



# Biodiversity monitoring in Rewanui

Initial pest animal surveys July 2008



FOR FURTHER INFORMATION

Greater Wellington  
Regional Council  
Masterton  
PO Box 41

T 06 378 2484  
F 06 378 7994  
W [www.gw.govt.nz](http://www.gw.govt.nz)

Publication date August 2008  
Publication No. GW/BIO-G-08/144

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## Appendices

## 1. Introduction

Greater Wellington Regional Council (Greater Wellington) is contracted by the Montfort Trimble Foundation to monitor biodiversity within the diverse Rewanui property. This project is funded for three years by a Sustainable Farming Fund with monitoring scheduled to be phased in gradually for the different indicator species in the first year from July 2008 to June 2009.

The species and monitoring methods chosen are selected as the most appropriate indicators of both 'operational' success (degree of pest suppression), and 'outcome' success (degree of recovery of native species) for this type of property. Operational monitoring for Rewanui by Greater Wellington will focus on the success of possum, rat, mice, mustelid (stoats, ferrets and weasels), rabbit, hare, ungulate (i.e. escaped sheep, goat, deer or pigs) and weed control programmes. The 'outcome' monitoring will focus on native birds, native invertebrates (including freshwater), native lizards and native vegetation as indicators of positive outcomes on biodiversity from pest control.

A fundamental stage of this monitoring programme is the identification of initial levels of pest animal species in the reserve which will be useful in determining the overall health of the property at the beginning of this monitoring programme.

## 2. Methods

Greater Wellington ran comparative trials between three techniques for monitoring rodents and possums. To be consistent with national monitoring methods, tracking tunnels were used for rodent and mustelids. This method was compared with a new and innovative technique, the ChewTrack card monitor, to compare sensitivity and reliability of these two different rodent survey methods. The ChewTrack cards are also useful for monitoring possums and this technique was compared to the national protocol for possum monitoring, the Residual Trap-Catch monitor (RTC). Whilst conducting the CT card trial across the entire property, systematic observations were also made for other pest animal species (escaped sheep, deer, rabbits and hares).

These surveys were conducted in the non-pasture, fenced areas on the Rewanui property (total 219 ha). Accurate rainfall data was kindly supplied by Ian Campbell from the weather station located at the Rewanui car park. Refer to Appendix 1 attached for detailed weather and field information for the work performed in July at Rewanui by Greater Wellington. A mustelid tracking tunnel survey was run three days after the rodent survey however; wet weather caused the tracking papers to be soaked and therefore unreadable.

## **2.1 CT cards Standard Operating Procedure (SOP)**

From Landcare Research trial protocol

### **10 July – 19 July 2008**

Transects spaced 250m

Cards placed every 50m, set 10 cm high from ground on tree

Card folded along middle of card

Ink dabbed about 1.5cm wide along three outer edges of lower half of card

Peanut Butter on inside middle bent edge, and flutes of corflute on top half outer edges

Attach with one nail through the centre of the folded edge to tree

No cards placed on fence lines and only on trees large enough to support a nailed card

Where habitat lacks trees every 50m over a continuous distance of 200m then discontinue line until forested habitat regained

Avoid paddocks with sheep / cattle

Set for five fine nights i.e. < 10mm of rain for first four hours. If rainfall of >10mm then set for extra night

Record all vertebrate animal sign seen within 25m of each card

Record if chew, track, scat or actual animal seen near card

## **2.2 Tracking tunnels (SOP)**

From Department of Conservation Protocol

### **28 July – 29 July 2008**

Transects spaced minimum of 200m apart

Minimum of 6 lines for an area < 300 Ha, minimum 8 lines for 300 - 600 Ha

Tunnel lines 500m in length with 1 tunnel every 50 m (total of 10 per line)

Randomly located throughout Rewanui

Philproof tunnels (total 60)

Peanut Butter placed at each end of the tunnel

Two papers placed at each end of the tracking tray

Set for one fine night

Prints identified and recorded

## **2.3 Possum RTC (SOP)**

From NPCA Possum Monitoring Protocol, 2007

### **28 July 28 – 31 July 2008**

Transects randomly located throughout reserve

Transects placed at least 200m apart

10 leg-hold traps placed every 20m (i.e. 200m transect)

Set for three fine nights (rain <10 mm in the 1st four hours of dark)

