

Ngati Awa Kawenata Bait Station Operation Report 2009

Prepared by Bruce Bancroft, Wayne O'Keefe and David Paine



Bay of Plenty Regional Council
Operations Publication 2010 02
August 2010

5 Quay Street
P O Box 364
Whakatane
NEW ZEALAND

ISSN: 1176 5550

*Working with our communities for a better environment
E mahi ngatahi e pai ake ai te taiao*





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Prepared for the Department of Conservation by: Bruce Bancroft,
Wayne Okeefe and David Paine

Cover Photo:

Acknowledgements

This project is a great example of inter-organisational cooperation. The goodwill shown by all parties recognises the value of this project to the community not only for the benefits to the land and its inhabitants but for the health and well being of the people who choose to visit and engage. Merely knowing this land is being restored, pests managed and species protected and enhanced is a measurable and valuable public good not only bestowed upon the people of Whakatāne but all of New Zealand. The outcomes of this project particularly the strong kiwi population could not be achieved without cooperation of all partners.

Te Runanga o Ngāti Awa and its farm committee have always shown strong commitment to restoring the land and for making this project happen in various forums. I thank them for the commitment.

Whakatāne District council have also shown strong commitment to this opportunity to apply sound biodiversity management to their reserves in difficult financial times. I thank them also for their conviction and commitment to this work.

Department of Conservation management and field staff have risen to this challenge also in difficult times and are here recognised for their seizing of an opportunity worthy of support both for its value to fauna and flora and to the community.

Whakatāne Kiwi Trust as community representatives have also shown vision and courage rising to the challenge to meet the future needs of this project and take it to the wider even global community. The trustees are commended for their hard work.

Bay of Plenty Regional Council councillors and staff are commended also for their philosophical insight and financial support for this work which could not proceed otherwise.

Executive summary

On the Ngāti Awa kawenata control of possums and rats was successfully carried out during September through November 2009 using two toxins placed simultaneously in bait stations on an intensive bait station network over 116ha.

The toxins used were; Pindone pellets (0.5g/kg) and Feratox (475g/kg) encapsulated cyanide.

All bait stations were fully loaded once with 1.5 kg of Pindone and five Feratox capsules, none of the bait stations required a second feed. At Ngāti Awa 23 % (53/227) of stations required a second feed of 750 gm.

The year of 2009, was the first year of maintenance control after an initial control operation in 2008 on a naive possum and rat population. Ngāti Awa farm has a history of sporadic possum control for fur production or recreational experience over the last two decades but no targeted rat control before 2008.

Possum densities were assessed at 2.5% RTCI post control 2008 and 0% post control 2009 indicating that possum density was successfully and further reduced by the 2009 operation. Care must be taken in interpreting this data as it is likely to be an underestimate due to use of raised sets to protect kiwi and due to small sample size. However we did count 50 possum carcasses at stations in 2009. (~0.43 possums / ha treated)

Rats were reduced from 90% TI with average of 70% high use to 0 % TI (2 lines x 10 cards). No rats tracked on 20 cards!

The operation is based on ground based bait stations laid out at ~1.8-2.0 bait stations per ha. Bait was left in the field for a minimum of six weeks before complete removal. This was sufficient to retard rodent repopulation for a further ~16 weeks until February 2010 when densities would probably have risen above 10% tracking index.

Rat densities had not returned to pre control levels at the June monitor but had rebounded to 55%TI which was very high. The high bait consumption is probably a factor of both high rat numbers and the residual possum population which we would hope is reduced sufficiently to not effect the 2010 operation.

There are many variables acting on rat populations and we believe effort should be expended to consider alternative baiting strategies that will extend the protection period. We think this should be achievable while low possum density remains at the site. We would hope to remain within the current cost.

Our preferred programme alteration is to deliver an initial feed of 500 gm with 2 x Feratox cyanide followed by a second fresh feed of 250 gm Pindone at time of bait removal. Removal of cyanide contaminated bait before school holidays is a requirement of the medical officer of health.

