



## Motu Kaikōura rat management programme progress report - December 2025

Michael Lee & Clint Stannard

### Summary

The Motu Kaikōura Trust has been undertaking a manual rat control operation (baiting and trapping) on Motu Kaikōura (564 ha) since March 2014 using an approximate 100m x 100m grid, with the objective of managing rodent numbers at or below 5% index level and thence by adaptive management to zero density.



Fig.1

Two species of rodents were recorded on Motu Kaikōura when the operation began, ship rat (*Rattus rattus*), at very high levels, and Pacific rat or kiore (*Rattus exulans*) which were barely detectable. As the result of sustained ground-based control from 2014 to 2020 ship rats were effectively eliminated from the island. After the removal of ship rats, the kiore population previously rapidly increased.

In late 2024, concluding that the existing network was inadequate to attrite kiore in the way it had ship rats, the Trust resolved to intensify it, to first of all to achieve a 100m by 50m grid and then progressively reduce that to 50m x 50m. Over the past year the network has been intensified and expanded with the addition of 11 new lines and 324 stations, an increase of in stations of 45%. The momentum of this work will be maintained over the coming year.

## Introduction

Motu Kaikōura or Kaikoura Island (36°10' S, 175°19' E), situated in a large embayment on the western coast of Aotea / Great Barrier helps form Port FitzRoy harbour. It was purchased in 2004 by the N.Z. Government after a campaign to secure the island in public ownership. Its purchase was funded by contributions from the Nature Heritage Fund, the former Auckland Regional Council, former Auckland territorial local authorities and the ASB Community Trust (now Foundation North).

The island is a scenic reserve administered by the Motu Kaikoura Trust, established in 2004 and appointed under section 29 of the Reserves Act (1977) as the Administering Body of the reserve. This was opened to the public by the Prime Minister, Helen Clark in May 2005. The Motu Kaikoura Trust administers the island under the terms of a Heads of Agreement with the Minister of Conservation signed in 2008. A management plan, the Motu Kaikoura Scenic Reserve Management Plan became operative in 2020.

Geologically, the island is comprised of volcanic andesite and breccia, part of the eroded remnants of an andesite stratovolcano of Miocene age (Hayward 2023). The island's topography is rugged with much of the coastline, especially on the northern side in steep cliffs. The highest point of the island Mitre Peak is 184m asl. Several-hundred-years of anthropogenic impacts, repeated burn-offs and pastoral farming resulted in the island's natural values becoming severely degraded. In parts of the island even the topsoil has been eroded away. The island's natural ecological processes therefore have long since been disrupted or destroyed.

In 2005 when the Motu Kaikoura Trust assumed management, the island was essentially an abandoned farm in the early stages of regeneration. Reverting pasture / manuka and kanuka shrubland linked pockets of mature coastal broadleaf forest of taraire, kohekohe, and puriri in several valleys, with some stands of exotic pines (maritime and radiata) mainly in the southeast. At that time the forest understory was heavily browsed by fallow deer (*Dama dama*), feral pigs (*Sus scrofa*), and rabbits (*Oryctolagus cuniculus cuniculus*). Goats (*Capra hircus*) had previously been removed in 1993. Like neighbouring Great Barrier Island, Motu Kaikōura was also infested with feral cats (*Felis catus*) and rats.

Fallow deer, pigs, feral cats and rabbits were progressively eradicated by the Trust in the period up to and including 2008. The removal of deer mainly by shooting, notably accelerated the process of forest regeneration.

In August 2008 an attempt was made to eradicate rats from the island with two aerial applications of 'Pestoff 20R' (brodifacoum based) (Ritchie 2008). Unfortunately, seven months later, both rat species *R. rattus* and *R. exulans* were detected on the island. The adjacent mainland at its closest point, the Stellin peninsula (Bunker Point) separated by the 80m wide Man of War Passage, is well within the swimming range of ship rats, which are known to reach the island from this location (Hamilton 2011; Bagasra *et al.* 2016). However the presence of kiore, known to be weak swimmers, as well as ship rats, identified by DNA testing to be from the island's original ship rat population (Fewster *et al.* 2011), provided conclusive evidence the aerial operation failed. A similar operation undertaken the following

year on neighbouring Glenfern Sanctuary evidently also failed to eradicate kiore. This would suggest that two applications of bait are insufficient for aerial operations with multiple rodent species present, especially in warm temperate northern New Zealand.

In the wake of the failure of the aerial operation, after seeking expert advice (not all of it consistent) and undertaking a period of review and analysis, the Motu Kaikoura Trust resolved to manage the island as a 'mainland island', treating the water barrier as a 'fence' and relying on ground-based methods to control rats on a permanent basis. This honours a key condition of the Heads of Agreement between the Minister of Conservation and the Motu Kaikoura Trust:

- 3 (e) *keep and maintain the Reserve free of litter and work towards the eradication of all plants and animals (including the eradication of fallow deer, pigs and rats) identified in the operative Auckland Regional Pest Management Strategy and the Biosecurity Act 1993;*

This is reflected in 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.*

This objective has also been included as a policy in the Motu Kaikoura Scenic Reserve Management Plan (2020):

**C.4.6 Policies for Animal Pest Management and Control:** *The Trust will work towards the eradication of rodents from Motu Kaikoura with an initial goal of achieving  $\leq 5\%$  relative abundance density and monitor progress by having an independent rat tracking monitor undertaken and reported on the outcomes every two years.*

In 2012/13 with the objective of facilitating rodent management and also for public amenity, a 15.6 km perimeter track encircling the island was constructed. For operational purposes, the perimeter track known as 'East Track' & 'West Track', forms the main framework of our rat control network.

