

Predator Control and Biodiversity Monitoring

On Quarantine Island/Kamau Taurua, we have many projects which help to restore the Island's biodiversity. These include managing the introduced Norway rats and mice on the Island, and monitoring biodiversity. By managing mammalian predators, we expect to see changes in the biodiversity that we monitor over time.

The problem:

The introduced Norway rats and mice are introduced mammalian predators that can affect biodiversity in a multitude of different ways including predation on insects, bird eggs and fledglings, and skinks and competing for resources such as food and shelter with our native species (called resource competition). Rats and mice also eat seeds of our native trees, potentially reducing forest regeneration.

Since Winter 2016 we have been:

1. Using various traps (A24, DOC200, snap traps) to reduce numbers of rats and mice on the Island with the intention to keep numbers down.
2. Monitoring biodiversity over time to see the impact of trapping (ongoing from 2016).
 - a. Includes lizard monitoring and bird surveys
3. Monitoring rat and mice activity using tracking tunnels
4. Engaging school groups and island visitors in data collection

See below for further details about our Curious Minds funded predator and biodiversity monitoring. If you would like to be involved in our predator management programme or biodiversity monitoring, check out the "Predator Control and Biodiversity monitoring, Teacher/group leader notes" document.

Mammalian predator monitoring

Tracking tunnels have an inkpad with some bait inside to encourage rats and mice to walk across and leave their footprints. Often when school groups visit the Island on overnight trips, we will set out tracking tunnel cards on the first day and check them the next day to see if there are any footprints. We mostly find mice footprints on the cards and can classify the amount of activity into none, low, moderate or high.

We make sure to correctly label and date the cards so we know when they were set out, and where they came from. This can give us a lot of information about changes in activity over seasons and

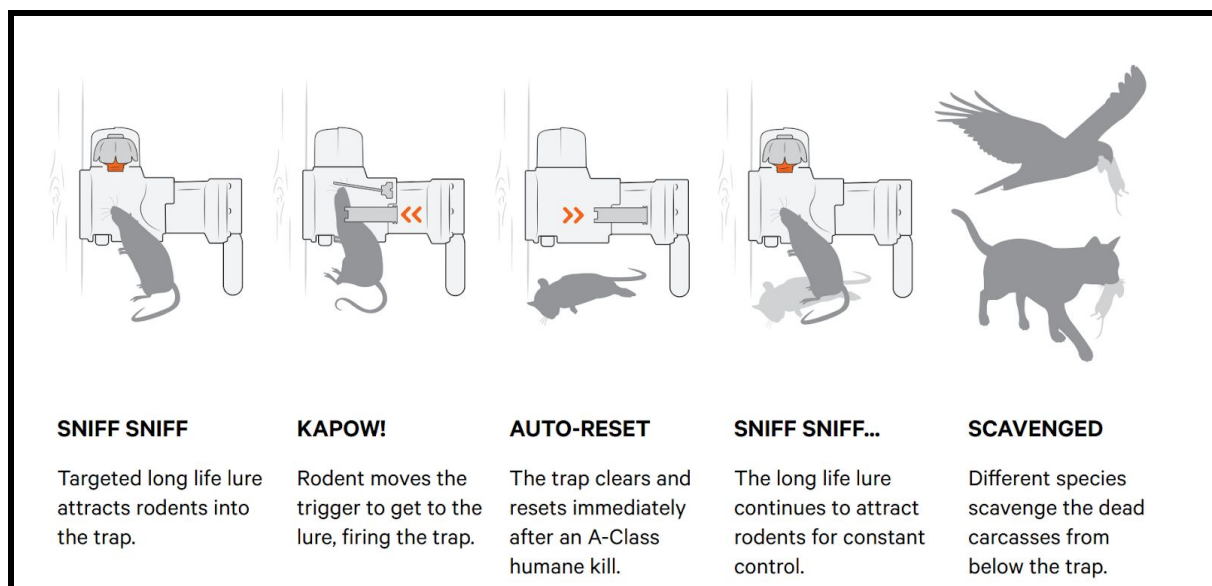


activity at different sites. We often find higher activity on the tracking cards in winter compared to spring and summer.

We have 31 Goodnature A24 traps placed around the Island as well as several conventional traps (DOC200 and mouse snap traps). Good nature A24 traps are automatic traps and can catch animals 24 times before they need to be reset.

Goodnature A24 trap.

