Rotoiti Nature Recovery Project Annual Report 2009-2010

Nelson Lakes Mainland Island, Nelson Lakes National Park

NOVEMBER 2010

Department of Conservation
Te Papa Atawhai

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Cover photo: Lake Rotoroa from Mt Misery, Nelson Lakes National Park, the non-treatment area for the Rotoiti Nature Recovery Project - by Grant Harper.

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Executive summary

BIODIVERSITY RESTORATION OBJECTIVES

Restore and maintain populations of kaka, mistletoe, *Pittosporum patulum* and *Powelliphanta* sp.

Mustelid control continued in the Mainland Island during 2009-10, and tracking tunnel monitoring showed that the <5% target was achieved in the treatment area, while mustelid abundance remained high at the Rotoroa non-treatment site.

The upgrade of predator traps, from Fenn Mk VI traps to DOC200s and DOC250s, was completed. The Friends of Rotoiti (FOR) predator control lines were similarly upgraded.

Possum control was increased and improved and cat control became more focussed this season. The recently developed kaka encounter rate appears to be providing comparable abundance data between years, although we now do not measure breeding success or recruitment. Extra mustelid traplines were established in Big Bush and the Core Area of the Mainland Island, which should provide more protection for nesting female kaka and chicks.

Monitoring of beech mistletoes and *Pittosporum patulum* was undertaken during 2009-10. Mistletoe species are healthy with only little browse noted. There was an apparent increase in the deer population (potential browsers of *Pittosporum patulum*), and a few deer were removed. *Powelliphanta* "Nelson Lakes" snail monitoring was not undertaken this season.

Establish and maintain populations of great spotted kiwi and other native species

Survival of radio-tagged great spotted kiwi was 100%. Fourteen adults were monitored. Four wild-raised chicks were monitored. Two possible nesting attempts occurred this reporting period but no chicks were subsequently located (Note: one chick found in July 2010). The Rotoiti Nature Recovery Project (RNRP) kiwi dog, 'Fen' proved to be very useful in finding several missing kiwi.

LEARNING OBJECTIVES

Test the effectiveness of rodent control tools in a beech forest system

There was no beech mast in autumn 2010. Tracking tunnel monitoring indicated an increase in rat abundance through 2009-10, probably in response to the small beech seedfall in mid-2009. Mice abundance

remained high throughout the reporting period. A proposed rat control operation using RatAbate™ paste (diphacinone) was postponed again after concern was raised by an NGO about effects on any possible population of short-tailed bats that may exist in the Core Area of the Mainland Island. South Island robin territory occupancy continues to be used as an outcome measure for rat control. The robin monitoring indicated a decline of robins within the standard survey area in 2009.

Test the effectiveness of wasp control tools

The toxin X-stingish™ was available for off-label experimental use through Landcare Research. The wasp population in the core area and St Arnaud township was successfully controlled to low levels, although wasp density was initially quite low. Experimental control from three poison nodes outside the control area indicated that wasp control could be effective up to 200m from poison bait stations.

Test the effectiveness of different translocation methods

Funding for an Operation Nest Egg (ONE) project was secured from the Bank of New Zealand Save the Kiwi Trust for the 2009-10 year. Three chicks, sourced from eggs removed from the Gouland Downs in November 2009, were released directly into the Mainland Island in March 2010. Two survived and now exceed the 'predator proof' 1kg weight threshold.

Determine long-term trends in bird abundance and forest health in response to ongoing management

Five-minute bird counts were undertaken at Lakehead, on the St Arnaud Range track; and at the Rotoroa non-treatment site. A scientific paper analysing trends in native bird abundance at Rotoroa using the five-minute bird count data for the past 35 years is now in press (Elliott et al. *in press*).

An alpine tussock seed fall transect was established at Mt Misery in early 2010. No seed was noted.

Systematically record observations of previously unreported native and non-native organisms in RNRP

A system for recording new species was established in 2010.

Facilitate research to improve our understanding of the ecology and management of beech forest and alpine systems

Two peer-reviewed scientific papers with a large component of RNRP data included were published this year (see below) and a survey for bats was also conducted within the Mainland Island.

Analyse and report on the effectiveness of management techniques and ensure that knowledge gained is transferred to the appropriate audiences to maximise conservation gain

The 2007-08 and 2008-09 annual reports were published in August 2009 and February 2010 respectively. The report on the effectiveness of the Fenn Mk VI vs DOC 200s was completed in late 2009, which showed no difference in the effectiveness of the two trap types. DOC200s are more humane and catch a wider weight range of pest species however. Two scientific papers, on native birds at Rotoroa, and effects of honeydew and introduced species on decomposer systems in beech forest were published in 2010. A MSc thesis on ship foraging under differing predation risk is close to completion. Staff also participated in the South Island Kiwi Hui.

COMMUNITY OBJECTIVES

Increase public knowledge, understanding and support for mainland islands and ecological restoration nationally through education, experience and participation

Participation remained high with Friends of Rotoiti (FOR) members contributing 323 workday equivalents. This involved trapping mustelids over more than 5000ha of land adjacent to the RNRP; and trapping rats over 250ha in St Arnaud township, Black Hill and the Brunner Peninsula. Another 31 volunteers (13 internationals and 18 New Zealanders) also contributed 120 workday equivalents, assisting with various projects, such as mustelid trapping and kiwi research, within the RNRP.

Advocacy and education work continued with two editions of the *Revive Rotoiti* newsletter published during the year. The Nelson Lakes National Park Visitor Centre continued to promote the RNRP through displays and the distribution of information.

This past year has seen a shift from general membership (with about half of the members actively volunteering) to the launch of a Supporters Group, which supports the FOR and RNRP with donations and sponsorship.

The RNRP PowerPoint show was updated and presented 24 times to a total of 760 students staying at Rotoiti Lodge. This PowerPoint show was also presented eight times to 240 others visitors to Nelson Lakes. Reflecting a new emphasis this year of telling the RNRP story by taking more groups on active walks, 814 students and visitors participated in 46 guided Honeydew Walks. Overall, this past year provided eight more opportunities for RNRP advocacy, with 200 less participants.

1. Introduction

The Rotoiti Nature Recovery Project (RNRP) is a 'Mainland Island' project established in 1996 to enable the recovery of a representative portion of an alpine honeydew beech (*Nothofagus*) forest ecosystem at Lake Rotoiti in Nelson Lakes National Park.

The project began with infrastructure development and baseline monitoring across 825 ha of forest on the western St Arnaud Range. Comprehensive pest control began in 1997. The project was established with control/ treatment sites so responses to management techniques at Lake Rotoiti could be compared with the control (non-treatment) site at nearby Lake Rotoroa. The first annual report covered the 1997-1998 business year.

South Island kaka (*Nestor meridonalis meridonalis*) were a key focus from the beginning of the project. DOC Science and Research Unit staff put considerable effort into radio-tracking kaka and monitoring nesting success in response to mustelid control. Kaka nesting success improved considerably and adult female mortality declined as a result of predator control when compared with non-treatment sites (Moorhouse et al. 2003).

In 2001-02 the extent of mustelid trapping was increased considerably and now over 5000 ha on the western St Arnaud Range and southern Big Bush is under sustained predator control as part of the Mainland Island. Trapping is also carried out by a local volunteer group, Friends of Rotoiti (FOR) in adjacent areas, encompassing some additional 5000 ha.

In addition to kaka, management of great spotted kiwi (*Apteryx haastii*) began in 2004 with the introduction of adult individuals from Gouland Downs in Kahurangi National Park. Additional introductions have ensured the successful establishment of a population. Some limited breeding has taken place, and kiwi chicks have survived, despite being known to be vulnerable to mustelid predation. An Operation Nest Egg (ONE) transfer of three hand-reared chicks, sourced from eggs removed from adults on the Gouland Downs, was carried out this year.

The RNRP has been a leader in large-scale control of introduced wasps (*Vespula* spp.) and, under a Landcare Research experimental use permit, the RNRP has been used as a trial site. Experiments have been undertaken with the poison Xtinguish™ in particular. Spacing of bait stations was the focus of this years research and effective reduction of wasp activity was achieved at much lower bait station density than previously deployed. Further trials of bait station density will continue in the next few years.

Rodent control has had a chequered history in the core area of the Mainland Island. Initial control of rodents, rats in particular, was effective with brodifacoum and 1080 between 1997 and 2000. After a Departmental review of the use of brodifacoum a switch to snap-trapping at a density of one trap/ha proved ineffective at knocking rodent numbers down, especially during rat plagues following a beech mast-seed event. No

rodent control has been undertaken since 2007-08, but plans for long term rat control are underway. Small passerines are expected to benefit from sustained rat control every spring. The continued use of five-minute bird counts and robin (*Petroica australis*) monitoring provides a response measure for rodent control.

Control of feral cats has been stepped up, although the use of Belise cat traps in chimney traps was discontinued due to weka being killed in these traps. Cage trapping has been instigated in spring and autumn, mainly in the Core Area and Lakehead area, where cats are known to be present. Continued trapping of possums, using Sentinel™ traps, has also been stepped up with new lines established. Other pest species under management include ungulates, pigs and hedgehogs using a mixture of techniques.

Monitoring of native species' responses to pest control include browse-sensitive plants - three species of beech mistletoe, the critically threatened understory plant *Pittosporum patulum*, and *Griselinea littoralis*. Beech seedfall and *Chionochloa* tussock flowering are monitored as 'ecological drivers' of rodent and subsequent mustelid population increases, and 20 x 20 vegetation plots are monitored to determine the trends and responses of native vegetation to multiple species pest control.

Invertebrate monitoring has included *Powelliphanta* snails, as well as beech scale insects and honeydew production due to their importance as 'ecological drivers' in the honeydew beech forest ecosystem.

In addition to the 'core work' undertaken by RNRP staff, several students conduct research in the Mainland Island each year, which adds to our understanding of the alpine beech forest ecosystem functioning and improves pest control. Some time and money from the RNRP budget is used to support these projects.

The involvement of the local and wider community in the RNRP is essential for the success of the project and there is a strong theme of advocacy and participation. Volunteers have undertaken hundreds of days of work in support of the Project over the past 13 years by Friends of Rotoiti (FOR), trainee rangers, Conservation Corp crews and the Over-50s tramping club. Staff have also given time for other departmental and community initiatives and attended workshops and conferences to transfer knowledge to the wider community. Advocacy has included presentations to many school and community groups, guided walks, displays in the Nelson Lakes Visitor Centre, information panels within the Mainland Island and various printed media. Many events and achievements from the RNRP have also been picked up by local and national media, including the listing as one of the Top 25 Ecological Restoration Sites in Australasia.

Although day to day work on the Mainland Island progresses in response to annual or multi-annual ecosystem cycles, no operation of this scale can operate without a vision and objectives to provide guidance in the medium term. Therefore the publication of the Rotoiti Nature Recovery Project Strategic Plan for 2008-2013 (Brown and Gasson 2008) has provided the planning framework and goals for the operation for the next four to five years and has highlighted the three major themes running through the project, namely;

Research, learning and knowledge transfer to a burgeoning number of ecological research projects nationwide.

Protecting and restoring biodiversity for its intrinsic value

Advocating the value of ecological restoration to the public

It is essential these themes remain the core values for ongoing restoration work within the Rotoiti Mainland Island for the future. A Technical Advisory Group and external advisors contribute an essential role in overseeing and guiding these themes.

2. Biodiversity restoration objectives

2.1 RESTORE AND MAINTAIN POPULATIONS OF KAKA, MISTLETOE, *PITTOSPORUM PATULUM* AND *POWELLIPHANTA* SP.

2.1.1 Introduction

The proposed RNRP Strategic Plan 2008-2013 identifies six threatened species will be actively maintained for their biodiversity values. These populations and their New Zealand Threat Classification System rankings are:

- South Island kaka *Nestor meridionalis meridionalis*, Category 2, Nationally endangered;
- the beech mistletoes *Peraxilla colensoi*, *P. tetrapetala* and *Alepis flavida* all Category 4, Declining;
- the heteroblastic tree *Pittosporum patulum,* Category 2, Nationally endangered;
- the carnivorous land snail *Powelliphanta* "Nelson Lakes", Category 7, Range restricted.

The RNRP contains some further threatened species that may benefit from pest control. The above populations were specifically identified in the Strategic Plan 2008-2013 because a considerable amount of work has already been invested into monitoring and managing them through the preceding decade.

The kaka is an endemic forest parrot which is threatened by predation. Stoats (*Mustela erminea*) are the main predator of kaka, but all three introduced mustelids (stoats, ferrets and weasels) are targeted by mustelid control. Mustelid trapping has been shown to protect the local kaka population (Moorhouse et al. 2003), and mustelid control will continue for the foreseeable future. An upgrade from Fenn MkVI traps to DOC 200 and DOC 250 traps commenced in 2007 and was completed in late 2009. Feral cat control, although localised to date, may protect fledging kaka chicks which spend up to three days on the ground between emerging from their nest holes and flying. More intensive cat control project is now in place. Other native bird species are likely to benefit from predator control, particularly great spotted kiwi and New Zealand falcon, which nest on the ground.

The beech mistletoes, *Pittosporum patulum* and snails *Powelliphanta* "Nelson Lakes" are all threatened as a result of predation by the introduced brushtail possum (*Trichosurus vulpecula*). Possum numbers have been reduced and suppressed within the Mainland Island through a sustained poisoning and trapping project. As with mustelid control,

possum control is considered to be effective, and will continue for the foreseeable future in order to protect biodiversity values.

In addition to being threatened by possums, *P. patulum* and *Powelliphanta* "Nelson Lakes" populations may be threatened by red deer (*Cervus elaphus scoticus*). Detrimental browsing of juvenile *P. patulum* plants has been attributed to red deer. Red deer may deleteriously impact *Powelliphanta* habitat through concentrated browsing and trampling in the mountain beech/tussock ecotone that is favoured by both deer and *Powelliphanta* "Nelson Lakes". Deer control is currently not part of the RNRP pest control programme, but has been supplemented by the initiation of limited access to the Mainland Island for recreational hunters in May 2010, principally through local NZ Deerstalker branch members in a volunteer capacity. Hunters are allocated one of four blocks within the area and all animals shot recorded.

Another probable problem species for these high montane and alpine species are hares (*Lupus europeaus*) that are likely to degrade habitat.

2.1.2 Mustelid (stoat, ferret and weasel) control and monitoring

RNRP mustelid control methods

Twenty-four mustelid trap lines were maintained, encompassing the 5000ha project area in 800ha blocks. Nine traps along the St Arnaud Range southern extension were permanently removed during the summer after discussions about their hazardous locations and low stoat capture rates. The RNRP is currently running around 920 traps spread over 100km of trap line. During the summer and autumn when stoat numbers are high, due to the dispersal of young, trap lines are checked fortnightly. Intervals between trap checks become extended to up to six weeks over the winter and early spring when very few stoats are captured.

The DOC200 trap up-grade was completed this year, replacing every remaining Fenn MK VI trap with either DOC 200 or DOC 250 traps. The latter traps have replaced Fenn traps as they are as effective whilst being more humane and catch a wider range of pest species due to their lower trigger set-off weight.

Line replacement and new lines

The 'Mountainbike' trap-line on the western boundary of the Mainland Island was removed in September 2009 as a large portion of it was sited within a forestry plantation that was logged from October 2009 onwards. This line was replaced with the 'Dogleg' line which was of a similar length and was sited within either beech or kānuka forest adjacent to the forestry block but further to the east (Fig. 1).

An exercise to assess the 'effective trapping radii' of the trap-lines was carried out in October 2009. A 700m buffer was placed around all the trap-lines (Fig. 2) to give an indication of gaps in coverage for stoat control. The 700m radius was a minimum figure based on a female stoat range length during a beech mast (Murphy & Dowding 1995). Range

lengths of most male stoats would be larger than 700m at all times, and female stoats would exceed 700m when rodents are at low density, so for most seasons outside a beech mast year stoats entering the Mainland Island should encounter a trap box as they traverse their home range.

The spacing between traps remains 100m apart. All traps are single set, baited with white hen's eggs and enclosed within wooden boxes. The box design is 'best practice' length for use in weka and kiwi areas. A trial to test the attractiveness of Erayz™ was run in 2009-10 to test the effectiveness of this lure.

A field trial ran during the 2008-09 financial year testing the efficacy of Fenn Mk VI traps vs. DOC 200 traps at catching stoats was completed and written up (Brow et al. 2009).

Figure 1: Location of RNRP and FOR trap lines in June 2010, showing removed traplines.

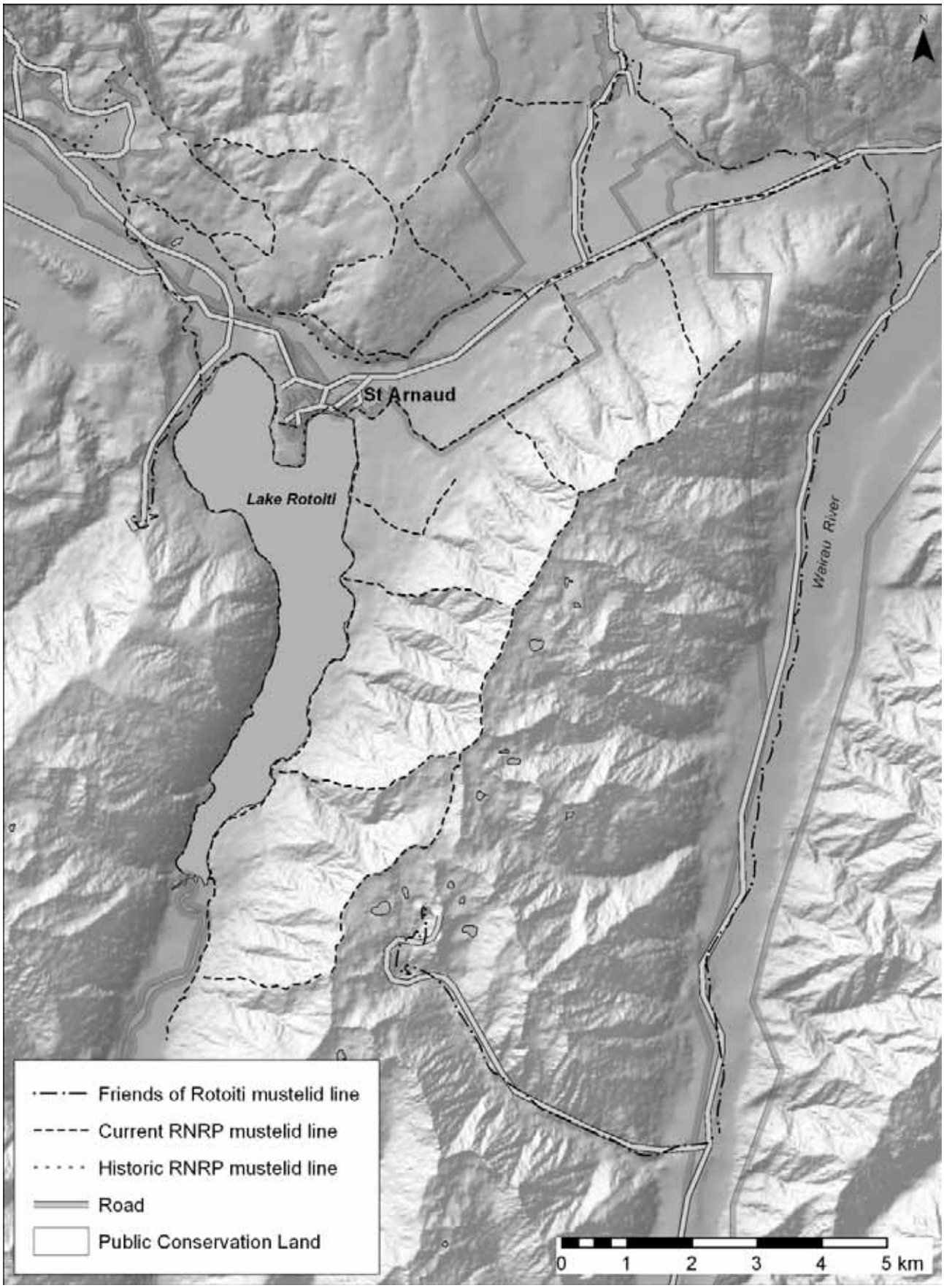
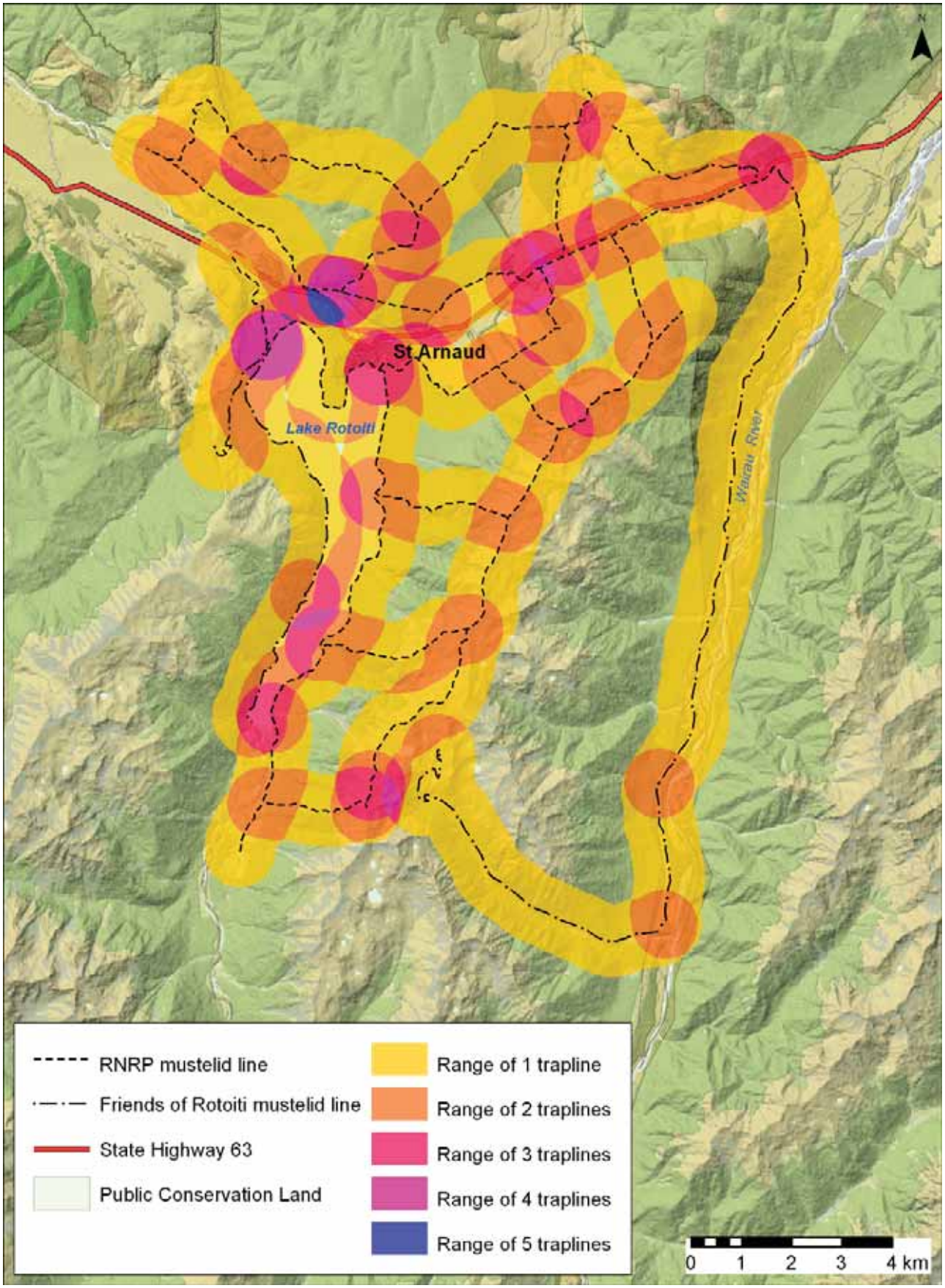


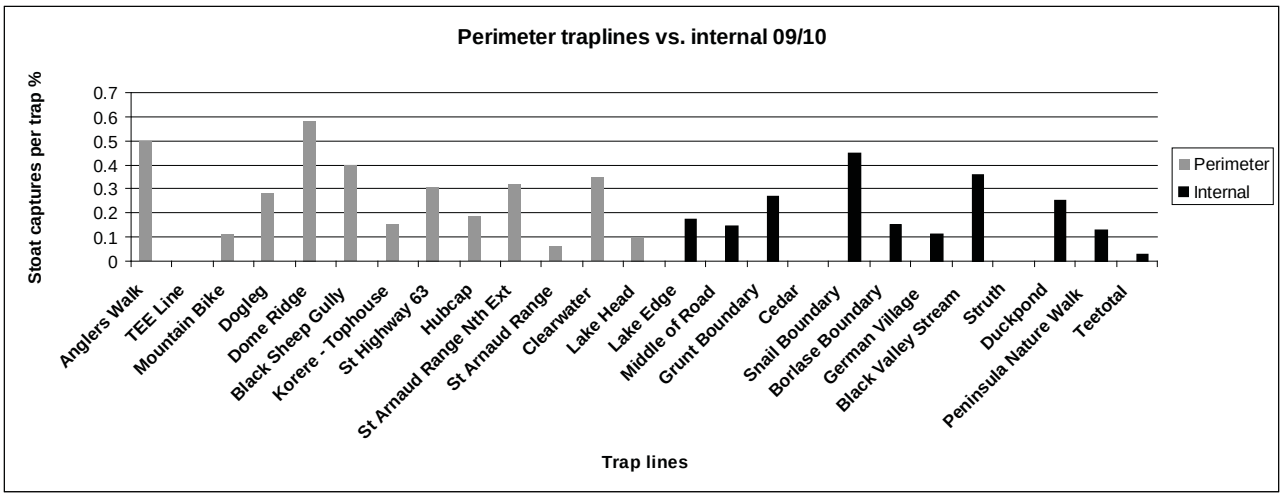
Figure 2: Map of RNRP trap lines as at spring 2009 showing 'effective trapping radii' of the traplines.