Bait statistics for Ngāti Awa Farm 2009

Site	Total Pindone delivered kg	Total Pindone consumed kg/ha	Total consumption kg/ha	Total Feratox delivered	Known Possum kills	Kills /ha found
Ngāti Awa (116ha)	380.25	202.26	1.75	1294	50	0.43

Department of Conservation standards for ground based rodent control operations have been changed since this operation to more readily accommodate this control methodology. (The same standards applicable to pest control on DOC land are applied to Ngāti Awa farm).

The condition relating to possums being below 5% RTCI has changed to being “at very low abundance, controlled simultaneously or excluded from bait stations.”

Contract delivery was carried out through Department of Conservation Programme Manager Threats John Lucas. John was able to contract Wayne O’Keefe of Ōpōtiki to deliver works on both Ngāti Awa and DOC lands. Bruce Bancroft provided on ground advice and audit of contractors. David Paine from Bay of Plenty Regional Council provided coordination and advice.

This report should be read in conjunction with the post control report for Ōhope Scenic Reserve.

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Part 1: Introduction

The purpose of this report is to provide details of the 2009 bait station operation on the Ngāti Awa farm using a combination of Pindone cereal bait and Feratox encapsulated cyanide in the simultaneous control of possums and rats.

Possoms and ship rats are undoubtedly the most destructive predators inhabiting our forests. The ship rat's ability to quickly reproduce, repopulate and re-establish over wide areas after control makes it a formidable and expensive pest to control particularly with ground based operations.

The operational philosophy follows the basic principles of pest control by ensuring very high percentages of target pest populations are put at mortal risk simultaneously with sufficient highly palatable bait to kill them all when they are most hungry and to have some bait over. Residual bait is then removed from all bait stations.

This baiting regime has proved effective at managing possum and rat populations in the Manawahe Ecological Corridor to low levels over five years with no sign of reduced effectiveness through bait shyness or aversion.

Part 2: Operation design

At Ngāti Awa farm (total 116 ha) 254 large Philproof bait stations have been established in contiguous bush at a pre-planned grid of ~75 m x ~75 m. Pre-planning of bait stations was carried out using Arc 9 software to determine optimum bait station distribution. Location points were then loaded into a Garmin Map 60 CSX handheld GPS and delivered to the field. Placement was on best site within 5.0 m of the pre-planned location. All tracks were marked with pink track markers and tracks cut with minimum vegetation disturbance required to see two consecutive markers in either direction.

Bait stations are set from 100 mm (300 mm on DOC land) above ground.

Pre-bagged Pindone pellets (1500 gm) are loaded into bait stations with five Feratox. This amount was chosen because the 2008 post control residual trap catch index (RTCI) was 2.5% and compounded by proximity to the adjacent pine forest. Feratox is placed at the front of the station before refitting the floor. Follow up or top up baiting is carried out if need is determined by a wide spread 10% bait station monitor. Extra bait was required at 53 /254 stations.

Typically in these operations rats are largely undetectable through most of the summer. Rarely are second fills required for maintenance operations, possum density typically remains sufficiently low that bait delivery volumes can be further reduced (with courage) to minimise left over bait removed from the stations. The benefit is less bait wastage, less bait delivered to the field, minimised labour costs.

All surplus bait is removed from stations and buried on site after a minimum of six weeks in the field and a post control rodent monitor confirms success.

Consultation and consents were jointly managed by John Lucas and David Paine with the able assistance of Rachel Janes from DOC in Murupara.

Part 3: Outcome monitoring

No outcome is carried out on Ngāti Awa farm. This is because the contiguous site of Ōhope Scenic Reserve (OSR) is monitored for changes to vegetation and small bird populations over time and the Kawenata benefits from the same pest control programme. By inference we expect any change to Ōhope to be reflected on the Ngāti Awa farm Kawenata. This would be following along in time as the forest health of the farm Kawenata is somewhat behind OSR due to its recent protection from grazing.

3.1 Operational monitoring

Possoms were monitored according to the national protocol, pre and post operation using 2 x 10 trap lines on raised sets due to kiwi presence.

Rodents were monitored pre and post operation using 2 x 10 tracking tunnel lines semi randomly located at ~1 line / 50 ha. Tunnels were baited with peanut butter placed on the centre of the cards and set out for one fine night. A further monitor occurred during June to assess population recovery. By June 2009 rat tracking had returned to very high levels (55%) up from 0% in December indicating a very rapid rat population build up.

