MATAKANUI

GOLD LIMITED

Matakanui Sanctuary Management Plan

~~September~~ June 202~~6~~5

Citation: Habitat NZ Ltd. (2026~~5~~). Bendigo-Ophir Gold Project: Matakanui Sanctuary Management Plan. Habitat NZ Ltd., Auckland.

DOCUMENT CONTROL

Revision	Authors	Organisation	Date	Approved
V1	K Barber, A Walsh, Y Singh	Habitat NZ Ltd.	17/07/2025	
V2	K. Barber, A Walsh, M Zwaagman	Habitat NZ Ltd.	31/07/2025	
V3	A Walsh	Habitat NZ Ltd.	05/09/2025	
V4	K Barber	Habitat NZ Ltd.	16/06/2026	

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Glossary

Specific terms	
AMP	Avifauna Management Plan
ARP	Applied Research Plan for Cushionfields and Spring Annuals
ARAMP	Ardgour Restoration Area Management Plan
BPPMP	Biosecurity and Plant Pest Management Plan
BOGP	Bendigo-Ophir Gold Project ('the Project')
BOMP	Biodiversity Outcome Monitoring Plan
CCI	Chew Card Index
CIT	Come in Time gold deposit
CTCI	Camera Trap Catch Index
CODC	Central Otago District Council
DDF	Direct disturbance footprint
DOC	Department of Conservation
ELF	Engineered landform
ESC	Erosion and Sediment Control
ESCP	Erosion and Sediment Control Plan
HIMP	Habitat Impact Management Plan
LEMP	Landscape and Ecology Management Plan
LERMP	Landscape and Ecological Rehabilitation Management Plan
LMP	Lizard Management Plan
MGL	Matakanui Gold Limited
MPMP	Mammalian Pest Management Plan
MSMP	Matakanui Sanctuary Management Plan
NZTCS	New Zealand Threat Classification System
ORC	Otago Regional Council
RAS	Rise and Shine gold deposit
RMA	Resource Management Act
RPMP	Otago Regional Pest Management Plan
SRE	Srex East gold deposit
SRX	Srex gold deposit
TIMP	Terrestrial Invertebrate Management Plan
TLF	Tailings Storage Facility

TTI	Tracking Tunnel Index

1. INTRODUCTION

1.1. Bendigo-Ophir Gold Project Overview

Matakanui Gold Limited (MGL) is applying for approval to establish the Bendigo-Ophir Gold Project (BOGP) in the Dunstan Mountains, about 20 kilometres north of Cromwell. Application is under the Fast Track Approvals Act 2024 (FTA).

1.2. Purpose

This Matakanui Sanctuary Management Plan (MSMP) sets out the management processes that guide the creation, operation, and enduring stewardship of two predator-proof sanctuaries within the BOGP area. The MSMP outlines how to create measurable conservation results by establishing secure, predator-free areas that help native species and ecosystems recover. This plan is part of the ecological rehabilitation, offsetting, and compensation package for the BOGP.

1.2.1. Management Framework Integration

This plan details management processes specific to land within the Ardgour and Bendigo sanctuaries. Areas of the BOGP site located outside of the sanctuaries are governed by the set of management plans detailed within the Landscape and Ecological Management Plan (LEMP).

The MSMP maintains operational independence for sanctuary-specific activities while managing broader site operations through:

- Alignment with pest management, biosecurity, and restoration activities across the BOGP site, particularly where efficiencies are enhanced
- Working with scientific initiatives and adaptive management systems
- Integration with biodiversity outcome monitoring and evaluation processes (such as those outlined in the Biodiversity Outcome Monitoring Plan (BOMP)).

1.2.2. Kā Rūnaka Engagement

Kā Rūnaka hold mana whenua over the BOGP area and their knowledge, values, and cultural interests are relevant to how the sanctuaries are designed, managed, and evaluated. MGL is committed to working with Kā Rūnaka through the workshopping and implementation of this plan, providing an opportunity to incorporate mātauraka Māori into how management priorities are set and refined over time. This engagement will be guided by the following principles:

- Kā Rūnaka representatives will be invited to participate in management plan workshopping prior to implementation, and at each major review milestone.

- Mātauraka Māori relating to taonga species and associated plant, invertebrate, and lizard communities within the sanctuaries will be sought and incorporated into adaptive management decision-making where relevant. ~~Mātauraka Māori relating to taonga species within the sanctuaries, including taramea (Aciphylla aurea) and associated invertebrate and lizard communities, will be sought and incorporated into adaptive management decision-making where relevant.~~
- Pest management consent conditions relating to the sanctuaries will be outcomes-focused, with obligations framed around actual on-the-ground conditions rather than fixed programmes, consistent with the approach advocated by Kā Rūnaka and supported by MGL in the FTA process.

1.3. Roles and responsibilities

Matakanui Gold Ltd will establish a governance structure to ensure oversight and long-term management of the sanctuary areas. A dedicated Environmental Manager position will be created ~~through a formal contract~~ to provide day-to-day operational leadership and implementation of this Sanctuary Management Plan.

~~The Environmental Manager will be supported by a Technical Advisory Group comprising selected experts in conservation, ecology, and infrastructure management. This advisory body will provide guidance on technical aspects of the fence operation, pest management strategies, and ecological restoration activities without the administrative burden of a full governance board.~~

Matakanui Gold Ltd will maintain ultimate responsibility for the project while delegating operational authority to the Environmental Manager. This governance approach balances professional management with expert guidance, ensuring both practical implementation and technical excellence in achieving the project's conservation objectives.

