Threatened species protection in the Eglinton Valley

Annual Report 2012/13

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Department of Conservation
Te Papa Atawhai

Cover image –.Kaka chicks in a cavity nest J Van De Wetering, Eglinton Valley.

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Summary

Progress has been made towards outcome targets for threatened species protection and recovery this season in the Eglinton Valley, Fiordland National Park. The key benefit species present in the site are South Island long-tailed bat *(Chalinolobus tuberculatus)*, southern short-tailed bat *(Mystacina tuberculata tuberculata)*, mohua/yellowhead *(Mohoua ochrocephala)*, and South Island kaka *(Nestor meridionalis meridionalis)*.

Monitoring of bat species indicates that populations have generally remained stable or increased. Annual survival of short-tailed bats has been maintained above 80% for the last four years, and mark-recapture modelling of long-tailed bats suggests that the population is increasing with rat management.

A total of 69 mohua were transferred from Chalky Island to the Eglinton Valley in October 2010 to supplement the existing valley population. Many of these birds have settled in the valley and paired up with other transferred birds or existing valley birds. The number of mohua pairs found had declined over winter 2012 from 27 to 18 at the start of the new breeding season. At least 34 mohua fledglings were recorded this season, also a reduction from the previous year.

The Department of Conservation undertakes continuous stoat and cat control; and periodic rat and possum control when required within the Eglinton Valley to protect a range of threatened species. Stoat and cat trapping was maintained during the 2012/13 season, however no rat control was required.

A low amount of beech seed was recorded in the valley during autumn 2012, and predator levels remained low through the 2012/13 season. A low level of beech seeding was generally recorded during autumn 2013. Although there was a moderate amount along the Walker Creek line it is expected to be insufficient to drive an increase in rodent levels in the south end of the valley heading into the 2013/14 season.

Introduction

This report summarises the animal pest control and monitoring carried out in the Eglinton Valley between July 2012 and June 2013. Invasive animal pests are controlled to protect a range of threatened native species present in the valley. Pest species that were targeted for control during the 2012/13 season included stoats and cats. Monitoring of rodent abundance and threatened species survival was conducted.

The Eglinton Valley lies at the eastern edge of Fiordland National Park, starting 50 km north of Te Anau (Fig 1). The valley is glacially formed, with steep sided walls and a generally flat valley floor 500-1500 m wide. The Milford Road between Te Anau and Milford Sound travels through the valley for the majority of its length, providing good access.

The Eglinton Valley contains two threatened bat species- the South Island long-tailed bat and southern short-tailed bat. Mohua or yellowhead are also present in the mid and upper reaches of the valley. Other native species present include South Island kaka, yellow-crowned parakeet *(Cyanoramphus auriceps)*, black fronted tern *(Chlidonias albostriatus)*, and South Island robin *(Petroica australis australis)*.

The forest canopy is predominantly made up of southern beech species *(Nothofagus* spp.*)*, with several large open grassland clearings across the valley floor. The mid and upper slopes tend to be dominated by silver beech *(Nothofagus menziesii)* in the upper valley, with mountain beech *(Nothofagus solandri* var. *cliffortoides)* being more common in the drier lower valley. Mature stands of red beech *(Nothofagus fusca)* tend to dominate the more fertile, warmer lower slopes and valley floor. Monitoring of the annual beech seedfall has been carried out in the Eglinton for several years, showing dramatic increases during mast years (e.g. 2000 & 2006), and generally low seed production in non-mast years. The seedfall trend in recent years has seen more frequent moderate and locally variable seeding (2009 & 2011).

Stoat control has been carried out in the Eglinton Valley in its current form continuously since 1998, and traps have been checked and rebaited four-six weekly. The number of stoat trap tunnels has increased from the original 195 in 1998 to 356 tunnels in 2013.

Rat control was first attempted in the Eglinton Valley during the 2006/07 season using a grid of bait stations to protect mohua, long-tailed and short-tailed bats across three small areas totalling 950 ha. The rat control block was expanded between 2009 and 2011 to encompass a contiguous area of 4800 ha.

Rodent abundance is monitored using standard tracking tunnel methods, and is typically carried out quarterly each year.

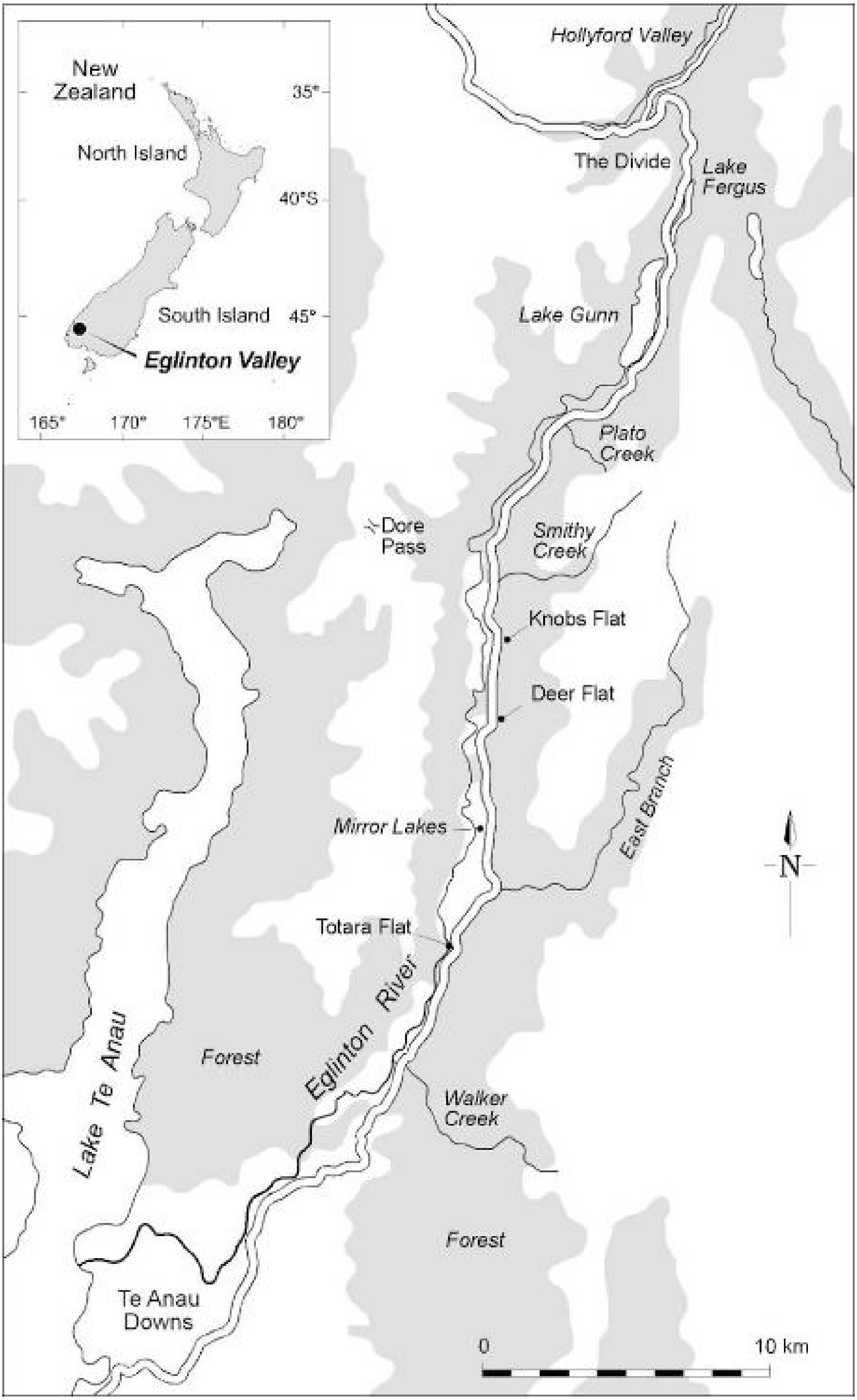

Figure 1- Eglinton Valley location, Fiordland National Park

Threatened Species Outcome Targets

<u>Ten year conservation outcome (2020)</u>

- <u>Mohua</u>- The Eglinton Valley will contain a population of at least 50 pairs of mohua

