

TĀKOKETAI/BLACK PETREL



*Updated preliminary report on the tākoketai/black petrel (*Procellaria parkinsoni*) 2022/2023 breeding season*

Preliminary Report on the tākoketai/black petrel (*Procellaria parkinsoni*) 2022/2023 breeding season.

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Cover image: Tākoketai/black petrel (*Procellaria parkinsoni*) chick in hand © Ed Marshall

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KEY OBJECTIVES & OUTPUTS

This research was carried out as part of the Department of Conservation (DOC) Conservation Services Program (CSP), black petrel population monitoring (POP2022-01).

The key objectives for the 2022-2023 were:

- 1. To monitor key demographic parameters at the breeding colony on Hiramata/Mt Hobson summit Aotea/Great Barrier Island of the threatened tākoketai/black petrel to reduce the uncertainty or bias in estimates of risk from commercial fishing.**
- 2. Capture black petrels at sea to determine the proportions of unbanded versus banded birds. This information will be used to assess if apparent low juvenile survival is biased by dispersal away from study colonies.**
- 3. Conduct nocturnal searches of the Hiramata/Mt Hobson colony for recruits (i.e., birds banded as chicks returning to the colony to breed).**

In addition to this work covered by the DOC CSP contract, Objective 3 was funded by Hauraki Gulf Conservation Trust, Hauraki Gulf Forum, Ministry of Primary Industries (Fisheries NZ) and the Department of Conservation.

Objective 2 will be reported separately.

Here we report the results of the expeditions to the Hiramata/Mt Hobson colony on Aotea/Great Barrier Island that took place in December 2022 (expedition focused on finding recruits), January 2023 (expedition focused on collecting demographic data) and April/May 2023 (expedition focusing on confirming breeding success and banding surviving chicks). Complete details of Objectives 1 and 3 will be reported in a future end of season report(s).

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1. BACKGROUND

The collection of demographic data (Objective 1) is part of an ongoing monitoring program to understand key demographic processes (e.g., occupancy, breeding success) of the tākoketai/black petrel (*Procellaria parkinsoni*) colony at the Hirakimata/Mt Hobson summit on Great Barrier Island/Aotea. Briefly, a system of marked ('study') burrows are monitored for the identity of occupants and whether or not breeding is occurring.

Despite regular searches at the Hirakimata/Mt Hobson colony over the last 27-years, very few fledglings have been recorded back at the colony as mature breeding adults. The dearth of recruits has major implications for the long-term future of the tākoketai/black petrel population. The cause for the lack of recruits found at the colony may be due to high mortality rates experienced by fledgling tākoketai/black petrels but may also be due to a lack of effort specifically focused on finding recruits. Low natal fidelity may also be a possibility as effort has been put into recapturing marked birds in the study area, but if birds disperse as pre-breeders, they would be harder to recapture on an island the size of Aotea.

Objective 3 was therefore to conduct an expedition to the Hirakimata/Mt Hobson colony to specifically search for those young recruits. This project was proposed and supported by the Black Petrel Working Group and funding was secured by Southern Seabirds from the following organisations: the Hauraki Gulf Conservation Trust, Hauraki Gulf Forum, Ministry of Primary Industries (Fisheries NZ) and Department of Conservation (DOC).

From dusk to dawn each night of the expedition, the research team systematically searched the colony, catching those birds wandering the forest and those coming into land. Each tākoketai/black petrel encountered had its unique metal ring read, or if the bird had no band, a new one was applied, and that individual became part of the study. The results presented here, represent the preliminary outcomes from three trips focused on recruitment (28 November to 5 December 2022) and the demographics (16 to 30 January 2023 and 27 April to 2 May 2023).

2. STUDY SITE

One study burrow was added to the study this season – inside PTG1 – increasing the number of study burrows to 480. This new burrow was being dug out by a non-breeding bird.

A network of 483 numbered burrows has been established within a c. 35-ha study area in the vicinity of Mt Hobson/Hirakimata on Great Barrier Island/Aotea (Figure 1). Of these, 480 have been or are currently being used by tākoketai/black petrels and 4 are used by Cook's petrels (*Pterodroma cookii*).

The colony residing around the Mt Hobson/Hirakimata summit represents the highest density of logistically accessible tākoketai/black petrels on Great Barrier Island/Aotea and was the reason underlying the establishment of the study site.