The monitoring data would have benefited from a further monitor during March to better identify the length of the protected period.

3.2 Pest animal targets

To reduce the rodent population to <5% TI and maintain possums at <5% RTCI.

3.3 Results by target

- (i) The possum control target is maintained at < 5% RTCI.

The 2009 possum result at Ngāti Awa farm Kawenata was 0.0% RTCI.

(That is 0 possums captured in 60 trap nights off two lines of 10 traps using raised sets).

- (ii) Rats are reduced to <5% TI.

Rats were reduced from 90% with 70% high use to 0.0% TI over two lines of 10 tunnels. This is a spectacular result but typical of this methodology.

3.4 Comment

Clearly the possum target has been exceeded easily. It is proposed that this target be reduced to 2% RTCI in future operations to recognise the underestimated result given by raised sets and to ensure that possum densities do not rise to levels where they will effect rodent bait consumption. (An RTCI of 2% will allow for one possum to be caught over 60 trap nights.) Critically this will allow managers to minimise rodent control bait volumes delivered into the environment with very high confidence. The greatest threat to this result on Ngati Awa farm would most likely be removal of adjacent pine forest encouraging movement of possums from there into the protected areas on Ngati Awa farm.

Typically during these operations rats are largely undetectable through remaining spring and most of the summer. This summer was very long and dry extending well into April with a mild autumn without significant rain until late May/June. This may well have allowed two full breeding cycles and high survival rate within litters supported by very heavy fruiting from drought stressed vegetation.

Indeed anecdotal evidence from some sites (Awakeri SR) suggested some drought induced vegetation die off occurred through this period. (Damien Jones pers comms.)

All surplus bait was removed from stations and buried on site after eight weeks in the field and a post control rodent monitor had confirmed success.

The Ngāti Awa site is roughly divided into two separate sites. East of the gorge against the pine forest consistently uses higher volumes of bait. We suggest in hind site that 1500 gm/bait station should be still be delivered and be sufficient to achieve target in 2010. We expect possum migration from the adjacent pine forest will occur between baiting periods.

In the western side of the gorge 500 gm/station could be delivered with confidence.

Greater cognisance of the 2008 possum result and proximity to untreated forest may have led to a better baiting decision. However the take home learning is that in very low possum densities, 500 gm of Pindone/station or less should be sufficient to reduce high levels of high use rodents to target.

3.5 **Proposed alteration to current method**

For two years now rodent indices have risen sharply at this site from being undetectable directly post control. Many variables affect breeding rate of rats.

Some examples:

- (i) Low stocking rates on nearby pasture. This could lead to rank seeded grass with increased grass seed as an extra food supply and support breeding in fragmented bush/pasture environments leading to rapid reinvasion.
- (ii) Ecosystem suppression with whiplash effect. Removing large numbers of rodents and possums for a period of time when forest growth is very productive and vigorous creates an abundant food source easily accessible and supporting accelerating breeding in rodent survivorship.
- (iii) Extra fruiting effect. Caused from extra seeding due to drought stressed vegetation producing extra heavy flowering, extra food available to breeding rodents.
- (iv) Additional food supply from elevated invertebrate hatchings. Possibly as a result of increased egg laying in cicada populations seven years previous.
- (v) A combinations of these.

We have experienced in previous years at other sites where rodent indices have remained low well into autumn and so allowed lower indices at the start of operations. Intuitively this must have beneficial effects on both the ecosystem and potentially on operational costs.

Alterations to management could be focussed either around timing of operations bringing forward, starting earlier as suggested by (Paul Jansen pers comms).

I am not convinced this is relevant because we can always achieve a state of undetectable rats after an operation.

The other option is to extend the effective baiting period with a product able to withstand several months of weathering yet be available and attractive to rodents but also remain compliant with consents.

The first is problematic with school holidays and the use of cyanide and also does not recognise that rats are undetectable at the end of our operations.

