Waitutu Forest Restoration

Annual Report 2020/2021

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Cover image: Mistletoe in flower\ *Credit:* George Ledgard

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Contents

Executive Summary

This report summarises the animal pest management and species monitoring performed in the Waitutu Forest between July 2020 and June 2021. Quarterly monitoring trips are performed each season in the Waitutu, during August, November, February, and May. During each trip seedfall is collected, tracking tunnels are monitored for rodents and mustelids, and traps serviced.

Tracking tunnel monitoring for both mustelids and rodents showed that tracking rates decreased to very low levels after the application of aerial 1080 in March 2020, and remained low through to mid-2021. Mustelid tracking rates showed a small increase in May 2021.

The trap regime was maintained during 2020/21 with 55 stoats, 10 weasels and 42 rats caught across the department serviced trap lines in the Waitutu Forest. Both mustelid and rat trap captures decreased during the season between August and November 2020, and remained low into 2021.

Five-minute bird counts are undertaken each November. Count data shows that numbers of native birds species such as toutouwai, NZ falcons, and kaka are continuing to increase.

Background

The Department of Conservation (DOC), in partnership with SILNA and support from the Nature Heritage Fund, is carrying out a restoration programme covering approximately 65,000 ha of the Waitutu Forest and the Princess Mountains, between Wairaurahiri River in the east, Big River in the west and the lower reaches of the Hay River and Hauroko Burn in the north.

The Waitutu Forest is one of the largest tracts of unmodified lowland forest left in New Zealand. The uplifted marine terraces of the Waitutu area are both nationally and internationally significant. The forest is one of the most diverse in Fiordland, with large areas dominated by rata, rimu and miro. It is a strong hold for South Island kākā *(Nestor meridionalis meridionalis)*, a nationally important mistletoe site and an area where South Island toutouwai /robin *(Petroica australis australis)* are thriving as a result of predator control.

Since 2001 comprehensive monitoring as part of a research programme aimed at understanding processes driving ecosystem change has been initiated by Landcare Research, Department of Conservation, Cambridge University and the Institute of Ecosystem Studies. Prior to extensive landscape-scale predator control operations beginning in 2010, monitoring work showed predator numbers within Waitutu were very high, and that several threatened native species were on the brink of local extinction. The mistletoe population had been severely impacted by possum browse, kākā were being killed on the nest by possums and stoats to the point of population collapse, and other formerly abundant bird species such as the South Island robin and mohua were rarely seen.

Rodent numbers in the forest fluctuate in response to the food provided by the annual beech seed crop, and heavy seeding years can lead to damaging irruptions of rats and mice through winter and spring. These rodent irruptions often lead to very high stoat numbers. To determine when rodent control should be initiated, predictive monitoring has been performed with seed fall monitored using seed rain collection trays. This monitoring enables the department to tailor the pest management to the expected density of rodents and stoats. Tracking tunnels, used to monitor rodent abundance, complement the seedfall data and play a key role in triggering rodent control.

Following four aerial 1080 operations (in 2010, 2014, 2016, and 2020), largely funded by the Nature Heritage Fund and supported by the Waitutu Incorporation, kākā numbers have increased significantly. Nesting female kākā are surviving to rear young and the sex ratio has recovered from the dire ratio of 6 males to every female to a healthy 1.7 males to every 1 female. Robins are thriving, fern birds and kārearea/falcons are becoming more conspicuous, and general forest bird abundance has increased. Recent monitoring shows that it is likely that further mistletoe decline by possum browse has been halted.

Mistletoe takes longer to recover than other species monitored in Waitutu. However, it is likely that further mistletoe decline by possum browse has been halted. There have not been significant changes in recruitment in Waitutu, but mistletoe health has shown a

significant improvement. It is likely that widespread recruitment will take decades, and that restoration of the mistletoe population to pre-possum levels of abundance will take considerably longer – if indeed it is achievable at all.

There are five sites within the Waitutu Forest where pest management and species monitoring are performed: Poteriteri, Crombie, Slaughter Burn, Waitutu, and Grant Burn. Quarterly monitoring and trapping trips occur in August, November, February and May at these locations. In addition to this monitoring and stoat control, DOC has undertaken aerial 1080 operations to control predators including rats and possums.

