Operational Plan for Eradication of Ship Rats *(Rattus rattus)*, Kiore *(Rattus exulans)*, House Mouse (*Mus musculus*) and Rabbit *(Oryctolagus cuniculus cuniculus*) from Ohinau and Motutapere Islands

Final Report

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1 Background/Rationale

1.1 Scope

This operation involved two phases:

- Two aerial applications of poison bait to target rabbits, mice and kiore on Ohinau and Ship rats on Motutapere Islands during the period 1 July to 30 August 2005.
- Follow-up shooting of rabbits on Ohinau Island if required.

The operational objective was to eradicate all four pest animal species from both islands, as an important part of their ecological restoration.

1.2 Priority/Justification

Motutapere Island (46ha) is designated as a scenic reserve which lies at the entrance to Coromandel Harbour. Ship rats were removed in 1994 and reinvaded again in 2003. Motutapere is the only DoC administered island on the Western Coromandel; this is significant as this is also the only island that the public can visit on a day basis of all the islands on the Western Coromandel. Motutapere is a forest clad island whose recovery since the removal of rodents in 1994 has been substantial. Moehanui Giant Weta was introduced in 1998 but has not been seen since. Motutapere lies some 900m west of Whanganui Island.

Ohinau Island (46ha) is privately owned by local Iwi Ngati Hei and is situated at the entrance to Whitianga harbour. While there is currently no public right of access, the owners are proposing to develop the island as an ecotourism opportunity given its easy topography and safe landing beach. Ohinau Island is a part of the Mercury Islands Ecological District (MIED) and is being managed as such.

Both islands were once connected to the mainland, and have developed a range of biological communities. While these communities exhibit a unique assemblage of species of subtropical and temperate origins, many of which are endemic. They also reflect both the islands' recent origins, and processes of evolution arising from the effects of human activity.

Bird populations and plant communities on both islands have been significantly modified by fire and introduced animals. Many of the rare and vulnerable species of indigenous fauna, formerly present on these islands, are now no longer present but still persist both on tiny, nearby islets and the neighboring Mercury Islands. Up to 16 bird and 11 lizard species have to potential to benefit from these eradications of rats, mice and rabbits from these islands, for most of these the lack of predator free habitat has been the only impediment to survival and removal from the threatened species list. Forest regeneration on Motutapere has benefited greatly from the removal of rats in the 1994; this was slowed greatly with the reinvasion by rats again in 2003 with many species struggling due to predation of seed by rats.

Increased breeding success of flesh footed and allied shearwaters and the return of such species as red crowned kakariki, from the Mercury Islands, are expected to be immediate results of the eradication on Ohinau Island. In the medium to longer term it is hoped that the island will once again become a breeding site for grey faced petrels, pycroft's petrels, white faced storm petrels, diving petrels, fluttering shearwaters and white fronted terns. Where re-colonization does not occur naturally, the Action Plan for Seabird Conservation in New Zealand provides recommendations for management actions that will assist the reintroduction of many of these species.

Removal of mammalian predators from Motutapere and Ohinau was seen as an inexpensive step in achieving major, long term, conservation benefits.

1.3 Description of Operational Area

1.3.1 Location

Ohinau Island lies in the centre of Mercury Bay, and Motutapere Island is approx 5 km west of Coromandel Town.

1.3.2 Area

Both Islands are 46 ha each.

1.3.3 Ownership and Status

Ohinau Island is owned by the Ngati Hei Trust. Motutapere is a Crown owned Scenic Reserve, administered by the department, subject to the Reserves Act 1977.

1.3.4 Occupation and Management

Neither island is staffed or occupied. The Area Manager-Hauraki is responsible for all management on Motutapere.