The second is unfettered by public health consent concerns as it is a non controlled VTA and could be placed as the cyanide laden bait is removed thus eliminating any major labour cost increase. Conversely if the bait deteriorated to unpalatable well before the following year's operation it may be wise to remove it in a separate operation.

Benefits

- Potentially 2-3 extra rat free months.
- Potentially 2-3 extra successful nesting's & clutches.
- Potentially better adult survival in winter leading to stronger breeding success fatter chicks going in to winter stronger in next breeding season.
- Likely reduced bait volume delivery and therefore reduced labour cost of next years operation.

Costs

- Potential extra labour round

3.6 Timeline

Date task carried out	Task
16/09/09	Pre assessment rats
27/10/09	Bait lay one
31/10/09	Bait monitor
12/11/09	Bait lay two top-up 53 bait stations
15/12/09	Bait removed
14/12/09	Post monitor rats
03/03/10	Post assessment possums

3.7 Costs

The total cost of the Ngāti Awa Kawenata possum and rat control operation for 2010 was \$9807.42 spread over 116 ha effective treatment. This equates to \$84.48/ ha. This cost includes all control materials, contract labour to deliver and remove bait, and operational monitoring of both possum and rat control effectiveness. No overhead costs are recorded.

Total monitoring cost for possums was \$700.00. Total cost for rodent control was \$540 spent over three monitors or roughly \$4.66 per ha. In future this rodent monitor should include a fourth monitor until we are confident enough to drop it. This monitoring component is absolutely critical to refining and improving this operational plan and must be maintained.

Part 4: Discussion

For single visit bait delivery the maximum bait quantity to be delivered for a successful single feed each operation is $\leq 1.5\text{kg}$ being the full capacity of a large Philproof station. Any quantity less than this brings efficiencies in material cost and reduced labour. We accept that in higher possum densities (initial control or adjacent to untreated areas) there may be greater bait consumption and that this may necessitate a complete or partial top-up of stations to ensure sufficient bait to kill rodents.

In our experience a complete fill and top-up with Pindone and Feratox is only required for initial control operations or adjacent to untreated areas. This method gives good possum control with very little extra effort and cost.

Potential to reduce bait delivery volumes is demonstrated further this year where with low possum density and high rat density, $<0.25\text{ kg}$ of bait was consumed on average at each station.

For sustained control (maintenance) operations we regularly have applied 750 gm/station and always achieve $<5\%$ TI. (During 2008 control season over 2500 ha we tracked two rats on over 410 cards.)

In hindsight and with greater experience we believe 500 gm would have been sufficient to give a good result and have plenty left over at sites separated from untreated areas.

A “good” operation will give about three months of low rodent numbers however the longer the controlled period, the lower the following year’s rodent pre-control densities should be. We have high confidence in our monitoring programme sample size but feel a fourth monitor should be used to show rodent recovery after summer and to help us understand the build up curve.

Good pre-control rodent and possum monitoring data can be used to reduce bait delivery volumes.

Part 5: Conclusions

- Excellent possum and rat control has been achieved with Pindone bait delivered with Feratox for possum control over two years at this site.
- Operational monitoring is being used to back up decisions and tweak the method.
- Outcome monitoring is established but it is too early to measure confirmed effects on vegetation or bird numbers.
- Managers continuously review methods.
- Minimising possum density helps to reduce volumes of pesticide delivered to the environment.
- Managers recognise the need to seek improved cost effectiveness along with improved operational effectiveness.

Recommendations

- The current method is retained and tweaked continuously for improved pest control target effectiveness using a “research by management” approach. Bait volumes are to be reduced and delivered more effectively where possible.
- The possum control target is reduced to 2% to reflect the need to ensure possums have no detectable effect on rodent baits and to negate the imprecise trap catch value of raised set monitoring.
- The rodent monitoring program is strengthened to provide better data on which to make management decisions. (four monitors/annum).