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% was approved by the Trust in February 2014. Island-wide baiting using 4 blocks of brodifacoum based rodenticide ('Pestoff' 30 grams, 20 ppm and 'Brigand' 21 grams, 50 ppm) per station on a fortnightly basis, commenced in March 2014, as the network was progressively expanded.

At the start of the manual operation in 2014, rat numbers were recorded at irruptive levels with initial bait-take at over 90% (see fig.4). Monitored index levels during this period peaked at nearly 80% - in winter! (see fig.6 & table 2). However, within seven months rat numbers declined to the stage where it was feasible to introduce snap-traps into the system. Ship rats were the overwhelmingly predominant species detected in traps. Servicing was reduced from fortnightly to monthly. Bait placement was reduced to 2 blocks per station early in 2018 while stations were progressively added to reach an approximate 100m x 100m grid,

## Motu Kaikōura rat control network

The Motu Kaikōura rat control network is operated by island ranger Clint Stannard (contracted as 'Island Care'). Bait stations and traps are normally serviced monthly. In 2024 for the first time since beginning the programme operations were paused in July and August mainly to undertake extensive track maintenance. This year the winter pause extended from July to September with the freed up time dedicated to cutting eleven new lines as part of the Trust's intensification goals.

Progress is monitored by monthly reporting of the numbers of bait taken and rats trapped, (except as noted during the winter pause) and by Index monitoring which takes place four times per year.

The programme has been overseen since its inception by trustee Mike Lee who reports to fellow trustees.

### State of the network

The island rat control network at December 2025 comprises, 1039 stations, in 34 lines, made up variously of 627 'Philproof' bait hoppers (2 bait blocks), 366 motels, (2 traps and 2 bait blocks), and 239 covered single trap units, the latter usually ganged with bait hoppers. This includes the experimental 'Intensified Management Area' of 239 stations.

As indicated in our last annual report (December 2024), this year the Trust began the first steps to significantly intensify the network. There are three components to the 2025 work programme.

- Intensify the existing track lines to 50m linear spacings.
- Reconfigure the experimental Intensified Management Area to a 50m x 50m grid.
- Initiate the first stage of island-wide intensification outlined in the Trust plan *Motu Kaikōura - Zero rats in 1000 days*.

### Intensification of existing network

The full perimeter track (East Track & West Track) was intensified with an extra 144 Philproof bait hoppers, placed every 50 metres between the existing 100m spaced rat motels, thereby creating a 15.6 km long 100m x 50m intensified zone encircling the island, comprising 300 ha. 500 old traps have been replaced with new traps.

### Intensified Management Area (IMA)

In 2021 a pilot intensified grid, totally 4 km in length, covering 30ha, comprising mostly newly-cut tracks with segments of older refurbished tracks was opened, specifically aimed at experimentally reducing kiore.

It is located in the Settlement Valley area, the island's logistical centre including the Lodge, accommodation and utility sheds and wharf, on the island's southern side. The IMA initially comprised 191 stations (motels, Philproof hoppers and covered trap units) armed with 234 traps and 450 baits.



Fig.2 The Intensified Management Area

Originally laid out in a 100m x 50m grid it became operational in January 2021, Early in 2022 it was further intensified by adding 52 more stations without cutting new tracks, thereby increasing the number of stations to 243, forming an unconventional 100m x 25m grid. Over the first weeks of 2025, two more lines were cut to enable grid reconfiguration to 50m x 50m spacing. This became fully operational in April. This work was funded by a grant from Auckland Council Natural Environment Delivery.

### Area One

In late 2024 the Trust resolved to work towards total eradication of kiore. Ranger Clint Stannard produced this concept plan illustrating the stages.



Fig 3 The concept plan for 'Motu Kaikōura - Zero rats in 1000 days' (graphic Clint Stannard).