- <u>Long-tailed bat</u>- An intrinsic rate of increase of >5% is maintained for study colonies and adult annual survival is maintained at >75%

- <u>Lesser short-tailed bat</u>- The Eglinton Valley will contain a population of at least 2000 lesser short-tailed bats

<u>Annual measures</u>

- <u>Mohua</u>

Nesting success is >60%
Adult annual survival is >50%

- <u>Long-tailed bat</u>

Halt current decline and increase current population:
Maintain current range
Average annual survival >70%

- <u>Short-tailed bat</u>

Increase current population:
Average video counts maintained or increase by >1% per year

Predator Control Result Targets

Rat control

- ≤ 5% rat tracking rate inside control areas

Stoat control

- ≤ 20% of lines tracked by stoats

Possum control inside control areas

- ≤ 3% RTC

Predictive monitoring

Seed fall of beech species is monitored annually during autumn using lines of eight seed collection trays located near Walker Creek, Knobs Flat, and Plato Creek (Fig 1). Collection data from Knobs Flat goes back to 1989 (Fig 2A); and additional lines at Walker and Plato Creeks were established in 2005 (Fig 2B & 2C). The amount of seed that beech species produce varies considerably from year to year. Generally there is a low amount of seed produced during autumn, however some years the amount of seeding substantially increases. Rodent levels in the forest fluctuate in response to the food provided by the annual beech seed crop, and heavy seeding years can lead to damaging irruptions of rats and mice through winter, spring, and summer. Stoats can respond to the extra food provided by elevated rodent levels, and often a higher than normal number of young stoats is born during the summer following a rodent irruption. Monitoring the amount of beech seed that falls in autumn is a useful way to predict probable trends in rodent and stoat populations for the following season.

A low level of beech seeding was recorded in autumn 2012. The seed fall density was variable between the monitored sites, with more seed produced in the southern parts of the valley compared with the northern end. The level of seeding was not sufficient to drive a rodent irruption.

A low level of seed was recorded during autumn 2013 in most of the valley, and again there was more recorded in the southern part of the valley. The level of seed recorded at Walker Creek is probably enough to allow mice levels to remain elevated longer through the following season, although the amount is unlikely to drive a rat irruption.

Table 1- Total number of seeds collected at each monitored site March-May 2013

	Walker Creek	Knobs Flat	Plato Creek
Red beech	2603	311	28
Silver beech	307	140	3
Mountain beech	0	517	75
TOTAL	**2910**	**968**	**106**

Table 2- Total seeds m^2 per site March-May 2013

	Walker Creek	Knobs Flat	Plato Creek
Red beech	1162	139	13
Silver beech	137	63	1
Mountain beech	0	231	33
TOTAL	**1299 seeds m^2**	**432 seeds m^2**	**47 seeds m^2**

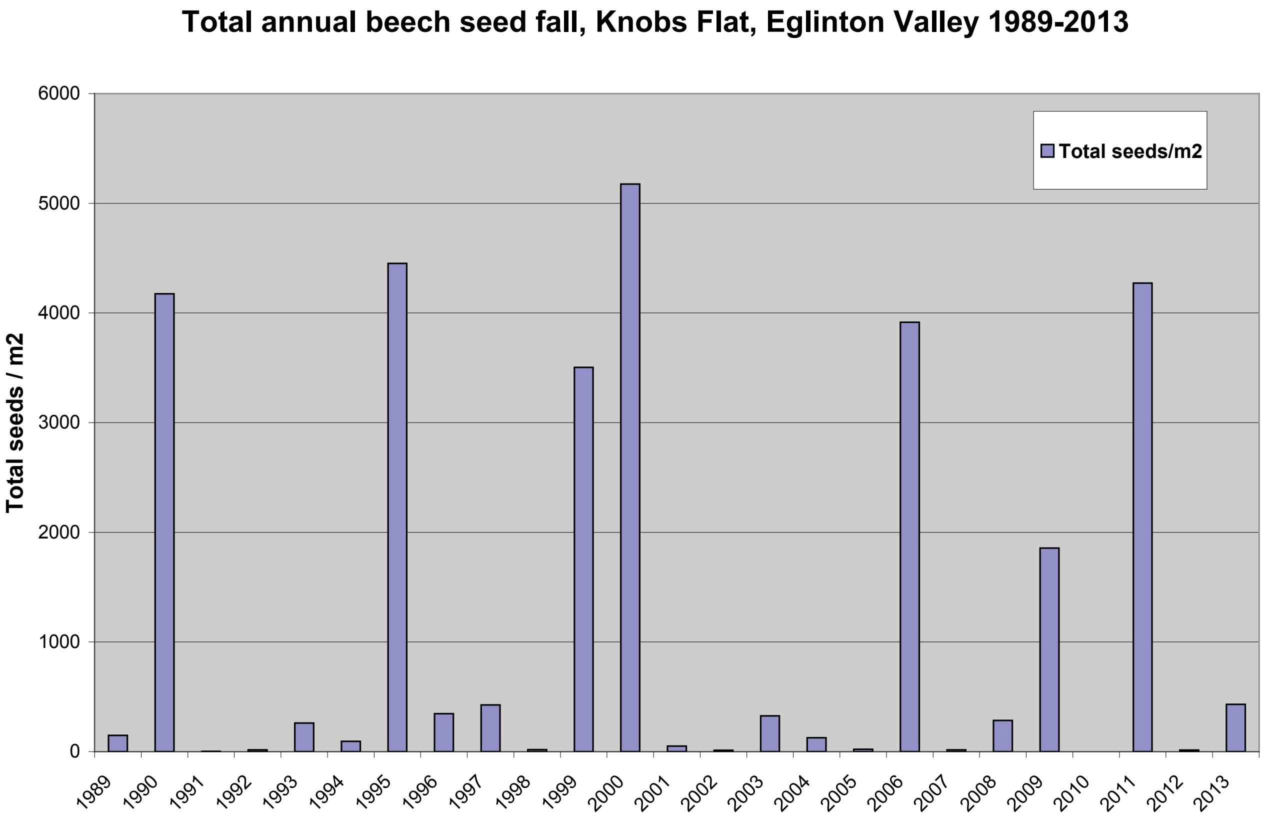

Figure 2A- Annual beech seed fall monitoring results at Knobs Flat, central Eglinton.

