

# **MAMMALIAN CORRECTIONS UNIT Ltd.**



**Assessing Possum Trap Avoidance  
to Improve Pest Suppression at  
Hikaroroa / Mt. Watkin  
Progress Report on 2026 AT220 Trial**

# Assessing Possum Trap Avoidance to Improve Pest Suppression at Hikaroroa / Mt. Watkin

## Progress Report on 2026 AT220 Trial



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*Produced through DOC-CF24 Funding*

*by*

*Mammalian Corrections Unit Ltd. and Rising Cloud Conservation*

*for*

*The Hikaroroa / Mt. Watkin Conservation Project*

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### ***Table of Contents:***

|                                       |           |
|---------------------------------------|-----------|
| <b>Executive Summary</b>              | <b>1</b>  |
| <b>Background</b>                     | <b>2</b>  |
| <b>The Current Trial</b>              | <b>3</b>  |
| Trial Rationale                       | 3         |
| Primary Research Questions            | 4         |
| Secondary Research Questions          | 4         |
| Food vs. Social Attractants           | 5         |
| Potential for Feral Cat Suppression   | 5         |
| Methods                               | 6         |
| Baseline Behavioral Camera Monitoring | 6         |
| Experimental Luring Methods           | 8         |
| <b>Preliminary Results</b>            | <b>12</b> |
| <b>Conclusion and Timeline</b>        | <b>13</b> |
| <b>Acknowledgements</b>               | <b>15</b> |
| <b>References</b>                     | <b>16</b> |

## Executive Summary

The landscape-scale AT220 possum control network at Hikaroroa / Mt. Watkin is designed to maintain low possum densities through continuous trapping suppression rather than periodic knockdown operations. After three years of continuous trapping and more than 1,500 recorded possum captures, there is a possibility that behavioural resistance to the traps may be emerging within the surviving possum population. Previous research at other sites has demonstrated that fixed trapping networks can become less effective over time as trap-shy individuals accumulate and lure novelty diminishes.

To investigate this possibility, HMWCG has partnered with Manaaki Whenua – Landcare Research (now the Bioeconomy Science Institute, BSI) to undertake behavioural monitoring of possum interactions with AT220 traps and to trial several luring methods designed to reduce trap avoidance. This study, which is ongoing, is also exploring whether modifications to lure formulations could increase interactions by feral cats, with a view to future development of automated multi-species suppression tools.

Baseline behavioral monitoring was conducted from November 2025 - February 2026 using trail cameras deployed at 30 semi-randomly selected AT220 sites across the project area. Analysis of 209,071 images from these cameras identified 373 independent possum encounters and 29 possum captures. Possum activity was unevenly distributed across the network, with approximately one-third of monitored sites recording either zero or a single possum encounter. These findings are consistent with previous monitoring indicating that possum abundance remains low across most of the project area.

Although some trap avoidance behaviours were observed, behavioural resistance within the Hikaroroa network was less common than has been reported from some other long-established AT220 sites. Possum captures recorded by BSI at trap networks at Omaui and Bluff were much lower than at Hikaroroa, despite similar numbers of possum encounters with traps.

The baseline behavioral monitoring also documented frequent feral cat activity at AT220 sites, with cats particularly attracted to rodent carcasses in the traps. These observations have prompted an ongoing investigation into alternative lure formulations that might increase cat interactions with AT220 traps while maintaining possum capture rates. This lure trial is comparing four treatment groups: Oreo pre-feeding, Oreo pre-feeding combined with visual and auditory ‘social’ lures, salmon oil mayonnaise lure, and standard AT220 mayonnaise lure. The trial aims to determine whether enhanced pre-feeding can increase possum and cat capture rates, reduce trap avoidance, and potentially reduce the need for periodic toxin knockdown operations in the future.

The lure trial is ongoing, but results to date support continued investigation into automated pre-feeding technologies and alternative lures as potential mechanisms for maintaining low-density possum populations while reducing long-term operational costs and reliance on secondary control methods.

## Background

Possum control within the Hikaroroa / Mt. Watkin Conservation Project area was established through a collaborative programme involving the Hikaroroa / Mt. Watkin Conservation Group (HMWCG), Predator Free Dunedin (PFD), Dunedin City Council (DCC), and Otago Regional Council (ORC). The programme was initiated following the successful approval of an ORC EcoFund application in 2023 and was developed as a long-term, community-led succession strategy following the completion of OSPRI's tuberculosis control operations across the project area.

After the discovery of a TB infected deer in the area in 2020, possum populations around Hikaroroa were managed through OSPRI operations that used a combination of leghold trapping and Feratox (encapsulated cyanide) baiting. While highly effective at reducing possum numbers in the short term, these operations were resource intensive and allowed population recovery after the OSPRI operations ended in 2024. The establishment of a permanent AT220 network in 2023 aims to transition toward a more sustainable long-term management model capable of maintaining low possum densities through continuous control pressure.

