (C) 2024-2025 breeding seasons per monitoring week. The numbers of nests that failed (red) and chicks that fledged (purple) are cumulative, while all others are provided per week. Note different x axes.

6.2 Monitoring – moult season

Throughout the moult seasons, we resighted seven juveniles that were marked last year and 12 2-year olds. The first moulter was sighted on 23 December 2024 (last year 1 January 2024) and concluded by 1 April 2025. The peak of moulting occurred earlier in mid-January this year compared to late January 2023-2024 and early March in 2022-2023. Of all the marked adults and juveniles in the colony (578 birds), we resighted 151 birds at moult (26.1%).

There were three juveniles (marked in 2023-2024), three 2-year olds, and four adults that were resignted over the season but not breeding or moulting.

6.3 Marking

Continuing from the previous seasons, we marked both chicks and adults from some of the active boxes with a passive integrated transponder (PIT or microchip) to identify each penguin in the box. When marking, we recorded bird weight and bill measurements, took photos of the flippers (to classify morphology based on unique markings), and took feather samples for future DNA and isotope analyses. Transponders are inserted by a qualified person (according to the New Zealand National Bird Banding Scheme through the Department of Conservation), following best practice. Dr. Rachel Hickcox is a qualified Level 3 trainer, so she oversees all marking at the colony and is currently training members of the Trust and students/staff from the University of Canterbury. We also work in close collaboration with the Oamaru Blue Penguin Colony and DOC as a training location. For instance, we welcomed a wildlife ecologist from Kumanu Environmental (Gisborne) and two people from Cape Sanctuary for two days of training.

Several HPCT trustees and students were trained this year and are currently waiting for a decision from the Department of Conservation Bird Banding Office about advancement from level 2 to level 3 in the NZ National Bird Banding Scheme.

- Averil Parthonnaud (L2)
- Kevin Parthonnaud (L2)
- Lucy Howell, University of Canterbury PhD student (L3 under consideration)
- Joey Cataliotti (L2)
- Geraldine Guillemot-Peacock (L2)
- Georgia Gwatkin, University of Canterbury Masters student (L3 under consideration)

- Kaitlin Bowe, University of Otago Masters student (L3 under consideration)
- Benoit Navarron (L2)
- Jess Helps (L1)
- Michelle LaRue, University of Canterbury (L2 under consideration)
- Sarah Flanagan, University of Canterbury (L1 2022)
- Alexandra Strang, University of Canterbury (L1 2022)

Table 4 summarises the total number of adults and chicks that have been marked in the colony, including those marked at Christchurch Penguin Rehabilitation and subsequently released at Pōhatu. In total, 775 birds are marked with transponders. All marking records for both Pōhatu and Christchurch Penguin Rehabilitation were submitted in March 2025 to the FALCON database maintained by DOC, as part of the NZ National Bird Banding Scheme and annual reporting process.

	2022	2023	2024	Total
Marked adults (Pōhatu)	110	48	53	211
Marked adults (Pōhatu rehab)	2	2	0	4
Marked adults (Christchurch rehab)	3	2	0	5
Marked adults (total)	115	52	53	220
Marked chicks (Pōhatu)	101	177	183	461
Marked chicks (Pōhatu rehab)	45	11	11	67
Marked chicks (Christchurch rehab)	16	8	3	27
Marked chicks (total)	162	196	197	555
Total	277	248	250	775

 Table 4. Marking statistics for 2022-2023 and 2023-2024.

6.4 Bay counts

To get a better idea of intraseasonal trends, last breeding season we began recording how many penguins and rafts we observed on the water and on the beach during tours. We originally created a Google Form to capture this data. However, we migrated this to Kobo Toolbox (same app used for the survey), which went live in October. Two forms were created:

<u>Penguins on the water during tours</u> contains observations on the water and on the beach during tours.

Nest monitoring during tours contains nest box monitoring observations during tour.

Figure 3 shows the trend in the number of penguins observed on the water during the evening tour, with a decline beginning in January. Tours did not occur in March due to the low return rate of penguins.



Moon Phase • Full Moon • Other

Figure 3. The number of penguins observed on the water during evening tours at the primary hides during 2024-2025. The LOESS smooth line highlights the underlying trend, while the shaded area represents the standard error, or uncertainty, in the trend estimation. Red dots show when a full moon was also observed.

