

Mason Bay Rat Project Report 2025

New Zealand Deerstalkers Association – Southland Branch

in collaboration with the Department of Conservation



Compiled by DOC Rakiura

Scope

The New Zealand Deerstalkers Association – Southland Branch and the Department of Conservation – Rakiura are in partnership to deliver targeted pest control at Mason Bay. This collaboration is formalised under a renewed 10-year Conservation Agreement (2023 to 2033) which captures the spirit of the partnership, roles, and responsibilities of each party. DOC has undertaken analysis of the field data returned from NZDA trapping teams and produced the following report which summarises the season and provides some interpretation of the results.

This report will cover the data collected from the 2025 trapping season.

Background

The Mason Bay rat trapping project covers approximately 300 ha of coastal forest situated amongst a broader dune ecosystem. The project has been underway since 2006 and was further formalised in 2013 with a Management Agreement, renewed in 2023, which outlines the roles and responsibilities of the NZDA volunteers and the Department of Conservation.

Mason Bay represents some of the only intact temperate dune systems in the southern hemisphere, stretching inland up to three kilometres and reaching over 200 m in height. It is home to a range of locally endemic plants and animals, including many threatened species. The location is a key wintering site for the critically endangered pukunui/Southern New Zealand Dotterel which rest here during the high tides before flying across to places like the Freshwater mudflats to feed during the low tides. It is home to one of the largest and most visible populations of kiwi in New Zealand, Rakiura tokoeka, as well as a range of forest bird species such as kākārīki (red-crowned parakeet), kererū (wood pigeon), tūī (Parson's bird), korimako (bellbird), miromiro (tomtit), pīwakawaka (fantail), and more. Native insects, invertebrates, and reptiles are also present, such as the *Pimelea* moth and green skink.

NZDA members maintain and rebait a network of 309 victor rat traps every year (see map in Figure 1). Trapping trips take place in spring and summer and generally range from August to December each year. The primary aim of the project is to increase the productivity of nesting forest birds during their vulnerable breeding season by reducing

rat density and therefore rat predation of eggs, chicks, and disturbance of incubating adults. Volunteers also use live capture cage traps and kill traps to target feral cats in the area, further reducing predator numbers during the nesting season. Feral cats are the biggest threat to the critically endangered pukunui, making this work more important than ever.

Field data is provided to the Department of Conservation staff based on Rakiura to analyse and collate into an annual report.

