Motu Kaikoura Sanctuary rat management programme - progress report (No.3)

Michael Lee Trustee. December 2016.

Summary

The Motu Kaikoura Trust has been undertaking a manual rat control operation (baiting and trapping) on Motu Kaikoura (564 ha) since March 2014, with the objective of managing rat numbers on the island at or below 5% relative index level. Over the past year most bait-only stations have been replaced with 'rat motels' fitted with snap-traps. This has led to the reduction of persistently high rat numbers along the island's difficult-to-access coastal zone. Satisfactory progress overall is reflected in the declining consumption of bait and in the number of rats trapped, (bait-take is presently below 1% and rats trapped 6%) across the island. These data are supported by the results of index monitoring in late November 2016 indicating 3.8% relative density. Simultaneous monitoring of a control line on nearby Great Barrier Island mainland indicated rat levels at 60%.

Fig.1. Note with the exception of the Coastal Line (marked blue), all lines equate with tracks.

Introduction

Motu Kaikoura or Kaikoura Island (36°10’40.48” S, 175°19'28.41"E), lies off Port Fitzroy, Great Barrier Island (Aotea). It was purchased in 2004 by the government (‘the Crown’) after a campaign to secure it in public ownership. The purchase was funded by contributions from the Nature Heritage Fund (NZ Government), the former Auckland Regional Council, former Auckland territorial local authorities and the ASB Community Trust funding (now Foundation North).

The island is a scenic reserve administered by the Motu Kaikoura Trust which was established by the Minister of Conservation in 2004 under section 29 of the Reserves Act (1977). The island was opened to the public by the Prime Minister, the Rt. Hon. Helen Clark in 2005.

The island is of rugged topography with much of the coastline in steep cliffs. The highest point of the island Mt Overlook is 502m asl.

Several-hundred-years of human activities has resulted in the island’s natural values becoming severely degraded. Kaikoura Island was farmed from 1839 up until the late 20th century.

In 2004 when the Motu Kaikoura Trust assumed management, the island was regenerating with manuka and kanuka (*Leptospermum-Kunzea*) dominated successional shrublands linking areas of mature coastal forest and emergent stands of pines located mainly at the southeastern part of the island. However the island was infested with fallow deer (*Dama dama*), with low numbers of feral pigs (*Sus scrofa*), cats (*Felis catus*) and rabbits (*Oryctolagus cuniculus cuniculus*). (Goats (*Capra hircus*) were removed in 1993).

Fallow deer, pigs, cats and rabbits were eradicated in the period up to and including 2008. The removal of deer in particular notably accelerated the process of native forest regeneration. However, like neighbouring Great Barrier Island, Motu Kaikoura was infested with ship rats (*Rattus rattus*) and kiore (*Rattus exulans*). House mouse (*Mus musculus*) have never been detected on the island.

In August 2008, an attempt was made to eradicate rats from the island with two aerial applications of ‘Pestoff 20R’ (brodifacoum based). The operation was at first believed to have been successful but after seven months, ship rats were detected on the island. The adjacent mainland is only 80 metres away at its closest point across the Man of War Passage (Stellin peninsula), easily within the swimming range of ship rats which periodically reach the island from this area (Bagasra 2013). However, the presence of kiore, known to be poor swimmers, confirmed by DNA identification (Fewster *et al.* 2011) gave strong grounds to assume that the aerial operation failed. Kiore are most unlikely to have reached the island unassisted.

After seeking expert advice (not all of it consistent) and undertaking a period of review and analysis the Motu Kaikoura Trust formally resolved to manage the

island as a ‘mainland island’, treating the water barrier as a ‘fence’ and relying on manual methods to control rats on a permanent basis.

This is a key objective of the *Motu Kaikoura Biodiversity Management Plan* (2012):
‘Animal pest control recommendations. Method of control. Target all rodent species (ship rats, kiore) and aim to contain <5% relative abundance (as measured by rodent monitoring…) by establishing a 100 x 100m grid of bait stations.’

To this objective (but also for visitor amenity) a 15 km perimeter track, encircling the island was constructed in 2012/2013. For operational purposes known as ‘East Track’ & ‘West Track’, the new perimeter track formed the back-bone of the rat control network, in addition to the Parihakoakoa (Ridge) and Pahangahou tracks developed by the Trust in 2006, and the cross-island farm road and original rudimentary West Track. Rat ‘motels’ were deployed along the length of the perimeter track at 50m intervals. During this period rat numbers continued to increase at a significant rate (monitored index levels during this period ranged between 60 to 80%).