7 Rehabilitation

Part of monitoring a penguin colony is maintaining a healthy population and taking ethical responsibility for our taonga wildlife. We work with a network of groups and individuals around Christchurch, including the Christchurch Penguin Rehabilitation and the South Island Wildlife Hospital at Willowbank Wildlife Reserve, to provide the best care possible for sick, injured, or starving penguins, or those found in unsafe locations or nesting in areas affected by natural disasters such as flooding. We also operate a rehabilitation facility at Robinsons Bay on Banks Peninsula (permitted under a Wildlife Act authority), which allows us to immediately care for uplifted birds. The outcomes of our rehabilitation efforts are due in large part to the dedication of Kristina Schuett, Thomas Stracke, Dr. Pauline Howard, Averil Parthonnaud, and Kevin Parthonnaud.

To be released, a penguin must be healthy, at a suitable weight, and waterproof. They must demonstrate the ability to swim and search for prey. To facilitate release, we maintain a soft-release area at Pōhatu to transition penguins gradually and naturally from captive care back to the wild. We work closely with the Department of Conservation, local iwi, and rehabilitators to coordinate the release of other species, including hoiho/yellow-eyed, tawaki/Fiordland crested, tawaki nana hī/ erect-crested, pokotiwha/Snares, and tawaki piki toka/rockhopper penguins at Pōhatu.

We had an early uplift on 22 August 2024, an adult found trapped in vines. Another adult was uplifted for malnutrition, both of which died in hospital. A marked breeding female was uplifted underweight towards the end of her moult (and successfully released). Two underweight moulters are still in rehab, one of which was missing a large patch of face feathers (**Figure 4**). In total, four adults were uplifted (**Table 5**).

Every year we typically have chicks in care from October to March. This year, we uplifted our first chick in December. From 14 December to 1 April 2024, we cared for 25 penguins (5 adult, 1 juvenile, and 19 chicks). Rehab release rate was about 64%. Most deaths were due to extreme injury or soon after uplift. The average length of care was 22 days (same as 2023). We had significantly fewer adults uplifted this year.

We also released four erect-crested penguins and one Fiordland crested found on Canterbury beaches. There was a noted increase in crested penguins being found on the east coast of the South Island.

	2022	2023	2024
First chick uplift	1 Nov	26 Oct	14 Dec
Last chick release	12 Apr	9 Apr	26 Mar
First adult uplift	6 Jan	21 Nov	22 Aug
Last adult release	5 May	3 May	(21 Feb)
Adults	14	15	5
Juveniles	0	2	1
Chicks	94	25	19
Total	108	42	25
Released adults	13	8	3
Released juveniles	0	1	1
Released chicks	82	21	14
Total	95	30	16
Release rate all	88%	71%	64%
Release rate chicks	89%	84%	74%
Release rate adults	93%	53%	20%
Other penguins	0	0	4 (ECP)
			1 (FCP)

Table 5. Marking statistics for 2022-2023 and 2023-2024.

Figure 4. Chicks getting ready for a feed in rehab, two adults during swim time, and an erectcrested penguin being released at Pōhatu. Photo credit: Averil Parthonnaud (left, middle) and Lucy Howell (right).



8 Research projects

8.1 Tracking at sea

We carried on GPS tracking at sea during incubation, guard, and post-guard but also tracked during pre-breeding this year. We timed deployments to coincide with deployments at the Oamaru Blue Penguin Colony, to understand if kororā from both colonies overlap in the Canterbury Bight. In 2024-2025, we deployed 30 times, six during pre-breeding, six during incubation, ten during guard, and four during post-guard. Four additional birds never went to sea during pre-breeding over the 5-day tracking period, so we had 26 successful deployments with dive data. We lost one device; chicks fledged during the post-guard deployment, so the adult was not seen for four weeks. When it returned to the nest box to moult, the device was no longer attached.

All the birds tracked during pre-breeding and incubation undertook long 9+ day trips travelling southwest into the Canterbury Bight (>120km from Pōhatu), similar to last year (**Figure 5**). We investigated different GPS settings to try to extend the battery life and obtain more of the foraging trip and could get six days of foraging. During post-guard, one penguin foraged in the Akaroa Marine Reserve (first observation of this), and another penguin ventured to Scenery Nook and Squally Bay (**Figure 6**). Patterns were similar to past years. Dive data still needs to be analysed. All tracking data is available on the online repository Movebank (<u>https://www.movebank.org/pohatupenguins</u>).



