Rotoiti Nature Recovery Project Annual Report July 2004 – June 2005

ST ARNAUD'S MAINLAND ISLAND, NELSON LAKES NATIONAL PARK

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Cover photo: Bellbird chicks, Alison Stanes.

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KEY RESULTS

Possum Control – Vegetation Response

Possum numbers were maintained at very low levels in the treatment area with no browse observed on the sensitive plant species monitored. RNRP kill trapping continued, and a continued presence of neighbouring Animal Health Board maintenance operations may have affected local possum activity. Wax chew stick monitoring indicates that possums continue to be maintained at low levels in the RNRP.

Rodent Control

Rat tracking indices are indicating that the current trapping techniques are showing a significant difference between the treatment and non-treatment area. The trapping regime was adhered to for the first time, giving a true test of the method. The indices still fell short of the target index. This year saw a partial mast seedfall in autumn 2004, ranking third in volume and second in energy contribution through the history of the project.

Mustelid Control

A moderate mustelid year was experienced based upon capture records. Tracking tunnel data this year demonstrated a significant difference in presence between the non-treatment site and the treated site. A similar but slightly higher result was recorded in the Wairau Valley indicating the Friends of Rotoiti mustelid control is effective at reducing mustelid activity.

Wasp Control

The current control area of 1,100 hectares was again treated with a non-preferred toxin, Finitron as opposed to the toxin of choice which had been Fipronil. The 2004-05 season was a high wasp season. Poisoning achieved a reduction in wasp numbers but failed to reduce wasps below the Ecological Damage Threshold (EDT). No assessment of invertebrate response was undertaken.

Response of Native Fauna

A non-breeding year for kaka precluded the ability to correlate nesting outcome with mustelid tracking tunnel results. The number of robin territories held in the survey area has remained stable over the past two years. However, there seems to have been a total lack of recruitment between the two seasons, with no new birds taking up territories in areas of historical robin breeding activity. Robin monitoring indicates that the previous seasons rat control is of insufficient quality to benefit robins. Five-minute bird counts were characterised by high counts for several species in May. Five minute bird counts were continued but were not subjected to any substantial analysis.

Reintroductions

The reintroduction of nine great spotted kiwi/roa to RNRP has been considered a partial success by meeting most of the operational performance measures. This suggests wild to wild transfers of adult roa may be an effective means of establishing new populations. All birds released remain in the recovery area and appear to have settled. All birds have been recaptured and are in good health with the majority gaining weight. One successful breeding attempt was observed. A further translocation is recommended.

Advocacy and Education

The presence of kiwi has maintained high public interest and support for the wider project. Local media has been active in pursuing the bird's progress with particular focus on the likely chick hatch, the one year health checks and to a lesser degree the recuperation and attempted introduction of the injured kiwi, Mohua. Evening talks at the Rotoiti Lodge and walks on the Honeydew Walk, predominantly for school groups, have largely maintained their popularity. Revive Rotoiti, due to staff changes, was only published once during the year.

Volunteers and Friends of Rotoiti

Casual volunteers, predominantly from oversees, continue to be an important resource to support the mainland island effort with 141 days of effort. The Friends of Rotoiti attracted new members and continued a solid effort in both rat and stoat trapping. Their efforts were recognised by the Tasman District Council awarding them the first place Environmental Award.

Research

Five reports were received for completed research undertaken in previous years at this site: four MSc theses, and one collaborative journal article between Landcare Research and project staff. Three projects continue or were initiated.

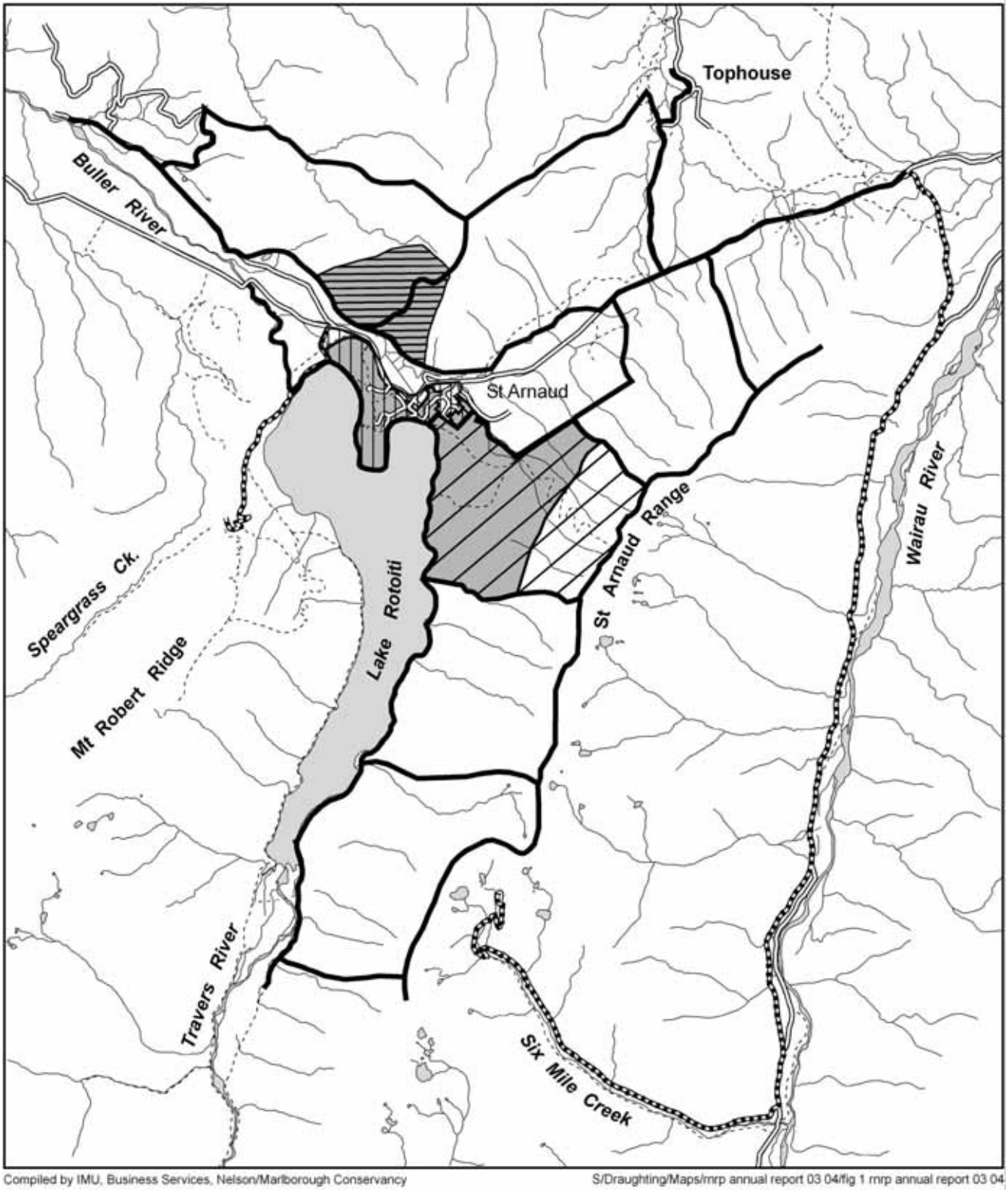
1. Introduction

The Rotoiti Nature Recovery Project (RNRP) is the name given to the mainland island project. It is based on beech forest containing honeydew, and is one of six such projects, two in the South Island and four in the North Island. The project area was extended in 2002 from the original 825 hectares on the slopes of the St Arnaud Range, Nelson Lakes National Park, to take in further forest in the Park to the north and south and part of Big Bush Conservation Area which made the total area managed 5,000 hectares. Figure 1 shows that different parts of the extended area are targeted for different pests and that some of the trapping is conducted by the Friends of Rotoiti community group. The overall site was chosen as representative of a habitat type that occupies about 1 million hectares or 15% of New Zealand's indigenous forests (Beggs 2001) particularly in the northern South Island, at a location accessible to visitors. It is crossed by three popular walking tracks adjacent to St Arnaud, the main gateway into Nelson Lakes National Park.

The same two non-treatment sites were used as in previous years at Lakehead (Figure 2), situated at the head of Lake Rotoiti about five kilometres from the treatment area covering similar aspect and altitudinal range, and Rotoroa or Mt Misery (Figure 3), situated at Lake Rotoroa 18 kilometres to the west of Lake Rotoiti, which extends to lower altitude.

This annual report presents its results within the project's three objectives (Section 2.0 below). Readers are referred to the Strategic Plan (Butler 1998) for the thinking behind these objectives and their translation into a long-term programme of scientifically based activities. More detail on methodologies or past results can be found in the Appendices.

Figure 1 Pest control areas RNRP



Compiled by IMU, Business Services, Nelson/Marlborough Conservancy S/Draughting/Maps/rnrp annual report 03 04/fig 1 rnrp annual report 03 04

Rotoiti Nature Recovery Project core rat control area

Rotoiti Nature Recovery Project stoat lines

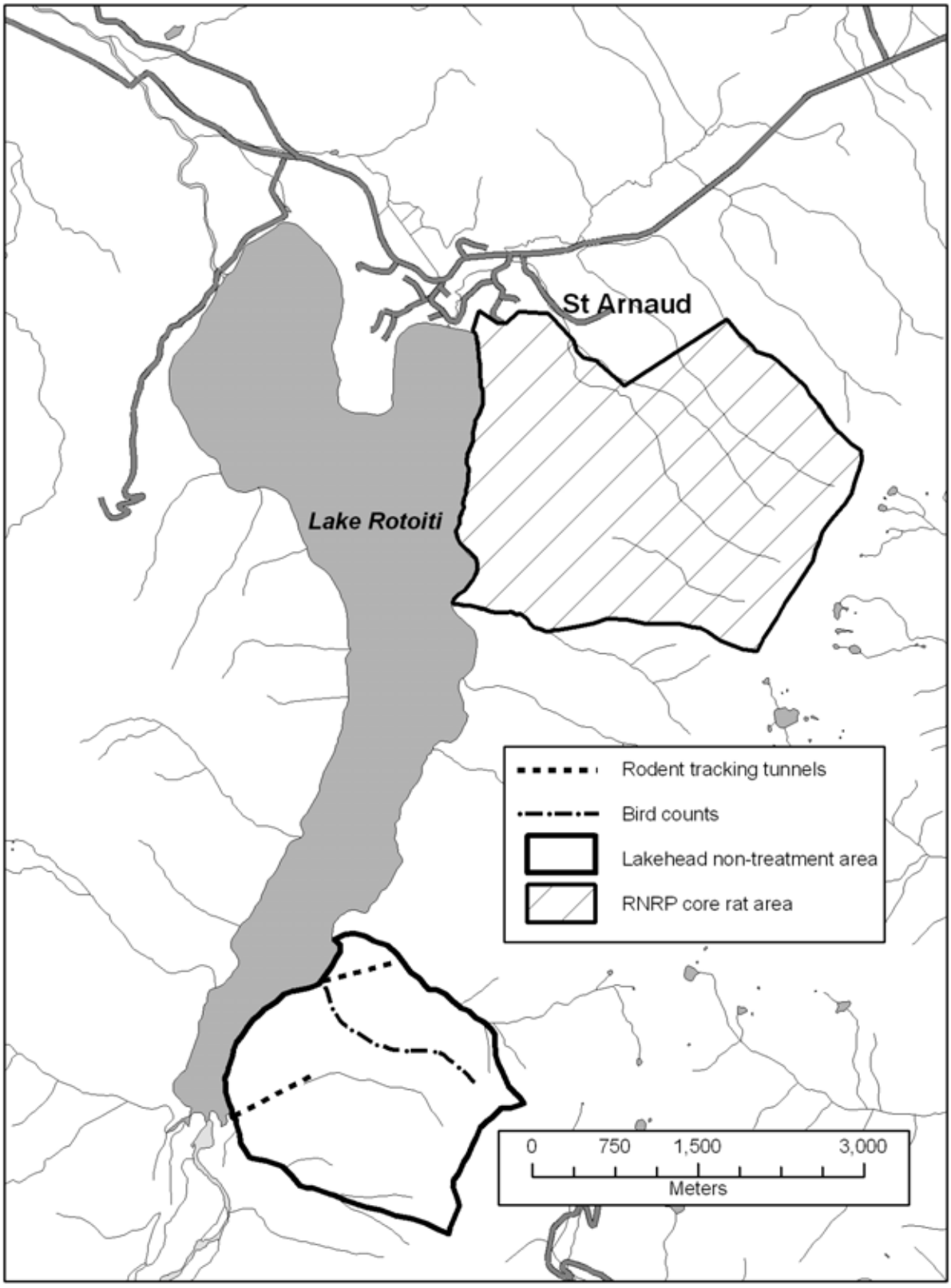
Rotoiti Nature Recovery Project Big Bush rat control area

Rotoiti Nature Recovery Project wasp control area

Friends of Rotoiti stoat line

Friends of Rotoiti rat control areas

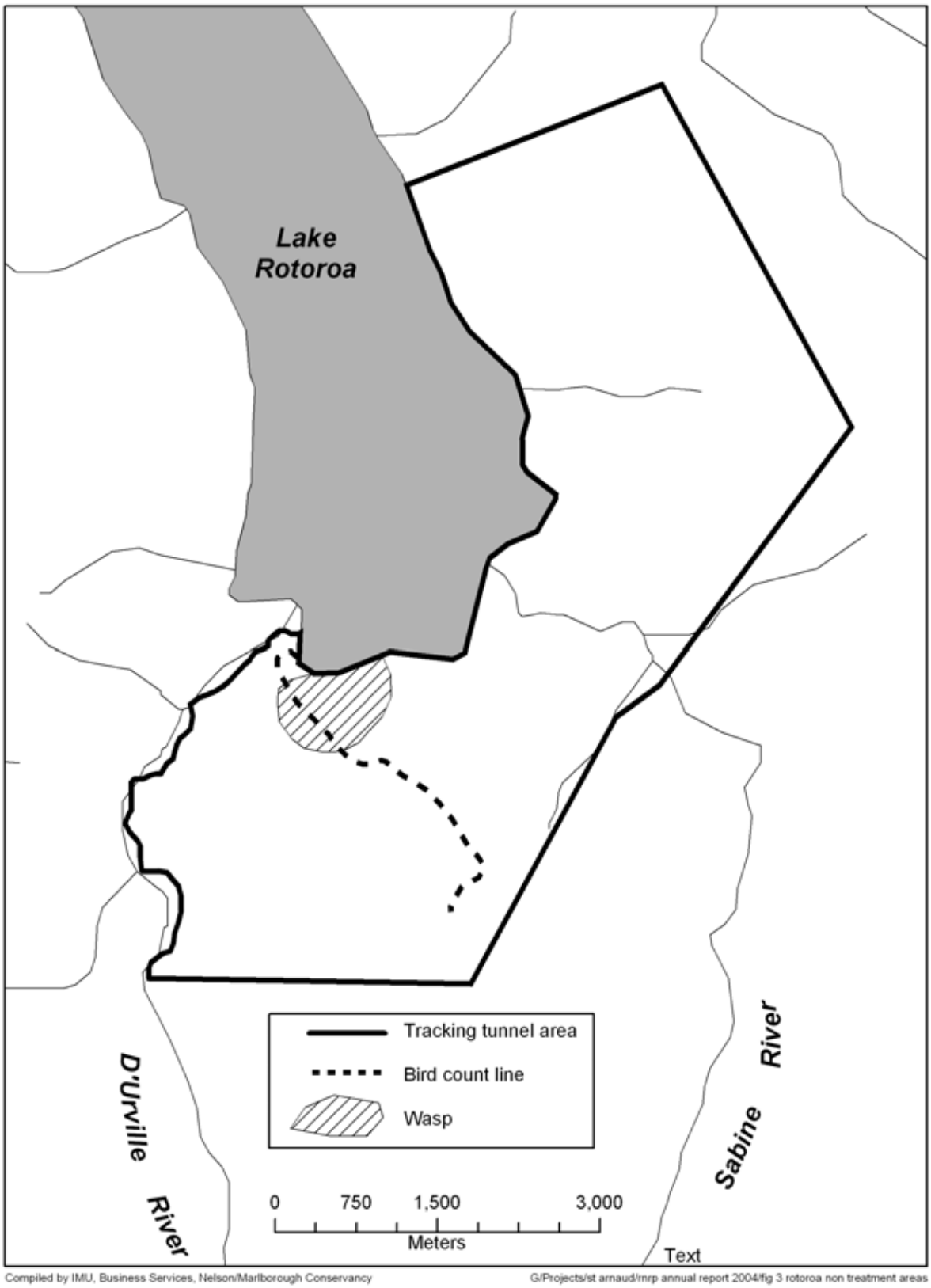
Figure 2 Lakehead non-treatment site



Compiled by IMU, Business Services, Nelson/Marlborough Conservancy

G/Projects/st arnaud/mrp annual report 2004/fig 2 non treatment area

Figure 3 Rotoroa (Mt Misery) non treatment site



Compiled by IMU, Business Services, Nelson/Marlborough Conservancy G/Projects/st arnaud/rnrp annual report 2004/fig 3 rotoroa non treatment areas

2. Project Goal and Objectives

GOAL

Restoration of a beech forest community with emphasis on the honeydew cycle.

Objectives

- To reduce wasp, rodent, stoat, feral cat, possum and deer populations to sufficiently low levels to allow the recovery of the indigenous ecosystem components (especially kaka, yellow-crowned parakeet, tui, bellbird, robin, long-tailed bat, and mistletoe) and ecosystem processes (especially the honeydew cycle).
- To re-introduce recently depleted species, such as yellowhead (mohua), kiwi and saddleback (tieke), once the beech forest ecosystem is sufficiently restored.
- To advocate for indigenous species conservation and long-term pest control, by providing an accessible example of a functioning honeydew beech forest ecosystem, so a large number of people can experience a beech forest in as near-to-pristine condition as possible.

3. Results – Pest Control and Monitoring

3.1 BRUSHTAIL POSSUM (*TRICHOSURUS VULPECULA*) CONTROL AND MONITORING

Objectives

- To maintain possum numbers long term within the RNRP at a level that:
  - Preferred browse species show increased growth/productivity and furthper plants re-establish.
  - Impacts on land snails are reduced to a level that is insignificant compared to other mortality factors.
  - Nesting success of kaka is maintained at a level allowing population growth.

Performance Measures

Operational

- Maintain existing kill traps and check in conjunction with mustelid Fenn™ trap lines as described in the RNRP Draft Operational Plan 2004-05.
- Plan future approach to possum control in the RNRP for inclusion in the 2005-06 Operational Plan.
- Maintain dialogue with biodiversity personnel undertaking liaison with Animal Health Board contractors as described in the RNRP Draft Operational Plan 2004-05.

Result

- Possum densities maintained at less than 2% residual trap catch (RTC), as assessed by the standard national possum control agencies (NPCA) monitoring protocol (conducted every 2-3 years).

Outcome

- Foliar browse indexing (FBI) monitoring shows an improvement in indicators within the treatment area.
- Impacts on kaka through nesting failure due to possums are reduced to a level that is insignificant compared to other mortality factors.

Methods

Refer to the RNRP 2003-04 Annual Report and RNRP 2004-05 Draft Operational Plan for detail on methodologies (dme: staao-10460).

Control

Kill trapping along the 'Borlase Boundary', 'German Village', 'Snail Boundary', 'Grunt Boundary' and 'MOR' Fenn™ trap lines as in the 2003-04 year. This work focuses on buffering the old Mainland Island core area only. During 2004-05 two rat traps were placed at each trap site along the German Village line in an attempt to reduce rat interference of possum lures. This rat trapping effort was designed to tie into a trial to investigate ways of reducing mouse interference of rat traps (see section 3.2, rodent control).

Trap-catch monitoring

No trap catch monitoring was undertaken in 2004-05. Resources were required elsewhere and it was decided to rely on the chew stick monitoring as an interim check on possum densities within the RNRP.

Chew stick monitoring

As in previous years, possum interference with wax chew sticks (designed by Pest Control Research as precursor to Wax-Tag®) was measured on four occasions.

Results

TABLE 1: TRAPPING OPERATION: NUMBER OF POSSUM KILLS

MONTH	BORLASE BOUNDARY	GERMAN VILLAGE	SNAIL BOUNDARY	GRUNT BOUNDARY	MOR
July	0	0	0	0	0
August	1	1	0	1	1
September	0	1	0	0	0
October	1	0	0	0	0
November	0	0	0	0	0
December	1	2	0	0	1
January	0	1	0	1	2
February	1	0	0	1	4
March	5	0	4	0	0
April	0	0	1	0	0
May	2	0	0	0	0
June	2	1	0	1	3
Total	13	6	5	4	11
# traps	60	23	10	10	12
Capture/trap*	0.22	0.26	0.50	0.40	0.92

*Not corrected for sprung traps

TABLE 2: TRAPPING OPERATION: NUMBER OF NON TARGET KILLS

LINE	SHIP RAT
Borlase Boundary	23
German Village	5
Grunt Boundary	0
Snail Boundary	0
MOR	6

TABLE 3: CHEW STICK RESULTS

	% STICKS CHEWED (+/- ONE STANDARD DEVIATION)			
	AUGUST	NOVEMBER	FEBRUARY	MAY
One night	0 (0)	1 (1)	0 (0)	2 (2)
Three night	1 (1)	0 (0)	1 (1)	0 (0)

There are some unresolved issues of independence between sample units in this data. A single possum could chew consecutive chew sticks. Since completion of this work protocols for the use of wax chew sticks as a result monitoring tool have been approved (National Possum Control Agencies, 2005).

Neighbouring operations

Neighbouring possum control operations for TB vector control were contracted out by the Animal Health Board and undertaken by Southern Pest Management. As in previous years, a 3km buffer, excluding toxins with secondary poisoning potential, has been maintained around the RNRP. It is acknowledged that neighbouring operations may impact the number of possums dispersing into the RNRP.

Tophouse Operation, 1 November 2004 – 28 January 2005 (File ref: NHT-02-16-143).

Subcontractor: Target Pest Contracting.

Raised leg-hold trapping and hand-laid toxins: Cholecalciferol long life gel baits, Feratox™ in bait bags, 1080 Exterminator paste, cyanide paste in bait stations.

Overall Actual RTC achieved: 0.7%.

Upper Motueka Operation, 26 October 2004 – 24 December 2004 (File ref: NHT-02-16-142).

Subcontractor: EcoFX.

Raised set leg-hold trapping.

Overall Actual RTC achieved: 0.3%.

Discussion

Wax chew stick monitoring indicates similar or lower possum activity in the RNRP core as in the 2003-04 year. This suggests that the current level of control is adequate for protecting the old core area. The project was unable to resource a Trap Catch monitor this year; the availability of the cheaper wax tag methodology will make monitoring of possum densities more achievable in the future. Quarterly 'quick checks' using wax tags in association with tracking tunnels is a useful tool for quickly evaluating possum densities in the RNRP in all seasons.

Outcome monitoring of Raukawa simplex by FBI recorded no observable possum browse indicating possum control to be effective for protecting floral values (Section 4.4.3).