A plan based on an island-wide network of bait stations to be progressively expanded to form a 100m x 100m grid, with the objective of reducing rodent population levels to 5% relative density was formally approved by the Trust in February 2014. Island-wide baiting (4 x blocks per station) on a fortnightly basis commenced in March 2014, while the network was progressively expanded. The work was carried out by island residents Clint Stannard, with assistance from Robbie Smith and Moana Kake. Given the very high numbers of rats on the island at that time and to avoid time–consuming servicing of traps, in the first eight months bait only, ‘Pestoff’ rodenticide (brodifacoum 20 ppm), was used. In November 2014 with rat numbers reduced to manageable levels, snap-traps were phased-in. See *Motu Kaikoura rat management progress reports* (December 2014 and July 2015).

The island rat control network
The island rat control network as at December 2016 is largely comprised of 403 x ‘rat motels’ (based on the design of Rowley Taylor) fitted in most cases with two snap-traps (mainly ‘T-Rex’ and lesser numbers of ‘Snap-E’), baited with peanut butter, with 4 x poison bait blocks; and 122 x waterproof hoppers (‘Philproof’), with 4 x bait blocks. On one line there are 16 x converted tracking tunnels fitted with snap-traps attached to a plywood base. During the summer season (January to June) stations are re-baited and traps re-set every fortnight. During the winter (June to December) the network is serviced monthly.

Motu Kaikoura trapping and bait station network

Coastal Line	123 motels	492 bait blocks	246 traps
East Track	96 motels	384 bait blocks	153 traps
West Track	62 motels	248 bait blocks	83 traps
Parihakoakoa	26 motels	104 bait blocks	52 traps
	28 Philproofs	112 bait blocks	
Road Line	31 motels	124 bait blocks	60 traps
Badlands	27 Philproofs	108 bait blocks	
Slip-Mt Overlook	10 motels	40 bait blocks	20 traps
	16 Philproofs	64 bait blocks	
	16 tunnels		16 traps
Pahangahou	16 motels	64 bait blocks	16 traps
	10 Philproofs	40 bait blocks	
House Track	12 motels	48 bait blocks	24 traps
Midline Track	12 Philproofs	48 bait blocks	
Airfield Line	12 motels	48 bait blocks	24 traps
Bradshaws	10 Philproofs	40 bait blocks	
Wharf Line	10 motels	40 bait blocks	20 traps
West Link Track	9 Philproofs	36 bait blocks	
Vodafone Track	8 motels	32 bait blocks	16 traps
Fence Line Track	8 motels	32 bait blocks	16 traps
Barn Track	5 Philproofs	20 bait blocks	
End of Airstrip	5 Philproofs	20 bait blocks	
Nelson Island	2 motels	32 bait blocks	

Total number of rat 'motels' **414** (not including Nelson Island)
Total number of Philproof hoppers **122**
Total number of converted tracking tunnels **16**
Total number of stations 554
Total number of bait blocks available (4 per station) **2144**
(Nelson Island 16 blocks per station **32**)
Total number of snap-traps **746**
Total length of formed operational tracks and roads: **29.8 km**
Total length of coastline network**: 16.5 km**

Monitoring network
Tracking tunnels **52** in **5** lines

Off Island
An off-island control area on the nearby mainland (Stellin's Peninsula) comprising of **10** x bait stations, and **10** x tracking tunnels has operated for several years and has provided useful comparative data. This is being withdrawn.
Nelson Island (12 ha), 2 x motels each loaded with 16 bait blocks have been placed near the summit of the island since early December.

Bait rotation
To minimise bait avoidance (and resistance) the Trust has a policy of rotating use of bait on a more or less annual basis. We have used 'Pestoff' (brodificoum 20 ppm), 'Brigand' (brodificoum 50 ppm), and are presently using 'Storm secure' (flocoumafen 50 ppm). In 2017 we will begin trialling French-manufactured 'Generation Soft Bait' (difethialone 45 ppm). The active ingredients of all of the above rodenticides are second-generation anti-coagulants. To prolong freshness, baits in motels are placed in sealed plastic bags.