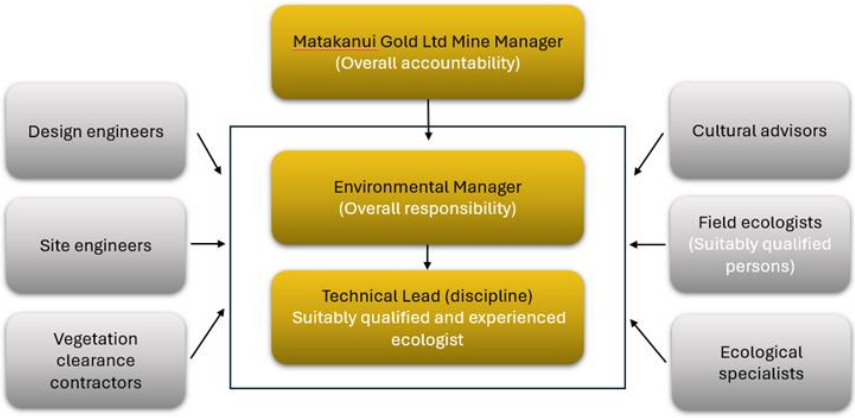


Figure 1. Management structure for the implantation of this MSMP.

1.4. Resource Consent Conditions for MSMP

The project resource consent conditions set out the requirements for the content of this MSMP. The table below identifies the key resource consent conditions relevant to MSMP and identify where they are addressed in this document.

Table 1 Draft resource consent conditions relevant to the MSMP. [PLACEHOLDER]

Condition number ()	Condition text	Relevant Section in MSMP
C79	The consent holder must implement the Matakanui Sanctuary Management Plan ("MSMP") certified as part of the approval of the BOGP pursuant to Section 81 of the Fast-track Approvals Act 2024 (or as amended in accordance with relevant conditions), and which forms part of the consents. The objective of the MSMP is to manage the establishment, operation, and enduring stewardship of two predator-free sanctuaries within the BOGP Consent Area, the Ardgour Sanctuary and the Bendigo Sanctuary, to help native species and ecosystems recover.	
C80	To achieve the objective set out in Condition C79 above, the MSMP must include, as a minimum: a. Objectives and targets of the fenced sanctuaries; b. A framework for sanctuary design and establishment; c. A mammalian predator eradication programme; d. Plant pest controls, pest prevention controls and biosecurity measures;	

Condition number ()	Condition text	Relevant Section in MSMP
	e. Monitoring, surveillance and maintenance system protocols; f. Habitat enhancement and species management measures for lizard and invertebrate species; and Requirements for data management and recording, compliance monitoring and reporting, and adaptive management process.	
C81	The MSMP must include requirements for the following: a. Establish and implement a management framework that provides comprehensive supervision of sanctuary operations; b. Design and construct two pest exclusion fences that meet the technical standards and timeframes contained within the certified MSMP; c. Certify all quality assurance tests, and obtain signoff from suitably qualified pest fence construction expert(s) before pest eradication starts; d. Complete regulatory requirements for aerial or broadcast brodifacoum bait application, according to the national Operating Plan 63 (OP-63) code of practice (or fulfil alternative regulatory requirements if brodifacoum use regulations have been modified); e. Eliminate 100% of target mammalian pest species within each fenced area within 3 years of fence completion;	

Condition number ()	Condition text	Relevant Section in MSMP
	f. Sustain pest-free sanctuary status through rapid response eradication of any target species incursions, with complete removal achieved within 6 months of detection; g. Establish a monitoring network capable of detecting breaches; h. Implement regular fence inspections for major defects; i. Implement monthly detailed fence inspections for minor defects; j. Conduct annual structural assessments to identify, address and prevent long-term fence degradation; k. Respond to and start repairs to any defects within 12 hours of detection (where possible); l. Start incursion response protocol within 48 hours of suspected breach, with key personnel alerted within 24 hours; m. Promote the re-establishment of diverse local plant species throughout the sanctuaries; n. Create a suitable environment for the reintroduction of Threatened species (from outside of the BOGP Consent Area) within 6 years of fence completion; and o. stablish measurable biodiversity outcome monitoring that informs management decisions.	

Condition number ()	Condition text	Relevant Section in MSMP
C82	The Consent Holder must undertake monitoring in accordance with the certified MSMP, including: a. Regular fence infrastructure integrity monitoring and surveillance (including an annual assessment of all fence components by an experienced predator-proof fence contractor), and maintenance of a comprehensive surveillance database to track fence condition assessments, maintenance issues and pest detections; b. Pest-detection monitoring throughout the operational life of the sanctuary, including the following methods: i) Trained pest detection dogs (quarterly sweeps of the sanctuary areas in year 1, six-monthly sweeps in year 2, and annual sweeps of the area from year 3); ii) Camera trap monitoring (with cameras placed at approximately 1 device per 3 ha density); iii) Non-toxic bait stations monitoring, placed at targeted locations (e.g. locations of high bait take or with suitable habitat); iv) Modified McClean Scale monitoring for rabbits (at least 3 assessment transects per sanctuary); v) Plant pest surveys (six-monthly vegetation surveys throughout both sanctuaries, with additional targeted	