Raw capture data suggests higher numbers of possums caught on the southern boundary (MOR). The next highest catching line was the northern buffer

(Snail Boundary). This pattern is not surprising as no possum control exists south of MOR, while German Village, Borlase Boundary and Snail Boundary lines all border AHB control areas. It is possible that RNRP possum control efforts have been assisted by AHB activities. This data still needs to undergo further analysis once more data has been collected.

Bait take, presumably from rat activity, along the German Village line has remained within acceptable levels since 18 February 2005. Rat traps will be maintained as long as rats are caught along this line.

Kaka did not breed in the 2004-05 year, so no assessment of the benefit of possum control to nesting kaka can be made. It is possible that possums may interfere with nesting great spotted kiwi and this may be a subject for investigation in the future.

Most possum control is dovetailed in with other activities, requiring only a slight increase in operational cost.

Recommendations

- Continue trapping of possums along existing possum trap lines.
- Use the WaxTag® protocol for future possum population monitoring.
- Continue quarterly WaxTag® 'quick checks' in conjunction with tracking tunnels.
- Continue with vegetation outcome monitoring.

3.2 RODENT CONTROL AND MONITORING

3.2.1 Ship Rats (*Rattus rattus*)

Objectives

To reduce rat numbers to levels at which:

- Predation of nesting birds (see section 4.1 bird monitoring);
- Predation of ground dwelling invertebrates;
- Inhibition of plant regeneration (through eating of fruit, seed);
- are insignificant alongside other mortality factors affecting these groups.

Performance Measures

Operational

- Grid spacing effectiveness will be examined at the end of the financial year, with indicative analyses done prior to business planning.
- Traps will be checked in accordance with prescribed frequency (see methods below).
- Trap entrance height will be examined against captures.
- 'Thomas' trap will be trialled against Victor Professional™.

Biological

- The biological response to rodent control will be measured; by means of tracking tunnels (result) and robin territory mapping (outcome measure).

Methods

Control – targeted trapping

Control was undertaken in 2004-05 by trapping as in the previous year using one Victor Professional™/hectare serviced fortnightly (see 2003-04 Annual Report).

Non-targeted trapping

Rodents are captured as non-target species during both possum and mustelid control.

Rat trapping trials

Two additional trials were undertaken this year. Both were undertaken outside of the rat trapping operational area. Preparatory work for a third was undertaken.

Trap Type

A new style of trap was tested for efficacy at excluding house mice (*Mus musculus*); for efficacy at killing ship rat *Rattus rattus*; and to assess for attractiveness to ship rat when compared against current best practice trap (Victor Professional™).

The 'Thomas' trap has a similar kill mechanism to the Victor Professional ™, but has a novel trigger mechanism.

Fifty paired 'Thomas' and "Victor Professional™" traps were set in new standard trap tunnels on a 200x 100m grid at the site known locally as "Weka Bush" (GR:@ 25020 59365).

The trial period was June 2004 to December 2004. Check frequencies varied but 34 checks were achieved.

The 'Thomas' trap trigger necessitated a different baiting strategy to the standard peanut butter mixed with rolled oats used in the Victor Professional™ traps. Several different styles of bait were used across the period of the trial, but were always consistent across all traps in any time period.

'Strike location' for all captures was recorded to test the null hypothesis that the "Thomas trap" will have no significant difference in kill type for ship rat than the "I Professional I™". The justification for this was that the "Thomas trap" is in development and has not been tested for 'humane kill', but it has a similar killing action to the approved Victor Professional™ trap and is therefore assumed to be 'unlikely to be inhumane'. Strike location were recorded as 1= head in front of ears; 2 = head behind ears and base of neck; 3 = forelimbs; 4 = torso; 5 = hind limbs; 6 = tail. Strike locations of '1' and '2' are considered most likely to deliver a 'humane kill'.

Following the paired trial at 'Weka Bush' and subsequent data analysis the second stage of the trial was 'operationalised' and incorporated within the Big Bush rat control area. This phase involved trap types being set alternately at

each trapping station and checked fortnightly in accordance with targeted trapping methodology.

Tunnel Entrance Height

Rat trap tunnel entrance height was examined both for efficacy in reducing mouse by-catch and comparative attractiveness to target animals (ship rats). Standard rat trap tunnels had been set previously at the base of 23 possum kill traps on the German Village line to reduce rat interference with the possum traps. A paired trial of tunnels with low entrances (ground level) and high entrances (at top of tunnel = 60mm above ground level) was implemented in October 2004. Ten checks in conjunction with possum trap maintenance were achieved.

Trap Density

The lower RNRP rat control area will be the venue for a rat trap density trial in the 2005-06 year, testing the relative efficacy of a 100m x 50m grid against the 'standard' of 100m x 100m grid. In preparation the 'Loop' and 'Watertank' areas were augmented with additional trap stations at intermediary points between existing traps. An additional 10 station (50m interval) tracking tunnel line was established in each of the trial sites to supplement the existing 20 station lines in 'Loop' and 'Rata' respectively. All traps and tracking tunnels had between three and six months 'weathering' on site to mitigate possible neophobic effect at commencement of trial (1 July 2005).

Monitoring

Tracking tunnel networks for rodents established at Rotoiti and Rotoroa (non treatment site) in previous years are monitored quarterly (August, November, February and May). All tunnels for rodent monitoring are centrally-baited with peanut butter, as opposed to end-baited as per the Department's Standard Operating Procedure (SOP) (Gillies and Williams 2002[a]), to retain continuity with the methodology previously used at this site. Tracking media are ferric nitrate and tannic acid treated papers.

A further site in the Wairau Valley/Eastern St Arnaud Range to monitor the effect of Friends of Rotoiti mustelid trapping in the valley floor and ski-field road. (See Section 3.3 Mustelids). This site provides rodent tracking information for a rodent non treatment site within a mustelid treated area. Tracking media is food colour on untreated papers. These tunnels are centrally baited for rodents.

Results

Trapping Effort

The prescribed operational performance measure was for fortnightly servicing of all traps was achieved with the exception of upper 'G' and 'H' lines which are serviced on an as required basis (see 2003-04 report). Traps in Big Bush were not serviced between July and early December due to vandalism having incurred in the 2003-04 financial year. A fortnightly service regime was followed from early February to end June.

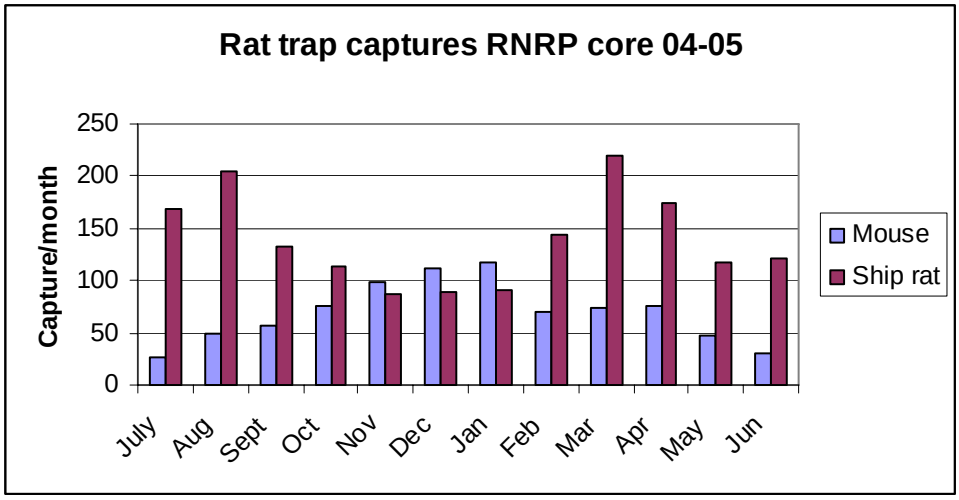
Targeted Trapping

Sixty percent more rats and similar numbers of mice were caught in the core area in rat traps this year compared with the last. This is expressed in Table 4 below as a ratio. Big Bush captures not presented as data exists for only part of the year.

TABLE 4: TOTAL CAPTURES FROM RNRP CORE RAT TRAPS BY YEAR

	RAT	MICE	STOAT	WEASEL	TOTAL
2003-04	1017	820	3	11	1851
2004-05	1660	833	9	4	2508
Ratio 2003-04; 2004-05	0.6:1	1:1	0.3:1	2.81	0.7:1

GRAPH 1: RAT TRAP CAPTURES BY MONTH, RNRP CORE



Note: Captures are recorded against date trap checked. Number of trap checks per month not always equal.

Rat capture peaks over the year were July through September, and then a further peak over autumn 2005. This is most likely a response to the seedfall of 2004, and a further response to the seedfall of 2005.

Trap covers in the core area are alternately black and white. Captures by cover colour were similar to the previous year, with no preference by any species (mouse, ship rat, stoat, or weasel) for either colour (white vs black = 1:1). Colour choice has now been tested in both high and low pest years and is shown to have no significant effect upon trap efficacy. This remains true when all years are aggregated.

TABLE 5: RAT TRAP CAPTURES BY COLOUR COVER

	MICE		RAT		STOAT		WEASEL		TOTAL	
	Black	White	Black	White	Black	White	Black	White	Black	White
2004-05	421 (51.2%	401 (48.8%)	810 (49.2%)	835 (50.8%)	3 (33.3%)	6 (66.7%)	2 (50%)	2 (50%)	1236 (49.9%)	1245 (50.2%)
Total Aug 2000 to June 2005	3578 (49.1%)	3578 (50.9%)	3341 (51.6%)	3128 (48.4%)	17 (48.6%)	18 (51.4%)	20 (55.6%)	16 (44.4%)	6956 (50.3%)	6870 (49.7%)

Cover colour preference by sex of trapped animal was examined, but is confounded by the high proportion (c.50%) of unsexed animals due to decomposition in the trap, or skill level/willingness of volunteers to sex. Mice were unsexed as they are considered non-targets.

Captures by Site

All rat traps are assigned to one of four major 'trap sites' - RNRP (core, perimeter north and perimeter south) and Big Bush. Results presented in Table 6 exclude Big Bush data as these are incomplete due to lost checks following vandalism.

TABLE 6: RAT CAPTURES BY SITE

	CORE	PERIMETER N.	PERIMETER S.
% of traps	61.8	25.8	12.4
% all captures	58.5	31.3	9.6
Ratio % of all captures: % of traps	0.95:1	1.21:1	0.78:1
% of mouse captures	61.7	29.7	8.5
Ratio % of mouse captures: % of traps	0.99:1	1.15:1	0.69:1
% of rat captures	57.3	32.2	10.3
Ratio % of rat captures: % of traps	0.93:1	1.24:1	0.83:1

Note: If all traps have an equal probability of capture then the ratio of captures to traps would equal one. Good 'fits' to this model are all sites for all species. RNRP Perimeter North does catch nearly 20% more animals than could be expected from its share of traps, a similar pattern observed in previous seasons.

Non-targeted Captures

No bird captures were recorded this year. Mammalian non-target captures are reported above. The lone non-mammal capture from rat trapping was a weta (not identified to species).

Grid Space Efficacy

No data is presented as this experiment is confounded by inoperative traps in Big Bush due to vandalism. Trap check efficiency is greater with the 200 x 50 m grid space in Big Bush with more traps checked per trapper hour.

"Thomas" vs Victor Professional™ trap trial

Baiting is an integral component of trapping, and teething problems with the 'Thomas' trap reflect this. A very high number of 'sprung empty' traps were recorded for the 'Thomas' trap until the wire coil bait was developed, and further reduce when this was employed vertically.

127 ship rats were caught, 72 in the 'Thomas' and 55 in the Victor Professional™.

Strike location was equal across traps for ship rats, with 77.7% of 'Thomas' and 76.4% of Victor Professional™ traps achieving a type '1' or '2' strike (head and neck area). The single weasel was a type '2' capture in a 'Thomas' trap. Mice captures received the full range of strike locations, with most being type '4' (body), and many being multiple strike (e.g. limbs and body, body and tail).

Mouse captures were even over all bait types for Victor Professional™ traps. A high proportion (76%) of 'Thomas' mouse captures were on peanut butter and almond.

TABLE 7: TUNNEL ENTRANCE HEIGHT TRIAL

	ENTRANCE HIGH	ENTRANCE LOW
Ship rat	11 (19.6%)	45 (80.4%)
Mouse	0 (0%)	5 (100%)

Ten checks of 23 paired tunnels were made. Trap tunnels with low entrances appear to be favoured by ship rats over those with high entrances. Of the 11 ship rats caught in tunnels with high entrances, only 4 (36%) were caught when the low entrance tunnel adjacent was unoccupied. Analysis can not be made as to which tunnel was occupied first in this situation, but observer anecdote suggests those animals found in high entrance tunnels are fresher (less decayed). All mice were caught in low entrance tunnels, but the sample is very small.

Friends of Rotoiti Trapping

TABLE 8: FRIENDS OF ROTOITI RAT TRAP CAPTURES

	RAT	MOUSE	HEDGEHOG	STOAT	FERRET	WEASEL
2004-05	167	428	6	2	0	0

Friends of Rotoiti Non-target Captures

2004-05 yielded eight mammalian non-target captures (six hedgehogs, two stoats), and zero non-mammal non-target captures. This suggests that modifications last season to reduce tunnel entrance size following bird captures in previous years have been successful.

Non-targeted Trapping

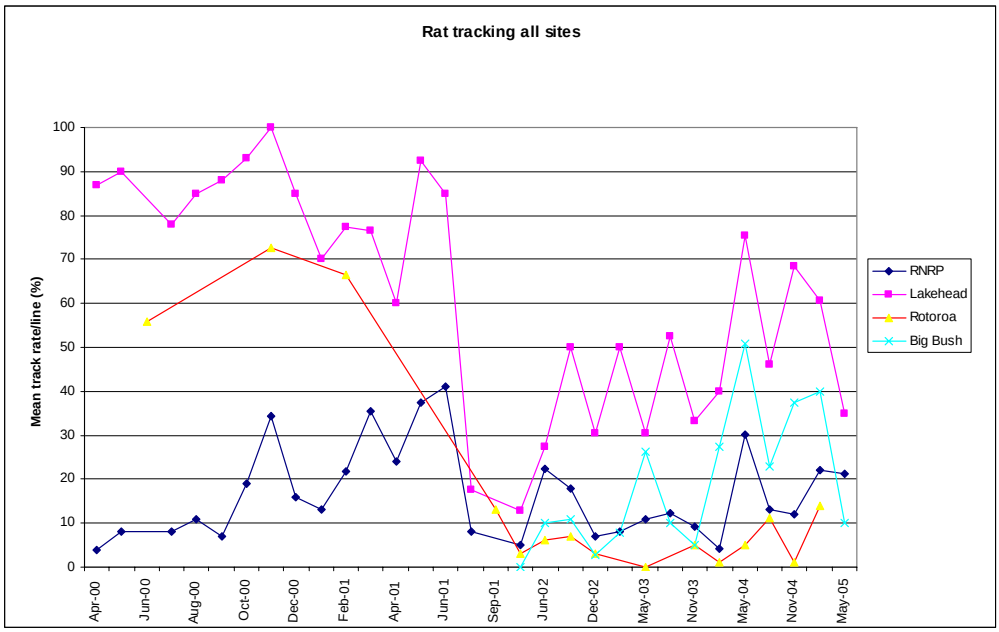
Rats were caught in both RNRP and Friends of Rotoiti Fenn™ trapping programmes targeting mustelids, and in RNRP possum control trapping operations. See respective sections of this report. Only some parts of the RNRP possum and Fenn™ operations overlap with rat control operations. The by-catch rate of rats from these operations is considered insignificant to impact upon the targeted operations.

Tracking Tunnel Monitoring

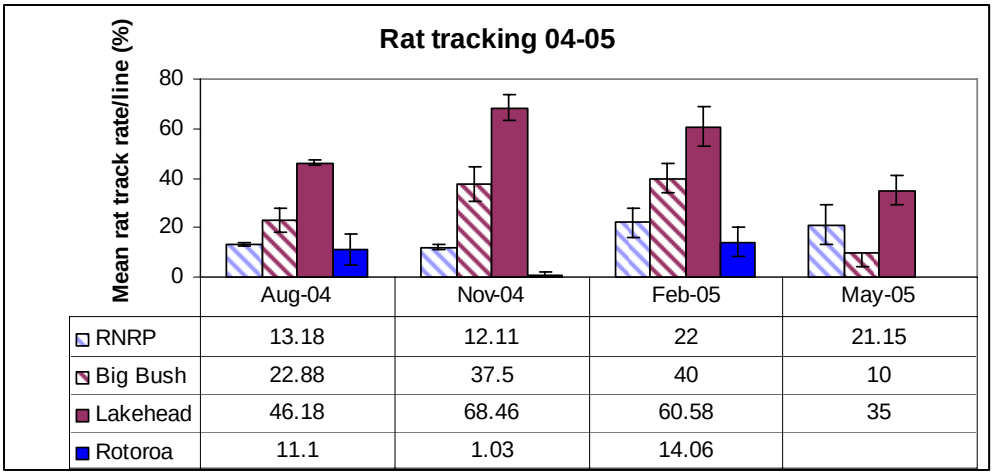
Rodent tracking results:

Four rodent tracking tunnel surveys were undertaken this year, with the last (May) excluding the Rotoroa site due to poor weather.

GRAPH 2: RAT TRACKING ALL SITES



GRAPH 3: RAT TRACKING 2004-05



	Aug-04	Nov-04	Feb-05	May-05
RNRP	13.18	12.11	22	21.15
Big Bush	22.88	37.5	40	10
Lakehead	46.18	68.46	60.58	35
Rotoroa	11.1	1.03	14.06	

Note: Rotoroa May no monitor; Big Bush treatment commenced February.

Tracking indices for treated areas are different from those of the local non-treatment site of Lakehead. The Rotoroa non-treatment site tracked very low numbers of rats over the previous few seasons.

Data presented above aggregates all tracking line data in RNRP as mean tracking rate per line. For comparison with the local non treatment site (Lakehead) it is useful to focus upon those lines occupying similar altitudinal range. Tracking lines 'Loop' and 'Rata' fit similar altitudinal ranges to Lakehead (approximately 620 - 950 metres above sea level). This year a good fit between 'all RNRP' and 'lower RNRP' is achieved with the exception of the May quarter.

If we assume that if Lower RNRP were not treated, rat indices would be similar to Lakehead we can ask the question "what reduction in tracking index has treatment achieved?"

TABLE 9: RAT TRACKING REDUCTION FROM UNTREATED

	LAKEHEAD	LOWER RNRP	REDUCTION
August 04	46.8	12.5	73.3%
November 04	68.5	12.5	81.8%
February 05	60.5	22.5	62.8%
May 05	35	30	14.3%

Note: Reduction of rat index in treated site from non-treated = [(Index non-treated) minus (index treated)] divided by (index non-treated).

Rodents were tracked when tracking tunnel surveys were run targeting mustelids. This data is not presented as it represents a 'by-catch'. Data from these surveys should be assessed at some stage for correlation with rodent targeted surveys.

Discussion

Previously biological performance measures of a prescribed tracking rate (5%) or a process for assessment against untreated sites and subsequent move to contingent measures had been specified. These have not been attained in previous seasons for several factors. The prescribed delivery regime had not been met, thus limiting the 'test'; the non-treated site at Rotoroa has recorded negligible levels of rats casting doubt upon its value as a reference site; and contingent measures or planning for such have never been included in annual business plans. Thus the biological performance measure has been modified to reflect this and now states that we will have no preconception regarding outcome but rather observe and record any response.

Previous inability to meet the operational performance targets for trap check frequency has been a major limitation to testing any of the hypotheses. This was achieved this year and allows us to state that the current rat trapping is unable to achieve a 5% tracking rate, but can achieve a significant reduction from untreated sites.

Ongoing issues of vandalism affecting rat trapping operations preclude any ability to compare treatment regimes (spatial arrangement). Analysis of the parts of years unaffected by vandalism may allow this comparison, but will be affected by the lack of continuity of treatment at the Big Bush site.

The 2004 beech seed fall was similar in volume to the events of 1999 and 2002. The energetic contribution was similar to 1999, but three times greater than that of 2002. This is borne out in the tracking rates at both non treatment sites, and to a reasonable extent at the treated site, particularly during the rat trapping era. The 2004 event can be described as 'typical' of beech seedfall events measured at Nelson Lakes between 1974 and 2005 with a (log10) seedfall/metre^2 value around 2.5 (after unpublished data P.R. Wilson et al).

The increase in rats caught in traps coinciding with the beech seedfall events indicate this period, or that immediately preceding it, should be targeted to maximise efficacy of rat control.

Rats continue to be present only at low levels at the Rotoroa non-treatment site. Data from this site has not been used for analysis; rather the focus has been placed upon the local non-treatment site of Lakehead. It must be

acknowledged that this site is now encompassed within the expanded mustelid control regime.

The potential positive outcomes of rat control are discussed under bird monitoring (Section 4.1).

3.2.2 Mice (*Mus musculus*)

Since July 2000 mice have not been targeted for any control but they have been caught as a significant by-catch during rat trapping. It is noted that although mice were targeted prior to August 2000 via brodifacoum poisoning it was shown to be ineffective at reaching target indices (Butler, 2003; Ecosystems Consultants, 2000). Monitoring was carried out using tracking tunnels as for rats.

Methods

Monitoring

Mouse activity indices are derived from rodent tracking tunnel monitoring at RNRP, Lakehead, Big Bush, Rotoroa and a new site this year in the Wairau Valley/eastern St Arnaud Range. (Section 3.2.1). Mouse activity indices are also generated from mustelid tracking tunnel monitoring at the above sites. This data is not presented as it represents a 'by-catch'.

Non-targeted Trapping

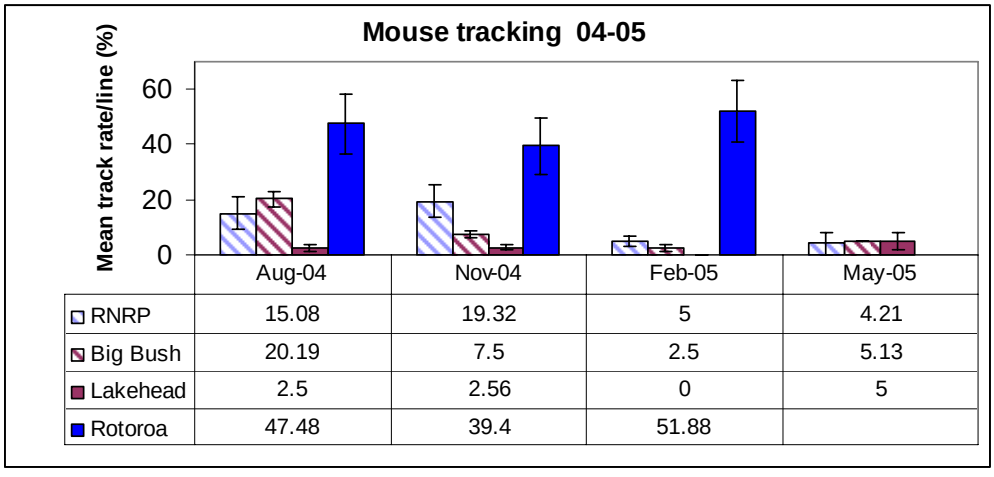
Mice are caught as by-catch from rat trapping operations (Section 3.2.1).

