

MEASURING THE BENEFITS

Monitoring birds, lizards, invertebrates and plants is extremely important. It is through monitoring that the effects of pest control can be seen. While the interrelationships between pest and predators and native species are complex, some effects are easily observable. For instance, as the number of possums is reduced, the number of native plants increases. As the number of rats reduces, the number of robins increases.

Monitoring

The success of pest control at Boundary Stream Mainland Island is determined by:

- measuring changes in pest levels in response to their control
- measuring how the ecosystem has recovered through vegetation, bird, lizard and invertebrate monitoring
- comparing changes in the treatment site relative to two non-treatment sites.

Identifying birds

You have to be really good at accurately identifying bird calls when carrying out five-minute bird counts. It's really hard not to count birds more than once. You have to identify the bird either by seeing it or by hearing its song. The populations of birds can be affected by what season it is and what the weather is like on the day. There might not be so many birds around on a rainy and windy day.

Birds

Monitoring shows that overall bird numbers in Boundary Stream are increasing.

Scientific methods

Five-minute bird counts – take place twice a year, in spring and autumn. They help to see what changes are going on, over time, in the bird communities in a particular area. At 200m intervals, observers note all birds seen and heard within a 100m radius over a five minute period. The type of bird and the number of each species is noted within 25m and more than 25m from the observer.

Vantage Point Kereru Counts – These took place during the first two years of the project. Kereru are counted as they respond well to a reduction in possum, rats and stoats and are considered a good indicator of the health of a forest. Kereru numbers are expected to increase as the vegetation recovers to provide more fruit, and rat and possum numbers are maintained at low levels, reducing competition for food and the threat of predation of eggs and chicks. By detecting the number of birds and their distance from the observer, a calculation of the density of kereru in an area can be made and changes tracked to this over time.



*Volunteers assist kereru/tui bird counts in January 1999.
Photo: C. Tiffen.*

Vegetation

Monitoring and protecting plants help record how the forest is recovering as well as ensuring that threatened plants continue to live. Vegetation monitoring includes mapping plant patterns, assessing changes in 20 x 20m permanent plots, photographing specific plots and watching over threatened species.

Plant recovery has been recorded at Boundary Stream Mainland Island since pest control and monitoring began. Because possums and goats are under control, seedlings and ground covers are flourishing, and palatable plants are not getting eaten as much as before. Some threatened species like neinei, mistletoe and kakabeak get extra protection and have begun to increase in number.

Scientific methods

Vegetation Map – shows where particular plant groups grow. It was made from a species list, survey material and aerial photographs. Plant groupings are classified in terms of dominant species in the forest canopy.

Permanent Plots – Records are taken at each of the 19 plots (20m x 20m, some of which are fenced) within Boundary Stream and six in the non-treatment sites of Thomas Bush and Cashes Bush. These include the presence of seedlings, the diameter of stems greater than 30cm, how often seedlings appear as plants or how often they germinate and the size of tree ferns.

A “recce” assessment is also carried out, recording what the site is like, what plant species are in each forest tier, the percentage of ground cover, the height of the canopy, the percentage of insect and animal browsing and bird presence.

Photopoints – Photopoints are established at each permanent vegetation plot and other selected sites in Boundary Stream and the non-treatment sites. Photographs are taken from exactly the same place using the same methods, film and time of day and then the subject and date is recorded.



Steve Cranwell, Geoff Walls and Elizabeth Pisseif measure and record trees in an enclosure at Boundary Stream, August 1996.
Photo: C. Tiffen.

Threatened plant protection and monitoring:

Fences have been built around some threatened plants to protect them from browsing animals. Called exclosures, they are built around the original kaka beak and neinei plants.

The neinei is regularly checked for health, new growth, reproduction, fruit and flower abundance. Seedlings found are protected from browsing, and their height measured.

Mistletoe plants are assessed on a quarterly basis for reproductive output, general health and signs of threats. Records are made of new plants found and percentage of new growth, browsing and fruit and flower abundance.