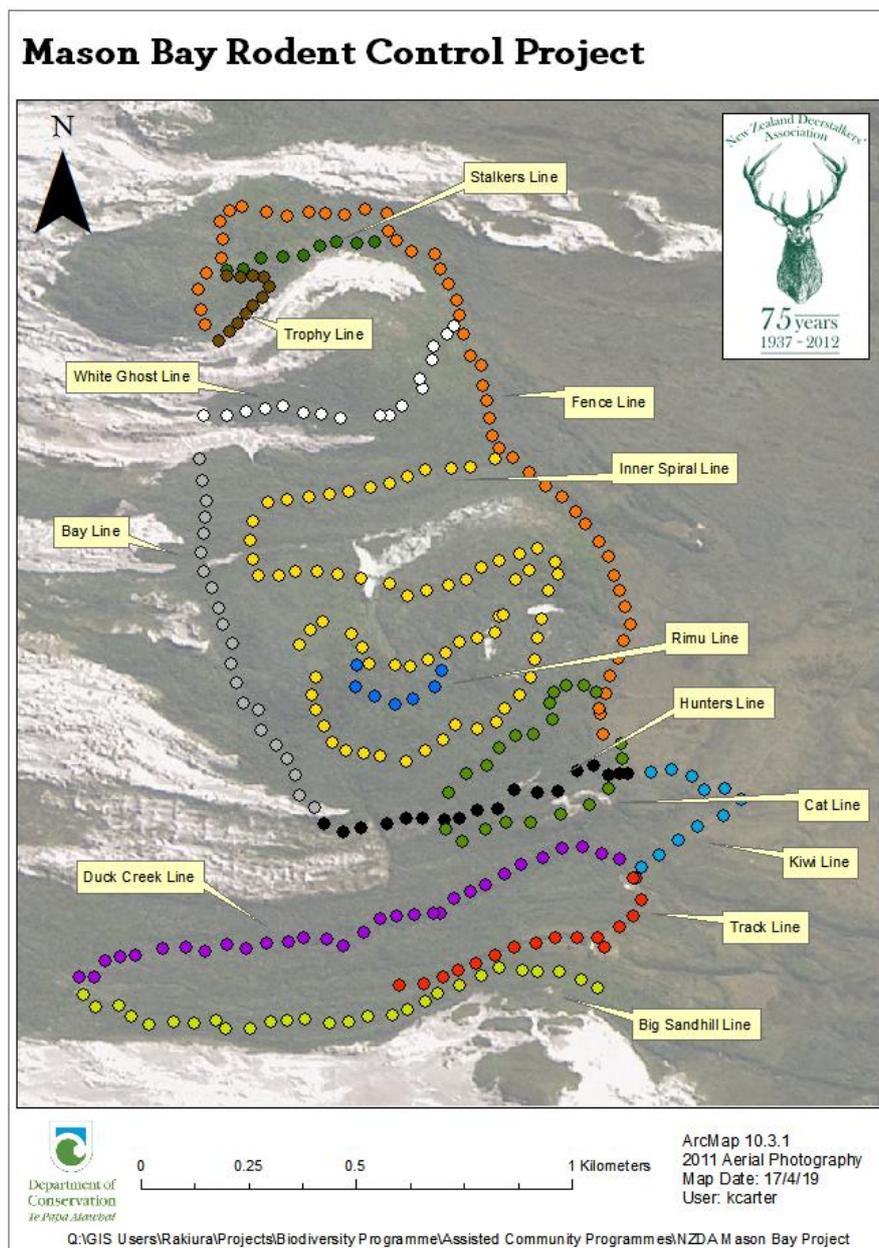


Figure 1: Map of the trapping network maintained by the New Zealand Deerstalkers Association at Mason Bay, Rakiura.

Introduction

Rats are widely recognised as a key predator of vulnerable nesting birds through both raiding nests and directly targeting incubating adults, especially so with smaller bird species such as fantails and tomtits. Rat impacts are twofold in that they also compete with birds for food sources such as seeds and fruit. Rats are also known to eat invertebrates and reptiles.

All three species of rat in New Zealand are present on Rakiura, comprising of the Norway, ship, and kiore (Pacific) rats. The dominance of different rat species depends on the habitat (for example, kiore are often outcompeted by the more aggressive ship and Norway rats) and each behave in different ways. Norway rats are generally known as swimmers and are often associated with water bodies whilst ship rats are normally more plentiful in forested areas and are known climbers. These characteristics make ship rats of particular concern as they are more likely to prey on bird nests.

In ideal conditions of good habitat and plentiful food, every female rat has the potential to give birth to dozens of pups per year. As rats reach sexual maturity after just a few months, a population can grow from two to 2,000 in just 12 months (in the absence of any other limiting factors like food availability), exacting a heavy toll on the ecosystem.

Rat population sizes naturally cycle over the course of any given year, increasing rapidly through spring and summer after breeding and in response to greater food availability with plants producing flowers, fruits and seeds. Rat plagues can occur in years when food availability is greater than average (i.e. a 'mast' year). In these years, rat pups are more likely to survive through to adulthood which provides a larger breeding population when the cycle starts again.

Bird count data continues to be collected since the first observations in 2012. This has been targeted to monitor four specific bird species that are most susceptible to rat predation; bellbird, toutouwai (Stewart Island robin), tomtit, and kākārīki. These are species that can help us understand and quantify the benefits of the rat trapping programme in terms of increasing bird counts as our overall aim for the project.

2025 results

Rat catches

This year saw a slight decrease in the numbers of rats caught compared to last year. Volunteers trapped a total of 165 rats between August and December, compared to the 204 rats caught in 2024. However, Team 4 did not undertake a trip, and trapping time for Team 1 was reduced by weather conditions, meaning less overall trapping took place. Approximately 2848 trap checks were done in 2025 (compared to 3696 in 2024), with 165 rats caught. This gives a catch rate of 5.8%, a slight increase from 5.5% in 2024.



The 2025 rat trapping season results are plotted on the graph below (Figure 2) against the previous nine season's results. It is important to note that this graph has been corrected for trapping effort (how many total trap checks took place), therefore catch results are comparable between years. Rimu most years are denoted in a darker colour.