Results

Tracking Tunnel Monitoring

Four tracking surveys were achieved this year at all sites with the exception of Rotoroa in August (poor weather).

GRAPH 4: MOUSE TRACKING



	Aug-04	Nov-04	Feb-05	May-05
RNRP	15.08	19.32	5	4.21
Big Bush	20.19	7.5	2.5	5.13
Lakehead	2.5	2.56	0	5
Rotoroa	47.48	39.4	51.88	

Non-targeted Trapping

Rat traps in RNRP core caught 833 mice as by-catch, and 79 from Big Bush. Mouse captures this year showed a 'bell curve' distribution centred upon summer (see Graph 1: rat trap captures by month in rat trapping above)

Friends of Rotoiti rat traps caught 428 mice, exceeding rat captures by 3.2:1. A similar relationship was apparent in previous years.

Discussion

From tracking tunnel results mice were present in reasonable numbers only at the Rotoroa non treatment site throughout the year. Mouse tracking indices remained low at the Lakehead non-treatment site throughout the year. Changes though the year in the tracking and trapping rate in the RNRP core area are not equal, and the relationship between these two measures could benefit from examination.

Both effectively targeting mice, and removing the negative influence of mice upon targeted rat control, remain areas of concern for this programme.

3.3 MUSTELID (STOAT – MUSTELA ERMINEA, FERRET – M. FURO, WEASEL – M. NIVALIS) CONTROL AND MONITORING

Objectives

- To maintain mustelid numbers long term within the recovery area at a level that allows local recovery of populations of resident birds (particularly kaka) and re-introduction of species vulnerable to mustelid predation (e.g. mohua, tieke).
- To monitor thirty kaka nesting attempts and during this period develop a target mustelid tracking index related to kaka nesting success.
- To refine and maximise efficiency of mustelid control in the RNRP.

Performance Targets

Operational

Check and maintain all Fenn™ sets and manage carcasses as described in the 2004-2005 RNRP Draft Operational Plan, and the RNRP Operational Field Manual (Appendix 2).

Liaise with and support the Friends of Rotoiti community trapping group and national mustelid research project leaders as required.

Obtain quarterly 'relative activity' indices for mustelids at treatment and non-treatment sites as result monitoring of mustelid control and forward tracking tunnel data to national survey coordinator.

Result

No result targets have been set. Mustelids were monitored for the third time this year using tracking tunnels in accordance with the National Tracking Tunnel standard operational procedure (SOP Gillies and Williams, 2002[a]). Over the next year tracking tunnel indices for mustelids will be correlated with kaka nesting success to guide development of a target tracking index for future operations.

Outcome

Maintain an increasing kaka population in the RNRP (see the 2004-2005 RNRP Draft Operational Plan, and Moorhouse, (1998)).

Increase in numbers and/or range of bird species recorded in 5-minute bird counts, compared with historical data and non-treatment areas.

Contribute to national understanding of mustelid activity and the effects of control.

Control Methods

Stoats are the primary target for mustelid control. Ferrets and weasels are caught as well but may not be optimally targeted by this system. Both the RNRP and Friends of Rotoiti continued kill trapping following the same methodology as in the 2003-04 year (refer to the RNRP 2003-04 Annual Report for detail).

Liaison with the Friends of Rotoiti trapping group continued throughout the 2004-05 financial year.

Neighbouring Pest Control Operations

Neighbouring possum control operations for Tb vector control were contracted out by the Animal Health Board. As in previous years, a 2km buffer, excluding toxins with secondary poisoning potential, has been maintained around the RNRP. However, it is acknowledged that the wider Tb vector control may still have some impact on numbers of mustelids invading the RNRP.

Neighbouring Tb vector control operations in the 2004-05 year are as follows:

1. Tophouse Operation, 1 November 2004 – 28 January 2005 (File ref: NHT-02-16-143)

   Subcontractor: Target Pest Contracting

   Raised leg-hold trapping and hand-laid toxins: Cholecalciferol long life gel baits, Feratox™ in bait bags, 1080 Exterminator paste, cyanide paste and bait stations.

2. Upper Motueka Operation, 26 October 2004 – 24 December 2004 (File ref: NHT-02-16-142)

   Subcontractor: EcoFX

   Raised set leg-hold trapping.

3. Wairau TB Survey 2004-05 and Rainbow Ferret Survey 2004-05, contracted out by the Marlborough District Council. All information stored at the Marlborough District Council.

   Ground set leg-hold trapping.

Monitoring Methods

As in the 2003-04 year, tracking tunnels were run in the RNRP, the Rotoroa non-treatment site and within the Friends of Rotoiti trapping network in the Wairau Valley (see the RNRP 2003-04 Annual Report and the RNRP Operational Field Manual for methodology, maps and further detail).

As no target tracking tunnel index has been set, data cannot be used to assess achievement of result targets. The primary use of this data is to record the effect upon the mustelid population of trapping according to the operational performance target. Mean tracking rate per tracking tunnel line is the figure used to assess control effect.

Results

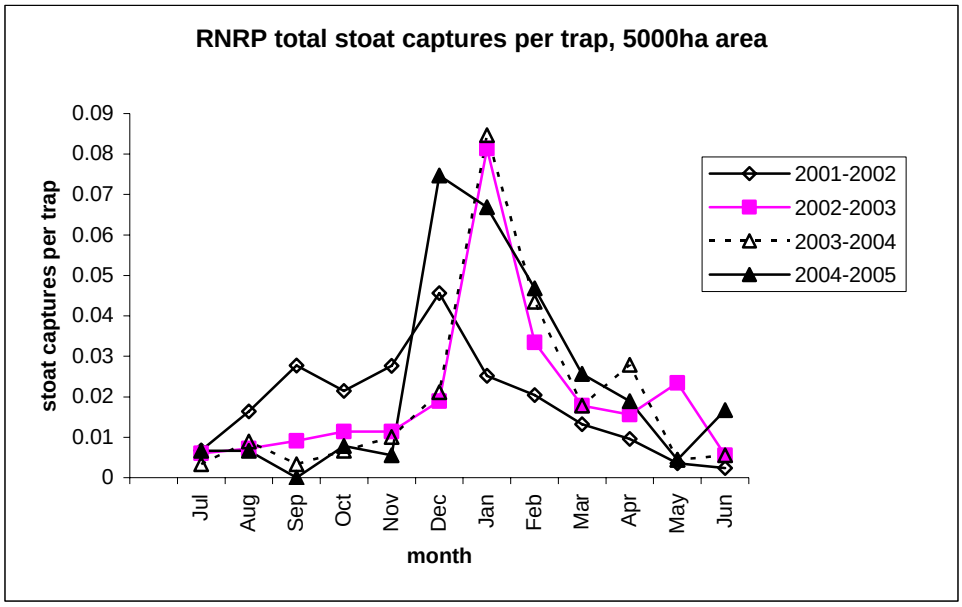
Stoats

GRAPH 5: TOTAL STOAT CAPTURES, 2004-05

MONTH	ST. ARNAUD RANGE	BIG BUSH	RNRP TOTAL*	RAINBOW VALLEY	MT ROBERT
July	1	4	6	1	2
August	1	5	6	0	0
Sepember	0	0	0	0	2
October	4	2	7	1	1
November	2	3	5	0	1
December	53	7	67	34	2
January	43	14	60	26	8
February	22	17	42	6	2
March	8	14	23	4	2
April	10	7	17	3	0
May	1	3	4	11	2
June	7	8	15	0	0
Total	152	84	252	86	22

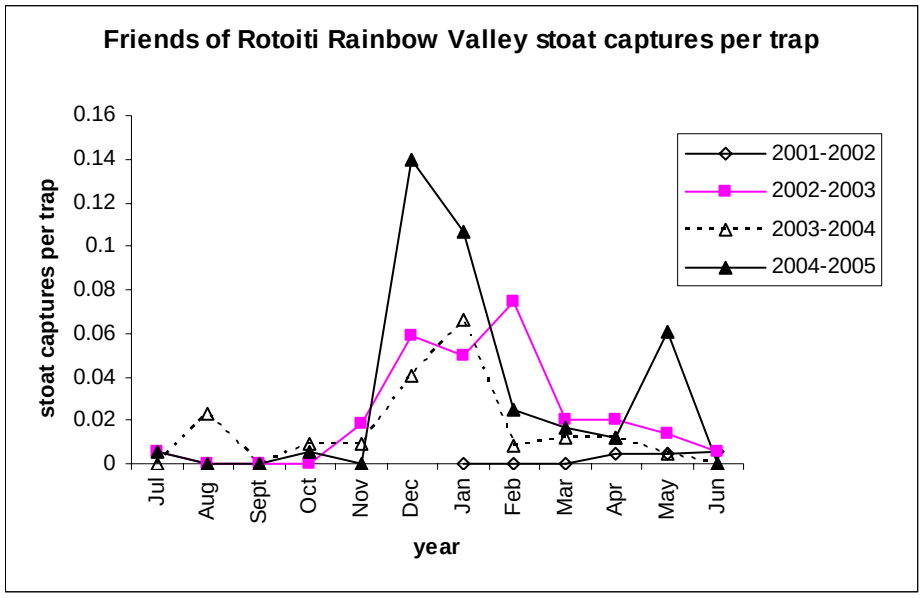
*St Arnaud Range, Big Bush, Peninsula Nature walk and Anglers' walk combined

GRAPH 6: RNRP TOTAL STOAT CAPTURES PER TRAP: 5000HA OPERATIONAL AREA

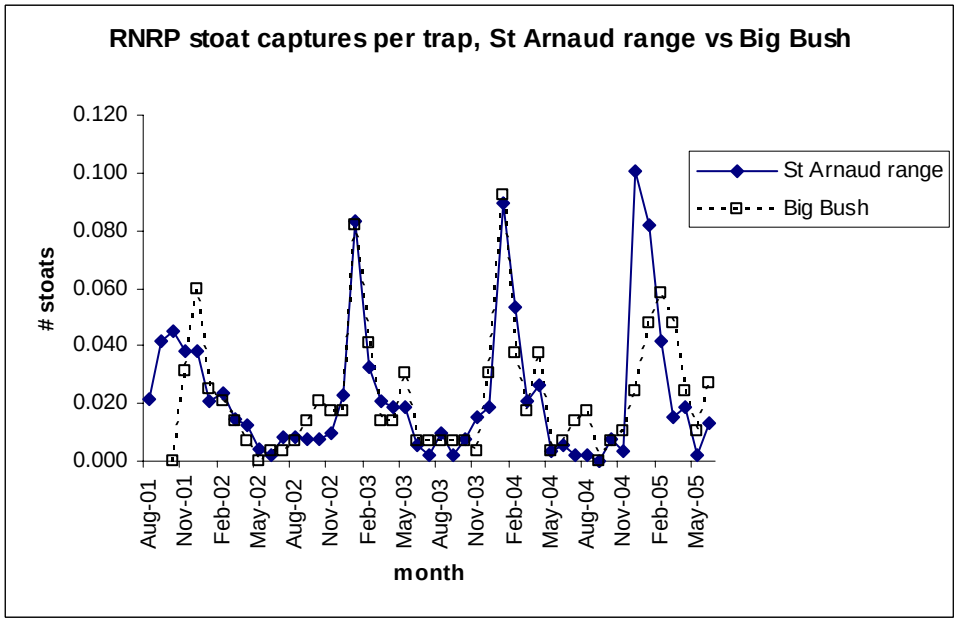


Note: the similar capture numbers between 2002-03, 2003-04 and 2004-05, and the absence of a January peak in captures in 2001-02 and 2004-05.

GRAPH 7: RAINBOW VALLEY STOAT CAPTURES PER TRAP



GRAPH 8: STOAT CAPTURES PER TRAP, ST ARNAUD RANGE VERSUS BIG BUSH



In 2004-05 stoat captures per trap were higher on the St Arnaud Range lines than on the Big Bush lines.

An unknown number of mustelids were killed in the AHB Tophouse and Upper Motueka possum operations. Eight ferrets were killed in the Wairau TB survey. All captures in the Rainbow Ferret Survey and total stoat captures overall (about five at the most (Dave Grueber, Marlborough District Council, pers. comm.) were too remote to consider as impacting on RNRP and FOR trapping operations.

TABLE 10: TOTAL FERRET AND WEASEL CAPTURES, RNRP AND FRIENDS OF ROTOITI FENN™ TRAP LINES

	FERRET		WEASEL[2]
MONTH	RNRP	FOR[1]	RNRP
July	0	0	3
August	0	0	1
September	0	0	0
October	1	0	1
November	0	0	1
December	0	0	2
January	0	0	3
February	3	0	1
March	8	3	3
April	3	1	2
May	0	1	0
June	2	0	0

[1] Rainbow Valley Fenn™ trap line only, no ferrets recorded as caught on the Mt Robert Road line

[2] No weasels were recorded as caught on the Friends of Rotoiti Rainbow Valley or Mt Robert Road Fenn™ trap lines

Non-target Captures

TABLE 11: FENN™ TRAP NON-TARGET CAPTURES 2004-05

SPECIES	RNRP	MT ROBERT ROAD	RAINBOW VALLEY
Cat	25	0	0
Ship rat	483	13	62
Hedgehog	161	1	110
Possum	1	2	26
Rabbit	93	0	18
Bird	2 (song thrush) 2 (house sparrow) 1 (greenfinch)	0	1 (South Island robin)

By-catch in rat trapping

Nine stoats and four weasels were caught in the old RNRP core area rat traps in 2004-05. Five of the stoats were caught on the northern perimeter, three in the core and one on the southern perimeter. Two weasels were caught in the Big Bush area. These captures were spread throughout the year. Two stoats were caught in the Friends of Rotoiti rat trapping operation in February 2005 on the Peninsula Nature Walk and Black Hill rat trap lines.

Monitoring - tracking tunnel

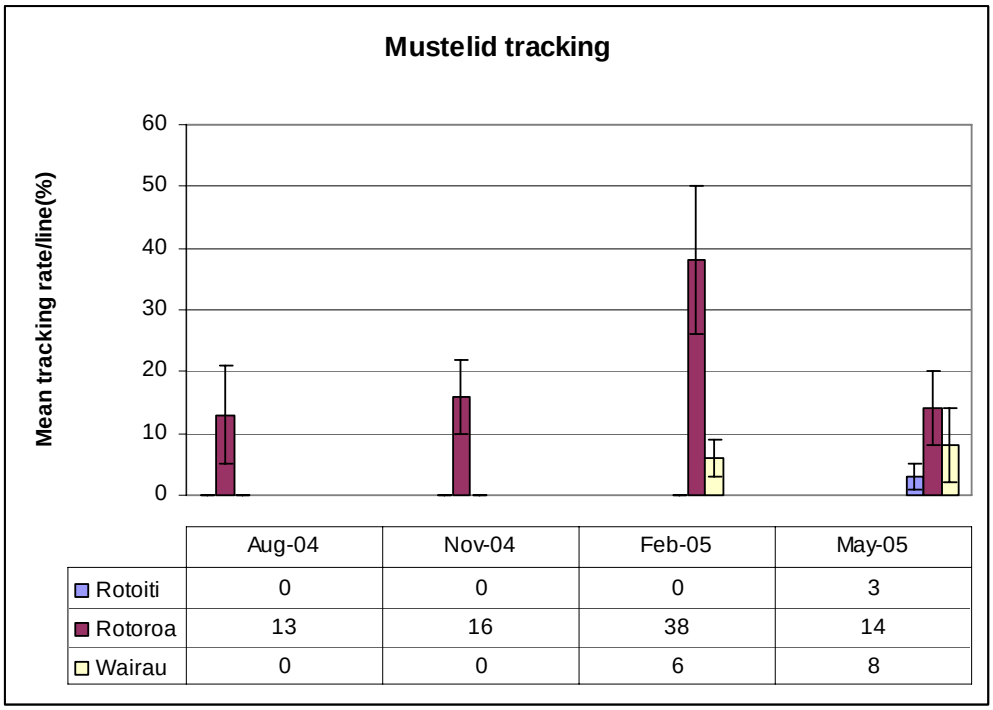
Tracking surveys were achieved all quarters at Rotoiti and Rotoroa.

Wairau tracking tunnels were operated with the Nelson Marlborough Institute of Technology Trainee Ranger class, and volunteers (mostly Friends of Rotoiti) in November when students are on summer placement. One line has been abandoned as it was 'lost', and subsequently found but removed due difficult terrain. Wairau tracking data can potentially be stratified for proximity to trap line but has not been done.

TABLE 12: MUSTELID TRACKING INDICES 2004-05

		AUGUST	NOVEMBER	FEBRUARY	MAY
Rotoiti (treatment)	Lines tracked (%) n=15	0	0	0	13
	Mean track rate/ line (% (standard error))	0	0	0	3(2)
	Tunnels tracked (%) n=75	0	0	0	3
Rotoroa (non treatment)	Lines tracked (%) n=11	20	45	64	36
	Mean track rate/ line (% (standard error))	13(8)	16(6)	38(12)	14(6)
	Tunnels tracked (%) n=55	12	16	40	15
Wairau (FOR treatment)	Lines tracked (%) n=11	0	0	27	18
	Mean track rate/ line (% (standard error))	0	0	6(3)	8(6)
	Tunnels tracked (%) n=55	0	0	6	8

GRAPH 9: MUSTELID TRACKING INDICES 2004-05



Hedgehogs were not tracked at either Rotoiti or Rotoroa over all surveys, and once only (March (3.25%)) in the Wairau.

Rat and mouse indices from mustelid tracking surveys are ignored as better quality data is derived from rodent tracking surveys run immediately prior.

Discussion

Mustelid indices for Rotoiti are assumed to be significantly different to Rotoroa indices as the values and patterns are similar to last year's data which was tested and found to be true. The same would appear to be true for the Wairau Valley with the exception of the May survey.

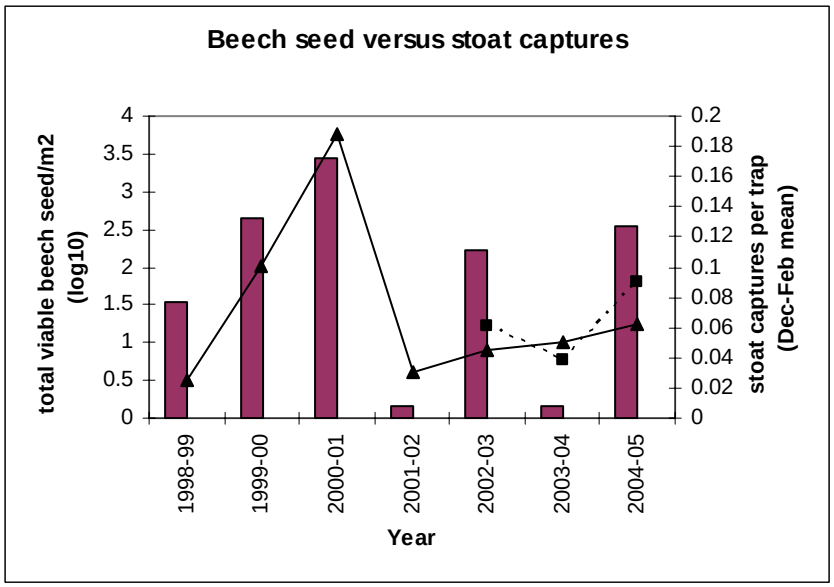
Effects of control on Mustelid numbers

While it cannot be assumed that without predator management the number of mustelids in the environment at Rotoiti would be the same as at Rotoroa, data collected nationally suggests that without treatment, tracking indices at Rotoiti would be more similar to those collected at Rotoroa (after Maddigan, 2004). Thus results suggest that trapping in the RNRP is having a significant impact. For the previous year and a half the mean track rate per line in the RNRP was held within the 5% threshold recommended by Greene et. al. (2004), as providing most benefit to kaka populations. This threshold was unable to be tested against kaka nesting success in 2004-05, however it is expected that this will be possible in future years. Capture trends indicate that the 2003-04 year was moderate in terms of stoat numbers in the environment. The regime now needs to be tested in the presence of high numbers of stoats, as seen during the 1999-2000 and 2000-2001 years.

Stoat capture trends and beech mast response

All trapping operations showed a typical summer peak in captures, tailing off slowly to typical low winter captures. Stoat captures on RNRP and Rainbow Valley lines peaked in December, rather than the more usual January peak. The reason for this is unknown, but may result from wet and cold temperatures in the first half of summer 2004-05 impacting stoat breeding success, or slight differences in the number of checks conducted between summers. Rainbow Valley stoat captures were higher than RNRP stoat captures, but it is not known if this difference is significant.

GRAPH 10: BEECH SEEDING AND STOAT CAPTURES, RNRP & RAINBOW VALLEY



Key: Column = total viable beech seed/m2 (log 10)
Solid line = stoat captures per trap, RNRP
Dotted line = stoat captures per trap, Rainbow Valley

Note: only summer peak stoat capture data is used (Dec-Feb mean). Stoat data is plotted against beech seed data from the autumn preceding the summer peak stoat data.

From 1998-99 to 2001-02 there was a strong relationship between beech mast events and stoat captures in the RNRP, with more animals caught in response to heavier beech seeding (see section 4.4.4 for yearly beech seedfall results). Since 2001-02 this response has been less clear. The reason for this is unknown, but may be influenced by the type of beech seed produced during different mast events or a data bias caused by the different trapping layout since 2001-02 with a higher ratio of internal:external trap lines than previously. Analysis of this data in a national context would be worthwhile to tease out cause and effect.

Animal Health Board (AHB) operations

It is possible that AHB control could have impacted stoat populations enough to directly affect RNRP trapping operations. If this effect was strong one might expect stoat captures per trap on the St Arnaud Range lines to be higher than those on the Big Bush lines, due to the far smaller proportion of lines adjacent to AHB operations on the St Arnaud Range. This was evident in the 2004-05 year, however it is unknown whether this result is statistically significant. This data has been split down arbitrary geographic features that may not accurately reflect the way in which stoats use the local environment and thus give an inaccurate picture. However, given that the same split has been used since 2001 it does appear that something different has happened this year. Further geographic analysis is required to ascertain whether it is likely that AHB operations have impacted stoat capture trends in the RNRP. This will in turn impact on conclusions drawn regarding the benefits of a trapping only regime for controlling stoats.

Recommendations

- Continue to collect mustelid tracking indices for correlation with Fenn™ capture rates and kaka nesting success. The Fenn™ trapping regime should continue without modification until enough kaka nesting attempts have been observed to determine the effectiveness of the trapping regime (number required to be reassessed by Graeme Elliot before the 2005-06 breeding season, following a recommendation by the Technical Advisory Group, February 2005).
- Continue to foster the relationship between AHB contractors and DOC St Arnaud, focussing on provision of technical information regarding surrounding AHB control operations.
- A large amount of data has been collected over the years, and the opportunity exists for detailed temporal and spatial analysis of capture trends, which should be pursued.