The AT220 control programme, which is based on the methodology developed by Predator Free Dunedin for its urban-rural expansion buffer, consists of a network of AT220 self-resetting traps deployed across both reserve and private land. Trap placement follows a topographically informed ~500x500m grid design intended to provide broad coverage of possum habitat while maximising operational efficiency. Self-resetting traps provide continuous control pressure between servicing visits and are particularly well-suited to large-scale suppression programmes where maintaining constant trap availability is desirable.

The network was installed in 2023 and has now operated continuously for approximately three years. During this period, traps have been serviced at six-monthly intervals, with lure replenishment, battery replacement, and maintenance undertaken according to Predator Free Dunedin operational protocols. All servicing activities, trap locations, and captures have been recorded through Trap.NZ.

To date, the network has successfully removed more than 1500 possums and contributed to substantial reductions in possum detectability across the project area. However, while self-resetting trapping networks are effective at maintaining suppression in the short term, research on other trap networks suggests their effectiveness may decline over time if surviving animals become increasingly cautious / trap avoidant and the novelty of lures wears off.

# The Current Trial

The present study is being undertaken to assess the possibility that trap avoidance may be emerging within the Hikaroroa possum population and to investigate whether modifications to lure presentation, pre-feeding regimes, and social attractants could improve trap performance. In addition, observations of feral cats regularly scavenging at AT220 traps has prompted investigation into whether alternative lure formulations could increase cat interactions with the devices, potentially informing future development of automated multi-species suppression tools. Both aspects of the study have been designed to evaluate opportunities for increasing the long-term effectiveness of lean fixed trapping networks as a tool for sustained landscape-scale predator suppression.

## ***Trial Rationale***

Recent research by Manaaki Whenua in North Canterbury has demonstrated that fixed trapping networks can become less effective over time as trap-shy and trap-resistant individuals accumulate within the surviving population and the novelty of trap devices diminishes (Johnstone et al. 2024). This work informed the original ORC EcoFund application that established the Hikaroroa AT220 possum control network and supported the adoption of a multi-method management strategy combining continuous trapping with periodic toxin knockdown operations.

Three years have now passed since the AT220 network was installed and the final OSPRI leghold and Feratox operations were completed. During this period, the offspring of control-resistant survivor possums will have been recruited into the breeding population. In addition, there will have been ongoing reinvasion of possums from surrounding unmanaged habitats. The current possum population therefore comprises a mix of control-resistant survivors and new possums with higher trappability.

This trial reported here form part of a wider BSI research programme investigating methods for targeting individuals resistant to conventional control techniques. In earlier trials using captive possums and ship rats, the BSI researchers examined the behavioural reward value of different attractants, including a range of substances traditionally considered highly addictive, such as nicotine, dexamphetamine, and other pharmacological compounds. That study (currently unpublished) found that a high-fat, high-sugar food (specifically, Oreo cookies) elicited stronger behavioural responses than the other compounds tested, highlighting the exceptional attractiveness of sweet, fatty foods to possums.

A follow-up BSI field trial demonstrated that 16 of 17 possums (94%) of possums recorded on cameras within a small bush remnant in South Canterbury were successfully captured using a standard AT220 trap when an Oreo pre-feeding regime was employed (the final possum was captured by swapping to a different trap design).

Pre-feeding has long been recognised as an important component of toxin-based pest control and leg-hold trapping operations, where it is routinely used to increase bait uptake and reduce neophobia. However, the value of pre-feeding as a mechanism for improving the efficacy of self-resetting kill-traps in landscape-scale networks is less clear because the labour requirements associated with manual pre-feeding would seem to undermine the benefits of deploying kill traps for long periods unattended.

AT220 traps provide a unique opportunity to overcome this limitation. Unlike conventional single-set traps, AT220s incorporate an automated lure pump capable of dispensing lure over extended periods between servicing visits. Within the Hikaroroa AT220 network, traps have been configured so that lure dispensed into the bait tray overflows onto the trap ramp, providing a limited degree of pre-feeding outside of the trap itself.

Additional external pre-feeding is likely to be even more effective. Assessing this approach is the aim of the current field trial at Hikaroroa / Mt. Watkin.

### ***Primary Research Questions***

Our overarching management objective is to evaluate whether periodic pre-feeding pulses, potentially delivered through future automated lure dispensing technology, have potential to reduce the need for secondary knockdown operations for maintenance of ecologically meaningful low-density possum populations. To validate this management hypothesis a trial programme has been designed to address **three primary questions**:

- Are some possums within the network exhibiting measurable trap-avoidant behaviour after three years of continuous kill-trap operation?
- Can additional pre-feeding using novel, highly palatable baits increase encounter rates, decrease trap-avoidant behaviors, and increase capture rates?
- Could automated pre-feeding technology increase the long-term effectiveness of lean fixed trapping networks as a tool for sustained deep suppression?