2 Management Approach

2.1 Project Management

The Coromandel Field Centre Supervisor, later Ranger – Biodiversity Islands (Rob Chappell) was the project manager for the planning and implementation of the operation. The project manager was supported by a project management team, comprising:

Project Manager	Rob Chappell
Operational Support	Jason Roxburgh
Operational/Technical/AEE Support	Andrew Styche

Other staff were co-opted to contribute on specialist matters, particularly, the Kaupapa Atawhai Manager and Technical Support Officers for Fauna and Flora.

The work of the Project Management Team was overseen by the Island Eradications Advisory Group, to ensure that input was sought from the widest possible range of people who had the skills or experience to ensure that the operational planning was of the highest possible quality.

2.2 Operational Team

The planning for the operation, including all permitting requirements, AEEs, Consents, etc, was carried out by Rob Chappell, with assistance from Jason Roxburgh and Andrew Styche. The personnel who implemented this plan on the operation days are listed as follows, with their respective roles noted:

- Rob Chappell — On each island, monitoring bait spread
- Steve Bolton — Helicopter loading and site manager

- Jason Roxburgh Helicopter loading
- Eddie Murphy Helicopter loading

2.3 Timetable of Key Events

This section provides only a brief summary. Detailed specifications and timings are contained in the following sections

Phase	Timing	Task	Responsibility
Planning			
	April 2005	Discuss operation with Skyworks	Rob Chappell
	May 2005	Circulate first draft of operational plan	Mike Ambrose
	May 2005	Circulate first draft of AEE	Rob Chappell
	May 2005	Undertake consultation with interested parties and finalize iwi liaison	Rob Chappell
	May 2005	Apply for Resource Consent	Jason Roxburgh & Rob Chappell
	June 2005	Finalize operational plan and AEE and submit resource consent application	Rob Chappell
	June 2005	Place order for rat bait	Rob Chappell
Pre-operation			
	May 2005	Obtain internal approval/project sign-off	Rob Chappell
	May 2002	Calibrate spreader buckets	Mike Ambrose Simon Mowbray Epro
	July 2005	Road freight bait to Coromandel	ACP
	June 2002	Select loading sites at Coromandel and Opito	Steve Bolton
	July-August 2005	Upon receipt of favourable forecasts proceed with first bait drop followed by, second drop one month later	Team
Operation	August 3rd 2005	Bait drop both islands Hand laid coast and known rabbit sites on Ohinau	Team
	August 12th 2005	Traps checked – nil	Rob Chappell
	August 16th 2005	Traps checked – nil	Rob Chappell
	August 31st 2005	Second bait drop	Team
	September 6th 2005	Traps removed from Motutapere	Rob Chappell
	September 8/9 2005	Traps set on Ohinau and night search for rabbit sign	Rob Chappell + Iwi
	September 13/14 2005	Check traps – night search for rabbit sign	Rob Chappell + Iwi
Post-operation	September 2005	Check with dog for any fresh rodent sign	Rob Chappell & Fin Buchanan
	September 2005	Hold post-operation debrief	Rob Chappell
	September 2005	Publish post-operation report	Rob Chappell
	December 2005	Check islands with dog for rodent sign	Rob Chappell & Fin Buchanan
	July 2006	Check islands with dog for rodent sign	Rob Chappell & Fin Buchanan
	September 2007	Check Islands with dog for rodent sign	Rob Chappell & Fin Buchanan
	September 2007	Make statement about success of operation	Jason Roxburgh

2.4 Contingency Plans

If the operation itself was delayed, due to adverse weather or other unforeseen circumstances, provision was in existence for minor postponements that would allow aerial poison application up until 30 August 2005, with further extension if required from Environment Waikato. Postponement beyond that time would have resulted in the rescheduling of the operation during the following winter.

3 Technical Specifications

3.1 Toxins

The toxin for aerial application against rats was Brodifiocoume ($C_{31}H_{23}O_3Br$) at 20ppm. This concentration has been shown to be successful in similar operations and has been registered for this use.