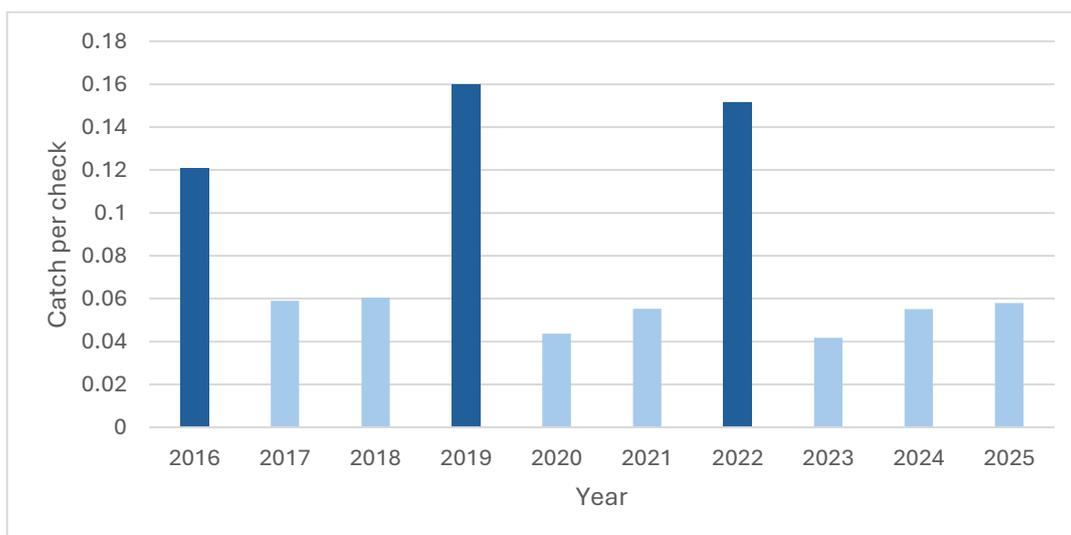


Figure 2: Total rat captures during target season, standardised for number of trap checks.

In non-mast years, rat catch results generally show a high catch at the start of the trapping season following by a tailing-off of catches. This trend is apparent in the 2025 season, as seen in Figure 3 below. The first check of the season resulted in 69 rats caught; subsequent trap checks gave lower catch numbers. Additionally, without Team 4 present, there is an increase in rats caught (18) during check nine onwards, showing a small repeat of this trend.