Condition number ()	Condition text	Relevant Section in MSMP
	inspections of high-risk incursion points (e.g. gates, recently disturbed areas, and aligned with flowering periods for optimal species identification); and vi) Ad-hoc staff reporting system.	
C83	The Consent Holder must prepare a detailed Incursion Response Plan prior to the completion of each fence, including triggers for: a. Fence inspection and repair; b. Alert and mobilisation of resources / contractors; c. Rapid assessments; d. Species-specific control deployment (e.g. trapping); e. Intensive monitoring; and f. Post-incursion review.	
	An annual MSMP Report must be prepared, as part of the Annual Monitoring and Compliance Report required by Condition C12, and must include: a. Statistical analysis of catch rates, bait consumption, detection frequencies on monitoring devices and changes in pest distribution over time, with statistics presented to clearly display potential temporal/spatial trends or patterns; b. Details of possum and rabbit ground control operations;	

Condition number ()	Condition text	Relevant Section in MSMP
	c. Details of biosecurity breaches or incursions/response works, if applicable; and d. Comprehensive evaluation of the pest control programme against management objectives with recommendations for improvement.	
C84	All reports prepared under the MSMP must be made available to Central Otago District Council (or other regulatory authority) on request.	

2. PROJECT CONTEXT

2.1. Fenced Sanctuary Concept

New Zealand's unique biodiversity has evolved in geographic isolation over millions of years without mammalian predators (Barker, 2016). This means native species are often~~they are~~ defenceless against introduced pests like rats, mice, possums, and mustelids. (Anton et al., 2020). Since their 19th-century introduction, these predators have caused devastating impacts, such as the annual loss of approximately 26.6 million native bird eggs and chicks. Rats are responsible for 40% of recorded bird extinctions. Possums consume an estimated 7.67 million tons of vegetation a year, compounding the ecosystem damage and altering its structure and function (Goldson et al., 2015; Russell et al., 2015).

Predator exclusion fences are built to exclude all introduced mammals from selected areas (Burns et al., 2012). They reduce predator impact, protecting native species while supporting the recovery of native biodiversity. Since the late 1990s, better fence design and eradication methods have led to growing success. New Zealand now has over 30 predator-proof sanctuaries (Innes et al., 2019) that show measurable recovery across various habitats.

Mokomoko Dryland Sanctuary is New Zealand's first dryland sanctuary, located 36 km south of the BOGP. It protects 14 hectares using 1.6km of predator-proof fencing and

has successfully protected native skinks, geckos, and dryland plants (Turner & Norbury, 2023) in an environment similar to the BOGP. Macraes Flat Sanctuary also protects endangered Otago and Grand skinks, with both showing steady recovery by 2008 (Burns et al., 2012; Collen et al., 2007). These projects provide significant evidence that predator-proof fences works and show consistent wildlife recovery, especially for insects, lizards, and ground-nesting birds in Otago. (Burns et al., 2012; Innes et al., 2019; Chen et al., 2022).

Predator exclusion fences are cost efficient long-term compared to ongoing trapping or poisoning. They also provide continuous protection without the environmental concern of repeated chemical applications (Norbury et al., 2014). These sanctuaries let usallow for the reintroduction ofe threatened species that could non't survive with predators around, helping them spread to more areas across New Zealand.

2.2. Regional Sanctuary Network: Building Conservation Resilience

The sanctuaries will complement the existing Mokomoko Sanctuary, creating a larger conservation area that improves the Central Otago regions resilience for critically threatened lizard species. This multi-sanctuary approach spreads the risk, so a single disaster like wildfire, disease, or extreme weather would notdoesn't cause catastrophic loss.

The larger wider network means biggerlarger-scale research using comparative studies, different habitats and management regimes is possible. Increased capacity also allows more ambitious species translocations with larger populations and genetic exchange between sites. This approach:

- Creates robust conservation infrastructure
- Safeguards species
- Provides a scalable recovery model
- Delivers maximum long-term benefits through redundancy
- Enhances research capacity and improved adaptive management.

2.3. Benefits of Sanctuary-Based Conservation

Sanctuary Benefits for Threatened Species Recovery

Predator-proof sanctuaries create the best conditions for threatened and native speciesspecies to breed and recover by removing the main threats that have driven them to be at risk, threatened or critically endangered. These environments create secure spaces where native species can breed and recover without the main threats that caused their original decline. More detail on the following is provided in Appendix C.

Core Conservation Advantages~~:~~

Sanctuaries eliminate all introduced predators that are the primary cause of native species decline. They also provide a controlled environment that optimises habitat and food resources and reduces environmental stressors. This means there are safe breeding areas where more offspring survive because introduced predators cannot~~predators can't~~ kill them, which makes predator-proof sanctuaries~~is~~ especially important for species that do not~~n't~~ breed often.

Management and Research Benefits~~:~~

The enclosed space makes it easier to monitor animals, track their health, and study their behaviour since they stay within the boundaries. This approach provides essential data for better management, ~~and~~ creates ideal conditions for controlled breeding programmes, and ~~the ability to introduce~~allows for the introduction new animals to keep the population genetically diverse.

Long-term Security~~:~~

Sanctuaries provide biosecurity control, preventing pathogens entering that could devastate small populations. They also ensure habitat enhancements remain intact and benefit the target species rather than pest species. This means a permanent, secure habitat is created that can support populations indefinitely, reducing ongoing management costs and ensuring conservation work delivers lasting benefits.