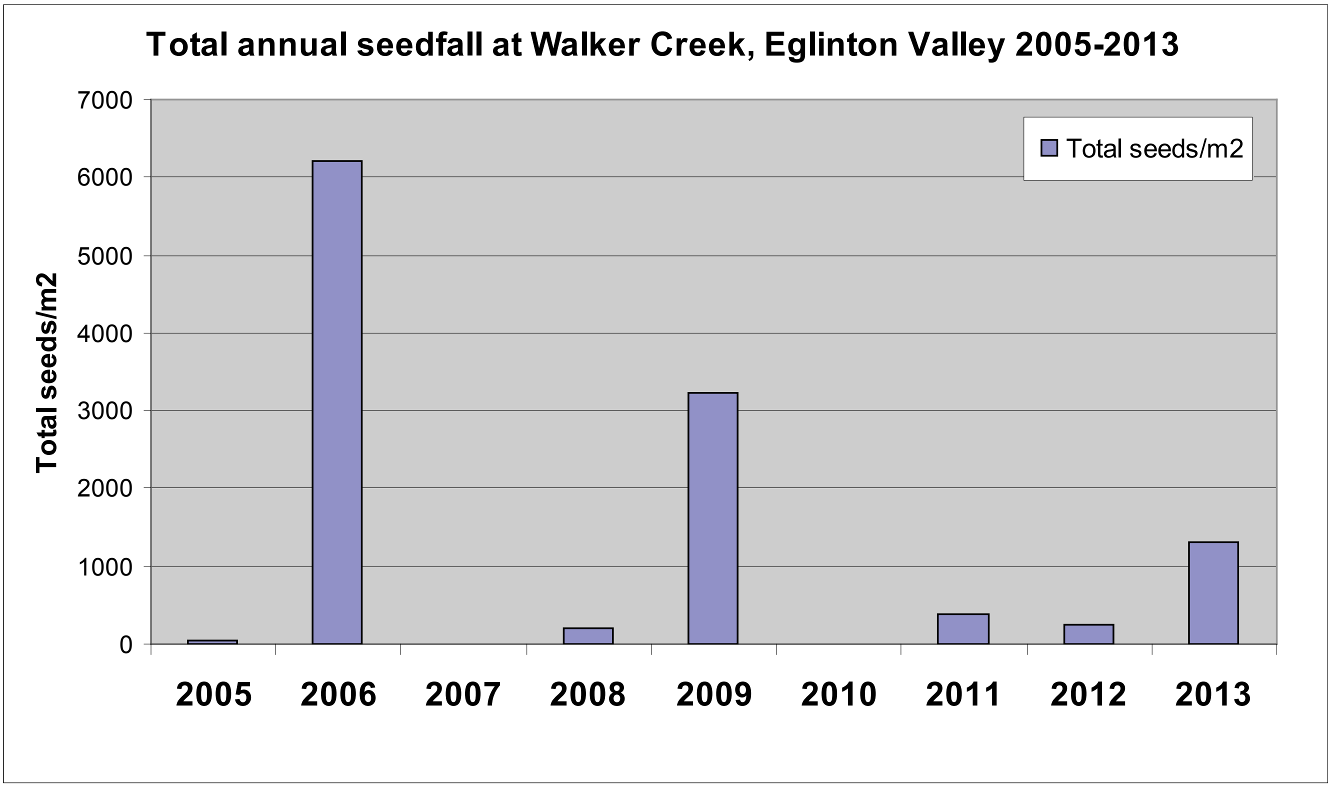

Figure 2B- Annual beech seed fall monitoring results at Walker Creek, southern Eglinton.

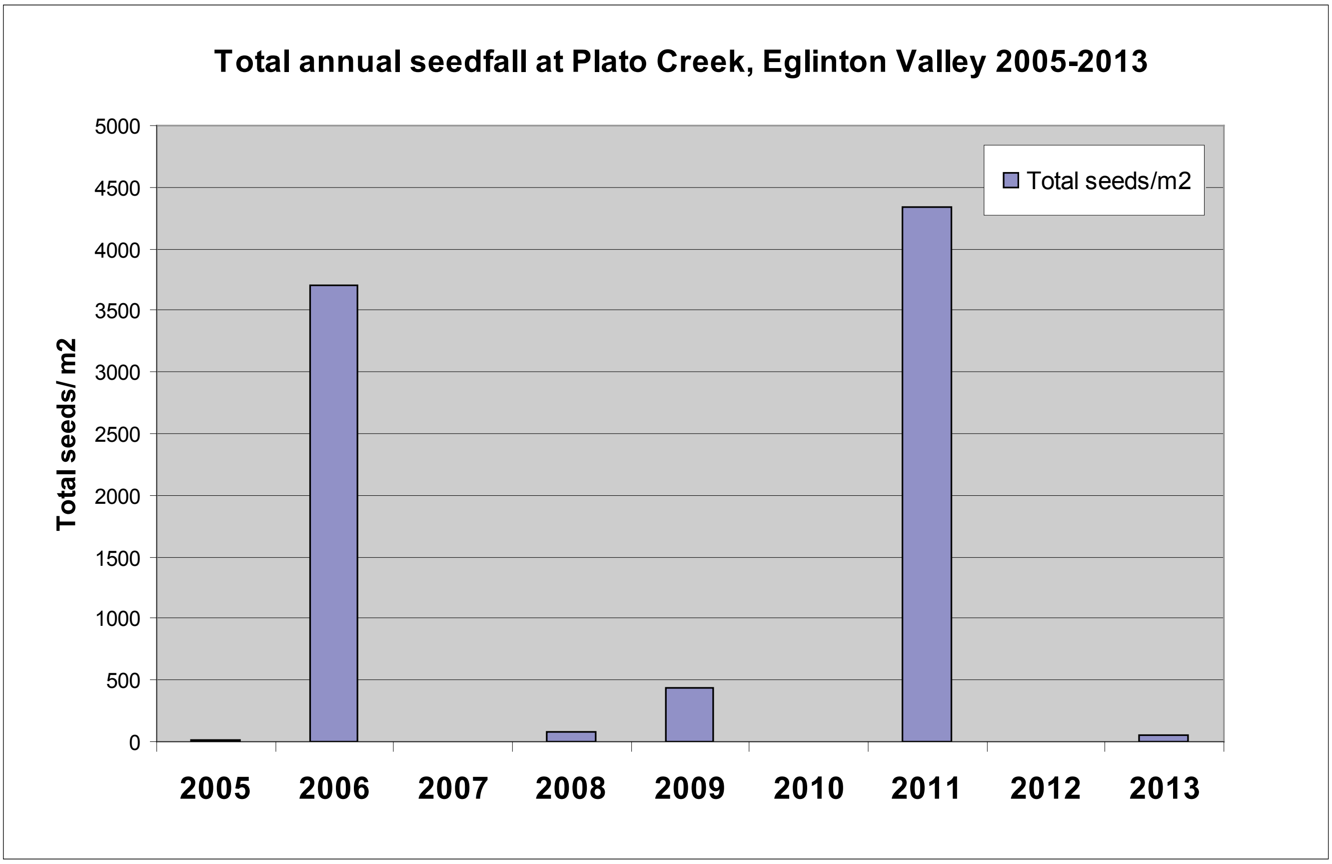

Figure 2C- Annual beech seed fall monitoring results at Plato Creek, northern Eglinton.

Stoat Control

Stoat control in the Eglinton Valley during the 2012/13 year consisted of 356 wooden tunnels containing either one or two stainless DOC-150 or DOC-200 traps. Tunnels are spaced at 100-200m intervals along lines from the National Park boundary to 1 km past the Divide, a distance of approximately 41 km (Appendix 3). Traps were checked and re-baited ten times during the 2012/13 season, approximately 6 weeks apart, and monthly through the summer months. Traps were rebaited each time with a hen's egg and a piece of rabbit meat, venison, or beef.

The servicing of the stoat traps was tendered out to a trapping contractor for the season. Stoat and Track Ltd (Dunedin) and Mainly Fauna Ltd (subcontractor, Te Anau) completed all the trap check rounds between July 2012 and June 2013.

A total of 140 stoats, 19 weasels, and 161 rats were caught in the traps during the 2012/13 season, which is typical of a year due following a low level of beech seeding. No ferrets were caught this year; the last ferret was caught in March 2011. The monthly capture breakdown is presented in Appendix 5.