Traps baited with flour and icing sugar

Animals caught killed, identified and removed from trap site

### 3. Results

#### 3.1 ChewTrack card survey (CT)

Rats = 22.83 %  
Mice = 44.23 %  
Possum = 4.44 %

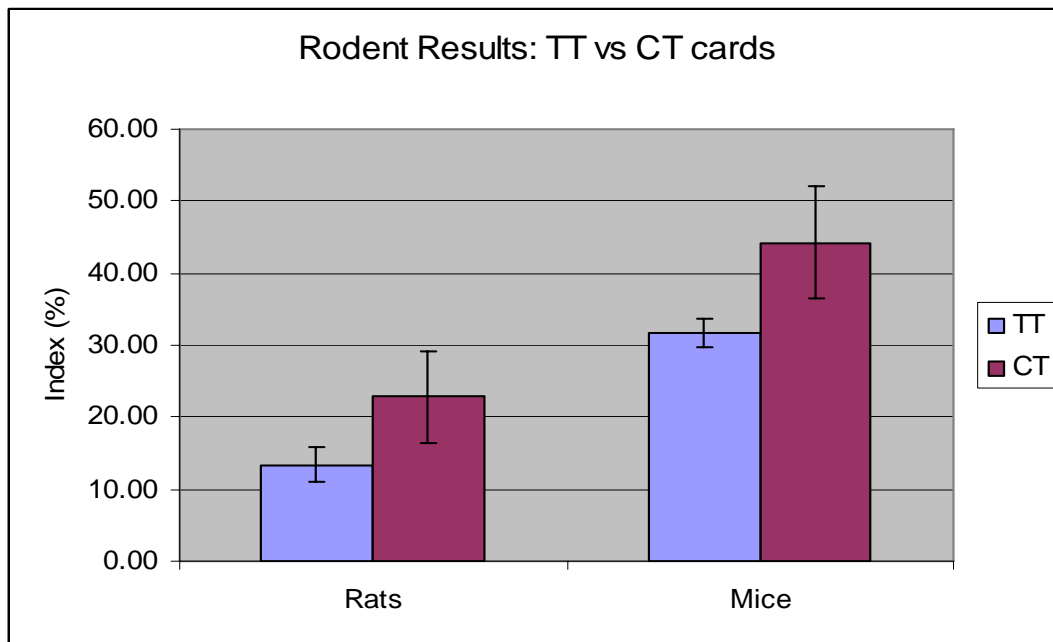
**Fieldwork Costs:** @ \$68.50 / hr = \$ 2, 637.25  
Total hours of fieldwork: 38.50 hrs

#### 3.2 Tracking tunnels (TT)

Rat = 13.33 %  
Mice = 31.62 %

**Fieldwork Costs:** @ \$68.50 / hr = \$890.50  
Total hours of fieldwork: 13.00 hrs

Chart 1: comparison between rat / mice indices (with standard error bars) for the TT monitor and the CT cards monitor