Predictive Monitoring

Seedfall assessment

Seed fall of beech species has been monitored annually in the Waitutu area since before 2001. There are 90 seed rain collection trays: 15 at Poteriteri, 30 across two grids at Slaughter Burn, 30 across two grids at Waitutu, and 15 at Crombie. There are none at Grant Burn.

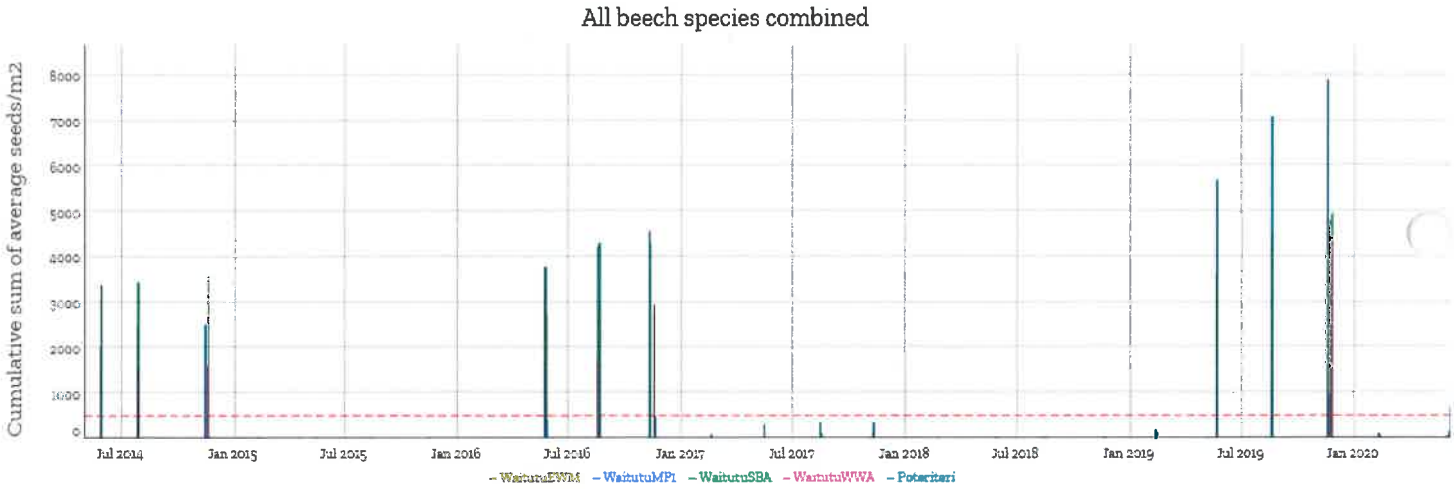

Figure 1: Cumulative sum of average seeds for all beech seed species in the Waitutu forest until June 2020. Dashed line represents the seedfall trigger for concern for impacts for introduced predators on native species.

Tracking tunnels

A total of 31 tracking tunnel lines, with 310 tunnels, are maintained within the Waitutu Forest area: 6 lines at Poteriteri, 6 lines at Crombie, 6 lines at Grant Burn, 6 lines at Slaughter Burn and 7 lines at Waitutu. Mustelid survey are run using the three night protocol, rather than the 21 night protocol which is standard for other South Island sites.

After the aerial 1080 operation in March 2020, tracking tunnel rates showed rat numbers decreased to undetectable levels and mouse numbers fell significantly to low levels. Tracking rates for rodents remained low throughout 2020 and through the first half of 2021.