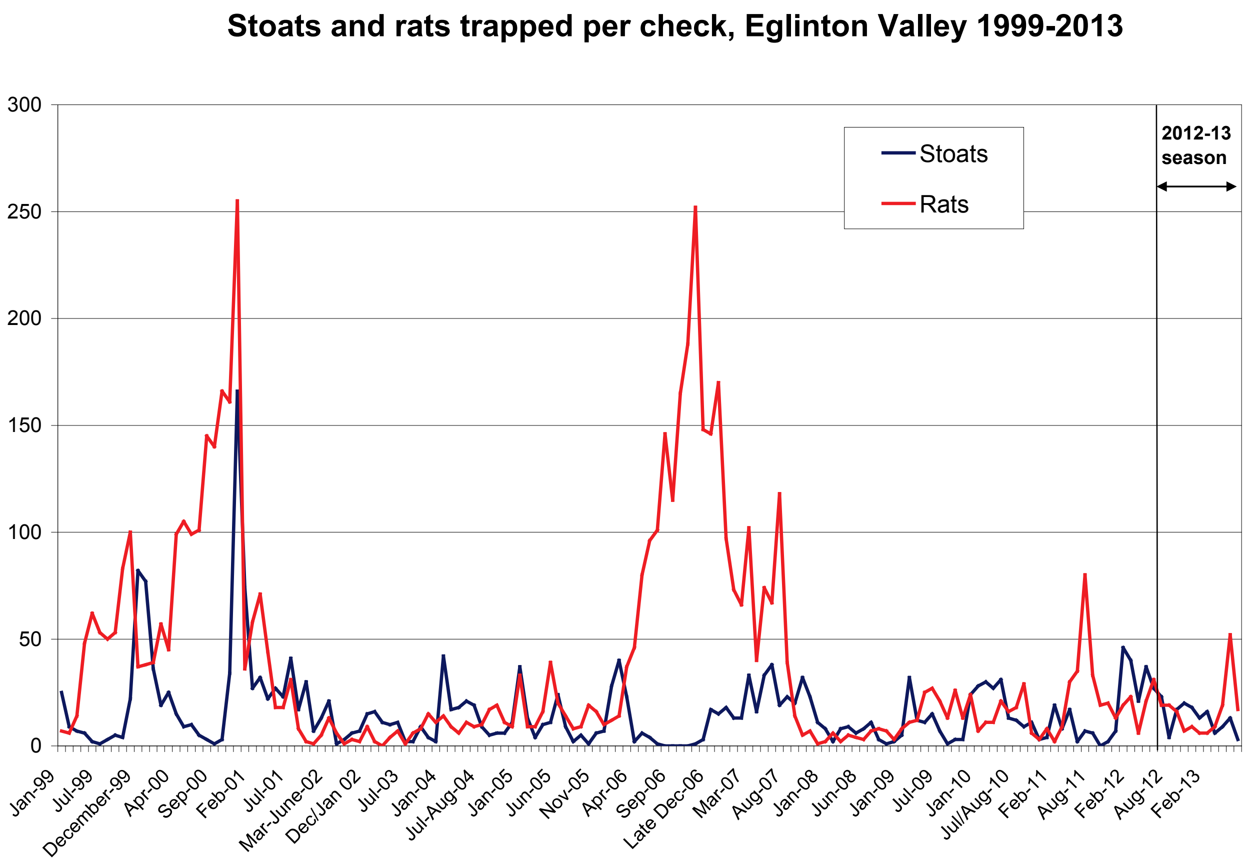

Figure 3- Total stoat and rat captures per check, 1999-2013.

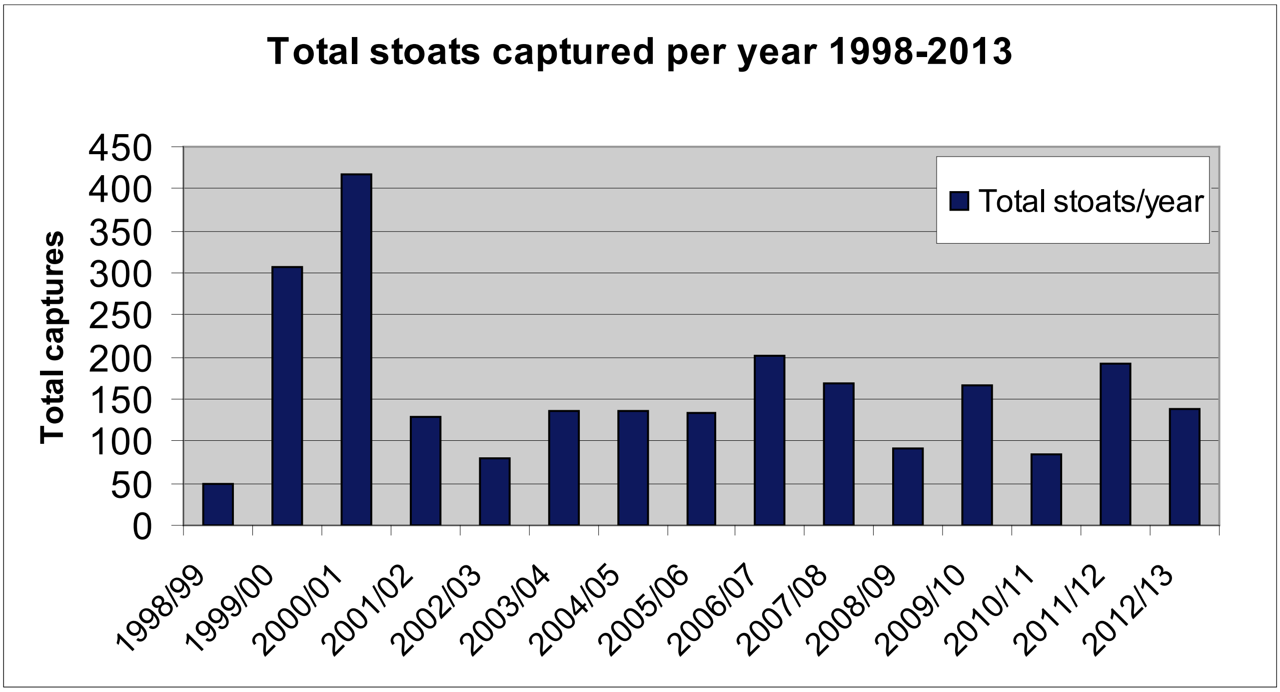

Figure 4- Total annual stoat captures (July-June), 1998-2013.

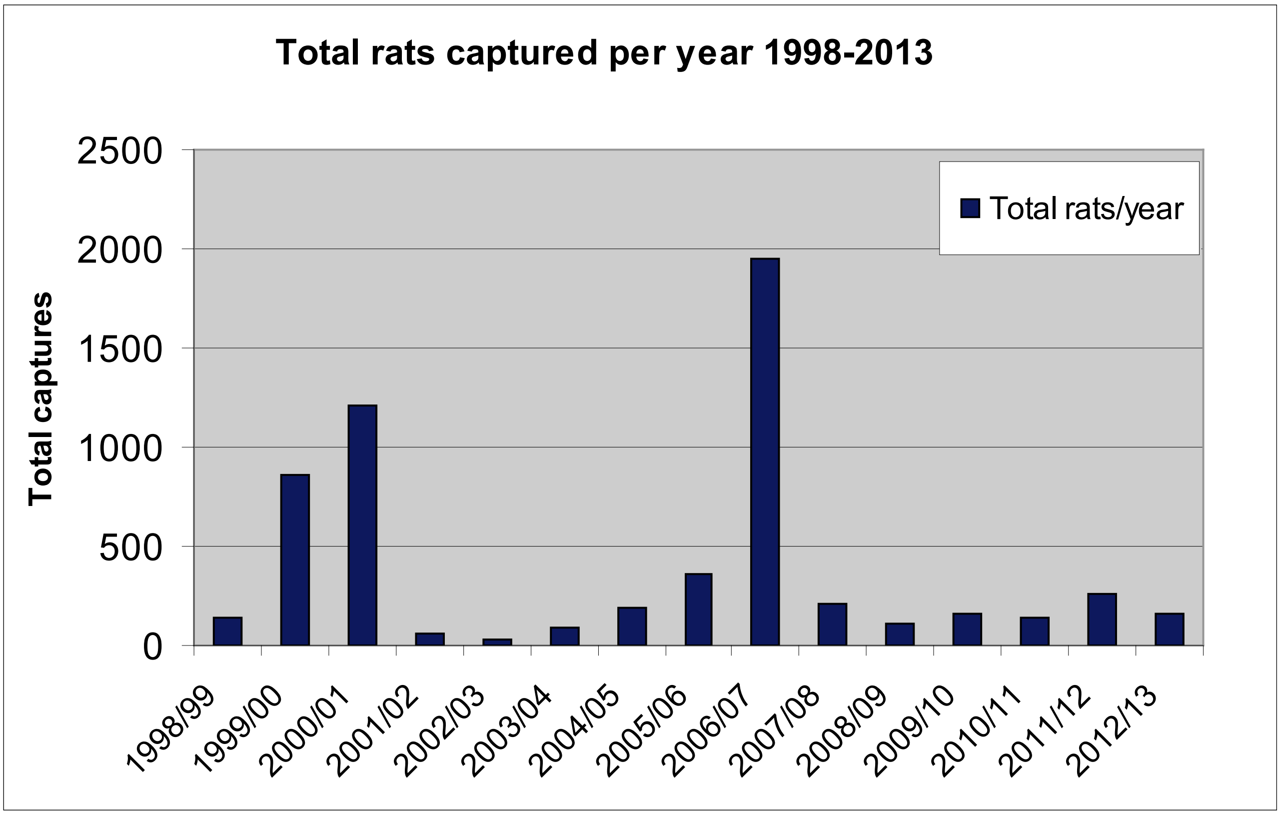

Figure 5- Total annual rat captures (July-June), 1998-2013.

Martin Sliva from True Travel donated seven more Goodnature A24 self-resetting traps to be used in the Eglinton Valley this season. These traps will be deployed in parts of the valley that are away from current stoat trap lines that contain mohua and/or bat roosts.