Network size and coverage
Given the size of the island, its difficult topography and challenging logistics the rat control network, currently 552 stations for 564 ha of habitat does not yet form the ideal 100m x 100m grid. While the network on Motu Kaikoura is one of the biggest in the country, there are still some areas outside the recommended 100m range of stations which still need to be covered.

Results

After nearly 3 years of operations rat numbers on Motu Kaikoura continue to track down – highlighted by the contrast with the situation on mainland Great Barrier Island, as indicated by our mainland Control line. Please note fig.2.

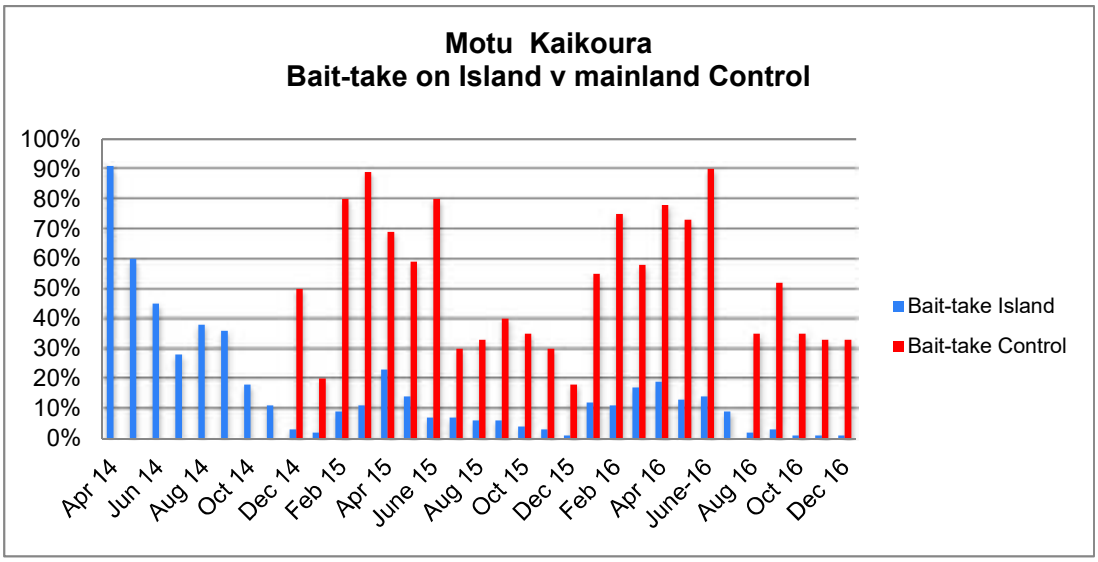

Fig.2.

When manual operations began in early 2014 bait-take was extremely high but steadily declined over subsequent months. This was confirmed by tracking tunnel monitoring in November 2014 (5%). See fig.5.

However bait-take began to increase again in January 2015, as did rats trapped and this increase was confirmed by tracking tunnel monitoring in February (8%). Bait-take then increased sharply as the season advanced with monitoring in April 2015 indicating a 44% index level. This disappointing result led to both a reorganization of network management and spurred a significant expansion of the network.

Monitoring (supported by baiting and trapping data) indicates a clear seasonal pattern to the level of the rat populations both on the island and on the nearby mainland (the latter at about 10 times the island level). See figs. 2 & 5. This late summer 'spike' in rat numbers presumably from residual populations on the island augmented by 'swimmers' was apparent again this year but monitoring in May indicated a peak of 12% compared to 25% at the same time in 2015.

For most of 2016 (late summer and several localised 'hotspots' excluded) rats over extensive areas of the interior of the island have been managed to low levels. Early this year the bait station network was expanded to cover the northern Stanley Point area by extending the Badlands Track by 10 stations.

Despite general progress in reducing rat numbers, rats persisted in high numbers in enclaves around the coast despite intensive baiting since September 2014. See fig.5. Most of these areas are difficult to access except by boat. While periodic invasion from the mainland by 'swimmers' is to be expected, populations of rats living along the island's coastline pose a more immediate threat – and are a prime suspected source for seasonal 'internal invasion'.

To better deal with this problem the Trust agreed to replace all bait stations (hoppers) along the Coastal Line with 'rat motels' to enable trapping as well as poisoning. The Coastal Line is the island's first line of defence; motels because they provide shelter have the additional benefit of being attractive to 'swimmers'.