3.2 Baits

Pest-Off 20R Rodent Bait (a.k.a. Wanganui No.7 pellets), in a 2 gram (10 mm diameter) nominal size, is preferred for use against rats. This bait is produced by Animal Control Products Ltd, of Wanganui, and is registered by the Pesticides Board for use with Brodifacoum. A variety of bait formulations have been previously tested for durability on islands. Baits being placed in mesh cages in a selection of locations and micro-climates and then monitored for decay. Pest-Off 20R was shown to remain palatable to rats longer than other baits. The bait did not contain Bitrix or any other additives.

3.3 Bait Quantity

Bait spread for successful rat eradication, was based on experience from previous operations, was two separate, successive aerial bait applications of 4kg/ha applied in swaths with a 50% overlap. In addition, coastlines were sown with two flights around each island's perimeter, with the sowing bucket directed to deliver bait only to one side. For this operation, the bait order was calculated as follows:

100 ha @ 15 kg/ha (allowing for overlapping) 1500kg

3.4 Bait Quality

The supply of bait was subject to a contract between DOC and Animal Control Products. Specifications in the contract clearly stated the requirements for toxin loading, moisture content, colour, hardness and the maximum allowable levels of fragmentation.

Once the bait arrived in Coromandel, a random sample of ten bags was opened to check bait condition. These bags then properly resealed after the check had been completed. This check was to be repeated, on different random samples, on weekly basis until the bait was dropped. During each bait drop, a 50 gram sample from every tenth bag loaded was collected, labelled and stored for reference should there have been any questions be raised about bait quality at a later stage.

3.5 Bait Packaging and Transport

Rat bait was packaged in 25 kg paper walled bags with breakable, polythene coated liners. For transport from Wanganui to Coromandel, bags were stacked in cling wrapped 1150kg loads on 1.6 x 1.1 metre pallets. These were loaded, single height into a truck for delivery to Coromandel. The transport

of the bait to Coromandel was the responsibility of ACP, who also placed condensation proof sheets over the pallets.

The bait pallets were stored in Coromandel Field Centres Island Biosecurity Store, and transported to the loading sites on the day of the operation. Empty bait bags were returned to Coromandel, and disposed of through the Coromandel Refuse transfer Station.

3.6 Personnel Transport

All personnel travelling to either island travelled in 'MV Kuaka', the Hauraki Area's boat.

3.7 Helicopters

All bait loads were flown from separate mainland sites to each island. Skyworks Helicopters supplied one BA Squirrel helicopter and all associated spreader equipment. This machine flew from Warkworth to the site the day before the operation, and returned the day of the operation

3.8 Bait Spread Equipment

One spare spreader bucket of the same capacity was on standby at the mainland site. The buckets had retractable legs and were calibrated prior to arrival. The calibration used non-toxic bait, produced to the same specifications as that used in the operation. Effective swath width and dispersal rate were measured and the orifices used to give the desired results were clearly marked.

The helicopter used Differential Global Positioning System. The DGPS output was able to be downloaded to disk and printed to any scale. The DGPS system being used required a fixed base station; this equipment was installed and tested on the day before each bait drop. The Tokatea trig offered the best potential for line of sight DGPS signal to wherever helicopters were operating. The DGPS base station was driven to the Tokatea Summit, and set up by Skyworks staff.

3.9 Weather Forecasting

A forecast of four days (three nights) without significant rainfall (less than 6mm) was preferred for each drop day. NZ Met Service was engaged to supply forecasts specific to the area.

3.10 Bait Loading

Due to the relatively small quantity of bait involved, each bucket was loaded by hand

In order to minimise the number of staff required to work under the helicopters, and to reduce the effects of rotor wash on empty bait sacks, bait particles and dust, the helicopter landed and had power down while the bait was loaded

Bait loading personnel worked in a team of three. There was only one loading area at each site. The Project Manager advised as who was in each loading team, and appointed a supervisor.

3.11 Helicopter Refueling

Helicopter refuelling was carried out at each mainland base site, and was the responsibility of Skyworks.