### ***Secondary Research Questions***

Several secondary questions are also being investigated during the treatment trial.

#### **Food vs. Social Attractants**

Most lure development for possum control has focused on food-based attractants that encourage animals to investigate and eat out of traps. However, possums are highly social animals that communicate through vocalisations, scent marking, and visual cues associated with territorial behaviour and breeding. It is possible that these social stimuli may elicit behavioural responses that differ from, or complement, food attractants. This trial investigates whether the

addition of a territorial audio lure and possum tail visual lure could increase trap investigation, reduce trap avoidance, and improve capture success compared with Oreo pre-feeding alone.

- Does the addition of a possum territorial audio lure increase trap interaction rates compared with Oreo pre-feeding alone?
- Does the addition of a possum tail visual lure increase trap interaction rates compared with Oreo pre-feeding alone?
- Does combining food, visual, and audio attractants reduce trap-avoidant behaviour more effectively than food attractants alone?

### **Potential for Feral Cat Suppression**

The baseline behavioral camera monitoring for this trial has revealed that feral cats regularly visit AT220 traps as scavenging sites, consuming possum and rodents that were trap catches. These observations have raised an additional question: could modifications to lure formulations encourage these regular cat visitors to investigate traps more closely and potentially enter the strike zone?

AT220 traps have previously failed NEWAC certification testing for use on feral cats. However, with feral cats now included within New Zealand's Predator Free 2050 target species, New Zealand AutoTraps (NZAT) has expressed interest in design modifications and future testing aimed at achieving NEWAC approval for cat control.

Meanwhile, previous AT220 cat trials conducted by Mammalian Corrections Unit Ltd. found no evidence to suggest that trap performance on cats differed substantially from possums from a welfare perspective, although these observations were not conducted as formal certification trials and should not be interpreted as evidence of compliance with NEWAC standards.

The current field trial therefore is being used as an opportunity to investigate whether automated trapping networks designed for possums could contribute to future landscape-scale suppression of both possums and feral cats, assuming either future approval of AT220 traps for cats or the development of a future automatic trap platform capable of effectively targeting both species.

Questions include:

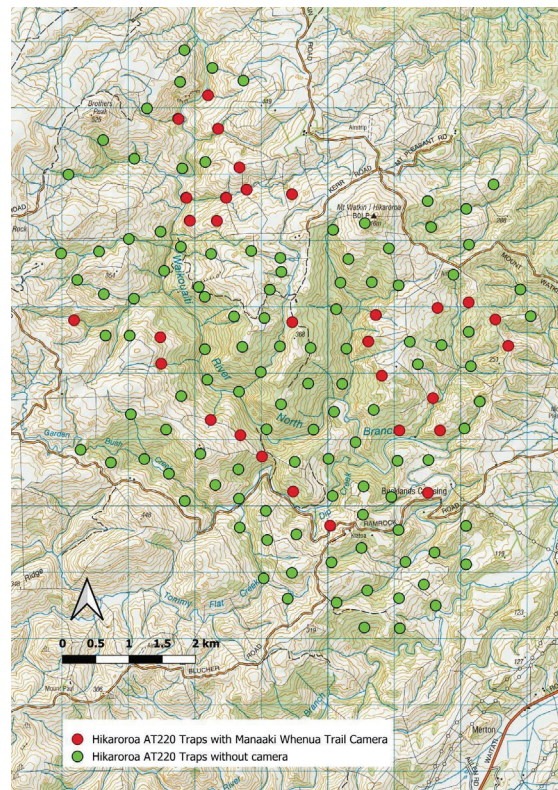
- Does a salmon oil and mayonnaise lure increase feral cat encounters/interactions with AT220 traps?
- Does a salmon oil and mayonnaise lure increase the frequency with which cats investigate the trap entrance and strike zone?
- Could modified lure formulations allow future automatic trapping networks to contribute meaningfully to landscape-scale feral cat suppression?
- How does a salmon oil and mayonnaise lure influence possum behaviour?

- Does the treatment increase possum encounter rates?
- Does the treatment decrease possum encounter rates by reducing lure attractiveness to possums?
- Is the overall effect of salmon oil and mayonnaise on possum trapping performance positive, negative, or neutral?

## Methods

### Baseline Behavioral Camera Monitoring

Thirty AT220 traps were semi-randomly selected across the Hikaroroa project area (**Map 1**) to provide a representative sample of trap performance across a range of habitat types. Cameras were left in place for approximately 3-months.