Thanks to a major volunteer effort led by trustee Rod Miller in June, 150 x plywood motels were constructed and shipped to Motu Kaikoura in two consignments. The difficult logistical effort of installing the new motels along the Coastal Line (and on several other lines) was carried out by island ranger Clint Stannard.

The installation of motels with snap-traps along the Coastal Line in August coincided with a dramatic decline in bait-take: 28% in July to zero in August and subsequently. The total number of rats trapped along the Coastal Line since August when trapping began is 63, an average of 12 per month (i.e. 8% of traps deployed in the Coastal Line). This has declined to 9 rats in December or 4% of traps. See fig.8. Bait-take remains at zero along the Coastal Line. The evident reduction of rat populations in the coastal zone is a significant strategic gain for our programme. See fig.3.

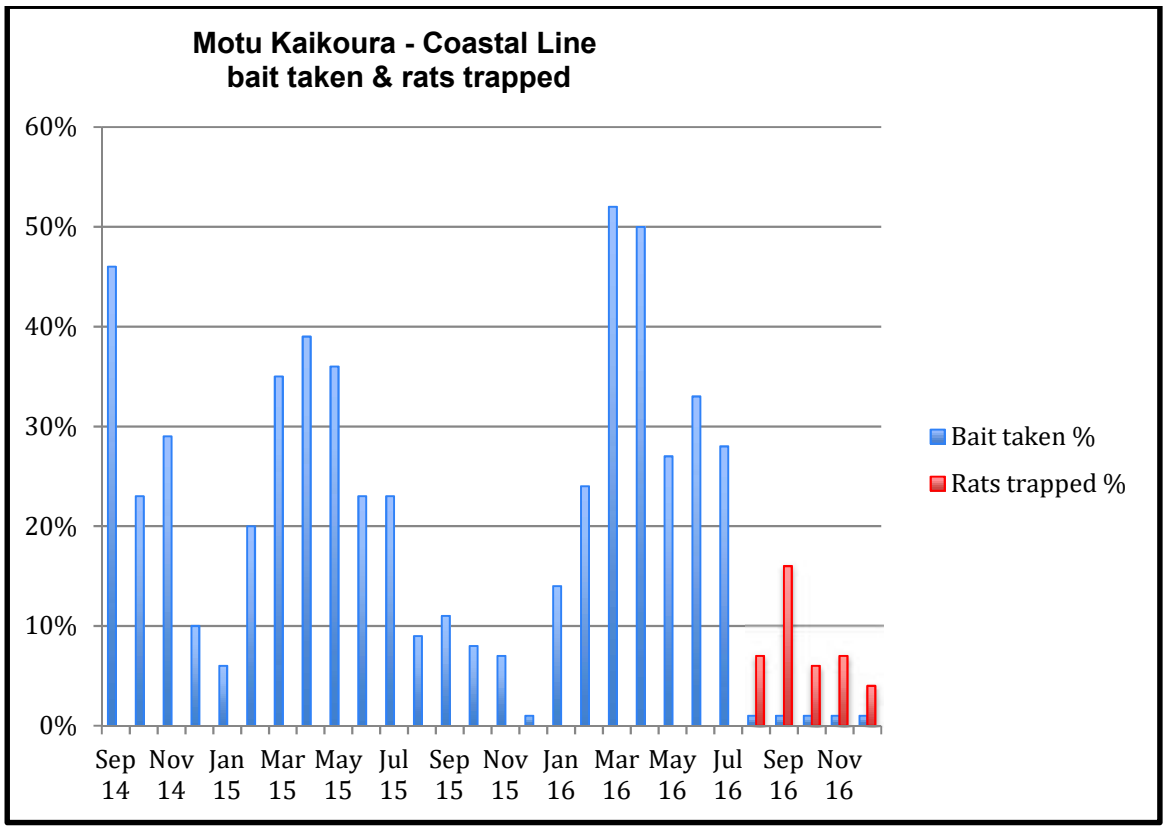

Fig.3.

Elsewhere on the island motels with traps have been deployed on interior lines such as Parihakoakoa (Ridge), Pahangahou and Fenceline.
The number of snap-traps deployed on the island has been increased this year from 390 to 746. Snap-traps are now our most effective means of killing rats and proving to be an effective alternative to bait. See fig.4. In the last 3 months traps have killed 114 rats while during the same period 16 bait blocks were eaten.

