

# **Residual Trap Catch Monitoring of the Outcomes of Aerial 1080 Poisoning on Parts of Molesworth Station in Spring 2008**

Ivor Yockney and Graham Nugent



**Landcare Research**  
**Manaaki Whenua**



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of Aerial 1080 Poisoning on Parts of Molesworth  
Station in Spring 2008**

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DATE: December 2008



ISO 14001

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Landcare Research Contract Report: LC0809/065

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## Contents

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Summary .....	i
1. Introduction .....	1
2. Background.....	1
3. Objective.....	2
4. Methods .....	2
5. Results .....	3
6. Conclusions .....	6
7. Acknowledgements .....	6
8. References .....	6
Appendix 1 Map of blocks .....	7
Appendix 2 Trap-line summaries .....	9



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## Summary

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### Project and Client

Landcare Research, Lincoln, was contracted by the Animal Health Board to monitor the Residual Trap-Catch Index (RTCI) of possum abundance after experimental aerial 1080 poisoning on eastern parts of Molesworth Station, Marlborough, in November 2008.

### Objective

- To determine the relative abundance of possums after various aerial 1080 poisoning treatments had been applied to eastern parts of Molesworth Station, by using the standard NPCA protocol to measure the possum RTCI in five treatment blocks by mid-December 2008.

### Methods

- Five different aerial poisoning treatments were monitored in five separate blocks:
  - Block 1 Low-coverage, high-sow
  - Block 2 High-coverage, low-sow
  - Block 3 High-coverage, high-sow
  - Block 4 Low-coverage, low-sow
  - Block 5 Prefed high-coverage, low-sow
- All the aerial treatment area was on previously identified possum habitat and therefore none of the blocks were stratified in terms of possum habitat.
- Within each treatment area, random trap-line start points were applied at a rate stipulated in the standard NPCA protocol. Up to five spare random points were also allocated as contingency lines, but only one of these points was actually used.
- Trapping was carried out using the standard NPCA protocol (NPCA 2008). Backing boards on all trap sets and all trap lines were established by currently certified NPCA operators. Lines were checked by either foot, motorbike or via helicopter access. A number of lines were checked directly from the helicopter, with an observer present at all times.

### Results

- The overall average RTCI was 0.9%. No possums were captured on 81 (79%) of the lines, one possum was captured on each of 19 (18%) of the lines, two possums on one line, and three possums on each of two lines (both in Block 4).
- RTCIs of 0.4 % and 0.8% were recorded in the two high-coverage blocks (Block 2 and 3 respectively; Tables 3 and 4). For the two low-coverage blocks (Blocks 1 and 4; Tables 2 and 5) RTCIs of 1.1% and 1.8% were recorded.
- In relation to sowing rate, the RTCIs for the two broadcast 'Molesworth standard' 2.5-kg/ha blocks (Blocks 1 and 3) were 1.1% and 0.8% respectively, while for the 'low-sow' 1.0-kg/ha blocks (Blocks 2 and 4) the RTCIs were 0.4% and 1.8% respectively.
- An RTCI of 0% was recorded in the small 359-ha prefed block in which bait was sown in clusters at 1 kg/ha.

**Conclusions**

- Across the five treatment blocks the post-control RTC was 0.9%, well below the 2% RTCI often applied by AHB as a performance standard., but two trap lines captured three possums in one block (the one with the highest predicted pre-control density) so would therefore have failed a 'No line over two captures' target if such a target had been applied to this operation.
- The main determinant of post-control possum abundance appeared to be the predicted abundance of possums before control.
- There was no evidence that the 60% lower sowing-rate in Blocks 2 and 4 resulted in a markedly poorer kill.
- Using prefeed in conjunction with sowing only 1 kg/ha of bait in clusters appeared to produce a better result than any of the non-prefed treatments in this trial.



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## 1. Introduction

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Landcare Research, Lincoln, was contracted by the Animal Health Board to monitor the Residual Trap-Catch Index (RTCI) of possum abundance after experimental aerial 1080 poisoning on eastern parts of Molesworth Station, Marlborough, in November 2008.