Figure 5. Pre-breeding, incubation, guard, and post-guard foraging during the 2024-2025 breeding season.



Figure 6. Foraging tracks during the 2024-2025 guard stage (left) and post-guard (right).

8.2 Student projects

There were four students who participated in weekly monitoring while simultaneously collecting data for their projects.

Georgia Gwatkin, MSc Biology, University of Canterbury

Supervisors: Michella LaRue, Sarah Flanagan, Rachel Hickcox (associate supervisor) Thesis: Interactions between kororā/little penguins (Eudyptula minor) and their terrestrial environment at Pōhatu/Flea Bay, Banks Peninsula Completion: February 2025

The aims of Georgia's Master's research were (1) to determine how fine-scale, terrestrial habitat characteristics are related to kororā nest box occupancy and (2) to determine the spatial patterns of intra-seasonal movement of kororā around the colony. In addition to the weekly monitoring data, she collected information on tick presence/quantity at the nest, nestbox habitat characteristics (e.g., soil wetness, temperature, vegetation, etc.), and resightings.

Kaitlin Bowe, MSc Marine Science, University of Otago

Supervisors: Will Rayment, Steve Wing, Rachel Hickcox (associate supervisor) *Thesis*: Foraging ecology of kororā from Pōhatu Bay, Banks Peninsula, New Zealand *Expected completion*: June 2025

The aims of Kaitlin's Master's research are (1) to determine the foraging distribution of kororā at Pōhatu, (2) quantify the important environmental variables effecting their behaviour, (3) visualise whether they overlap with commercial fisheries, and (4) determine their trophic position using stable isotope analysis (SIA) to predict whether they are relying on distinct prey at various stages of the breeding season. She is assisting with GPS tracking and is currently analysing the foraging tracks while also collecting feather and faecal samples for SIA.

Paula Brown, MSc School of Earth and Environment, University of Canterbury

Supervisors: Michelle LaRue, Mia Wege, Rachel Hickcox (associate supervisor) Thesis: Seasonal and within-season variation in breeding phenology and juvenile survival of white-flippered penguins, kororā (*Eudyptula minor albosignata*) at Flea Bay/Pōhatu, Banks Peninsula, New Zealand *Expected completion*: July 2025

The aims of Paula's Masters is (1) to determine a survival rate of juvenile kororā and identify what factors contribute to their survival and (2) to determine breeding phenologies within a season and between seasons and assess if there is a correlation to sea surface temperatures and other climate variables.

Lucy Howell, PhD Biology, University of Canterbury

Supervisors: Tammy Steeves, Elissa Cameron Thesis: Optimising non-invasive sampling for assessing kororā (Eudyptula minor) health: Enhancing long-term management strategies at the Pōhatu/Flea Bay Colony, Horomaka, Banks Peninsula

Expected completion: July 2026

The aims of Lucy's PhD research are (1) to DNA sex penguins from feathers, (2) to determine the prey species comprising kororā diet at Pōhatu using faecal DNA metabarcoding, and (3) to quantify stress baselines using non-invasive corticosterone sampling to investigate links between stress and breeding success, and diet. In addition to weekly monitoring and marking information, she is collecting feathers and faecal samples, along with behavioural observations of stress encounters.

Meg Cooch, BS, Open University

Supervisors: Jacqui Middleton (Open University), Rachel Hickcox (advisor) Thesis: The impact of breeding season sea surface temperature (SST) on hatching rates and chick mortality in the Pōhatu little penguin colony (2022–2024) Expected completion: July 2025

The aim of Meg's undergraduate project is to determine the impact of sea surface temperature on chick hatching and mortality from the first three seasons of monitoring.