RNRP mustelid control results

This year 199 stoats, 73 weasels and two ferrets were captured. The stoat and ferret figures were around the average capture rates for the extended 5000ha mustelid controlled area. However the number of weasels is unprecedented with the highest previous captures only 32 during the 2006-2007 season and the yearly average is approximately 25 (Fig. 3). The lighter set-off weight of DOC200's over Mk 6 Fenns is likely to have contributed to the increase in weasel captures.

Figure 3: Percentage captures of stoats in RNRP perimeter and internal traplines over 2009-10



Of the 199 stoats captured for the 2009-10 season 124 were caught in the perimeter traps and the remaining 75 within the internal trap lines. The perimeter lines 'Dome Ridge', 'Northern Extension' and 'Clearwater' were again consistent with reasonable capture rates. 'Anglers Walk' and 'Black Sheep Gully' both have increased capture rates. So far the new 'Dogleg' line is looking like a suitable replacement for the now decommissioned 'Mountain Bike' that was only run for the first couple of months of the season. Within the internal trap lines 'Snail Boundary', the 'Black Valley Stream' and the 'Grunt Boundary' lines had the highest capture rates. Although the capture rate for 'Duckpond' line was less than last season it still had reasonable captures. The highest capture rates for the internal lines were during the summer and autumn, probably due to reinvasion from outside the trapped area (Figs 4 & 5). The 'Dome Ridge' and 'Black Sheep Gully' trap-lines in Big Bush were the only lines to trap stoats in all seasons.

Non-target species caught this year were:

- Rats 707
- Hedgehogs 134
- Rabbits 48
- Mice 28
- Cats 12
- Birds 5
- Possum 1

No weka were captured in the mustelid traps this season.

Figure 4: Map of stoat captures on RNRP traplines for Dec 2009 - Feb 2010.

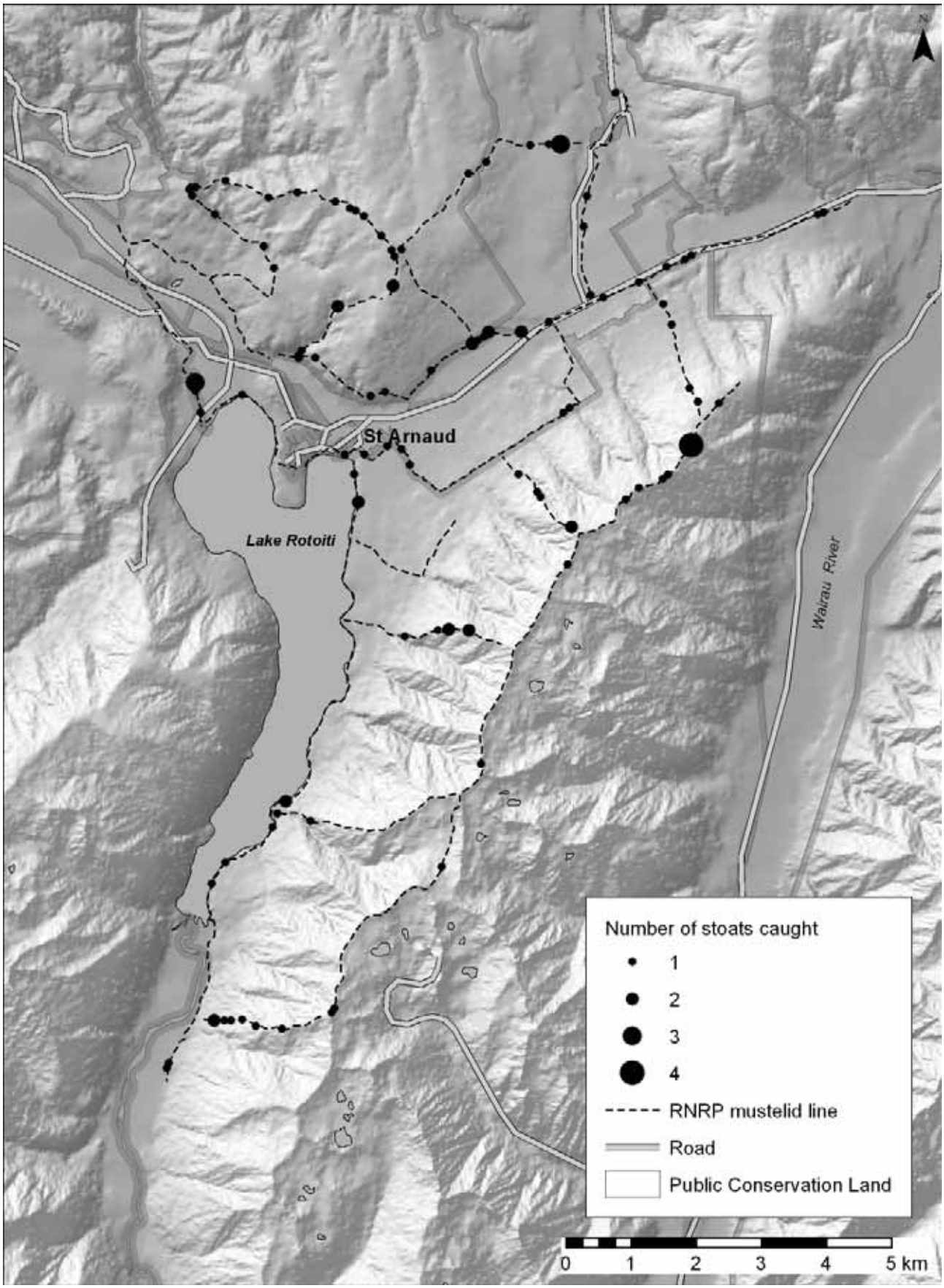


Figure 5: Map of stoat captures on RNRP traplines for March - May 2010.

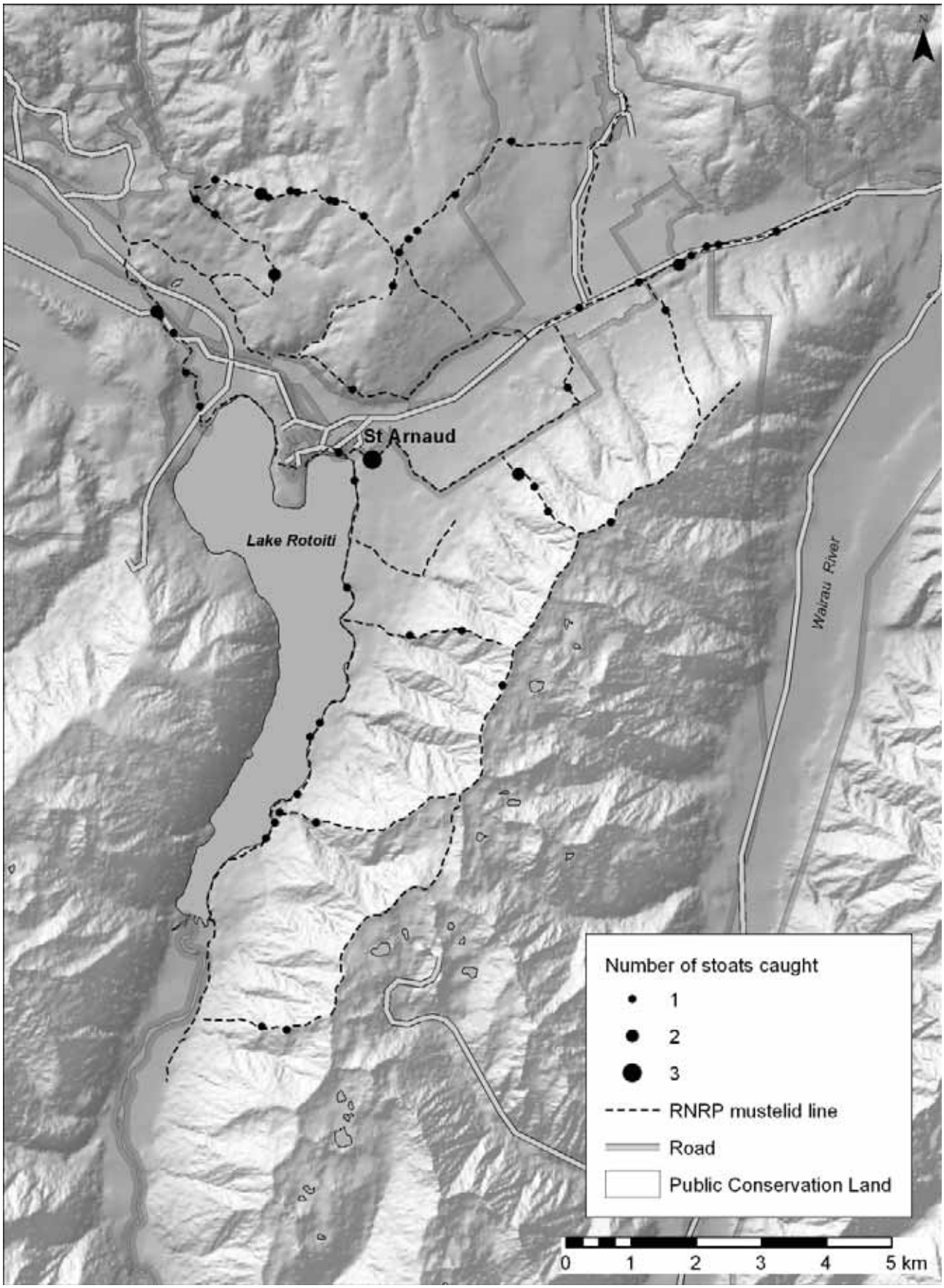


Figure 6: Map of stoat captures on RNRP trap lines for July-August 2009 & June 2010.

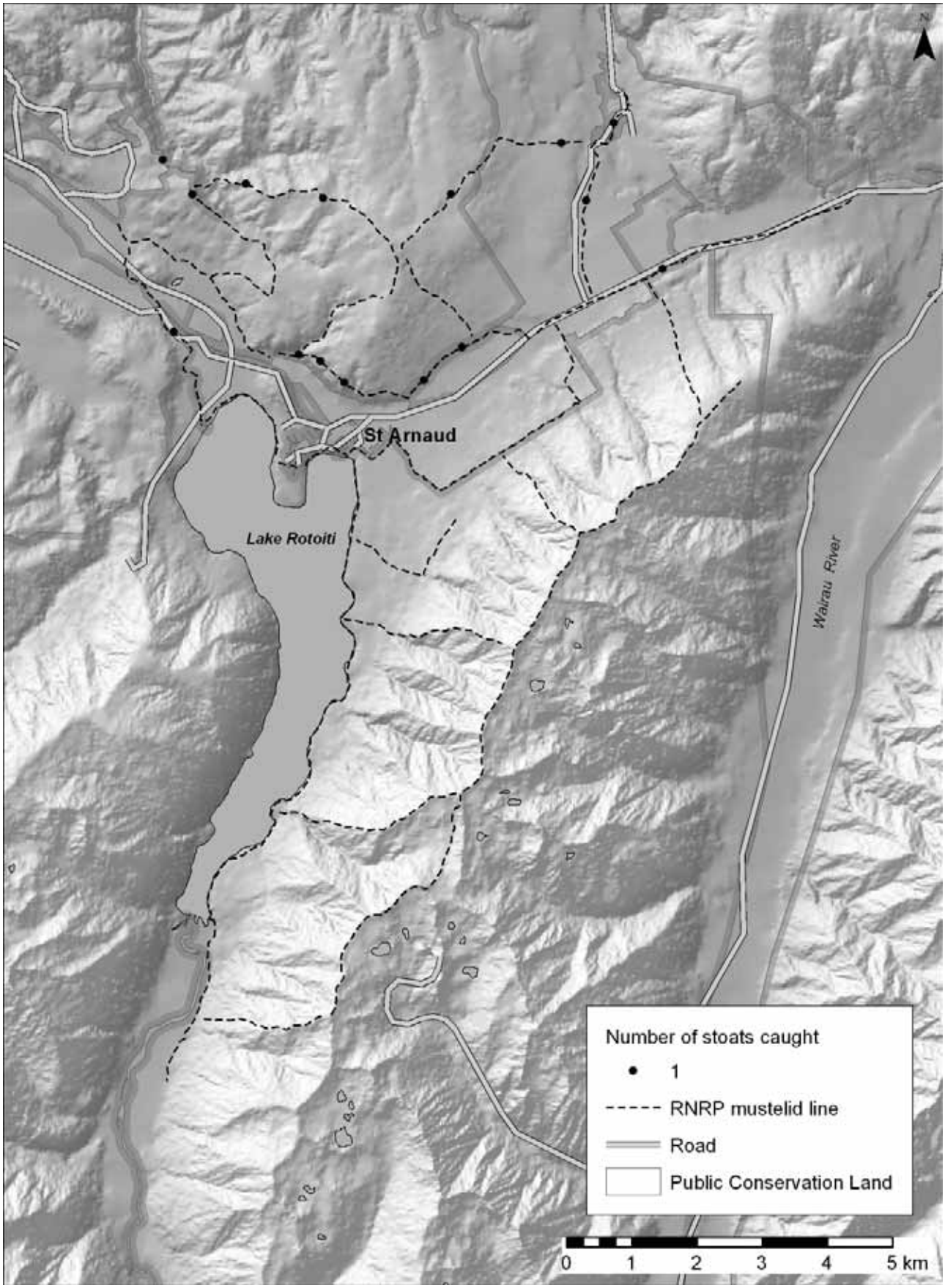


Figure 7: Map of stoat captures on RNRP trap lines for September – November .2009

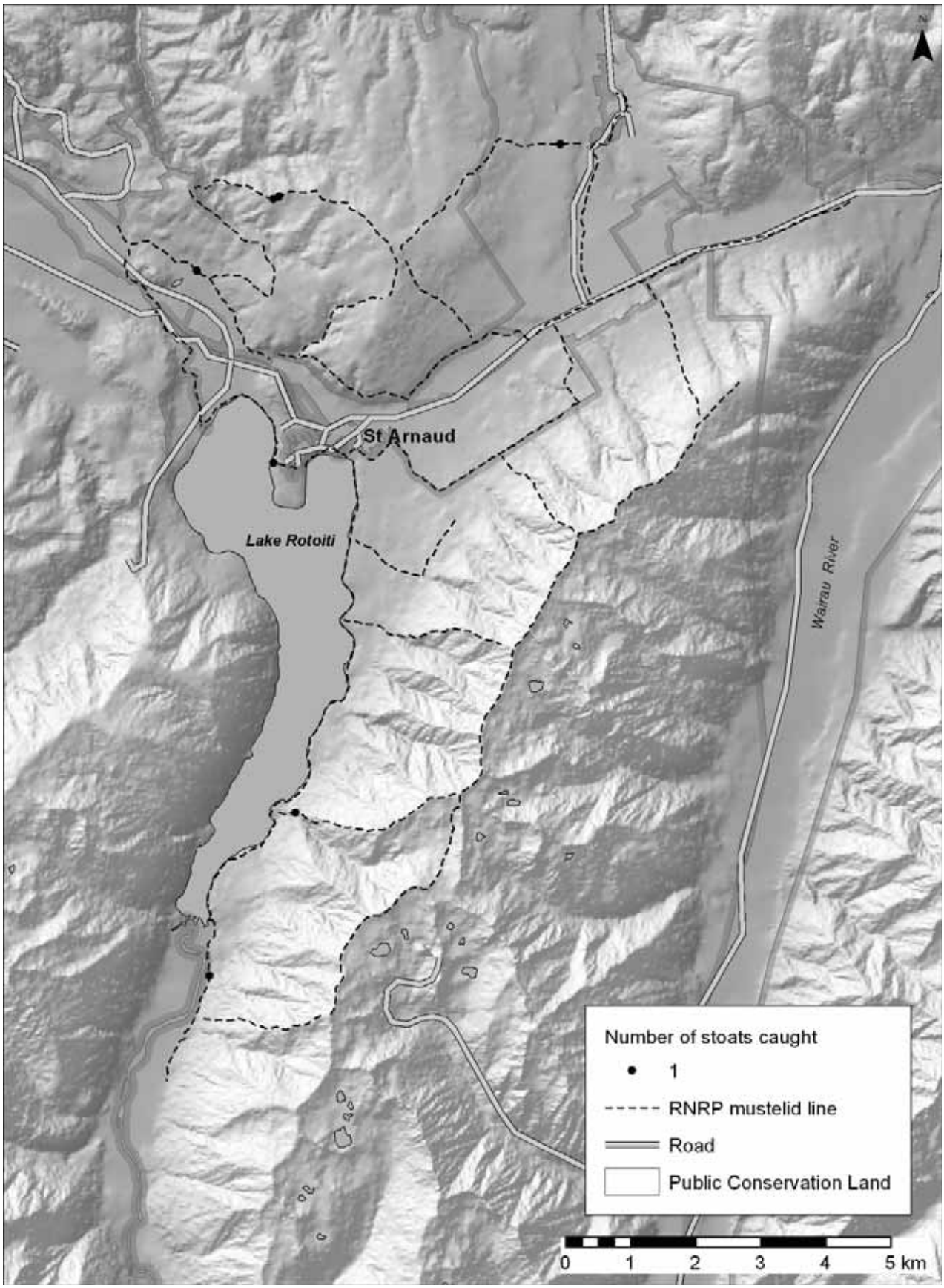
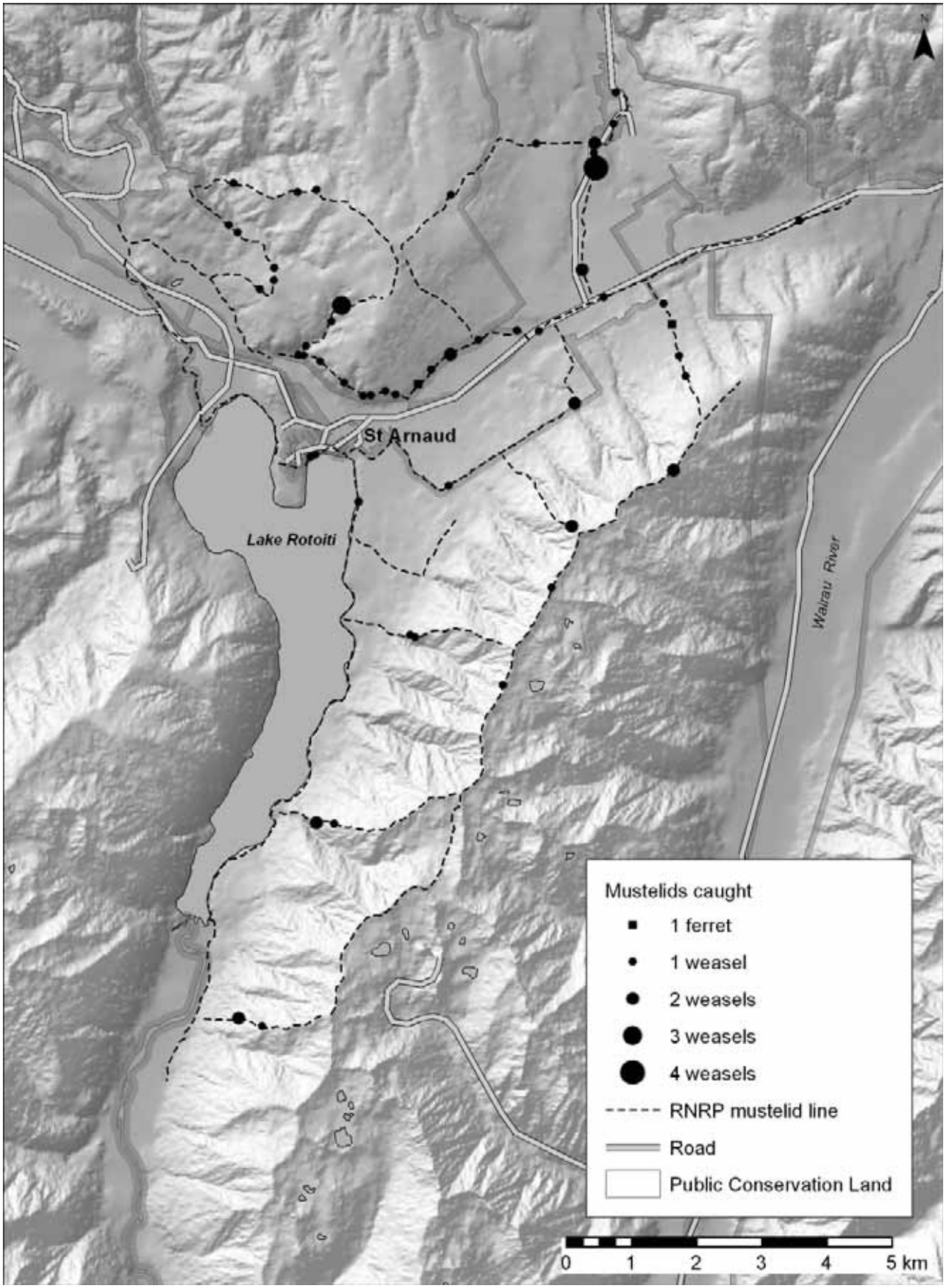


Figure 8: Map of weasel and ferret captures on RNRP traplines for 2009-2010.