Rat and possum control

Rat and mouse numbers fluctuate in southern beech forest in response to food availability, generally beech seed. Periods of high rat numbers are damaging to a variety of native species, and substantial losses of bats, mohua, and other small forest birds have been recorded following previous rat irruptions (e.g. 1999-2001, and 2006-07). Possum control has been undertaken concurrently with rat control in the past.

The level of beech seeding recorded during autumn 2012 was insufficient to drive an increase in rodent numbers and no rat or possum control was required during the 2012/13 season.

Cat control

Wild cats have been present in the Eglinton Valley in low to moderate numbers for several years, and infrequent localised attempts to live capture them in cage traps have been made. Cats have also been captured in stoat trap tunnels as non-target by-catch since the trapping programme began.

This season was the third year cats have been targeted with cat specific traps. Twenty eight cat kill-trap sets were installed in 2010 and their maintenance was added to the stoat trap servicing contract. Cat traps are spread between the National Park boundary and Cascade Creek, in areas where cat sign had previously been reported. Three styles of kill-traps are used: double Conibear traps under Philproof covers; modified Timms traps set on the ground; and single Belisle Super-X 220 traps set in 'submarine' or 'chimney' tunnels. The site does not contain ground birds. All designs are considered current Best Practise options and have passed NAWAC tests for cats. Traps were baited with fresh rabbit meat, and were checked ten times during the 2012-13 season.

Table 3- Cat trap capture results 2012/13

	CAT	HEDGEHOG	STOAT
'Twizel' Conibear n = 9	4	1	1
Timms n = 8	1	0	0
Belisle chimney n = 11	0	0	0
TOTAL	5	1	1

Predator monitoring results

Monitoring of rodents and mustelids is carried out using a network of tracking tunnel lines following the standard protocol of lines of ten tunnels 50 metres apart described by Gillies & Williams (2005). All predator monitoring results achieved the result targets set for the project. The tracking tunnel lines were monitored four times as planned during the 2012/13 season. Rat tracking remained low through the whole year, and mouse tracking declined after winter and then remained low.

Table 4- Average tracking tunnel monitoring line results 2012/13

Month	Rats % of tunnels tracked	Mice % of tunnels tracked	Stoats % of lines tracked (10 lines)	Number of rodent lines run
Aug-2012	2	44	20	31
Nov-2012	1	7	-	26
Feb-2013	1	4	-	29
May-2013	1	6	-	29

Full tracking tunnel line results are available in DOCDM-74961.

Outcome Monitoring

Short-tailed bats (Hannah Edmonds)

Annual monitoring of short-tailed bats was undertaken during January 2013 by DOC Te Anau Area and Science & Technical staff. The monitoring programme had a target to individually tag 200 bats each season and a total of 206 new bats were tagged with Passive Integrated Transponders (PIT) during the 2013 season, bringing the total number marked to 1495 since the tagging programme began in 2006. Juvenile bats were quite late leaving the roosts this summer compared with previous seasons, and only started to appear near the end of January. As a consequence of the late emergence of juveniles a lower proportion were tagged during 2013 (51 of 206). On balance, the majority of tagged bats this season were adult females (124 of 206).

Automatic data loggers were used to record PIT tagged bat activity at selected roost sites. Program MARK was used to generate annual survival estimates using the tagged individual bats recorded by the data loggers positioned on roost entrances (Fig 9). The lower survival rate in 2008 probably reflects the high rat numbers in 2007. Good annual survival results were recorded for 2012, and the 2013 survival can be calculated once the monitoring session in January 2014 is completed.

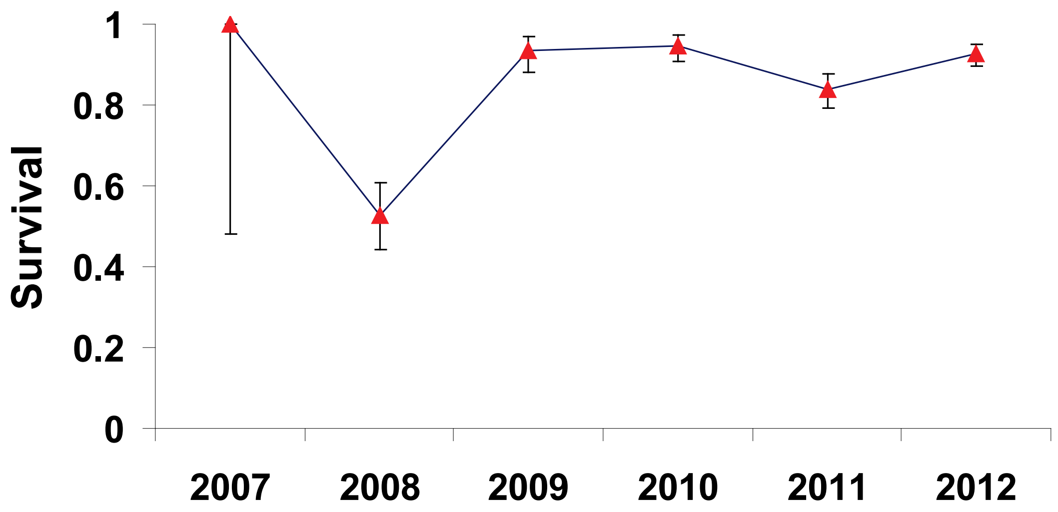

Figure 9- Short-tailed bat annual survival estimate calculated from mark-recapture analysis (from Edmonds 2013)

Another monitoring method being used is video counts of bats exiting roost cavities during their emergence after dark. Video counts have been repeated most years since 1997. A total of fourteen video counts were made in 2013 at two known communal roost trees (M45 & M65) on the western side of the river. Two of the video counts finished an hour earlier than programmed, returning incomplete counts due to technical problems. The highest video count of bats exiting a single roost tree during the 2013 season was 841 (Fig 10).

The roost tree M31 in which the highest recorded count was made (1423) fell over during 2011, reducing the available suitable roosts. See Edmonds (2013) for more details of the bat monitoring programme and Appendix 1 for roost locations.

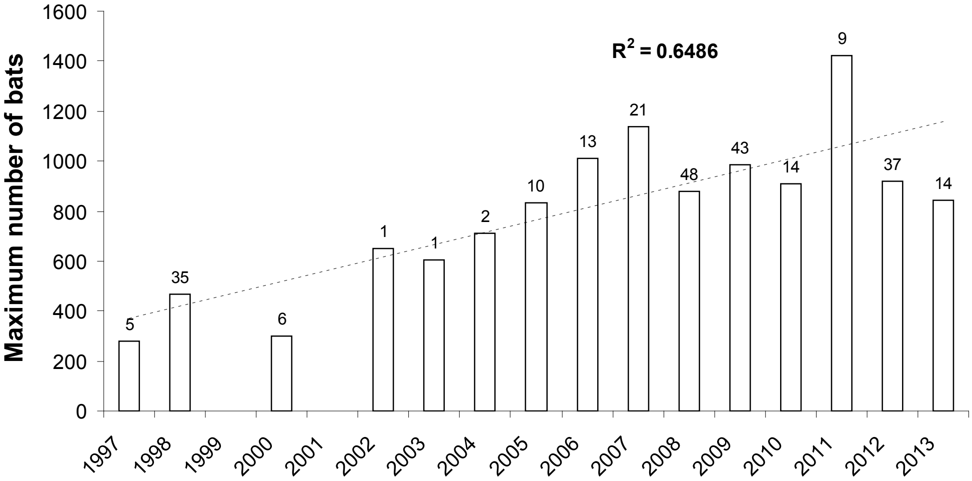

Figure 10- Maximum number of ST bats exiting roosts during video count monitoring 1997-2013. Numbers above bars indicate total number of video counts conducted each year.