Broader Conservation Value~~:~~

These protected areas are invaluable for scientific studies on species ecology, behaviour, and conservation techniques. The learnings gained inform other conservation projects and future relocations. Additionally, they offer safe, controlled environments for education and advocacy programmes that build public support while minimising disturbance to sensitive species.

3. OBJECTIVES AND TARGETS

The objective of the predator-proof sanctuaries is to restore and preserve biodiversity within the Ardgour and Bendigo Sanctuary areas through comprehensive protection and species recovery. This will be achieved through the following:

Primary Goals

- Protect and enhance existing local ecology assets
- Prevent invasive pests accessing sensitive habitats
- Create secure environments for native flora and fauna regeneration
- Enable reintroduction of significant taonga species

Expected Outcomes

- Long-term preservation of regional biodiversity
- Enhanced ecological integrity across protected areas
- Sustainable habitat restoration for native species
- Demonstrated commitment to conservation through measurable biodiversity improvements

Governance, Responsibility and Long-term Certainty

MGL will be solely responsible for the development, operation, and maintenance of the sanctuary areas for the duration of the consents and any future consents required. This responsibility includes all pest control, habitat management, monitoring, biosecurity, and reporting obligations within the Ardgour and Bendigo Sanctuaries. The sanctuary areas will have intergenerational ~~be~~ protection~~ed~~ in perpetuity by a covenant or covenants, which will provide legal protection and support ongoing obligations relating to the environmental outcomes ~~to be achieved~~ within the ecological rehabilitation and enhancement areas, including the sanctuaries, beyond the life of the mining operation.

- Long-term financial certainty for sanctuary operations will be provided through the ~~BOGP Biodiversity and Heritage Fund~~Matakinui Trust, ~~which is described in the LERMP.~~ This fund is intended to support ongoing sanctuary maintenance and management activities after the active mining phase concludes, ensuring conservation gains are not lost through funding discontinuity.

The predator-proof sanctuaries will serve multiple ecological functions. They will protect and enhance existing ecological assets while preventing invasive pests from accessing sensitive habitats. These areas will provide secure environments for native flora and fauna regeneration and opportunities to reintroduce significant taonga species. These sanctuaries demonstrate a substantial and long-term commitment to preserving regional biodiversity and ecological integrity.

The objective and targets set (Table 2~~Table 1~~) are based on similar successful pest exclusion projects and reflect realistic, achievable outcomes for the proposed site.

The technical requirements, timelines, and resources needed to reach these targets have been assessed and designed to be practical and deliverable within the project's scope and constraints.

Table ~~22~~1: Objectives and target descriptions to achieve the overarching goal set by the Sanctuary Management Plan.

Objective	Target	Description
Objective 1: Establish a Management Framework	1.1	Establish and implement a management framework that provides comprehensive supervision of sanctuary operations.
Objective 2: Design and Construct two Pest Exclusions Fences	2.1	Design and construct two pest exclusion fences that meet all technical standards and timeframes contained within this MSMP.
	2.2	Successfully certify all quality assurance tests. Signoff from suitably qualified pest fence construction experts before pest eradication starts.
Objective 3: Achieve and maintain complete Pest Eradication	3.1	Complete all regulatory requirements for aerial or broadcast brodifacoum bait application, according to the national Operating Plan 63 (OP-63) code of practice~~,~~ or fulfil alternative regulatory requirements if brodifacoum use regulations have been modified.
	3.1	Eliminate 100% of target pest species within each fenced area within 3 years of fence completion.
	3.2	Sustain pest-free sanctuary status through rapid response eradication of any target species incursions, with complete removal achieved within 6 months of detection.
Objective 4: Implement Effective	4.1	Establish a monitoring network capable of detecting breaches.
	4.2	Implement weekly fence inspections for major defects.
	4.3	Implement monthly detailed fence inspections for minor defects.

Objective	Target	Description
Surveillance and Maintenance Systems	4.4	Conduct annual structural assessments to identify, address and prevent long-term fence degradation.
	4.5	Respond to and start repairs to any defects with identified breaches within 12 hours of detection.[1]
	4.6	Start incursion response protocol within 48 hours of suspected incursion, with key personnel alerted within 24 hours.
Objective 5: Integrate with Ecological Restoration Programme	5.1	Promote the re-establishment of diverse local plant species throughout the sanctuaries.
	5.2	Create a suitable environment for reintroduction of critically threatened species (from outside of the BOGP area) within 6 years.
Objective 6: Sustain and Improve Conservation Measures	6.1	Establish measurable biodiversity outcome monitoring that feeds into management decisions.
Objective 7: Achieve Taxon-Specific Biodiversity Outcomes	7.1	Lizards: Achieve measurable population recovery of lizard species within both sanctuaries. Demonstrate conditions suitable for translocation of critically threatened skinks (Otago skink and Grand skink) within six years of confirmed pest eradication completion. Invertebrates: Achieve measurable increase in native invertebrate diversity and abundance relative to baseline within both sanctuaries. Invertebrate management is treated as a distinct objective: management actions will not assume that outcomes beneficial to lizards are automatically beneficial to invertebrates. Vegetation: Achieve increased cover and diversity of native vegetation species, particularly those supporting native food webs. For Ardgour Sanctuary specifically: maintain and enhance cushionfield extent and condition, with measurable monitoring of spring annual flora communities. Birds: Achieve detectable increase in native bird diversity and abundance within both sanctuaries within 10 years of eradication completion.