3.4 FERAL CAT CONTROL & MONITORING

Objectives

- To reduce feral cat numbers long term within the Recovery Area to benefit resident native bird populations and allow re-introduction of species vulnerable to cat predation (e.g. tieke, kiwi).
- To reduce to zero the population of pet cats in St Arnaud in the long term, with support of the local community.

Performance Target

Operational

Run and maintain cat trapping regime as described in the 2004-05 RNRP Draft Operational Plan.

Design a 'result monitor' in collaboration with Dave Seelye, utilising his 'cat' dog 'Roger'. (Roger is a Border Terrier – Fox Terrier cross bred by Scott Theobold of Northland, and is part of the National Predator Dog programme).

Provide information and support to advocacy team as required.

Result

No result targets have been set, due to the absence of a good method to monitor cats. Stomachs were not collected from carcasses in the 2004-05 year, but have been kept prior to this period and contents will be sorted at some stage as an initial gauge of the impacts of cats. Captures in Fenn™ traps may act as an index of cat activity in the area.

Outcome

No result monitoring is available for cat control at present. Survival of great-spotted kiwi chicks may be used as an indicator in the future.

Methods

Sixteen 'Steve Allan Conibear™ style' kill traps were located in areas of historical cat sign/sightings, and cat sign/sightings detected during the year. One of these traps was removed during the year. Traps were set as in the 2003-04 year (refer to the RNRP Operational Field Manual for trap set design).

Kill traps were generally checked in conjunction with other work, mainly Fenn™ trapping and rodent trapping. The checking and re-baiting periods are uneven for each trap. Generally rabbit was used as bait, however, possum and rat were also used. As always, problems with bait life occurred during the summer when wasps remove all protein bait within a few hours.

One Friends of Rotoiti member regularly ran one live trap at the water tank between St Arnaud and Rotoiti.

No active advocacy work was done to discourage St Arnaud residents from keeping pet cats, however discussions were held with owners on a casual basis when the opportunity arose.

Results

A total of 5782 kill trap nights (uncorrected) were run.

No cats and two stoats (one in February and one in March) were caught in the Steve Allan modified Conibear™ traps. One cat was shot at bushline on the Clearwater Fenn line in January and four cats were caught in May in live-traps set at the water tank.

Twenty-five cats were caught in RNRP Fenn™ traps during the 2004-2005 year (cf. 11 in 2003-04 and 2002-03 and eight in 2001-02).

Discussion

As in previous years, bait life was a major issue in the RNRP honeydew beech forest, as wasps remove bait in a few hours during the day. A long-life cat lure that is unattractive to wasps is needed.

Cat control was not a high priority for work in the RNRP in the 2004-05 year, however with the reintroduction of great-spotted kiwi importance of this work should rise. The current regime is marginal and continuation of this programme needs to be discussed with the Technical Advisory Group at the 2006 meeting. It is evident from RNRP work that Fenn™ trap sets catch far more cats (proportionally) than the Steve Allan Conibears in the honeydew beech forest environment. Ground sets are apparently better at targeting cats than raised sets (Darren Peters and Scott Theobold, pers. comm.). Options for ground set cat traps need to be explored as resources allow.

It was decided during this year that 'Roger' the 'cat' dog was not reliable enough to work in a kiwi area. Roger was sent to Kaikoura Field Centre, where it is hoped he can be worked without endangering indigenous fauna by staff there, and the result monitor performance target has been dropped from the RNRP Operational Plan.

Recommendations

- Continue cat targeted trapping as the best tool available for cat control.
- Develop a strategy for future cat control and monitoring that reflects the importance of cat control in the presence of a breeding population of great spotted kiwi.
- Support development of a 'wasp proof' cat attractant if the opportunity arises.
- Support the advocacy team to establish a programme to encourage responsible ownership of pet cats resident in St Arnaud, and discourage acquisition of new cats by St Arnaud residents.

3.5 WASP (*VESPULA SPP.*) CONTROL AND MONITORING

Common wasps (*Vespula vulgaris*) build up to high densities in these forests in summer when they reduce the levels of honeydew, which is a significant food source for native fauna, and take large numbers of native invertebrates.

Objectives

General objectives were:

- to reduce the removal of honeydew by wasps;
- to reduce predation by wasps on native invertebrates and bird nestlings (Moller, 1990) so that the impacts of wasps are insignificant alongside other mortality factors affecting these groups;
- to improve the public's experience visiting the beech forest in late summer.

Performance Targets

The performance measure was based on the Ecological Damage Threshold (EDT) (Beggs & Rees, 1999) used in the previous three years, to maintain wasp activity levels below 2.7 captures per Malaise trap per day.

Methods

Wasp control

Control was undertaken using the toxin Finitron™ (sulfluramid, 0.5%) in sardine cat food based bait, applied in KK™ bait stations. The preferred toxin Fipronil™ used at this site 1999-2003 remains unavailable because its experimental use permit had expired.

The 2005 operation covered the same area treated since 2002 (lower slopes RNRP core, Duckpond Stream, Brunner Peninsula, and St Arnaud Village) giving a total treated area of approximately 1,100 hectares. (Figure 1).

Bait stations were spaced throughout the core area on a grid of 100 x 50 m. In Duckpond, village and Peninsula areas a delivery spacing approximating 200 x 50 metres was used, reflecting existing infrastructure.

Poisoning was planned for 20 January in accordance with the Wasp Poisoning Decision Maker flowchart prepared by Landcare Research (refer Appendix 3).

114 kg of bait was prepared on 19 January using the accredited laboratory facilities of Landcare Research, Nelson. Bait needed to be prepared as close as possible to the date of application as once mixed it has a short shelf life. Thirty two person hours were used for bait preparation. (For Finitron™ bait preparation prescription, refer to Appendix 6). Bait was stored overnight in refrigerators. Storage shortages experienced last year were not experienced as sufficient refrigeration space had been acquired.

On 20 January 80 grams of bait was applied per KK™ bait station giving a loading of 0.08 kilogram bait/ha in the core area, and less in other operational areas (minimum 0.04kg/ha.). Any remaining bait was removed on 26 and 27 January. Twelve person days of labour was required to put the bait out.

The quantity of bait applied was greater than the previous year's operation in response to the high bait take observed then, and to minimise potential undersupply of bait to some areas.

An additional bait application was considered early March and is discussed below.

An Assessment of Environmental Effect (AEE) for Control of Common Wasps was prepared in December 2004 (refer Appendix 3). There were no significant outstanding issues following consultation and risk assessment. Changes to the regulatory environment, particularly the implementation of the Hazardous Substances and New Organisms Act (HSNO) caused some uncertainty regarding ability to comply. The Department of Conservation focussed efforts for compliance with this Act upon its core business of vertebrate pest control. Conflicting advice was received regarding need for 'Approved Handler' status for Finitron™, but this was resolved in the negative. A 'best fit' situation was devised for this project with respect internal approvals most likely to be HSNO compliant whereby a new AEE template was used, a 'Compulsory Performance Standards' sheet developed following departmental templates, and new measures for labelling of mixed Finitron™ implemented.

Wasp monitoring

Malaise traps are used for result monitoring of wasp activity. Twenty traps at the Rotoiti treatment site and ten and six respectively at Lakehead and Rotoroa non-treatment sites were open from November to May and samples collected fortnightly. Wasps were counted and removed and the remainder of the sample stored in 70% ethanol. These samples are also used for outcome monitoring as covered in Section 4.2.

Limited wasp nest monitoring utilising the strip plots of previous seasons was undertaken. Two strip plot transects (one treatment (Rotoiti A) and one non-treatment (Rotoroa) of approximately one kilometre length and ten metres width are walked by observer(s). All nests encountered are individually marked and one minute traffic counts undertaken. Strip plots are measured pre and post poisoning to detect changes in wasp nest activity and abundance attributable to management intervention and natural variation. Strip plots or nest monitoring are not undertaken at the Lakehead non-treatment site, or the Duckpond Stream treatment site. It has been recommended that strip plot monitoring occur as close as possible temporally to malaise collection (Paton et. al. 2004).

Landcare Research provided wasp nest density and activity data they collected from strip plots at Mt Misery (Rotoroa) and Rotoiti Lakeside (near Lakehead).

Wasp foraging activity for protein is assessed by monitoring non-toxic bait take (ref Appendix 3). An average of one wasp per bait is required to indicate sufficient attraction of wasps to protein for poisoning to be effective, and is the trigger point used when following the Wasp Poison Decision Maker. Non-toxic bait take assessment is usually undertaken when malaise wasp indices approach the Ecological Damage Threshold.

Results

Non-toxic bait take

Malaise trapping indices in RNRP were first observed to exceed the EDT on 5 January. This provided the trigger for non-toxic bait take assessment.

The non-toxic bait take protocol was varied to cater for two checks per bait and averaging of scores for little extra effort. Staff walked the line of baits to take the first count, and then returned immediately obtaining another count as bait was collected for disposal.

All locations assessed are in the 'Loop' area of the core. The uppermost of these ('LF') is approximately 720m a.s.l. and approximately mid altitude for the controlled area.

Bait used was sardine cat food in aspic, the same protein medium used in the toxic bait.

TABLE 13: PRE-POISON NON TOXIC BAIT TAKE SCHEDULE

DATE	LOCATION	N BAITS	ACTIVITY 1	ACTIVITY 2	ACTIVITY MEAN	TRIGGER REACHED?
10/1/05	LB	20	0.2	0.65	0.425	No
	LD	21	0.286	0.38	0.333	No
	sum	41			0.383	No
13/1/05	LE	20	0.3	0.4	0.35	No
	LC	20	0.75	0.9	0.825	No
	sum	40			0.5875	No
18/1/05	LD	20	1.65	2.0	1.175	Yes
	LB	20	1.65	1.2	1.325	Yes
	sum	40			1.625	Yes

Consideration was given to a second poison operation when malaise traps indicated that wasp activity had not been reduced below the EDT. Non-toxic bait trials were undertaken to assess feasibility.

TABLE 14: PRE-SECOND POISON BAIT TAKE SCHEDULE

DATE	LOCATION	N BAITS	ACTIVITY 1	ACTIVITY 2	ACTIVITY MEAN	TRIGGER REACHED?
1/3/2005[1]	LD	20	0	0	0	No
	LG	20	0	0	0	No
	sum	40			0	No
8/3/2005	LB	20	0.35	0.15	0.4	No
	LD	10	0	0.2	0.1	No
	LE	10	0.4	0.1	0.25	No
	LF	7	0.143	0.714	0.429	No
	sum	47			0.245	No
17/3/2005	LD	10			0.2	No
	LH	10			0.3	No
	CH	10			0	No
	RF	10			0.1	No
	CE	10			0.3	No
	sum	50			0.18	No

[1] 'Pams sardines in soya oil' used this monitor only due unavailability sardine cat food

Bait take

A subjective assessment of bait take was made by staff removing unconsumed baits on 26 and 27 January. Staff reported a high bait take (nearly 100%) from the Loop, lower Cedar, and Rata areas (all core), and in the Peninsula and Village. A lower bait take was reported at higher altitudes in the core area.

Wasp monitoring

Strip Plot Transects

Strip plot pre-poison monitoring was undertaken at Rotoiti and Rotoroa on 14 and 19 January respectively. A post-poison monitor was undertaken at Rotoiti on 23 February, (34 days post-poison application). Staff pressures precluded a post-poison monitor at Rotoroa (non- treatment) being undertaken.

TABLE 15: STRIP PLOT MONITORING RESULTS (34 DAYS POST-POISON)

Nests inactive (killed)	46.7%
Nests active (surviving)	53.3%
Mean activity reduction/nest (± 1 std error)	43.8 (22.2) %
Mean activity reduction/transect	47.3%
Surviving nests with reduced activity (mean reduction ± 1 s.e.)	33.3% (79.8(9.7)%)
Surviving nests with increased activity (mean reduction ± 1 s.e.)	66.7% (-75.5(37.4)%)
Mean reduction all surviving nests (± 1 s.e)	-20.4(34.4)%

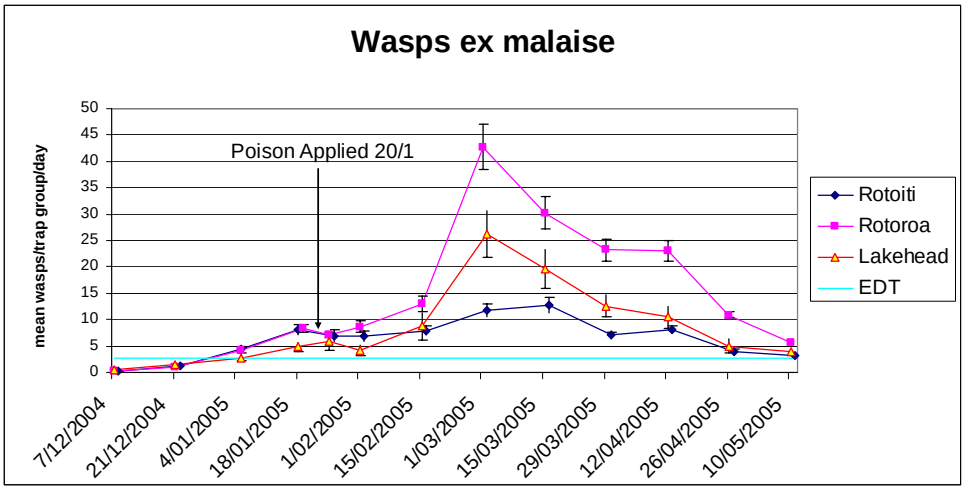
Pre-poison data provides a baseline of all detectable wasp nests (wasp activity) on the strip plot in the early season, and their respective activity rates (nest activity). The above analyses use the pre-poison data as 100% activity, and then compare these baseline figures to the post-poison data.

The recommendation for temporal alignment of strip plot and malaise trap monitoring was not achieved at Rotoiti, principally due to staff logistics and weather considerations. This requirement was achieved at Rotoroa, and is facilitated by both site access logistics and tight clustering of malaise traps requiring less effort than Rotoiti.

Malaise trapping

Malaise trapping was undertaken as planned with fortnightly collections at all sites between November and May. Two collections of approximately one week each were undertaken in the fortnight following poison application.

GRAPH 11: COUNTS OF WASPS CAUGHT IN MALAISE TRAPS, 2004-05 (± 1 STANDARD ERROR)



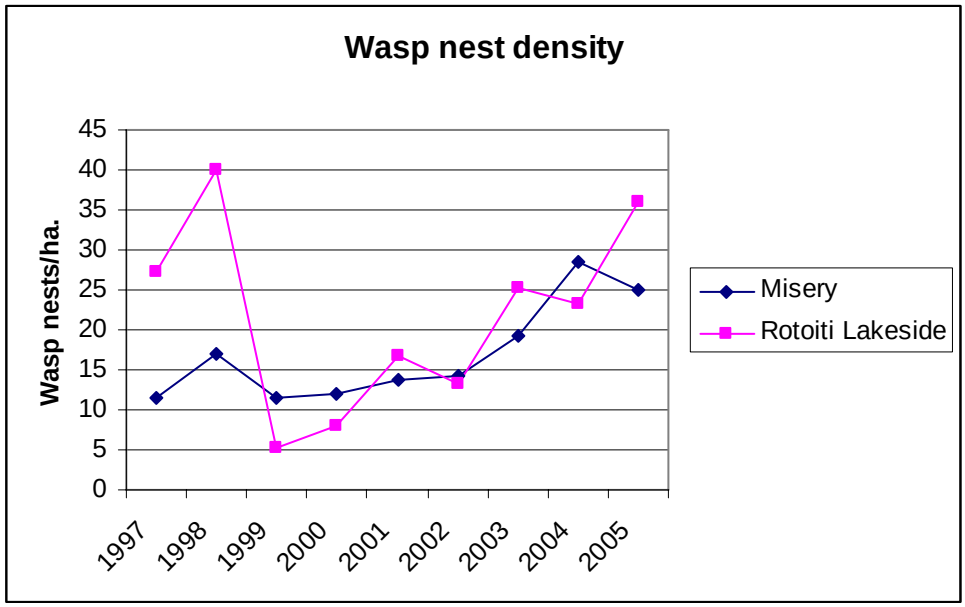
January to March weather was drier than average (with the exception of a single heavy rain event (137mm) on 24 March) and warmer than average.

Wasp numbers from malaise traps at point of poisoning were approximately eight wasps/trap group/day. Typical indices at this point are seven wasps/trap group/day (range three to ten).

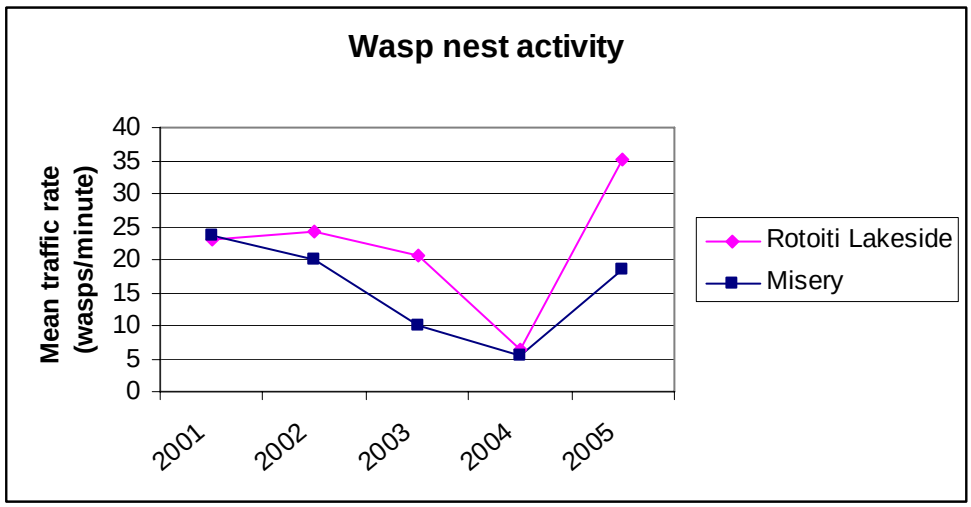
Peaks of >25 wasps/trap group/day from malaise data are typical of 'good' seasons, which was reached at Lakehead and exceeded at Rotoroa (peaking at 42 wasps/trap group/ day, the highest values recorded at any of the three sites over the project history).

Wasp nest transects monitored by Landcare Research at Mt Misery (Rotoroa) and Rotoiti Lakeside (near Lakehead malaise site) in March showed high nest densities and wasp activity at each site (Rees, unpublished data, 2005). The nest density values at each site are further apart than previous seasons, and even further apart for wasp activity. Both data corroborate malaise indices in indicating this season as a 'good' wasp year.

GRAPH 12: WASP NEST DENSITY (AFTER REES, UNPUBLISHED DATA, 2005)



GRAPH 13: WASP NEST ACTIVITY (AFTER REES, UNPUBLISHED DATA, 2005)



Honeydew

The honeydew resource was not monitored this year as a clear link between wasp reduction and honeydew recovery has been demonstrated from previous operations. Honeydew quality was to be inferred from wasp reduction (see discussion).

Non-target impacts

Monitoring of non-target invertebrates was not undertaken as advice received was that we were unlikely to find anything new as past seasons had yielded similar information across years. No vertebrates were observed feeding on baits or found dead following the operation.

Discussion

The 2004-05 season was a high wasp season, as illustrated by mid season wasp transects measured by Landcare Research showing both high densities and activity rates of nests relative to previous measures throughout the history of wasp control at this site. This is corroborated by high forager activity rates as measured by malaise trapping at non treatment sites.

Poisoning did not achieve a reduction in wasp numbers to values below the EDT. Maximum differential between RNRP and Lakehead malaise figures (2 March) suggest a 45% reduction. This is supported by strip plot monitoring which indicates a reduction in active nests of 46.7%, which would result in a reduction from 15 to 7 nests/ha., or a -20% 'reduction' of wasp activity (positive growth).

Performance measures specified in the Strategic Plan (Butler , 1998) and used during the earlier years of wasp control at this site before adoption of the easier to measure EDT specify a reduction of wasp nest density (or equivalent wasp reduction) to 2/ha. (after Thomas et al., 1998), or a 92% reduction in wasps to avoid reduction of standing honeydew crop below 2500 J/m² (after Moller et al., 1996). It is clear from the available data that neither of these measures was achieved or even came close. Thus none of the proposed benefits of wasp control can be assumed i.e. mitigation of predation pressure of highly vulnerable invertebrates, or honeydew availability to non-wasps.

Had the results been more marginal/equivocal it would have been difficult to address any benefit from wasp control in the above terms as detailed monitoring of both the honeydew crop and wasp activity/density has been consciously dropped from the projects work plan due the strength of relationship between malaise trapping, strip plots and honeydew resource. The project must decide if it wishes to measure these values in terms of 'how close did we get?' when the EDT is not met.

However a reduction in wasp activity was achieved in the RNRP. Malaise trap figures show similar values and rate of increase at all sites in the early season. From point of poisoning patterns continue in similar fashion until 15 February (26 days post poison) when the curves diverge. Poisoning appears to have impacted primarily upon rate of growth, and did not cause any reduction in malaise trapped wasps at RNRP. The difference between sites narrowed with time, with overlap of error bars almost occurring at 16 March, at which point all sites are in 'natural decline' as the season peak has been passed. By 12 April there is substantial overlap in Lakehead and RNRP values and any effect of poisoning has passed (superseded by natural events)

It is probable based upon the evidence discussed above that the principal cause of decline was the application of toxic bait.

A tool for assessing bait required based upon wasp density and interest in protein to maximise potential kill without unnecessarily over-provisioning bait stations is needed.

Recommendations

- That wasp control using Finitron™ be undertaken in the absence of Fipronil™ availability.
- That triggers for poison application be tested and met across the altitudinal and habitat spectrum of the control area.
- That strip plot monitoring be undertaken as close as possible temporally across sites, and as close as possible temporally to malaise collections.
- That additional strip plots, or samples of nests, are monitored at Duckpond Stream to identify the effect of wasp control at greater bait station density, and at Lakehead for correlation of colony change with local non treatment malaise.

Community Led Wasp Control Programme

The St Arnaud Community Association has not undertaken any poison baiting of wasps for several years. Several individuals from the community did undertake individual nest destruction using Permex ™ (a pyrethroid powder) killing 348 nests, principally in the village and peninsula area. This compares with 160 nests treated last season for similar effort, and 65, 90 and 150 in the previous three years (Buckland and Hunter, pers. comm). The high number of nests encountered is consistent with the high density of wasp nests recorded from strip plots monitored by the project and Landcare Research. The voluntary effort of these individuals is greatly appreciated by the project, and presumably by the local and visiting public.

3.6 DEER (*CERVUS ELAPHUS*) AND CHAMOIS (*RUPICAPRA RUPICAPRA*) CONTROL AND MONITORING

Objective

- The target of hunting is red deer but any chamois encountered are to be shot too. Hunting is primarily focussed upon gathering stomach samples to assess diet to guide outcome monitoring relating to deer impacts.