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## 2. Background

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Aerial 1080 poisoning of possums was applied to parts of a 28 600-ha area in the south-eastern-most parts of Molesworth Station in spring 2008. The operation was jointly funded by the AHB and Landcorp, and was structured as an operational test of the cost-effectiveness of different aerial poisoning strategies. The AHB contracted Landcare Research to determine how effective each treatment was in achieving low post-control possum abundance by the standard RTCI protocol (NPCA 2008), and this report documents those outcomes. Landcare Research has also been funded separately (to determine the percentage reduction, subsequent possum population recovery, and the effect of poisoning on Tb levels in wildlife), but those data are not included here.

The main experiment involved four different treatments with an all-treatment design of combinations of high and low coverage and high and low sowing rate. This involved two levels of landscape coverage (the usual level previously applied on Molesworth Station, and a level of about half that) and two sowing rates (the standard sowing rate previously applied on Molesworth Station, and a 60% lower rate in which bait was sown in clusters), as follows:

- *Low-coverage, high-sow (LCHS)*: Low coverage of about 30–40% of the landscape with bait broadcast at the rate of 2.5 kg/ha of 1080 cereal bait in the areas actually poisoned.
- *High-coverage, low-sow (HCLS)*: Coverage of about 60–80% of the landscape with bait sown in clusters at the rate of 1.0 kg/ha of 1080 cereal bait in the areas actually poisoned.
- *High-coverage, high-sow (HCHS)*: Coverage of about 60–80% of the landscape with 2.5 kg/ha of 1080 bait broadcast in the areas actually poisoned.
- *Low-coverage, low-sow (LCLS)*: Low coverage of about 30–40% of the landscape with bait sown in clusters at the rate of 1.0 kg/ha of 1080 cereal bait in the areas actually poisoned.

Treatment 3 represents what is standard practice for Molesworth Station. For all four treatments 8-g RS5 cereal bait were applied without prefeeding along flight paths spaced 130 m apart. This (and historical) operations did not use prefeeding to increase possum kill because prefeeding almost doubles the cost, and previous operations on Molesworth Station have shown that not using prefeed successfully and quickly reduced cattle-reactor rates (J. Ward pers. comm.) and the incidence of Tb in pigs (Byrom et al. 2007). However, to help interpret trial outcomes and at the AHB's request, prefeeding was used in a ~500-ha area adjacent to Treatment #1 above, with 1 kg/ha of cinnamon-lured non-toxic RS5 bait being broadcast in this area (Block 5 in this report) one week before poisoning.

The total area actually poisoned was approximately 17 800 ha, and was sown on 2 and 3 November 2008. Trap-catch monitoring was undertaken between 10 and 21 November 2008.

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### 3. Objective

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- To determine the relative abundance of possums after various aerial 1080 poisoning treatments had been applied to eastern parts of Molesworth Station, by using the standard NPCA protocol to measure the possum RTCI in five treatment blocks by mid-December 2008.

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### 4. Methods

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The area to be poisoned within each of the five treatment blocks was defined by using the spatial model developed by Byrom et al. (2007) to identify and exclude strata with a predicted pre-control Trap Catch Index (TCI) of <5% (= high-coverage treatments) or <10% (= low-coverage treatments). As it is not practical to aerially sow bait into (or leave out) small areas of up to 50 ha, the boundaries of the respective treatment areas were smoothed to facilitate aerial sowing.

Within each treatment area random trap-line start points were applied at a rate stipulated in the latest NPCA protocol (NPCA 2008). As all the aerial 1080 application was on previously identified possum habitat (Byrom et al. 2007) none of the blocks were stratified in terms of possum habitat. Therefore, for the first 500 ha, 10 trap lines were allocated, with one line allocated per 300 ha thereafter to a maximum of 40 lines (Table 1).

The trap-catch surveys were conducted as per the NPCA (2008) protocol for unforested habitat. Trapping was carried out using backing boards on all trap sets and all trap lines were established by currently certified NPCA operators. Observers were mostly transported to or near line starts by helicopter during line establishment and removal. On the second and third days lines were checked by helicopter using two observers wherever that was feasible. There was no rainfall recorded for the duration of the monitoring.

**Table 1** Number of randomly allocated 10-trap lines by block

Block	Area (ha)	Number of trap lines
1	1893	15
2	4300	23
3	7869	35
4	3358	20
5	360	10
Total	17779	103

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## 5. Results

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Survey effort and outcomes are summarised for each block (see Appendix 1 for maps) in Tables 2–6, with summaries for each trap line presented in full (by block in Appendix 2). The overall average RTCI was 0.9%. No possums were captured on 81 (79%) of the lines, one possum was captured on each of 19 (18%) of the lines, two possums on one line in Block 3, and three possums on each of two lines in Block 4.