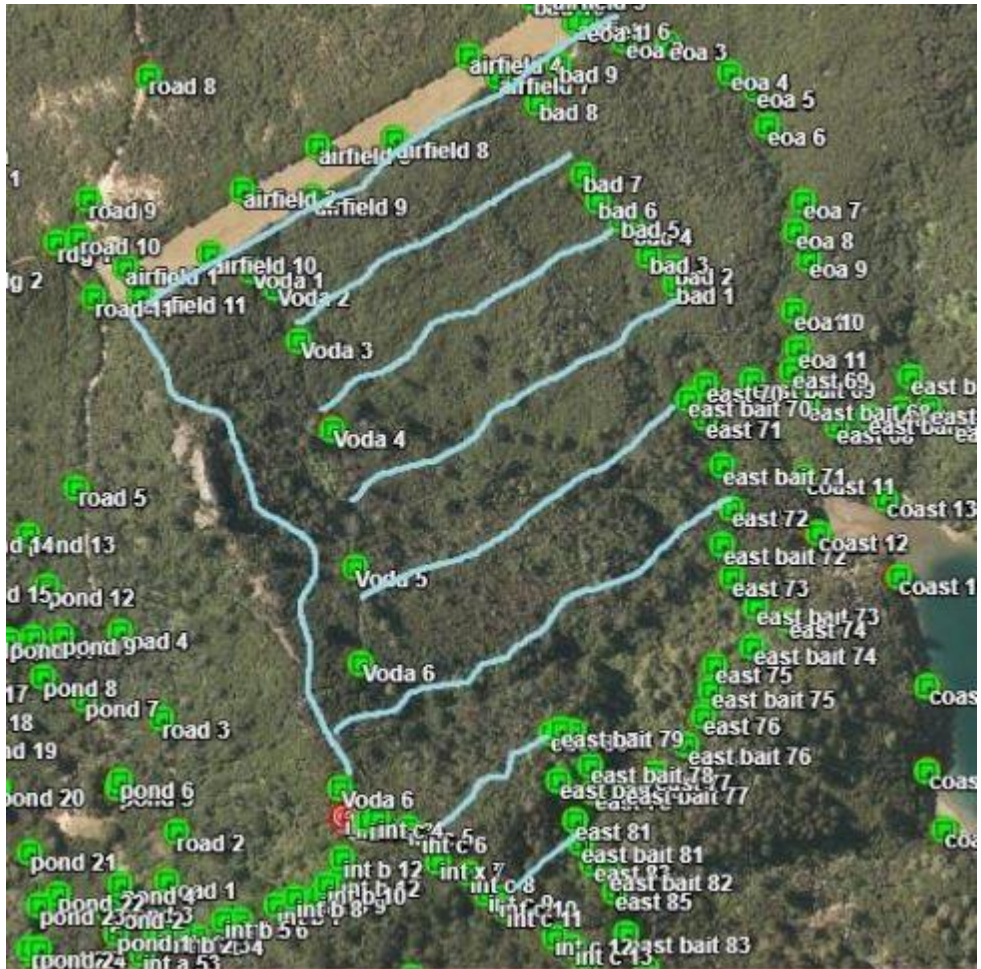


Fig 4 Area One is a 100m x 50m grid of newly cut tracks with 133 bait stations covering nearly 67 ha (Trap NZ).

**Off Island Protective Zone**

There are 10 bait stations which form the off-island protective zone on the Great Barrier mainland and on Nelson Island. This is made up of:

**Stellin Peninsula** (80m from Motu Kaikōura)  
 Located on the nearest part of the Great Barrier mainland, Bunker Point (Stellin Peninsula) across the Man of War Passage. It comprises 8 x bait stations, each loaded with 4 bait blocks. This is designed to reduce numbers of potential invading ship rats. These and the 10 x tracking tunnels deployed 750 metres to the south of Bunker Point line (see Fig.5 RM6) also provide a statistical control providing useful comparative data.

**Nelson Island** (130m to the west of Motu Kaikōura)  
 Nelson Island (12 ha) is managed by the Trust by agreement with the owner Bryan King. Difficult to land on and steep-sided, the Trust maintains 2 x motels located just above the intertidal, each loaded with 16 bait blocks which are serviced on a monthly basis. The island is 330m from Motu Hāku where ship rats are also present. It is likely the ship rats on Nelson are periodically reinforced by swimmers from Motu Hāku.

## Motu Kaikōura trap and bait station inventory - January to December 2025

	stations	philproofs	motels	trap units	bait blocks	traps
Coastline	72	0	72	0	144	144
East	167	84	83	0	334	166
West	122	60	62	0	244	124
Overlook	54	27	27	0	108	54
Ridge	51	25	26	0	102	52
Road	17	0	17	0	34	34
Badlands	54	27	0	27	54	27
House/Pond	30	12	11	7	46	29
<b>IMA</b>	<b>239</b>	<b>196</b>	<b>43</b>	<b>148</b>	<b>478</b>	<b>234</b>
Area 1	133	133	0	0	266	0
Midline	24	12	0	12	24	12
Airstrip	12	0	12	0	24	24
Bradshaws	10	10	0	10	20	10
Pohutukawa	20	20	0	20	40	20
Vodafone	5		5	4	10	14
Fence	8	0	8	0	16	16
End Airstrip	11	11	0	11	22	11
Gecko area	10	10	0	0	20	0
<b>Island Total</b>	<b>1039</b>	<b>627</b>	<b>366</b>	<b>239</b>	<b>1986</b>	<b>971</b>
Nelson Is.	2	0	0	2	32	2
Stellin Pen.	8	3	5	0	32	0
<b>Grand Total</b>	<b>1049</b>	<b>630</b>	<b>341</b>	<b>241</b>	<b>2050</b>	<b>973</b>

Table 1.

### Motu Kaikōura Index monitoring system

There are 50 x footprint tracking tunnels, grouped in five lines of 10, with one control line of 10 stations on the nearby mainland. This monitoring network was installed by Auckland Council Biosecurity officers in late 2010 (Mitchell 2010) and has not been altered since, except for the addition of a control line on nearby Great Barrier installed in April 2015 (see Fig.5). The plastic tunnels have an inked tracking card which is baited with peanut butter, left overnight, then collected the next day. (Brown *et al.* 1996). Standard 1 x night footprint tracking monitoring is undertaken every quarter.

## Monitoring Lines on Motu Kaikōura and on nearby Great Barrier Island



Fig. 5 Monitoring lines each comprised of 10 tracking tunnels (RM1to 5) on island, (RM6) is mainland control

### **Bait rotation**

The Trust has a policy of rotating use of bait. For the last two years we have been using 'Double-Tap' which is the first non 2<sup>nd</sup> generation anti-coagulant bait that we have found to be effective – rats readily consume it. There are two active ingredients to 'Double Tap' as the name suggests: diphacinone and cholecalciferol. It is sold by Connovation Ltd. 'Double Tap' was recommended to us by Brett Butland of Predator-Free NZ Ltd.