Appendices

Appendix 1 – Ngāti Awa pre assessment rodent data sheet

Rodent tracking tunnel data recording sheet

Site: Ngati Awa
Date and survey number: 16 September 2009 Pre
Date toxins laid:
Date toxins removed:
Name of toxin:
Quantity of toxin:
Number of feeds:
Weather conditions: Fine, mild
Recorder: D Kennedy

Mean rat tracking rate	90.00%	± Std error	10.00%
Mean mouse tracking rate	0.00%	± Std error	0.00%
Mean hedgehog tracking rate	0.00%	± Std error	0.00%
Mean possum tracking rate	5.00%	± Std error	2.24%
Mean insect tracking rate	50.00%	± Std error	8.94%

High rat use	70.00%
High mouse use	0.00%
High insect use	0.00%

No'	Line 1								Line 2								
	Rat	Hgh use	Mo	Hgh use	Hhog	Poss	Insect	Hgh use	No'	Rat	Hgh use	Mo	Hgh use	Hhog	Poss	Insect	Hgh use
1							1		1	1	1				1		
2	1	1					1		2	1	1						
3	1						1		3	1	1						
4							1		4	1	1						
5	1	1							5	1	1					1	
6	1	1					1		6	1	1						
7	1						1		7	1	1					1	
8	1	1							8	1	1					1	
9	1						1		9	1	1						
10	1								10	1	1						
Tot.	8	4	0	0	0	0	7	0	Tot.	10	10	0	0	0	1	3	0
cn=	10								cn=	10							
%	80%	40%	0%	0%	0%	0%	70%	0%	%	100%	100%	0%	0%	0%	10%	30%	0%

Appendix 2 – Ngāti Awa post control rodent data sheet

Rodent tracking tunnel data recording sheet

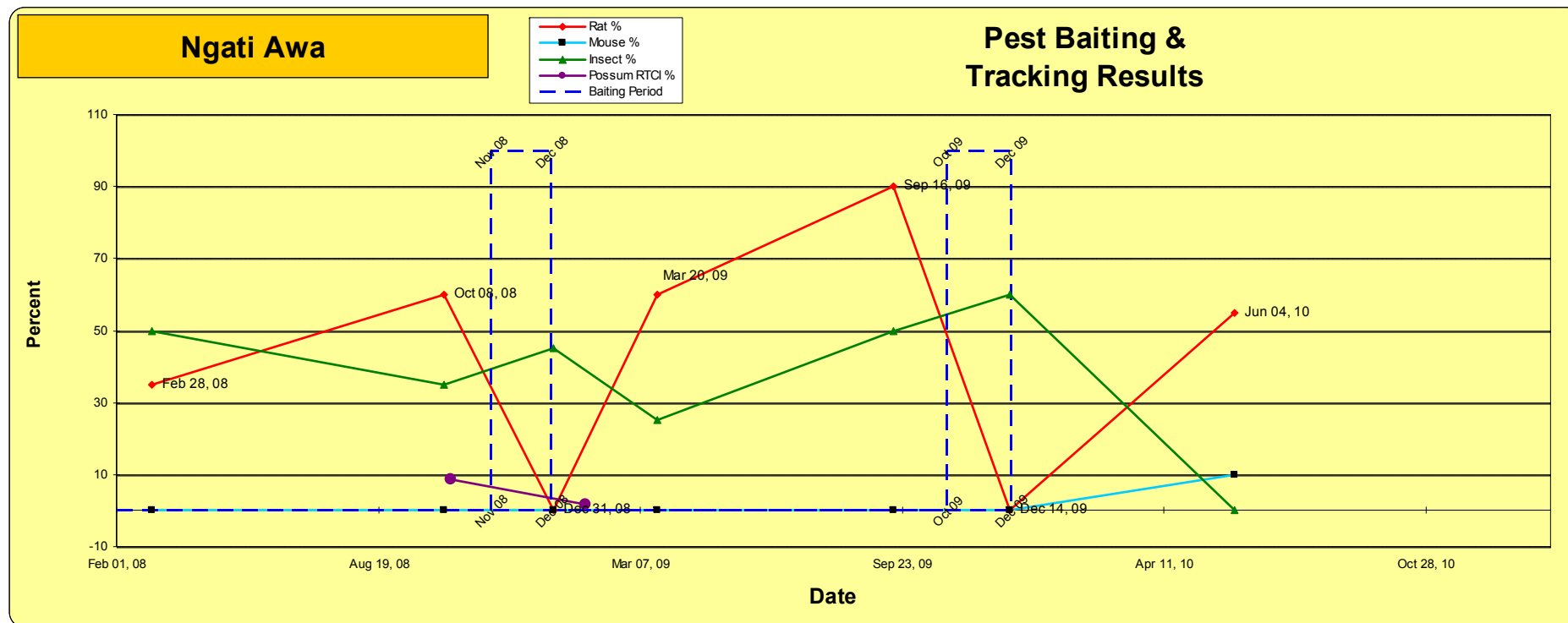
Site: Ngati Awa
Date and survey number: 14 December 2009 Post
Date toxins laid: Tuesday, 27 October 2009
Date toxins removed: Tuesday, 15 December 2009
Name of toxin: Pindone & Feratox
Quantity of toxin: 1.5kg Pindone, 5 Feratox
Number of feeds: 1.5
Weather conditions: Fine mostly, period of rain 4am
Recorder: B Bancroft