RTCIs of 0.4% and 0.8% were recorded in the two high-coverage blocks (Blocks 2 and 3 respectively; Tables 3 and 4) where pre-control TCI was predicted to exceed 5%. For the two low-coverage blocks (Blocks 1 and 4; Tables 2 and 5), where pre-control TCI was predicted to exceed 10% (i.e. possum densities were higher), RTCIs of 1.1% and 1.8% were recorded, respectively. In general post-control RTCIs appeared to correlate with predicted pre-control possum abundance.

In relation to sowing rate, the RTCIs for the two broadcast ‘Molesworth standard’ 2.5-kg/ha blocks (1 and 3) were 1.1% and 0.8% respectively, while for the ‘low-sow’ 1.0-kg/ha blocks (2 and 4) the RTCIs were 0.4% and 1.8% respectively. There was no consistent overall difference between the sowing-rate treatments.

**Table 2** RTCI results for the low-coverage, high-sow block (Block 1)

Operation type	Initial
Start date of control	2 Nov 2008
Completion date of control	2 Nov 2008
Start date of monitor	13 Nov 2008
Completion date of monitor	21 Nov 2008
Operational area size	1893
Control contractor	Phil Packham, Alpine Pest Control
Control methods	Low coverage of about 30–40% of the landscape with 2.5 kg/ha of 1080 bait broadcast sown in the areas actually poisoned
Monitor contractor	Landcare Research
Number of traps per line	10
Number of trap nights	449.5
Number of trap lines	15
RTCI $\pm$ SE	1.11 $\pm$ 0.29%

**Table 3** RTCI results for the high-coverage, low-sow block (Block 2)

Operation type	Initial
Start date of control	2 Nov 2008
Completion date of control	2 Nov 2008
Start date of monitor	13 Nov 2008
Completion date of monitor	21 Nov 2008
Operational area size	4300 ha
Control contractor	Phil Packham, Alpine Pest Control
Control methods	Coverage of about 60–80% of the landscape with cluster-sown rate of about 1.0 kg/ha of 1080 bait in the areas actually poisoned
Monitor contractor	Landcare Research
Number of traps per line	10
Number of trap nights	688
Number of trap lines	23
RTCI $\pm$ SE	0.43 $\pm$ 0.09%

**Table 4** RTCI results for the high-coverage, high-sow block (Block 3)

Operation type	Initial
Start date of control	2 Nov 2008
Completion date of control	3 Nov 2008
Start date of monitor	10 Nov 2008
Completion date of monitor	21 Nov 2008
Operational area size	7869 ha
Control contractor	Phil Packham, Alpine Pest Control
Control methods	Coverage of about 60–80% of the landscape with 2.5 kg/ha of 1080 bait broadcast sown in the areas actually poisoned
Monitor contractor	Landcare Research
Number of traps per line	10
Number of trap nights	1049
Number of trap lines	35
RTCI $\pm$ SE	0.76 $\pm$ 0.13%

**Table 5** RTCI results for the low-coverage, low-sow block (Block 4)

Operation type	Initial
Start date of control	3 Nov 2008
Completion date of control	3 Nov 2008
Start date of monitor	16 Nov 2008
Completion date of monitor	19 Nov 2008
Operational area size	3358 ha
Control contractor	Phil Packham, Alpine Pest Control
Control methods	Low coverage of about 30–40% of the landscape cluster-sown at 1.0 kg/ha of 1080 bait in the areas actually poisoned
Monitor contractor	Landcare Research
Number of traps per line	10
Number of trap nights	598.5
Number of trap lines	20
RTCI $\pm$ SE	1.84 $\pm$ 0.41%

**Table 6** RTCI results for the prefed high-coverage, low-sow block (Block 5)

Operation type	Initial
Start date of control	Prefeed 26 Oct 2008 Toxic sown 2 Nov 2008
Completion date of control	2 Nov 2008
Start date of monitor	13 Nov 2008
Completion date of monitor	16 Nov 2008
Operational area size	360 ha
Control contractor	Phil Packham, Alpine Pest Control
Control methods	350 kg of cinnamon-based prefeed to 360 ha of target area one week before poisoning. Toxic then cluster sown at 1.0 kg/ha of 1080 bait in the areas actually poisoned
Monitor contractor	Landcare Research
Number of traps per line	10
Number of trap nights	100
Number of trap lines	10
RTCI $\pm$ SE	0 $\pm$ 0%

An RTCI of 0% was recorded in the small 359-ha prefed block in which bait was sown in clusters at 1 kg/ha (Table 6) As the predicted RTCI for this block was greater than 10%, this is likely to represent a high kill.