**Map 1.** Locations (in red) of the 30 AT220 traps monitored with BSI trail cameras from November 2025 through February 2026

Cameras were positioned to record the behaviours of possums that encountered the traps (**Figure 1**). Images from the camera have been analysed to quantify:

- Possum encounter rates, catch rates, and the proportion of encounters resulting in successful captures.
- The frequency and nature of trap-avoidant behaviours.
- Trap encounters and interactions by non-target species.



**Figure 1.** A Reconyx trail camera being deployed by a BSI staffer to monitor one of the trial AT220 kill-traps.

## Experimental Luring Methods

Following collection and analysis of the baseline camera data, 24 cameras were redeployed In June 2026 to investigate several potential luring methods for improving trap performance.

The luring trial consists of four treatment groups, each replicated at four trap sites:

- Oreo pre-feeding via a Enviromate bait dispenser
- ‘Enhanced’ Oreo pre-feeding, adding a territorial audio lure and possum tail visual lure
- Salmon oil and mayonnaise luring

- Standard AT220 mayonnaise luring (= experimental control)

The Oreo treatment involved placing an Oreo cookie (standard vanilla flavour) within the trap, another on the trap ramp, and then dispensing 2 additional cookies at 2-day intervals for 22 days onto the ground beneath the trap (via a waratah-mounted Enviromate at the bottom of the ramp; **Figure 2**).



**Figure 2.** Possum investigating an oreo cookie that has been dispensed at the base of the AT220 trap ramp by an Enviromate bait dispenser. Pairs of cookies were dropped at 2-day intervals for 22 days.

The 'enhanced' Oreo treatment deployed cookies as described above, and added two additional 'social' attractants. Firstly, a recorded possum territorial call was broadcast from an audio playback device placed inside the trap lid; this call was timed to play at 15 min intervals after dark (**Figure 3**). Secondly, a possum 'tail' (a strip of raw possum hide) was stapled to the tree adjacent to the trap as a visual cue (**Figure 4**).



**Figure 3.** An audio lure (top center) placed inside the lid of the AT220. The device was programmed to play a territorial possum call at 15 min intervals each night. The battery capacity of the device allowed for 22 nights of playback.

The salmon oil and mayonnaise treatment was designed to investigate whether a fish-based (and non-cinnamon) attractant could increase trap interactions by scavenging feral cats while maintaining acceptable possum capture performance. AT220 bait reservoirs were emptied and filled with a 2:25 salmon oil concentrate to mayonnaise mixture, thinned with canola oil to approximate AT220 lure consistency (**Figure 5**).



**Figure 4.** Possum investigating an ‘enhanced’ Oreo pre-fed trap AT220. Oreos dispensed from the Enviromate (bottom center) were supplemented with a possum ‘tail’ (top right) and an audio lure (not visible).



**Figure 5.** Feral cats have been targeted by refilling the standard AT220 mayonnaise lure sachet with a 2:25 salmon oil concentrate to mayonnaise mixture, thinned with canola oil.

All treatment groups are being compared against the standard network operation to assess differences in encounter rates, trap-avoidant behaviour, capture success, and non-target interactions.

This initial lure trial is a pilot study that is not expected to provide statistically robust data, but should nevertheless be informative as proof of concept. If initial trial results look promising, the trial will be repeated annually until a robust sample size has been collected. The trial is presently underway; cameras will be collected and analysed in mid-July 2026.

## Preliminary Results

Analysis of the baseline camera monitoring dataset is ongoing and the results presented here are preliminary. Nevertheless, several patterns have emerged that provide useful insights into possum behaviour within the Hikaroroa AT220 network.

A total of 209,071 images were reviewed from the 30 monitored AT220 sites. Of these, 5,033 images containing possums were grouped into 373 independent possum ‘trap encounters’, defined as batches of images separated by at least 10 minutes without a possum detection.

Possum activity was unevenly distributed across the network. A small number of camera sites accounted for a large proportion of recorded encounters, while many sites experienced very little possum activity during the monitoring period. Approximately one-third of monitored sites recorded either zero or a single possum encounter. This pattern is consistent with previous monitoring indicating that possum abundance remains relatively low across much of the project area following three years of continuous suppression.

Across all monitored sites, 29 possum captures were either directly observed or inferred from the presence of a freshly killed possum in subsequent images.

The most frequently observed behaviour was a possum approaching and ascending the trap ramp without a subsequent capture being recorded. Interpretation of these apparent non-capture interactions should be undertaken with caution. During image review it became apparent that camera positioning and trigger intervals may have resulted in critical behaviours being missed by the cameras. In many instances possums were observed approaching and climbing the trap ramp, followed by a gap in image capture before the same individual was subsequently photographed moving away from the trap. Consequently, the dataset likely underestimates the frequency of close investigations, nose-in interactions, and near-capture events.

Despite these limitations, the monitoring confirms that possums continue to regularly encounter AT220 devices throughout the network and provides evidence that capture events are still occurring three years after trap installation.