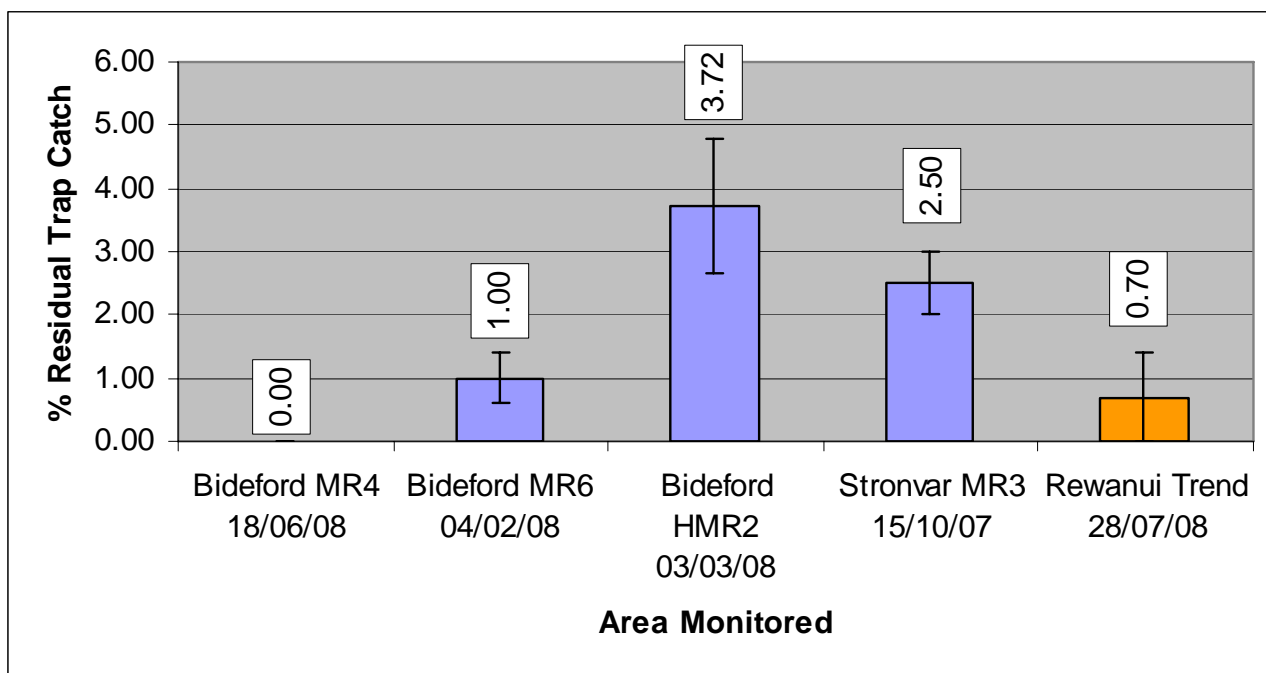


#### 3.3 Possum Residual Trap Catch (RTC)

Possum = 0.70 %

**Fieldwork Costs:** @ \$68.50 / hr = \$ 2, 397.50  
Total hours of fieldwork: 35.00 hrs

Chart 2: comparison between the Rewanui RTC (in orange) and recent RTCs (with standard error bars) performed by the Animal Health Board (AHB) in nearby management areas (blue)



### 3.4 Results compared with CT cards

Table 1: comparative results for the different survey methods

	CT Rats	CT Mice	CT Possum	TT Rats	TT Mice	RTC Possum
Actual Index (%)	22.83	44.23	4.44	13.33	31.62	0.70
Ratio to CT cards	1.00	1.00	1.00	0.58	0.71	0.16
Hrs Fieldwork	38.5	Incl. with rats	Incl. with rats	13.0	Incl. with rats	35.0
Costs Fieldwork	\$ 2,637.25	Incl. with rats	Incl. with rats	\$890.50	Incl. with rats	\$ 2,397.50

Appendices 2 to 5 show the locations of pest species from the rodent tracking tunnels, possum RTC and CT cards. Appendices 3 and 4 in particular show the different results for locations and presence of possums and rats between TT / RTC monitors and the CT card monitor. For the TT monitor, rats were essentially detected on only two of the six tunnel lines (in a total of 8 tunnels). However, for the CT cards they were detected across the whole sampling area (on a total of 39 cards). For the RTC monitor, only one possum was caught on RTC Line 1. However, for the CT cards, possums were detected on six CT cards (see locations on Appendices 2 and 3). The mice indices exhibit the most similar result between TT and the CT cards (31.62% cf. 44.23% respectively).



## 4. Other pest animals

Deer sign is shown as an interesting option for pest animal species detected during a CT card trial (Appendix 6). As deer prints and scat can be systematically surveyed with this technique, it is possible to map the locations and thereby focus control effort on the areas where they occur.

Two sheep were also detected in Rewanui along the western fence boundary within the reserve during the setting up phase of the TT monitor (24 July). Sign from rabbits and hares were observed and recorded (i.e. scat, burrows) however, as the CT card is a method used primarily in forested habitats, it was not a meaningful method for surveying these animals.

## 5. Budget predictions

Early in 2008, Greater Wellington tabled a budget for the monitoring work proposed in Rewanui for consideration by the Montfort Trimble Foundation. Table 2 below details the costs predicted and the actual costs incurred for these three monitors (TT, CT cards and RTC monitors). This table shows that Greater Wellington conducted these surveys within budget amounts forecasted.

Table 2: predicted costs (June 2008) versus actual costs incurred (July-August 2008) for fieldwork and reporting

Costs	TT Predicted \$	TT Actual \$	CT cards Predicted \$	CT cards Actual \$	RTC Predicted \$	RTC Actual \$
Set-Up	1,096.00	1096.00	0.00	0.00	0.00	0.00
Cost Materials	680.00	600.00	170.00	50.00	30.00	30.00
Fieldwork	1,096.00	890.50	3,288.00	2,637.25	2,192.00	2,397.50
Reporting	1,096.00	548.00	1,644.00	548.00	1,096.00	548.00
Total	3968.00	3134.50	5,102.00	3,235.25	3,318.00	2,975.50
+ / -		- \$ 833.50		- \$1866.75		- \$ 342.50

## 6. Predator control by Greater Wellington

In September 2006, Greater Wellington commenced a predator control operation on the entire Rewanui Farm (334 Ha) with 84 control sites. This control site includes a Sentry bait station placed approximately two metres up on a tree; containing Pestoff 20p waxed brodifacoum pellets to control both possums and rats. On the ground a Fenn Mark 4 trap is set within a Philproof tunnel to target rats, hedgehogs, ferrets, stoats and weasels and a Timms possum trap is set for killing feral cats, possums and ferrets. DoC 200 predator traps are used within the walking tracks in the western bush block. These are used for control of stoats, ferrets and rats. All traps are baited and set on a monthly basis using beef offal. Table 3 details the total number of pest animals caught in the Greater Wellington traps.