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## 6. Conclusions

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Across the five treatment blocks the post-control RTCI was 0.9%, well below the 2% RTCI often applied by AHB as a performance standard. However, two lines in Block 4 nominally caught three possums, although for one of these lines one of the ‘captures’ was a trap sprung by a possum on the second night that may have been caught on the third night. Block 4 (~1900 ha) would therefore have failed a ‘No line over two captures’ target if such a target had been applied to this operation.

The main determinant of post-control possum abundance appeared to be the predicted abundance of possums before control. That is, fewer possums were captured in blocks with high coverage that included many areas with a predicted pre-control TCI of between 5% and 10% than in the blocks with low coverage where the predicted TCI for treated areas was >10%.

There was no evidence that the 60% lower sowing-rate in Blocks 2 and 4 resulted in a markedly poorer kill. Using prefeed in conjunction with sowing only 1 kg/ha of bait in clusters appeared to produce a better result than any of the non-prefed treatments in this trial.

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## 7. Acknowledgements

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This work was conducted by Mike Perry and Ivor Yockney (Landcare Research) and several contractors, including Roland Mapp, Chris Brausch, Natalie Curnow, Charles Lim, Nyree Fea, and Jeff Lennon. All the flying was conducted by Phil Packham (Amuri Helicopters), whose knowledge of Molesworth Station and practical experience was invaluable during this work. We thank Jim Ward (Molesworth Station) and Colin and Tina Nimmo (Muzzle Station) for the use of their station huts while undertaking the work.