### **Motu Kaikōura Track system**

Total length of formed operational tracks and roads: Approx **37.5 km**

Perimeter track **15.6 km**

Total length of coastline network: **16.8 km**

Over the past year to facilitate the efficiency of rat management, with the additional benefit of improving the quality of access for recreational walkers, major tracks have been comprehensively upgraded and the balance of the tracks given basic maintenance. Track maintenance is a major part of our ranger work programme.

## Results

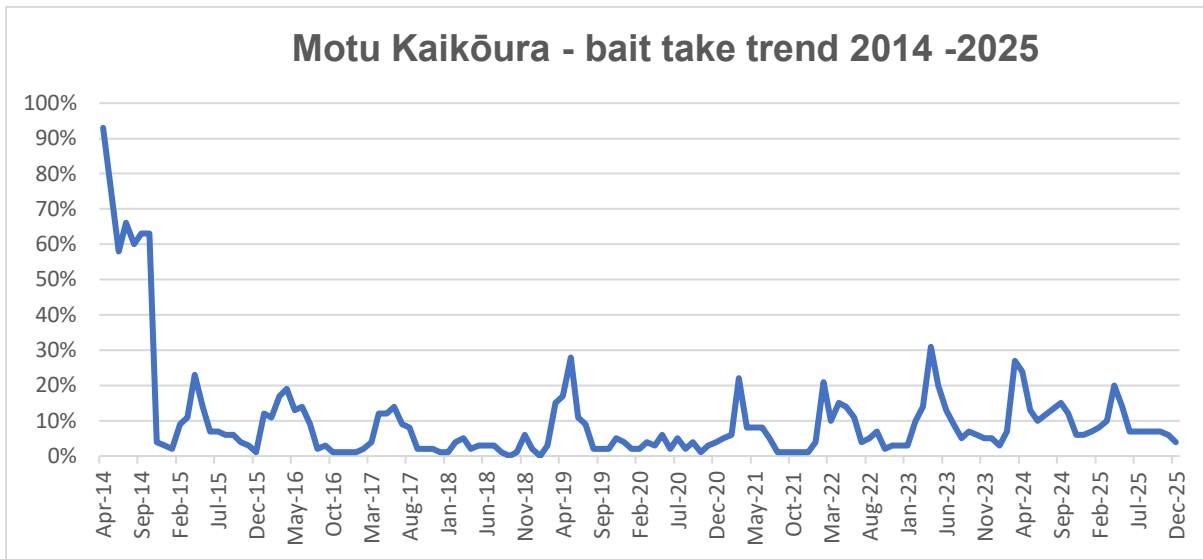


Fig. 6. Bait take trend beginning in April 2014 when rats were at irruptive levels. Spikes indicate peaks in rat numbers after the summer breeding season. Previously dominant ship rats were selectively removed by the 100m x 100m station grid until in 2019 numbers of ship rats became so low previously subordinate kiore began to rapidly increase.

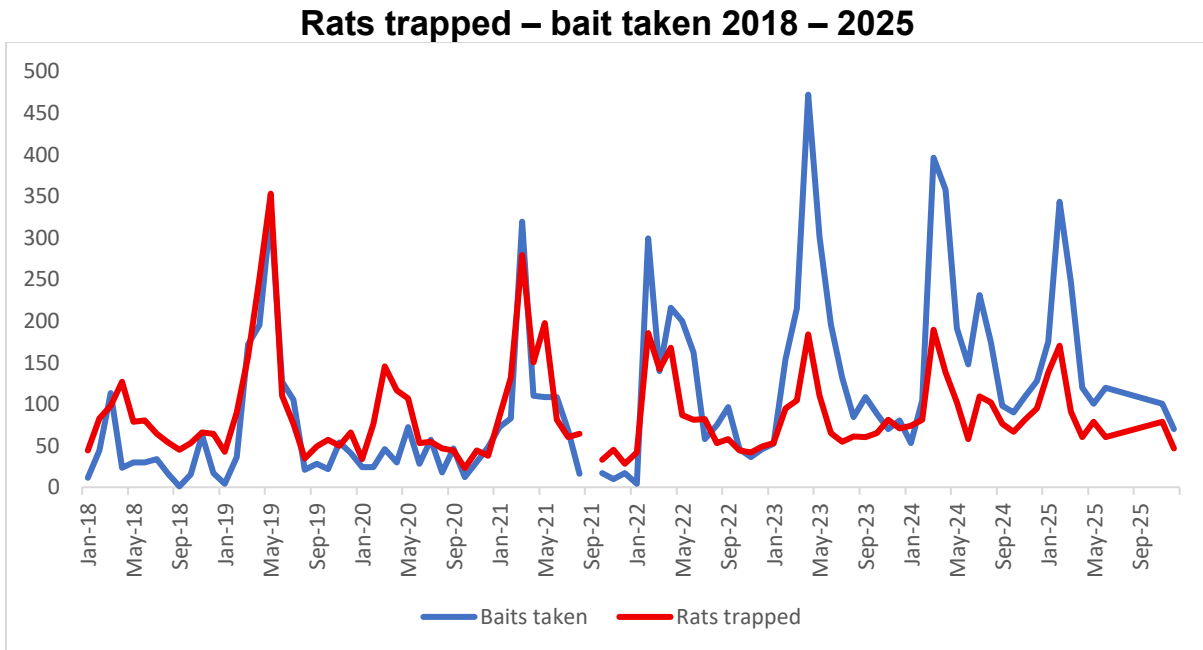


Fig.7. Trapping and baiting show a trend of declining numbers of rats trapped & comparatively more bait take, with a peak in 2023 though both trending down, another indicator the attrition process has recommenced. Note. We estimate rat mortality from bait ingestion at 50% of the bait consumption rate.