Table 3: predator catch results by Greater Wellington from September 2006 to July 2008

	Rats	Cats	Hedgehogs	Magpies	Ferrets	Hawks	Stoats	Weasels
Total Caught	245	32	207	14	12	4	1	7

## 7. Discussion

### 7.1 ChewTrack cards, tracking tunnels and RTCs

The CT cards trial resulted in the highest estimates for rats, mice and possums. From the summary provided in Table 1 page 8, and the results in Appendix 2, we can see that the CT cards are a more sensitive and thorough method for mapping rats, mice and possums. We chose to use CT cards in a systematic manner with coverage of the area in a grid system throughout the entire forested habitat on Rewanui. This is possible with CT cards as they are light, easy to set-out in the field and need only be visited twice (once in setting them out, once when bringing them in). CT cards are also useful as they are highly sensitive for rats, possums and mice. Other systematic methods used in pest species management (e.g. waxtags, TTs) are not as sensitive to all three of these pest species. Although mice are yet to be covered in regional pest management strategies, their impact is becoming more understood and may eventually be targeted for control. The Karori Sanctuary in Wellington is currently trialling mice control methods and the impacts they have on native biodiversity.

For both TT and RTC monitoring, these are traditionally used with randomly placed transects. Random placement is chosen so that assumptions can be made for the entire study area and therefore less area needs to be physically sampled. This method is necessarily conservative with effort and coverage, and does not therefore provide real data for the entire area.

The indices provided by these survey methods do not provide information on absolute abundance of pest species present. Rather they provide relative abundance data, that is, information that can be compared with other trials conducted using the same protocols. For the CT cards, the cards chewed or tracked by rats, mice and possums show areas where these animals will be having an impact. It can be inferred that where two cards in close proximity show possum chew, these may be caused by the same animal. Likewise where many cards show rat chew or track marks, it is unlikely to be caused by the one animal. The indices presented in Chart 1 page 7 and the ratios in Table 1 page 8 show that for rats, TT are about three-fifths the result of CT cards, and for mice, TT are about three-quarters the index result of mice detected with CT cards. For possums, the RTC is less than a fifth the index result of CT cards.



## 7.2 Other pest animals

Mapping of other pest animal sign (deer, sheep, rabbits and hares) was trialled with the CT cards survey. This is possible with all methods, but most appropriate with the CT cards as the entire property is walked in a systematic way. Fresh deer sign was observed throughout the northern end of the studied area. Refer to Appendix 6. Deer browse trees and saplings are known to cause considerable damage to both naturally occurring bush and plantation forests. Deer selectively remove palatable species (e.g. broadleaf, pate, coprosma, five-finger) leaving the forest floor bare. As they target a few species in particular, the presence of even a few individuals on a property can significantly alter the forest structure.

Hares and rabbits were frequently seen in the grassy areas of the property throughout all these surveys. Controlling the impacts of these pests is recommended as it is unsure if such levels are sustainable. Hares and rabbits impact on plant species, especially young trees recently planted and are also known to tear bark off saplings and small trees. The burrowing habit of rabbits may not be such an issue in Rewanui as the areas fenced from stock have tall rank grass which is not a favoured habitat for rabbits (*Ray Clarey, Greater Wellington, pers.comm.*).

Two sheep were also observed grazing on the edge of the forest over the boundary fence in Rewanui on the western side (bordering with the Rorokoko farm). These animals appear to have been within the Rewanui boundary for some time, judging by the amount of sheep scat and grass grazing seen. It is recommended that these sheep are removed as they will also target palatable species on the forest floor and hinder recovery of the forest under-story.

## 7.3 Budget predictions

Table 1 page 8 compares the costs involved in the fieldwork. As more area is covered with CT cards the survey takes longer (38.5 hrs for CT cards, compared with 13 hrs for TT). Rodents are fast-breeders and their populations can therefore change significantly within a short time. Tracking tunnels are a more efficient method for frequent monitoring of rodent populations so that control can be continually altered to address increases in rat populations.