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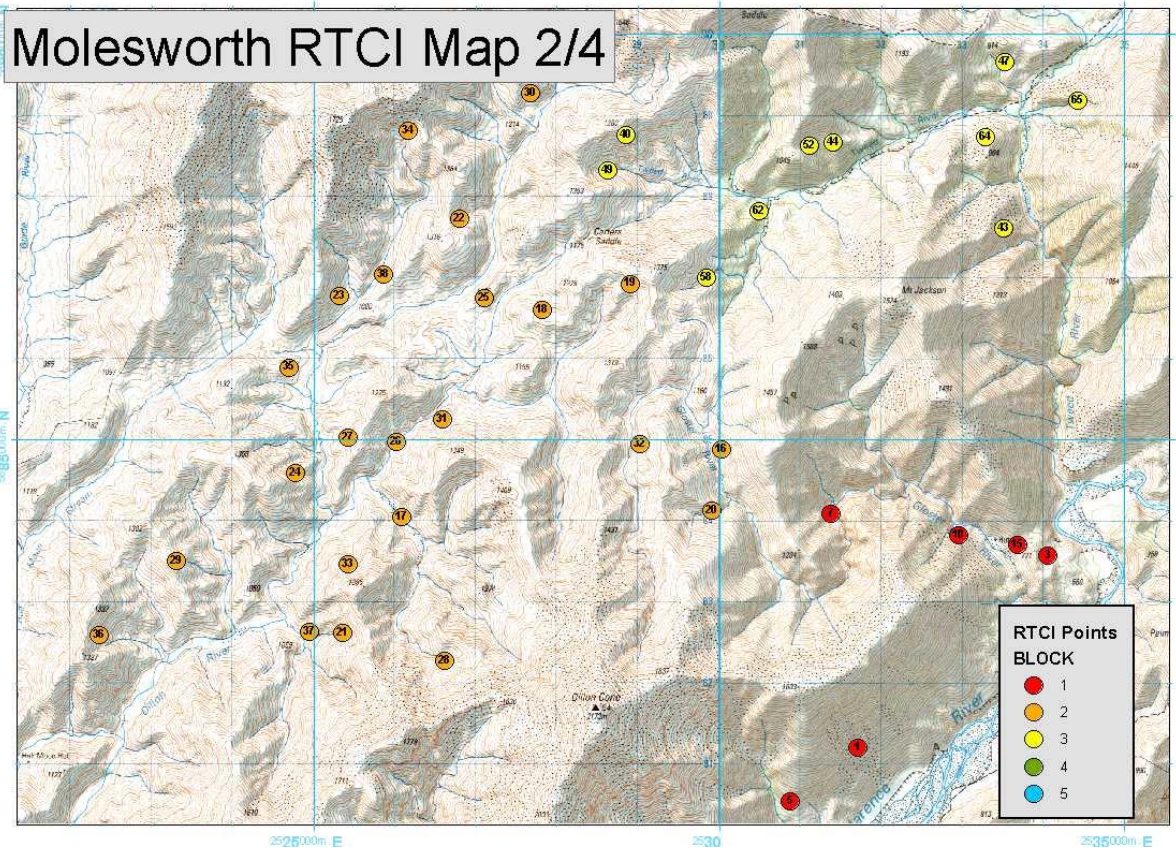
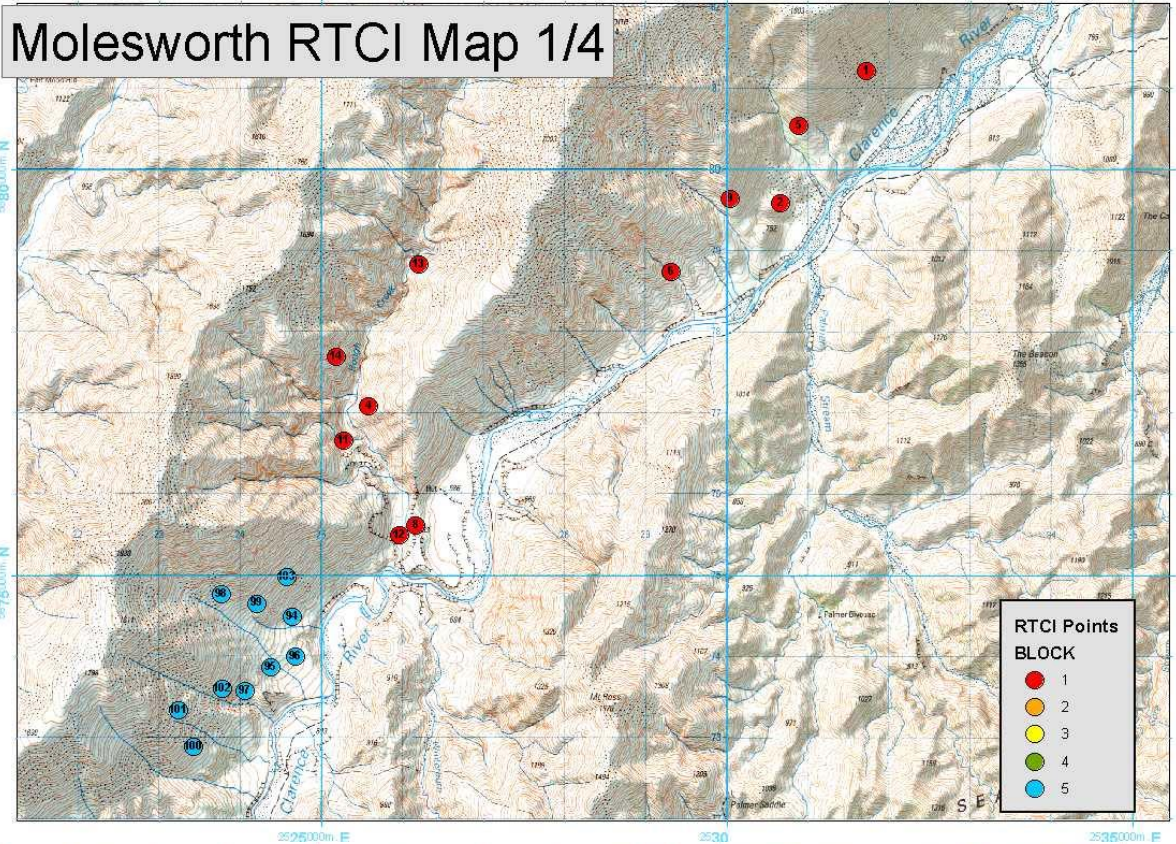
## 8. References