[1] Acknowledging that extended time may be required for some repairs and that the intent is to maintain predator-proof capacity through temporary measures until full repairs are complete.

4. SANCTUARY ESTABLISHMENT

4.1. Overview

The Bendigo and Ardgour Sanctuaries are designed to maximize conservation success while being practical to operate and maintain long-term. Both sanctuaries are in areas that represent the wider landscape and have strong potential for ecological improvement. These sites contain suitable habitat for important native communities once the invasive species eradication and rehabilitation programs are completed. The sanctuaries use proven predator-proof fencing with site-specific habitat consideration to create optimal conditions for native species recovery and ecosystem restoration.

This section provides a high-level overview of sanctuary locations and design considerations, followed by detailed specs for fence building.

4.2. Design Philosophy

Both sanctuaries follow the same design principles and protect biodiversity through several methods, including:

- Complete predator exclusion using internationally proven fence specifications
- Habitat diversity using natural terrain features with constructed enhancements
- Requirements that meet the specific needs of threatened species, especially critically endangered skinks
- Ecosystems supporting natural ecological processes and food web development.

The design elements chosen for the sanctuaries are flexible for:

- Monitoring systems that provide data to improve management practices
- Easy access for efficient maintenance and day-to-day operations
- Research capabilities for scientific studies and monitoring programmes
- Future habitat improvements based on monitoring results.

Both sanctuaries will use the same processes and systemsto ensure efficient operations. Services and facilities will be consolidated where practical to reduce complexity.

Table 3~~Table 2~~ provides an overview of the design and habitat features within Bendigo Sanctuary and Ardgour Sanctuary.

Table 332. Overview of design and habitats within Bendigo and Ardgour Sanctuary

	Bendigo Sanctuary	Ardgour Sanctuary
Location	On the Bendigo Terraces, on the south-western end of the BOGP site	Northern section of BOGP on Ardgour Terrace
Size	29 ha	38 ha
Fence length	2,868m	2,960m
Elevation Range	420-480m ASL	380-420m ASL
Terrain	Rolling with structurally complex existing rock outcrops and varied topography	Rolling though less structurally complex than Bendigo, requiring extensive habitat enhancement.
Existing habitat types	• Natural schist rock formations • Depleted native cushionfields • Remnant native tussock and shrubland areas • Exotic grasslands	• Depleted native cushionfields (specialised management required) • Remnant native tussock and shrubland areas • Modified pastoral areas and exotic grassland • Remnant kowhai node • Some natural schist rock formations
Planned habitat enhancement	• Woody vegetation enhancement (up to 7 ha) • Tussock vegetation enhancement (up to 4 ha) • Constructed rock refugia i.e. Lizard Habitat Features (LHF)	• Woody vegetation enhancement (up to 9 ha) • Tussock vegetation enhancement (up to 13 ha) • Constructed rock refugia i.e. Lizard Habitat Features (LHF)

4.3. Fence design and construction

Given the substantial investment and construction requirements for developing two sanctuaries, implementation will happen sequentially. Both sanctuaries will use a standardised fence design with site-specific adaptations to address the unique topographical conditions. Infrastructure elements will include culverts and access points.

A separate Fence Design and Construction Plan will be developed prior to fence construction. It will be reviewed by a suitably qualified and experienced person before construction starts. This plan will document full specifications of fence design and construction methods required for each Sanctuary.

This section provides a summary of details that will be expanded upon in the Fence Design and Construction Plan.

4.3.1. Design

The Bendigo Sanctuary will encompass 29ha within a 2,868km predator-proof fence. The Ardgour Sanctuary will protect 39ha with a 2,960km fence. Both sanctuaries will use current best-practice predator-proof fence design based on proven specifications developed from the Karori Wildlife Sanctuary (Zealandia) fence trials (Burns et al., 2012) (Figure 2~~Figure 1~~), using the following key design elements:

- Jump Prevention: Minimum 1.8m above-ground height prevents medium-sized mammals (including feral cats) from clearing the barrier by jumping.
- Climb Prevention: Smooth metal hood with 300mm outward curve at fence apex eliminates grip points, causing climbing predators to fall when trying to scale the barrier.
- Dig Prevention: Stainless steel mesh with 300mm horizontal skirt extends underground, securely anchored to wooden posts to prevent manipulation by burrowing animals.
- Entry Prevention: Maximum 6mm mesh aperture, blocks entry of the smallest species (juvenile mice) while maintaining structural integrity.
- Structural Integrity: Posts anchored minimum 1m below ground provide secure foundations capable of withstanding wind and environmental pressures.

Both sanctuaries will feature dual vehicle access gates with interlocking mechanisms that permit only one gate to be open at any time, minimising pest re-entry risk. Biosecurity protocols will govern all personnel and visitor access to prevent accidental introduction of pests and plant propagules. Predator-proof culvert systems will manage waterway crossings along the fence line, preventing animal incursions through or around water flow paths. While sharing these core design principles, each sanctuary will incorporate site-specific adaptations addressing unique terrain and infrastructure challenges.