## Summary of results

### January to December 2025

Number of rats trapped **822** (971 traps). 24 carcasses identified as ship rats (3%). Number of bait blocks consumed **1423** (1755 available at the start of year, 1974 by the end).

Estimated number of rats poisoned **c711**<sup>1</sup>.

Total number of rats killed in 2025: **c1533**.

Percentage of rats killed by traps **54%**, by bait **46%**.

Quarterly monitoring index average **8.5%**. Mainland control **42.5%**

### Summary of results from previous years:

#### January to December 2024

Number of rats trapped **996** (971 traps). **18** carcasses identified as ship rats (1.8%).

Number of bait blocks consumed **1843** (1464 available monthly).

Estimated number of rats poisoned **c 911**.

Total number of rats killed in 2024: **c1928**.

Percentage of rats killed by traps **52%**, by bait **48%**.

Quarterly monitoring index average **11%**. Mainland control **35%**.

#### January to December 2023

Number of rats trapped **1004** (971 traps). **21** carcasses identified as ship rats (2%).

Number of bait blocks consumed **1952** (1464 available monthly).

Estimated number of rats poisoned **976**.

Total number of rats killed in 2023: **c1980**.

Percentage of rats killed by traps **50%**, by bait **49%**

Quarterly monitoring average **10%**. Mainland control **60%**.

#### January to December 2022

Number of rats trapped **1033** (1043 traps). **32** carcasses identified as ship rats (3%).

Number of bait blocks consumed **1378** (1464 available monthly).

Estimated number of rats poisoned **689**.

Total number of rats killed in 2022: **c1722**.

Percentage of rats killed by traps **60%**, by bait **40%**.

Quarterly monitoring average **4.5%**. Mainland control **20%**.

#### January to December 2021

Number of rats trapped **1154** (1043 traps). **6** carcasses identified as ship rats (0.005%).

Number of bait blocks consumed **928** (1450 available).

Estimated number of rats poisoned **464**.

Total number of rats killed in 2021: **c1618**.

Percentage of rats killed by traps **71%**, by bait **29%**.

Quarterly monitoring average **5%**. Mainland control **30%**

#### January to December 2020

Number of rats trapped: **800** (959 traps). **7** carcasses identified as ship rats. (0.008%).

Number of bait blocks consumed: **437** (1192 available)

Estimated number of rats poisoned **391**.

Total number of rats killed in 2020: **c1018**.

Percentage of rats killed by traps **67%**, by bait **32%**.

Quarterly monitoring average **6%**. Mainland control **17.5%**

---

<sup>1</sup> a conservative estimate – baits taken divided by 2.

### January to December 2019

Number of rats trapped: **1337** (959 traps). **10** carcasses identified as ship rats (0.7%).

Number of bait blocks consumed: **1135** (1152 available).

Estimated number of rats poisoned **567**.

Total number of rats killed in 2019: **c1702**.

Percentage of rats killed by traps **70%**, by bait **30%**.

### Monitoring results 2010 -2025

Table of Index monitoring results 2010 – 2025

	island	control		island	control		island	control
Dec-10	16%*	-	Aug-17	2%	-	Feb-22	8%	10%
Feb-12	28%		Nov-17	2%	-	May-22	8%	10%
Dec-12	43%		Feb-18	10%	20%	Aug-22	2%	40%
Jul-13	79%		May-18	10%	80%	Nov-22	0%	20%
Dec-13	59%		Aug-18	8%	70%	Feb-23	16%	80%
Nov-14	5%		Nov-18	8%	60%	May-23	10%	60%
Feb-15	8%		Feb-19	10%	70%	Aug-23	6%	60%
Apr-15	44%*	50%	May-19	10%	60%	Nov-23	8%	40%
May-15	25% **	40%	Aug-19	6%	50%	Feb-24	16%	30%
July-15	6%	50%	Nov-19	4%	0%	May-24	8%	20%
Sep-15	4%	50%	Feb-20	10%	0%	Aug-24	18%	50%
Nov-15	6%	50%	May-20	6%	40%	Nov-24	4%	40%
Feb-16	12%	80%	Aug-20	8%	30%	Feb-25	16%	50%
May-16	12%	70%	Nov-20	0%	0%	May-25	8%	60%
Aug-16	12%	60%	Feb-21	8%	0%	Aug-25	6%	40%
Nov-16	4%	60%	May-21	8%	40%	Nov-25	4%	20%
Feb-17	12%	-	Aug-21	2%	50%			
May-17	12%	-	Nov-21	2%	30%			

Table 2.

N.B. Manual operation commenced April 2014.

\* Mitchell *et al.* 2015. \*\* Sambell *et al.* 2015.