Additional lines:

As an outcome of the 'effective trapping radii' exercise, some lines were realigned and a few new trap lines were established. The trap line around the Brunner peninsula was shortened and re-routed over the peninsula. The additional traps remaining from this exercise were set out within the Core Area as the 2.2 km 'Cedar' line. Another line was established within the Teetotal area to the Buller bridge (Tee line) and extra traps put out at the Buller Bridge on SH1. An additional trap line ('Struth') was laid from Black Valley Stream line to the Dome/Black Sheep gully junction within Big Bush, which should provide extra protection for kaka nesting in this area.

Fenn Mk VI / DOC200 trap field trial:

A mixture of 214 DOC200 traps and 218 Fenn Mk VI traps, each in single set wooden trap tunnels, were placed alternately along the same trap lines. Each trap was baited with a hen's egg as a lure. A total of 20 checks were carried out. The 'relative risk' of a DOC200 set catching a stoat (or stoats) versus a Fenn Mk VI set at catching a stoat (or stoats) on the 11 trap-lines was calculated using the Medcalc Software V11.11© package; P values were based upon the *z* statistic.

The 20 Fenn Mk VIs caught 27 stoats and 26 DOC200 trap sets caught 28 stoats. There was no significant difference between the 'relative risk' of a DOC200 set catching a stoat (or stoats) vs. a Fenn Mk VI set catching a stoat (or stoats); relative risk = 1.324 (95% CI = 0.763 to 2.299), z = 0.998, P = 0.318.

Non-target catches included 42 rats caught in 40 Fenn trap sets and 115 caught in 66 DOC200 sets. 79 hedgehogs (*Erinaceus europaeus*) were caught in 45 Fenn trap sets and 42 were caught in 22 DOC200 sets. The DOC200s were significantly more likely to catch a rat (or rats) than the Fenns (relative risk = 1.681 (95% CI = 1.191 to 2.372), z = 2.955, P = 0.003), but caught significantly fewer hedgehogs (relative risk = 0.498 (95% CI = 0.31 to 0.8), z = 2.884, P = 0.004).

The DOC200 traps set in new wooden tunnels caught similar proportions of stoats as Fenn MK VI traps despite the latter having been in place for many years with many having previously trapped stoats or rats. The DOC200 sets had not caught any animals prior to the trial. That said, the DOC200s caught significantly more rats than the Fenn traps, which may have subsequently been more attractive to stoats, thus creating a positive bias towards the DOC200s. The possibility of increased trapping success with previously successful traps requires testing with a large sample size of traps. The results suggested that new single set DOC 200 catches stoats with similar success to a weathered Fenn Mk VI trap. Future trials should consider the difference in trapping success between traps of both kinds that have been weathered and/or have previously captured animals.

Friends of Rotoiti mustelid control methods

As in the previous year, the main three mustelid trapping lines have been maintained as a buffer to the Mainland Island, with another additional line set up on Tophouse Road. There are now a total of 362 traps in

operation, spaced 100m apart. All traps, with the exception of the Whisky Falls bait trial are baited with white chicken eggs.

Rainbow Valley line (including a seasonal deployment up the ski-field road): The longest line with 221 traps is the Rainbow Valley line, including the 68 traps which are positioned along the Rainbow Skifield Road during the warmer months. These seasonal traps were put out in October 2009 and removed for the winter in June 2010. All the odd numbers are currently DOC 250 traps and even numbers have now all been replaced with the new DOC200 traps. The replacement of all Fenn traps has been a major project, with all traps changed over to DOC traps at the beginning of March 2010.

Whisky Falls line: All 81 traps are DOC 200s. A bait trial was commenced in December 2008 comparing long-life rabbit based polymer bait with standard white chicken eggs. The 41 odd-numbered traps have the polymer baits and the 40 even-numbered traps were baited with eggs. This trial is to determine which bait type attracts a greater proportion of stoats to DOC 200 traps. This trial is continuing until December 2010. The field work is being carried out by FOR, under the guidance of Biodiversity Ranger, Kate Steffens.

Mt Robert line: All 17 traps are DOC200s.

Tophouse Road: This new line of 43 DOC200s was set up in August 2009 to provide extra protection for the northern portion of the Mainland Island. This trapping line runs through farmland that borders the top north eastern side of the Mainland Island, with all traps positioned along the road edge.

Trap check frequency differs to the RNRP schedule, with checks occurring weekly in the warmer months from December - February, fortnightly during March & April and October & November, and monthly through the remaining colder months of the year. Bait changes occur every eight weeks. Results of trapping are shown below (Table 1 & Fig. 9)

Friends of Rotoiti mustelid control results

TABLE 1: FRIENDS OF ROTOITI TRAP LINES - MUSTELID CAPTURES 2009-10

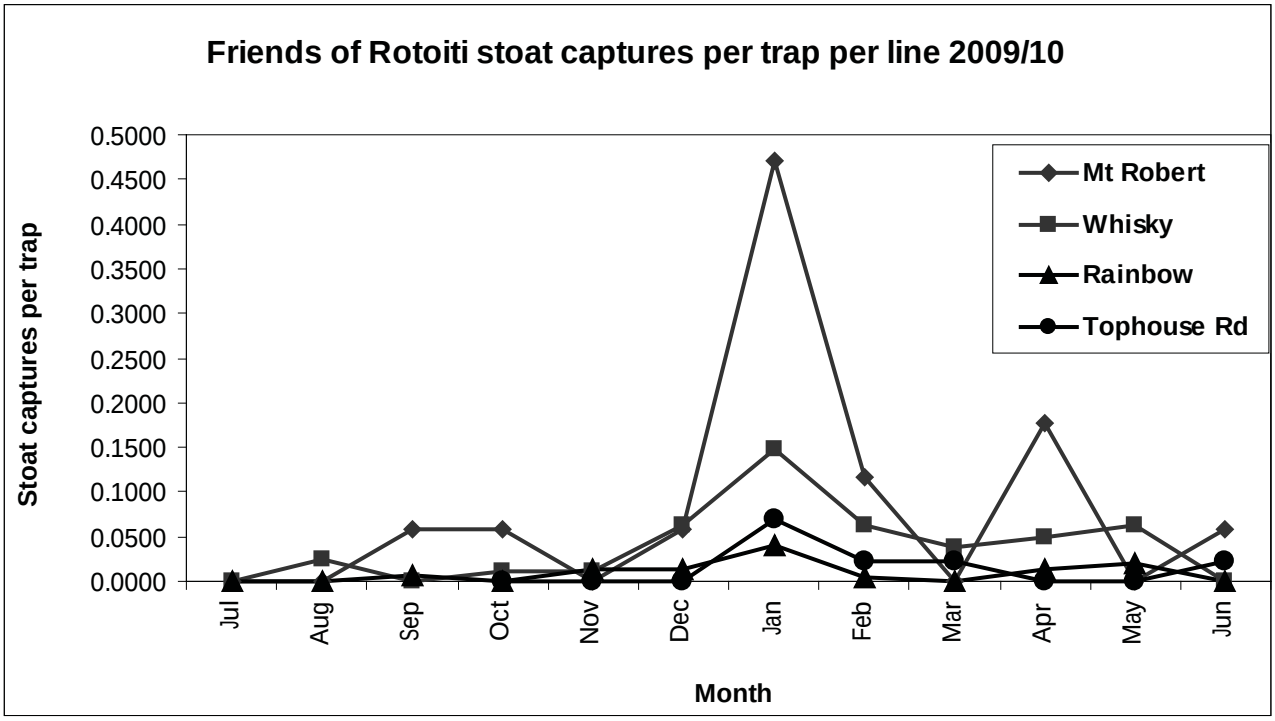
MONTH	STOAT	WEASEL	FERRET
July	0	0	0
August	2	0	0
September	1	0	1
October	2	0	0
November	2	3	0
December	13	0	0
January	43	2	0
February	14	1	3
March	6	2	3
April	14	1	0
May	7	1	0
June	4	0	0
Totals	108	10	7

The following captures were non-target species caught as "by-catch" in the Friends of Rotoiti mustelid traps.

- Hedgehogs 71
- Possums 18
- Rats 218
- Rabbits 16
- Cats 7
- Mice 4

There were no weka or other bird species caught in the mustelid traps this year.

Figure 9: Friends of Rotoiti stoat capture per trap per line 2009-2010.



RNRP mustelid population monitoring methods

Mustelid monitoring is used to compare mustelid tracking rates between the Rotoiti treatment site (trapping) and the Rotoroa non-treatment site (no trapping). The Rotoiti site includes the Core Area, Lakehead and Big Bush lines.

Mustelid monitoring is carried out using standard coreflute tracking tunnels with Trakka™ inked cards and rabbit meat bait set to the best practice method described by Gillies and Williams (2004). Refer to the 'RNRP Field Manual 09-10' for further details.

RNRP mustelid population monitoring results

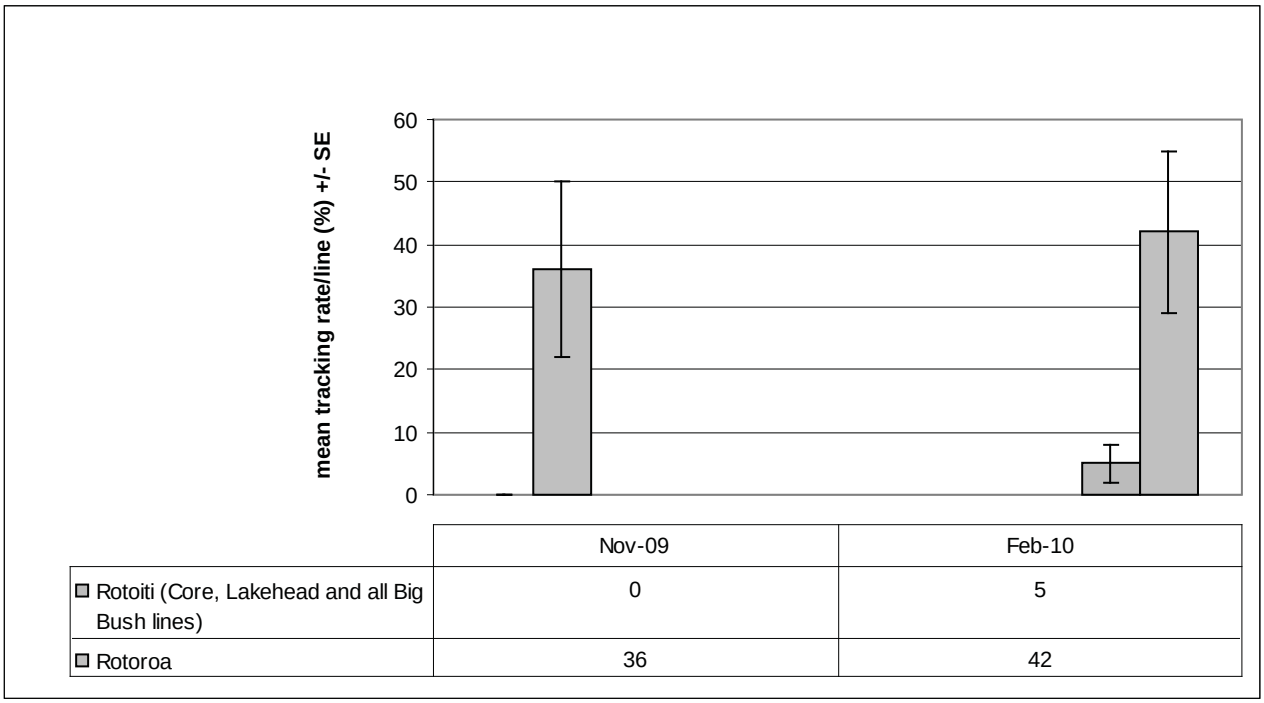
Tracking Tunnels were set for mustelids in November 2009 and February 2010 (Fig. 10).

Mustelid tracking at the Rotoiti site remained at or below the recommended <5% mean tracking rate/line throughout 20009-10, which research has shown to be of most benefit to kaka populations (Greene et al. 2004).

Of note was the mouse plague and the increase in the number of prints for hedgehogs, especially around the Teetotal line.

Detailed tracking tunnel descriptions, results and graphs and are found in the Excel document 'Tracking Calculator 2007-08'.

Figure 10: Tracking rates for mustelids recorded by the RNRP in 2009-10.



	Nov-09	Feb-10
Rotoiti (Core, Lakehead and all Big Bush lines)	0	5
Rotoroa	36	42

Discussion

As with most seasons, the trapping results produced a few surprises. The very high number of weasels trapped was unexpected. There are two possible, not mutually exclusive, reasons for this. One was the very high numbers of mice recorded all year, which weasels may have responded to. The other reason was the likely increased trap success of DOC200s compared with Fenn Mk VI traps. This question may be resolved when mice numbers decline. If we continue to catch large numbers of weasels then the latter reason would appear to be the principal one. This result would be a fitting endnote to the outcome of the Trap Efficacy Trial completed in 2009. DOC200s were as, or possibly more, efficient at trapping stoats as the Fenn Mk VIs they replaced.

Rat by-catch this year was the second highest recorded, and is likely, along with the high mice numbers, to be related to the beech seed mast that occurred in autumn 2009.

There were fewer hedgehogs captures this year, probably as a response to the weka proofing of the traps. The tighter holes may now exclude largely hedgehogs.

The rearrangement of existing lines and inclusion of new lines should hopefully reduce mustelid tracking rates even further and improve protection for native species within the Mainland Island. The Cedar and Struth lines should be particularly effective, with the former also adding protection for the ONE kiwi chicks being released in the Core Area.

2.1.3 Feral cat control and monitoring

Methods

The Lake Edge line of twin Belize Super X220 cat kill-traps set in chimney tunnel boxes ('Chimney traps') was removed in October 2009, due to by catch of two weka. In lieu of the kill traps, 15 Havahart™ cage traps were purchased. Live trapping within the Core Area was carried out initially due to the release of kiwi chicks in to the area. Live trapping was also carried out at Lakehead where cat scats are regularly encountered. Trapped cats were shot with a .22 rifle. In addition to the targeted trapping, the DOC200s on the stoat trap lines continued to catch juvenile cats.

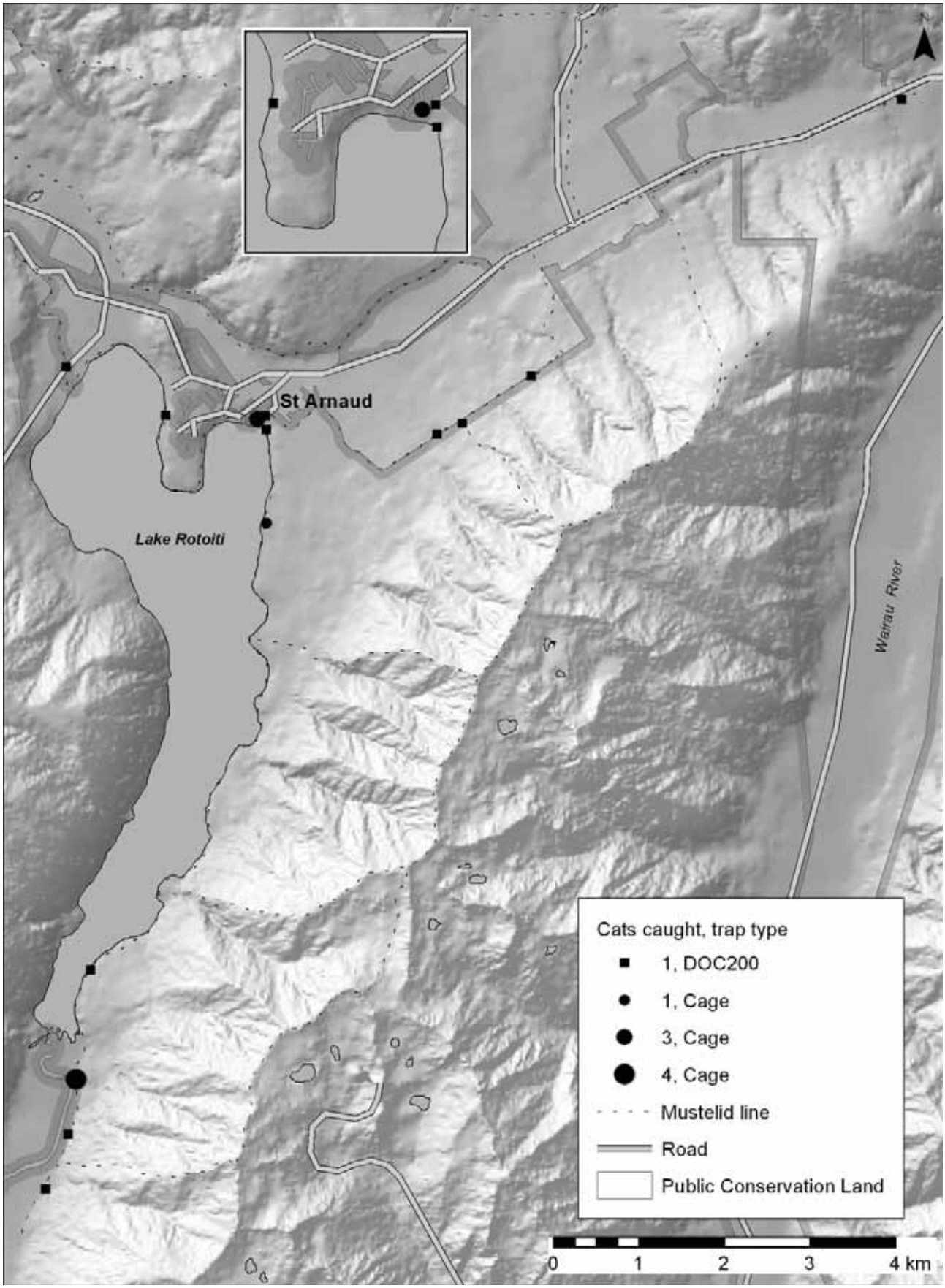
Results

In total 20 feral cats were removed from the RNRP this season using a variety of methods (Fig. 11). In comparison, no cats were caught in the chimney traps in the four months of operation prior to removal this season, suggesting they were not very effective or not placed where cats were in high densities. Eight cats were caught using cage traps. Four in the Kerr Bay/Loop track area and four at Lakehead. The DOC200s on the stoat trap lines caught 12 small cats.

Discussion

Feral cat captures were highest in three places: adjacent to St Arnaud, bordering farmland and at Lakehead. These areas will continue to be targeted with cage trapping next season to reduce cat density in or adjacent to the Mainland Island. The removal of the chimney traps was disappointing as a lot of establishment work was expended but the weka captures precluded the use of Belise cat traps in chimney sets. Sourcing weka-proof cat kill traps would be ideal, negating the need for daily trap checks. Cage trapping is the only safe option at this stage, and appears to have been more effective than chimney traps. Cage traps will be redeployed in spring and autumn at sites of previously high cat captures and where ONE kiwi chicks are to be released. The continued removal of small cats by the stoat traps is very useful and will inform cage trap deployment next season.

Figure 11: Map of RNRP cat captures in 2009-2010.



2.1.4 Possum control and monitoring

Methods

Kill trapping was maintained on the Snail, Grunt and MOR mustelid trap lines using Warrior kill traps baited with cinnamon cereal baits. The Borlase Boundary trap line was also maintained using BMI traps.

The German Village line was removed as a local community group has established a possum trapping regime adjacent to this area. Possum control was increased within the Core Area with the use of Sentinel kill traps due to the increased possum populations indicated by the waxtag monitoring undertaken in the 08/09 year.

Replacement of all Warrior traps with Sentinel traps was undertaken part way through the year due to the issues around rat interference on baits and the lower capture rates found with the use of Warrior traps.

Additional trap lines were established throughout the RNRP using a rolling front method focusing on areas that had not previously had any possum control.

Results

Possum captures were the highest recorded for the RNRP with 101 possums killed, in comparison to 13 in 2008-09. This increase in captures is probably due to increased effort and that some areas had either very little or nil previous possum control, although the previous waxtag monitoring undertaken in 2008-09 did indicate a rise in possum populations within the Core Area of the Mainland Island.

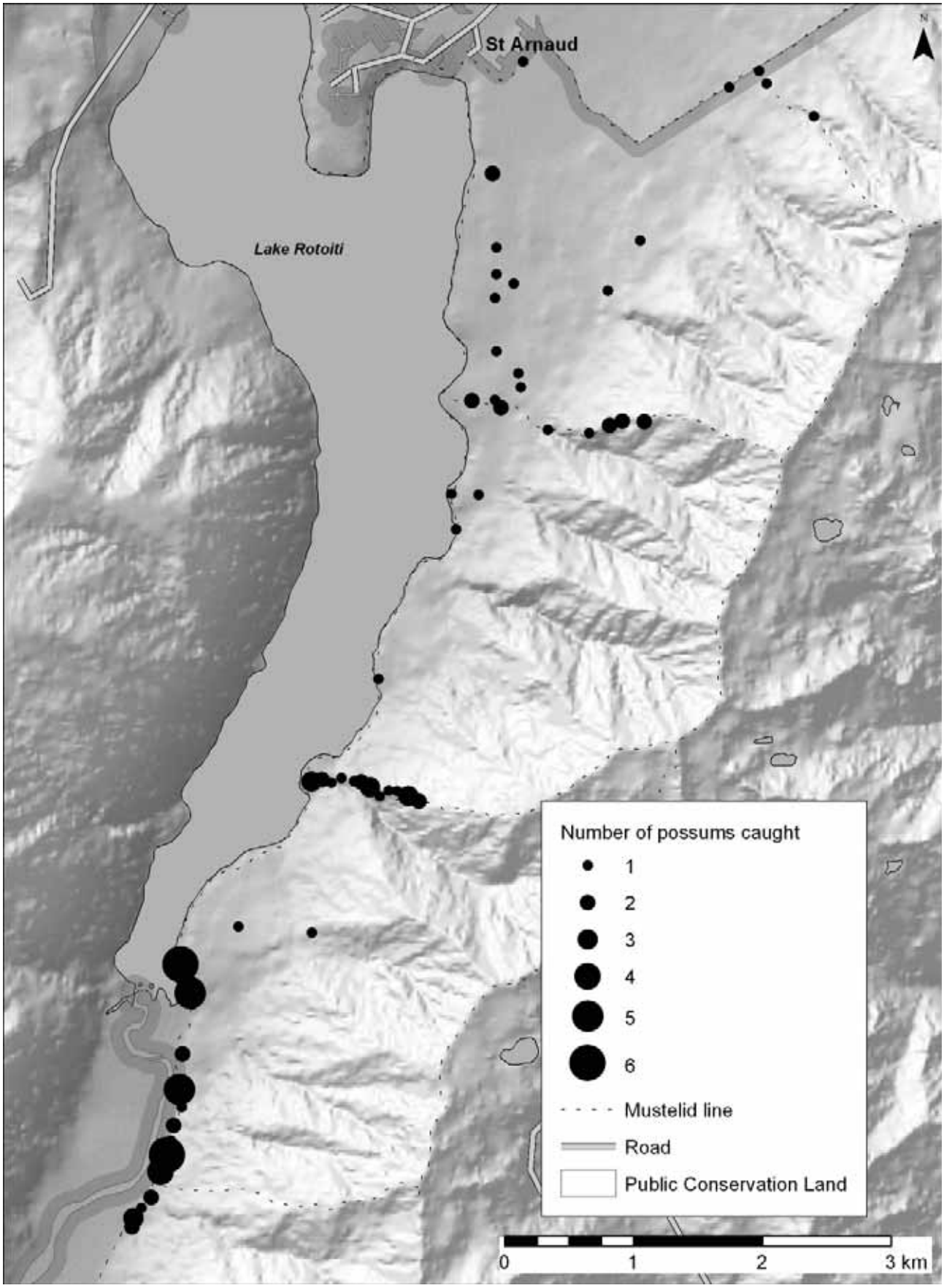
The possum capture results were consistent with the mistletoe FBI results – see the 'mistletoe' section and Figure 15 for details on browse within the Core Area.