Results

Sightings/incidental encounters

Only sightings of animals are reported on here. Incidental records of pellets, prints, and feed sign are recorded in field diaries. These are treated as an unreliable index as not all observers will record sign, multiple recording of same sign can not be discounted, and assignation of sign to species can not be guaranteed.

Deer and chamois

There were two reported encounters of deer in core area: one group of four animals near the farm boundary area (October); and a single animal (yearling) on the PF line (February).

One buck chamois was sighted on the farm boundary in June following a heavy snow event. This is consistent with previous sightings of chamois at low altitude occurring after heavy snow.

Hunting

Five hours hunting effort was undertaken by project staff in response to the group sighting above. This was unplanned reactive work.

The neighbouring farmer shot one of two young stags on the shared boundary in October. Liver and stomach samples were collected.

Recreational hunting effort is unknown, although much of the site, excluding Big Bush is a closed hunting area due to presence of field staff, past history of toxin use, and potential conflict with other park users.

Discussion

Deer and chamois numbers continue to be at low levels. Outcome monitoring of deer impacts/control remains to be designed and implemented, as do outcome targets.

3.7 PIG (*SUS SCROFA*) CONTROL AND MONITORING

Objective

- Most of the project area is historically free of pigs. The northern St Arnaud Range and Big Bush hold resident pig populations, and incursions south into the remainder of the project area are occasional. Such incursions or expansion in range to new areas are to be prevented, principally as a biosecurity measure.

Method

Construction and monitoring of one pig live capture trap.

No other pig control work was planned this year, although the capacity to respond in a reactive manner to pig interference with management tools or expansions in range was allowed for.

Results

Pig trapping

One pig live capture trap was constructed in July by Dave Seelye of the Murchison Field Base in the National Park bordering the Beech Hill subdivision, an area frequented by pigs, especially during times of 'range expansion'.

The trap is best described as a 'push through koru' design constructed of welded wire netting on the side walls supported by waratahs. The roof is deer netting. A Sirtrack minder transmitter is fitted to the 'gate' which when activated will remove the magnet to initiate radio transmission to allow remote monitoring and remove need for daily checking as required for live capture traps. Time required for construction was approximately eight hours.

The trap has been baited with either commercial pig nuts or goat carcasses on an intermittent basis.

No captures were recorded.

Sightings/incidental encounters

Only sightings of pigs are reported on here. Incidental records of pellets, prints, and feed sign are recorded in field diaries. These are treated as an unreliable index as not all observers will record sign, multiple recording of same sign can not be discounted, and assignation of sign to species can not be guaranteed.

A single staff encounter of (probably) one pig heard (SRN Fenn line, February) was recorded. This area is historically well utilised by pigs, and thus no hunting response was initiated.

A report of two separate pig sightings in the Travers Valley was received in October.

A young boar was found washed up (freshly) dead in eastern Kerr Bay in July with no obvious sign of injury.

Ground hunting

No hunting of pigs by project staff was planned this year. However one keen staff member was permitted to carry a firearm when undertaking trapping activities in areas utilised by pigs. Nil return recorded from this. No record of hunting effort kept as this was an incidental activity.

Eight hours of hunting effort was undertaken in October in response to two pig sightings in the Travers Valley (outside of historic pig range) from a park user. Nil return.

Recreational pig hunters are restricted in their activities in the RNRP as approximately two thirds of the area falls within the boundaries of Nelson Lakes National Park, from which dogs are excluded. Additionally within this area is a permanently closed area due to presence of field staff, past history of toxin use, and potential conflict with other park users. The remaining third of the RNRP falls largely within Big Bush Conservation Area where hunting (with dogs) is allowable subject to conditions of hunting permit and Pesticide Use Summaries.

Discussion

The number of staff encounters with pigs was much reduced from last year indicating a 'low pig year'. The efficacy of pig trapping will continue to be monitored, including through a 'high pig year'. Costs, trap types, baits, and remote monitoring tools should all be investigated.

3.8 HEDGEHOG (*ERINACEUS EUROPAEUS*) CONTROL AND MONITORING

Fenn™ traps caught 161 hedgehogs in the year, most between October and April. Friends of Rotoiti caught an additional 77 on their lines, most of them (63) in the Rainbow Valley.

Hedgehog prints were recorded incidentally through the tracking tunnel programme once only at one site (Wairau Valley, 3.25(±2)%, March 2005).

3.9 HARE (*LEPUS EUROPAEUS*) AND RABBIT (*ORYCTOLAGUS CUNIULUS*) CONTROL AND MONITORING

No planned hare or rabbit control was undertaken.

Incidental sightings confirm continued use of forest habitat by hares, commonly, but not exclusively within several hundred metres of forest margin.

3.10 WEED CONTROL AND MONITORING

Weed control within the mainland island falls under the Area Office weed programmes. Weed sightings are reported by RNRP staff, and small incidental encounters of weeds are often treated manually at the time of encounter (e.g. rowan, cotoneaster and douglas fir). This is an area of poor record keeping, particularly with respect observations/encounters. 2004-05 records show the removal of one rowan by project staff, and the collection of multiple green willow branches from the lake shore following the floods of Easter.

4. Results – Monitoring of Native Species and Systems

4.1 BIRD MONITORING

Objectives

- Programme objective: to increase bird numbers through the reduction of predation and competition by pest species.
- Monitoring objective: to document changes in bird populations and determine those that relate to pest control programmes.

4.1.1 Multi-Species Bird Monitoring – 5-Minute Counts

Objective

- To document changes in bird populations and determine those that relate to pest control programmes.

Methods

Five-minute counts were undertaken on the same transect lines within the project area ('St Arnaud') and at Lakehead ('Lakehead') and in the non-treatment area ('Rotoroa') as in previous years. Counts were again done to a standard technique based on Dawson & Bull (1975) (see RNRP Annual Report 2003-04 for further detail).

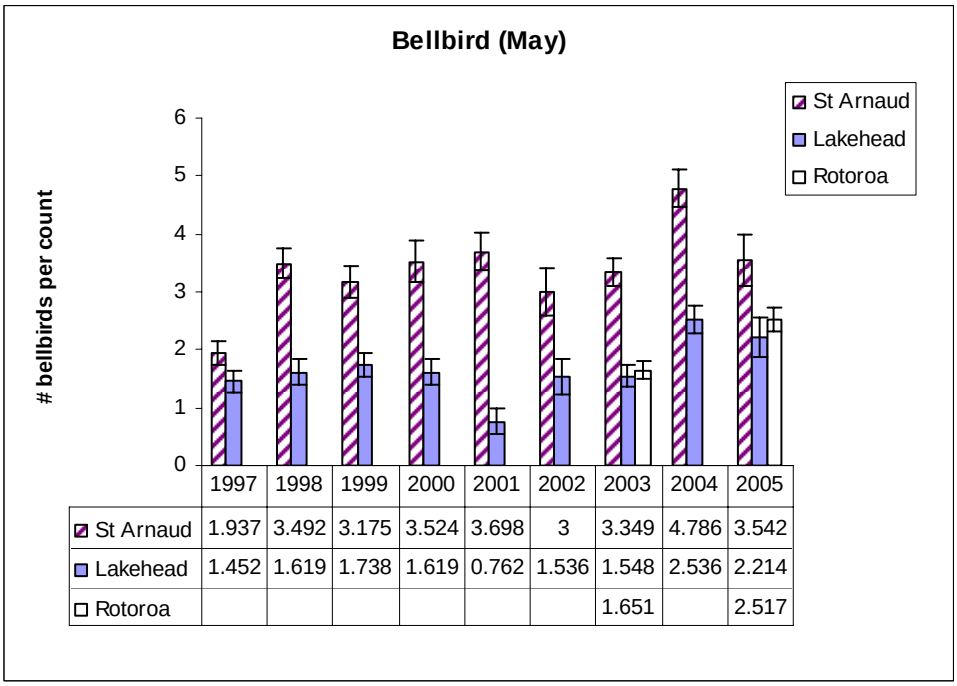
One new observer was trained in five minute bird count methodology, and from November 2004 replaced a former staff member involved in this work.

Results

Graphs 14 to 25 summarise the results for a range of native and introduced species at the St Arnaud, Lakehead and Rotoroa sites. No counts were done at Rotoroa during May 2002 and May 2004, and no counts were done at the Rotoiti sites in November 1998. Heavy snowfall following the first May 2005 count at the St Arnaud and Lakehead sites impacted replication of these counts, and in the absence of further analysis only one day's worth of data from this time period has been presented.

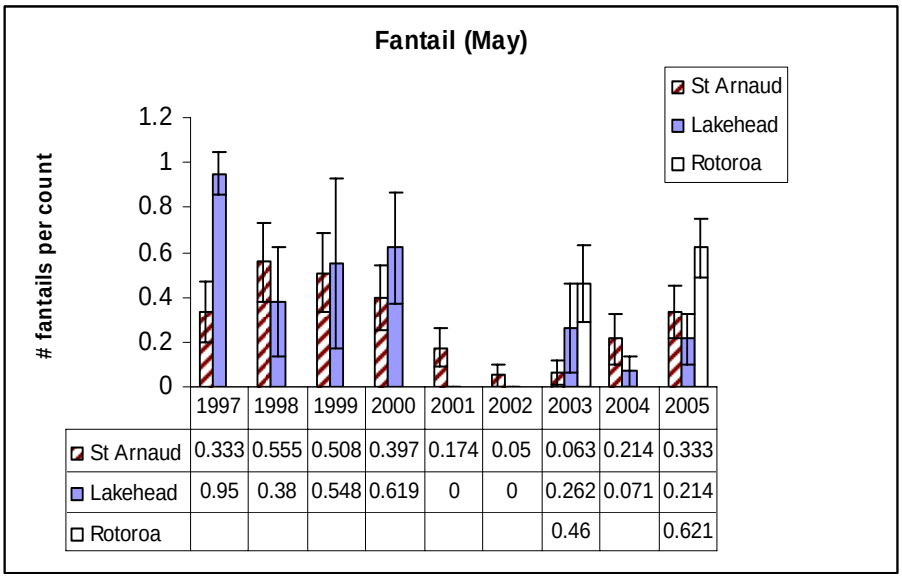
May data only is presented, as this is thought to represent most accurately numbers of birds recruited into the local populations following breeding. May counts are thus not influenced so much by breeding behaviour or differences in breeding season (for example longer breeding/late breeding, etc), with the possible exception of yellow-crowned parakeets which are capable of breeding all winter during a beech mast.

GRAPH14: BELLBIRDS (MAY)



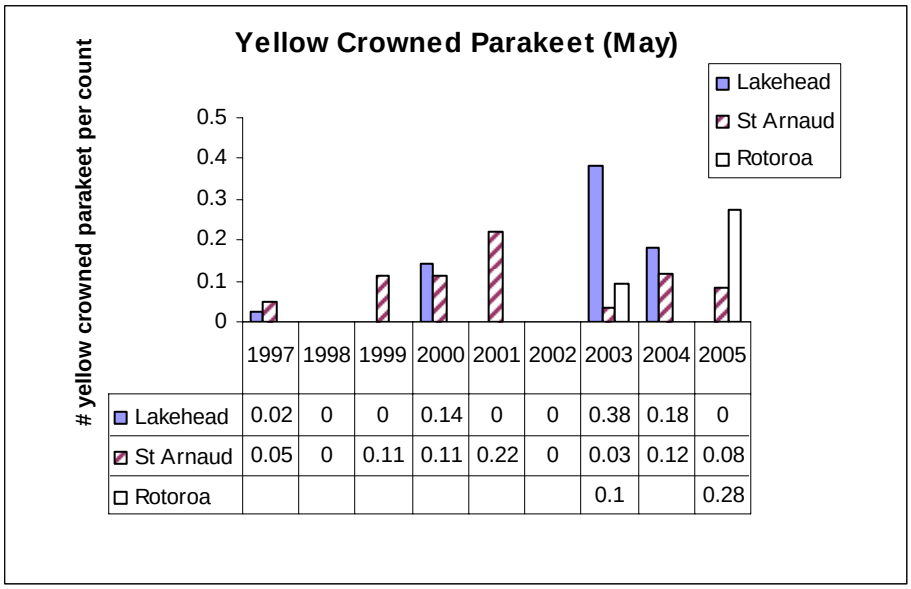
	1997	1998	1999	2000	2001	2002	2003	2004	2005
St Arnaud	1.937	3.492	3.175	3.524	3.698	3	3.349	4.786	3.542
Lakehead	1.452	1.619	1.738	1.619	0.762	1.536	1.548	2.536	2.214
Rotoroa							1.651		2.517

GRAPH 15: FANTAILS (MAY)



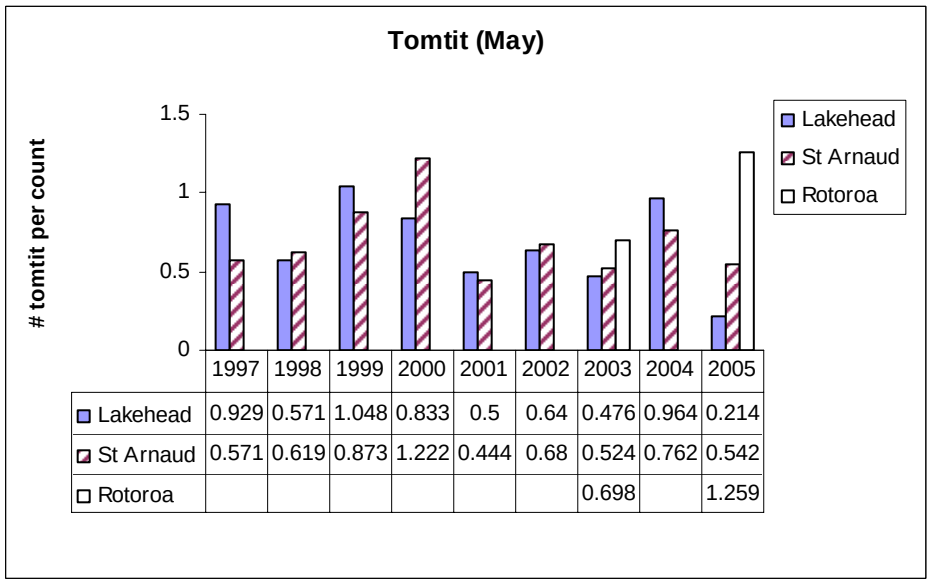
	1997	1998	1999	2000	2001	2002	2003	2004	2005
St Arnaud	0.333	0.555	0.508	0.397	0.174	0.05	0.063	0.214	0.333
Lakehead	0.95	0.38	0.548	0.619	0	0	0.262	0.071	0.214
Rotoroa							0.46		0.621

GRAPH 16: YELLOW CROWNED PARAKEET (MAY)



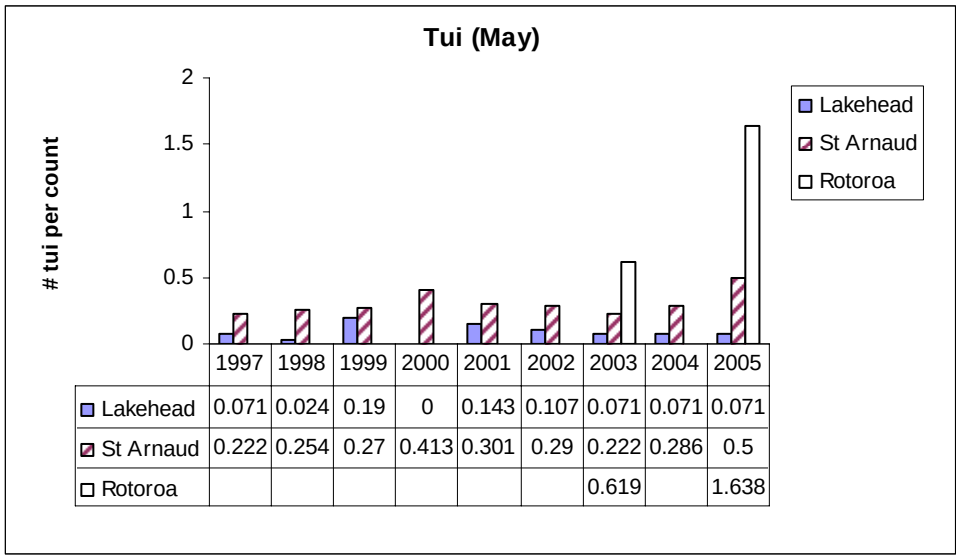
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0.02	0	0	0.14	0	0	0.38	0.18	0
St Arnaud	0.05	0	0.11	0.11	0.22	0	0.03	0.12	0.08
Rotoroa							0.1		0.28

GRAPH 17: TOMTITS (MAY)



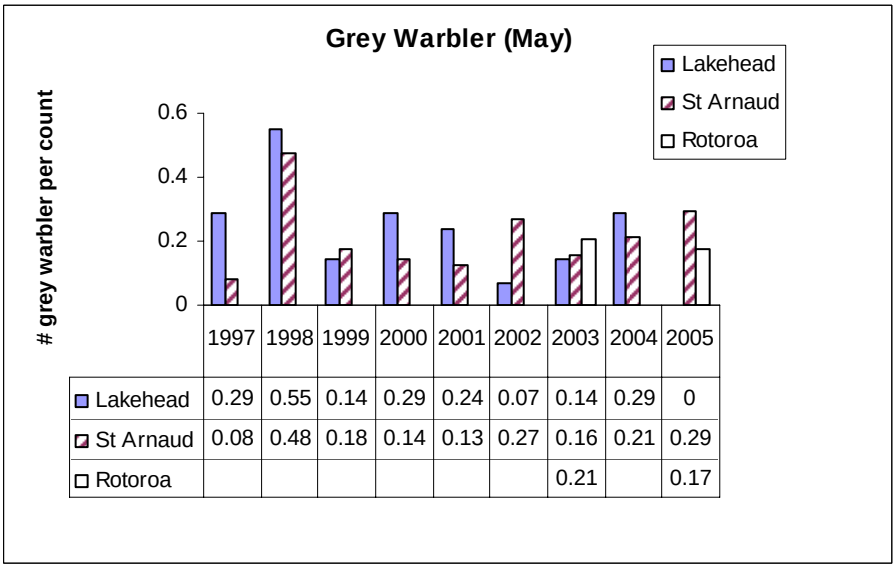
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0.929	0.571	1.048	0.833	0.5	0.64	0.476	0.964	0.214
St Arnaud	0.571	0.619	0.873	1.222	0.444	0.68	0.524	0.762	0.542
Rotoroa							0.698		1.259

GRAPH 18: TUI (MAY)



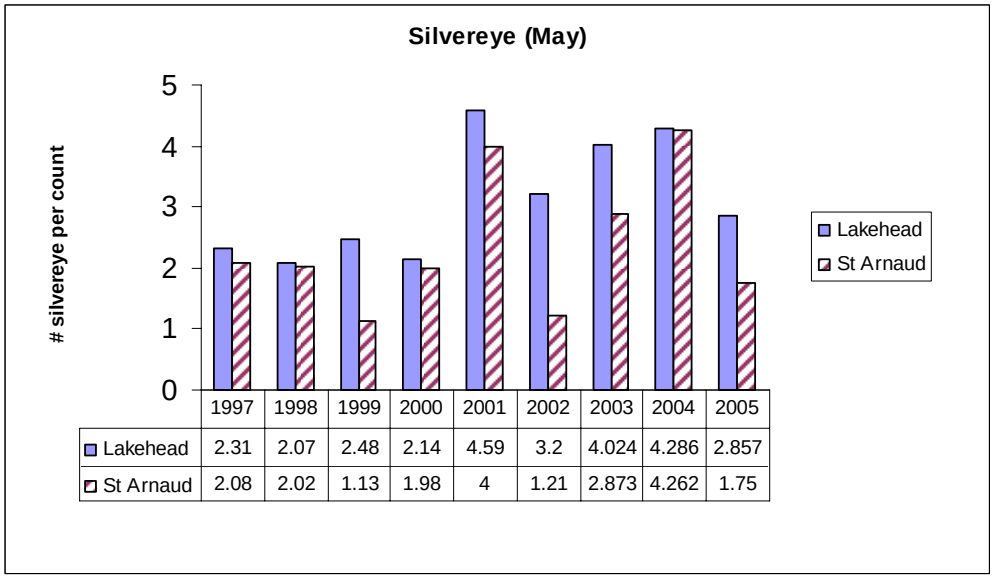
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0.071	0.024	0.19	0	0.143	0.107	0.071	0.071	0.071
St Arnaud	0.222	0.254	0.27	0.413	0.301	0.29	0.222	0.286	0.5
Rotoroa							0.619		1.638

GRAPH 19: GREY WARBLER (MAY)



	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0.29	0.55	0.14	0.29	0.24	0.07	0.14	0.29	0
St Arnaud	0.08	0.48	0.18	0.14	0.13	0.27	0.16	0.21	0.29
Rotoroa							0.21		0.17

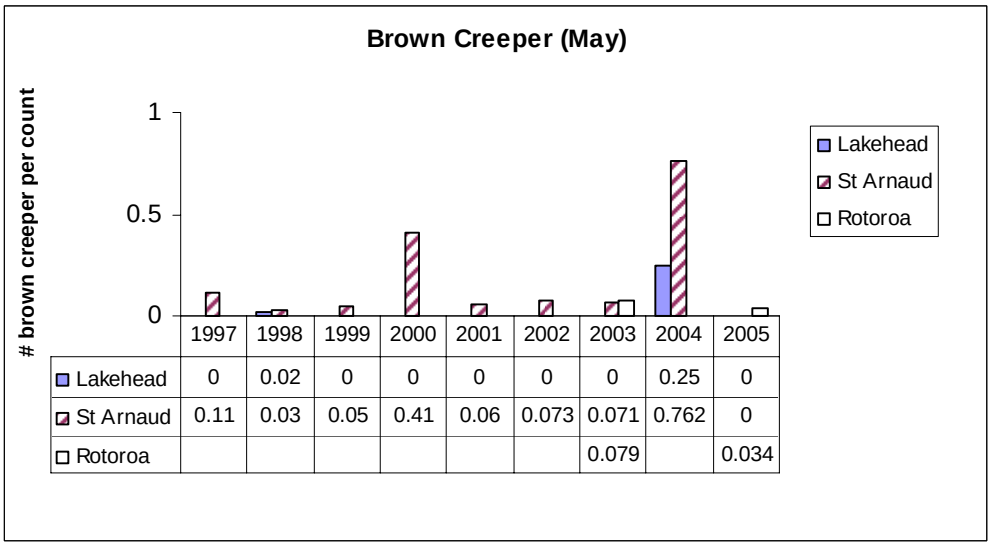
GRAPH 20: SILVEREYE (MAY)



	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	2.31	2.07	2.48	2.14	4.59	3.2	4.024	4.286	2.857
St Arnaud	2.08	2.02	1.13	1.98	4	1.21	2.873	4.262	1.75

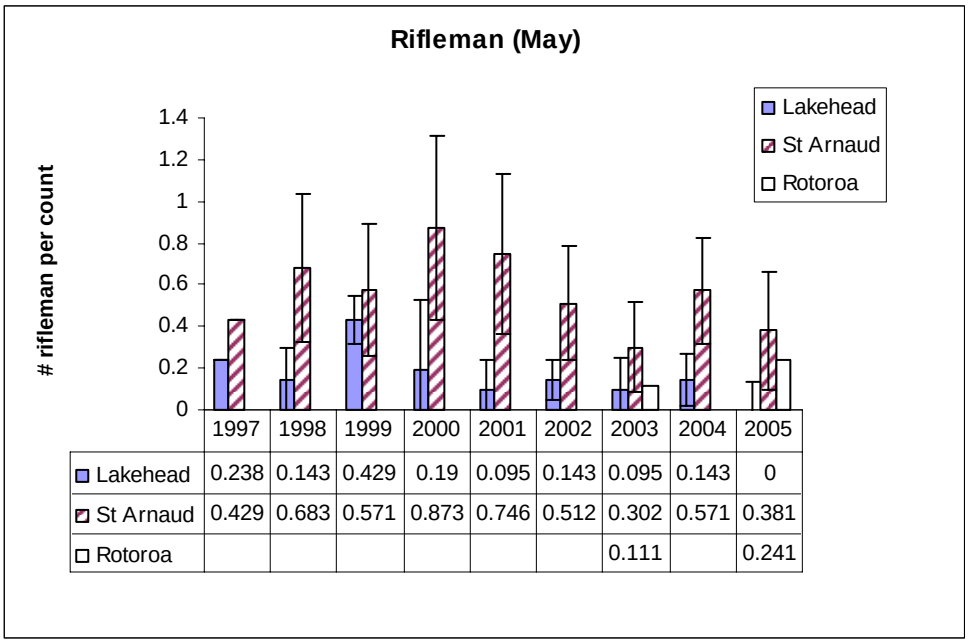
Rotoroa data is not presented as silvereye numbers are often too numerous to count at this site.