Long-tailed bats (Moira Pryde)

Predation, particularly by introduced rats, has been identified as the major cause of decline of the critically endangered South Island long-tailed bat. Groups of long-tailed bats have been monitored in the Eglinton Valley for several years, and their survival has been linked with fluctuating predator levels driven by annual beech seed production (Pryde, O'Donnell, & Barker 2005). We measured the response of long-tailed bats to rat control in beech forest in the Eglinton Valley by estimating survival using mark-recapture field data from 1993 to 2013 in Program MARK. The survival of juvenile and adult female long-tailed bats along with the proportion of females breeding was recorded in three colonies each year and modelled using an age-classified population projection matrix. The effect of periodic predation by rats on long-term survival and population trends of bats was compared with bat-population response when rat population irruptions were managed. The intrinsic rate of increase, λ, was calculated for both management and no management scenarios and the results were projected over a 25 year scenario (Fig. 1). For a population to be stable or growing management must result in λ being equal to or greater than 1. The confidence intervals were calculated using the variation of survival figures within each time period.

Results: The modelling was based on the current data of 13 years with low rat numbers, three years with medium rats and four years with high rats. The management of rats in the Eglinton Valley was instigated after a rat irruption was predicted in 2006 following heavy seeding (mast) of beech. Two more mast events have occurred since 2006 with rats having been controlled on both occasions. The intrinsic rate of increase for the time period with rat management is >1.0 (λ =1..05) therefore the population increases (Fig. 1), whereas the rate of increase for the time period without rat management is <1.0 (λ =0.99) causing the population to decline. These predicted trends are based on a start point of 159 adult females, which were alive in 2006.

Interpretation and implications: Numbers of introduced predators in temperate beech forests fluctuate dramatically in relation to food availability. The beech trees flower and seed heavily (mast) at irregular intervals, usually every 3-5 years, dramatically increasing the food supply for introduced rodents. Irruptions in mouse and rat numbers that follow will then trigger the prolific breeding of stoats and increase the predation pressure on native fauna even further. Effective management of predator irruptions is essential for improving the long-term survival of threatened native species in these forests. Our data indicate that the management regime instituted in the Eglinton Valley will be effective at reversing declines of long-tailed bats in the valley.

Fig 11. Predicted population trends in numbers of female long-tailed bats in the Eglinton Valley over 25 years with and without management of rats (shaded areas represent 95% confidence intervals).

Known roost locations of long-tailed bats are shown in Appendix 1.

Mohua (J & M van de Wetering)

In October 2010 69 mohua were transferred from Chalky Island in southwest Fiordland to the Eglinton Valley. The transfer was to supplement the existing small mohua population that was present in the valley prior to the release (18 known original valley birds at the time).

The mohua subpopulation in the Eglinton Valley seems to have decreased in number over the winter of 2012. At the end of the 2011/12 season there were 66 adults known, forming 27 pairs, whereas at the start of the 2012/13 season only found 45 adults in 18 pairs were known. Several pairs from previous years had either a male or female missing, and the remaining bird had formed a new pair with another bird. In these cases the missing spouse was never seen, so is presumed to have died over the winter. The amount of search effort in each of the seasons has been comparable, and similar areas covered, with extra time focused on areas that had birds last season.

The mohua seemed to be quieter this season, with much less real singing in the October to December period. The first mohua nests were found on average two or three weeks later in the season than in previous years. The first pair were found nest building on 7th November 2012.

Twenty nests were found during the 2012/13 season, fifteen were first clutches and five were second clutches (re-nests). Fifteen nests definitely fledged young, four failed, and one nest outcome was unknown. Of the four failed nests one was due to long-tailed cuckoo parasitism; one failed during incubation (pair still alive); one failed at early chick stage (reason unknown, pair still alive); and one failed at either late incubation or early chick stage (reason unknown, pair not seen again).

The fifteen successful nests fledged at least 34 chicks, an average of 1.7 fledglings per nest attempt. This is similar to the 2011/12 seasons mean of 1.76 fledglings per nest attempt (67 fledglings/38 nests found), but lower than the 2010/11 seasons mean (59/25) of 2.36 fledglings per nest found.

It is encouraging that we have no definite depredations of adult females on the nest this season. However, with the low number of mohua, spread fairly thinly over a wide area (see Appendix 4), if the numbers continue to drop as they have done over the last couple of winters, the population is not producing enough young to recoup their losses and will decline further. Recruitment of juveniles into the breeding population has been adequate, but bird disappearance over the autumn/winter/early spring is of concern. Birds do not seem to disappear over the summer period in the same way as they do over the winter, and nest predation has not been a major factor in population decline in the last few years at least. A top up transfer may be required to get the population up to a self sustaining critical mass level.

At the end of the 2012/13 season there were 79 known mohua in the Eglinton Valley (adults plus fledglings). A full description of the mohua monitoring results is available in van de Wetering & van de Wetering (2012).

Morepork (J & M van de Wetering)

This season there were 10 morepork monitored with transmitters (9 females and 1 male). The female morepork were tracked closely to see if there was any nesting this season. One female did have a nest attempt which was found on 30th October 2012 and climbed on the 6th November, when she was seen to be sitting on one egg. The nest was videoed but unfortunately the egg never hatched, and on the 13th December she abandoned the nest. The egg was retrieved and candled and it looked infertile with no sign of an embryo.

Kaka (J & M van de Wetering)

This season 15 kaka were monitored with working transmitters (11 adult females, three juvenile females, and one adult male). The kaka bred this year, and breeding seemed to mainly happen in two waves, with several transmittered females nesting in December, and the others not seen to start nesting until February.

A total of 13 nests were found through the season. In two of the nests eggs were laid but they failed to hatch, and another nest failed probably due to predation. A total of nine nests fledged chicks of the 13 nest attempts. There was not a lot of beech seed (although kaka were seen feeding on unripe red beech seed in February), but the mistletoe had a great year for flowering, and the flax and fuchsia also flowered. Eleven kaka chicks were colour banded prior to fledging, and possibly another six chicks fledged before they could be banded.

Budget 2012/13

Stoat/cat control & predator monitoring costs	
Trapping contractor	$12,738
Monitoring wages	$2,287
Trap bait	$650
Postage/freight	$427
Field equipment	$2,862
Total	**$18,964**

(*Project management salary costs excluded)

Plans for 2013/14

- Continue stoat trapping. Trap checks completed by contractors and at least 10 trap rounds will be made during the year. Monthly checks during summer months.
- Continue cat kill-trapping, plus investigate periodic leghold trapping and cat detection dog use.
- Continue to monitor beech seed fall amounts between February and May annually as a tool for predicting rodent irruptions.
- Continue to monitor rodent levels using tracking tunnels quarterly as a minimum, and more often if rat control is possibly required.
- Initiate rat control within the 4800 ha bait station block if beech seed fall, rodent monitoring, and trap catch indicates that a rat irruption is likely to occur.
- Continue to monitor mustelid levels using tracking tunnels quarterly. The value of continuing this will be assessed.
- Continue to monitor short-tailed & long-tailed bats, kaka, and mohua (combined efforts of Te Anau area staff and DOC Science & Technical staff).

Acknowledgements

A large number of people have been involved with the Eglinton Valley for several years across a variety of projects. Te Anau Area staff who contributed to the programme this year included Shinji Kameyama, Hannah Edmonds, Gerard Hill, Warren Simpson, Stephen Martin, Ian Thorn, and Linda Kilduff.

Colin O'Donnell, Peter Dilks, Terry Greene, Lynette Hartley, Jo Hoare, Iris Broekema, Jason and Maddie van de Wetering and others from DOC Science & Technical put in many long hours on the species monitoring programme.

Thanks to Stoat and Track Ltd and Mainly Fauna who were contracted to do the stoat and cat trap checks through the season. Thanks also to Martin Sliva from True Travel Ltd who donated seven more A24 self-resetting stoat traps that will be set out in the valley during the 2013/14 season. Thanks to PC Taylor from Knobs Flat Accommodation for his ongoing support and assistance.