Conducting an RTC on a property this size costs almost as much as the CT trial (i.e. 35 hours fieldwork cf. 38.5 hours for CT cards). If a more systematic and sensitive survey of possums is preferred then the CT trial could be run each year instead of an RTC, providing additional information on rodent populations at the same time.

Greater Wellington conducted these surveys effectively within budget. As the amounts predicted were in total \$3,042.75 more than actually spent (from Table 2 page 9). Greater Wellington have therefore scheduled another rodent and mustelid tracking tunnel monitor in September to see if results differ significantly once tunnels have been out in the field for a whole month. There is a general belief that rodents may exhibit “neo-phobic” behaviour to new objects in the field. This would be a useful study to test the effect on tracking

indices of any such behaviour. This will also effectively be the first mustelid monitor as the initial one in July was hampered by excessive rain.

#### **7.4 Predator control by Greater Wellington**

The control programme in place in Rewanui by Greater Wellington has been quite effective in removing a variety of predators and in particular rats, cats, hedgehogs and ferrets. Trevor Thompson, a field officer for the QE II National Trust, is contracted by The Trimble Foundation each year to perform rodent control on a grid system in the native bush blocks on the western side of Rewanui between October and March using “possum pindone”. The Monitoring and Investigations team at Greater Wellington recommend this control continue and if possible, to be increased throughout the entire property as the rodent monitors in this study show rat numbers to be considerably high throughout. It is generally accepted that rat numbers be kept below 5% TT index for native birds to recover and successfully breed over spring and summer.

With regards to native bird species observed during these surveys in July, the native New Zealand falcon (*Falco novaeseelandiae*) was observed on a number of occasions, therefore this species may be a resident in the area. This is an exciting discovery as native falcons are listed by the World Conservation Union as a near-threatened species. With respect to sustainable farming, Marlborough wine growers are hoping falcons will help rid their vineyards of pest birds that eat or damage grapes. The growers are supporting a breeding programme to re-establish the falcons among vineyards on the Wairau Plains.

Other native bird species observed were the bellbird, woodpigeon, tui, grey warbler, silvereye and fantail. Numbers of bellbirds are often cited as an indicator of forest health and it will be interesting to see what levels are detected in Rewanui of these and other bird species in the Greater Wellington bird surveys scheduled later this year.

### **8. Supply of monitoring data – Terms and Conditions**

The enclosed information is supplied, within the framework of Greater Wellington’s data quality system, from the best practice currently available. Greater Wellington has exercised all reasonable skill and care in controlling the contents of the information.

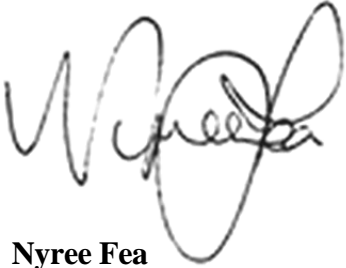
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Report Prepared by:

A handwritten signature in black ink, appearing to read 'Nyree Fea', written in a cursive style.