8.3 Blood-based detection of ectoparasites in kororā

Pl: Dr. Phoebe Chapman, University of Otago

Partners:

- Professor Crid Fraser, University of Otago
- Professor Michelle LaRue, University of Canterbury
- Professor Sarah Flanagan, University of Canterbury
- Dr. Chris Niebuhr, Landcare Research
- Dr. Phillipa Agnew, Oamaru Blue Penguin Colony
- Henry Elsom, Oamaru Blue Penguin Colony
- Dr. Rachel Hickcox, Helps Pohatu Conservation Trust

"The proposed research aims to explore diagnosis of ectoparasite infections by detecting their DNA in the blood of kororā (little/blue penguins), ultimately increasing detection accuracy and reducing handling time (and subsequent stress) of methods traditionally used to assess parasite loads. If successful, this new method would have application in health assessments for other threatened species. Effective and efficient diagnostics will be important moving into the future as wildlife populations are placed under more pressure by factors such as urbanisation and climate change." (Source: provided by PI). In collaboration with colony staff, 20 birds will be blood sampled during the breeding season, both chicks and adults, and a topical antiparasitic Inca Pestene powder will be applied to their feathers to collect parasites. The procedure will take about 5-10 minutes per bird. DOC permits have been accepted as a variation to the University of Canterbury research permit, with ethics approval through the University of Otago.

9 Other projects

9.1 Virtual reality Pohatu

Funding: \$8,500

Funder: Pacific Development Conservation Trust, Department of Internal Affairs *Timeframe*: 6 Nov 2023-5 Nov 2024 *PI*: Dr. Rachel Hickcox *Partners*:

• James Nikitine, Blue Cradle

- Iain Cook-Bonney, Learning Architects, Digital technology and PBL facilitator
- Gabe Baker, Frame VR
- Sarah Washbrooke, TENZ, Deputy chair

The aim of this project was to create an educational resource and interactive digital experience that would enable users to explore and experience the kororā colony at Pōhatu/Flea Bay from anywhere in the world. The outcome was a web-based virtual version of the colony (Frame VR; https://framevr.io/pohatutest#) and a Minecraft Education world, backed by a teaching resource website. This was a collaborative project, relying on the expertise of Iain Cook-Bonney to lead the development of the VR.

We had a soft launch of both versions during the 2024 Days of Ice public expo, hosted at Tūranga, Christchurch City Library in October. Families, children, and curious members of the public tried out the resources, exploring the VR environment and especially flocking to the Minecraft stations.

We are also working with Koukourarata and the Department of Conservation (and partners) to integrate whakapapa and tikanga Māori into the story of how we and the marine and terrestrial environments are interconnected at Pōhatu. We are also hoping to integrate some photos and videos from the <u>longairo project</u>, which developed interactive maps of the seafloor habitats around Banks Peninsula.



Figure 7. (left) Article about the VR world in the Bay Harbour News newspaper, 27 February 2025. (right) Days of Ice event testing out Pōhatu Minecraft.

9.2 Interactive map of monitoring and research data Pohatu

Funding: \$1,500

Funder: Pacific Development Conservation Trust, Department of Internal Affairs; Pōhatu Penguins subsidiary *Timeframe*: 6 Nov 2023-5 Nov 2024 *PI*: Dr. Rachel Hickcox *Partners*:

- Professor Michelle LaRue, University of Canterbury
- Dr. Carolynne Hultquist, University of Canterbury (Spatial Data Science lecturer)
- Lilian von Kaenel, student at the University of Canterbury
- James Nikitine, Blue Cradle

We are developing a mapping interface to present various types of data to show kororā terrestrial and marine distribution across Banks Peninsula and Pōhatu/Flea Bay for scientific, educational, and outreach purposes. We anticipate the map being displayed in our office, in the new Pōhatu Conservation Centre, possibly at the International Antarctic Centre in Christchurch, and during education programs including Conservation Club.

The map is inspired by the Adoptions map, but with more data, layers, and functionality. Data will include: Horomaka/Banks Peninsula little penguin survey nest counts (2000-2002, 2020-2022), annual Pōhatu survey nest locations/counts/statistics, distribution of Pōhatu nest boxes, information about each nest box (bird IDs, occupancy, current status, last visit, reproductive success, etc.), and at-sea foraging tracks.

Development of the R Shiny map is ongoing. Lilian von Kaenel, a student at the University of Canterbury, began the coding for the project, and Dr. Hickcox will continue to improve and modify the map.