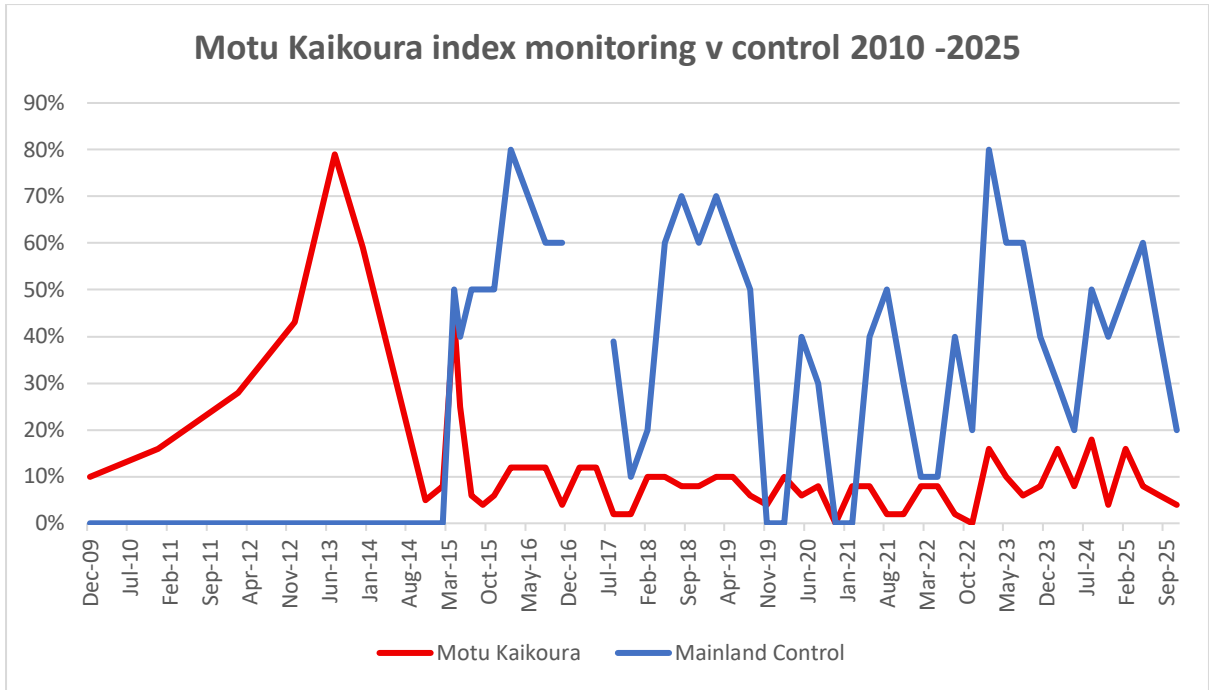


Fig.8 Index monitoring on Motu Kaikōura compared to the mainland (Great Barrier) control site. This indicates rat numbers on Motu Kaikōura generally to approaching an order of magnitude below that of Great Barrier.

**Intensified management area (IMA)**

The 30ha intensified grid covers just 5% of the island but given its inherent limitations i.e. relatively small size and vulnerability to incursion, has been effective at reaching those kiore previously unaffected by the island-wide 100m x 100m grid. The IMA was at first configured at 100m x 50m, then in 2022 100m x 25m. This year two new lines were cut in February enabling the grid to reconfigured to 50m x 50m.

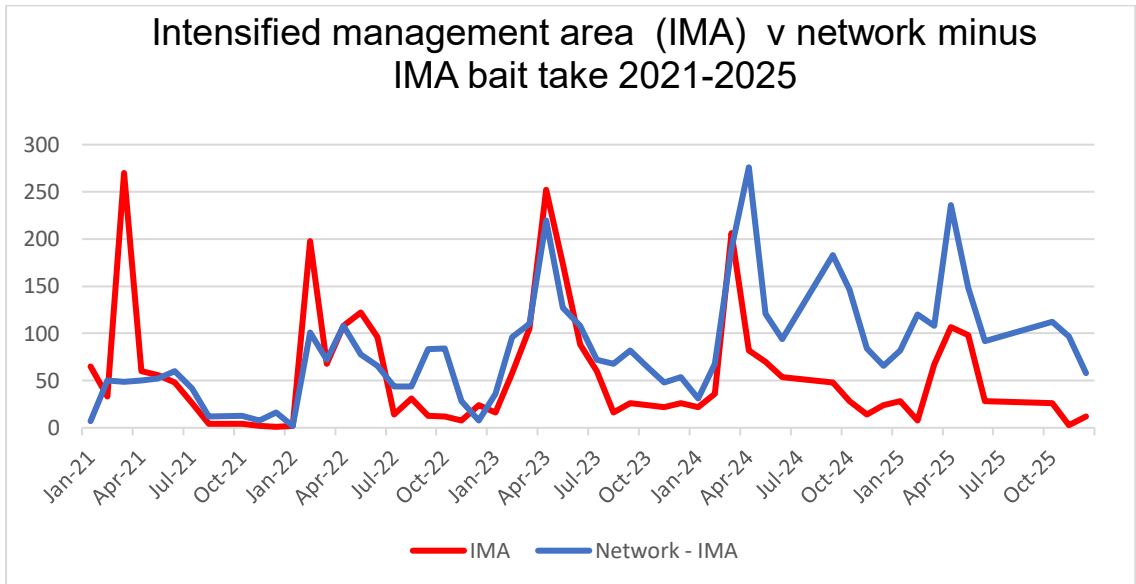


Fig 9. Attrition effect measured by bait take in the experimental Intensified Management Area grid compared to the balance of the network. Note late summer peaks. The initial bait take in the IMA exceeded that of the rest of the network in 2021, 2022 & 2023.