Mean rat tracking rate	0.00%	± Std error	0.00%
Mean mouse tracking rate	0.00%	± Std error	0.00%
Mean hedgehog tracking rate	0.00%	± Std error	0.00%
Mean possum tracking rate	0.00%	± Std error	0.00%
Mean insect tracking rate	60.00%	± Std error	4.47%

High rat use	0.00%
High mouse use	0.00%
High insect use	10.00%

Line 1									Line 2									
No'	Rat	Hgh use	Mo	Hgh use	Hhog	Poss	Insect	Hgh use	No'	Rat	Hgh use	Mo	Hgh use	Hhog	Poss	Insect	Hgh use	
1									1								1	
2							1	1	2									
3							1		3								1	
4							1		4								1	
5									5								1	
6							1		6									
7									7								1	
8							1	1	8									
9									9								1	
10									10								1	
Tot.	0	0	0	0	0	0	5	2	Tot.	0	0	0	0	0	0	0	7	0
cn=	10								cn=	10								
%	0%	0%	0%	0%	0%	0%	50%	20%	%	0%	0%	0%	0%	0%	0%	0%	70%	0%

Appendix 3 – Rodent tracking data and graph OSR



Appendix 4 – Bait stations refilled

Ngati Awa - Bait Stations Refilled (750g) 2009																			
Totals	0	0	0	1500	0	750	0	0	0	6000	1500	10500	4500	2250	3750	5250	3750	39750	grams
BS	0	0	0	2	0	1	0	0	0	8	2	14	6	3	5	7	5	53	BS
	K	L	M	N	O	P	PA	Q	R	T	TA	U	V	W	X	Y	Z		
1				1						1	1		1		1			1	
2																			2
3										1	1		1					3	
4												1			1			4	
5												1		1				5	
6												1	1	1				6	
7						1				1		1			1			7	
8										1		1						8	
9										1					1			9	
10				1						1			1					10	
11																	1	11	
12												1					1	12	
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64																		64	