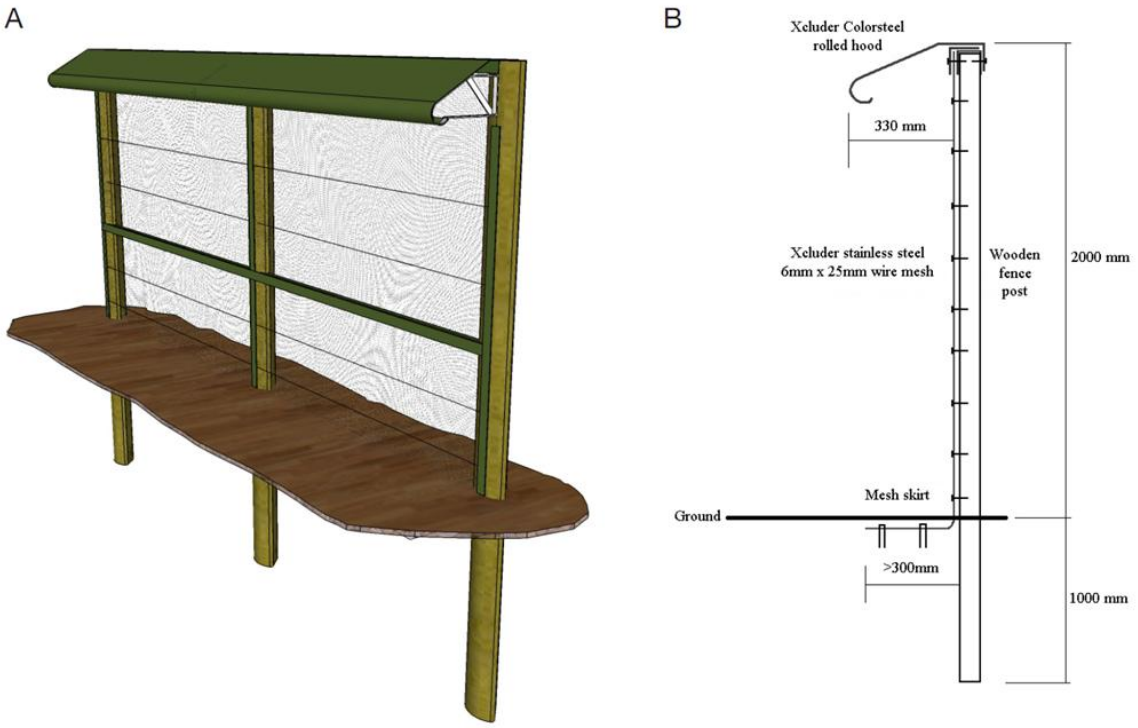


Figure 22~~1~~: Example diagram of predator exclusion fence (A) and cross section of Xcluder® predator exclusion fence (B) (Bell, 2014).

4.3.2. Water crossings

No permanent watercourses cross the proposed fence positions, though temporary overland flow may occur in some areas during heavy rainfall. The Fence Design and Construction Plan will identify and detail water crossing requirements for these intermittent flows. The detailed design phase of the project will include specific hydrological sizing of the underpass culvert(s), using the following process:

- Digital Elevation Model (DEM) of the sanctuary areas and surroundings are acquired,
- A mapping or GIS tool called Watershed Generation is performed while using the DEM to define the various sub catchments contributing to each potential under-fence culvert,
  - Each watershed defined would have, as minimum data, upstream catchment area and average mid-line creek gradient,
- Earth Sciences NZ (formerly NIWA) High Intensity Rainfall Design System (HIRDS) online is interrogated to provide tables of average reoccurrence interval (ARI) or annual exceedance probability (AEP) downpour rainfall rates in millimetres per hour specific to each watershed,

- The Rational Method is employed:
  - Q = CiA. Where Q is the peak runoff rate, C is the runoff coefficient, i is the rainfall intensity, and A is the drainage area. This formula is primarily used for smaller drainage areas.
- The peak flow rate at each culvert node is used to size the cross-section required to safely pass the storm flow.

This is a proven method used by engineers and hydrologists to estimate flood flows in dry creek channels using statistical data. Climate change impact for various representative concentration pathways (RCPs) will be factored in at the HIRDS stage of the process.

4.3.3. Construction

The Predator-proof fence will be done in stages to ensure its structural integrity and build efficiency. Site preparation will include boundary surveying, vegetation clearance along fence lines, and ground preparation to address topographical challenges.

In general, the fence construction process will involve:

- Temporary Drainage Measures: Interim water management systems, such as temporary diversion culverts, will be implemented to ensure effective sediment control. These measures will work alongside a lizard salvage programme (outlined in the Lizard Management Plan (LMP)). The salvage is within all earthwork areas to protect and relocate native reptile species before ground disturbance
- Vegetation Clearance Zone: A 5m boundary will be maintained around the fence perimeter, keeping clear of all overhanging vegetation. This precautionary measure prevents animals using nearby plants to climb and jump over the barrier
- Earthwork Operations: Excavation will be done to establish proper gradients along fence lines and culverts. Additional earthworks will be required to build an access road along the exterior of the fence line (where possible) to facilitate maintenance and monitoring.
- Fence construction: Construction of fence
- Site rehabilitation and close out: Rehabilitation of all cut surfaces to blend with the surrounding environment. Disturbed surfaces will be seeded with appropriate grass species to restore areas damaged during construction.