**Nyree Fea**  
Biosecurity Officer (Investigations)

Date: 25 August 2008

## Appendix 1

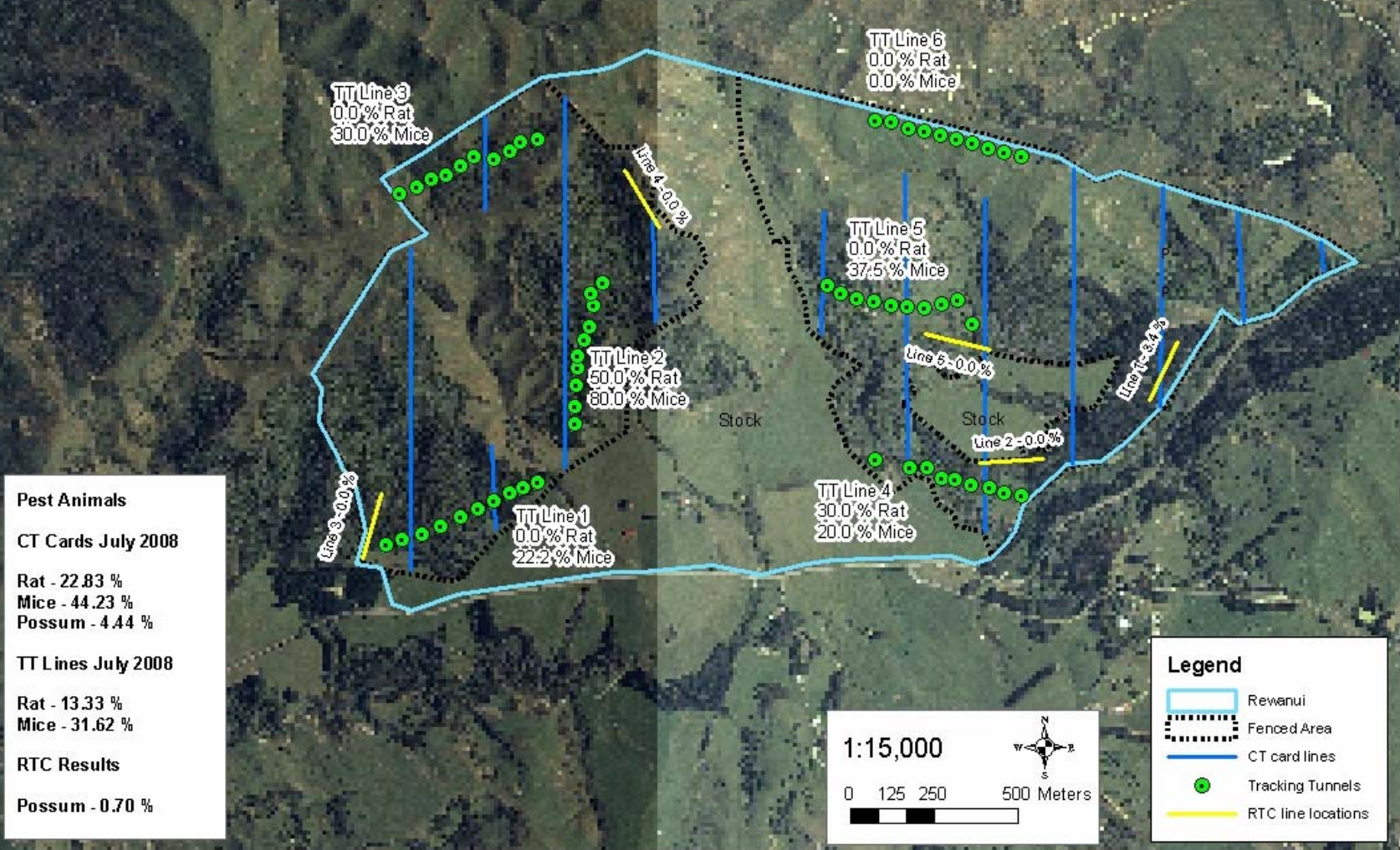
### Rewanui monitoring diary

Date - 2008	Activity Notes	Weather
Thursday 10 July	NF Set ChewTrack Lines 1 – 4 (Cards 1 - 56)	Wx: Fine (o/n = 0 ml)
Friday 11 July	NF Set ChewTrack Lines 5 – 7 (Cards 57 – 96)	Wx: Fine (1 <sup>st</sup> 4 hrs = 0 ml, o/n = 7 ml total)
Monday 14 July	NF Set ChewTrack Lines 8 – 11 (Cards 97 – 135)	Wx: Fine (o/n = 0 ml)
Tuesday 15 July	NF Cleared CT Lines 1 – 4	Total rain for last 5 nights = 7 ml
Wednesday 16 July	NF Cleared CT Lines 5 - 7	Total rain for last 5 nights = 7 ml
Thursday 17 July	GPS locations of Trevor Thompson's Philproof rodent lines by NF	Wx: Fine
Saturday 19 July	NF Cleared CT Lines 8 - 11	Total rain for last 5 nights = 1 ml
Tuesday 22 July	Moved the Philproof tunnels to pick-up points on tracks	Wx: Fine
Thursday 24 July	Tunnels relocated to 6 new line locations throughout property by NF	Wx: Cold and rainy
Monday 28 July	Rodent tracking tunnels set by NF All RTC lines set by GL	Wx: Fine
Tuesday 29 July	Rodent tracking cards removed by NF meat placed in mustelid tunnels GL cleared RTC Lines (1 possum)	Wx: Fine (o/n = 0 ml)
Wednesday 30 July	GL cleared RTC Lines (0 possums)	Wx: Rain (1 <sup>st</sup> 4 hrs = 3ml, o/n = 4 ml). Rain during entire day = 81 ml.
Thursday 31 July	GL cleared and finished RTC lines (0 possums)	Wx: Wet (1 <sup>st</sup> 4 hrs = 7ml, o/n = 11 ml)
Friday 1 August	NF cleared mustelid tunnel lines	Wx: Fine (o/n = 0 ml). Total rain for last 3 nights = 90 ml.