Discussion

As in previous years, trap lines situated to the south of the Core Area caught the most possums. This is due the lack of possum control to the south of the Mainland Island, so there is likely to be a continuing high rate of re-invasion.

The RNRP has benefitted from the adjacent recent AHB possum control operations which have kept possum numbers extremely low and minimised the number of possums moving south into the Mainland Island. However, the AHB are planning to cease control in these areas after 2010 as no TB has been detected in the possum populations for some time. This is likely to results in a see slow rise in the local population in future.

Figure 11b: Map of RNRP possum captures in 2009-2010.



2.1.5 Deer control and monitoring

Methods

Project staff report deer sign and sightings on the St Arnaud Range while carrying out other work within the project. These signs and sightings are recorded in the Excel document 'Predator and Ungulate Sign'. Sign and sightings are only recorded for the St Arnaud Range as this is where most vulnerable plant species are present.

Results

Eight deer and two chamois were sighted within the Mainland Island over the period, all during the summer/autumn period.

A system to allow principally NZ deerstalker local branch members access on a volunteer basis was established. It allowed hunters access to hunting blocks within Mainland Island and has had some uptake since May 2010. One chamois had been shot thus far.

Discussion

Although numbers of ungulates within the Mainland Island appear to be at low densities or have a very patchy distribution, their affect on native plants is likely to be biased toward particular preferred species, like *Pittosporum patulatum*. This means that numbers of browsers in the Mainland Island need to be kept low to reduce impact on rare plant species in particular.

2.1.6 Kaka (*Nestor meridionalis*) monitoring

Methods

The kaka encounter rate survey was again continued this year and run in conjunction with the mustelid trapping programme during the regular trap checks from the beginning of October through to the end of April on 19 of the 24 trap lines. The other remaining mustelid trap lines are excluded as they do not traverse suitable kaka habitat, along the state highway or above the bush line for example. The new 'Struth' line has been added to the survey and the new Dogleg line was also included to replace discontinued old Mountain bike trap line.

Staff recorded the date, start and finish time on a trap line, kaka seen or heard, and the trap location and time. No recording was done above the bush line.

Results

Seventy kaka were seen or heard over 289 hours with an encounter rate of 0.24 encounters/hour. Dome, Black Valley Stream, Dogleg and Grunt trap-lines were the lines with the highest encounter rate. No kaka were encountered on Anglers Walk, Peninsula, Lakehead and German Village trap-lines (Table 2).

TABLE 2: KAKA ENCOUNTER RATE ON RNRP TRAP LINES (OCTOBER 2009 – APRIL 2010)

TRAP LINE	HOURS SURVEYED	KAKA SEEN	KAKA HEARD	ENCOUNTER RATE PER HOUR SEEN & HEARD
Lake Edge	32	1	4	0.156
Lake Head	7	0	0	0.000
Hubcap	12	0	2	0.167
Snail Boundary	20	0	1	0.051
Anglers Walk	9	0	0	0.000
Peninsula Nature Walk	16	0	0	0.000
Clearwater	19	0	2	0.105
German Village	7	0	0	0.000
Borlase Boundary	22	3	2	0.223
Dogleg	12	0	1	0.084
Duck Pond Stream	7	3	7	1.408
Dome Ridge	19	4	1	0.267
Cedar	6	0	2	0.328
Struth Line	2	4	0	2.667
Black Sheep Gully	20	2	1	0.151
Grunt Boundary	26	1	13	0.534
Black Valley Stream	22	0	12	0.541
Teetotal Road	10	0	2	0.202
Middle of the Road	22	1	1	0.092
TOTAL	289	19	51	0.242

Discussion

A similar encounter rate for kaka was recorded this season as in previous seasons (Fig. 12). There was less effort this season (289 hours vs 465 and 486 hours for 2007-08 and 2008-09 respectively) as trapping frequency was lower due to the later start in fortnightly trap checks. Despite the reduced effort the encounter rate remained similar although the variability increased, which is likely due to the fewer hours expended (Fig. 12). Most kaka were recorded in lines within Big Bush and on the Grunt trap-line, on the southern Boundary of the Core Area. This pattern has persisted for the past three years (Fig. 13). These lines are all within large areas of contiguous beech forest. This season, and for the past three years, the fewest or no kaka are recorded on Anglers Walk, Peninsula, Lakehead and German Village trap-lines where there is patchy beech forest, substantial areas of kānuka/mānuka forest, or a forest boundary with pasture.

Figure 12: Seasonal Kaka Encounter Rates for 2007-08 to 2009-10.

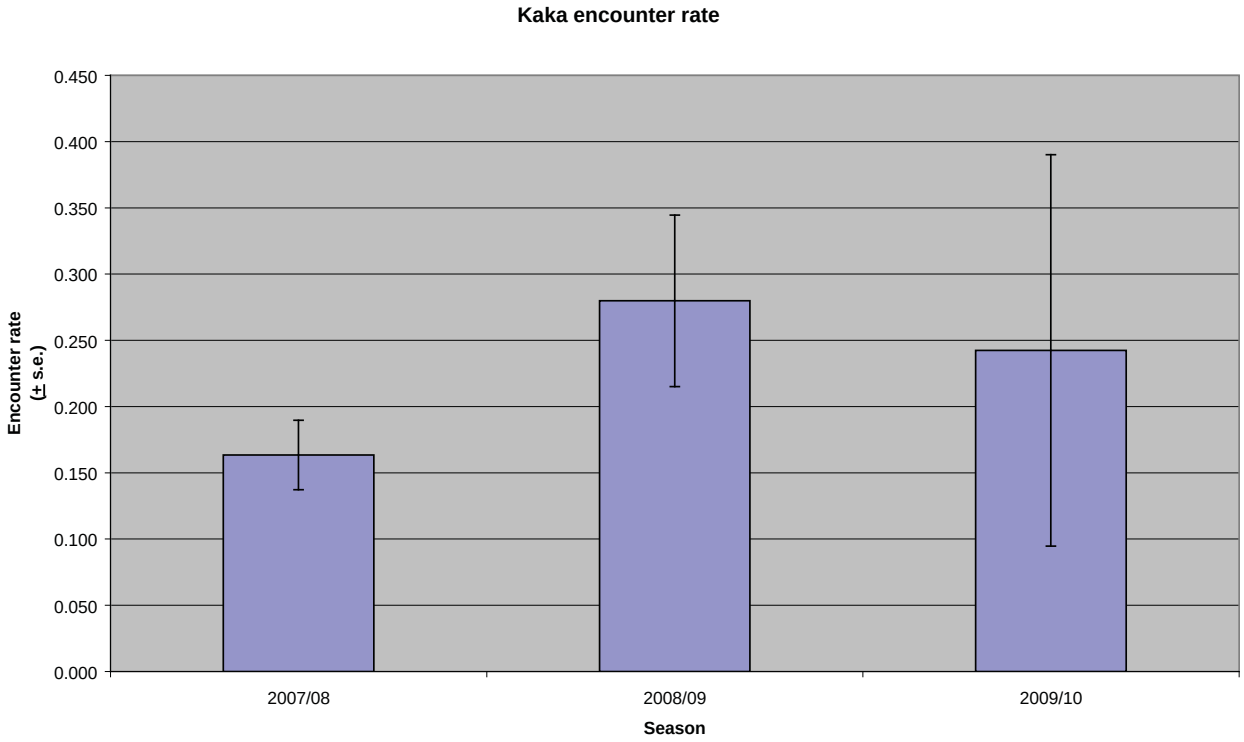
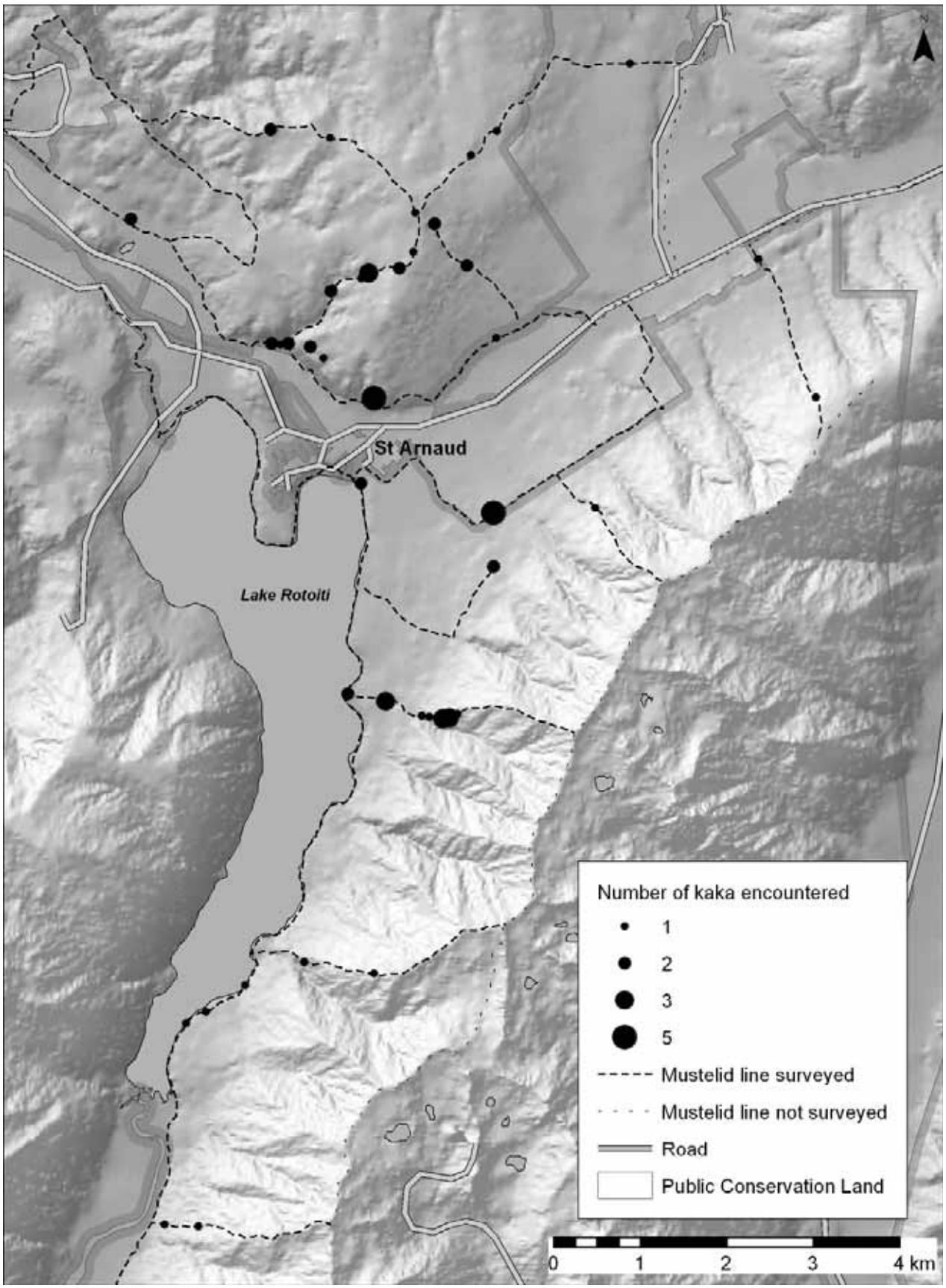


Figure 13: Map of RNRP Mainland Island Showing Locations of Kaka Encounters (October 2009 – April 2010).



2.1.7 Mistletoe (*Alepis* and *Peraxilla*) monitoring

Methods

The Payton et al. (1999) standard foliar browse technique was used to survey plants in the Core Area along the mistletoe survey lines (Fig. 14). The survey was carried out between July and November 2009 with most of the survey effort in the winter months. The time of the surveying increased the effectiveness of the technique as leaves were not obscured by flowers. Only *Peraxilla tetrapetala* and *Peraxilla colensoi* were fully indexed for browse. The majority of *Alepis flavida* plants were visited and surveyed but the results were not analysed due to the small sample size.

Results

See Figure 15 for location of browsed plants – the dots on the map represent total browse.

Discussion

It is clear from the browse activity that some possums remain in the RNRP Core Area.

There has been a substantial increase in the trapping effort during the report period, with a new permanent line of Sentinel traps being established within the Core Area on the new 'Cedar' stoat trap line.

Figure 14: Location of mistletoe species on Core Area survey lines.

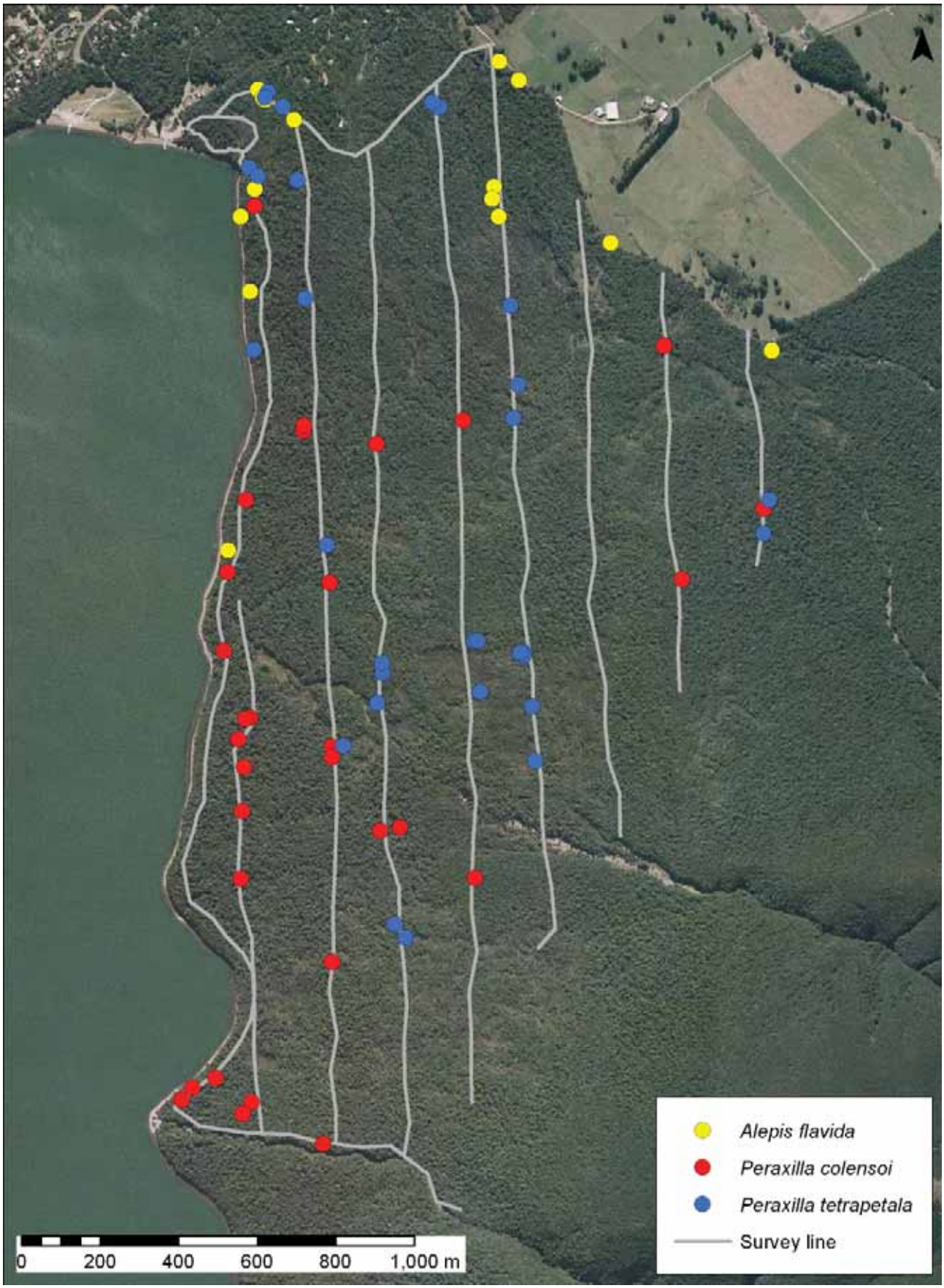
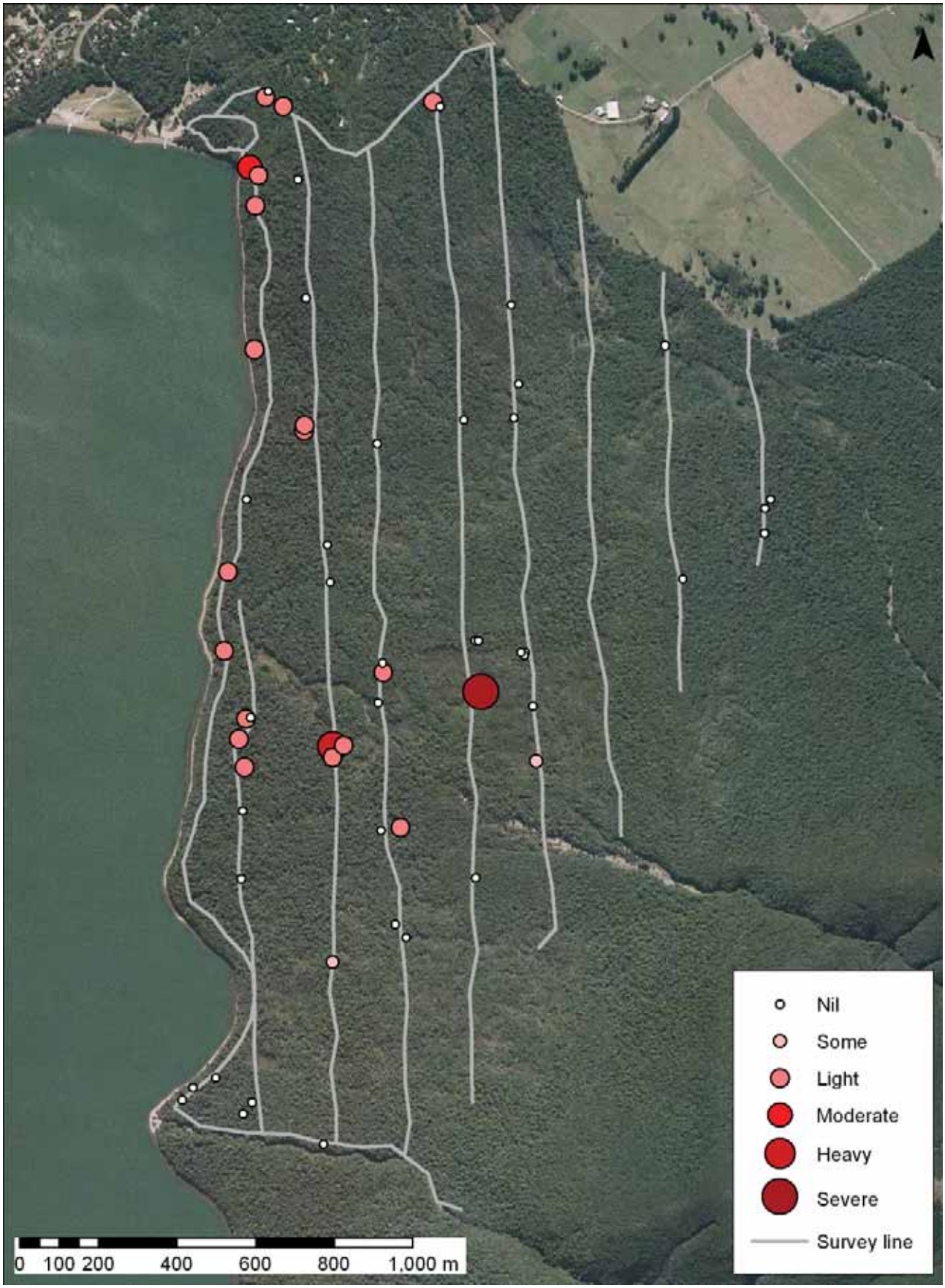


Figure15: Map of possum browse on mistletoe species within the Core Area.



2.1.8 *Pittosporum patulum* monitoring

Methods

Pittosporum patulum is classified as a threatened plant. The Mainland Island has patches of *P. patulum*, though the majority of the plants are juveniles.

Following a vegetation review by Mike Hawes and Anne Brow it was determined that the best way to continue to survey the plants was to record the height of the plant only. The survey was carried out in 2009-10. All plants were GPSed to better understand their site requirements within the Core Area.

A *P. patulum* enclosure to exclude deer and chamois, adjacent to the St Arnaud Range Track, is expected to be established in late 2010 with the assistance of the RNZAF to fly materials up to the site.

Results

Of the 16 plants surveyed, 5 (31%) were assessed as unhealthy. Thirteen plants had obvious browse damage (81%) and one was apparently dead.

Discussion

At present the main problem with maintaining the *P. patulum* population is the lack of known adult plants and additional juvenile plants within the Mainland Island and establishing their condition. Adult plants would be dispersal points for seeds to establish within the Project boundaries and would also provide additional seed source for propagation. Obviously finding adult plants is a priority. Deer appear to be the main browser on juvenile plants and control effort for deer within the Mainland Island needs to be increased.

2.1.9 *Powelliphanta* sp monitoring

No *Powelliphanta* monitoring was carried out this season.

2.2 ESTABLISH AND MAINTAIN POPULATIONS OF GREAT SPOTTED KIWI AND OTHER SPECIES

2.2.1 Introduction

Great spotted kiwi (GSK) were likely present in the Nelson Lakes area early in the 20th century but have since become locally extinct (Steffens and Gasson 2009). Fourteen GSK were reintroduced to the Mainland Island in two operations in 2004 and 2006, from a population at the Gouland Downs, Kahurangi National Park. The reintroduced birds settled well and have since produced at least four chicks. One additional wild chick was located in 2010. Reproductive success has not been as high as expected and a proposal to supplement the population with up to14 Operation

Nest Egg (ONE) chicks, sourced as eggs from the Gouland Downs, was approved in 2008. This operation commenced in early 2009 with the radio-tagging of adults in the Gouland Downs (Brow et al. 2010).