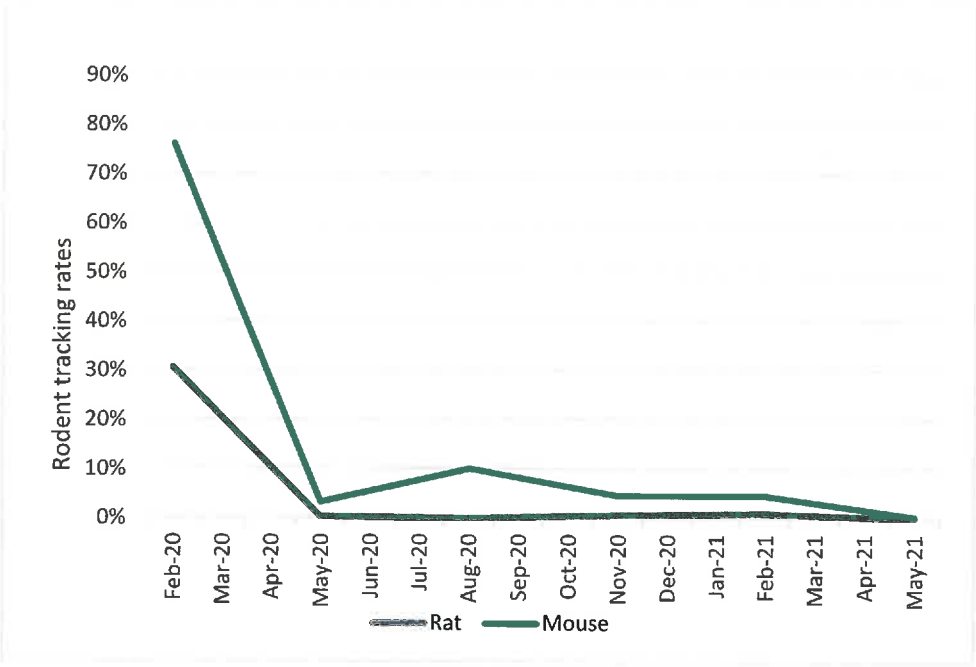

Figure 2: Rat and mouse tracking rates in the Waitutu, Feb 2020 – May 2021.

Mustelid tracking rates also decreased drastically following the aerial 1080 operation. Tracking rates remained low throughout 2020 and in February 2021. An increase in tracking was seen in May 2021.Tracking surveys in the Waitutu forest are conducted using the three night protocol, unlike many other South Island sites which use the 21 night protocol.

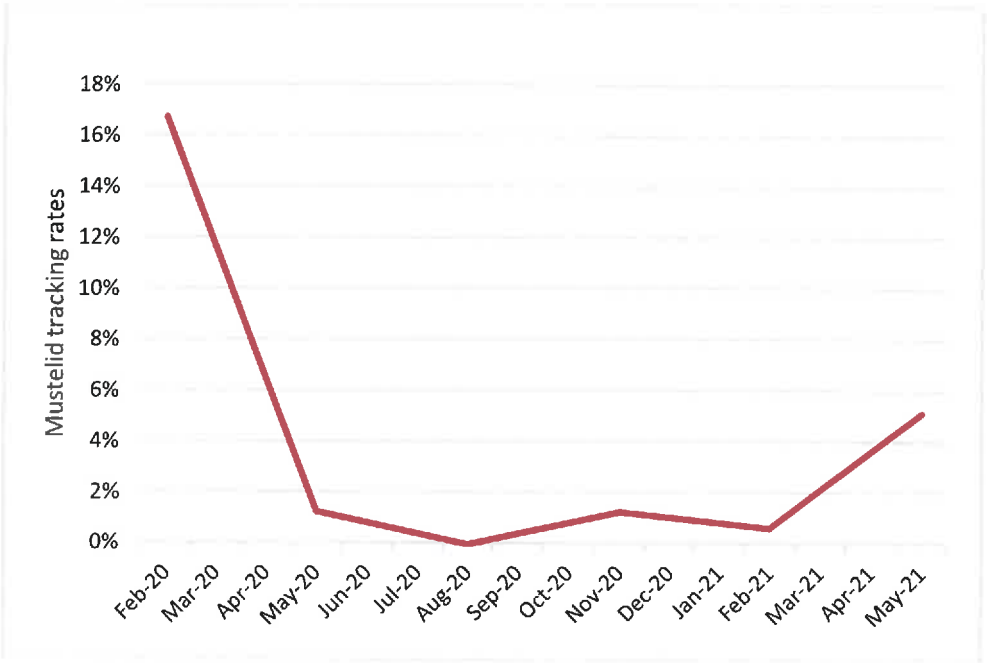

Figure 3: Mustelid tracking rates in the Waitutu, Feb 2020 – May 2021.