Lizards

Lizard populations have been drastically reduced because other animals prey on them and suitable habitat has been reduced. Species known to be present at Boundary Stream include common skink, *Oligosoma nigriplantare*; common gecko, *Hoplodactylus maculatus*; and green gecko, *Nautilinus elegans*.

Monitoring began in 1997, using pitfall traps for ground-dwelling lizards.

Scientific methods

Pitfall traps – Three lines of pitfall traps (each with 50 pitfall traps at 20m intervals) run through the reserve, covering three types of habitat and the full altitudinal range. A pitfall trap is a four litre paint tin with drainage holes buried level with the ground. A layer of soil and leaf litter scattered over the bottom keeps it cool and moist inside. Lizards are attracted by the bait of tinned pear and the shelter provided by the large piece of wood used as the trap lid.

Traps are checked three times a week for one month in summer and captured animals measured and identified to species level. Searches are made for geckos during the day and night since New Zealand has both day feeders and nocturnal species.

Lizard houses – small, flat wooden boxes are nailed to a tree, 1.7 metres above the ground. Where possible, boxes are located on trees that lack obvious hiding holes for lizards, and face north for maximum warmth.



Green gecko
Photo: Rod Morris

Invertebrates

Invertebrate monitoring was introduced to measure how another part or component of the natural ecosystem responded to intensive pest control. In Boundary Stream and the non-treatment sites, the invertebrate community is monitored using pitfall traps.



*Invertebrate pitfall trap.
Photo: C. Tiffen.*

Scientific methods

Pitfall trapping – Boundary Stream has five pitfall trap lines each of which has five trapping sites, comprising four pitfall traps. A pitfall trap has a plastic cup in the ground with the lid at ground level. A metal cover, 1 cm above the trap, allows invertebrates to enter but keeps out leaves and debris. Each trap has a killing solution of antifreeze, water, detergent and salt. Monitoring takes place for a full month from mid-December to mid-January. Samples are grouped by site, washed, sieved and placed into alcohol solution. They are then sorted into the main groups (over 30) such as beetles, wetas and spiders and the numbers in each group recorded.

Weta houses – Weta houses are placed in groups of four, 1.5 metres above the ground with each house on a separate tree. Houses are 50 x 50mm pieces of wood, 20cm long with a 32mm diameter cavity. Rats are particularly fond of wetas so it is expected that as rodent numbers are kept at low levels, weta populations will steadily increase.

Non-treatment sites

Two non-treatment sites in close proximity to Boundary Stream Mainland Island – Thomas Bush (Opouahi Scenic Reserve) and Cashes Bush Conservation Area – are also monitored to provide more accurate information on treatment versus non-treatment areas. Monitoring of vegetation, possums, rodents, mustelids, birds and invertebrates allows staff to decide whether the management programmes used in Boundary Stream Mainland Island are having the desired effect on the flora and fauna of the area.

Thomas Bush is about one kilometre south of Boundary Stream Mainland Island, on the eastern flanks of the Maungaharuru Range. It covers a land area of 87 hectares, between 500 and 700 metres above sea level. Its vegetation is comparable with the central region of Boundary Stream Scenic Reserve.

Cashes Bush is about five kilometres southwest of the upper reaches of Boundary Stream Scenic Reserve, on the western slopes of the Maungaharuru Ranges. It covers a land area of 187 hectares, ranging from 700 to 1000 metres above sea level. Its vegetation is very similar to the upper reaches of Boundary Stream Scenic Reserve. It comprises beech forest with podocarps (rimu, matai and kahikatea) in the lower slopes and gullies. The higher slopes are dominated by montane species of mountain holly, coprosma and other montane shrubs, with a few remaining totara.



Counting the number of emerging seedlings is part of vegetation monitoring

Sites compared

Tracking tunnels and possum assessment lines are used to compare Boundary Stream to where there is no control or a level of control similar or typical of many other reserves. To date, far fewer tunnels (about 7 percent in Boundary Stream) have mustelid footprints compared to the non-treatment sites which have prints in around 30 percent of the tunnels. In Boundary Stream there are generally only one or two possums caught in 600 set traps compared to about 33 possums caught in 360 set traps in the non-treatment sites.