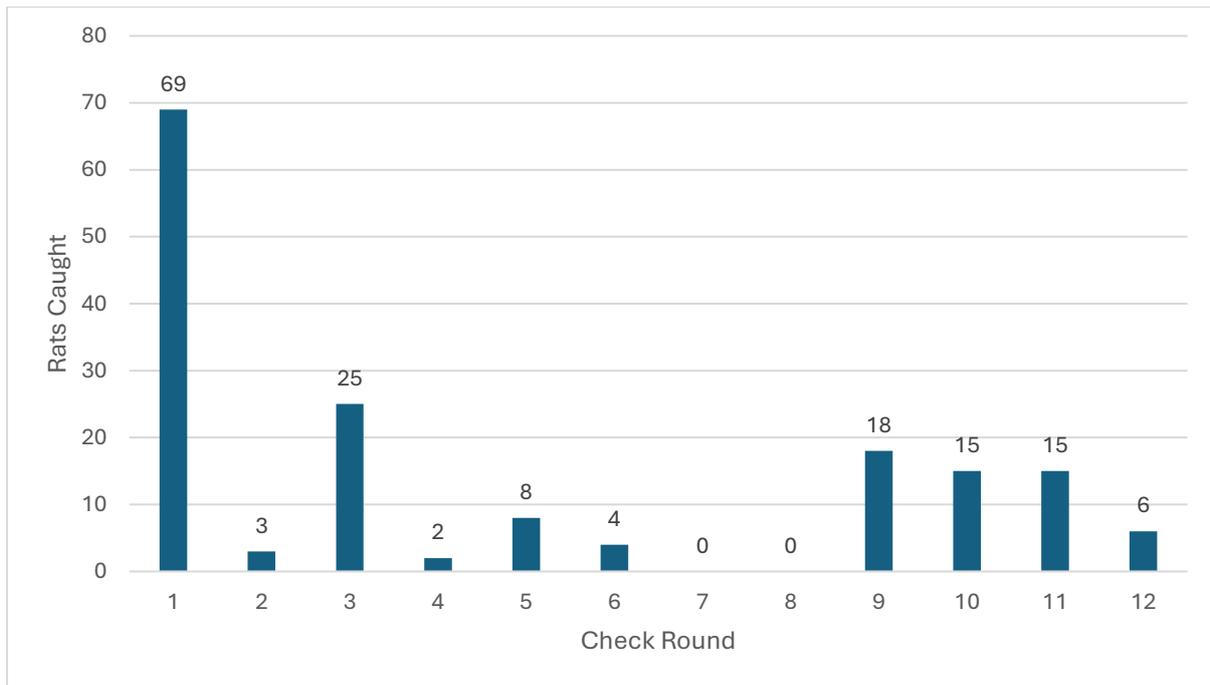


Figure 3: Total rats caught by recheck in 2025. Checks with more traps will show more rats caught. Note check seven and eight represent the absence of Team 4.

Between lines, the most rats were caught on Inner Spiral (27), while the least were caught on Stalkers and Trophy (3 each). Per trap, the most rats were caught on Kiwi (0.9 per trap), while the least were again caught on Trophy (0.3) and Stalkers (0.33 per trap), shown in the Figure 4 below. Overall, the trapping success of the entire network this season was around 0.5 rats per trap.



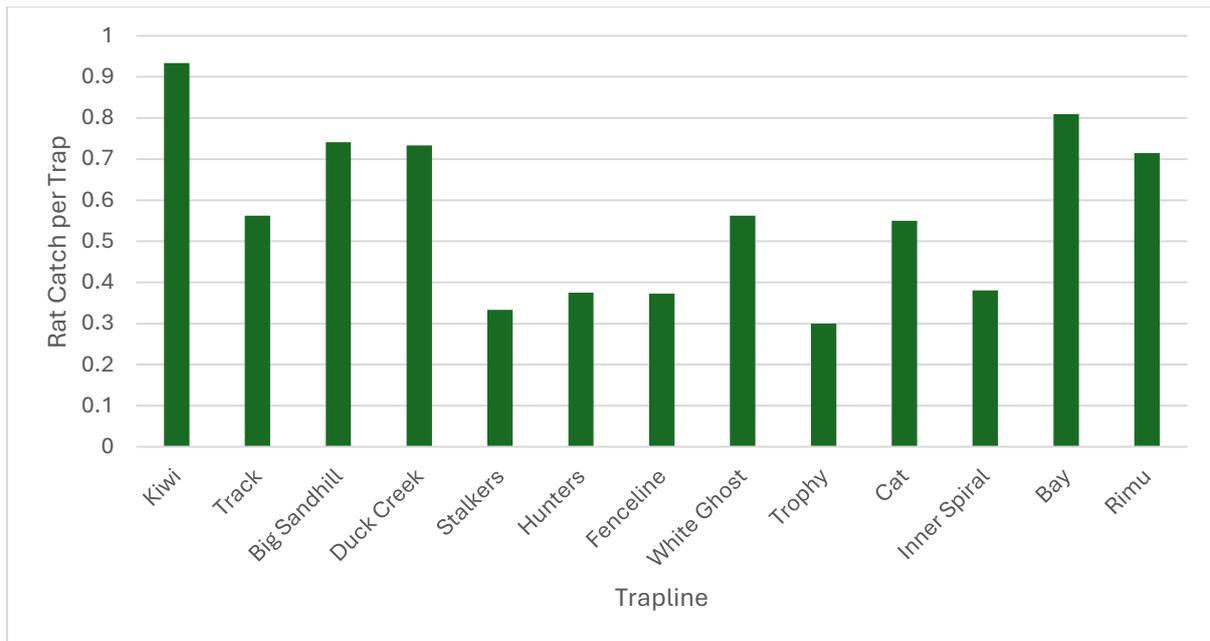


Figure 4: Average rat catch per trap, by trapline. Lines checked more often will have higher figures.

Bird encounters

Four key indicator bird species were used to compare the number of birds encountered on rat trapping lines each season. The bird species chosen were bellbird, kākārīki, tomtit, and robin. These four bird species are deemed to be sensitive to predation by mammalian predators such as rats, cats, and possums, therefore can be a good indication of the impacts these predators are having on their populations.