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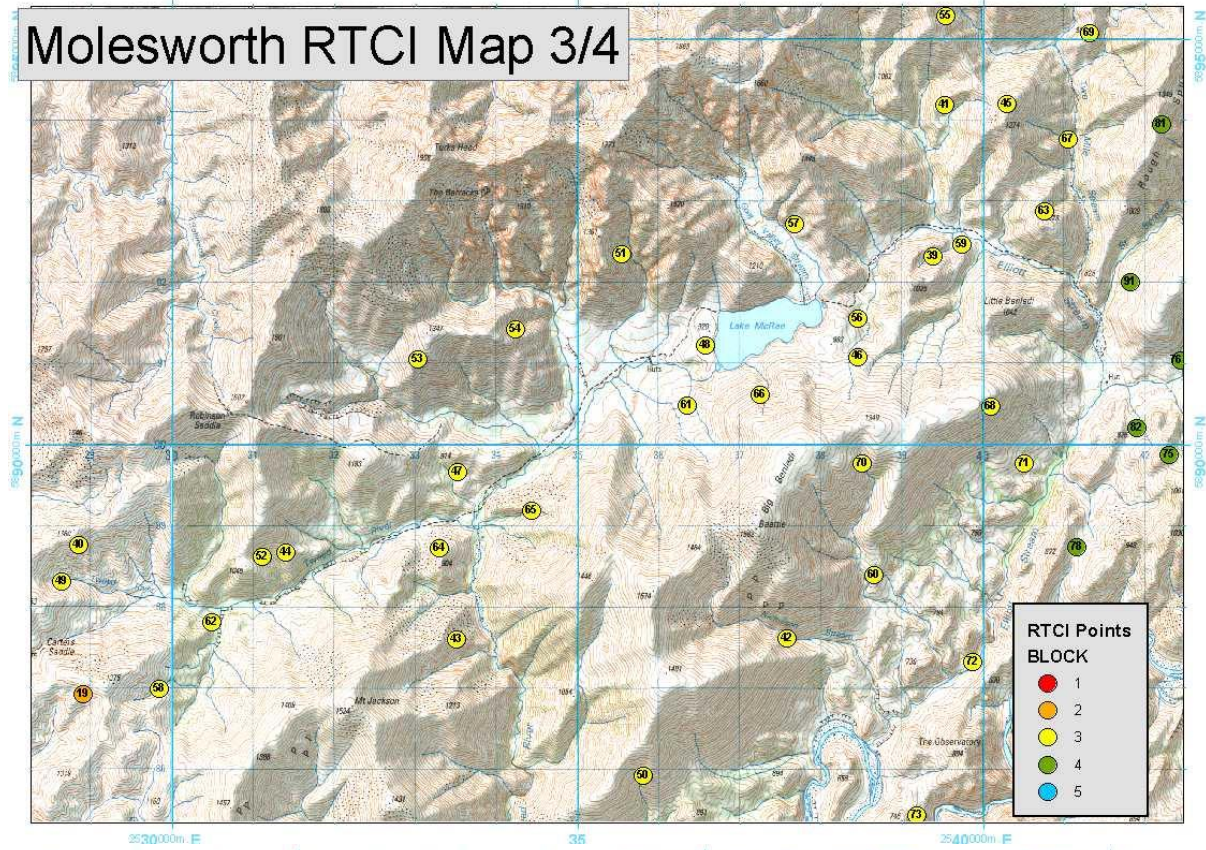
Byrom A, Nugent G, McKenzie J, Porphyre T, Poutu N, Shepherd J, Whitford J, Yockney I 2007. Cost-effective control of Tb in the northern South Island High Country (NSIHC): Identifying the habitats and vector species requiring control. Landcare Research Contract Report LC0708/110 for the Animal Health Board (R-80629).

NPCA 2008. Possum population monitoring using the trap-catch method. Wellington, National Possum Control Agencies.