GRAPH 21: BROWN CREEPER (MAY)



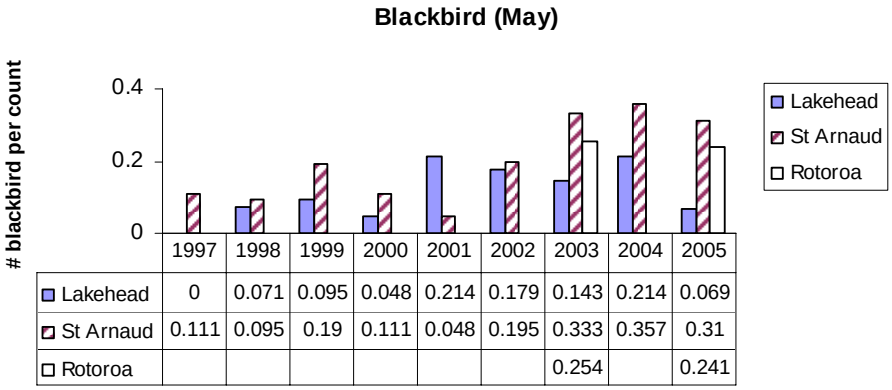
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0	0.02	0	0	0	0	0	0.25	0
St Arnaud	0.11	0.03	0.05	0.41	0.06	0.073	0.071	0.762	0
Rotoroa							0.079		0.034

GRAPH 22: RIFLEMAN (MAY)



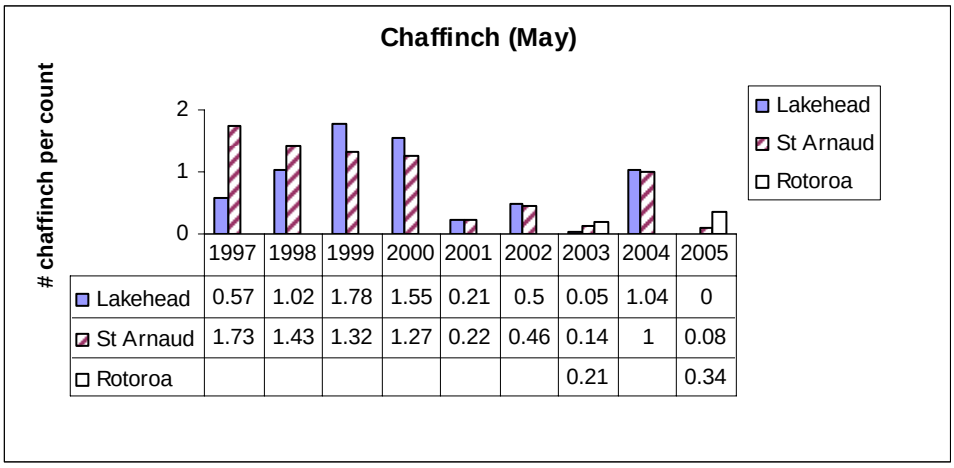
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0.238	0.143	0.429	0.19	0.095	0.143	0.095	0.143	0
St Arnaud	0.429	0.683	0.571	0.873	0.746	0.512	0.302	0.571	0.381
Rotoroa							0.111		0.241

GRAPH 23: BLACKBIRD (MAY)



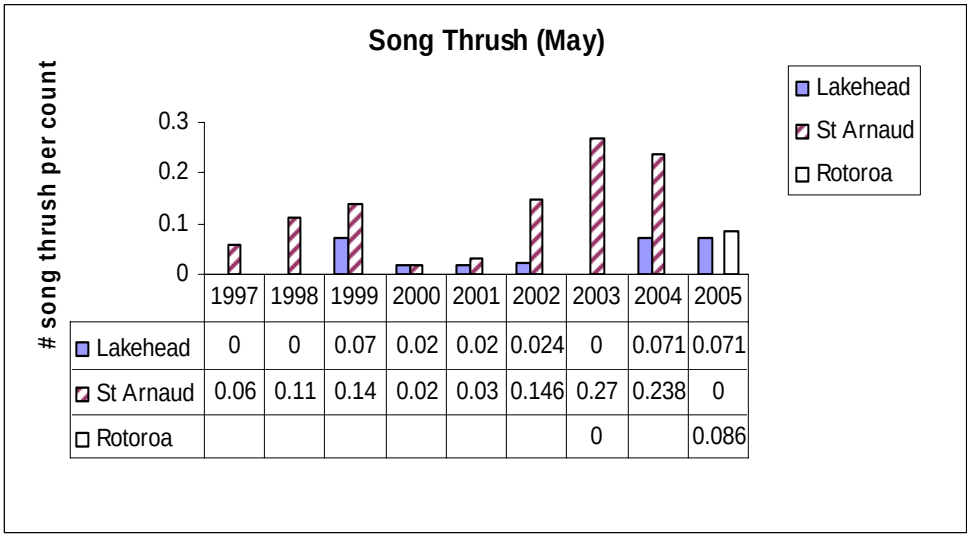
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0	0.071	0.095	0.048	0.214	0.179	0.143	0.214	0.069
St Arnaud	0.111	0.095	0.19	0.111	0.048	0.195	0.333	0.357	0.31
Rotoroa							0.254		0.241

GRAPH 24: CHAFFINCH (MAY)



	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0.57	1.02	1.78	1.55	0.21	0.5	0.05	1.04	0
St Arnaud	1.73	1.43	1.32	1.27	0.22	0.46	0.14	1	0.08
Rotoroa							0.21		0.34

GRAPH 25: SONG THRUSH (MAY)



	1997	1998	1999	2000	2001	2002	2003	2004	2005
Lakehead	0	0	0.07	0.02	0.02	0.024	0	0.071	0.071
St Arnaud	0.06	0.11	0.14	0.02	0.03	0.146	0.27	0.238	0
Rotoroa							0		0.086

Other species detected in five minute bird counts in low numbers are:

- Long-tailed cuckoo
- Shining cuckoo
- Goldfinch
- Hedge Sparrow
- Kaka
- Kea
- NZ falcon
- NZ pipit
- Paradise shelduck
- Redpoll
- Skylark

- South island robin

St Arnaud site only:

- Greenfinch
- Australasian harrier
- Spur-winged plover

Rotoroa only:

- Kingfisher
- NZ pigeon

Discussion

This data has only been subject to simple analysis comparing trends in mean counts. Refer to the RNRP 2003-04 Annual report for discussion on factors influencing the data and the need for more detailed analysis. No discussion has been attempted this year due to this lack of analysis.

Ceisha Poirot, University of Canterbury, MSc, completed a thesis reporting on her work investigating bellbird nesting success and time budgets in the RNRP during the 2002-03 and 2003-04 seasons. This report will be important in contributing to more detailed analysis of RNRP bird count data.

Recommendations

- Continue bird counts as an important monitoring tool at all sites to keep track of trends and feed into information about impacts of management.
- Further analysis of data is required to fully interpret the results (as discussed in the RNRP 2003-04 Annual report). Funding should be sought to hire an expert to undertake this analysis and produce a paper for publication.
- Research initiatives targeting specific species need to be encouraged, to augment understanding of trends observed for these species (eg. Ceisha Poirot's work).

4.1.2 Kaka (*Nestor meridionalis*) Monitoring

Objectives

- To assess the effectiveness of the current stoat control regime in protecting the local kaka population.

Methods

Kaka did not breed in the 2004-05 season and so monitoring focussed on dispersal and survival of transmittered birds. An aerial survey was conducted in June 2005 to search for and locate transmittered kaka that had dispersed outside the range of normal ground-based monitoring. A Cessna 172 was chartered from the Marlborough Aero Club to undertake this work. The survey area was limited by flying time and the following area was covered:

- Wairau Valley from the Wash Bridge to Connors Creek, with side trips up Lees Creek, Hamilton River and Connors Creek.

- Western side of the St Arnaud Range and the eastern side of the Mt Robert Ridge and the Travers Range to Summit Creek, with side trips up Hukere Stream, Hopeless Creek, Arnst River and Cupola Creek.
- Sabine River, including the East and West Branches.
- D'Urville River
- Area between Lake Rotoroa and the Gowan Valley Road, Tophouse, Korere-Tophouse Road, Atapo, Glenhope and the Gowan Bridge.
- Southern end of the Mt Richmond Forest Park as far north as Lake Chalice.

Results

Two transmittered birds died during the 2004-05 year. A female fledgling was killed in August 2004 and her carcass found cached well outside the RNRP. A non-breeding adult female was killed in July 2004, two months after fledging chicks, and her carcass was also found well outside the RNRP but close to the Mt Robert Fenn™ trap buffer line. This female was transmittered as a juvenile in May 2001. Caching of the carcasses suggests both birds were killed by stoats.

Two birds (one caught as a juvenile in the RNRP and one fledged from a nest inside the RNRP) of previously unknown location were detected during the aerial search.

Updated survival and dispersal data will be analysed to re-assess the need for future monitoring of kaka nesting success (following a recommendation from the 2005 Annual Technical Advisory Group Meeting).

Discussion

This season was the second time a non-breeding adult female kaka has been found killed by a predator. In both cases stoats were implicated, by caching of the carcass; but in both cases the carcass was too decomposed to ascertain with high certainty cause of death from autopsy. Both birds were resident outside RNRP boundaries at time of death, and carcasses were found cached outside RNRP boundaries. The female killed in July 2004 was a young bird (3 or 4 years old) and healthy enough to have raised and fledged three chicks in April 2004. The implication is that in the absence of stoat control even non-breeding adult females are susceptible to being killed by stoats. Possible contributing factors to these deaths are unknown, such as weakening of the kaka by illness.

No deaths of non-breeding adult female kaka have been recorded occurring inside the RNRP. Mustelid tracking indices ranged from 0% to 3% this year.

Recommendations

- Analyse updated survival and dispersal data to re-assess the need for future monitoring of kaka nesting success (following a recommendation from the 2005 Annual Science Advisory Group Meeting).

4.1.3 Robin (*Petroica australis*) Monitoring

Objective

- To assess the effectiveness of the rat control regime in protecting the local robin population.

Methods

Territory mapping was undertaken, as in previous seasons, using survey methods as set out by Powlesland (1997). Refer to the RNRP 2003-04 Annual Report for further detail.

Results

Territory mapping

One pair of robins holding a territory was detected in the survey area in 2004-05 (Table 16).

TABLE 16: NUMBERS OF ROBIN PAIRS HOLDING TERRITORIES IN SURVEY AREA

DATE	NUMBER OF PAIRS	SINGLE MALES	SINGLE FEMALES
August 1998 - February 1999	5	?	?
August 1999 - February 2000	5	?	?
September 2000 - February 2001	6	2	0
September - October 2001[1]	6	2	0
September 2002	2	2	1[2]
September 2003	2	1	1[2]
September 2004	1	1	0

[1] Lower five lines in Water Tank block not surveyed in this year.

[2] Breeding status of this female (same bird) is uncertain. She was seen in the vicinity of a male in both years, but never exhibited positive pair-bond behaviour and is thus considered a single female by this data.

Note: numbers differ from those in the 2001-02 report, to include pairs present in the lower five lines of the Water Tank block in 2000-01; and that 2001-02 was the first time Powlesland's protocol was followed for territory mapping.

In April 2003 several birds with lesions on their feet and legs were observed in the area, but birds/symptoms disappeared by winter 2003. Again, between March and May 2005 several individuals were observed to have similar lesions on their feet and legs. This year a sample of scab from one of these lesions was sent to Massey University for analysis and a positive identification of avian pox was made (Brett Gartrell, pers. comm.). At the time of writing further analysis of this sample was awaited for possible identification of the pox type.

Discussion

Robin territory mapping provides an outcome monitor that reflects the quality of the previous operational year's rodent control.

While no carcasses have been found to positively identify the cause of death of robins in the survey area, rising rat indices following the switch to rat trapping

have coincided with less pairs resident in the survey area (refer to RNRP 2003-04 Annual Report for discussion on this). The impacts of the avian pox prevalent in this population are not understood at present, but this pox did not become apparent until nearly three years after the switch to rat trapping. Thus it seems most likely that rats have been responsible for reducing robin numbers in the survey area, and that rat trapping at the current intensity in the RNRP is not good enough to protect robins.

Recommendations

- Continue robin territory mapping to monitor response to rodent control.
- Identify the need for further health surveillance of the local robin population and respond accordingly.

4.2 NON-WASP INVERTEBRATE MONITORING

Objectives

- To document the beneficial impacts of the control of wasps on the populations of the native insects that make up their prey.
- To examine changes in invertebrate communities across time and pest control treatments.

Methods

Malaise traps used for result monitoring of wasp activity also yield samples suitable for outcome monitoring of wasp control. Twenty traps at the Rotoiti treatment site and ten and six respectively at Lakehead and Rotoroa non-treatment sites are open from November to May and samples collected fortnightly. Wasps are counted and removed and the remainder of the sample stored in 70% ethanol.

Additionally this season weta, bumblebees, and honeybees were removed and stored separately. Weta have been proposed as indicators of ecosystem health as they are negatively affected by a range of pest animals both vertebrate and invertebrate. Weta here have not been sorted to species, sex, or age class.

Tachinidae (bristle-flies) and Tipulidae (craneflies) were not separated, sorted and counted from a sub-sample of material collected in malaise traps by contract entomologist as in previous seasons.

Results

No results are presented for any of the above groups.

Discussion

Weta will require analysis by species, sex, and age or size class, and possibly across years before any conclusions can be drawn.

Insects belonging to indicator groups were not assessed for outcome monitoring as results to date have been relatively inconclusive in showing a benefit to these animals from wasp reduction. This combined with a poor result this season suggested there was little merit in undertaking this work.

The malaise trapping 'design' was established principally for result monitoring of wasps. This species is relatively homogenously distributed across the landscape, and 'micro-habitat' differences need not be allowed for. The same can not be said for the indicator invertebrates collected by the same method, almost as a by-catch of the target wasps. (Community differences at the macro-habitat level were identified and led to the establishment of the Lakehead malaise non-treatment site in 2000-01 with the intention of collecting similar indicator invertebrates present in the RNRP treatment to allow for comparison between treatments). Wasp poisoning is replicated only in time but not in space, and there is no measure for the Rotoiti site through a season prior to wasp control. Thus there are significant limitations with respect experimental design for assessment of 'outcomes'.

The last two seasons have both shown poor results with respect wasp reduction, and as such may allow for analysis of invertebrate outcome indicator species at Rotoiti as an 'untreated' site. This may help identify if any outcome measures can be attributed to the wasp control undertaken, and provide guidance for future outcome monitoring. Similarly a meta-analysis across years may yield information.

4.3 LIZARD SURVEY AND MONITORING

Objectives

- To record changes in lizard populations in the Friends of Rotoiti and RNRP rat-trapping area and identify cause of change.

Methods

As in previous years, Terra Dumont, a Friends of Rotoiti member, operated two transects of 20 pitfall traps each for four days at a time in November and December 2004 and January 2005. Refer to RNRP 2003-04 Annual Report for further detail on Friends of Rotoiti lizard pitfall trapping.

Aparna Lal, a University of Otago Wildlife Management Diploma student, set up and ran 40 lizard pitfall traps in the clearings within the Big Bush rat trapping area during summer 2004-05. This work was aimed at identifying the species of lizard present in the area and providing baseline data for future monitoring.

Results

TABLE 17: SUMMARY OF TOTAL LIZARD CAPTURES (RE-CAPTURES EXCLUDED) ON THE FRIENDS OF ROTOITI PITFALL TRAPPING TRANSECTS FOR 2004-05

YEAR	MONTH	DATES OPEN	MAX TEMP RANGE ºC	TOTAL RAINFALL MM	WARD STREET	BLACK HILL		
					O. nig. pol.[1]	*O. nig. pol.*	*O. lin.*[2]	*O. inf.*[3]
2004	November	20-23	9.5 – 20.5	39.4	7	3	0	6
2004	December	14-17	11.2 – 20.0	29.2	12	4	1	6
2005	January	20-23	18.8 – 21.8	7.0	13	4	0	11

[1] Oligosoma nigriplantare polychroma Common skink

[2] Oligosoma lineoocellatum Spotted skink

[3] Oligosoma infrapunctatum Speckled skink

No results are currently available for Aparna's work.

Discussion

Friends of Rotoiti traps have been operated every summer since November 2000. Because the work is undertaken by volunteers, with restricted time, weather conditions are not always optimised. More data is required before any analysis can be done.

Recommendations

- Friends of Rotoiti pitfall trapping should continue on an annual basis as a useful programme for identifying lizard species present, as an education tool and potentially for identifying population trends.
- Lizard work should remain a low priority for RNRP staff, given that a useful RNRP monitor population has not been identified and to get significant results more hours than are available need to be invested to the work. If time allows, work should focus on identification of lizard species and populations in the RNRP area.

4.4 PLANT AND VEGETATION MONITORING

4.4.1 RNRP Mistletoe – Possum Control Outcome Monitoring

Objectives

- Monitor the health of selected plants within the treatment and non-treatment areas, to test the hypothesis that the apparent decline is the result of possum browse.
- Record the anticipated recovery of the mistletoe population with sustained possum control.
- Use mistletoes to monitor possum presence/impact within the treatment area.

Methods

Further plants continue to be located in the course of other work in the treatment area and non-treatment sites. All plants monitored have been tagged and a standard set of data collected from each, including measurements and an assessment of browse using the Foliar Browse Index methodology (Payton et al., 1997). This concurs with the internal document 'Best practice for survey and monitoring of *Loranthaceous* mistletoe. Such recording will continue on an annual basis with all new plants to be tagged and baseline measurements taken until a suitable sample (30+) is obtained for each species.

Results

No mistletoe monitoring was undertaken this year. This was dropped from the work plan as a response to other pressures negatively affecting the project and team.

Discussion

Mistletoe health is a primary measure of possum control outcomes. In the current regime of possum trap catch indices on a triennial cycle it is imperative that any change in floral values attributable to changes in possum activity be detected as early as possible. The Technical Advisory Group meeting recommended that this work be a priority. It was also suggested that mistletoe monitoring could fulfil a greater role than possum control outcome monitoring and serve as an indicator of ecosystem health. Non treatment data would be required for this.

4.4.2 Pittosporum patulum

Pittosporum patulum is an endangered South Island endemic species subject to browse by deer and possums.

Objective

- To use *Pittosporum patulum* to monitor possum presence/impact within the treatment area and to document improved growth and survival of seedlings in response to possum control.

Methods

As for mistletoes, though details of measurements taken differ. Monitoring is planned for December to coincide with flowering.

Results

24 of 60 existing plants were remeasured, with one unable to be relocated. Seven new plants were encountered during the course of this work. Fifteen plants exhibited positive growth. Of those (nine) exhibiting negative growth, several had no observable browse and may be attributable to observer error as the measurement is relatively fussy following the curves of the stem. Height change ranged from 90mm to 630mm.

A single plant was scored as unhealthy, with the remainder being either healthy or very healthy.

Five plants were recorded as sub-adult, four of which are new plants, and the remaining one a change from juvenile.

Discussion

Following recommendation from the Technical Advisory Group the person responsible for this work was changed to avoid a clash with wasp control planning. Work was achieved in February rather than the December planned period.

4.4.3 Foliar Browse Index

Objective

- Foliar browse analyses are used to detect responses to herbivore control in relatively abundant, browse-sensitive and herbivore palatable plants.

Methods

A standard methodology developed by Landcare Research was used (Payton et al., 1997). Marked trees were re-assessed annually. Species monitored have been reduced to *Raukawa simplex* as the most possum sensitive of the previous suite examined, unless possum activity increases dramatically (Paton et al 2004).

Griselinia littoralis is monitored for ungulate outcome monitoring, with its canopy density a 'health' measure.

Results

No possum browse was observed on *Raukawa simplex* (n=11). Mean canopy foliage density was 41.4% (+/- 2.44%).

Griseliniia littoralis coppices were observed to be browsed in 83% of monitored plants with epicormic coppices (n= 26). Mean percentage of epicormic coppices browsed was 59% (+/- 7.8%). Canopy foliar density was 41.7% (+/- 2.2%).

Discussion

Foliar Browse Index of *Raukawa simplex* along with mistletoe monitoring is a primary measure of possum control outcome monitoring. In the current regime of possum trap catch indices on a triennial cycle it is imperative that any change in floral values attributable to changes in possum activity be detected as early as possible.

Results for browse and canopy foliar density are comparable with previous monitoring of this species since 1999, and indicate that current levels of possum control are adequate for this species. *Raukawa simplex* has been determined to be the most susceptible tree species to possum browse at this location, and thus it can be extrapolated that the current level of possum control is adequate for all tree species.

Monitoring of *Griselinia littoralis* should be retained as it is our only form of ungulate outcome monitoring. There are issues in discrimination between this years browse and that of the past. This is compounded by change in observer(s) and loss of consistency. Results indicate that both incidence and severity of browse of *Griselinia littoralis* have increased since last measured

in 2002-03. The implications of this for recovery of ungulate palatable species at this site are unknown.

4.4.4 Beech Seeding

Objectives

- The periodic seeding of beech (*Nothofagus spp.)* is the primary determinant of the population cycles of rodents and mustelid, and for native invertebrates and birds such as kaka in this forest.
- Monitoring of beech seedfall allows the placement of each annual seed event, and subsequent response, in an historical context.