Importantly, the level of apparent trap avoidance observed at Hikaroroa was substantially lower than that reported from other long-established AT220 networks, such as at Omaui and Bluff. While direct comparisons among sites should be treated cautiously until analyses are complete, BSI researchers noted that 354 possum encounters at Omaui resulted in only two known captures, whereas the Hikaroroa cameras recorded 29 captures from 373 encounters. This suggests that behavioural responses to AT220 traps may vary considerably between sites and that trap avoidance within the Hikaroroa possum population is less pronounced than is seen at other well-established kill-trapping networks.

Once the results of the luring phase of the trial become available, further analysis of encounter classifications and treatment trial data will help determine whether enhanced pre-feeding and social attractants can further improve trap performance.

## Conclusion and Timeline

Three years after installation, the Hikaroroa AT220 network continues to demonstrate strong performance as a landscape-scale possum suppression tool. Baseline behavioural monitoring indicates that possums continue to encounter and be captured by AT220 traps throughout the project area, while overall possum activity remains relatively low across much of the network. Although some evidence of trap wariness was observed, the level of apparent behavioural resistance appears substantially lower than that reported from some other long-established AT220 networks.

These findings suggest that the current suppression strategy remains effective and that the network has not yet reached a point where behavioural resistance is significantly limiting performance. This is encouraging given that the original EcoFund proposal anticipated that periodic knockdown operations using toxins may eventually be required to restore low possum densities if significant numbers of trap-shy individuals began to accumulate within the trapping network.

It should be noted, however, that possum trap catches have increased over the past 6 months and landowner observations / night shooting tallies are also increasing. So despite trap avoidance probably not being the primary cause, possum populations may be rebounding. Future monitoring will help inform whether a toxic knockdown will be required to maintain possum levels below target thresholds.

Meanwhile, several opportunities for improving future performance could help contribute to improved landscape suppression. The work undertaken by BSI suggests that high sugar - high fat lure pre-feeding regimes may provide a practical mechanism for increasing trap interactions among survivor possums. If successful, this enhanced pre-feeding approach could increase the

effectiveness of lean trapping networks while reducing reliance on labour-intensive secondary control methods such as Feratox operations.

If enhanced pre-feeding can be shown to increase capture success and reduce trap avoidance, there would be considerable value in developing a standalone automated lure dispenser that is compact, affordable, field-programmable, refillable, rechargeable battery-powered, and capable of operating for extended periods between servicing visits.

A device sharing batteries, servicing schedules, and operational procedures with existing AT220 infrastructure would be particularly attractive. Current lure pumps and automated pre-feeding systems such as the Enviromate, ZIP MotoLure, and ZIP H2Lure do not currently meet all of these criteria.

If such technology can be developed, fixed trapping networks may be capable of maintaining ecologically significant low-density possum populations for longer periods while reducing reliance on periodic toxin knockdown operations. This could substantially improve the cost-effectiveness and scalability of sustained deep suppression programmes and limit the Hikaroroa / Mt. Watkin Conservation group's reliance on knockdown operations requiring external contractors with controlled substance licenses to maintain low possum densities.

The trial has also identified a previously underappreciated interaction between AT220 traps and feral cats. Frequent scavenging behaviour observed at monitored traps suggests that existing possum control infrastructure may provide opportunities for future multi-species suppression systems. Although AT220 traps are not currently approved for feral cat control, the observations gathered during this project provide valuable preliminary information regarding lure preferences and cat behaviour around automated trapping devices.

The lure trial is still underway and will be reported once completed. Particular attention will be given to determining whether Oreo pre-feeding, social attractants, or alternative lure formulations can measurably increase captures. Results are expected to provide valuable proof-of-concept information that can guide future research and operational development.

## Acknowledgements

This report was prepared by the Hikaroroa / Mt. Watkin Conservation Group (HMWCG) Project Coordinator as part of the Department of Conservation Community Fund project, with technical guidance and scientific support provided by the BSI Wildlife Ecology and Management Team.

Fieldwork for this study was undertaken collaboratively by the HMWCG Project Coordinator, HMWCG Interns, and BSI field technicians Becky Goodsell and Emily Lawrence. Image processing, behavioural classification, and preliminary analysis of the baseline camera monitoring data were completed by Becky Goodsell.

We acknowledge Dr Graham Hickling (BSI) for his guidance in the design and interpretation of the behavioural monitoring programme and his ongoing collaboration throughout the project.

Permission to undertake field operations was generously provided by participating HMWCG landowners across the project area and by Dunedin City Council for operations undertaken within the Hikaroroa / Mt. Watkin Scenic Reserve. Their continued support and willingness to facilitate long-term ecological research is sincerely appreciated.