Of the 1423 baits taken across the 564 ha island in 2025, 377 (26%) were taken from the 30 ha IMA, down from 584 (32%) in 2024, 867 (44%) in 2023, 696 (51%) in 2022 569 (61%) in 2021.

Of the 822 rats trapped on the island in 2025, 70 were caught in the IMA (8.5%), down from 198 (18%) in 2024, 145 (15%) in 2023, 241 (23% ) in 2022, and 334 (29%) in 2021, when we began the experiment.

## Discussion

Manual rat control operation on Motu Kaikōura has been underway for eleven years. Ship rats which were the most numerous and dominant species, as the result of six years of steady attrition were effectively removed from the island's ecosystem in 2020.

Individual ship rats still swim to the island, from the nearby Great Barrier mainland and presumably from Motu Hāku and Nelson islands – almost all trapped in late summer. The status of ship rats on Motu Kaikōura is therefore best described as 'near eradication' (Innes & Saunders 2011). The number of trapped ship rat carcasses identified this year was 24 out of a total of 822 i.e. 3% compared with 18 out of 996 in 2024 (1.8%), 21 out of 1004 (3%) in 2023, and 34 out of 1022 in 2022 (3%). This is in line with the results of the last live-trapping exercise by Thomas Bodey (unpubl.) early in 2019. Out of the 34 rats caught, Bodey found 1 x ship rat (3%) and 33 x kiore (97%).

Live-trapping exercises at southern Great Barrier Island undertaken by Bodey in the same period indicated ship rats at 96% and kiore at 4% – almost the exact reverse of that found on Motu Kaikōura. These Great Barrier figures align with the normal population ratios and species relationship: ship rats (dominant) and kiore (subordinate) on northern New Zealand islands, for instance, Rakitu in 2016. See also Russell & Clout 2004; Harper 2006; and more broadly on tropical islands where the two rat species coexist (Russell *et al* 2015).

Such ship rat dominance was the previous situation on Motu Kaikōura as reported by Fewster *et al.* (2011), and Bagasra *et al.* (2016). However, ship rats can be expected to attempt to re-establish as long as there are ship rats on the Great Barrier mainland. That being said, our experience confirms we have the infrastructure in place to prevent ship rats re-establishing – as long of course as the present operation is maintained.

The steady long-term decline of the island's overall 'rodent' population, evident since we began the operation in 2014, ended with a sharp increase in numbers in the late summer of 2023. This co-related with notably prolonged heavy rain, likely to have resulted in an abundance of wild food (see Bunn & Craig 1989). However, as a similar spike occurred in 2024 we therefore conclude those spikes to be a direct result of our unplanned facilitation of the replacement of ship rats by kiore (to our knowledge unprecedented in this country - or anywhere to our knowledge). In contrast 'over-invasion' of kiore by ship rats has been common since the arrival of European ships in the Pacific Ocean. (Russell *et al.* 2015). The removal of dominant ship rats looks to have triggered a phenomenon ecologists call 'meso-predator release.'

While the successful 'near eradication' of ship rats can only be beneficial for the island's environment, evidenced by the recent sightings of previously unrecorded lizard species, there can be no doubt that the presence of kiore is an impediment to ecosystem recovery. Moreover kiore due to their smaller foraging range, have proven to be less affected by the bait/station network that proved to be effective in eliminating ship rats. While ship rats are

known to out compete and directly prey on kiore, as Harper & Bunbury (2015) noted: “When predators and competitors are absent, Pacific rats appear to reach higher densities than their conspecifics, possibly related to their smaller size.’ See also (Atkinson & Moller in King 1990; Moller & Craig 1987; Bunn & Craig 1994; Bramley 2014; Harper & Bunbury 2015).

Therefore kiore have attempted to fill the void left by ship rats. While the full expression of this has been blocked by our previous network, the outcome, in terms of our strategy of steady attrition, was stalemate. When this became clear the Trust decided to re-intensify the network.

The Intensified Management Area (IMA) experiment has confirmed assumptions that given the smaller foraging range of this species more intensively designed control grid (ideally 50m) across the island would be needed to collapse their numbers in the same way achieved with ship rats. (See Atkinson 1990; Harper 2006).

Given the limited swimming range of kiore it would be theoretically possible to eradicate this species from the island. Such a 50m grid based on what the NZ Wildlife service and DOC successfully employed to remove rats from islands (albeit much smaller islands e.g. Korapuki) in the Mercury group (Towns 2023), would entail approximately four times the numbers of traps and bait stations as deployed up to 2024; a major logistic and financial challenge especially given the Trust’s limited resources.

The Trust as noted decided on a two-step process; first expanding the 100m x 50m grid across the island and thence by adaptive management employing available technologies, to a 50m x 50m grid. Over the past year thanks to the work of ranger Clint Stannard significant progress has been achieved. A spatially accurate 100m x 50m grid, would require 1128 bait stations, we now have 1039 stations in place an increase of 45% from 2024.



Fig 10. The first ever confirmed sighting of a Chevron skink (*Oligosoma homalonotum*) on 16 October 2025 by Xyra Stannard. The chevron skink is one of New Zealand’s rarest lizards (photo Clint Stannard).

A positive indication of progress in terms of habitat repair and ecosystem restoration was the discovery recently of the nationally vulnerable chevron skink– the first ever confirmed sighting on Motu Kaikōura.