4.4. Ecological effects of construction

The potential ecological effects associated with the establishment of the sanctuary fences and all necessary resource consents and wildlife approvals required for the

fences have been considered and addressed in the Terrestrial Ecological Effects Assessment (Alliance Ecology 2025) and the substantive application for the BOGP prepared by Mitchell Daysh Limited. As a result, construction-related effects will not be assessed further in this management plan.

4.5. Archaeological values

Archaeological sites have been identified in the vicinity of the Bendigo Sanctuary. The Bendigo Terraces and surrounding landscape contain cultural heritage values associated with Central Otago's gold-mining history, including structures, features, and artefact scatters. Fence construction and ongoing sanctuary management activities have the potential to disturb or damage these values if not carefully managed.

The following measures will be implemented to avoid, remedy, or mitigate adverse effects on archaeological values during fence construction and sanctuary management:

- **Pre-construction archaeological assessment:** A suitably qualified archaeologist will carry out a targeted assessment of the Bendigo Sanctuary fence line and any areas subject to ground disturbance (post holes, trenching, access tracks) prior to construction commencing. This assessment will identify any recorded or newly identified archaeological sites and features within or immediately adjacent to the construction corridor.
- **Fence route design:** Where practicable, the fence line will be routed to avoid identified archaeological sites and features. This may include deviations from the nominal fence alignment to skirt structures, walls, or other heritage features. Any such deviations will be incorporated into the Fence Design and Construction Plan.
- **Archaeological supervision during construction:** Ground-disturbing construction activities within or adjacent to identified archaeological sites will be carried out under the supervision of a suitably qualified archaeologist. The archaeologist will have authority to halt work if unexpected archaeological material is uncovered, pending further investigation and any required authority under the Heritage New Zealand Pouhere Taonga Act 2014.
- **Ongoing management:** Sanctuary management activities that involve ground disturbance (including post replacement, drainage works, or habitat enhancement earthworks) within or adjacent to identified archaeological sites will be assessed on a case-by-case basis. Where there is potential to affect archaeological values, an archaeologist will be consulted before works proceed.
- **Accidental discovery protocol:** If any previously unidentified archaeological material is discovered during construction or management activities, all work in the immediate area must stop. The discovery must be reported to Heritage New Zealand Pouhere Taonga, and works must not recommence until any required authority has been obtained or the material has been assessed and cleared by a qualified archaeologist.

These requirements apply to the Bendigo Sanctuary. The Ardgour Sanctuary is not known to contain ~~significant~~ archaeological values at this time; however, if any are identified during pre-construction assessment or subsequent management activities, the same protocols will apply.

5. ERADICATION PROGRAMME

5.1. Eradication Programme Overview

To achieve eradication, it is essential to completely remove every individual of each target species, taking into account their behaviours, habitats, and home ranges. Control methods must ensure that no individual escapes. Simply reducing the population will not be considered successful.

The eradication programme will begin in the winter immediately following fence completion and approval by a qualified expert in predator-proof fence construction. The eradication draws heavily on methods and experience from the nearby Mokomoko sanctuary, while also using lessons from successful island and mainland sanctuary projects that have involved mice. These have been adapted for site-specific conditions to ensure sanctuary success.

The following sections detail requirements by phase for complete mammalian pest elimination within the fenced areas, including:

- Aerial baiting operations designed to target mice, rats and possums
- Deployment of intensive bait station and integrated kill trap networks
- Follow-up night shooting targeting possums and larger predators and ungulates (hoofed mammals) (if present)
- Intensive monitoring to detect remaining individuals and eventually confirm pest-free status
- Permanent bait and trap station networks (reduced intensity)

This management plan provides general programme aspects and timings. A detailed Operational Plan confirming exact timings and specifications will be done prior to eradication starting and will follow the requirements outlined in this MSMP.

5.1.1. Target Species

Areas within the BOGP Direct Disturbance Footprint (DDF) and Surrounding Landscape (SL) are under significant ecological pressure from various invasive mammalian pest species (Habitat NZ 2025), including:

- Feral cats (*Felis catus*)

- Feral deer (*Dama dama* and *Cervus elaphus*),
- Feral goats (*Capra hircus*)
- Feral pigs (*Sus scrofa*)
- Hares (*Lepus europaeus occidentalis*)
- Hedgehogs (*Erinaceus europaeus*),
- Mice (*Mus musculus*),
- Mustelids (*Mustela putorius furo, M. erminea*, and *M. nivalis*),
- Possums (Trichosurus vulpecula),
- Rabbits (Oryctolagus cuniculus), and
- Rats (species unconfirmed but presumed to be *Rattus rattus* and/or *Rattus norvegicus*).

While not all mammalian pest species may be present within the fence area during construction, all are targeted for control and eradication, with the exception of rabbits within Ardgour Sanctuary. Rabbit control measures in Ardgour Sanctuary are explained in the section below.