This project was made possible through funding from the Department of Conservation Community Fund and through the continued collaboration of the Hikaroroa / Mt. Watkin Conservation Group, the Bioeconomy Science Institute, Predator Free Dunedin, Dunedin City Council, and all volunteers and project partners contributing to the long-term restoration of the Hikaroroa landscape.

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| <b>Executive Summary</b>              | <b>1</b>  |
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Additional external pre-feeding is likely to be even more effective. Assessing this approach is the aim of the current field trial at Hikaroroa / Mt. Watkin.

### ***Primary Research Questions***

Our overarching management objective is to evaluate whether periodic pre-feeding pulses, potentially delivered through future automated lure dispensing technology, have potential to reduce the need for secondary knockdown operations for maintenance of ecologically meaningful low-density possum populations. To validate this management hypothesis a trial programme has been designed to address **three primary questions**:

- Are some possums within the network exhibiting measurable trap-avoidant behaviour after three years of continuous kill-trap operation?
- Can additional pre-feeding using novel, highly palatable baits increase encounter rates, decrease trap-avoidant behaviors, and increase capture rates?
- Could automated pre-feeding technology increase the long-term effectiveness of lean fixed trapping networks as a tool for sustained deep suppression?

### ***Secondary Research Questions***

Several secondary questions are also being investigated during the treatment trial.

#### **Food vs. Social Attractants**

Most lure development for possum control has focused on food-based attractants that encourage animals to investigate and eat out of traps. However, possums are highly social animals that communicate through vocalisations, scent marking, and visual cues associated with territorial behaviour and breeding. It is possible that these social stimuli may elicit behavioural responses that differ from, or complement, food attractants. This trial investigates whether the

addition of a territorial audio lure and possum tail visual lure could increase trap investigation, reduce trap avoidance, and improve capture success compared with Oreo pre-feeding alone.

- Does the addition of a possum territorial audio lure increase trap interaction rates compared with Oreo pre-feeding alone?
- Does the addition of a possum tail visual lure increase trap interaction rates compared with Oreo pre-feeding alone?
- Does combining food, visual, and audio attractants reduce trap-avoidant behaviour more effectively than food attractants alone?

### **Potential for Feral Cat Suppression**

The baseline behavioral camera monitoring for this trial has revealed that feral cats regularly visit AT220 traps as scavenging sites, consuming possum and rodents that were trap catches. These observations have raised an additional question: could modifications to lure formulations encourage these regular cat visitors to investigate traps more closely and potentially enter the strike zone?

AT220 traps have previously failed NEWAC certification testing for use on feral cats. However, with feral cats now included within New Zealand's Predator Free 2050 target species, New Zealand AutoTraps (NZAT) has expressed interest in design modifications and future testing aimed at achieving NEWAC approval for cat control.

Meanwhile, previous AT220 cat trials conducted by Mammalian Corrections Unit Ltd. found no evidence to suggest that trap performance on cats differed substantially from possums from a welfare perspective, although these observations were not conducted as formal certification trials and should not be interpreted as evidence of compliance with NEWAC standards.

The current field trial therefore is being used as an opportunity to investigate whether automated trapping networks designed for possums could contribute to future landscape-scale suppression of both possums and feral cats, assuming either future approval of AT220 traps for cats or the development of a future automatic trap platform capable of effectively targeting both species.

Questions include:

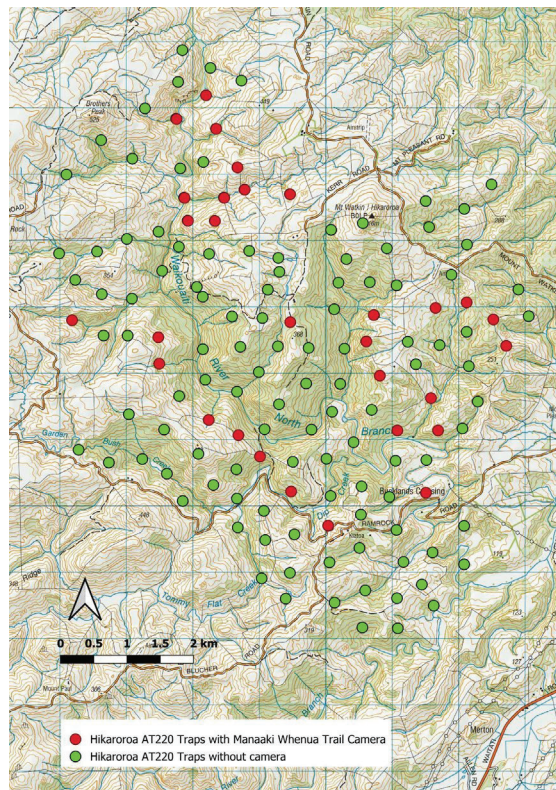
- Does a salmon oil and mayonnaise lure increase feral cat encounters/interactions with AT220 traps?
- Does a salmon oil and mayonnaise lure increase the frequency with which cats investigate the trap entrance and strike zone?
- Could modified lure formulations allow future automatic trapping networks to contribute meaningfully to landscape-scale feral cat suppression?
- How does a salmon oil and mayonnaise lure influence possum behaviour?