Predator Control

Trap Captures

256 double-set DOC150 trap boxes are maintained in the Waitutu area. There are 58 trap boxes in the Poteriteri area.

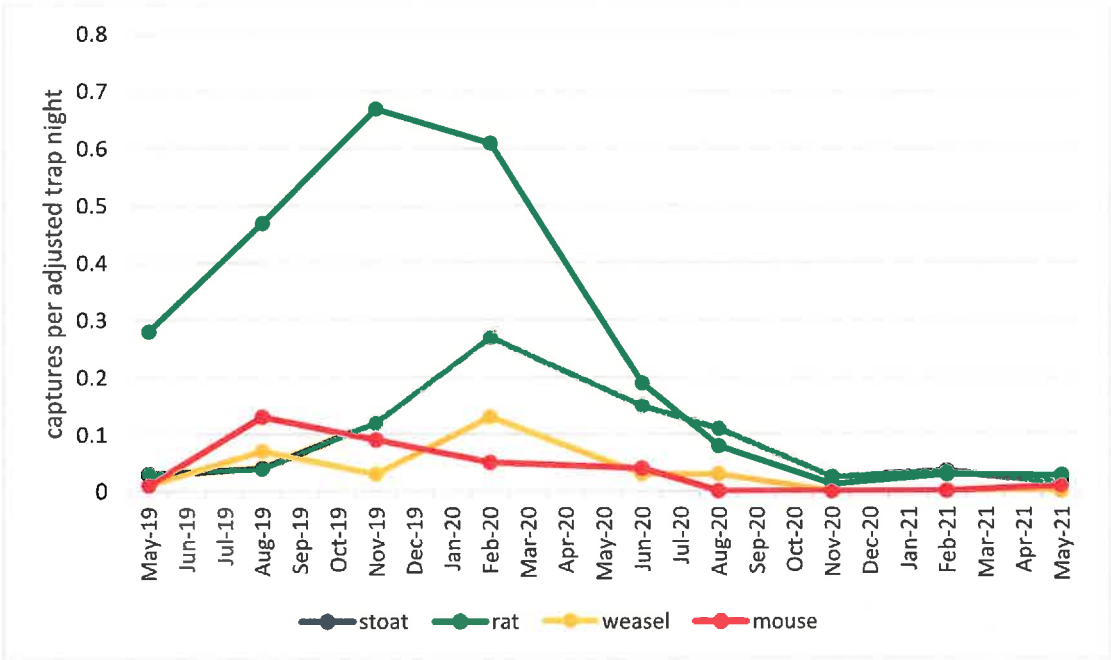

Figure 4: Waitutu trap network captures per adjusted trap night, May 2019 – May 2021.