3.12 Aerial Bait Spread

Bait was spread once a suitable weather forecast had been received and all necessary personnel and equipment were in place. Two separate aerial applications of bait were carried out.

The bait was applied by one Squirrel helicopter with an under slung spreader bucket. For the first application the bucket calibrations and air speeds were matched to give a nominal spread rate of 4 kg of bait per hectare. Flight lines were spaced to give a 50% overlap between bait spread swaths and the coastline was flown separately to guard against gaps at the end of the parallel flight lines. The drop start was as early in the day as possible to ensure that there was time to finish spreading, check DGPS print outs and re-fly any gaps before dark. If, for any reason this, or any other, bait application had not been completed in one day, the untreated area would have been flown as soon as possible on the following day.

Weather forecasts were consulted before deciding on a day for the second application of bait which was four weeks after the first drop day. The second application was at the same rate and overlap.

4 Operation Quarantine

Both islands continue to be treated as they have been to date, under the Waikato Conservancy Island Biosecurity Plan.

4.1 Bulk Bait

The possibility of cling wrapped pallets of poison bait harboring rodents, without exposing them to lethal doses of toxin, was remote but was still guarded against. Coromandel Island Biosecurity Store has rodent contingency measures in place to ensure rodents are not present in the area the bait was stored.

4.2 Helicopter Fuel

Jet A1 for the helicopter was transported to the mainland sites by Skyworks ground crew.

4.3 Spreader Buckets, Bucket Loading Systems and other Miscellaneous Equipment

Spreader Buckets, Bucket Loading Systems and other Miscellaneous Equipment were transported to the mainland sites by Skyworks ground crew.

4.4 Personal Equipment

Prior to going to either island, operational personnel were put through the procedures in the Waikato Conservancy Island Biosecurity Plan.

4.5 Dogs

The dog handler had the responsibility for ensuring that his animal was fully vaccinated and free from disease prior to going to both islands. The dog was thoroughly groomed whilst in transit to the Island and its fur, paws and travelling boxes checked for traces of dirt and seeds, prior to being unloaded.

5 Communication

5.1 Helicopter to Mainland sites

For voice communications the DOC VHF radio system interfaced with the VHF system in the helicopter. This could have been used in Simplex mode if required. Mobile phones were also available.

5.2 Official Progress Reporting

The Project Manager provided verbal notification to the Area Manager-Hauraki upon making the decision to proceed with aerial bait spread and provided a further report at the conclusion of each bait spread day. During standby periods (waiting for bait application days) the Project Manager maintained, at least twice weekly, contact with the Programme Manager-Biodiversity Assets in Thames.

6 Monitoring

6.1 Pre-operation Monitoring

A range of vegetation, reptile, and seabird monitoring was established on both islands by DoC staff and various non-DOC parties, including as a part of RASP (Rats and Seabirds Project), a long term study by Dr. Ian Atkinson on the impacts of kiore and their eradication on island ecosystems, Joanne Hoare, a PhD student from Canterbury University, using Ohinau as part of her thesis on the impacts of rodent eradication on reptiles and Bob Cooper surveying the invertebrate recovery for Ngati Hei.

6.2 Monitoring of Target Species

Tracking tunnels and bait stations were monitored, as part of the Island Biosecurity Procedure, on both islands. An in-house rodent dog was used on both islands at six and twelve months post-op to detect the presence of any live rodents. The plan was to hunt the remaining rabbits post-op, should any presence remain.

6.3 Monitoring of Non-target Species

Apart from the longer term monitoring referred to in 4.1, there is no specific monitoring for the effects of the operation on non-target species.

Experience gained from monitoring previous island eradications suggests while there will be some impact on the species present by the actual operation, the long term effects at a population level will be positive.

7 Legal/Internal Requirements

7.1 DOC Consents

7.1.1 Waikato Conservation Board

The maintenance of Motutapere's pest free status is a stated objective of the Waikato Conservation Management Strategy, a document that has been approved by the Waikato Conservation Board. The Board was given pre and post operation briefings.