2.2.2 Great spotted kiwi *(Apteryx haastii)* population management

Methods

No close-order or direct management of the kiwi population in the Mainland Island was undertaken during 2009-10. The egg removal part of the Operation Nest Egg (ONE) programme was initiated in spring 2009 (refer Section 3.3.1).

Indirect management that benefited kiwi consisted of threat management, principally control of stoats which can prey on kiwi chicks. A fairly intensive effort to control cats before and shortly after the ONE kiwi chicks were released removed several cats that may have depredated them. Live capture cage traps were set around the Kerr Bay-Loop Track area.

Dogs remain one of the biggest threats to kiwi nationally. Signs posted at the main entrances to the National Park are maintained to reiterate that dogs are prohibited.

Results

There were 11 recorded minor dog offences in Kerr and West bays this past year whereby most people were either unaware of the signage or were happy to comply upon request. There have been reported incidences of local dog owners letting their dogs wander and these people have been spoken to by DOC staff.

Discussion

Ongoing vigilance with regard to dog control and cat removal will be required.

2.2.3 Great spotted kiwi *(Apteryx haastii)* population monitoring

Methods

Remote monitoring of the translocated Rotoiti population for mortality and breeding has continued this year. A brief report was also written on whether noise generated by the power boat races in February were adversely affecting kiwi to the extent that they increase diurnal activity.

An increasing number of individuals remain un-radiotagged, as some kiwi were not located by dog handlers in last years ‘round up’. Transmitter changes and annual health checks were carried out as usual on the remaining eight radio-tagged birds Three of the 11 radio-tagged birds from last year were either not caught or located. Harnesses were successfully checked at around six months on five birds to minimise further transmitter loss.

Results

It was uncertain whether kiwi monitored through the power boat races in February were adversely affected by noise due to a low sample size. This study will likely be repeated next February with an increased number of 'twitch count' readings recorded to determine whether individuals increase diurnal activity during the races.

Annual health checks were carried out once or twice this year with added harness changes. All kiwi appeared healthy with no abnormalities or major weight losses.

The youngest known juvenile, Marama, dropped his/her transmitter at the bush line and other birds have also been found at higher altitudes. Two birds' transmitter signals were lost suddenly suggesting that birds could possibly have traversed the St Arnaud Range to the Wairau Valley side. Miharo, the last remaining radio-tagged sub-adult, is one kiwi possibly on the other side of the range.

Monitoring pairs for incubation over the breeding season indicated two pairs switching to incubating behaviour, which lasted the full term (70-80 days). Puremahaia (♂) and Awaroa (♀) were checked for a chick soon after the incubation period and no chick was found. A tiny fragment of egg shell appeared to remain in the probable nest burrow, but it is uncertain whether it was a failed nesting attempt. A chick has not been located in subsequent checks. Takaka (♂) and Onekaka (♀) apparently had a successful incubation and were likely to have fledged a chick as they had hatched Marama successfully two years ago. However, no chick was found with either adults and the nest site was not located. Avoiding disturbance to nesting kiwi is priority, and this means that the outcomes of nesting attempts are not always determined.

Discussion

Development of Great Spotted Kiwi diagnostic transmitters:

Discussion over the potential, and justification for, development of GSK specific activity-timer transmitters (which would detect incubation for this relatively unpredictable kiwi species) has taken place between GSK practitioners, John Wilkes from Wildtech and the Kiwi Recovery Group (KRG).

It was concluded that the diagnostic transmitters available at present (GSK V2.0) that give two weeks of activity data, store a continuous stream of data that can be downloaded upon retrieval and do not have an 'incubation mode' programmed in, are sufficient. Key issues in developing a GSK-specific transmitter revolved around cost-effectiveness so there may still be future developments if funding becomes available.

The RNRP, and other GSK projects, have assessed activity readings as it becomes available during breeding seasons, and have made decisions on when to lift eggs or check for a chick based on subjective analysis of these activity readings. The RNRP will continue to use ground-truthing methods, like repeated triangulation of possible incubating birds, to verify incubations in the Gouland Downs for ONE this breeding season. We

will then attempt retrospective analysis of activity readings of known incubating birds to determine which aspect of the readings provides more certainty of nesting behaviour.

Development of improved kiwi transmitter-harnesses:

The current transmitter fitting for kiwi is attached with a hospital baby band and several loops of electrical tape to a leg-mounted transmitter and this method has remained unchanged for many years. This method has several shortcomings which include:

- short attachment duration, requiring checks every six months, which in turn means frequent captures and stress to the bird;
- a lengthy attachment fitting period of at least 25 minutes;
- frequent attachment failure, which means searching for the missing kiwi with a dog and recapture;
- abrasion and occasional damage to the leg.

In light of these problems RNRP staff discussed the problems with Sirtrack staff at the BNZ Kiwi Hui in April 2010. As a result Sirtrack and RNRP staff, along with researchers from Massey University, are exploring backpack and improved leg transmitter options. It is likely that captive and possibly monitored wild bird trials with new transmitter designs will take place on improved transmitter designs in the 2010-11 season.

3. Learning objectives

3.1 TEST THE EFFECTIVENESS OF RODENT CONTROL TOOLS IN A BEECH FOREST SYSTEM

3.1.1 Introduction

Following several years of rat control using toxins (1080 and brodifacoum), the effectiveness of snap trapping (targeting ship rats, *Rattus rattus*) was trialled from July 2000 to March 2007. Throughout that period snap trapping failed to consistently achieve the performance target of sustained rat tracking index of ≤ 5%. During the 2006-07 year a 'detection and staged response' model using toxins was trialled, but failed to achieve an initial knockdown. Snap trapping was abandoned in March 2007. At that stage the intention for the following year was to implement an operation using diphacinone presented in Defender bait stations, recently developed by Connovation.

During 2007-08 it became apparent that a new toxin operation would not be affordable that year and no rat control was undertaken. In 2008-09 the target rodent tracking rate in August did not reach the 'trigger point' of >15% and was again postponed until the next spring.

Although no rodent control has been undertaken for two years, associated rodent population indexing and South Island robin (*Petroica australis australis*) territory occupancy monitoring, as outcome monitoring, has continued. There was a light beech seed mast in autumn 2009.

3.1.2 Ship rat (*Rattus rattus*) control

Methods

It was planned that diphacinone paste (300gm of RatAbate™) in bags were to be placed in Philproof bait stations in spring 2009.

Results

In August 2009 the operation was again postponed, this time due to concerns raised by a Forest and Bird researcher about possible lethal effects of diphacinone on any bat population that may have been present. Moreover, the philproof bait stations were not free from interference by possums or access by kea, so there were non-target issues with the established bait station setup.

After discussions with the Technical Advisory Group (TAG) in August 2009 regarding non-target interference from kea, kaka and possums, stainless steel baffles were fitted to all 600 bait stations over October-November 2009.

Discussion

In light of the concerns highlighted about the existing bait station setup the postponement of the rat poisoning operation was probably justified and allowed time to rectify the problems raised. The operation was unlikely to be effective if possum interference was likely and deferring the operation allowed for all possible problems to be dealt with before proceeding in spring 2010 rather than done in haste.

Moreover, a survey for possible bat populations was carried out in autumn 2010 to determine if bats were extant within the Mainland Island. If bats were present we would adjust any rat control operation accordingly to reduce poisoning risk.

3.1.3 Rodent population monitoring

Methods

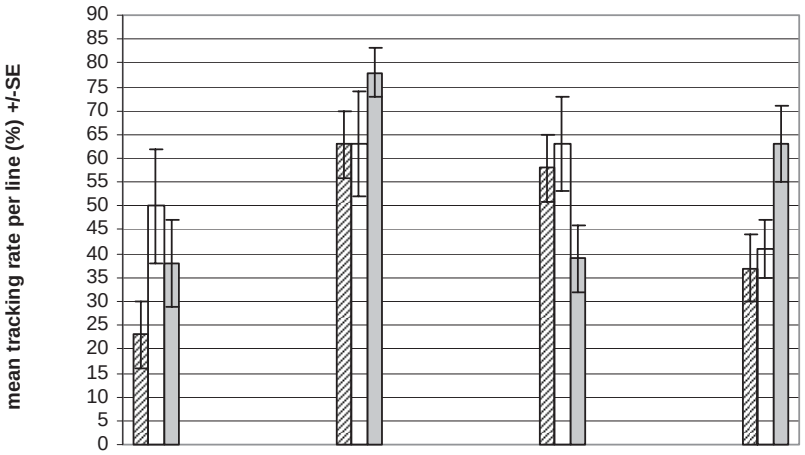
Rodent monitoring is based on the use of tracking tunnels to provide a relative abundance index of rodents within the Core Area compared with Lakehead & Big Bush (no rat control but mustelid trapping) and Rotoroa (no control of any species). For the past five years no rat control has been carried out in the Core Area so the tracking rate has provided a background rate for planned rat poisoning operations.

Rodent monitoring is carried out using Tracka™ cards with a peanut butter and oat mix as a lure, set in black corflute tunnels (Gillies and Williams 2004). Refer to the 'RNRP Field Manual 09-10' for further details.

Results

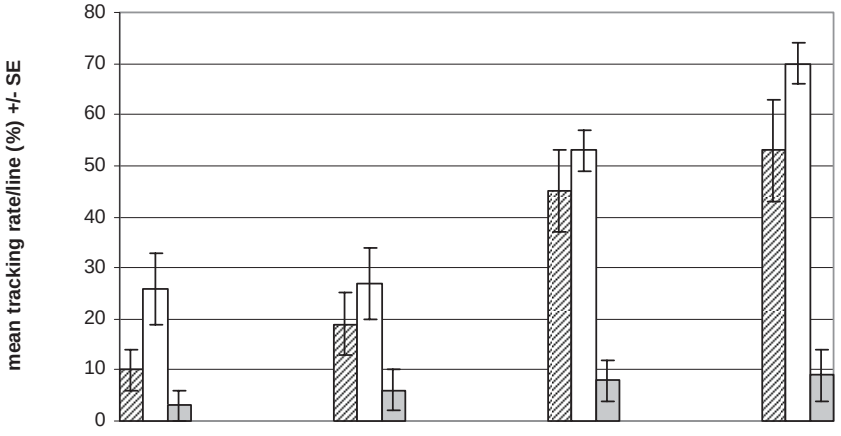
Mouse tracking remained high at all sites for the entire year (Fig. 16). Rat tracking rates increased throughout the year at the Rotoiti sites (Fig. 17) and reached over 50% within the Core Area and 70% at Lakehead and Big Bush combined by May 2010. Although rat tracking at Rotoroa increased also it remained below 10% for the entire period.

Figure 16: Tracking rates for mice at Lakes Rotoiti and Rotoroa 2009-10.



	Aug-09	Nov-09	Feb-10	May-10
RNRP Core	23	63	58	37
Big Bush & Lakehead	50	63	63	41
Rotoroa	38	78	39	63

Figure 17: Tracking rates for rats at Lakes Rotoiti and Rotoroa 2009-10.



	Aug-09	Nov-09	Feb-10	May-10
RNRP Core	10	19	45	53
Big Bush & Lakehead	26	27	53	70
Rotoroa	3	6	8	9

Discussion

The UC, LC, UD and LD lines at Rotoroa were removed in 2008-09 have not been replaced and are unlikely to in the future. This does increase the error measure on the results but still provides enough information for the purposes of the RNRP.

Mice numbers remained high at all sites throughout the year in contrast to rat numbers which increased in the Mainland Island through the reporting period to reach relatively high numbers. The increase in rat abundance during the year was possibly in response to the small beech mast of autumn 2009 (Section 3.4.4). As usual, tracking rates for rats remained consistently low at Rotoroa, where stoats are not controlled.

3.1.4 South Island robin *(Petroica australis australis)* monitoring

The South Island robin is an endemic passerine, and although the species is classified as not threatened (Miskelly et al 2008), it has declined dramatically since European settlement, primarily due to habitat loss and mammalian predation (Bell 1986). Robins are territorial year-round and breed mainly in spring, although the robin breeding season was from August to February at Rotoiti in 1998-99 (Etheridge and Powlesland, 2001).

South Island robins have been monitored within the Core Area of the Mainland Island since 1998-1999 to measure the effectiveness of rat control operations.

Methods

To determine the total number of (i) paired robins and (ii) unpaired males and females at the start of the breeding season, a census of robins is conducted once a week, four times during September each year. The total area surveyed is 161.2 ha (Fig. 18).

The census is conducted following Powlesland's protocol (1997) with some modifications:

1. The project manager was signed off to handle and band robins (and to supervise others banding robins). The equipment used to band robins included: size B metal and colour bands, banding pliers, mealworms (Tenebrio larvae), catch bags and a potter trap or hand-net. Banding pliers and hands were cleaned with medi-wipes or similar between handling robins to avoid passing pox between birds.
2. Mealworms were ordered from Biosuppliers.
3. An MP3 player and loud speaker set-up were used to broadcast robin calls (calls were copied from the audio supply of bird calls on the DOC Intranet).

Pre-census: To enable individual recognition we attempted to capture and colour-band all the robins in the census area. Initial attraction for trapping used a combination of audio-playback of robin calls and 'tapping' a mealworm container. When the robin was nearby, the audio was

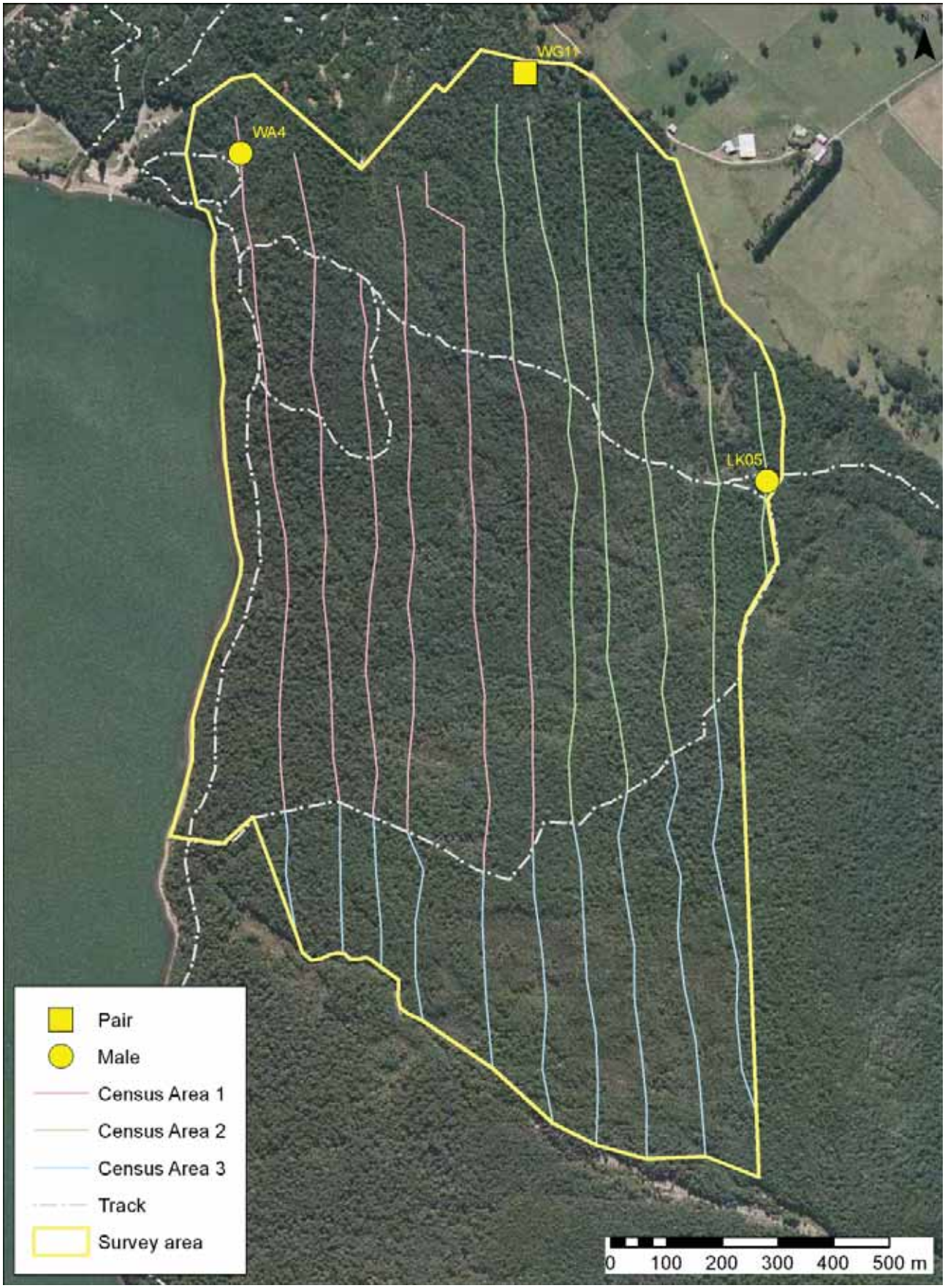
switched off and the mealworm container was tapped at the same time as mealworms were being fed to the robin in order to train the robin to come to a 'tapping' sound. Pre-census work was carried out during July and August. Two appropriately trained staff were required for 5-6 days.

Census: Three staff were required for one day a week over the four weeks of the September census. The census site was split into three areas for ease of monitoring (one person per area per census day, Fig 18). Each surveyor walked slowly along each line while tapping a mealworm container, they stopped at every second bait station for 1-2 minutes and tapped loudly to attract robins.

- If a robin appeared the surveyor tapped the container until the robin approached and fed it a few mealworms as a reward. The surveyor recorded the following information about each robin: the band combination (or 'no bands' if none present), sex, date, whether paired or alone, observer, location (line ID and nearest bait station number) and behaviour e.g. eating all mealworms, stashing mealworms, flying off with mealworms. These behaviours indicate whether it has a nesting partner nearby.
- If a robin was not sighted the surveyor continued walking and tapping.

The census data for each daily survey was entered an Excel spreadsheet. If an un-banded robin was sighted, attempts were made to band the robin as soon as possible.

Figure 18: Map of robin survey area within the RNRP Core Area 2009.



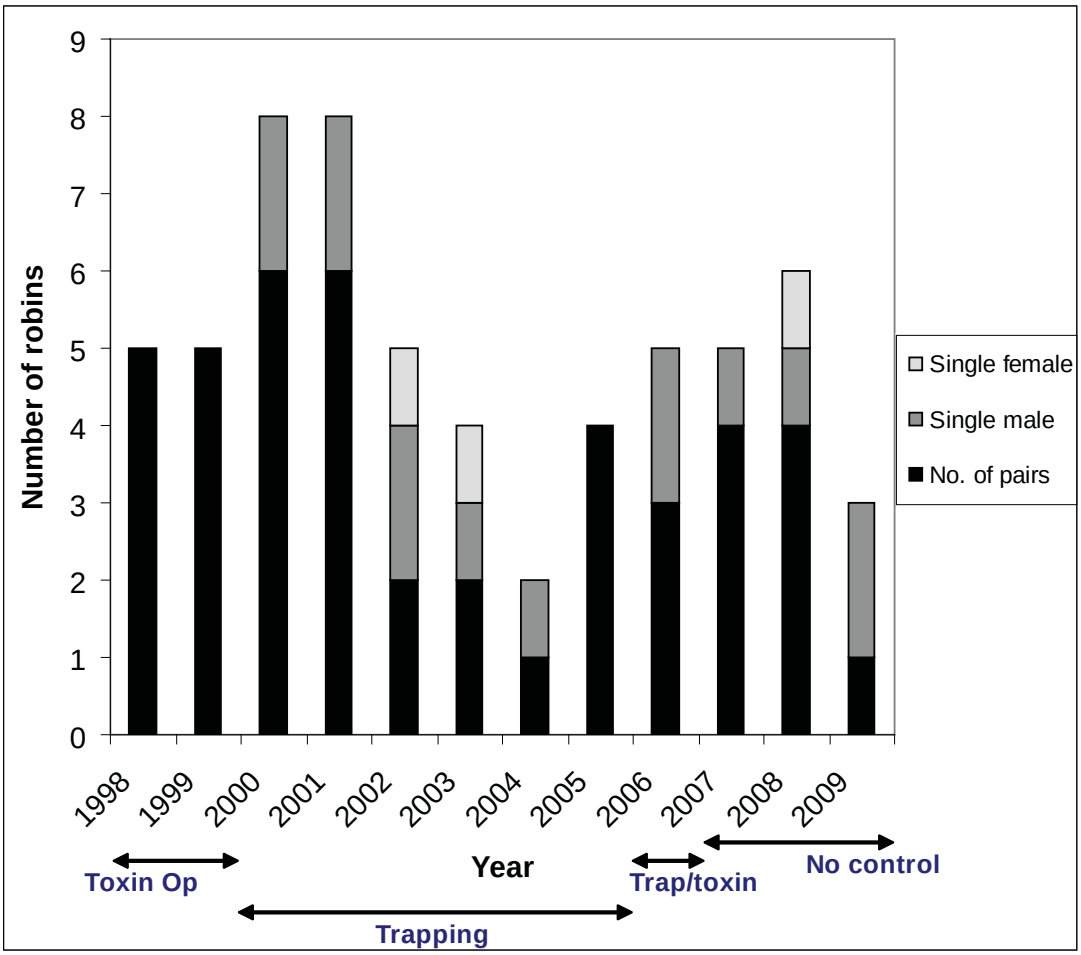
Results

In the pre-census and census period in 2009 eight robins (7 males; 1 female) were banded in the census area, with the exception of the sole female who was banded in St Arnaud village. However, only one pair of robins plus two individual males, all banded, were counted in 2009. The pair (female = RM/PP; male = M/O) were observed at bait station WG11; one male (RM/YR) was observed at WA4 and the remaining male (M/DB) at LK05 (Fig. 18). In early September the male of the pair was seen feeding the female. About a week later the male flew off with all the mealworms given to him, indicating that the female was nesting. However, by late September, only the male was located and either eat or cached the mealworms, suggesting the female was no longer present. The female was not seen again.

Robin numbers within the RNRP Core Area have fluctuated since 1998 (Fig. 19) but generally the number of robins counted has declined. The seasons with the lowest counts were 2004 (N = 3) and 2009 (N = 4). Robin numbers declined during the years when only rodent trapping was carried out and the number of robin pairs increased during and in the two years after a toxin operation.

It is important to note when interpreting Figure 19 that the census area was extended in 2002 and again in 2007 to increase the sampling area. This means that although the number of robins counted in 2007 and 2008 was only slightly lower than in 1998 and 1999 for example, the density of robins was substantially lower post-2006. In 2007, two of the four robins pairs were in the new addition to the census area. Moreover, robins were not banded in 2007 and 2008 so some robins may have been double counted.

Figure 19: Results of robin counts in RNRP core during years of different rodent control techniques



Discussion

The 2009 population of four robins, with only one breeding pair, was at very low density. This was the third consecutive breeding season without rat control in the Core Area and the results suggest a decreasing robin population, probably due to increased predation by rats (Butler 2003). In 1998-1999 high robin productivity and nesting success was recorded within the Mainland Island, probably as a result of low rat abundance due to concurrent rat poison operations (Etheridge and Powlesland 2001). Similarly high productivity was recorded in 1999-2000 and it was concluded that there was a inverse relationship between robin productivity and rat abundance (Butler 2003).