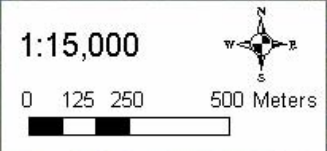
# ChewTrack Cards / Tracking Tunnels / RTC Results Rewanui July 2008

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<b>Pest Animals</b>
<b>CT Cards July 2008</b>
Rat - 22.83 %
Mice - 44.23 %
Possum - 4.44 %
<b>TT Lines July 2008</b>
Rat - 13.33 %
Mice - 31.62 %
<b>RTC Results</b>
Possum - 0.70 %



**Legend**

- Rewanui
- Fenced Area
- CT card lines
- Tracking Tunnels
- RTC line locations



# ChewTrack Cards - Possum sign July 2008

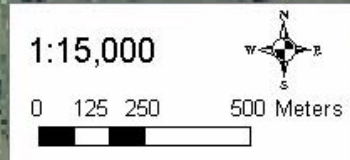
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**Pest Animals**  
 CT Cards July 2008  
 P = Possum Chew or Tracks detected  
 Possum - 4.44 %



**Legend**

- Rewanui Reserve
- Fenced Area
- ChewTrack Cards (CT)

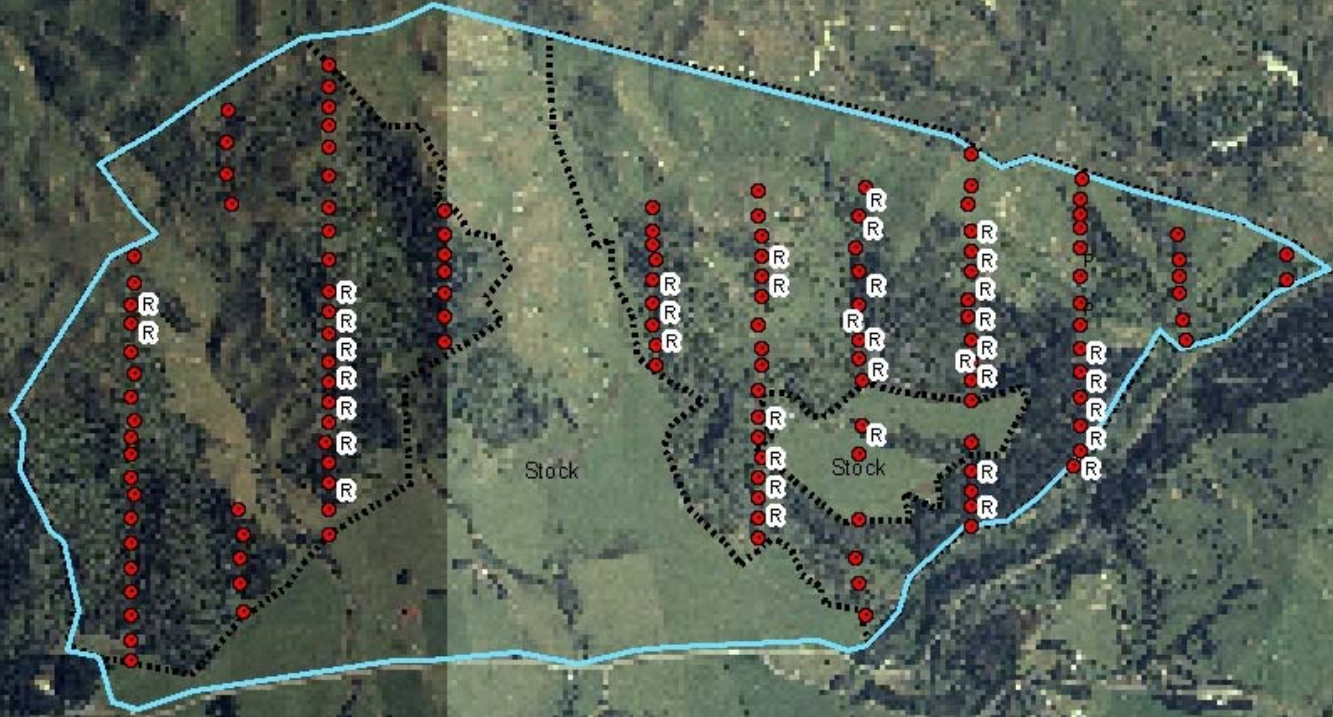


# ChewTrack Cards - Rat sign July 2008

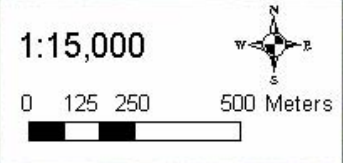
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**Pest Animals**  
 CT Cards July 2008  
 R = Rat Chew or Tracks detected  
 Rat - 22.83 %