7.1.2 Area Manager and Conservator

The eradication work plan for this project was signed off by the Area Manager-Hauraki, and was included in the Conservancy business plan, which has been signed off by the Waikato Conservator. Funding for the Ohinau part of the operation was from the Biodiversity Condition Fund.

In addition, all contracts for bait supply and aerial work were approved and signed by the Area Manager-Hauraki.

7.1.3 Regional General Manager

Approval to use brodifacoum was been granted by the RGM Northern.

7.2 Pesticide Regulations

The Department of Conservation is authorised to use Brodifacoum in cereal pellet bait for rodent eradication by aerial sowing on un-stocked islands.

Thames-Coromandel District Council provided written support for the operations, and a resource Consent was granted by the Waikato Regional Council.

7.3 Resource Management Act 1991

A Resource Consent was required for the discharge of contaminants to land and water. This Consent was granted by the Waikato Regional Council

7.4 Medical Officer of Health

The Vertebrate Pest Control Regulations provide that Medical Officer of Health approval was not required for the application of Pestoff 20R. However, the Waikato Medical Officer of Health was notified of the operation.

8 Consultation/Notification

8.1 Public

Ohinau Island is private land, and the public are not allowed access to the island. Motutapere is a Scenic Reserve, used in low volume by boaties, kayakers, and Forest and Bird (who have provided written support for the operation). Signage was erected on all access beaches on both islands informing any visitors that the operation was underway. Information about the operation was shared with Forest and Bird and other local interest groups.

A public notice, advising of the commencement of the operation, was placed in the Hauraki Herald, Coastal News, and Mercury Bay Beacon during the week prior to 25 July 2005. An appropriate media item was released during the operation for media organisations to follow up on, as they saw fit.

8.2 Signage

Warning signs were posted to inform any visitors of the operations, per the relevant SOP

8.3 Iwi

Ngati Maru, Ngati Tamatera, and Patukirikiri claim mana whenua over the group of islands including Motutapere. Ngati Hei has mana whenua, and is the legal owners, of Ohinau. All four provided written approval for the operation.

9 Safety

A separate safety plan was prepared.

10 Risk Management

A comprehensive risk profile was prepared.

11. Project Notes

Following a favorable weather forecast, the first bait drop occurred on August 3rd, this was completed late on the same morning. This was followed, the same day by the hand laying of bait on Ohinau at known rabbit sites. Snap traps were set on both islands baited with peanut butter and were checked on the days of the 12th and 16th of August with a nil capture result.

As one of the targets on Ohinau had been mice *Mus musculus* (which are regarded as being significantly more difficult to eradicate) a second bait drop was scheduled for one month after the first. This occurred on August 31st and the traps reset on Motutapere Island. On September 6th these traps were checked and removed following a nil result.

On September 8th /9th snap traps were reset on Ohinau and checked again and removed on September 14th with a nil result. The island was intensely searched on the nights of 8th and 13th for sign of rabbits and mice. No sign was found. A rodent dog has since been used for one day on each island in September and December 2005, July 2006 and September 2007 with a nil result.

The islands were declared predator free in September 2007.

12. Conclusion

No visual or other sign of either rodents or rabbits have been seen since the first operation was carried out on August 3rd 2005. All indications are that both islands are now predator free. It is possible that the mice were removed as a result of the first operation, the second was still recommended to ensure success. Rabbits will succumb to Pestoff Rodent pellets (Bill Simmons ACP pers.comm.), the option of placing small stacks of bait on obvious rabbit sites may well have contributed to the success of this section of the operation. Current and ongoing monitoring will continue using a rodent dog and tracking tunnels and will be in line with the monitoring currently carried out on those other protected islands in the area that the department is responsible for.

My thanks goes to all those involved in the discussion, planning and implementation of this project that has led to its success.

Rob Chappell

Ranger Biodiversity
For Area Manager Hauraki.