A toxin operation to control rats within the Core Area is scheduled for spring 2010 which will only benefit the local population of robins if breeding females remain within the census area. Although only one female was counted in the 2009 census and she disappeared during the study, she was originally banded in St Arnaud village which indicates that robins migrate into the Core Area, at least for the breeding season. In addition, the forestry block at Teetotal Recreation Reserve holds a substantial breeding population of robins and if necessary, robin fledglings

could be translocated from Teetotal into the Core Area to help boost the surviving robin population.

3.2 TEST THE EFFECTIVENESS OF WASP CONTROL TOOLS

3.2.1 Introduction

Common wasps (*Vespula vulgaris*) have been controlled in the RNRP Core from 1998 using protein-based baits containing the toxins Finitron or Fipronil (Xstinguish™). This work has been carried out in close association with Landcare Research. X-stingish™ has proven to be the more effective of the two poisons, however access is currently constrained by commercial imperatives. Finitron has not always been available and no wasp control was undertaken during the 2006-07 season due to the unavailability of a suitable toxin. During the 2007-08 season, Xstinguish™ was again available for experimental purposes and has been used for subsequent operations since then. Experimentation by Friends of Rotoiti in Big Bush in 2008-09 suggested that effective control of wasp nests could extend up to 350m away from poison bait stations (Brow et al. 2010).

3.2.2 Wasp control and monitoring

Methods

Wasp poisoning is preceded by monitoring to determine when wasp visitation of protein-based bait is sufficient to ensure that the toxic operation will be effective. An average of one wasp visiting per bait at the instant of observation is the trigger for entering the process defined in the 'wasp poisoning decision maker'. For further detail on wasp monitoring and the decision making process refer to the 'RNRP 2009-10 Field Manual'.

In light of the results of the FOR wasp bait trial, during the 2010 operation the bait station spacing was reduced from lines every 100m to lines every 200m, while still maintaining 50m spacing on the lines. In addition, three groups of eight bait stations were established, one at Lakehead, and two in the forest near the lake edge to the south of the Core Area. Around each of the three sites wasp nests were located at distances up to 500m from the grouped poison bait stations. These nests were marked and flight counts taken pre-poison and at one week and six weeks post-poisoning. Additional wasp nests within the Core Area were also located on an opportunistic basis, flight counts were also taken pre-poison and post-poisoning.

Chicken-based toxic bait, containing Xstinguish™ (active ingredient 0.1%), was prepared at the Landcare lab in Nelson in early January 2010 and then was packaged into 1.5 litre plastic pails. The toxic bait was laid on the 5 February 2010 in the RNRP Core and St Arnaud township/Brunner Peninsula areas, using the established wasp bait station grid and lines.

Lines within the township/peninsula areas generally follow established roads and walking tracks. 40g of toxic bait was placed into each bait station. For further information regarding the bait and bait station layout, refer to the 'RNRP 2009-10 Field Manual'. Also the bait station line on the western side of Lake Rotoiti was filled by the FOR group.

Operational performance standards specified that uneaten bait must be collected from bait stations three days after application. Bait was brought in from the Core Area, St Arnaud Township and from two of the three experimental sites on 8 February (three days after application). The bait was retrieved from the third experimental site after four days. All retrieved bait was weighed.

Results

The average number of wasps observed on non-toxic baits was only 2.1 on 4 February 2010, although this was still high enough to indicate the poison operation should be initiated.

Including all of the DOC and FOR operations a total of 31.40kg toxic bait was deployed, although the bait take was relatively low this year with only 14.72kg (47%) removed by wasps.

Wasp activity within the core area was observed to fall markedly within a few days of the operation but there were still some active nests noted in the following months.

The operation achieved an 86% reduction in flight counts of marked nests inside the Core Area after three weeks (50% after 1 week, Fig. 20a).

After six weeks the three trial bait station clusters showed mixed results, with the two sites on the lakeshore (W, M) relatively effective out to a radius of approximately 250m, reducing wasp flight count numbers by 62% and 58% (Figs 20b, 20c). One site reduced flight counts by 30% up to 300m and the other by 16% up to 450m from the bait station cluster. After this point the flight traffic rates increased at both sites. The third site at Lakehead (R) did not appear to be as effective but still reduced wasp numbers by 30% up to 250m from the cluster (Fig. 20d). Flight counts increased after this point, although there was a 76% reduction at 350m indicating that wasp nest activity had been affected out to that distance.

Figure 20a: Flight counts at wasp nests within the RNRP Core Area before and after poisoning.

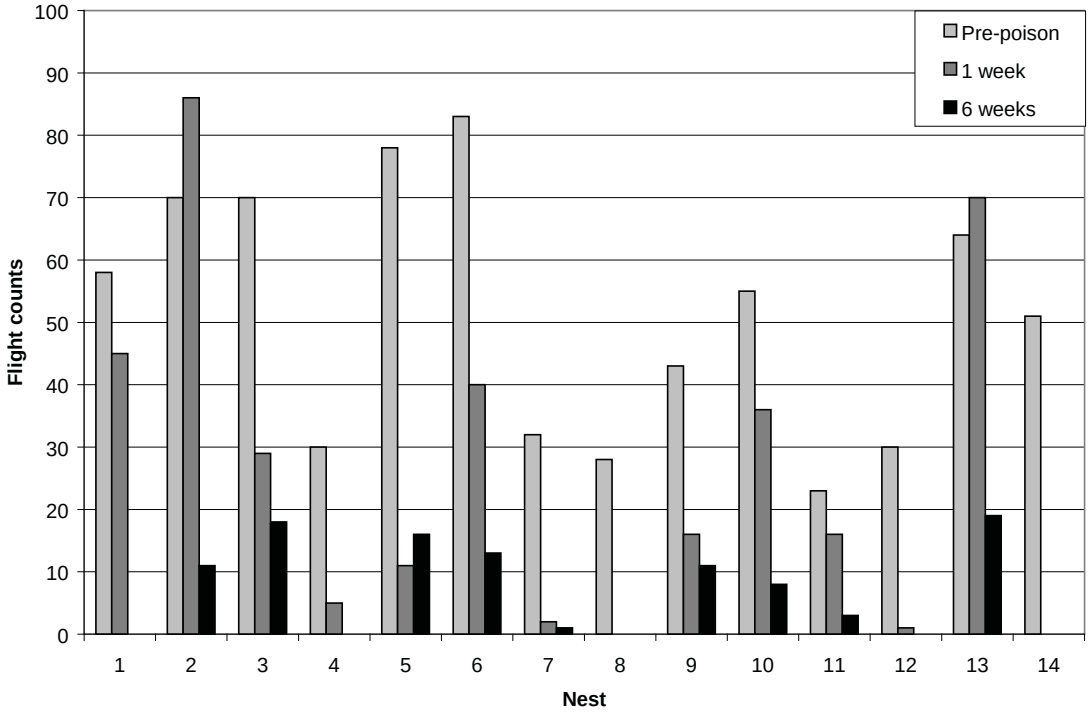


Figure 20b: Flight counts at wasp nests surrounding Site W (Lake Rotoiti) before and after poisoning.

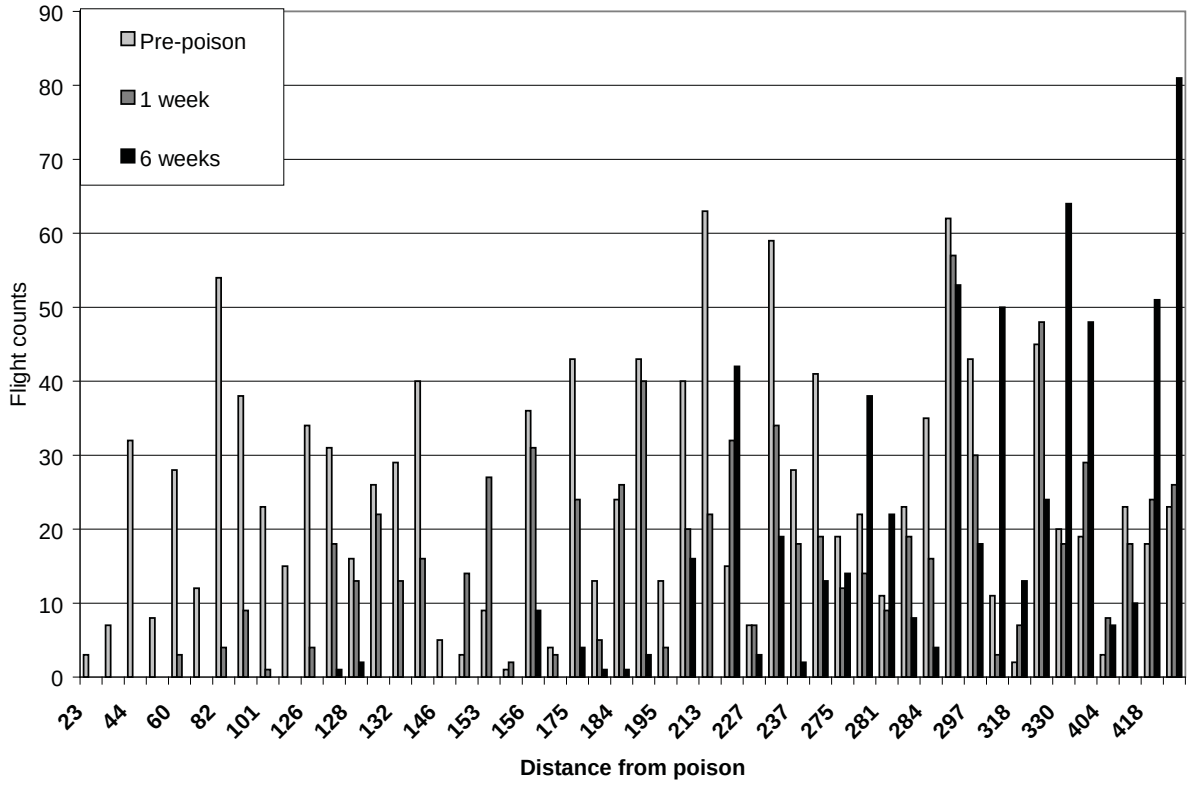


Figure 20c: Flight counts at wasp nests surrounding Site M (Lake Rotoiti 5MBC line) before and after poisoning.

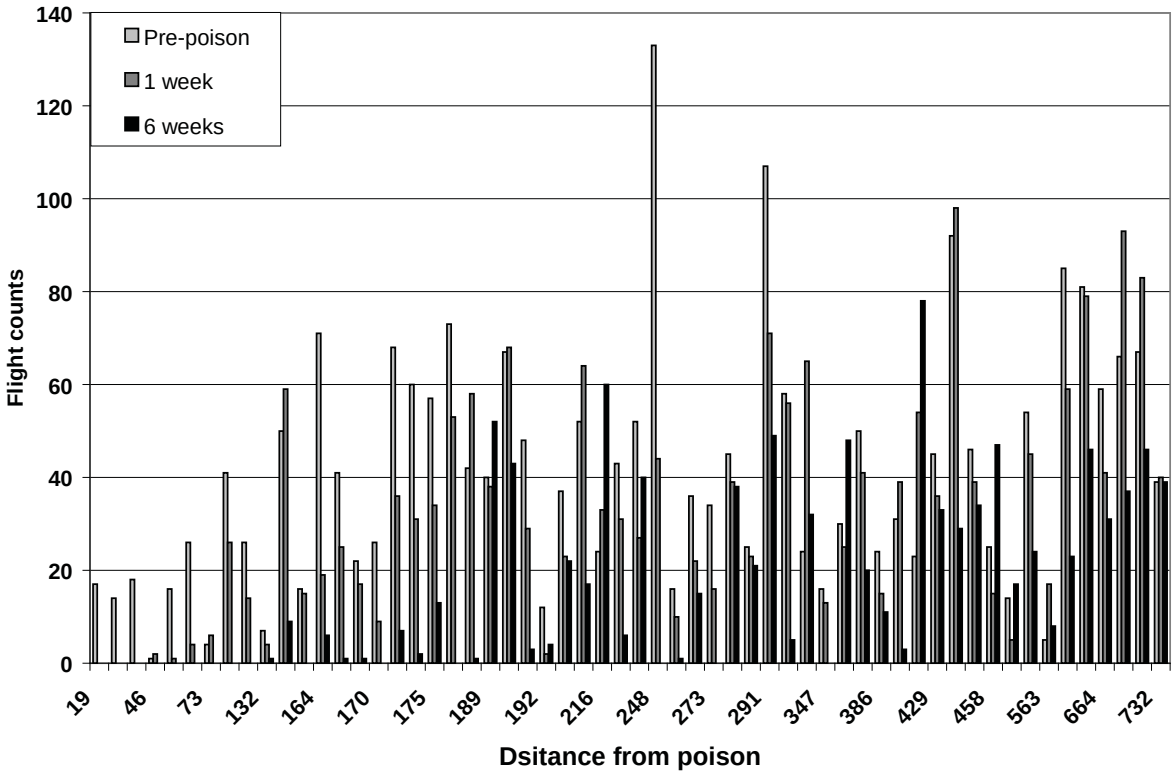
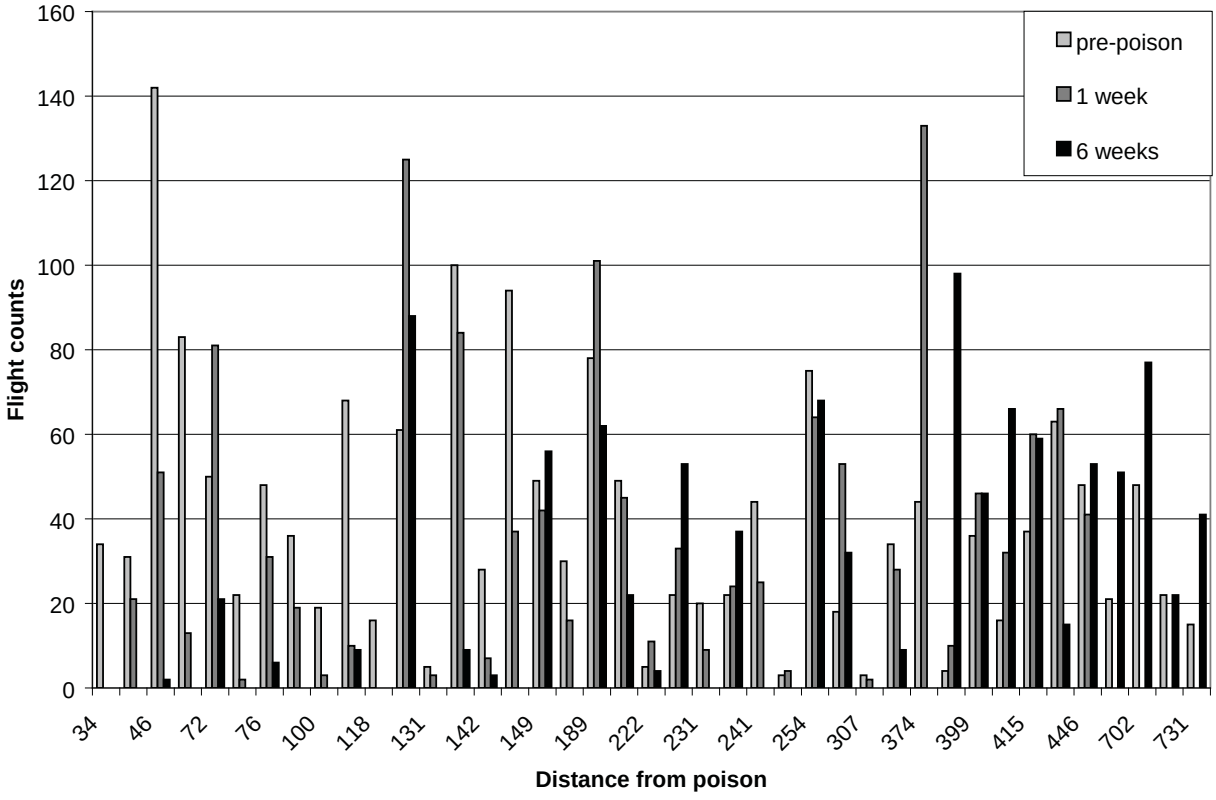


Figure 20d: Flight counts at wasp nests surrounding Site R (Lakehead) before and after poisoning.



Discussion

The toxic operation was successful in reducing the wasp nuisance around St Arnaud township and in the Mainland Island core area.

The 2009-2010 season wasp control operation was initiated later than in previous years due to the apparent low wasp numbers. The reduced amount of toxic bait taken this year could have also been the result of the perceived lower number of wasps.

For next years operation we will be looking at a trial of potential lures to increase the amount of toxic bait take. Lures such as fish oil will be applied to freshly baited stations. Previous study into bait preferences found sardine cat-food as the bait collected in the greatest amounts (Spurr 1995).

Of the three trial sites, the one at Lakehead did not appear to be as successful as the others. The main difference with the site at Lakehead is the presence of a large grass area surrounding the cluster. This may have influenced the foraging behaviour of the wasps in that area, although the amount of bait taken at the Lakehead site was higher at 64% compared with 44% and 54% at the two other sites.

Due to the fact that not all of the bait was taken from trial bait station clusters and no wasps were noted foraging on baits after three days, it was decided not to top up the bait stations. Each cluster (of eight stations) was pre-baited with fish based cat food the day before and filled with around 450g of the toxic bait during the operation.

Next season, predictive models suggest that much higher wasp numbers are likely, apparently related to a preceding year with low wasp abundance.

3.3 TEST THE EFFECTIVENESS OF DIFFERENT TRANSLOCATION METHODS

3.3.1 Introduction

Great spotted kiwi is the only species to have been translocated to the RNRP through wild-to-wild translocations of adults in 2004 and 2006 (Gasson 2005). No work has commenced on introducing any other species. There is more that can be done to test the effectiveness of different translocation methods for great spotted kiwi. Planning commenced in 2008 for future translocations of juvenile great spotted kiwi through an Operation Nest-Egg (ONE) project involving the collection of eggs from Gouland Downs in Kahurangi National Park. Eggs were to be incubated at Willowbank Wildlife Park in Christchurch, and subsequent chicks put on a crèche island. At a weight of >1kg the juveniles were to be released into the Mainland Island. There were two broad objectives for the ONE translocations:

- Biodiversity objective: to augment the existing founder population with young birds from another site, and

- Research objective: a pilot study to compare the success of ONE birds to the success of RNRP-hatched birds, with respect to territory establishment and breeding success in the RNRP.

A funding application submitted to the Bank of New Zealand Save the Kiwi Trust was approved. The pilot study is relevant due to increasing interest in using ONE to manage existing great spotted kiwi populations and to perhaps establish new populations. The RNRP is a site where the fate of ONE birds can be monitored and compared to wild-raised chicks protected by predator control. The project should indicate whether successful recruitment of ONE birds into an existing population will occur, and if so, whether the process (including dispersal and age of breeding) is broadly similar to wild-raised birds.

Methods

Eight kiwi in the Gouland Downs were fitted with egg-timer transmitters in March 2009. Hut wardens on the Heaphy Track monitored the kiwi through spring and phoned through the activity information about once a fortnight. When it was assessed that birds or pair activity suggested incubation had begun it was planned to remove eggs after approximately 45-60 days incubation. These eggs were to be flown out to Wakefield and then driven to Willowbank in Christchurch. At Willowbank the eggs were to be incubated and successfully hatched chicks reared until release. Chicks were planned to be released on to Adele Island about January until they reached a 'predator-safe' weight of approximately 1 kg. Once they attained that weight they were to be transferred to the Core Area of the Mainland Island, probably in early spring.

Results

Hut wardens on the Heaphy Track provided the RNRP team with information from activity transmitters through the spring. This information proved difficult to interpret although indications were that at least three pairs were incubating. Based on the activity information received, the RNRP team went to the Gouland Downs in mid-November.

Of the five possible pairs, three were found to have nests. Three eggs were removed for ONE on 23 November 2009 (Egg ages: 44, 50 and 60 days), transferred to Willowbank and subsequently hatched successfully. After discussion and approval by the Kiwi Recovery Group it was decided to 'hard-release' the chicks into the Core Area of the Mainland Island. This occurred on 25 March 2010 when the three chicks weighed about 700 g. There were several reasons to pursue the hard release. Firstly, it was noted that four known wild-raised chicks had hatched and survived within the Mainland Island, which suggested that stoat control was effective. Secondly, we were not able to really test whether ONE chicks growth and reproductive success was different to wild-raised birds if they spent the first 10 months of their life on a crèche island and thirdly, we were also able to check the chicks as often as required from the Area Office, which would not have been possible if the chicks were on Adele Island. Two chicks adapted well to the new environment but one chick died within 10 days and although predation was ruled out, an autopsy was

inconclusive after an initial finding of chronic enteritis. The remaining two chicks grew well, and gained about 50gm/week until late May. They weighed just over 1 kg within 11 weeks of release.

A further 12 kiwi were radio-tagged in March 2010. At present 20 kiwi (13 ♂, 7 ♀) on the Gouland Downs are radio-tagged. We aimed to radio-tag more males than females as the males generally incubate diurnally which makes monitoring easier. It is planned to do repeated triangulations of male kiwi earlier in the breeding season to supplement the activity timer information and to indicate likely nesting birds and their approximate locations. Later in the breeding season the males or pairs that are most likely to be incubating will be targeted for egg removal.

Discussion

At this early stage, the ONE programme in the RNRP has been a qualified success, with two of the three released chicks quickly growing to over 1 kg and apparently thriving within the Mainland Island. It appears the 'hard release' into an extensively trapped area has not been a problem for the captive reared chicks. On the basis of this further adults in the Gouland Downs were radio-tagged, with a view to transferring a larger number of eggs (~8-12) in spring 2010. We are still mindful of possible problems with ONE chick releases into the Mainland Island and will be particularly careful to manage likely risks, particularly predation.

3.4 DETERMINE LONG-TERM TRENDS IN BIRD ABUNDANCE AND FOREST HEALTH IN RESPONSE TO ONGOING MANAGEMENT

3.4.1 Introduction

The RNRP continues to play an important role in monitoring bird calls and forest health as part of the Department's commitment to measuring long term biodiversity trends. Monitoring of beech seed-fall adds value to the national picture of forest seed-fall and enables the project to plan appropriate management responses.

3.4.2 Five-minute bird counts

Methods

Five-minute bird counts (5MBC) were conducted in November, February and May using the technique detailed by Dawson and Bull (1975). The counts were conducted on the St Arnaud Range Track in the Core Area, at Lakehead and along the Mt Misery Track at Rotoroa. Each site was sampled three times during each month, usually on consecutive days. A total of five different observers were used this year.

Results

The bird count data was entered into an spreadsheet (RNRP 5MBC). Mean counts were calculated for each bird species at each location for May 2010. These were graphed against the pooled averages since 1997 in RNRP and Lakehead and 2003 in Rotoroa (Appendix 6). The bird count data will be included in the national 5MBC database.

Discussion

Findings from bird counts undertaken at Rotoroa between 1974 and 2007 were published this year by Elliott et al. (*in press*). They showed bellbird, rifleman, grey warbler, N.Z. pied tit and tui declined in abundance in this period while silvereye, yellow-crowned parakeet and N.Z. robin increased in abundance. Overall, the trend was for declining abundance. A similar analysis on bird count data from the RNRP sites (St Arnaud track and Lakehead) would be useful.