Methods

Twenty x 0.28m² funnel shaped seed traps are used to collect seed and litter fall from canopy between 1 March and 30 June at each Mt Misery (Rotoroa) and RNRP. Seed is separated from litter, sorted to species and tested for viability.

Energy contribution is calculated by multiplying viable seed per square metre by energy values (after Beggs, 1999). Values of 180 kJ and 60 kJ are given for red and silver beech respectively. A median value of 120kJ has been assigned to mountain beech as it is sized and weighted approximately halfway between the values for red and silver. Tests showed that silver and red beech had similar energy values by weight, and that the difference in energetic contribution was attributable to the mass of the seed (Ibid.)

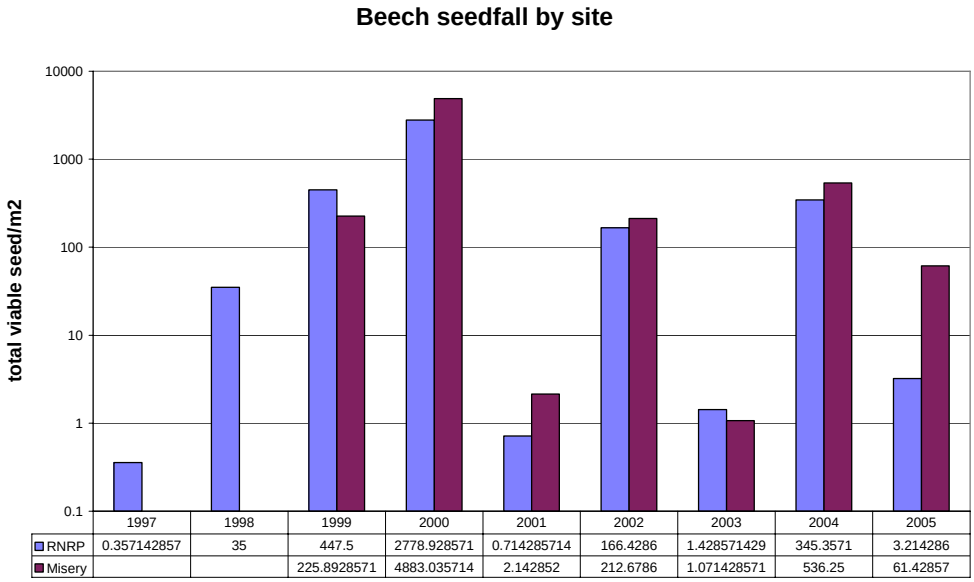
Results

Beech seedfall for 2004 yielded 345 viable seeds per square metre or 1934 total seeds per square metre. It can be described as a 'partial mast' (after Wardle, 1984) with seedfall in the 500-4000 seed per square metre range. Seedfall was red beech (*N. fusca)* dominated (66.7%), followed by *N.solandrii* (29.8%), and a small component of *N.menziesii* (3.5%).

Total viable seedfall at RNRP for 2004 ranks as the third highest experienced through the history of the project (after 2000 and 1999 respectively). It ranks second in terms of energetic contribution (after 2000). 2004 has a greater energetic contribution than 1999 due to the higher proportion of red and mountain beech to silver beech.

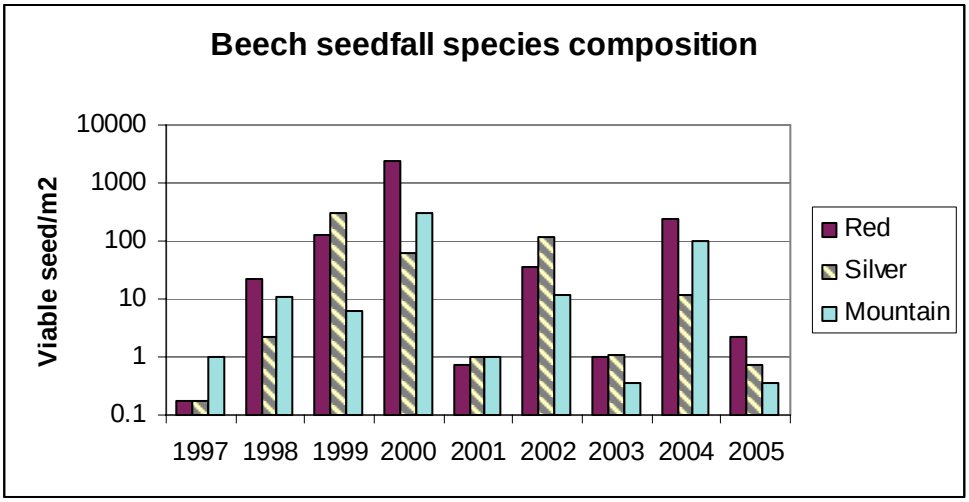
2005 seedfall can be described as 'poor' with less than 500 seeds per square metre (Ibid.). Seedfall at Mt Misery (344/m²) is nearly 20 times greater than at RNRP (18/m²).

GRAPH 26: BEECH SEEDFALL BY SITE



	1997	1998	1999	2000	2001	2002	2003	2004	2005
RNRP	0.357142857	35	447.5	2778.928571	0.714285714	166.4286	1.428571429	345.3571	3.214286
Misery			225.8928571	4883.035714	2.142852	212.6786	1.071428571	536.25	61.42857

GRAPH 27: BEECH SEEDFALL SPECIES COMPOSITION



GRAPH 28: BEECH SEEDFALL ENERGY BY SITE

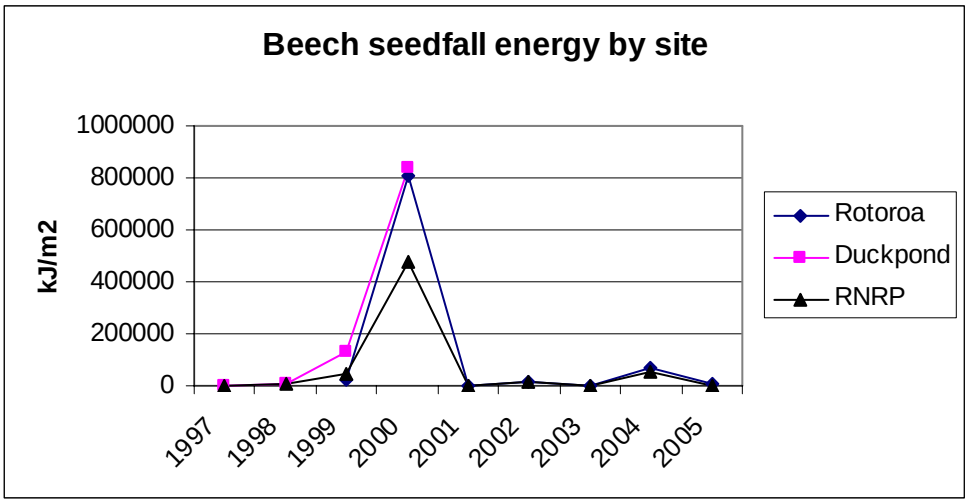


TABLE 18: BEECH SEEDFALL ENERGY CONTRIBUTION BY SPECIES

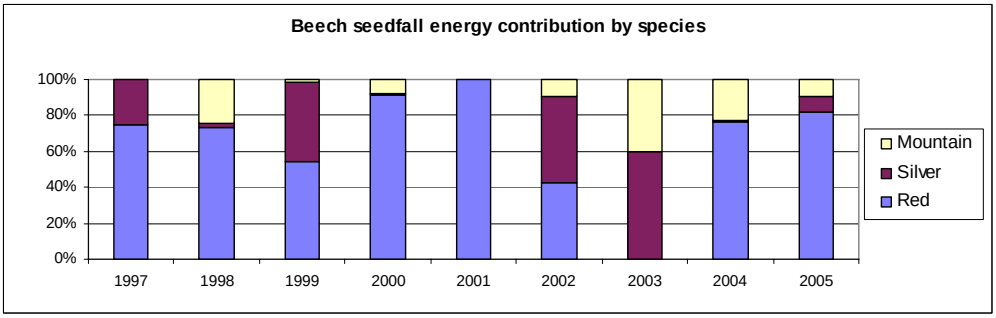


TABLE 19: RELATIVE BEECH SEED CONTRIBUTION (DOMINANT SPECIES BOLD)

	RELATIVE CONTRIBUTION (DOMINANT SPECIES BOLD)			TOTAL ENERGY (KJ/M²)
	RED	SILVER	MOUNTAIN	
2000	91%	1%	8%	474396
2001	100%	0%	0%	128
2002	43%	48%	9%	14946
2003	0%	60%	40%	107
2004	81.8%	9.1%	9.1%	54546

Discussion

The 2004 seedfall can be described as a 'partial mast' (after Wardle, 1984) with seedfall in the 500-4000 seed per square metre

The 2005 seedfall can be described as 'poor' (Ibid) with less than 500 seeds per site. However the disparity between RNRP and Mt Misery in total viable seed falling suggests that comparison between sites, particularly through the 2005-06 year should be treated cautiously. Although differences of this magnitude or greater have been recorded previously between the two sites.

Such direct comparison between sites must be treated cautiously as seed tray location is not randomised. Comparison between years at each site is more advisable.

The 2004 event can be described as 'typical' of beech seedfall events measured at Nelson Lakes between 1974 and 2005 with a (log10) seedfall/metre² value around 2.5, with a periodicity of approximately three years.

Previous reporting on beech seedfall has contained some errors in analysis and interpretation. Due to the large range of seedfall figures between years data has been log transformed for graphing. This has included conversion of negative values (derived when log transforming values <1 seed/m2) to positive values. Figures for 2001 had previously been erroneously reported as equal. Figures presented here are corrected.

Further analysis and reporting on beech seedfall should follow any guidelines for such designed for Operation Ark initiatives to maximise opportunity for between site comparisons.

4.4.5 Tussock Seeding

Objectives

- Seeding of tussock is used as a good indication of the intensity of beech seeding that can be expected in the same year, although the relationship is not mathematically perfect.

Methods

Two species of tussock (*Chionochloa australis* and *C. pallens*) are monitored over a 1000m transect at Mt Misery (200 counts) and a 500m transect at RNRP (100 counts). (For the full methodology refer Appendix 2).

Only Mt Misery was achieved this year.

Results

Mean seedheads per count (± s.e.):

C .australis 0.635 (0.11)

C. pallens 1.825 (0.30)

Discussion

Counts by species cannot be directly compared as method varies slightly (primarily area/count).

Values are low for *C.australis* and moderate for *C.pallens.*

5. Reintroductions – Roroa/Great Spotted Kiwi (*Apteryx haastii*)

5.1 BACKGROUND

The 2004-05 year saw the continuation of the translocation of great-spotted kiwi/roa to the Rotoiti Nature recovery Project.

Key activities for the year included:

- Ongoing monitoring of all birds;
- Breeding activity monitoring;
- Captive management of an injured bird;
- Post collection monitoring of the source population;
- Recapture of all translocated birds including health checks and transmitter changes;
- Writing of technical report.

According to criteria specified in the translocation operational plan, the translocation has met the definition of a partial success.

The following executive summary, data tables, performance standard assessment and recommendations are extracted directly from:

Translocation of Great Spotted Kiwi/Roa (Apteryx haastii) to Rotoiti Nature Recovery Project

Technical Report

P.A. Gasson

dme: STAAO-10679 (in press).

5.2 EXECUTIVE SUMMARY

Nine adult wild great spotted kiwi (*Apteryx haastii*) were transferred in a trial reintroduction from the Gouland Downs (North-west Nelson) to the Rotoiti Nature Recovery Project area, a Department of Conservation ecosystem restoration project or mainland island in Nelson Lakes National Park. A tenth kiwi was injured during the transfer and was not able to be rehabilitated for release into the wild. All nine released kiwi remained within the unfenced Rotoiti Nature Recovery Project area during the year after the release, and the majority of kiwi gained weight. One breeding attempt was identified and is considered to have resulted in a fertile egg hatching, although a chick was not seen. The results of the trial reintroduction suggest that wild-to-wild transfers of adult great spotted kiwi may be an effective way of establishing new

founder populations in favourable areas. A second transfer is recommended to allow further study and improvement of the transfer method, and to enhance opportunities for founder population monitoring and management in the future.

TABLE 20: KIWI DISTANCES FROM RELEASE POINTS AT TIME OF RECAPTURE

BAND	RELEASE GRID REF.	RECAPTURE GRID REF.	INTERVAL	DISTANCE
R-31758 / ONETAHUA	2496918 5928639	2498418 5928786	367 days	1507 metres
R-31760 / TE MATAU	2497542 5929790	2497674 5929981	366 days	232 metres
RA-0443 / TAI TAPU	2497542 5929790	2497674 5929981	366 days	232 metres
R-31759 / KAHURANGI	2496370 5927856	2497399 5929173	364 days	1671 metres
RA-0442 / RAMEKA	2496370 5927856	2498020 5930676	363 days	3267 metres
R-31761 / TAKAKA	2497160 5929131	2497146 5929356	364 days	225 metres
RA-0444 / AWAROA	2497160 5929131	2497892 5929058	365 days	735 metres
RA-0446 / TATA	2497686 5930438	2497702 5930139	400 days	299 metres
RA-0445 / WAINUI	2497686 5930438	2497773 5930484	405 days	98 metres

Note: Grid references were obtained using handheld Garmin Etrex GPS. Accuracy is variable, but a stated accuracy of 6-12 metres is not unusual in RNRP recovery area.

TABLE 21: WEIGHT AND GENERAL CONDITION PRE-TRANSFER AND YEAR 1 RECAPTURES

BAND NO.	WEIGHT PRE-TRANSFER	WEIGHT YEAR 1	WEIGHT CHANGE	CONDITION PRE-TRANSFER	CONDITION YEAR 1
R-31758 / ONETAHUA	2.17kg	2.38kg	210g (gain)	*Medium*	Moderate
RA-0441 / MOHUA	3.51kg	-	-	Good	-
R-31760 / TE MATAU	2.61kg	3.03kg	420g (gain)	*Healthy*	Good
RA-0443 / TAI TAPU	3.62kg	3.43kg	190g (loss)	*Medium*	Good-very good
R-31759 / KAHURANGI	2.45kg	2.60kg	150g (gain)	Poor-moderate	Good
RA-0442 / RAMEKA	3.1kg	3.18kg	80g (gain)	Medium-poor	Good
R-31761 / TAKAKA	2.15kg	2.33kg	180g (gain)	Poor	Moderate-good
RA-0444 / AWAROA	3.2kg	3.18kg	20g (loss)	Good	Moderate-good
RA-0446 / TATA	2.57kg	2.63kg	60g (gain)	Good	Excellent
RA-0445 / WAINUI	3.35kg	3.38kg	30g (gain)	Good	Very good

Note: Italics denote incorrect categories: medium is assumed to equate to moderate.

TABLE 22: PERFORMANCE STANDARDS (OPERATIONAL TARGETS) SPECIFIED IN THE TRANSLOCATION OPERATIONAL PLAN

Note: Performance standards in shaded boxes are the critical performance standards used to define the success of the translocation operation (all section references relate to source document)

DISEASE MANAGEMENT PERFORMANCE STANDARDS	STANDARD MET?
A visual health check and assessment of general condition is undertaken at every opportunity, whenever a kiwi is handled.	Yes - (section 5.4.3)
Information about the incidence of disease in the source population is gathered without handling any of the initial release group kiwi pre-transfer.	Yes (section 3.5)
Moderate or better condition kiwi are collected from a great spotted kiwi population with a normal or low incidence of disease.	Mostly - 3 kiwi in poor to moderate condition. (section 5.4.3)
The health status of each kiwi transferred to the Rotoiti Nature Recovery Project area is retrospectively confirmed after the transfer.	Yes (section 5.4)
Transfer operation performance standards	Standard met?
A founder population of 8-10 healthy great spotted kiwi – comprising an equal balance of males and females – is collected within a seven day period.	Yes (section 5.1.1)
As far as practical, established pairs are collected.	Yes – 4 of 5 pairs (section 5.1.1)
All transferred kiwi survive until release into RNRP.	No – 1 injured and taken into captivity (section 10)
All kiwi are transferred to RNRP less than 48 hours after being collected.	Yes – longest time about 46.5 hours (section 5.2)
Each pair of kiwi is released as soon as practicable after collection.	Yes – first pair held for public event but others transferred following day.
All founder population pairs are released into RNRP within a seven-day period.	Yes – all birds released over 5 days.
The general condition of each bird is known at time of release.	Yes – external exams prior to release (section 5.4.3)
No kiwi are panicked during placement into the release burrows or during release from the burrows.	Yes, but 1 kiwi stressed by media photographer (section 5.3.2)
Ceremonial and publicity events are catered for, but do not significantly extend the amount of time that kiwi spend in transfer boxes.	Yes – event proceeded, kiwi held for under 48 hours.
Post-transfer monitoring and management performance standards	Standard met?
The fate and whereabouts of all translocated kiwi remaining in St Arnaud Area is known 10 months after release.	Mostly – at 13 ½ months when all recaptured (section 7.3)
No translocated kiwi have abandoned St Arnaud Area undetected.	Yes – (no dispersal from RNRP)
All translocated kiwi are fitted with functional radio transmitters until subsequent generations of kiwi are raised at RNRP and radio transmitters are required to monitor RNRP-raised adults.	Yes – two kiwi dropped transmitters but were recaptured.
The average territory size of great spotted kiwi established in RNRP is known.	No – (section 8.1)

DISEASE MANAGEMENT PERFORMANCE STANDARDS	STANDARD MET?
Habitat preferences of great spotted kiwi established in RNRP are known.	Partly – (section 8.3)
All kiwi nesting attempts are identified: the approximate location of each nesting burrow and the approximate duration of the incubation period is known.	Yes – (section 8.4)
Recapture & handling of kiwi is avoided during the first 10 months following the release date unless they disperse from St Arnaud Area.	Almost – 1 recaptured (section 8.4)
Any kiwi that disperse into an area that may be managed as part of an expanded RNRP / FOR management area in the future are monitored and managed as part of the founder population.	N/A – no dispersal from RNRP
Any kiwi that disperse as far as the St Arnaud Area boundary are recaptured and transferred to an appropriate location, taking into account the success of the initial transfer.	N/A – no dispersal from RNRP
Kiwi that are recaptured in a sick or unhealthy condition are rehabilitated, quarantined if necessary, and returned to an appropriate location taking into account the success of the initial transfer.	Yes – one kiwi temporarily released then removed to captive facilities (section 10)
No kiwi adults or chicks are unnecessarily disturbed, harmed or killed by human activity or predation during establishment of the founder population.	Almost - 2 disturbed (section 10)
Source area kiwi survey performance standards	Standard met?
Prior to the transfer, identify several potential capture sites within each of 8-10 different great spotted kiwi territories.	Yes – (section 11.3.2)
Prior to the transfer, collect baseline data about great spotted kiwi distribution at the source location.	Yes – (section 11.3)
Determine the immediate impact that removal of 8-10 kiwi has had on great spotted kiwi density at the source location.	Almost – follow up survey was one year later (sections 11.1 & 11.4)

5.3 RECOMMENDATIONS

5.3.1 Follow-up transfer

- A second transfer of wild-sourced adult great spotted kiwi to the RNRP recovery area during autumn (late April) of 2006 is recommended to allow further study and improvement of the transfer method, and to enhance opportunities for founder population monitoring and management in the future.

- Another transfer of five pairs will augment the small population currently living in the RNRP recovery area, creating a more robust founder population that may only require infrequent and minimal supplementation to maintain genetic viability.
- The follow-up transfer should also be regarded as experimental (with defined research and monitoring objectives) as it is not known how the second release group will interact with the initial release group. In effect, the transfer will be the second part of a two-part experiment.
- Subject to the technical recommendations (below) it is recommended that the same transfer method be used in the second transfer as for the first transfer. The performance standards included in the original operational plan (Gasson 2004b) should be reviewed, and a new set of performance standards should be produced to reflect the knowledge and experience gained during the first transfer, and the technical recommendations below.

5.3.2 Technical recommendations

The following are recommended actions for the follow-up transfer of great spotted kiwi to the RNRP recovery area:

Source population, survey and preparation

- Collect the second group of kiwi from a new source area some kilometres distant from Corkscrew Creek, to ensure that the founder population includes a range of genetic stock.
- Consider sourcing birds from a site near the Gouland Downs, as health screening prior to the transfer may not be necessary: the same procedure as for the first transfer could be followed.
- If kiwi are sourced from a different population then advance health screening may be necessary (refer to translocation and wildlife health SOPs). Seek veterinary advice on whether pre-transfer diagnostic sampling for disease screening is essential.
- Visit the chosen source area no later than February-March 2006 in order to conduct baseline surveys and identify pairs for collection. As a minimum, a standard three-night call count surveys should be undertaken.
- Only undertake pre-transfer captures for health screening if absolutely necessary, as great spotted kiwi can be difficult to recapture. A specialist kiwi catching dog may be required. A safer strategy may be to collect representative samples from birds adjacent to the source area that are not intended for transfer.
- If it is considered necessary to collect diagnostic samples from the source area prior to the kiwi collection and transfer, avoid normal night catching (attract-and-ambush) methods that may result in a failure to catch kiwi and are likely to make them more wary of being caught in the future. Use a proven kiwi-catching dog at night to increase the chances of an encounter resulting in a successful capture, or else use a dog to locate kiwi during the daytime. Radio-tag any kiwi that are caught and are likely to be needed for transfer.

- If pre-transfer captures are deemed necessary then ensure that the opportunity to collect data is maximised. Blood samples (including whole blood samples) are required for establishing baseline reference ranges for great spotted kiwi. Consult Brett Gartrell (Massey IVABS) and the Kiwi Recovery Group.

Collection

- Use a proven night dog/catching team to collect the required number of untagged kiwi as quickly as possible. Have a dedicated kiwi catcher and kiwi indicator dog available to catch any previously radio-tagged kiwi.
- Collect established pairs wherever possible as they may stay together at the release site, and this approach minimises the impact on established pairs at the source area.
- Collect adult birds in any condition (including poor) if they appear otherwise healthy.
- Do not hold any kiwi at capture sites while playing calls to attract further kiwi: transport captured birds directly to base camp.
- Birds can be transferred short distances in either cardboard "pet cubes" or canvas bags. Do not tape legs together during transporting.
- Process kiwi at night to keep them cooler and calmer. Ensure skilled staff are available to process birds, enabling catchers to focus on catching.

Holding and Transfer

- Redesign the transfer boxes: transfer boxes need a "foolproof" system for preventing bill injuries when the door/lid is being shut. Current proposals include a transparent Perspex internal lid sitting on a rim underneath the hinged lid, a sliding door, a fabric sheet that fits over the top before shutting the lid, or a rubber flap at the back of the hinged lid.
- Consider halving the existing double transfer boxes: single transfer boxes will be easier to handle than double boxes, although they will need to be well marked to ensure that pairs are kept together.
- Consider installing viewing ports or transparent lid liners in each transfer box. These would be useful for assessing bird health, behaviour and worm supply.
- Additional (perhaps adjustable) ventilation should be installed. One ventilation port on three sides of each transfer box is marginal when holding birds on warm days.
- Hold kiwi in transfer boxes for a maximum of 48 hours. Provide worms to keep kiwi hydrated.
- Consider collecting blood samples at St Arnaud rather than at the source area, as this will provide a better overview of how well each bird has coped with holding and transfer.