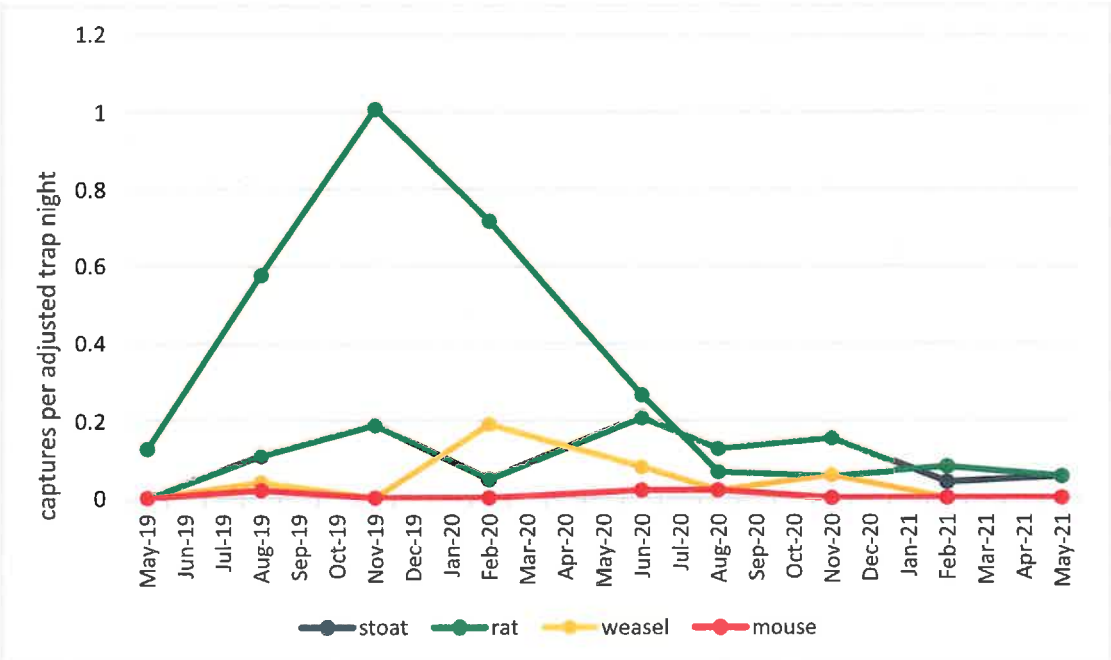

Figure 5: Poteriteri trap network captures per adjusted trap night, May 2019 – May 2021.

Trap captures declined rapidly following the application of aerial 1080 in early March 2020, and remained low into 2021.

Possum monitoring

Residual trap-catch (RTC) monitoring is performed to measure the relative density of possums. RTC monitoring follows a standardised protocol as described in the NPCA Publication: A1, Possum Population Monitoring using the Trap-Catch Method, October 2011 edition (http://www.npca.org.nz/). No RTC monitoring was performed during 2020/21. RTC may be performed in the future to determine possum densities and the need for control.

Outcome Monitoring

Prior to the initiation of trapping and aerial 1080 operations, monitoring work showed predator numbers within Waitutu were very high, and several threatened native species were on the brink of local extinction. Outcome monitoring shows that predator control work is reversing this trend for several species. Since trapping and aerial 1080 operations began, kaka have increased significantly, from 6 males to every female, to a healthy 1.7 males to every 1 female. Toutouwai (robin) numbers are thriving, and sightings of NZ falcons are increasing. General forest abundance of native species has increased.

Five Minute Bird Counts

Each November five-minute bird counts are conducted at 758 stations throughout the Waitutu forest. Results from the past 15 years are shown below (figures 7 and 8).

Mistletoe

Waitutu Forest was likely once the national stronghold for *Loranthaceous* mistletoe species, particularly beech mistletoe *Peraxilla colensoi, Peraxilla tetrepetala* and *Alepis flavida*. Possums established in moderate to high densities relatively late in Waitutu Forest compared to other parts of New Zealand, building up in numbers during the 1970s and 1980s.

Monitoring of mostly large individual mistletoe across Waitutu Forest suggests that between the mid-1990s and 2010 the bulk of the mistletoe population in Waitutu Forest was lost, due to predation by possums.

In Jan 2021 a mistletoe monitoring team found that on the whole mistletoes in monitoring plots appeared healthy, with plenty of fresh growth on a number of plants observed. Mortality of existing mistletoes seemed to have returned to natural levels (browse no longer contributing) with most mistletoes previously recorded being found again. Mistletoe plots will be remeasured in 2022, to give more insight into recruitment and condition.