9.3 Videography

Rachel George finished up her time at Pōhatu in December. She is currently editing footage to create additional videos. She has created the following ones thus far:

Monitoring a little penguin colony

Why are marine birds important

How to identify little penguins

Adopt a penguin at Pohatu penguins

Preening penguins in rehabilitation

Explore New Zealand's most rare and special wildlife in Akaroa

Explore the underwater world of Pohatu Marine Reserve

Banks Peninsula marine reserve anniversary

Seaweek 2024

10 Predator trapping

The "Pōhatu penguin predator control" project, as named on Trap.NZ, is a network of 234 traps over 10 trap lines covering 521 hectares. Three main trappers are responsible for checking the existing traps. In total, 352 predators including feral cats, mustelids, possums, hedgehogs, rats, and other introduced mammals have been trapped in 2024-2025 (**Table 6**). See past reports for previous years' data.

Table 6. Total captures of introduced mammals per trap line at Pohatu/Flea Bay from 1 April2024 to 1 April 2025.

Line	Cat	Hedgehog	Mouse	Possum	Rabbit	Rat	Stoat	Weasel	Other	Total
Ridge Run	0	7	0	0	0	4	1	1	0	13
Cottage Line	0	3	1	0	1	18	1	0	2	26
Valley Line	1	32	1	0	0	19	1	0	0	54
Penguin Colony	1	15	6	0	3	34	6	2	1	68
Tutakahikura Line	0	12	1	1	0	22	1	0	35	72
F Line	1	11	1	0	0	9	1	0	4	27
Mabel Hope	0	6	0	0	0	27	3	1	0	37
Oborne Line	1	9	3	0	0	2	0	1	1	17
Indian rock Line	0	4	1	0	0	2	0	0	0	7
DOC	0	13	0	1	0	3	9	0	5	31
Total	4	112	14	2	4	140	23	5	48	352

11 Collaborations

We are working alongside several organisations as collaborators. Dr. Hickcox is working closely with students at the University of Canterbury and Otago as an external supervisor or advisor. Additionally, we are collaborating with New Zealand Penguin Initiative (NZPI) as part of the NZ kororā monitoring program. We have shared the 2022-2023 monitoring data to aid in their development of a <u>dashboard</u> for breeding statistics from multiple colonies of kororā across New Zealand. We also submitted information that was included in their 2024 <u>annual review</u>.

We are also working with Penguins International, an American-based non-profit that "actively participates in penguin conservation and research" while engaging with zoos/aquariums and education platforms to promote penguin awareness and protection. This year, Penguins International developed education material for us, tailored to the New Zealand curriculum, with activities and information all about penguin feathers. This activity book is included in the VR world. We also received a donation from the Bronx Zoo, who reached out to us through Penguins International. They held an event in honour of penguins, and proceeds were donated to the trust to be used for the monitoring programme.

12 Conferences

Three trustees and Dr. Hickcox will attend the Oamaru Penguin Symposium in May. Lucy and Kaitlin will both be presenting their research on the Pōhatu kororā, and Dr. Hickcox will talk about her trip to Antarctica in November 2024.

13 Community outreach and education

Each year the Helps Pōhatu Conservation Trust participates in or host events for public outreach and education. We welcomed several schools and groups to Pōhatu, as well as hosted the school holiday Conservation Club, where we talked about the local wildlife, the importance of marine reserves, regenerative farming, forest restoration, penguin conservation, and more.

Additionally, the Trust sends a quarterly newsletter to adopters and subscribers which communicates happenings at the colony, such as stories about individual penguins, monitoring findings, research highlights, and program updates. These newsletters, along with social media, are key to our community outreach.

We held two Seaweek events in March 2025. The first was a free public Akaroa Seaweek Celebration (Figure 8). There were educational activities about the marine environment, stalls from community groups and organisations displaying their work to protect and research the ocean, local vendors selling handmade arts and crafts, a scientific poster display, and photography exhibit. We also hosted a variety show where local musicians, dancers, and singers performed, followed by an ocean-inspired costume competition for kids.



Figure 8. (top left) Dr. Hickcox representing the HPCT at the Penguin Party Seaweek event. (top left-bottom right) The variety show, including a costume competition.