Release

- Continue to disallow flash photography of kiwi. Provide photographic opportunities for approved media in high-light situations (e.g. during post-transfer health checks at St Arnaud), but not in low-light situations (e.g. near release burrows) where a flash might be used.
- Continue to use release burrows for containing kiwi during the daytime.
- Release burrows should not be inside known kiwi territories (estimated from daytime shelter locations), but should be about 500 metres from known territories.
- Consider the possibility that artificially matched pairs of kiwi could roam further than previously established pairs and single birds when allocating release burrows to particular birds. Artificially paired birds and singles may require a greater "buffer" of protected habitat.
- Have a trained vet available to inspect and hydrate birds before they are placed into the release burrows, and have a plan for dealing with injured birds. Massey IVABS has offered to assist with a second transfer.
- Open the release burrows no later than 0-15 minutes after sunset (videoing showed that kiwi become active in the burrows 15-45 minutes after sunset).

6. Advocacy and Education

6.1 OBJECTIVES

The project's third overall objective is:

- To advocate for indigenous species conservation and long-term pest control, by providing an accessible example of a functioning honeydew beech forest ecosystem, so a large number of people can experience a beech forest in as near-to-pristine condition as possible.

The advocacy and education programme is working towards this, and has identified five aims as follows:

- Develop a high public profile for the project, enhancing opportunities for its key message to be put across.
- Develop and seek opportunities to express the key message that the conservation of indigenous species requires the control of pests. The use of poisons, shooting and traps are currently the only practical options for this control.
- Develop opportunities to involve the St Arnaud and wider community in the project.
- Extend the work of the project into the St Arnaud area through the involvement of its community.
- Develop opportunities for schools to contribute to the project and achieve education outcomes at the same time.

6.2 DEVELOPING AND MAINTAINING PROJECT PROFILE

6.2.1 Spreading the message

The Rotoiti Nature Recovery Project is readily accessible to visitors. The Bellbird and Honeydew Walks within the original core area at Kerr Bay offer all weather tracks with a series of detailed panels about many aspects of the project. Returning visitors often comment on the increased bird song and presence of native wildlife around the village and the tracks through the RNRP area. The presence of kiwi in the last year has increased interest and there have been several reports from members of the public of hearing kiwi calls.

The potential threat of dogs to the newly released kiwi is an area of ongoing concern. 'Kiwi Zone / No Dogs' signs remain in place and have proven to be largely effective in reducing the incursion of dogs in the adjacent national park. An incident involving two youths and a dog shortly after the release of the kiwi has been dealt with through the courts resulting in a diversion agreement.

The ever increasing number of 'mainland island' type projects outside the department's management (both on and off private land); provide testimony to

the inspiration that the early departmentally-managed projects have provided. RNRP staff also provided technical support to several community groups involved in mainland restoration work such as the Friends of Flora group and a broader Landcare Trust trapping workshop.

RNRP staff participated in the Departments annual mainland island hui held at Waimana Valley at which individuals from a number of groups outside the Department were exposed to the work going on at Rotoiti.

Ongoing community support is vital to the long-term future of the project. We continue to aim to keep the community informed through regular (at least monthly) contributions to the local newsletter, and indirectly through the media, and offer opportunities for more in-depth contact through talking to groups, providing guided walks and opportunities for 'hands on' involvement through involvement with the Friends of Rotoiti (refer Section 6.5 Volunteer Involvement).

6.2.2 Revive Rotoiti Newsletter

One edition of Revive Rotoiti (Appendix 1) was published in the year (autumn 2005). The newsletter (including photocopies of back-issues) is available in the Nelson Lakes National Park Visitor Centre.

6.2.3 Meetings

Project information has been supplied regularly to meetings of the Rotoiti District Community Council and community forums held by the Department in Nelson.

6.3 MEDIA LIAISON

Media interest in the kiwi remains high. The highlight was the discovery of egg fragments suggesting a chick had hatched to Kahurangi and Awaroa. Several media contacted the area office on a regular basis to follow up on the story. Unfortunately, as the chick was not found, we could not develop this further.

The ongoing rehabilitation of the injured kiwi Mohua, also remained in the media's "eye". An overly dramatic TV news story, when she was still at Massey, suggesting euthanasia as being her most likely fate was the only negative publicity this year. The attempted reintroduction of Mohua to the wild, recapture and placement in captivity at Willowbank Wildlife Park in Christchurch all attracted minor media interest.

Fresh FM, a regional access radio station aired a two part 'Fresh Feature' documentary on the capture and release of the kiwi. The rights to the documentary has since been on sold to Radio New Zealand though it is unknown when this will be aired and in what format.

6.4 EDUCATION PROGRAMMES

6.4.1 Intermediate, Secondary and Tertiary Education

Groups given talks on the project in 2004-2005 included:

- Bohally Intermediate
- Nelson Intermediate
- West Mount Tasman School
- Area Schools
- Nelson Girls College
- Newlands College
- Marlborough Girls College
- Marlborough Boys College
- Waimea College
- Nayland College
- Motueka High School
- Queen Charlotte College
- Victoria University
- Canterbury Forestry Students
- Nelson Marlborough Institute of Technology (NMIT) Trainee Ranger class

A talk was given at Rotoiti Lodge every week in term time. Three staff were involved in this activity. 1,189 secondary school students were given the power-point presentation at Rotoiti Lodge.

Groups given guided walks round the project site were:

- Youth Nelson
- NMIT Trainee Rangers
- Ecoquest
- Probis Walking Club
- Waimea College
- Nayland College
- Nelson Girls College
- Marlborough Girls College
- Newlands College
- Motueka College

The total number of people given guided walks around the project in 2004-05 was 460. Many of these were Year 12 biology and geography students doing NCEA unit standards on conservation and resource management.

Walk numbers were slightly down on 2003-04. This could be due to several community groups requesting a power-point presentation on the great spotted kiwi transfer rather then the guided walk.

6.4.2 Primary School Resource Kit

Most primary schools that visited in 2004-05 used the resource kit to plan their trips. They are still requesting a staff member to give an introductory talk to

their classes, and some requested a power-point presentation on the great spotted kiwi transfer.

6.5 VOLUNTEER INVOLVEMENT

6.5.1 RNRP Volunteers

RNRP received 141 volunteer work days this year from 15 individuals.

(Note - This does not include the Friends of Rotoiti hours)

6.5.2 Friends of Rotoiti

The Friends of Rotoiti (FOR) community group was set up in 2001. Its objectives are to provide opportunities for the community to be involved in pest control, species monitoring, re-introductions and for individuals to receive training from the department in best practice techniques in these areas. In this year there was one organised training day for all group members. All new members are inducted by either staff or experienced volunteers on their first day. The group conducts rat trapping in the village, 'filling the gap' between the old core and the new rat control area at Duckpond Stream and they also run a Fenn™ trap line up the Wairau Valley and from Six Mile Road to the top of the Rainbow Skifield, and from the Buller Bridge to Mt Robert Car Park. Predator control methods are identical to RNRP techniques, with the frequency of trap checking also the same where possible. Results can be found in Sections 3.2 and 3.3.

Friends of Rotoiti had over 70 members at the end of 2004. The number is necessarily vague as some of the "members" are representatives of groups such as the 50+ Tramping Club and Forest and Bird may bring up to ten volunteers on a day.

A highlight for the group was winning the Tasman District Council top Environmental Award with a grant of $1,000.

The Friends of Rotoiti did 142 volunteer days of work over the 2004-05 period.

6.6 VISITOR SERVICES

No major activity took place in this area. Nelson Lakes National Park Visitor Centre staff continued to distribute information about the project. Most requests for information come from school and tertiary students.

7. Research

Projects funded or assisted by the project to differing levels in 2003-04:

Rex Bartholomew (University of Victoria) was awarded an RNRP scholarship in 2004-05 for study investigating factors influencing the recruitment and establishment of *Fuchsia excorticate* in the Nelson Lakes National Park. Rex carried out pilot studies in April 2001 and 2005. Anticipated date for completion of this study is November 2006.

Dave Kelly and Jenny Ladley (University of Canterbury) and Alastair Robertson (Massey University), were provided logistical support for national research on mistletoe flower opening and pollination in areas with and without predator control. This was anticipated to be the last year of field work.

The RNRP continued to be a research site for Landcare Research, Nelson and Lincoln, to undertake research into the impacts of mice and wasps on soil chemistry and soil microbes and invertebrates in a honeydew beech forest. This work is supervised by David Wardle and has two more field seasons programmed.

Reports received in 2004-05 for completed research:

Poirot, Ceisha. 2004. The role of predation as a limiting factor of bellbird (*Anthornis melanura*) nest success in New Zealand. MSc Thesis, University of Canterbury.

Sarvala, Minna. 2004. Conservation of native species at mainland sites where invasive species are a threat. Case study: Kaka, a native New Zealand parrot. MSc Thesis, University of Turku, Finland.

Sim, Mike. 2005. Invertebrate community response to sustained pest control in *Nothofagus* beech forest. MSc Thesis, University of Auckland.

Spurr, E., Maitland, M.J., Taylor, G.E., Wright, G.R.G., Radford, C.D., Brown, L.E. 2005. Residues of brodifacoum and other anticoagulant pesticides in target and non-target species, Nelson Lakes National Park, New Zealand. NZ Journal of Zoology, vol. 32:237-249.

Wardhaugh, Carl. 2004. Factors Influencing the Distribution of the Beech Scale Insect (*Ultracoelostoma* spp.): Implications for the Ecology of Honeydew Beech Forests. MSc Thesis, University of Canterbury.

8. Project Management

8.1 BUDGET

TABLE 23: 2003-04 BUSINESS PLAN BREAKDOWN BY MAIN TASKS

ACTIVITY	STAFF HOURS[1]	OPERATING COSTS ($$)	TEMPORARY WAGE COSTS ($$)
Predator management	1,237	1,369	25,960
Wasp control	372	750	8,360
Management of rodents	660	300	28,520
Vegetation monitoring	376	400	800
Native fauna monitoring	912	0	6,000
Small mammal monitoring	352	400	2,400
Project management	2,117	5,500	2,160
Reintroductions	436	5,600	0
Possum control	0	800	0
Ungulate control & monitoring	168 [2]	1,600 [2]	0
Research support	124	800	0
Advocacy	548	3,000	0
TOTAL	7,302	$20,519	$74,200

[1] Does not include volunteer effort (refer Section 6.5 Volunteer Involvement)

[2] Planned but not carried out.

8.2 STAFFING

- Brian Paton, Programme Manager Biodiversity, 50% RNRP
- Matt Maitland, Project Supervisor
- Genevieve Taylor, A2 Ranger
- James McConchie, A1 Ranger
- Andrew Taylor, 2 year temporary A1 Ranger
- Logan Martin, 6 month A1 Ranger
- Stu Bennett, 6 month A1 Ranger
- Brett Thompson, 10 month A1 Ranger

Others that contributed business-planned hours were:

- John Wotherspoon, Programme Manager Community Relations
- Sally Leggett, Community Relations A2 temp Ranger

- Paul Gasson, Biodiversity A2 Ranger (Assets)
- Dave Seelye, Biodiversity A2 Ranger (Threats/Assets)

8.3 TECHNICAL ADVISORY GROUP

The RNRP Technical Advisory Group continues to contribute valuable input in providing advice to the project team. The advisory group met formally from 10-11 February 2005, prior to business planning, to review the previous years' work and provide recommendations for the coming year. Minutes of the meeting can be found in dme: staao-11243 (16pp). Technical Advisory Group members in 2004-05 were:

- Jacqueline Beggs, Auckland University
- Peter Wilson, Auckland
- Eric Spurr, Landcare Research, Lincoln
- David Kelly, Canterbury University
- Graeme Elliot, RD&I, Nelson
- Dave Butler, Private Consultant, Nelson

Elaine Wright and Craig Gillies from the Terrestrial Conservation Unit (TCU) also attended the meeting as Mainland Islands are now nationally coordinated through this unit.

Pete Gaze, and Kerry Brown, technical support staff from Nelson/Marlborough Conservancy, also attend the annual meeting.

9. Acknowledgements

This year we bade farewell to the last of the original staff members who had helped set up the RNRP beginning in the spring of 1996. James (Jimbo) McConchie who spent nine years working on the project took medical retirement at the end of June 2005. The project will miss his exceptional mistletoe observations and his attention to quality trap sets which set him apart as a valuable team member. During these last 12 months the rest of the trappers have had to cover extra ground that Jimbo could not do any more, which they managed to do through good weather and bad.

Many folk from outside the department have also contributed to the success of the project, particularly the Friends of Rotoiti who continue to attract regular trappers who give up their weekends to assist with the predator control that buffers the mainland island. The project has also benefited from volunteers from around the country and from overseas who have been keen to assist with the rat trapping in the core area. Thanks are also due to the Technical Advisory Group who give of their valuable time to guide and encourage the work that is done in the project.

The RNRP has enjoyed another year of very positive support and encouragement from members of Te Tau Ihu and from Manawhenua ki Mohua in Takaka particularly.

The kiwi programme was pleased to be able to give staff from the Bank of New Zealand an opportunity to see kiwi. The bank's continued support of the programme is appreciated and acknowledged.

It is appropriate to single out Phil and Fiona Borlase for special thanks for their support in letting the project team through their property on a very regular basis which saves a lot of wear and tear on the trappers.

Finally thanks to Dave Butler for his editorial and technical auditing assistance with this report.

References

Protocol for Low-Density Possum Monitoring using the WaxTag® Method. 2005. National Possum Control Agencies, Wellington.

Maddigan, F. 2003, 2004. Summaries of national tracking tunnel survey data. Unpublished report. DOC St Arnaud Area Office, File NHE 04-08-13-04.

Greene, T.C., Powlesland, R.G., Dilks, P.J., Moran, L. 2004. Research Summary and Options for Conservation of Kaka (*Nestor meridionalis*). Department of Conservation Science Internal Series #178, Department of Conservation, Wellington.

Beggs, J.R. 1999. Comparison of the quality of red and silver beech (Nothofagus) seeds in Nelson Lakes National Park, New Zealand. New Zealand Journal of Botany 37 (3), pp. 495-501

Beggs, J.R. & Rees, J.S. 1999: Restructuring of insect communities by introduced *Vespula* wasps in a New Zealand beech forest. *Oecologia* 119: 565-571.

Butler, D.J. 1998. Rotoiti Nature Recovery Project. St Arnaud's Honeydew Beech Mainland Island Strategic Plan. Department of Conservation, Nelson/Marlborough Conservancy, Nelson. 52pp.

Butler, D.J., Maitland M.J., Taylor G.E., Parlane K.J. and Gasson P.A. 2003. Rotoiti Nature Recovery Project Annual Report, 2001-2002. Department of Conservation, Nelson.

Butler, D.J. (Ed.). 2003. Rotoiti Nature Recovery Project Triennial Report 1998-2001. Department of Conservation, Nelson.

Dawson, D.G. & Bull, P.C. 1975. Counting Birds in New Zealand Forests. *Notornis* 22 (2):101-109.

Ecosystems Consultants. 2000. Controlling feral house mouse (*Mus musculus*) populations during beech seeding in a New Zealand forest using Brodifacoum in bait stations. Ecosystems Consultants Report No.15, Dunedin.

Gillies, C. & Williams, D. 2002a. Using tracking tunnels to monitor rodents and other small mammals. Department of Conservation unpublished report (HAMRO-60778) Northern Regional Office, Hamilton.

Moller, H. 1990. Wasps kill nestling birds. *Notornis* 37: 76-77.

Moorhouse, R. 1998. Predation of female kaka in the RNRP area: How much is too much? Unpublished Report, Department of Conservation, held at St Arnaud Area Office.

Paton, B.P., Maitland M.J., Taylor, G.E., Knevel A.W.J., Wotherspoon, J.A. 2004. Rotoiti Nature Recovery Project Annual Report 2002-03. Department of Conservation, St Arnaud, Nelson.

Paton, B.R., Maitland, M.J., Taylor, G.E., Knevel, A.W.J., Parlane, K.J., Wotherspoon, J.A., Gasson, P.A. 2004. Rotoiti Nature Recovery Project Annual Report 2003-04. Department of Conservation, St Arnaud, Nelson.

Payton, I.J., C.J. Pekelharing & C.M. Frampton. 1997. Foliar Browse Index: A method for monitoring possum damage to forests and rare or endangered species. Contract Report LC 9697/60, Landcare Research, Lincoln.

Powlesland, R.G. 1997. Protocols for monitoring New Zealand robins (*Petroica australis*) Department of Conservation technical series No.13, Wellington.

Thomas, C.D., H. Moller, R.J. Toft, J.A.V. Tilley, G.M. Plunkett & R. Harris. 1989. *Impact of Vespula wasp on native insects and birds - Second year research report.* Contract Report No. 25 to Department of Conservation, DSIR Ecology Division, Nelson.

Wardle, J.A. 1984. The New Zealand Beeches. Ecology, Utilisation and Management. N.Z. Forest Service. Caxton Press, Christchurch.

Appendix 1

REVIVE ROTOITI NEWSLETTER

Appendix 2

OPERATIONAL FIELD MANUAL CONTENTS

The Operational Field Manual is a folder that is available for field staff to reference in the Area office. It contains hard copies of prescriptions and instructions for specific tasks. It is arranged in numerical order according to business plan task codes.

7405 126 210 - Predator Management

- Mustelid control and monitoring: an overview document
- Sketch of Fenn™ cover design
- Sketch of Fenn™ trap set
- Fenn™ trapping data sheet masters

7405 126 220 - Wasp Control and Monitoring

- Wasp Poison Decision Maker. Scanned version: dme:\\staao-8221
- Non-toxic wasp count protocol
- Wasp strip plot transect map RNRP
- Malaise collection and sorting methods at: dme:\\staao-5976
- Malaise/honeydew suppliers list
- Malaise trap location maps: RNRP, Misery, Lakehead
- Malaise trapping data sheet master
- Honeydew sampling protocol (refractometer method)
- Honeydew location map and instructions filter paper method
- Honeydew tree location map

7405 126 230- Rodent Management

- Rat trap checking prescription at: dme:\\staao-6809
- Rat trapping data sheet master: dme:\\staao-5757
- RNRP core grid map S:\Camera|Mainland Island\maps\core grid.bmp
- Rat trap information sheet (includes photos of tunnels set): dme:\\staao-7222
- Rat trap cover cutting pattern sketch, scanned version: dme:\\staao-7352
- Snap trapping database instructions. Printed from screens from Citrix database St Arnaud Snap Trapping
- Rodent snap trapping for monitoring instructions RNRP and Rotoroa
- Cunningham and Moors rodent paper with identification features and protocol for calculating snap trap index

- Protocol for tissue sampling and testing for Vertebrate Pesticides. G.R.G. Wright, Landcare Research

7405 126 310 - Vegetation Monitoring

- RNRP vegetation monitoring synopsis
- Mistletoe monitoring protocol Kerr Bay and RNRP. See also: dme:\\wscco-22338
- Tussock counts protocol Misery and RNRP. See also: dme:\\staao-1869
- Beech seed collection and analysis instructions: dme:\\staao-6352
- Equipment list for two 20x20 plots

7405 126 320 - Fauna

- Lizard survey protocol and data sheet
- Robin monitoring protocol
- Snail monitoring protocol
- Kaka monitoring protocol

7405 126 330 - Monitoring of Small Mammals

- Rodent monitoring documents with line locations and written instructions for setting tunnels, analysis results and suppliers. Requires updating but useful as guide
- TT (Tracking Tunnel) line locations (including treatment types, hazards, best combinations): dme:\\staao-9073
- Maps for tracking tunnel lines: Rotoroa A-D (with notes), Lakehead, Big Bush rat area, RNRP core
- Sketch diagram for galvanised 1m possum proof tracking tunnel
- TT ink and paper preparation (ferric/tannic method)
- TT field data sheets: dme:\\staao-9063
- TT rodent and mustelid data sheets Rotoiti and Rotoroa from dme:\\staao-8614
- TT excel calculator: instructions for and from dme:\\staao-8614
- TT rodent and mustelid synopsis sheets
- TT guide to prints: dme:\\hamro-20234
- TT protocol for SRU investigation sites dme:\\hamro-66179 Note – some variance from protocol noted on hard copy
- TT protocol for field from dme:\\hamro-66179 with variances

7405 126 100 - RNRP Management

- Etrex settings
- Maps
- Project codes and task managers dme:\\staao-6740
- Business planning calendar tables

- Iwi contact list
- Acetate map grids for estimating area
- Mainland Island Draft reporting guidelines dme:\\hwkco-18884
- Memorandum of Understanding – Borlase farm access dme:\\staao-9230

7405 126 240 - Possum Management

- NPCA trap catch protocol for field operatives
- Kill trap line and trap locations
- Kill trap data sheets: dme:\\staao-8725
- Wax tag spreadsheets: dme:\\staao-9067

7405 126 250 - Ungulate management

- Deer, chamois, hare protocol, including stomach sampling: dme:\\staao-4224
- Hunter return sheet: dme:\\staao-6256

7405 126 500 - Research support

- RNRP request for research proposals with research needs: dme:\\nelco-32119

Appendix 3

INTERNAL DEPARTMENT OF CONSERVATION DOCUMENTS

(DOC computer document reference numbers in brackets)

1. RNRP Strategic Plan 1998 (staao-10245)
2. RNRP Feratox Field Trial 2004 (staao-9934)
3. RNRP Operational Plan 2004-05 (staao-11400)
4. RNRP Wasp Poison Decision Maker (staao-8221)
5. RNRP Wasp Finitron Preparation Prescription 2004 (staao-10105)
6. RNRP Wasp AEE 2003-04 (staao-9781)
7. Draft RNRP Strategic Plan - review of 1998 plan (staao-9591)
8. Falcon nesting data (staao-7290)
9. Tussock Count RNRP (staao-1869)
10. Maitland 3rd International Wildlife Congress Abstract (staao-8837)
11. RNRP Advisory Group Minutes February 2005 (staao-11243)
12. RNRP 3rd International Wildlife Management Congress Presentation (staao-9758)
13. Draft management plan for great-spotted kiwi recruitment and founder population in the RNRP 2005-11 (staao-10679)
14. 14 Great-spotted Kiwi Translocation Technical Report 2005 (currently in print) (staao-11372)
15. Trans-GSK Source Options (staao - 9921)
16. Trans-GSK-Operational Plan (staao -8844)
17. Trans-GSK Proposal (staao -8331)
18. RNRP Honeydew Post Statistician (staao-9009)
19. Department of Conservation's Translocation of New Zealand's Indigenous Terrestrial Flora and Fauna SOP. QD number NH1042 (wgnro-13668)
20. Best Practise for Survey and Monitoring of Loranthaceous Mistletoe (wscco-22338)