Source: Wikimedia Commons AnnieDick [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)



How the Goodnature A24 trap operates. Source: Goodnature A24 Quick Start Guide Product Manual, retrieved from <https://goodnature.co.nz/pages/support>

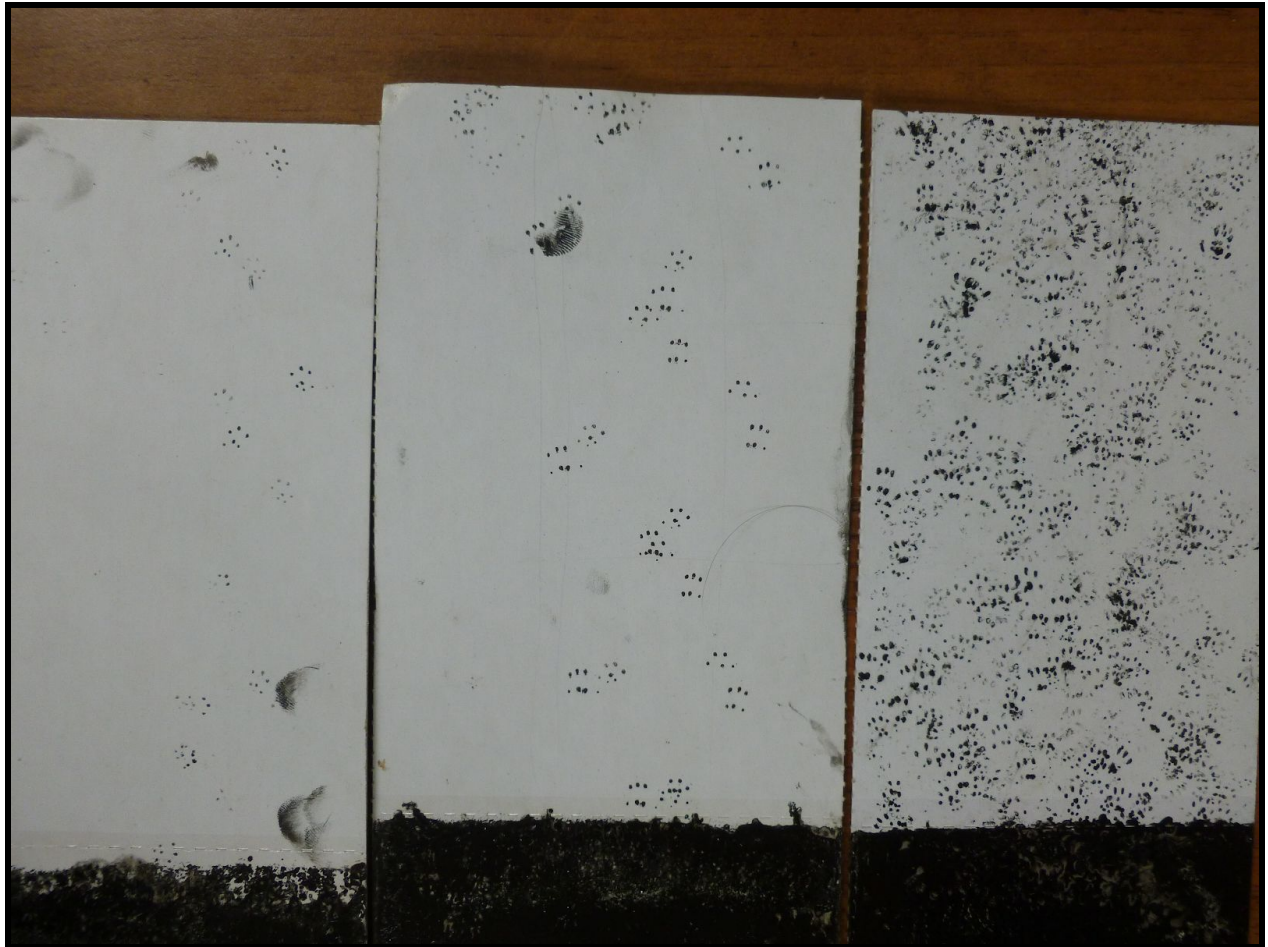
The Goodnature A24 traps have been in place on the Island since 2016 and unlike conventional traps, only need to be checked every few months to replenish the chocolate-based bait or CO₂ canister. Can you see the advantages of this for the island, compared to snap traps?

Unfortunately, it is hard to get data for the Goodnature A24 traps as the bodies may be scavenged by other animals. When we do find bodies under the Goodnature A24 traps or in our conventional traps these tend to be in Autumn.

We also tested how likely rats and mice were to enter the Goodnature A24 traps using our Infrared motion sensitive cameras - we found often the mice and rats would spend

some time sniffing around the trap but not actually enter. We are looking into the setup of our traps to encourage them to enter the trap.

This means our tracking tunnel data and biodiversity monitoring are important for determining changes in rat and mice numbers. We do a full survey of the Island with the tracking cards every three months and classify the results according to the density of prints: None, low, moderate or high.