Figure 5: Images of korimako (bellbird), kākārīki, miromiro (tomtit), and toutouwai (Stewart Island robin).

The total number of individual birds per species encountered this season is shown in the pie chart below (Figure 6). Bellbirds were the most seen birds, recorded 104 times throughout the 2025 period. Kākārīki were the second most recorded species, sighted 33 times between the five teams. Tomtits were sighted 17 times, and robins not sighted at all.

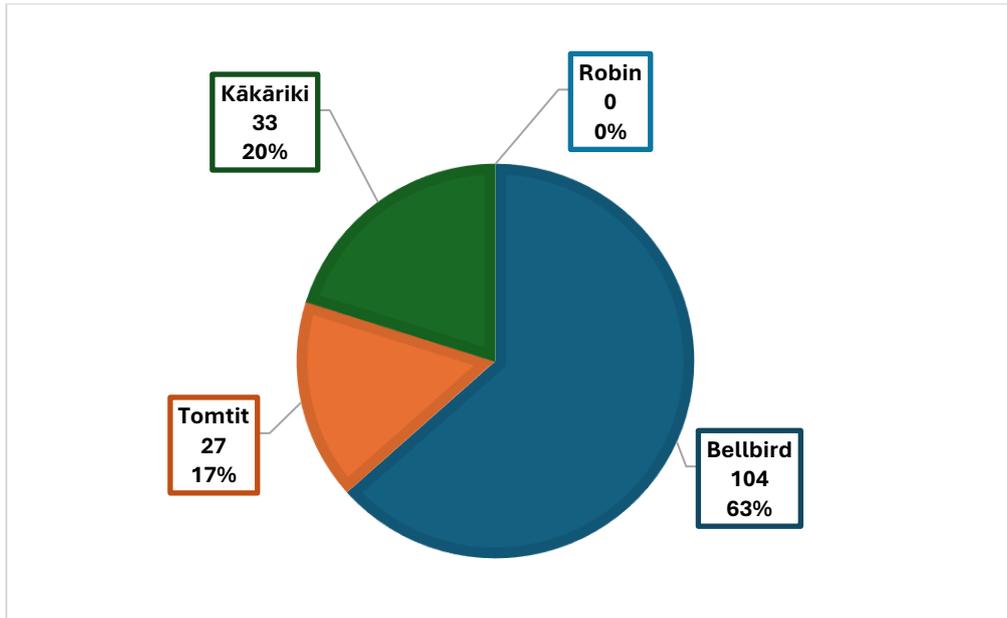


Figure 5: Proportion of bird sightings by species.

Comparisons of the numbers of each key bird species per year from 2016 to 2025 are shown in the graphs below, split by species for ease of viewing now that the dataset spans 10 years. This data has been standardised for the number of trap checks, so it is comparable between years and species. Note that data for kererū, tūī, and kiwi has not been recorded since 2020 and so has now been removed from these figures. Rimu mast years (2016, 2019, and 2022) have been denoted in a darker colour.