3.4.3 Vegetation plot monitoring

No vegetation plots were re-measured this season. Vegetation plots are monitored using the updated field protocols for permanent plots and the RECCE method (Hurst and Allen 2007a, Hurst and Allen 2007b).

3.4.4 Beech seed fall monitoring

Methods

Beech seedfall monitoring is conducted within the Core Area of the Mainland Island and along the Mt Misery Track at the Rotoroa non-treatment site. There are 20 seed fall traps located at each site. The beech seedfall trays were fitted with seedfall collection bags in early March. The bags were replaced in late April and finally removed in late June. The seed was then counted and tested for viability.

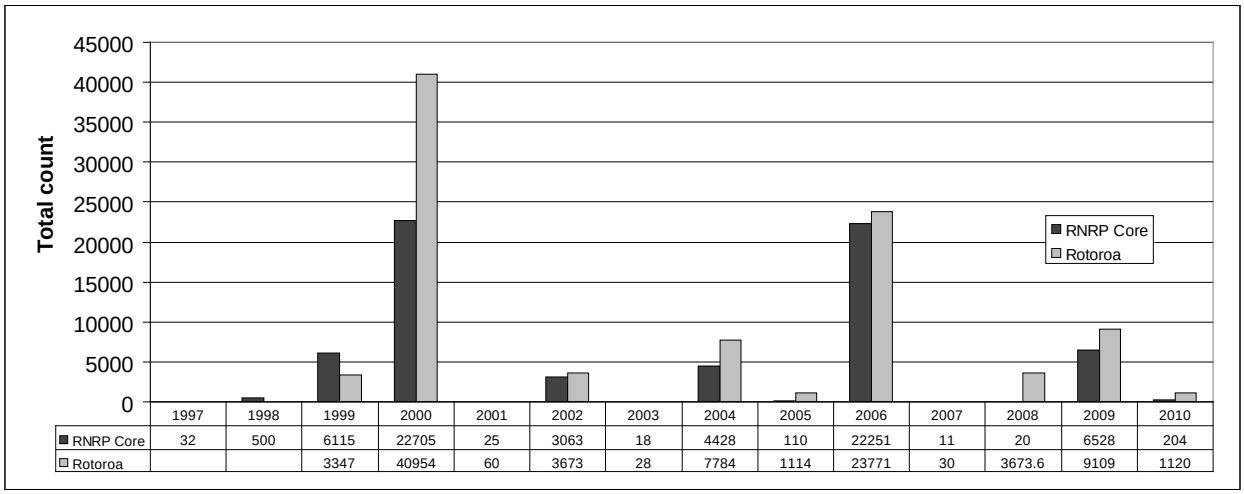
Results

The lack of flowering noted on beech trees over summer indicated that a mast-seed event was unlikely to occur in 2010. Very little beech seed was collected at either site and seed viability was also low (Table 3, Fig. 21). Silver beech at Rotoroa contributed the most seed, with one seedfall tray having a count of 656 seeds at relatively low altitude. Red beech contributed the most energy of the three species at Rotoiti.

TABLE 3: BEECH SEED COUNTS FOR THE MAINLAND ISLAND AND LAKE ROTOROA 2009-10

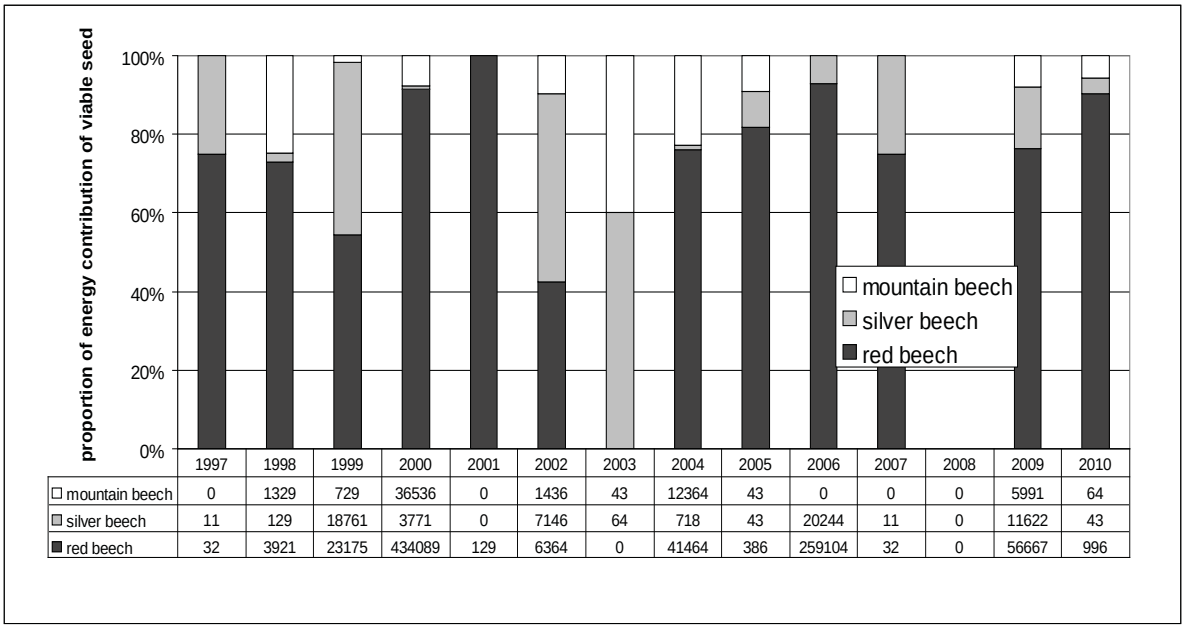
SITE		NOTFUS	NOTMEN	NOTSOL
Mainland Island	Total count	144	16	44
	Total viable seed	31	4	3
	Percentage viable	21.5%	25%	6.5%
Lake Rotoroa	Total count	64	986	70
	Total viable seed	9	14	15
	Percentage viable	12.5%	1.5%	18.5%

Figure 21: Total viable beech seed from the RNRP Mainland Island and Rotoroa.



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
RNRP Core	32	500	6115	22705	25	3063	18	4428	110	22251	11	20	6528	204
Rotoroa			3347	40954	60	3673	28	7784	1114	23771	30	3673.6	9109	1120

Figure 22: Energy contribution of seed by species in the RNRP Mainland Island.



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
mountain beech	0	1329	729	36536	0	1436	43	12364	43	0	0	0	5991	64
silver beech	11	129	18761	3771	0	7146	64	718	43	20244	11	0	11622	43
red beech	32	3921	23175	434089	129	6364	0	41464	386	259104	32	0	56667	996

Discussion

There was no beech mast event in 2010. Very little beech seed was collected at both sampling sites and seed viability was also very low. Climate records for the 2009-2010 period indicated a warmer than average summer, but probably not enough to initiate a beech mast in 2010-11.

3.5 SYSTEMATICALLY RECORD OBSERVATIONS OF PREVIOUSLY UNREPORTED NATIVE AND NON-NATIVE ORGANISMS IN RNRP

3.5.1 Introduction

Methods

The systematic recording of previously unreported native and non-native organisms is a new objective identified in the proposed RNRP Strategic Plan 2008-13. The intention of this objective is to maximise the learning from observations of species previously unknown to be present, regardless of whether the observation is part of an organised survey or not. Increased knowledge of the native species present in the RNRP is useful. Detection of invasive plants or animals will inform management actions to protect biodiversity values.

Results

There is currently a repository for new information; 'Flora and fauna of Lake Rotoiti Recovery Project'. New species were identified during 2009-10 were royal spoonbills at Kerr Bay on 29 December 2009 and a fairy prion on the St Arnaud Range in March 2010.

Discussion

Only two new species were recorded during the period and the prion was of the most interest, being found at ~1700m on the St Arnaud Range. Whether this sighting is an isolated event with a vagrant is possible, but it may also be a response by this species to the stoat trapping, as seabirds were known to nest on many inland ranges before mammalian predators were common.

3.6 FACILITATE RESEARCH TO IMPROVE OUR UNDERSTANDING OF THE ECOLOGY AND MANAGEMENT OF BEECH FOREST AND ALPINE SYSTEMS

3.6.1 Introduction

The RNRP continues to be a place of learning for external researchers. Two peer-reviewed scientific papers with a large component of RNRP data included were published this year (Elliott et al. *in press*, Wardle et al. 2010).

3.6.2 Research conducted during 2009/10

Short-tailed bat (Mystacina tuberculata) survey

Only two extant species of endemic bats occur in New Zealand, the lesser short–tailed bat (*Mystacina tuberculata*) and the long–tailed bat (*Chalinolobus tuberculata*). Both species have declined significantly since the arrival of humans, and their distribution is now discontinuous (O'Donnell and Sedgeley 1994).

A survey for short-tailed bats was conducted in late March/early April 2010 within the Core Area of the Mainland Island to determine whether they were present in the area.

Methods

Seven digital bat box recorders were placed within the Core Area for 14 nights from 26 March to 8 April 2010. The boxes recorded from 1900hrs to 0700 hrs each night.

Each bat recorder was secured with bungy cord as high as the surveyor could reach up each of seven beech tree trunks in seven different locations. Boxes were placed along rat lines at bait station numbers: CU17, CU22, RV20, RU05, RB19, BU05, BU01. These were set within the beech forest in areas where large, old red beech trees dominated the forest (preferred short-tailed bat habitat).

Results

The weather was generally fine with warm days but cool (occasionally frosty) nights. All seven boxes continuously recorded throughout the period.

No bat passes (long-tailed or short-tailed) were detected.

The boxes recorded kiwi calls at two locations.

Discussion

No bat passes were recorded in this survey. The survey nights were relatively fine but quite cool, perhaps too cold for bat activity. A bat survey in nearby St Arnaud village and Tophouse carried out earlier in the year (February 2010) recorded the occasional long-tailed bat pass but no short-tailed bat passes. It is highly likely that short-tailed bats are locally extinct in the area and are unlikely to exist within the RNRP. However, the survey will be repeated in 2011 to target short-tailed bats over the summer when conditions are more favourable for bat activity.

3.7 ANALYSE AND REPORT ON THE EFFECTIVENESS OF MANAGEMENT TECHNIQUES AND ENSURE THAT KNOWLEDGE GAINED IS TRANSFERRED TO THE APPROPRIATE AUDIENCES TO MAXIMISE CONSERVATION GAIN

3.7.1 Introduction

Analysing and communicating technical information about the effectiveness of management techniques is a key learning objective, linking directly to national Mainland Island Principle 2: "Results and outcomes are communicated". The RNRP transfers technical information to target groups through various documents including annual reports, field trial reports, and occasional publications, as well as through presentations to technical audiences and input to periodic workshops and hui. Technical analysis and communications need to be distinguished from advocacy work which is discussed in section 4.1.3., and includes brochures, newsletters and presentations targeted at non-technical groups.

3.7.2 Reports generated during 2009-10

The Fenn MkVI vs DOC200 trap trial was completed and written up.

3.7.3 Hui and workshops and presentations

All the RNRP staff attended a Kiwi Hui in Queenstown in April 2010.

4. Community objectives

4.1 INCREASE PUBLIC KNOWLEDGE, UNDERSTANDING AND SUPPORT FOR MAINLAND ISLANDS AND ECOLOGICAL RESTORATION NATIONALLY THROUGH EDUCATION, EXPERIENCE AND PARTICIPATION

4.1.1 Introduction

This year has presented more opportunities than in previous years to meet the project's community objectives, with a change of focus away from indoor RNRP PowerPoint presentations to guided (Honeydew) walks and talks within the project boundaries. These presentations are conducted as part of the educational programme for the Rotoiti Lodge Outdoor Education Centre. In total, just over eighteen hundred participants gained knowledge about Mainland Islands and specifically the RNRP.

Friends of Rotoiti, the local conservation volunteer group, have continued to move forward with their pest control trapping lines. Visiting individuals and groups of volunteers have provided their assistance to the project, and in turn, received quality ecological restoration experience and knowledge. Ongoing promotion of the RNRP has continued with the publication of two editions of the newsletter *Revive Rotoiti*, as well as displays in the Nelson Lakes Visitor Centre and articles in the Murchison and St Arnaud Community newsletters.

4.1.2 Friends of Rotoiti

This community group was formed in 2001, in partnership with the department, as a result of members of the local community wanting to assist with the efforts of the RNRP. As active conservation volunteers, members of the Friends of Rotoiti (FOR) maintain trapping lines for pest control, and learn about species monitoring and re-introductions. A key aspect to the group is to enable members to be trained in best practice techniques. This past year has seen a shift from general membership (with about half of the members actively volunteering) to the launch of a Supporters Group. This group supports the active conservation volunteers and RNRP with donations and sponsorship, which reached almost $3000 (to June 2010) and includes sponsorship of 16 DOC200 trap boxes. There are 47 active volunteers, with most regularly involved in rat or stoat trap checks. All active volunteers are expected to stay up to date with the groups activities, utilising a regular newsletter and attending at least two training meetings a year. This year, the group contributed 323 workday equivalents (one work day equals six hours), which is an increase on previous years. This is due to more hours working on trap boxes, changing trap boxes over from the Fenn Mk VI to the DOC200 traps, and the commencement of another stoat trapping line on Tophouse

Road. Note: FOR mustelid control methods and results are covered in section 2.1.2.

FOR rat control

Since December 2001, the FOR have been operating a rat control programme over 250 hectares adjacent to the St Arnaud township (Brunner Peninsula, Black Hill and Black Valley stream areas). Core board tunnels house Victor Professional rat traps, baited with a peanut butter and rolled oats mix. Fortnightly checks were carried out throughout the year. This year has seen a mouse plague throughout the warmer months, with over four thousand mice (4343) trapped, with only an usual number of rats being caught (116; Table 4). The increase in mouse numbers had no obvious cause, as a beech mast seed event did not occur. As in recent years, the 'by-catch' was limited, with one stoat, one weasel and a robin. This robin capture occurred on the Moraine Walk in March 2010, with the trap and tunnel found to be in good repair. The additional 41 traps on the Peninsula Nature Walk have been set during the entire year due to the high mouse numbers.

TABLE 4: FRIENDS OF ROTOITI RAT TRAPPING RESULTS FOR THE PAST THREE YEARS

	RODENT CAPTURES	
YEAR	RATS	MICE
2007/08	112	422
2008/09	113	446
2009/10	116	4343

FOR lizard monitoring

From the summer of 2002-03 to last year 2008-09, FOR have operated a lizard pitfall trapping programme for identifying lizard species present in the FOR rat control area. This programme was set up for FOR volunteers to gain experience with species monitoring and to identify population trends. After consultation with Peter Gaze (Technical Support Officer – Vertebrates; Nelson/Marlborough Conservancy Office), Nik Joice (RNRP) and John Wotherspoon (Programme Manager Community Relations – Nelson Lakes) monitoring was postponed for this year. Further discussion will be held in the coming year, with consideration of future methodology.

4.1.3 Volunteers

This year saw a reduction in visiting volunteers, with two individuals and two groups, making up a total of 31 volunteers who contributed 120 workday equivalents. The groups were the Conservation Corps (18) in November 2009 and a Pacific Discovery Group (11) in February 2010. Note that these volunteer hours do not include those contributed by the Friends of Rotoiti.

4.1.4 Advocacy and education

Revive Rotoiti

Two publications of this six monthly newsletter *Revive Rotoiti* were published in Spring 2009 (Issue 21) and Autumn 2010 (Issue 22). All editions are available online on the DOC website. A hard copy mail out was done to main stakeholders, who were asked if they would prefer to go on the email list, to reduce costs and environmental impacts. Copies of these newsletters are also available at the Nelson Lakes Visitor Centre and the Nelson Regional Visitor Centre.

Media releases and other advocacy work

A media release outlining the release of the three ONE kiwi chicks was distributed on 25 March 2010.

Both the Lake Rotoiti Community Newsletter and Murchison Newsletter have had articles submitted. The DOC webpage has several RNRP pages, and these are linked to the project's annual reports, strategic plan and newsletters.

Promotion continued this year at the Power Boat Show (February 2010) and the Antique and Classic Boat Show (March 2010). Updates were given at the Rotoiti District Community Council meetings and Nelson Community forums.

Visitor services

The RNRP corner in the Nelson Lakes Visitor Centre remained a focus for visitors wishing to learn more about the project. For those wishing to explore the project, the Bellbird and Honeydew Walks provided interpretation panels as educational tools and to broaden the experience for visitors.

Rotoiti Lodge Outdoor Education Centre – RNRP presentations

This year has seen a decrease in RNRP PowerPoint presentations at Rotoiti Lodge, with 24 talks being conducted to 760 students, compared to 37 talks to 1261 students last year. These students included Year 12 and 13 students who were learning about conservation and resource management as part of their National Certificate Education Achievement unit standard. A shift has occurred this year whereby schools prefer the RNRP guided walk option for their students, as opposed to the inside presentation option.

RNRP guided walks and other presentations

The number of RNRP guided walks this year is more than double that of last year, with 46 guided walks conducted for 814 students. Taking the students out into the project area provides a more personal experience whereby they see the practical hands-on aspects (such as traps and bait stations) and see and hear the bird life, rather than just the audio-visual side of the PowerPoint presentation. In addition, there were another eight RNRP/Nelson Lakes National Park PowerPoint presentations to other groups not staying at Rotoiti Lodge.

5. Discussion

A YEAR OF CHANGE

The 2009-2010 year was a year of change, which was reflected in the change in staff. Most of the RNRP personnel left the project during late 2008 and 2009 and were replaced with Grant Harper, Nik Joice and John Henderson, with Sarah Forder being made permanent. New people often result in alternative ideas and ways of approaching management but conversely results in a lag in application as new staff learn their new role. The RNRP also had a full staff complement for the first time in about 18 months, which meant that instead of simply 'coping' with the project's demand, progress began to be made.

So this report covers some changes and work achieved with the advent of a new complement of staff. There were some reviews of existing protocols, like the trapping regime for example. Less time will now be spent on trap checks than in previous seasons and in the winter will operate on more of a adaptive management approach, stretching out times between trap checks if there have been no previous mustelid captures. In addition, more trap lines have been set out or realigned to make up for probable gaps in coverage, especially in the Core Area and Big Bush, where kaka are in the highest numbers. The RNRP also investigated increasing the distance between wasp poison stations, and whether we could achieve effective kills of wasps with less work. This example is one of the reasons the RNRP was established, to test the efficacy of pest control methods and improve them if possible. This will save DOC and other agencies that control pests both money, effort and time in future.

This year also saw an increased focus on the small forest birds in the Mainland Island, which appear to have been neglected for some time as kaka and great spotted kiwi were the primary focus. Increased effort and resources were put into possum and cat control and planning for the first rat poison operation in the Core Area for many years was underway by the end of the reporting period. It is hoped that the native passerines can do as well as their larger cousins over the next few years.

One of the big questions that face the Project at present is where the RNRP fits into the nascent NHMS structure and what impact that will have on the funding and resourcing over the medium term. Recent scientific publications (Wardle et al. 2010, Elliott et al. *in press*) would suggest that the Project provides a useful site for ongoing research and has developed a significant database and monitoring record that is now producing information to inform and guide ecological management, particularly in beech forest ecosystems. This is the raison d'etre of the RNRP.

6. Acknowledgements

The Rotoiti Nature Recovery Project relies on support from fieldworkers, volunteers, technical staff and experts.

Thanks to the seasonal fieldworkers, namely Ruth Garland and Katrina Hale. Other staff at Nelson Lakes Area Office also assisted the programme on occasions with removal of traps (on a snowy day) and other shared logistics and costs.

The West Coast Cons Corp., Motueka Cons. Corp. and Pacific Discovery Volunteers all provided the grunt to get the traps on the hill and baffles into bait stations.

The Royal New Zealand Airforce, No. 6 Squadron, got traps onto the top of the hill.

Matt Gibb of Helicharter Nelson also got us, kiwi eggs, and traps in and out of the hills

Richard Toft of Entecol provided us with valuable advice and assistance relating to wasp control yet again.

Members of the Technical Advisory Group and external advisors provided advice at various times during the year (membership in Appendix 5).

Geraldine Moore provided a lot of assistance with mapping requests, and Trish Grant and Charmayne King helped with getting this report to print and with publicity for the project.

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Appendix 1: RNRP datasets

Data sets referred to in the report, and others that were maintained during the 2009-2010 year are listed below:

INTRODUCED SPECIES

DATA SET DESCRIPTION	FILE NAME AND LOCATION	CONTACT PERSON
Wasp bait stations	dme://docdm-612441/	Nik Joice
Possum captures	dme://docdm-516760/	Dan Chisnall
Possum monitoring results	dme://docdm-516760/	Dan Chisnall
Rodent tracking tunnel results	dme://docdm-621366/	Nik Joice
Mustelid captures	RNRP stoat database 09/10 - docdm-433158	John Henderson
Mustelid tracking tunnel results	dme://docdm-621366/	John Henderson
Ungulate sightings	dme://docdm-148952/	Grant Harper

NATIVE SPECIES

DATA SET DESCRIPTION	FILE NAME AND LOCATION	CONTACT PERSON
20 x 20 vegetation plots	Vegetation Plot Ring binder in RNRP office	Nik Joice
Beech seed fall monitoring	dme://docdm-60998/	Nik Joice
Mistletoe monitoring results	dme://docdm-72306/	John Henderson
Pittosporum patulum monitoring results	dme://docdm-199798/	Nik Joice
Powelliphanta monitoring results	dme://docdm-546239/	John Henderson
Great spotted kiwi monitoring	dme://docdm-156428/	Sarah Forder
Robin (Petroica australis) monitoring	S/drive-mainland is-robin-maps	Kate Steffens
Kaka (Nestor meridionalis) monitoring	dme://docdm-171970/	John Henderson
5-minute bird counts	5 minute bird count data - docdm-196645	John Henderson

Appendix 2: RNRP reports generated

Brow, A., Bruce, T., Harper, G. A. 2009. Animal Pest Field Trial Report for the efficacy of single-set DOC200 traps versus single-set Fenn Mk 6 traps set in wooden tunnels in the Rotoiti Mainland Island and environs (July 2008 - June 2009). DOCDM-478762.

Appendix 3: Project reviews

REVIEW DATE	REVIEW TITLE	FILE NAME AND LOCATION
NIL		

Appendix 4: Research reports received

NIL

Appendix 5: Project management

BUDGET

Staff (salary & wages)	$188,852	[excluding volunteer hours]
Operating	$33,328	
BNZ Save the Kiwi	$11,080	
Total	**$233,260**	

STAFFING

Grant Harper, Nik Joice, John Henderson, Sarah Forder, Ann Brow, Kate Steffens, Ruth Garland, Athena Irvine, Katrina Hale, Dave Rees, Dan Chisnall, Akira Doura.