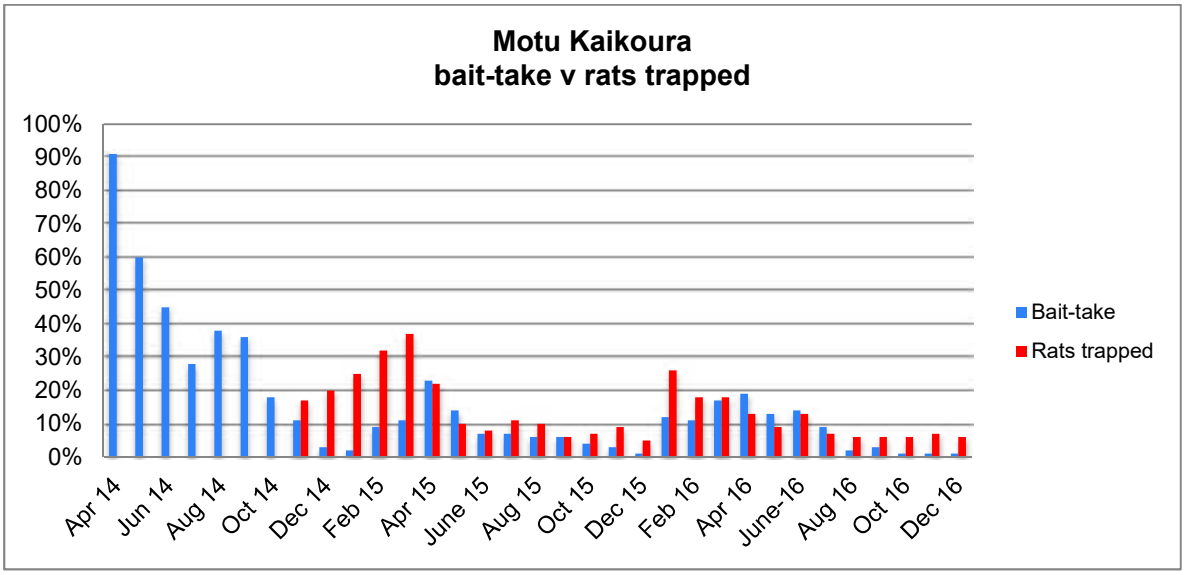

Fig.4.

Also noteworthy is that with the overall reduction of rat numbers there is an apparent increase in the number of kiore relative to ship rats. This was indicated by DNA samples collected in February 2015. This phenomenon is also evident on the neighbouring Glenfern Sanctuary (Scott Sambell pers. comm.) and is suggestive of further research.

Index monitoring results: 2010 – 2016

There are **52** tracking tunnels, grouped in four lines of 10, one line of 12, strategically placed across the island for periodic index monitoring and one control line of 10 stations on the nearby mainland. (Two 'extra' tunnels on the Ridgeline (Parihakoakoa) have been useful for in the past where tunnels on other lines have been missed). Standard one night monitoring procedure is used. The corflute tunnels ('Black Trakka') have an inked tracking card (from same manufacturer) which is baited with peanut butter left overnight and collected the next day.

Monitoring lines on Motu Kaikoura and on nearby Great Barrier

Fig. 5.

Latest monitoring results for Motu Kaikoura

Results from monitoring from 22-23 November 2016 were as follows:

Lodge **(**RM1) **1/10;** Bradshaws (RM2) **0/12;** Mangrove (RM3) **1/10;** Ridge (RM4) **0/10;** Overlook (RM5) **0/10.**

Total <4%.

Control (RM6) **6/10.**

Motu Kaikoura Index Monitoring – 2008 - 2016

	Island		Island	control		Island	control
Dec 2008	5%*	Nov 2014	5%		Feb 2016	12%	80%
Dec 2009	10%*	Feb 2015	8%		May 2016	12%	70%
Dec 2010	16%	Apr 2015	44%	50%	Aug 2016	12%	60%
Feb 2012	28%	May 2015	25%	40%*	Nov 2016	<4%	60%
Dec 2012	43%	July 2015	6%	50%			
Jul 2013	79%	Sep 2015	4%	50%			
Dec 2013	59%	Nov 2015	6%	50%			