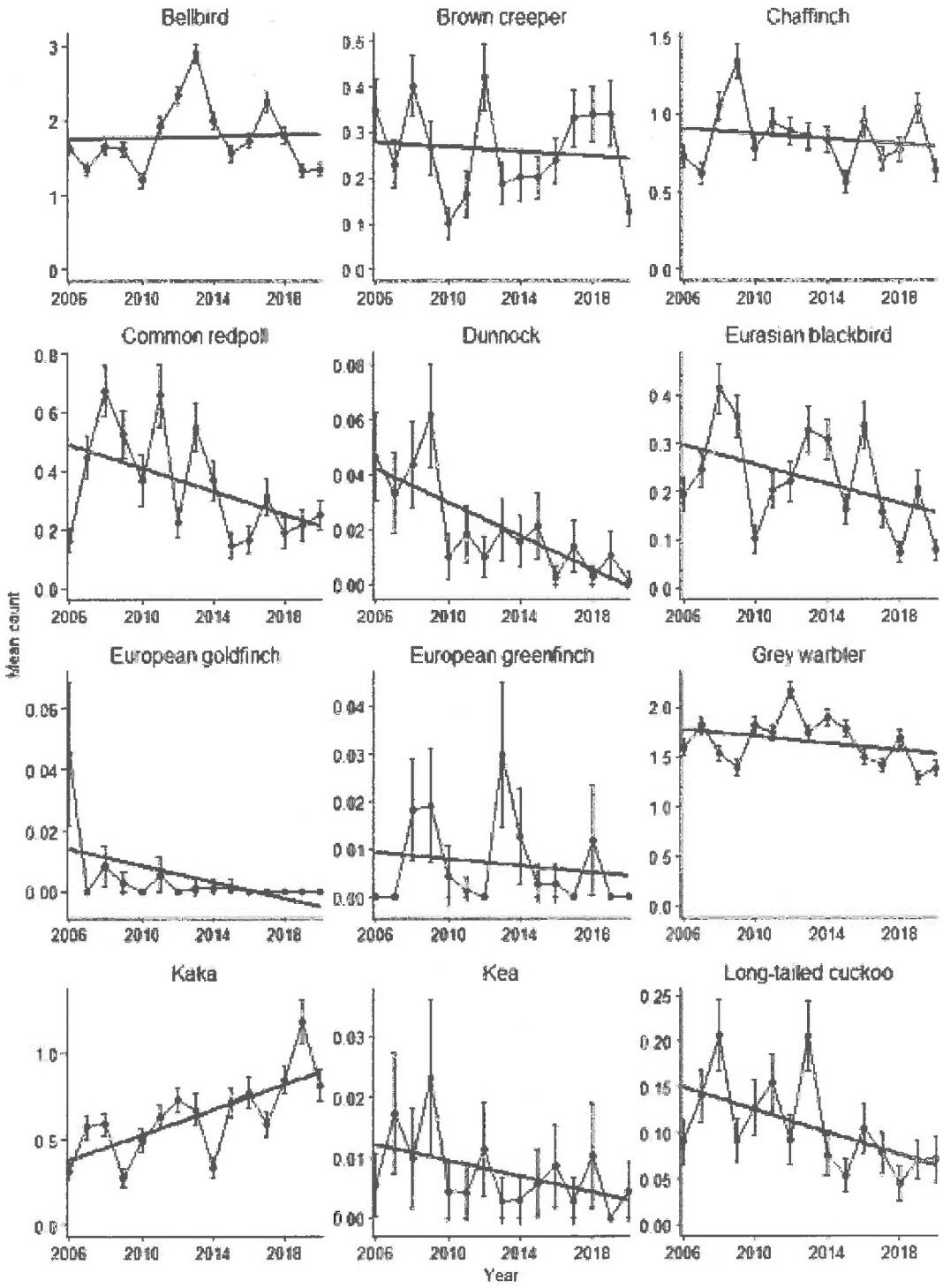

Figure 7: 5MBC mean counts by species, 2006-2020.