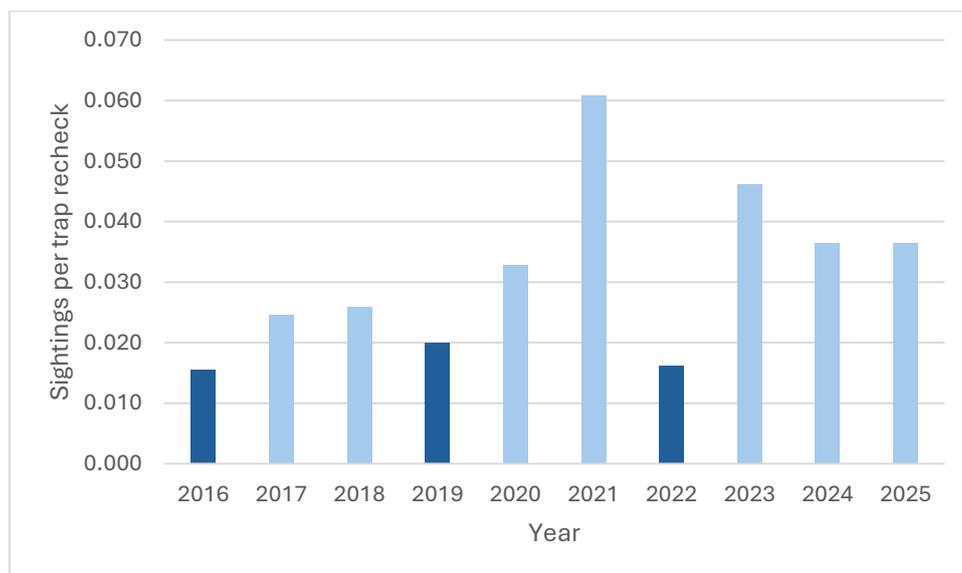


Figure 6: Bellbird sightings per year from 2016-2025.

Bellbird sightings are consistently the most recorded species throughout the 2016-2025 period. Slightly fewer birds were observed this season (104) compared to last season's observations (135); however, when sightings are standardised for number of trap checks they are on par with last year.

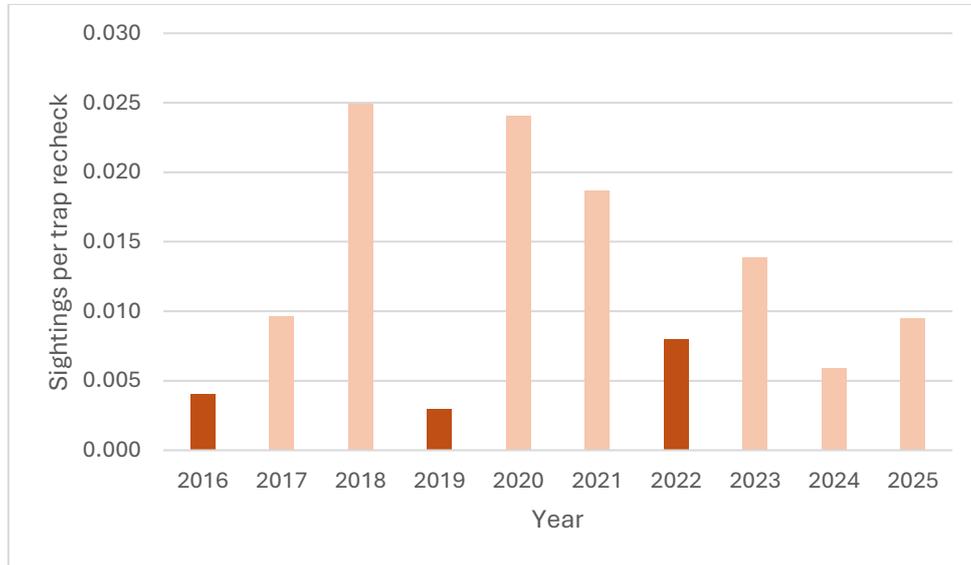


Figure 7: Tomtit sightings per year from 2016-2025.

Tomtit sightings increased this year, at 27 compared to last year's 22.

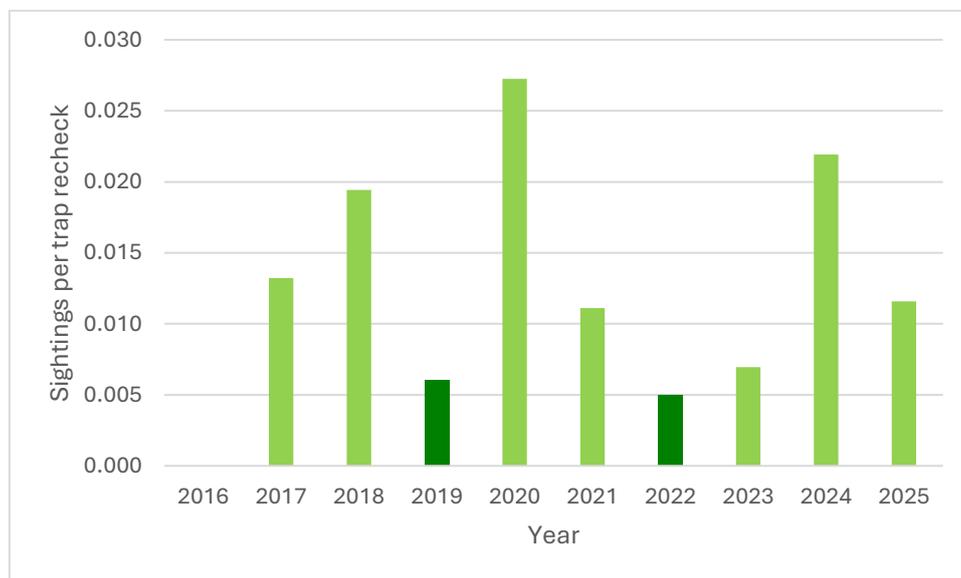


Figure 8: Kākāriki sightings per year from 2016-2025.