Table 1. * estimated

See Fig. 5

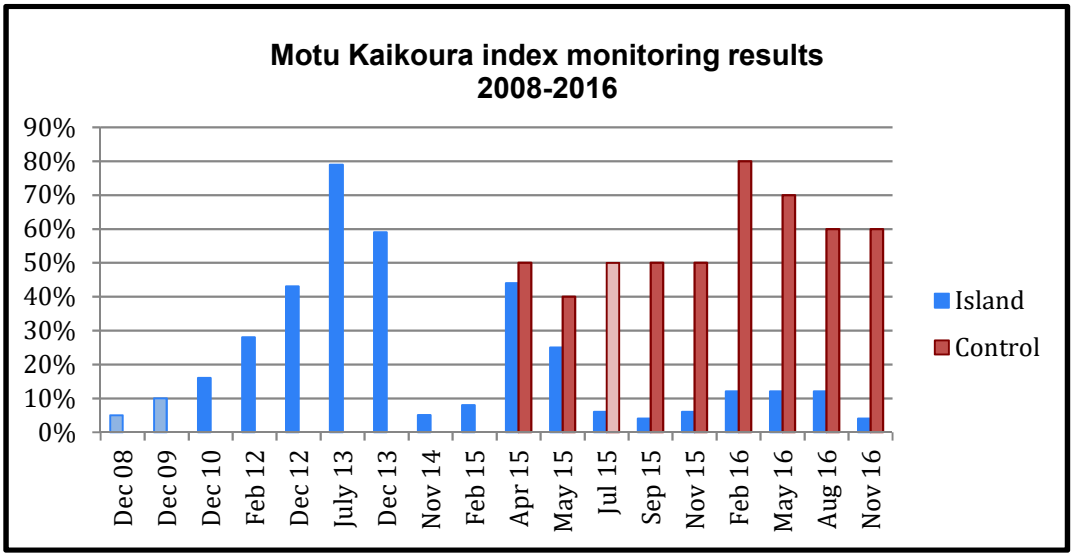

Fig.5. Note. 'Island' Dec 08 & Dec 09 are estimates; as is 'Control' May 15

Summary

The Motukaikoura Trust using manual methods has reduced rat numbers on the island, and since 2014 has kept them at around 5% during the ecologically important spring bird breeding season. Despite rat numbers on Great Barrier Island and northern New Zealand being relatively high all year round, we have detected a distinct pattern of seasonal increase (or 'spike') in rat population levels, beginning in mid-summer and lasting until about June. This is apparent both on Motu Kaikoura and on Great Barrier (as revealed by our mainland control). However on Motu Kaikoura we are encouraged that the spike in rat numbers was lower in 2016 than in 2015. The coastal line of motels has been reinforced opposite the mainland at the Man of War Passage (nearest point, 80m) and now on Nelson Island (second nearest point 100m) by arrangement with the owner, Bryan King. We hope to manage Nelson Island which is heavily infested with ship rats down to zero relative density.

On Motukaikoura 'Habitat repair' due to natural forest regeneration and controlling rats is resulting in improving ecological health, evidenced by increased forest regeneration and diversity of understory. There is greater visibility of small forest birds in particular and noticeably more bird song –

indications of recovering ecological processes. However the island's native biodiversity is beyond the ambit of this report. Native bird numbers and species diversity in particular is subject to a long-term monitoring programme led by trustee Mal Galbraith and will be reported in due course.

With the apparent reduction of rat enclaves along the coast in the second half of this year it is anticipated that the post-summer population increase will be lower again in 2017. If this proves to be the case, the Motu Kaikoura Trust's long-term goal of adaptively managing rats below a 5% index level ('almost eradication') remains a feasible objective. Confirmation of sustainable progress in managing rats on the island will enable the Trust to focus on achieving its wider conservation restorations goals as set in the *Motu Kaikoura Trust Biodiversity Management Plan*.

Acknowledgement and Thanks

I would like to thank Motu Kaikoura Island ranger Clint Stannard for his hard work and dedication in making this operation a success. Assisted by his wife Jacinda, Clint has done a superb job. I would also like to thank resident volunteer Robbie Smith for his contribution to the programme.
Thanks are also due for the ongoing support of Brett Butland and his Biosecurity team at Auckland Council both in terms of providing independent monitoring, advice and material support. Also to the Department of Conservation for its logistic support, especially in regard to transporting material to the island on MV *Hauturu*. Thanks also to Fenton Hazlewood of BASF Auckland and to John Read of ETEC Crop Solutions for donating trial samples of bait.

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