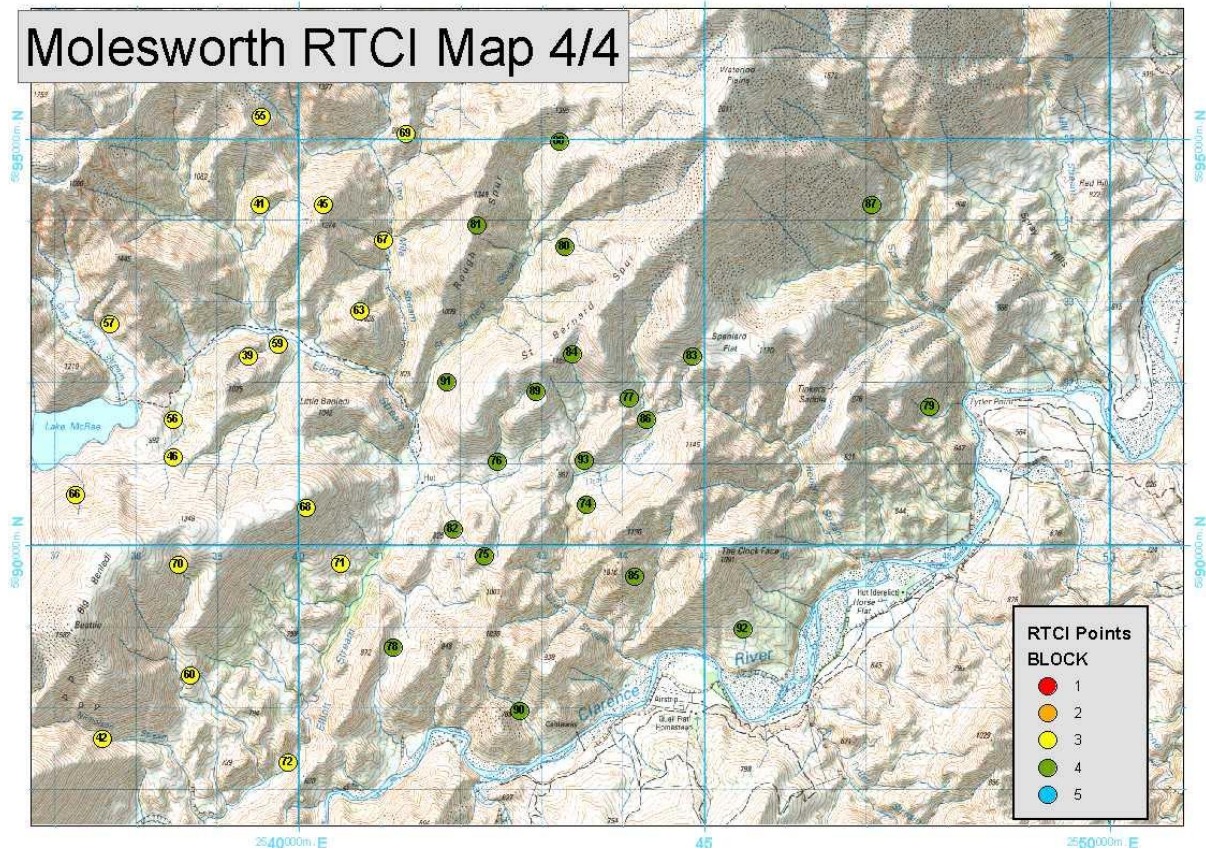
Appendix 1 1:50,000 maps of blocks



# Molesworth RTCI Map 3/4



# Molesworth RTCI Map 4/4





## Appendix 2 Trap-line summaries

Block 1

Line no.	Trap nights	Possums	Possum escapes	Non-targets	Sprung	Possum	Summary statistics	
					/empty	/100TN		
1	30	0	0	Hare	0	0.00	No. lines	15
2	30	0	0	0	0	0.00	RTCI	1.11%
3	30	0	0	0	0	0.00	Min.	0.00%
4	30	0	0	0	0	0.00	Max.	3.33%
5	30	0	0	0	0	0.00	SD	1.57%
6	30	1	0	0	0	3.33	SE	0.29%
7	30	0	0	0	0	0.00		
8	30	1	0	0	0	3.33		
9	30	1	0	0	0	3.33		
10	29.5	1	0	0	1	3.39		
11	30	0	0	0	0	0.00		
12	30	1	0	0	0	3.33		
13	30	0	0	0	0	0.00		
14	30	0	0	0	0	0.00		
15	30	0	0	0	0	0.00		
	449.5	5						