Kākāriki sightings decreased this season, at 33 sightings, down from 81 in 2024.

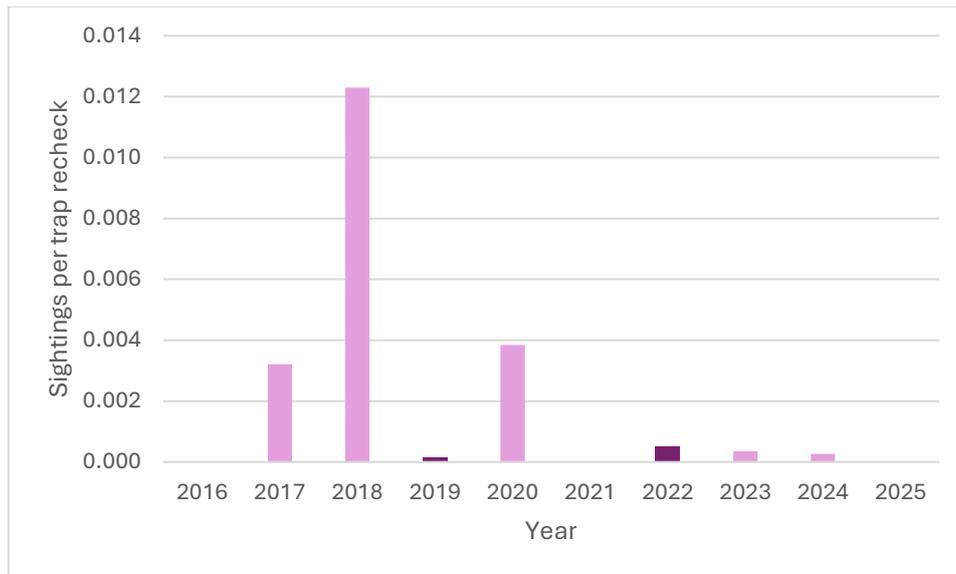


Figure 9: Robin sightings per year from 2016-2025.

No robins were observed this season. Robin sightings have been consistently low the past few seasons (note that 2018's sightings (38) are unusually high and are possibly an outlier). Robin sightings are very rare island-wide and are generally not seen outside of Ulva Island in the present day.

All bird observations appear to be lowest during rimu mast years. This is when we can expect high numbers of rats due to high food availability, and in turn increased predation pressure from more rats.