Appendix 5 – Bait removed

Ngāti Awa - Bait Removed from Stations 2009																			
Totals	26150	14250	14100	15800	6550	13650	13500	3600	1100	24000	6800	4300	4400	550	5600	13110	10530	177990	grams
BS	41	10	10	11	5	19	9	4	3	24	5	21	15	9	10	17	14	227	BS
	K	L	M	N	O	P	PA	Q	R	T	TA	U	V	W	X	Y	Z		
1	300	1500	1400	1500	1500	0	1500	1200	750	0	1500	400	0	100	0	0	1450	1	
2	150	750	1500	1500	1400	0	1500	1200	350	0	1200	50	0	50	350	750	600	2	
3	400	1500	1500	1500	1400	350	1500	1200	0	0	1400	250	0	100	750	0	300	3	
4	300	1500	1500	1500	1500	350	1500	0			1200	250	0	0	750	750	0	4	
5	300	1500	1500	1400	750	0	1500			1500	1500	100	0	0	1500	750	0	5	
6	500	1500	1400	1400		0	1500			1500		100	350	150	750	1200	0	6	
7	150	1500	1400	1350		0	1500			1500		400	350	100	0	1400	0	7	
8	900	1500	1200	1400		350	1500			1500		250	350	0	750	1400	30	8	
9	0	1500	1350	1400		750	1500			1500		100	350	50	750	750	1500	9	
10	0	1500	1350	1400		750				1500		200	0		0	750	750	10	
11	900					750				1500		100	0			30	1500	11	
12	500			NF		750				1500		50	750			1200	1500	12	
13	750					1500				1500		250	1500			750	1500	13	
14	900					1500				1500		400	750			1400	1400	14	
15	750					1500				1500		400	0			1200	NF	15	
16						1200				1500		250				750		16	
17						1500				1500		100				30		17	
18						1200				1500		100						18	
19						1200				0		50						19	
20										0		400						20	
21										0		100						21	
22										0								22	
23										1500								23	
24										1500								24	
36	750																	36	
37	300																	37	
38	750																	38	
39	500																	39	
40	500																	40	
41	750																	41	
42	300																	42	
43	NF																	43	
44	500																	44	
45	500																	45	
46	750																	46	
47	400																	47	
48	750																	48	
49	150																	49	
50	150																	50	
51	250																	51	
52	0																	52	
53	0																	53	
54	NF																	54	
55	150																	55	
56	1500																	56	
57	1500																	57	
58	1500																	58	
59	1500																	59	
60	1500																	60	
61	1500																	61	
62	1500																	62	
63	NF																	63	
64	1400																	64	

Ngāti Awa Pindone & Feratox Operation 2009				
Pindone Bait Consumed				
	Date	Bait Stations Filled	Kgs	Totals (kgs)
43	Fill 1	27-Oct-09	227	1.5
44	Fill 2	23-Nov-09	53	0.75
45		Total Pindone put out		380.25
46	Remv	15-Dec-09	Total removed from Bait Stations	
47				177.99
47			Total Consumed	
47				202.26

Feratox Put Out			
	Bait Stations	Feratox/BS	Totals
52	Fill 1	227	5
53	Fill 2	53	3
54		Total Feratox Put Out	
54			1294

Possum Bodies at Bait Station Sites	
	50

Appendix 6 – Possum bodies found

Ngāti Awa - Possum Bodies Found at Bait Stations																			
Totals	0	0	0	5	0	4	2	0	0	7	0	14	5	0	3	4	6	50	Possums
BS	0	0	0	2	0	3	1	0	0	7	0	8	3	0	3	4	4	35	BS
	K	L	M	N	O	P	PA	Q	R	T	TA	U	V	W	X	Y	Z		
1				2		1				1			2				2	1	
2						2						1	1					2	
3							2			1			1		1			3	
4										1			2					4	
5																		5	
6												1				1	1	6	
7						1									1		1	7	
8																		8	
9																		9	
10																		10	
11				3								2			1			11	
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Appendix 7 – Trap-catch monitoring report

Operation name:	Ngāti Awa
Area involved:	93.32 ha
Monitoring method:	NPCA “Protocol for Possum Population Monitoring using the Trap-Catch Method”.
Field operative:	R Wade – Registration nr. 1617 G Knopers – Registration nr. 1324
Timing:	Monitoring carried out on 03/03/10 until 06/03/10
Weather conditions:	Night one - Fine and calm Night two - Fine and calm Night three - Fine and calm
Trap type and set:	Victor No. 1, raised of the ground
Trapping regime:	Lines of ten traps, set for three nights
Number of lines:	2
Line locations:	See attached map
<u>Summary of results:</u>	(Also see line summary sheet)
Weighted Catch Rate:	0.0 % 0.0 % (Approximate 95% confidence interval +/-)
Combined Standard Error:	0.0 %

Discussion

All traps were raised set as there is kiwi-birds present in the area which might have some affect (less catching) on trapping the possums.

Observation

Good numbers of native birds present. All traps were raised set as there is kiwi-birds present in the area which might have some affect (less catching) on trapping the possums.

TRAP-LINE SUMMARY Ngāti Awa January 2009										
Line number	Pre	Post	Maintenance	Trap-nights	Habitat	Stratum	Possums caught	Possum escapes	Non-targets	Sprung/empty
1		*		30		1	-	-	-	-
2		*		30		1	-	-	-	-