Bayfield High school student checking the tracking tunnel card.



Tracking card with mice footprints.



A tracking tunnel placed along the bush track.



Baiting the tracking card with peanut butter.



Families from North East Valley setting out tracking cards.

Bird monitoring

Every spring and autumn, a team of volunteers including ornithologist Derek Onely undertake 5-minute bird counts on the Island. These involve standing quietly at each of the 9 bird count sites and recording the species and number of birds seen or heard as well as various weather variables.

School groups and visitors to the Island also get a taste of undertaking their own bird count.

We often see a diversity in the species of birds recorded on the Island reflecting the different niches available (coastal, paddock and bush).

Notable birds on the Island include the rare and endangered [Otago shags](#). Historical counts of these birds (59 and 72 in 2000) and a bird count showing the diversity of [species in 2012](#) help with our baseline data.



Students from East Otago High School doing a bird count during their school camp on the Island.

Lizard monitoring

We have only recorded Southern Grass skinks living on the Island. We have set up artificial cover objects (ACOs) to monitor lizards on the Island using a special [Lizard monitoring protocol](#). ACOs are special lizard retreats made with 2 sheets of a corrugated bitumen-based material called onduline. Onduline warms up in the sun (although doesn't get too hot), so lizards love wedging themselves between the sheets and basking on top.

We have a Wildlife permit from DOC for this project and strict protocols to follow. It's very important no one disturbs the skinks in between our monthly checks.

We are grateful for herpetologist Sam Haultain's help in monitoring the ACOs and developing the Lizard monitoring protocol.



A Southern Grass Skink.

Our previous biodiversity monitoring mahi:

For results from our 2017 Curious Minds funded biodiversity monitoring project, check out these summary posters created by scientist Dr Jillian Hetherington.
[QI-KT-Curious-minds-posters-Feb-2018](#)

Moths:

Tamariki from Te Kura Kaupapa Māori o Ōtepoti and Dr Barbara Anderson previously led an overnight moth monitoring workshop on the Island. We used 6 Heath Moth traps placed in various spots around the island: two in established bush, two in regenerating bush, and two in a paddock/open area (the control). They also shared resources and information about moths in Te Reo and English.

Part of the identification process was to kill the moths to enable us to identify them easily and have a reference collection for future monitoring. We felt uncomfortable about killing other creatures, but identifying live moths is very challenging, even using

the beautiful guides showing moths from our area. We know that moths have a very short lifecycle (sometimes only days). So they were going to die very soon even if we released them. Also, the proportion of moths we caught is tiny as they were only those within close range of the light traps. James Tweed, a MSc student studying moths, was able to help us identify moths.

We repeated our moth survey, and with the help of James, identified them and created a reference collection. Check out the data from this survey here: [Moth Data 20.01.18](#)



Identifying moths caught on the Island with the help of James Tweed and Ahi Pepe MothNet identification guides.

Seedling Surveys:

We started monitoring seedling growth on the Island. We know rats and mice eat seeds, so if our trapping is successful, our hypothesis is that more seeds will get the

chance to grow into seedlings/trees. One of the changes we expected to see as we reduced mammalian predator numbers, was an increase in native tree seedlings.

To test this hypothesis, ecologist Dr Jillian Hetherington, helped us set up rat proof 'seedling cages' in a number of different locations. Adjacent comparison sites (without the cages) are pegged out. Initially, we were observing and recording how many different plants we could see in each cage and its control site. We know other factors also influence what grows in each site. For example, if the area is shaded, partially shaded, open, or if there are competing grasses.



Spotting the differences in seedling growth between the rat-proof cages and control sites with tamariki from Bradford School.



Checking the seedlings within the Rat-proof cage.

Infrared Motion sensitive cameras:

We set up an Infrared (IR) motion sensitive camera and caught a rat climbing a tree near the historic buildings.

The camera takes three pictures, then a 30 second video. This camera (Little LTL Acorn 5310, photos below) triggered well even though the rat is quite a small animal, and was up a tree (we did not expect that so the rat is at the edge of the image). The camera is very sensitive, and the first fire has a lot of IR light, whiting out the middle of the image. However, the camera compensates during the video (below).



Can you spot the rat in this tree?



Thank you to our supporters!

The Island is a haven for natural biodiversity in Otago Harbour! Thanks to the DCC's Biodiversity Fund, Otago Peninsula Community Board and the Dunedin Amenities Society for funding the traps. Thanks also to Curious Minds and the Otago Participatory Science Fund, and scientists; Dr Jillian Hetherington, Clare Cross, Sam Haultain, Derek Onley, Dr Barbara Anderson, James Tweed, and Aishwarya Muralidhar, who helped us explore ways to monitor biodiversity.