What the Motu Kaikōura Trust has achieved in the last ten years suggests that long-term attrition by manual means, even on an island of this size, given time and sufficient resources, is a viable strategy. The year's results suggest the kiore stalemate has been broken and the process of steady attrition has restarted. Over the coming year the momentum will be maintained.

### **Acknowledgements and thanks**

The Motu Kaikoura Trust would like to acknowledge the dedicated work of scenic reserve ranger Clint Stannard (Island Care). We also record our thanks to DOC, Foundation North, Lottery Grants Board and the Auckland Council Natural Environment Delivery team, especially Jonathan Miles and Jeremy Warden for vital support for funding our rat and ecosystem management work, and to the Aotea Great Barrier Local Board for funding in support of the island's essential infrastructure. Thanks also for the support of DOC Aotea Great Barrier Operational Manager Fletcher Beazley who is also chair of the Ngāti Rehua/Ngāti Wai ki Aotea Trust Board. Thanks also to Cat Boyse & Rueben Goh of Auckland Council Bio Information, to our neighbours Sven & Trish Stellin of Port FitzRoy, Aotea for their support for our programme and to Bryan King of Motu Hāku. Finally our thanks to the Motu Kaikoura Trust Board members for their unstinting support this operation and its transformational objectives.

## References

- Atkinson, I.A.E., Moller, H. 1990. Kiore. In King, C.M. (ed.) *The Handbook of New Zealand Mammals*, pp 175-192. Oxford University Press. Auckland,
- Bagasra, A., Nathan H.W., Mitchell, M.S. & Russell, J.C. 2016. Tracking invasive rat movements with a systemic biomarker. *New Zealand Journal of Ecology* (2016) 40(2): 267-272.
- Bramley, G.N. 2014. Home ranges and interactions of kiore (*Rattus exulans*) and Norway rats (*R. norvegicus*) on Kapiti Island. *New Zealand Journal of Ecology*. 38:2. 328-334.
- Brown, K.P., Moller, H., Innes, J. & Alterio, N. 1996. Calibration of tunnel tracking rate to estimate relative abundance of ship rats (*Rattus rats*) and mice (*Mus Musculus*) in a New Zealand forest. *New Zealand Journal of Ecology*, Vol.20. No.2.
- Bunn, T.J. & Craig, J.L. 1989. Population cycles of *Rattus exulans*: Population changes, diet, and food availability, *New Zealand Journal of Zoology*, 16:3, 409-418, DOI: [10.1080/03014223.1989.10422907](https://doi.org/10.1080/03014223.1989.10422907)
- Fewster, R.M., S.D. Miller & Ritchie, J. 2011. DNA profiling - a management tool for rat eradication. Pp 426-431 In: Veitch, C. R. Clout, M.N. & Towns, D.R. (eds.) *Island invasives: eradication and management*. IUCN, Gland & Auckland.
- Hamilton, O. 2011. *Distribution and density of ship rat (Rattus rattus) on Motu Kaikoura, Hauraki Gulf, following reinvasion after eradication*. University of Auckland, School of Biological Sciences (unpublished report).
- Harper, G. 2006. Habitat use by three rat species on an island without other mammalian predators *NZ Journal of Ecology*. 30 (3) 321-333.
- Harper G. & Bunbury N. 2015. Invasive rats on tropical islands: their population biology and impacts on native species. *Global Ecology and Conservation*. 3: 607-627.
- Hayward, B. W. 2023. Geology of Motu Kaikoura, Aotea/Great Barrier. *Geocene*, 33:14-17.
- Innes, J & Saunders, A. 2011. Eradicating multiple pests: an overview. Pp 177-181 in: Veitch, C.R; Clout, M.N. & Towns D.R. (eds.) 2011. *Island invasives: eradication and management* IUCN, Gland & Auckland.
- Lee, M. & Stannard, C. 2023. *Motu Kaikoura rat management programme – Progress Report*.
- Mitchell, M. 2010. *Report on Motu Kaikoura rat monitoring*. Auckland Council. Unpublished report to Motu Kaikoura Trust.
- Mitchell, M. Warden, J. Shields, B. 2015. *Motu Kaikoura Rodent Monitor April 2015*. Unpublished report to Motu Kaikoura Trust.

Moller, H. & Craig, J.L. 1987. The population ecology of *Rattus exulans* on Tiritiri Matangi Island, and a model of comparative population dynamics in New Zealand. *New Zealand Journal of Zoology*, 14: 3, 305-328.

Motu Kaikoura Trust. 2012. *Motu Kaikoura Biodiversity Management Plan*, Motu Kaikoura Trust, Auckland.

Motu Kaikoura Trust. 2020. *Motu Kaikoura Scenic Reserve Management Plan*. Motu Kaikoura Trust, Auckland.

Ritchie, J. 2008. *Kaikoura Island Eradication Plan*. Natural Logic Environmental Management. Unpublished report to Motu Kaikoura Trust.

Russell J.C. & Clout, M. 2004. Modelling the distribution and interaction of introduced rodents on New Zealand offshore islands. *Global Ecology and Biogeography*, **13**, 497–507.

Russell, J.C., Caut, S., Anderson, S.H. & Lee, M. 2015. Invasive rat interactions and over-invasion on a coral atoll *Biological Conservation* 185 59–65.

Towns, D. 2023. *Ahuahu – a conservation journey in Aotearoa New Zealand*. Canterbury University Press. Christchurch.