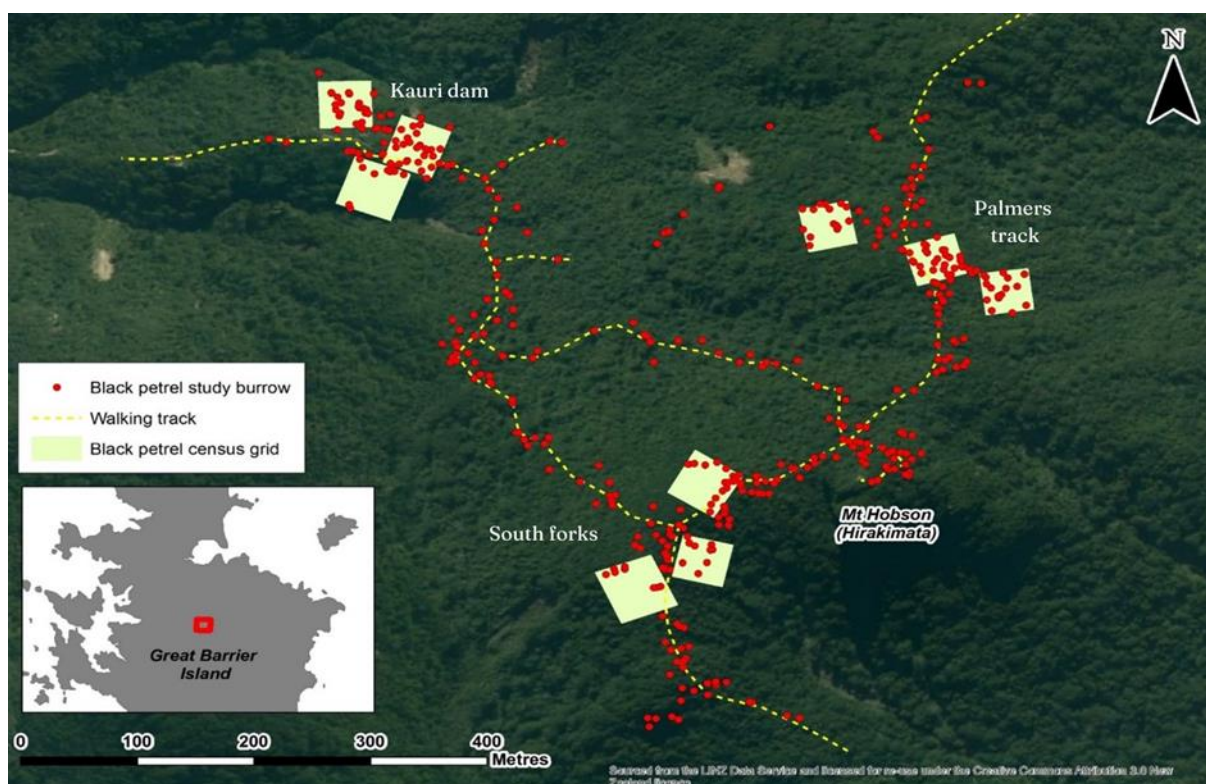


Figure 1: Map of the 476 tākoketai/black petrel (*Procellaria parkinsoni*) study burrows (red points) that have been established in the vicinity of Mt Hobson/Hirakimata on Great Barrier Island/Aotea. Yellow dashed lines are public walking tracks and highlighted squares are census grids (Kauri Dam, South Forks, and Palmers Track).

3. PRELIMINARY RESULTS

3.1 NUMBER OF BIRDS ENCOUNTERED AT THE COLONY

Over three expeditions, the research team captured a total of 804 birds throughout the Hirakimata/Mt Hobson colony (Table 1). Of these birds caught, 120 were originally banded as fledgling chicks that had returned to the colony as adult, 493 were either banded as adults previously or were unbanded adults and 129 were banded this season as chicks (prior to fledging). Thirty-seven birds were seen for the first time since being banded as fledglings. A summary of the numbers caught is available in Table 1.

Table 1: Tākoketai/black petrels (*Procellaria parkinsoni*) caught at the Hirakimata/Mt Hobson colony on Great Barrier Island/Aotea during the three trips in November/December 2022, January 2023 and April/May 2023. Numbers are subsetting by birds that were either banded as adults (including unbanded birds) or banded as chicks (i.e., recruits). Numbers in brackets indicate those birds that were caught for the first time in the 2022/23 after being banded in prior seasons.