- Does the treatment increase possum encounter rates?
- Does the treatment decrease possum encounter rates by reducing lure attractiveness to possums?
- Is the overall effect of salmon oil and mayonnaise on possum trapping performance positive, negative, or neutral?

## Methods

### Baseline Behavioral Camera Monitoring

Thirty AT220 traps were semi-randomly selected across the Hikaroroa project area (**Map 1**) to provide a representative sample of trap performance across a range of habitat types. Cameras were left in place for approximately 3-months.



**Map 1.** Locations (in red) of the 30 AT220 traps monitored with BSI trail cameras from November 2025 through February 2026

Cameras were positioned to record the behaviours of possums that encountered the traps (**Figure 1**). Images from the camera have been analysed to quantify:

- Possum encounter rates, catch rates, and the proportion of encounters resulting in successful captures.
- The frequency and nature of trap-avoidant behaviours.
- Trap encounters and interactions by non-target species.



**Figure 1.** A Reconyx trail camera being deployed by a BSI staffer to monitor one of the trial AT220 kill-traps.

## Experimental Luring Methods

Following collection and analysis of the baseline camera data, 24 cameras were redeployed In June 2026 to investigate several potential luring methods for improving trap performance.

The luring trial consists of four treatment groups, each replicated at four trap sites:

- Oreo pre-feeding via a Enviromate bait dispenser
- ‘Enhanced’ Oreo pre-feeding, adding a territorial audio lure and possum tail visual lure
- Salmon oil and mayonnaise luring

- Standard AT220 mayonnaise luring (= experimental control)

The Oreo treatment involved placing an Oreo cookie (standard vanilla flavour) within the trap, another on the trap ramp, and then dispensing 2 additional cookies at 2-day intervals for 22 days onto the ground beneath the trap (via a waratah-mounted Enviromate at the bottom of the ramp; **Figure 2**).



**Figure 2.** Possum investigating an oreo cookie that has been dispensed at the base of the AT220 trap ramp by an Enviromate bait dispenser. Pairs of cookies were dropped at 2-day intervals for 22 days.

The ‘enhanced’ Oreo treatment deployed cookies as described above, and added two additional ‘social’ attractants. Firstly, a recorded possum territorial call was broadcast from an audio playback device placed inside the trap lid; this call was timed to play at 15 min intervals after dark (**Figure 3**). Secondly, a possum ‘tail’ (a strip of raw possum hide) was stapled to the tree adjacent to the trap as a visual cue (**Figure 4**).



**Figure 3.** An audio lure (top center) placed inside the lid of the AT220. The device was programmed to play a territorial possum call at 15 min intervals each night. The battery capacity of the device allowed for 22 nights of playback.

The salmon oil and mayonnaise treatment was designed to investigate whether a fish-based (and non-cinnamon) attractant could increase trap interactions by scavenging feral cats while maintaining acceptable possum capture performance. AT220 bait reservoirs were emptied and filled with a 2:25 salmon oil concentrate to mayonnaise mixture, thinned with canola oil to approximate AT220 lure consistency (**Figure 5**).



**Figure 4.** Possum investigating an ‘enhanced’ Oreo pre-fed trap AT220. Oreos dispensed from the Enviromate (bottom center) were supplemented with a possum ‘tail’ (top right) and an audio lure (not visible).



**Figure 5.** Feral cats have been targeted by refilling the standard AT220 mayonnaise lure sachet with a 2:25 salmon oil concentrate to mayonnaise mixture, thinned with canola oil.

All treatment groups are being compared against the standard network operation to assess differences in encounter rates, trap-avoidant behaviour, capture success, and non-target interactions.

This initial lure trial is a pilot study that is not expected to provide statistically robust data, but should nevertheless be informative as proof of concept. If initial trial results look promising, the trial will be repeated annually until a robust sample size has been collected. The trial is presently underway; cameras will be collected and analysed in mid-July 2026.

## Preliminary Results

Analysis of the baseline camera monitoring dataset is ongoing and the results presented here are preliminary. Nevertheless, several patterns have emerged that provide useful insights into possum behaviour within the Hikaroroa AT220 network.

A total of 209,071 images were reviewed from the 30 monitored AT220 sites. Of these, 5,033 images containing possums were grouped into 373 independent possum ‘trap encounters’, defined as batches of images separated by at least 10 minutes without a possum detection.