## Block 2

Line no.	Trap nights	Possums	Possum escapes	Non-targets	Sprung	Possum	Summary statistics	
					/empty	/100TN		
16	30	0	0	0	0	0.00	No. lines	23
17	29.5	0	0	Hare	0	0.00	RTCI	0.43%
18	30	0	0	0	0	0.00	Min.	0.00%
19	30	0	0	0	0	0.00	Max.	3.33%
20	29.5	0	0	Hare	0	0.00	SD	1.12%
21	30	1	0	0	0	3.33	SE	0.09%
22	30	0	0	0	0	0.00		
23	30	0	0	0	0	0.00		
24	30	0	0	0	0	0.00		
25	30	0	0	0	0	0.00		
26	30	0	0	0	0	0.00		
27	29.5	0	0	0	1	0.00		
28	30	0	0	0	0	0.00		
29	30	0	0	0	0	0.00		
30	30	0	0	0	0	0.00		
31	30	0	0	0	0	0.00		
32	29.5	0	0	0	1	0.00		
33	30	0	0	0	0	0.00		
34	30	0	0	0	0	0.00		
35	30	0	0	0	0	0.00		
36	30	1	0	0	0	3.33		
37	30	1	0	0	0	3.33		
38	30	0	0	0	0	0.00		
	688	3						

Block 3									
Line no.	Trap nights	Possum		Non-targets	Sprung /empty	Possum /100TN	Summary statistics		
		Possoms	escapes				No. lines		
39	30	1	0	0	0	3.33	No. lines	35	
40	30	0	0	0	0	0.00	RTCI	0.76%	
41	30	0	0	0	0	0.00	Min.	0.00%	
42	30	0	0	0	0	0.00	Max.	6.67%	
43	30	0	0	0	0	0.00	SD	1.61%	
44	30	1	0	0	0	3.33	SE	0.13%	
45	30	0	0	0	0	0.00			
46	30	0	0	0	0	0.00			
47	30	0	0	0	0	0.00			
48	30	0	0	0	0	0.00			
49	30	0	0	0	0	0.00			
50	30	0	0	0	0	0.00			
51	30	0	0	0	0	0.00			
52	30	0	0	0	0	0.00			
53	30	0	0	0	0	0.00			
54	30	0	0	0	0	0.00			
55	30	0	0	0	0	0.00			
56	30	0	0	0	0	0.00			
57	30	1	0	0	0	3.33			
58	30	0	0	0	0	0.00			
59	30	1	0	0	0	3.33			
60	29.5	1	0	0	1	3.39			
61	30	0	0	0	0	0.00			
62	30	1	0	0	0	3.33			
63	29.5	0	0	0	1	0.00			
64	30	0	0	0	0	0.00			
65	30	0	0	0	0	0.00			
66	30	0	0	0	0	0.00			
67	30	2	0	0	0	6.67			
68	30	0	0	0	0	0.00			
69	30	0	0	0	0	0.00			
70	30	0	0	0	0	0.00			
71	30	0	0	0	0	0.00			
72	30	0	0	0	0	0.00			
73	30	0	0	0	0	0.00			
	1049	8							

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Block 4

Line no.	Trap nights	Possums	Possum		Sprung /empty	Possum /100TN	Summary statistics	
			escapes	Non-targets			No. lines	
74	30	0	0	0	0	0.00	No. lines	20
75	29.5	1	0	Goat	0	3.39	RTCI	1.84%
76	29.5	2	1	0	1	10.17	Min.	0.00%
77	30	3	0	0	0	10.00	Max.	10.17%
78	30	0	0	0	0	0.00	SD	3.07%
79	29.5	0	0	0	1	0.00	SE	0.41%
80	30	0	0	0	0	0.00		
81	30	0	0	0	0	0.00		
82	30	0	0	0	0	0.00		
83	30	0	0	0	0	0.00		
84	30	0	0	0	0	0.00		
85	30	0	1	0	0	3.33		
86	30	0	0	0	0	0.00		
87	30	1	0	0	0	3.33		
88	30	1	0	0	0	3.33		
89	30	0	0	0	0	0.00		
90	30	0	0	0	0	0.00		
91	30	1	0	0	0	3.33		
92	30	0	0	0	0	0.00		
93	30	0	0	0	0	0.00		
	598.5	9						

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## Block 5

Line no.	Trap nights	Possums	Possum escapes	Non-targets	Sprung Possum		Summary statistics	
					/empty	/100TN		
94	30	0	0	0	0	0.00	No. lines	10
95	30	0	0	0	0	0.00	RTCI	0.00%
96	30	0	0	0	0	0.00	Min.	0.00%
97	30	0	0	0	0	0.00	Max.	0.00%
98	30	0	0	0	0	0.00	SD	0.00%
99	30	0	0	0	0	0.00	SE	0.00%
100	30	0	0	0	0	0.00		
101	30	0	0	0	0	0.00		
102	30	0	0	0	0	0.00		
103	30	0	0	0	0	0.00		