The Trust also hosted an evening of scientific talks about marine birds. We learned about Rachel's trip to Antarctica in November, sea turtle monitoring on dredge vessels in the US (Ali Ballard), GPS tracking of kororā at Pōhatu (Kaitlin Bowe), resight rates and phenology of kororā at Pōhatu (Paula Brown), and Hector's dolphin research by Rose Ursem of the NZ Whale and Dolphin Trust/University of Otago (**Figure 9**).



Figure 9. Scientific Birds Night presenters and students. From left back: Rose Ursem (NZ Whale and Dolphin Trust), Kaitlin Bowe, Alexandra Strang, Ali Ballard, Paula Brown. From left front: Rachel Hickcox, Lucy Howell.

14 Media

In March 2024, Dr. Rachel Hickcox was selected by Penguins International for the <u>2024 Scientist</u> <u>Spotlight</u>, where they interviewed her about her work and research with penguins, particularly kororā.

We also welcomed Rachel Parkin and cameraman Jason from 7 Sharp to the bay, to film a piece about the monitoring and research program and the new fairy garden of nest boxes. It aired on 7 Sharp on 27 February 2025.

Pōhatu Penguins was featured in several news articles discussing the VR world as well (see section 9.1 Virtual reality Pōhatu).

15 People involved

This project is a unique opportunity to facilitate collaborations between many groups, whose aim is to protect wildlife, especially penguins, on Banks Peninsula. Monitoring is conducted by trained trustees of the Helps Pōhatu Conservation Trust and/or employees of Pōhatu Penguins/Plunge NZ Ltd. Penguin scientist and ecologist Dr. Rachel Hickcox is the principal investigator on behalf of the Trust. The following individuals, organisations, and groups have participated in, supported, or funded the project.

• Helps Pohatu Conservation Trust

Project leaders, monitoring, research, rehabilitation, health & safety, transportation, protocols.

Dr. Rachel Hickcox (research scientist) Kevin Parthonnaud (trust manager) Averil Parthonnaud (trustee and rehab manager) Geraldine Guillemot-Peacock (trustee) Joey Cataliotti (trustee) Benoit Navarron (trustee) Thomas Stracke (trustee) Robin Burleigh (trustee) Dan Helps (trustee) Shireen Helps (trustee) Jess Helps (trustee)

• University of Canterbury - Dr. Michelle LaRue, Dr. Sarah Flanagan, Dr. Mia Wege, PhD/MSc students

Conducting research and helping with monitoring, data analysis, result publication, funding; training to handle, microchip, measure, deploy/retrieve GPS devices. Currently, a PhD student is studying kororā behaviour and diet using faecal and feather samples. Two Master's students also assisted with weekly monitoring and other aspects of the projects while collecting data and samples for their projects. One of those students completed her project in February 2025, and one will finish in July 2025.

- Landcare Research Dr. Chris Niebuhr
 Conducting research on tick presence and malaria prevalence in kororā. Supervising students at the University of Canterbury.
- University of Otago

- International Antarctic Centre Providing fish for rehab penguins, funding; aiding microchip training of staff/volunteers.
- Christchurch Penguin Rehabilitation *Kirstina Schuett and Thomas Stracke* Rehabilitating injured or sick penguins.
- South Island Wildlife Hospital at Willowbank Wildlife Reserve *Dr. Pauline Howard* Treating injured or sick penguins who need emergency or intensive medical care.
- Koukourarata Rūnanga Consulted during permit process and during the project; updated periodically on progress.
- Shireen and Francis Helps, landowners
- Pohatu Penguins/Plunge Ecotours
- Volunteers
- Funders and other organisations

Environment Canterbury	Forest and Bird – North Canterbury
Christchurch City Council	Lyttleton Port Company
Department of Conservation	Orbica
Blue Cradle	Bronx Zoo
Pub Charity Limited	Pacific Development Conservation Trust
Proteus Research and Consulting	Technology Education New Zealand (TENZ)
Banks Peninsula Conservation Trust	Penguins International
Pest Free Banks Peninsula	New Zealand Penguin Initiative

Over the past year, we have made considerable progress towards these goals by increasing our predator trapping efforts, tracking more penguins at sea, monitoring nest boxes, rehabilitating injured and sick birds, and surveying breeding pairs. The Helps Pōhatu Conservation Trust, as well as our volunteers and collaborators, will continue this work in the upcoming year to maintain and further expand this critical, long-term conservation program.