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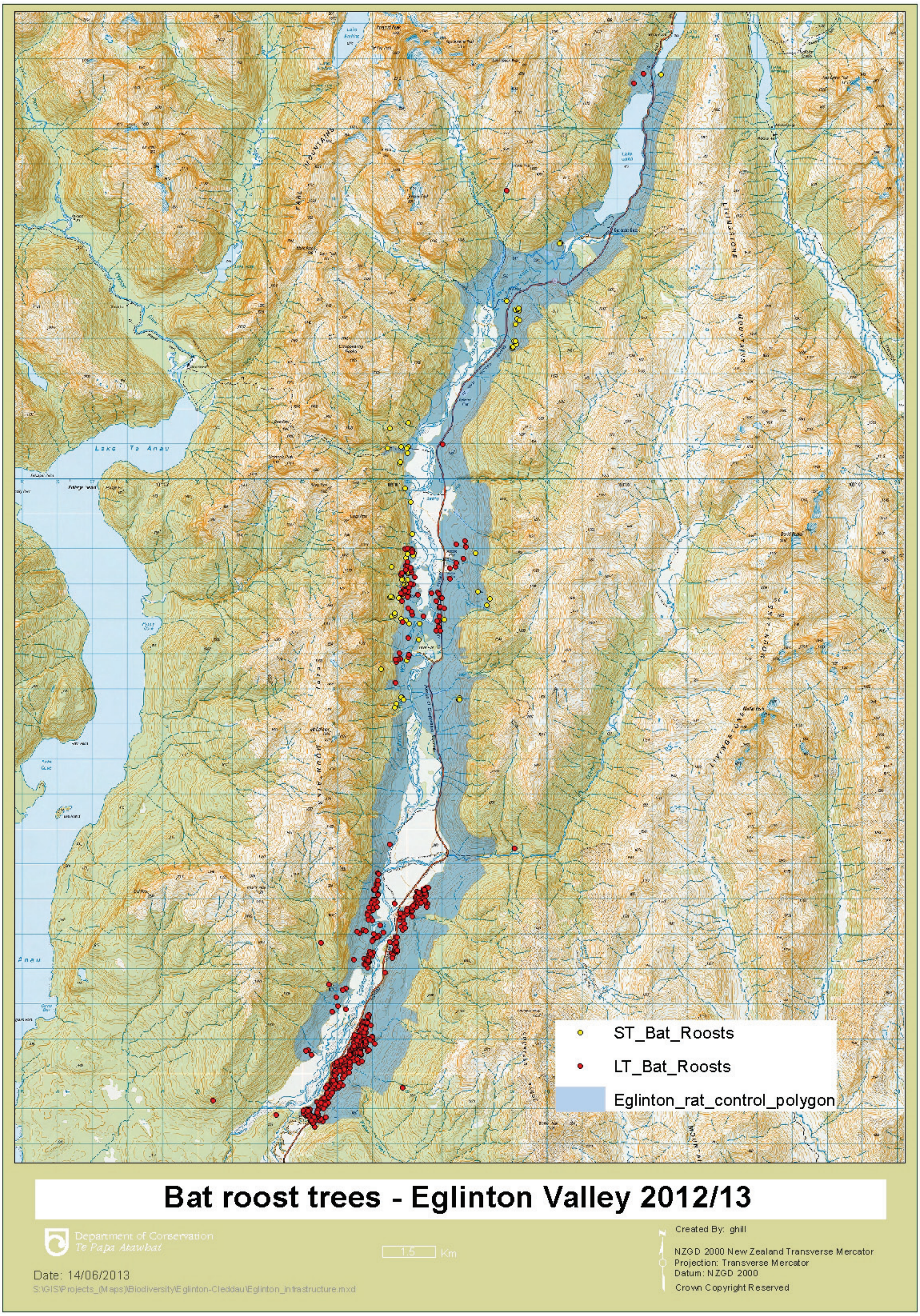
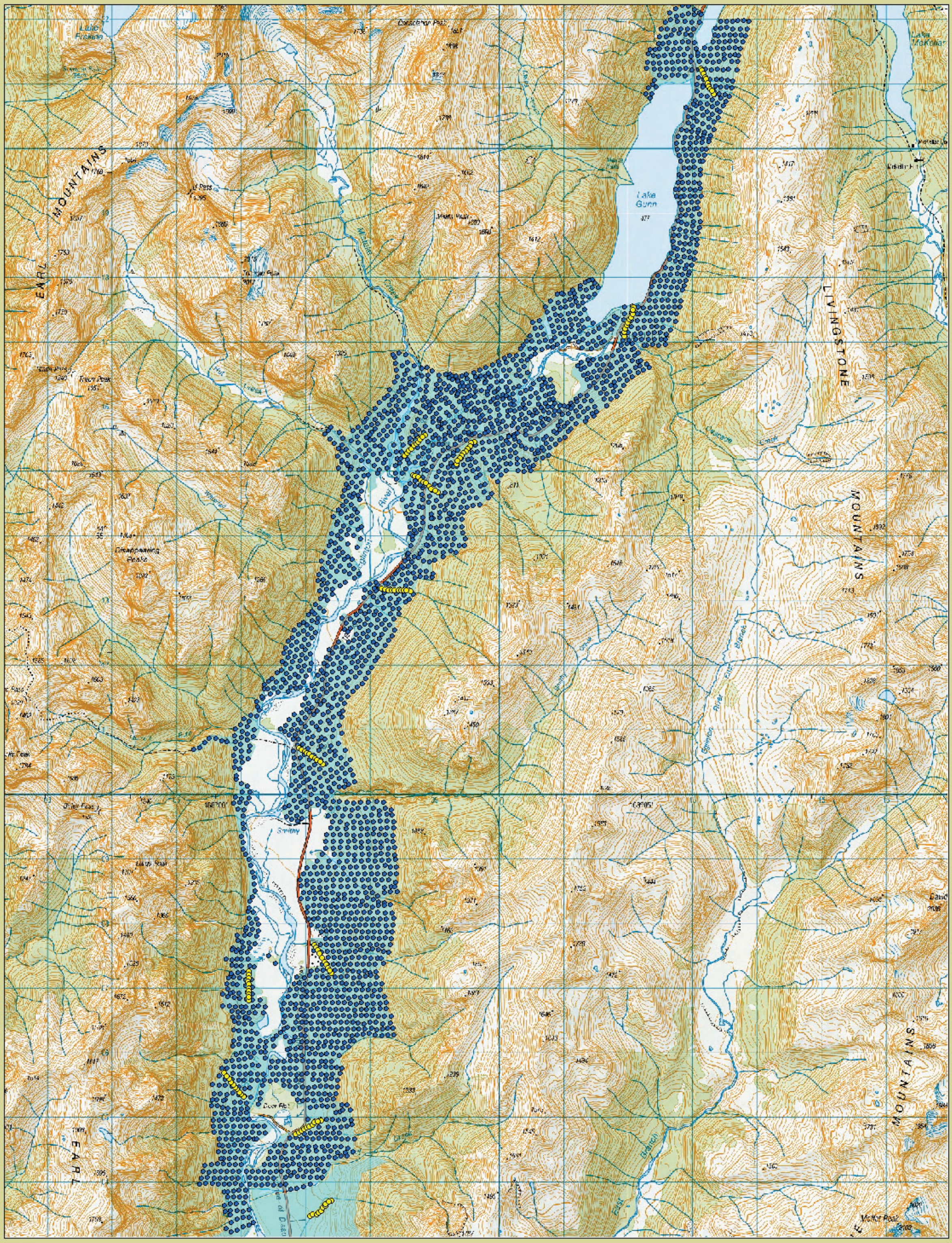
Appendix 1