Possum activity was unevenly distributed across the network. A small number of camera sites accounted for a large proportion of recorded encounters, while many sites experienced very little possum activity during the monitoring period. Approximately one-third of monitored sites recorded either zero or a single possum encounter. This pattern is consistent with previous monitoring indicating that possum abundance remains relatively low across much of the project area following three years of continuous suppression.

Across all monitored sites, 29 possum captures were either directly observed or inferred from the presence of a freshly killed possum in subsequent images.

The most frequently observed behaviour was a possum approaching and ascending the trap ramp without a subsequent capture being recorded. Interpretation of these apparent non-capture interactions should be undertaken with caution. During image review it became apparent that camera positioning and trigger intervals may have resulted in critical behaviours being missed by the cameras. In many instances possums were observed approaching and climbing the trap ramp, followed by a gap in image capture before the same individual was subsequently photographed moving away from the trap. Consequently, the dataset likely underestimates the frequency of close investigations, nose-in interactions, and near-capture events.

Despite these limitations, the monitoring confirms that possums continue to regularly encounter AT220 devices throughout the network and provides evidence that capture events are still occurring three years after trap installation.

Importantly, the level of apparent trap avoidance observed at Hikaroroa was substantially lower than that reported from other long-established AT220 networks, such as at Omaui and Bluff. While direct comparisons among sites should be treated cautiously until analyses are complete, BSI researchers noted that 354 possum encounters at Omaui resulted in only two known captures, whereas the Hikaroroa cameras recorded 29 captures from 373 encounters. This suggests that behavioural responses to AT220 traps may vary considerably between sites and that trap avoidance within the Hikaroroa possum population is less pronounced than is seen at other well-established kill-trapping networks.

Once the results of the luring phase of the trial become available, further analysis of encounter classifications and treatment trial data will help determine whether enhanced pre-feeding and social attractants can further improve trap performance.

## Conclusion and Timeline

Three years after installation, the Hikaroroa AT220 network continues to demonstrate strong performance as a landscape-scale possum suppression tool. Baseline behavioural monitoring indicates that possums continue to encounter and be captured by AT220 traps throughout the project area, while overall possum activity remains relatively low across much of the network. Although some evidence of trap wariness was observed, the level of apparent behavioural resistance appears substantially lower than that reported from some other long-established AT220 networks.

These findings suggest that the current suppression strategy remains effective and that the network has not yet reached a point where behavioural resistance is significantly limiting performance. This is encouraging given that the original EcoFund proposal anticipated that periodic knockdown operations using toxins may eventually be required to restore low possum densities if significant numbers of trap-shy individuals began to accumulate within the trapping network.

It should be noted, however, that possum trap catches have increased over the past 6 months and landowner observations / night shooting tallies are also increasing. So despite trap avoidance probably not being the primary cause, possum populations may be rebounding. Future monitoring will help inform whether a toxic knockdown will be required to maintain possum levels below target thresholds.

Meanwhile, several opportunities for improving future performance could help contribute to improved landscape suppression. The work undertaken by BSI suggests that high sugar - high fat lure pre-feeding regimes may provide a practical mechanism for increasing trap interactions among survivor possums. If successful, this enhanced pre-feeding approach could increase the

effectiveness of lean trapping networks while reducing reliance on labour-intensive secondary control methods such as Feratox operations.

If enhanced pre-feeding can be shown to increase capture success and reduce trap avoidance, there would be considerable value in developing a standalone automated lure dispenser that is compact, affordable, field-programmable, refillable, rechargeable battery-powered, and capable of operating for extended periods between servicing visits.

A device sharing batteries, servicing schedules, and operational procedures with existing AT220 infrastructure would be particularly attractive. Current lure pumps and automated pre-feeding systems such as the Enviromate, ZIP MotoLure, and ZIP H2Lure do not currently meet all of these criteria.

If such technology can be developed, fixed trapping networks may be capable of maintaining ecologically significant low-density possum populations for longer periods while reducing reliance on periodic toxin knockdown operations. This could substantially improve the cost-effectiveness and scalability of sustained deep suppression programmes and limit the Hikaroroa / Mt. Watkin Conservation group's reliance on knockdown operations requiring external contractors with controlled substance licenses to maintain low possum densities.

The trial has also identified a previously underappreciated interaction between AT220 traps and feral cats. Frequent scavenging behaviour observed at monitored traps suggests that existing possum control infrastructure may provide opportunities for future multi-species suppression systems. Although AT220 traps are not currently approved for feral cat control, the observations gathered during this project provide valuable preliminary information regarding lure preferences and cat behaviour around automated trapping devices.

The lure trial is still underway and will be reported once completed. Particular attention will be given to determining whether Oreo pre-feeding, social attractants, or alternative lure formulations can measurably increase captures. Results are expected to provide valuable proof-of-concept information that can guide future research and operational development.

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