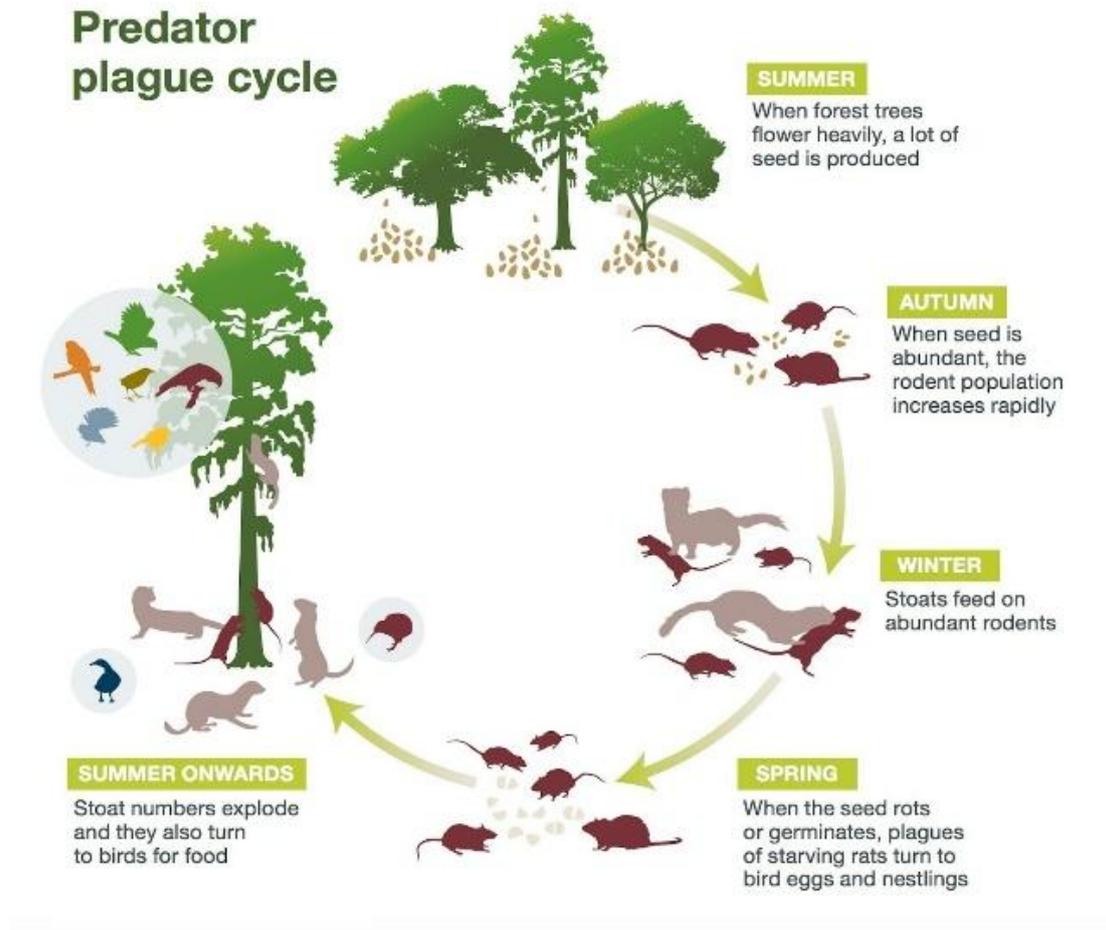


Figure 10: A graphic explaining how predator 'plagues' work during mast years. This graphic also depicts stoats, which are not present on Rakiura.

Cat catches

Cat kill traps were set for 87 trap nights, and cage traps were set for 172 trap nights (trap nights = number of traps x nights set). Two cats were killed this season. This is an excellent result and will help to protect the critically endangered pukunui, which frequent Mason Bay over winter but are heavily predated by cats.



Figure 11: Images provided of the cats caught during this project.

A note on observational variation

There are several variables when recording bird observations, such as the individual's ability to identify between similar species, such as robins and tomtits, and the speed in which the particular trapline is walked, which change the likelihood and accuracy of bird encounters. Female tomtits and juvenile bellbirds may also be more difficult to correctly identify. Weather conditions also play a large role in how many birds are seen or heard on a given trap line check. There is no discernible trend in bird sightings over the season, with variable numbers between trips and species.

Encounter results

Comparing the number of key indicator birds (bellbird, kākārīki, tomtit and robin) encountered each trip over several years can give us an idea of the effectiveness of the NZDA trapping program. However, it should be noted that while these observations are useful as an empirical trend and may be **correlated** with rat results, they should not be used to discern ultimate **causation** of population status.

The data from the 2025 season showed an increase or at least equal sightings in two of the four bird species from the previous year, and this appears to be a continuing trend. Robin numbers remain low with no birds encountered this season; as mentioned above this is not unexpected in this current environment.

The rat trapping data showed a slight decrease in the number of rats caught this year, although standardised trapping success is slightly higher. Similarly to last year, as this year was a non-mast year, it is unlikely that there would be a large increase in the rat population with similar quantities of food available. The next rimu mast is expected either summer 2026 or 2027, so we await this upcoming season's results with interest.



Figure 12: Photo of a rat caught in the NZDA network.

Conclusion

The NZDA has completed another busy year of rat and cat trapping at Mason Bay during a period where our native birds are particularly vulnerable to the effects of predation.

We would like to make special thanks to Invercargill Hunting & Fishing for the generous financial support towards transportation costs of the project. We would also like to thank the NZDA hunters and volunteers who cover the remaining associated costs and carry out the annual trap checks and monitoring, and for their continued enthusiasm for protecting our native fauna and flora in such a special place. We look forward to another season of good results.