Bat roost trees - Eglinton Valley 2012/13

Appendix 2A



Northern Bait Station block & rodent monitoring lines

Department of Conservation
Te Papa Atawbai

1 Km

Date: 21/11/2011

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NZGD 2000 New Zealand Transverse Mercator
Projection: Transverse Mercator
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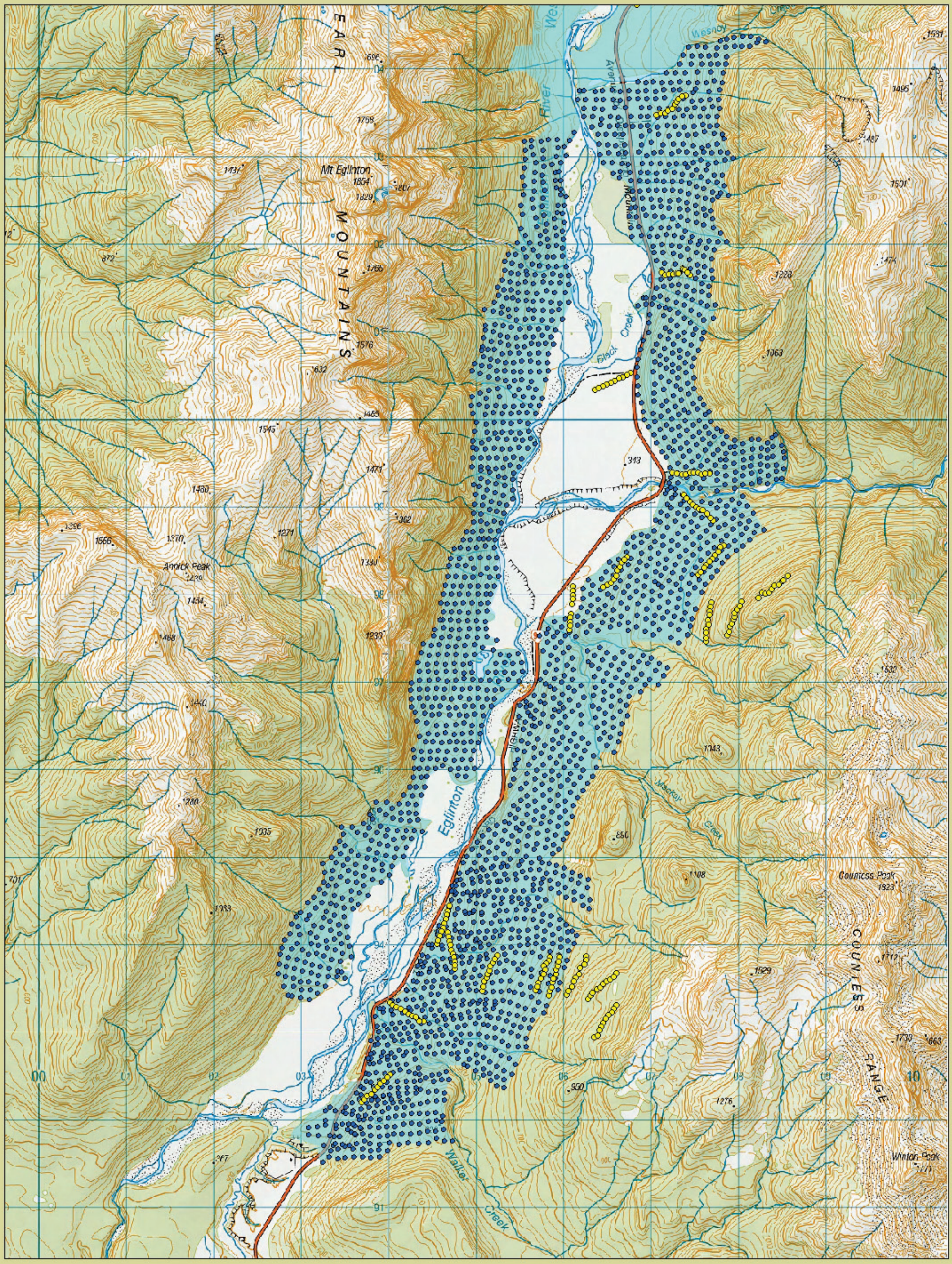
Appendix 2B



Southern Bait Station block & rodent monitoring lines

Department of Conservation
Te Papa Atawhai

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Date: 21/11/2011

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Appendix 3


Lake Te Anau
Cat_traps_Eglinton
Stoat_traps_Eglinton
Eglinton Valley Stoat & Cat Trap Sites 2012/13
Department of Conservation
Te Papa Atawhai
1 Km
Date: 20/05/2013
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NZGD 2000 New Zealand Transverse Mercator
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Datum: NZGD 2000
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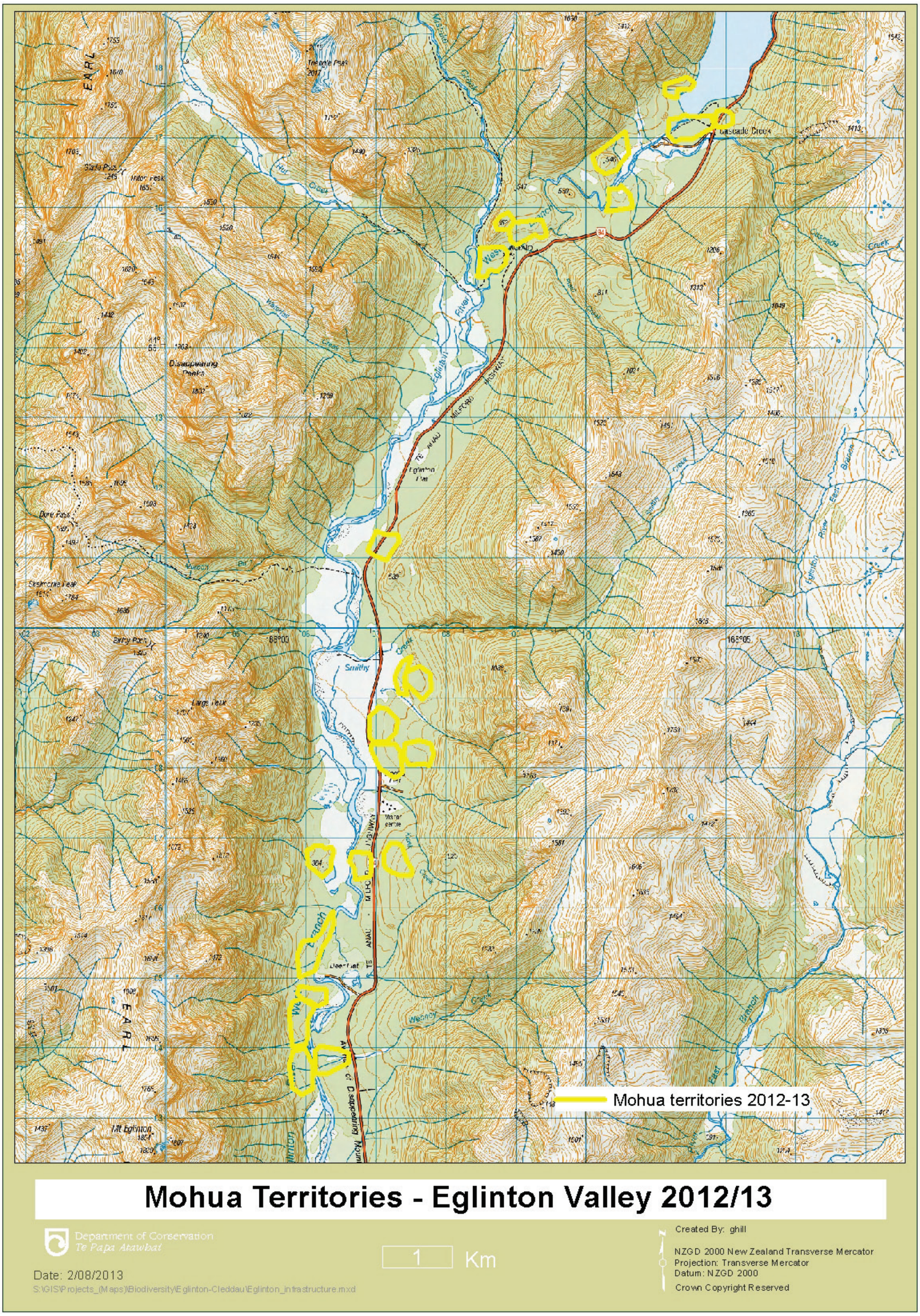
Appendix 4



Mohua Territories - Eglinton Valley 2012/13

Appendix 5

Trap capture results 2012/13

MONTH	STOAT	RAT	WEASEL	CAT	Hedgehog	OTHER*
JULY 2012	23	19	0	2	0	7
AUG 2012	4	18	0	2	0	2
SEPT 2012	17	16	1	0	0	4
OCT 2012	20	7	3	0	1	0
NOV 2012	18	9	5	0	1	2
JAN 2013	13	6	0	3	1	0
FEB 2013	17	6	0	1	2	1
MAR 2013	6	9	2	3	1	2
APRIL 2013	9	19	2	1	4	3
JUNE 2013	13	52	6	1	1	1
TOTAL	**140**	**161**	**19**	**13**	**11**	**22**

*Other includes mouse, possum, bird, or rabbit. Full details are recorded in DOCDM-212559.