	Re-captured	Newly banded this season	Unbanded	Total
Banded as adults	321 (50)	173	-	494 (50)
Banded as chicks (i.e., recruits)	120 (37)	-	-	120 (37)
Chicks (banded this season)	-	129	-	129
Chicks (unbanded this season)	-	-	61	61
	441	302	61	804 (86)

3.2 OCCUPANCY OF BURROWS AND BREEDING ACTIVITY

From a total of 480 study burrows checked during January and April/May 2023 (with some checks also taking place also in December 2022), the tākoketai/black petrel breeding occupancy (the percentage of burrows where a breeding attempt occurred) was 65.2% (313 breeding burrows; Table 2). By the end of the April/May 2023 trip, 122 (39.0%) had been confirmed as failed. Current breeding success at the Hirakimata/Mt Hobson colony is 61.0%, which is lower than average breeding success (72.4%) for the full 28-year study.

Table 2: The total number (and percentage) of breeding, non-breeding, and unoccupied tākoketai/black petrels (*Procellaria parkinsoni*) study burrows and breeding success rate in the breeding burrows at the Hirakimata/Mt Hobson colony on Great Barrier Island/Aotea, 2022/23.

Burrow type	Number (%)	Breeding success (%)
Breeding burrow	313 (65.2%)	191 (61%)
Non-breeding burrow	64 (13.3%)	
Tākoketai occupied burrow (breeding and non-breeding combined)	377 (78.5%)	
Unoccupied burrow	103 (21.5%)	
Total tākoketai burrows	400	
Cook's petrel burrow	3 (0.01%)	
Total	483	

3.3 IMPACT OF EXTREME WEATHER EVENTS

During the later portion of the January 2023 trip and during May 2023, significant storm systems, including Cyclone Gabrielle, caused a number of burrows to flood (Bell, E.A., *pers. obs.*).

These storms resulted in the January 2023 trip being cut short and overall, lost the research team an estimated 8-days of field work. The timing of the January storms coincided with the chick hatching period.

More poor weather (heavy prolonged rainfall event) during the April/May trip reduced opportunities to band surviving fledging chicks; with only 129 chicks out of the surviving 190 chicks in the study burrows being banded. Burrow checks were completed, and breeding outcomes could be recorded, but banding effort was reduced compared to earlier cohorts.

Poor weather in January and April/May also reduced the amount of night work that could be completed, which in turn reduced collection of recruitment and survival data.

Rainfall (between November and June) and other climate impacts over time will be investigated in the final report to determine if there are any effects on breeding success. Burrows that failed will be mapped to determine if there were areas (or sub-areas) of higher risk to climate impacts at the Hirakimata colony.

3.4 ADDITIONAL FINDINGS

On 26 January 2023, a returned tākoketai/black petrel was caught that had not been seen for the last 35 years (Figure 2). Originally banded as a chick in 1988 on Aotea/Great Barrier Island, the bird was transferred to Te Hauturu-o-Toi/Little Barrier Island as part of a translocation program to re-start the tākoketai/black petrel colony. This bird was found calling for a new mate back on Aotea/Great Barrier Island.



Figure 2: *Tākōketai/black petrel, once banded as a chick in 1988 on Aotea/Great Barrier Island, transferred to Te Hauturu-o-Toi and seen for the first time in 35 years back on Aotea/Great Barrier Island. © Chase Hann, Lee Fish.*

An unexpected discovery was the re-finding of two birds that, as chicks in 2018, were outfitted with satellite tracking devices before their first migratory flight (Figure 3). The devices on these birds transmitted for 55-79 days and would have fallen off during the birds' first moult (when the feathers are replaced). One of the males (red) was found during the night of 1 December 2022 outside a burrow near the Hirakimata/Mt Hobson summit attempting to attract in a mate with his 'clacking' calls. The other male (orange) was found patrolling the forest floor four nights later. Incredibly both birds were found just over 20 metres from the burrow that they were born in.



Figure 3: *Map of migratory path of 14 tākōketai/black petrel chicks that were outfitted with satellite tracking devices in 2018 (funding provided by Auckland Zoo Charitable Trust) on their maiden voyage. Both red and orange were found back at the colony in December 2022.*

At sea capture trips (i.e., expeditions focused on catching tākōketai/black petrels off the back of a vessel) were implemented as another avenue to increase effort into finding recruits. By being able to target individuals not strictly tied to study burrows (or that may even appear within the boundaries of

the studied colony, it increases the capacity to target a broader range of individuals. During the November 2022 at-sea trip, one adult originally banded as a chick was seen again for the first time since being banded during the 2016/2017 season. During the March 2023 at sea trip, two adults originally banded as chicks were seen at sea; both were the first recaptures for these birds (one banded in April 2015 (2024/215 season) and the other banded in May 2016 (2015/16 season)). Complete details of the at-sea work will be reported separately.

4. ACKNOWLEDGEMENTS

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