TECHNICAL ADVISORY GROUP (TAG)

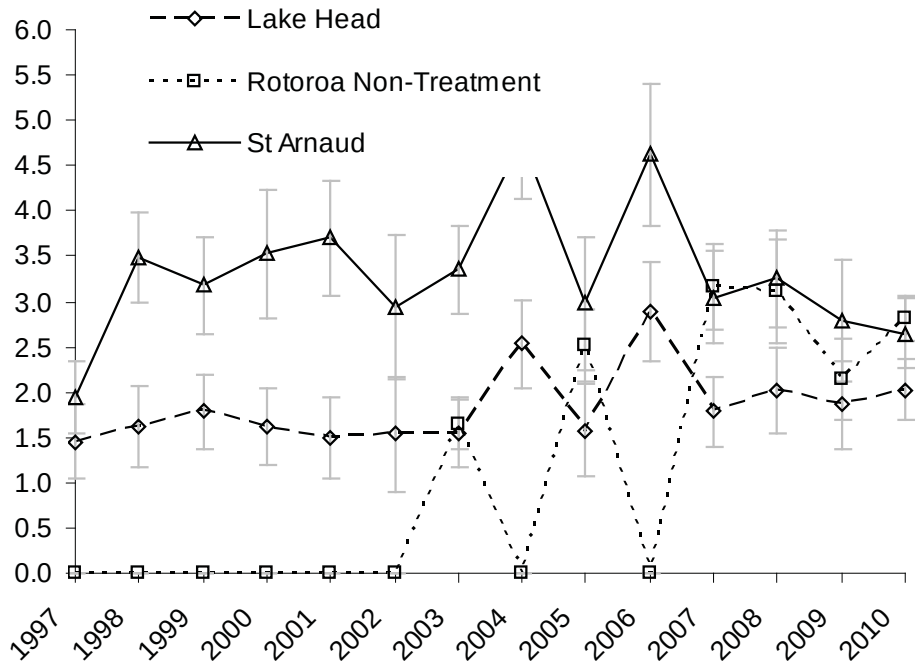
Kerry Brown, Peter Gaze, Craig Gillies, Grant Harper, Mike Hawes, Martin Heine, Dave Rees, Alison Rothschild.

RNRP ADVISORS

Mick Clout, Graeme Elliott, Dave Kelly.

Appendix 6: Bird count graphs

BELLBIRD



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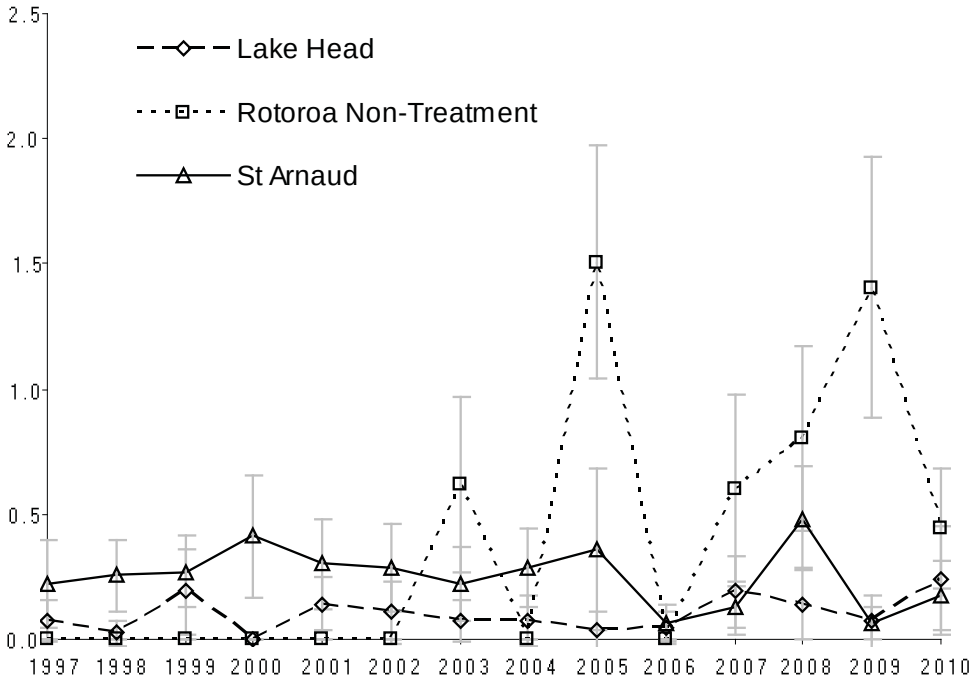

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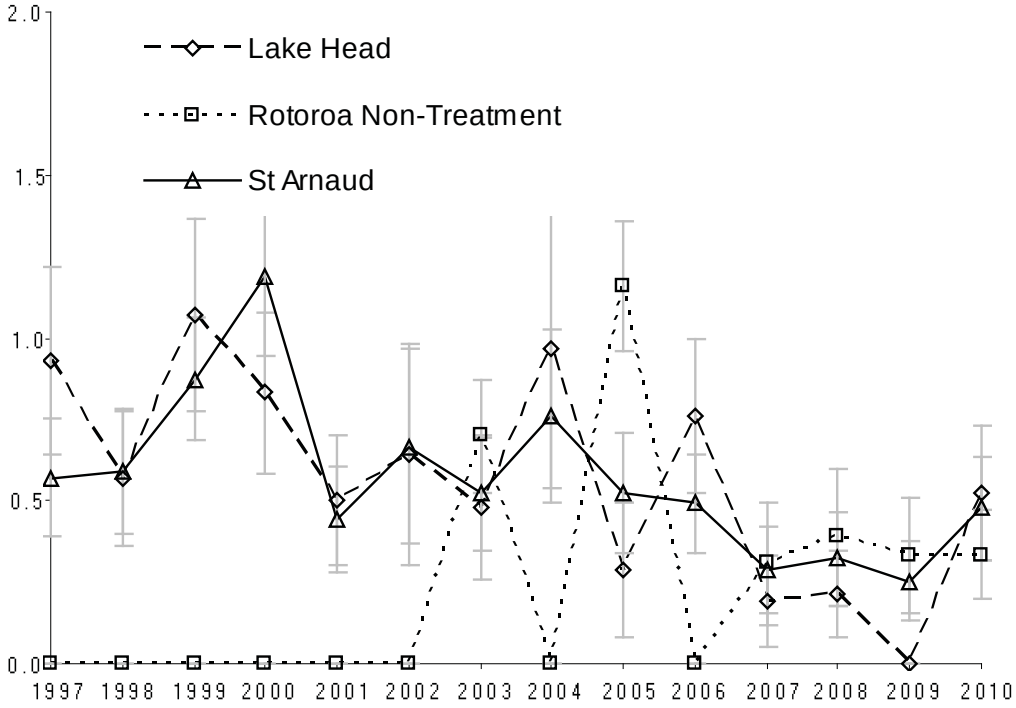
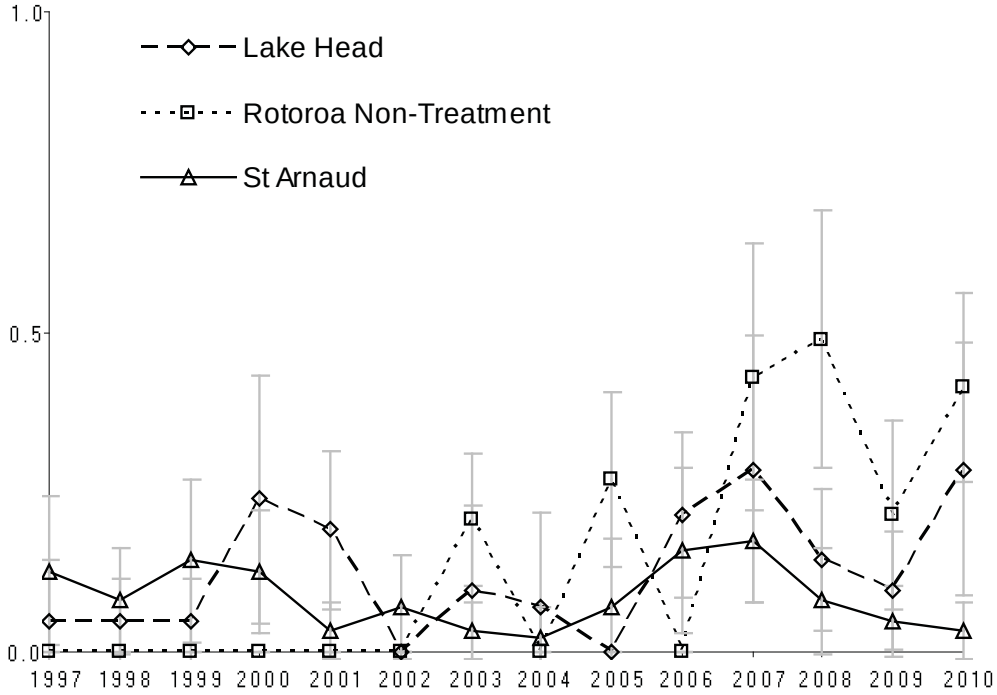
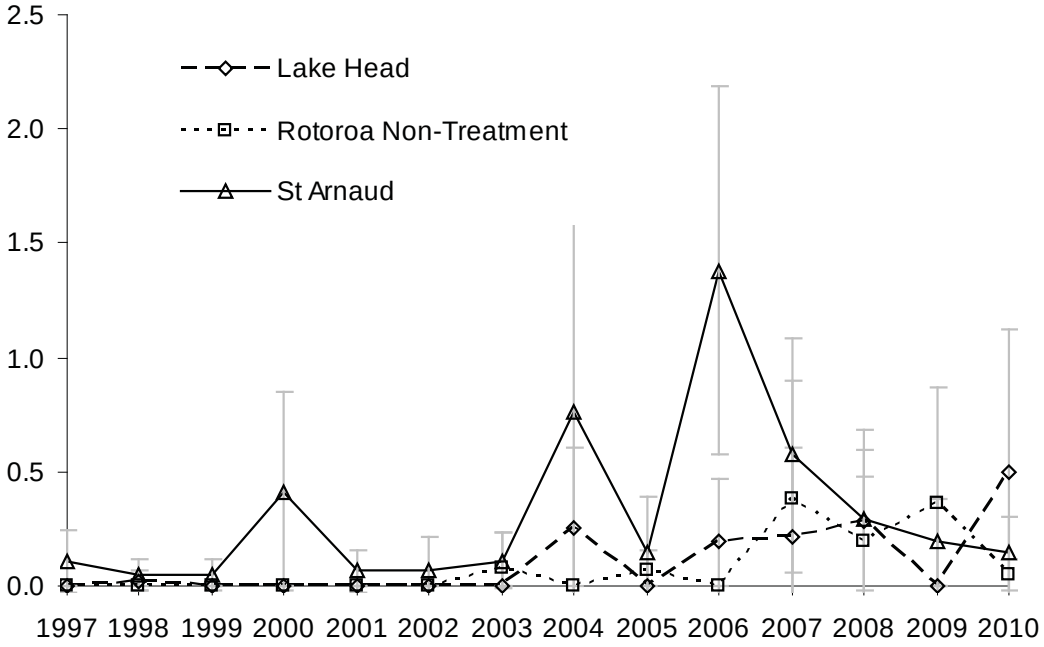


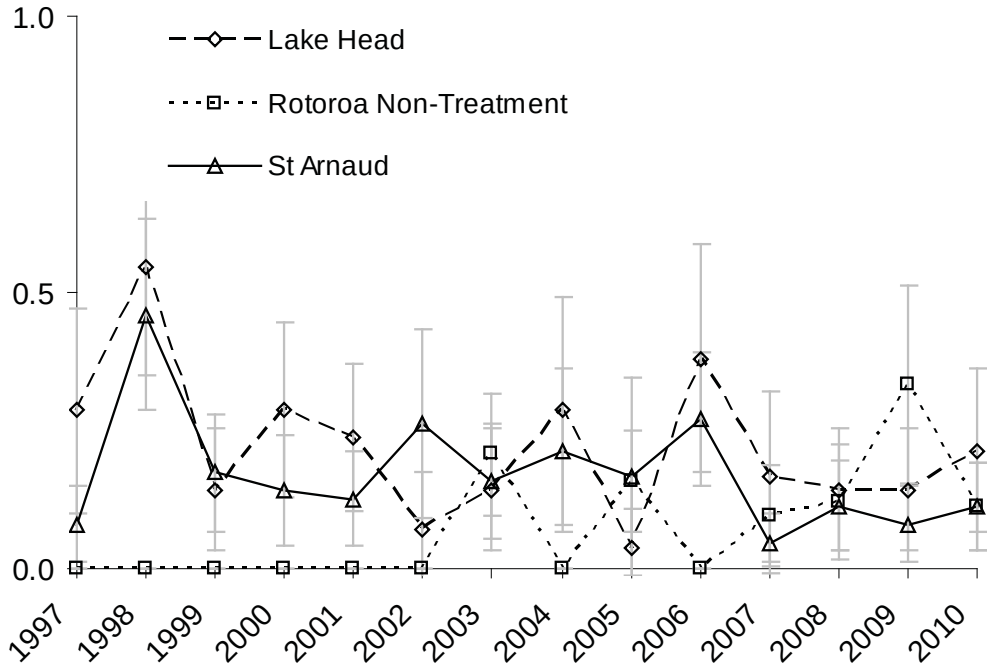
SOUTH ISLAND ROBIN



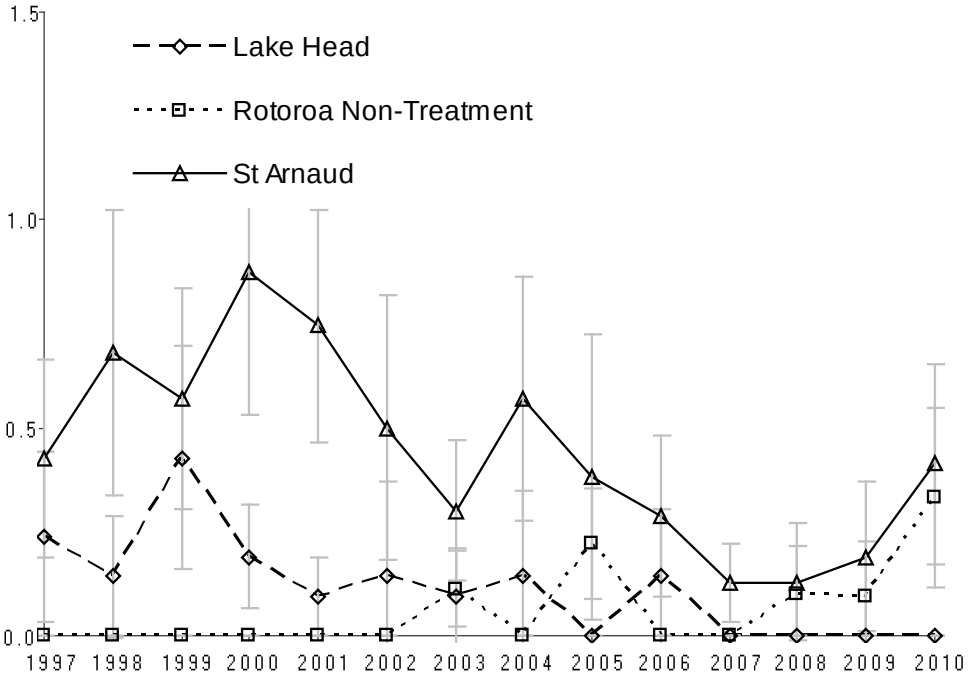
BROWN CREEPER



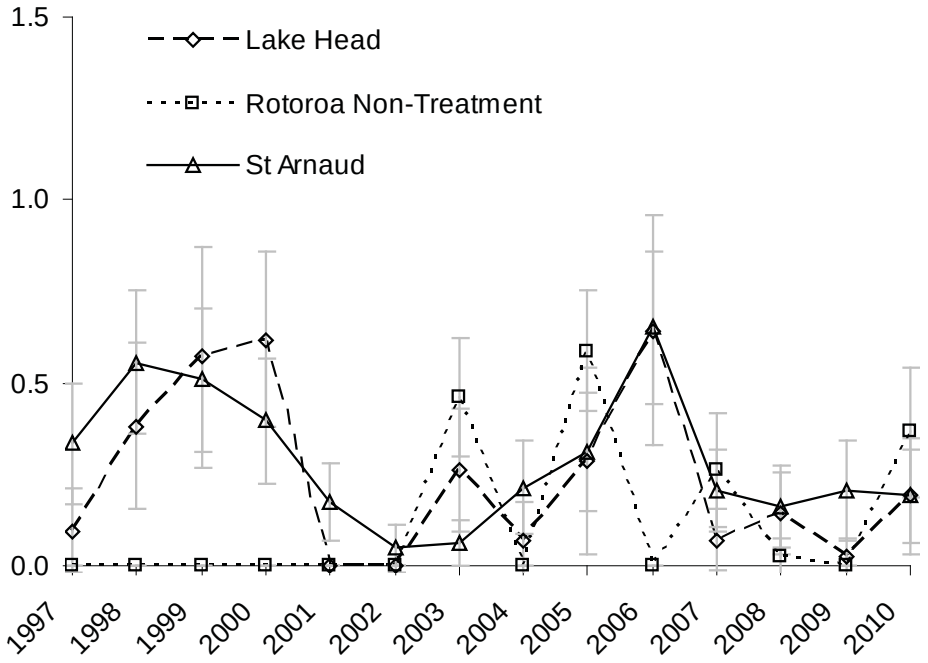
GREY WARBLER



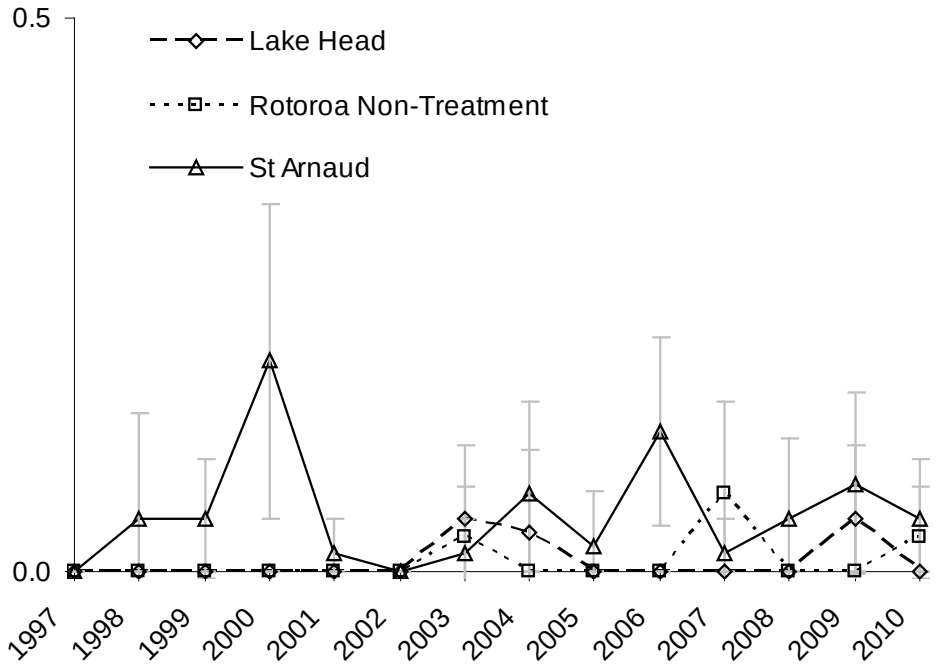
RIFLEMAN



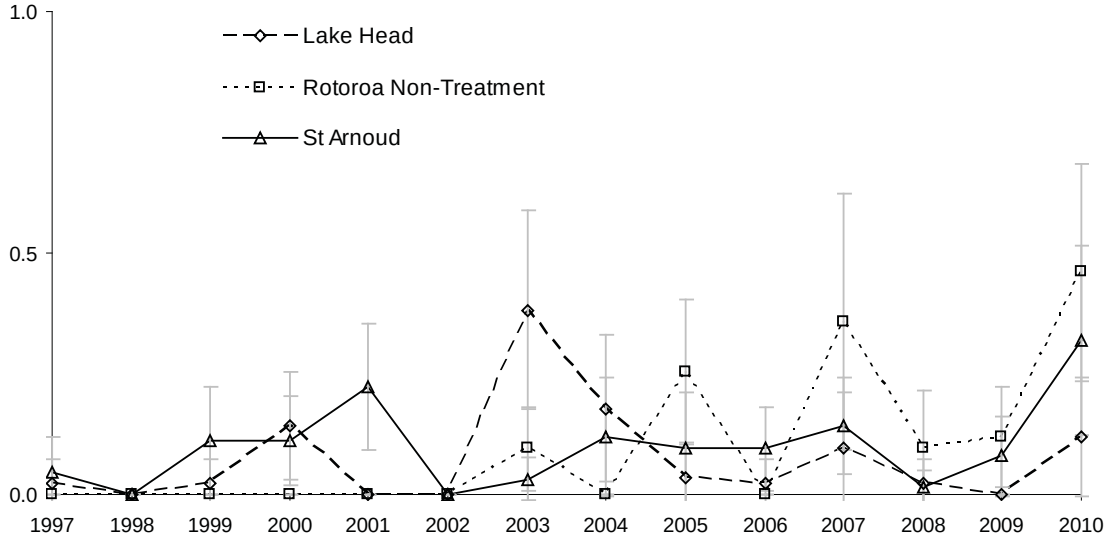
FANTAIL



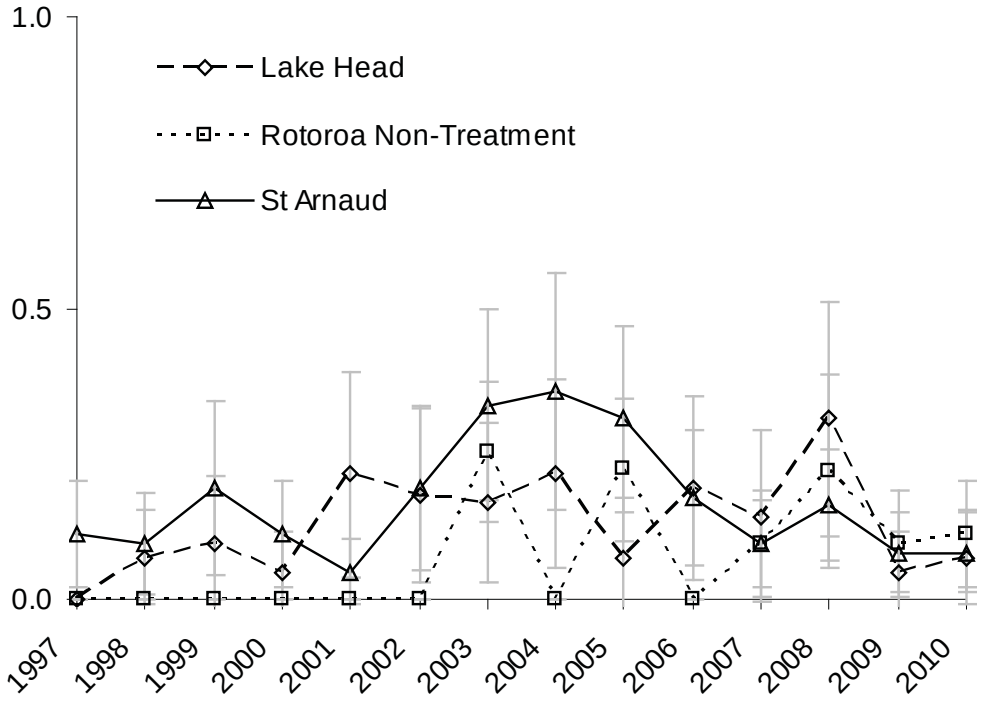
KAKA



YELLOW-CROWNED PARAKEET



B L A C K B I R D



C H A F F I N C H