**Legend**

- Rewanui Reserve
- Fenced Area
- ChewTrack Cards (CT)



# ChewTrack Cards - Mice sign July 2008

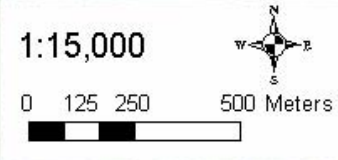
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**Pest Animals**  
 CT Cards July 2008  
 M = Mouse Chew or Tracks detected  
 Mice - 44.23 %



**Legend**

- Rewanui Reserve
- Fenced Area
- ChewTrack Cards (CT)

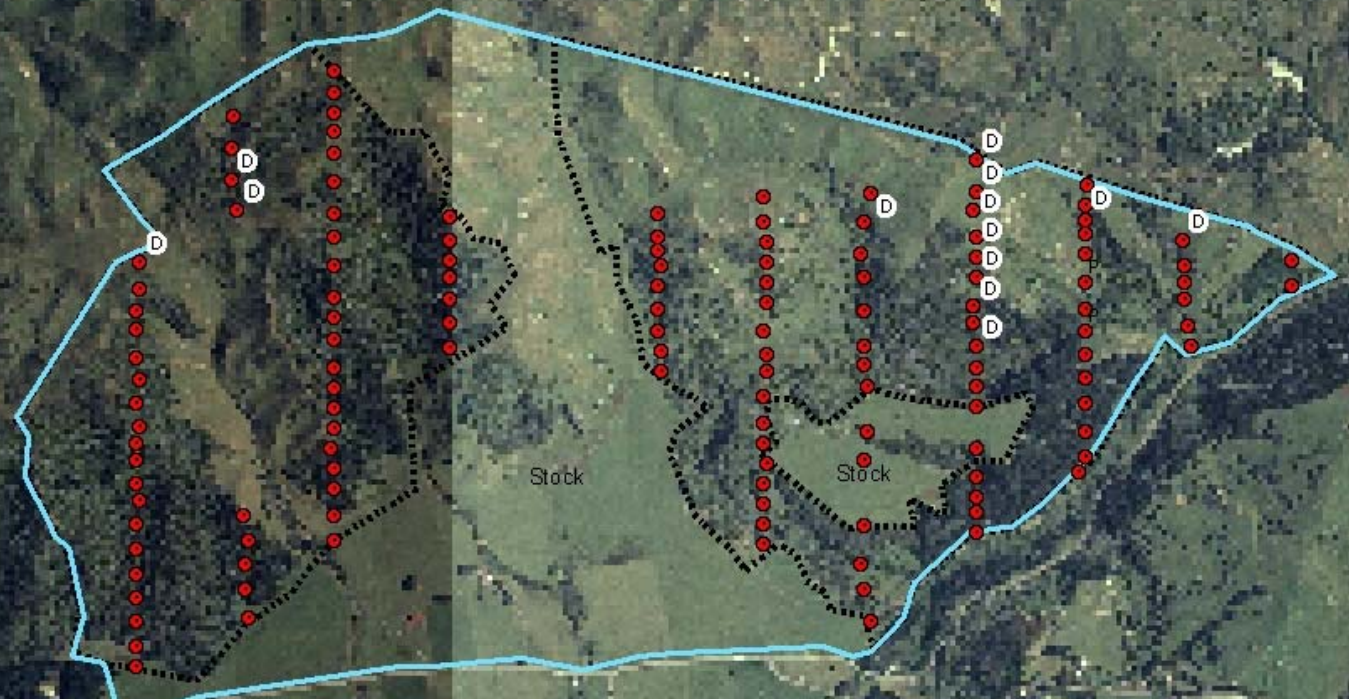


# ChewTrack Cards - Deer sign July 2008

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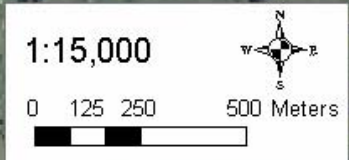


**Pest Animals**

CT Cards July 2008

D = Deer Tracks or Scat detected

Deer - 9.63 %



**Legend**

- Rewanui Reserve
- Fenced Area
- ChewTrack Cards (CT)