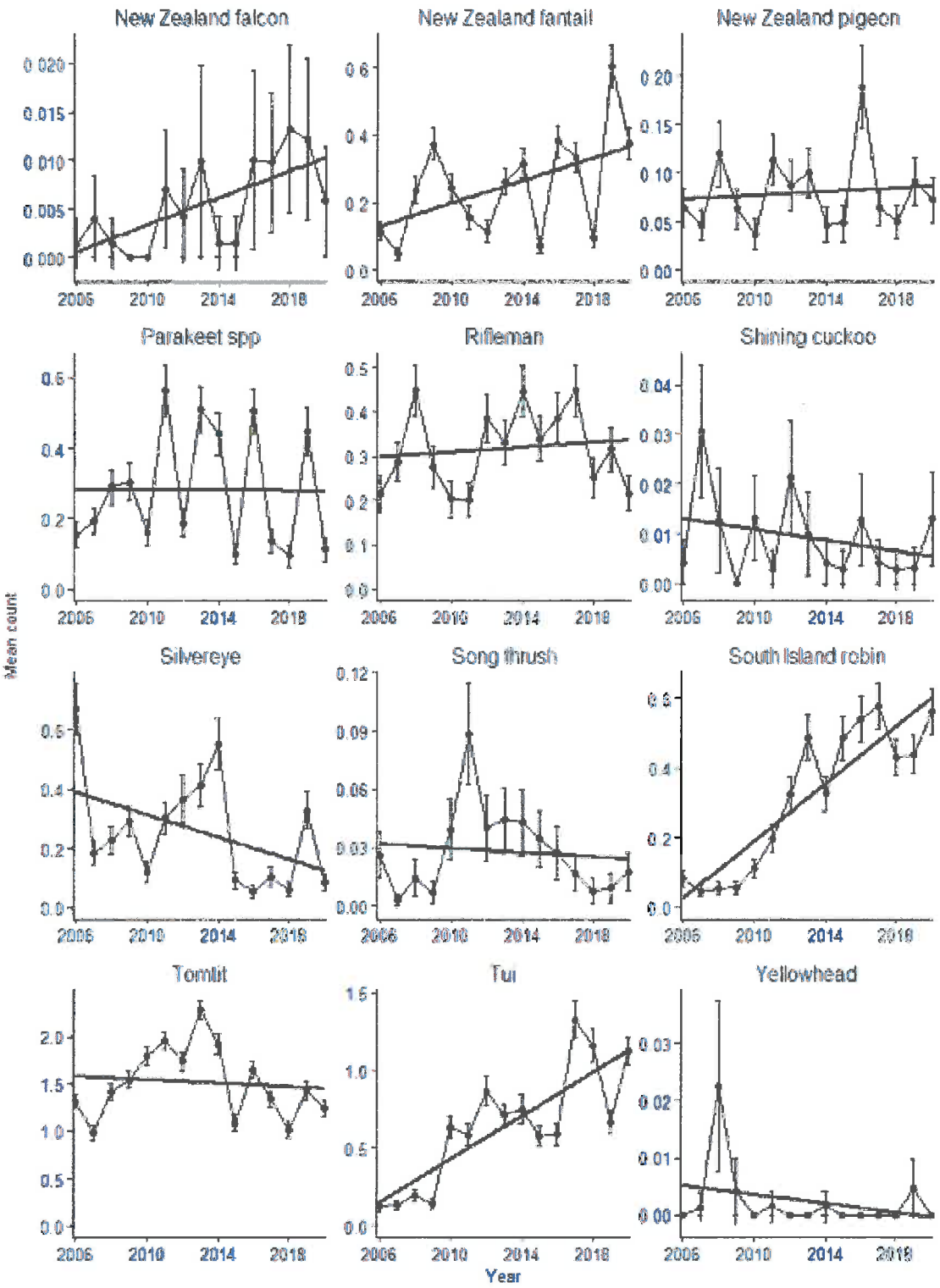

Figure 8: 5MBC mean counts by species, 2006-2020.

Future Plans and access to data

The short-term plan for monitoring in Waitutu is largely about consolidating progress to date, ensuring adequate resourcing to conduct core programmes and instituting maintenance on essential infrastructure.

Longer-term plans include the continued maintenance of core monitoring programmes (rodent, mustelid and possum monitoring; seed rain and bird counts), incorporation of a freshwater monitoring programme, and intensive monitoring of kaka demographics following 10 years of pest control in the area. A funding application is also in place to study the impact of weasels on native fauna, including Waitutu forest.
The Department of Conservation supports collaboration with the scientific community and is working to make data easily available to the public. Beech seedfall data is available online (https://docnewzealand.shinyapps.io/seedrain_shiny/), and we are investigating options for making trapping and tracking data more easily accessible. Researchers wanting to access these data are invited to get in touch with the Departement of Conservation Te Anau district office.