5.1.2. Eradication vs control (special case: Ardgour Sanctuary)

The Ardgour Sanctuary protects threatened cushionfield ecosystems requiring specialised management distinct from standard pest eradication protocols. These ecosystems depend on controlled grazing pressure to maintain ecological integrity and prevent unwanted vegetation taking hold (Simcock 2025). To achieve this, the following exceptions will be implemented for the Ardgour sanctuary:

- Rabbit Management: Population control rather than eradication, as rabbits grazing helps maintain cushionfield structure. Numbers will be managed to prevent overgrazing while preserving beneficial grazing.
- Plant Pest Management: Precautionary 'light touch' approach with reduced herbicides or destructive methods. Selective targeting based on demonstrated impact, with phasing to allow for adaptive management.
- Adaptive Research Programme (ARP): Systematic research (outlined in Applied Research Plan) for conservation management, rehabilitation and expansion of cushionfield (Simcock & Brownstein 2025) will examine pest impacts, control effectiveness, and optimal grazing levels. Improved control measures may be introduced only after comprehensive ecological compatibility assessment and alignment with conservation objectives.

5.1.3. Contingency: sheep grazing if rabbit population control fails

Maintaining rabbit populations at controlled densities within a predator-free enclosure presents genuine management challenges. Within a sanctuary, rabbits are protected from their natural predators and cannot be suppressed by conventional landscape-scale methods such as brodifacoum or pindone that are incompatible with the predator-free environment. If the ARP and ongoing monitoring demonstrate that rabbit populations cannot be maintained within target density ranges, either because control is ineffective or because densities fluctuate in ways that cause unacceptable overgrazing or undergrazing of cushionfield. In this case a contingency programme will be triggered to replace rabbit grazing with managed sheep grazing.

Trigger criteria

The sheep grazing contingency will be triggered if any of the following conditions are met following a formal review by the sanctuary ecologist and, where applicable, in consultation with the ARP team:

- Rabbit density persistently exceeds the upper McLean Scale threshold for acceptable grazing pressure despite repeated control interventions over two consecutive monitoring years; or
- Available control methods within the sanctuary (shooting, fumigation, trapping) are assessed by the sanctuary ecologist as insufficient to reliably maintain target density ranges on an ongoing basis; or
- The ARP concludes that rabbit grazing is not delivering the intended cushionfield management outcomes and that an alternative grazing regime is required.

Transition to sheep grazing

If the contingency is triggered, rabbit populations within Ardgour Sanctuary will be reduced to zero density, with eradication the preferred outcome. Standard eradication methods applicable within the sanctuary environment will be used (shooting, fumigation, trapping). Once rabbit-free status has been confirmed and appropriate habitat assessment completed, a managed sheep grazing regime will be introduced to replace the grazing function previously provided by rabbits. Sheep stocking rates and grazing rotations will be determined in consultation with the ARP team and a suitably qualified ecologist, targeting the same cushionfield maintenance outcomes as the prior rabbit management regime.

Quarantine and biosecurity for sheep entry and exit

Introducing and removing livestock within a predator-proof sanctuary requires strict biosecurity controls to prevent pest incursions. The Ardgour Sanctuary fence system is

capable of managing controlled livestock access; the following protocols will apply whenever sheep are moved into or out of the sanctuary:

- **Pre-entry quarantine:** All sheep must be held in a dedicated quarantine facility outside the sanctuary for a minimum period (to be specified in the operational protocol, noting standard practice of at least 14 days) prior to entry. During this period animals will be checked and treated for any external parasites or conditions that could introduce pest species or pathogens into the sanctuary. Wool must be cleared of any seeds, plant material, or soil that could introduce weed species.
- **Entry and exit via airlock:** Livestock will be moved through a designated airlock gate or race incorporated into the fence design at Ardgour Sanctuary. The airlock must be fully closed on one side before the other is opened to prevent any opportunity for pest species to enter or exit with the animals. A suitably qualified person must supervise all livestock movements through the fence.
- **Post-movement monitoring:** Following each livestock movement event, an intensive monitoring sweep of the sanctuary will be conducted within 72 hours to detect any potential pest incursion associated with the movement. Monitoring will use the standard surveillance tools (tracking tunnels, camera traps, trained dogs where available) deployed across the movement corridor and airlock zone.
- **Removal protocol:** When sheep are removed from the sanctuary (for shearing, veterinary treatment, or end of grazing rotation), the same airlock and post-movement monitoring protocols apply. Any sheep that die within the sanctuary must be removed promptly to avoid attracting scavengers that could compromise the fence or biosecurity integrity of the sanctuary.

Full operational protocols for livestock management within the sanctuary, including stocking rates, grazing rotations, animal health requirements, and detailed airlock procedures, will be developed as a supplementary operational document prior to any sheep being introduced.

5.2. Aerial baiting operations

Ardgour sanctuary will use brodifacoum-based baits only. Bendigo sanctuary will implement a two-phase aerial baiting approach: the initial operation will deploy brodifacoum-based baits for rodents and predators, followed by a pindone application approximately eight months later to control rabbits. This staged approach prevents the pindone operation from negatively impacting rodent and predator eradication results.

5.2.1. Aerial Baiting (Brodifacoum)

Operating Plan 63 compliance

This phase will use aerial and/or hand broadcast methods to distribute Pestoff® Rodent Bait 20R (containing brodifacoum) across the entire site following a systematic grid pattern. Under the Resource Management (Exemption) Regulations 2017, brodifacoum-based applications are exempt from requiring discharge consents under the Resource Management Act 1991, providing all regulatory requirements are met. Therefore, the proposed eradication can proceed without resource consents, as long as the operations adhere to all standards outlined in Operating Plan 63[2].

Brodifacoum will be the primary control method through broadcast toxin application (both aerial and ground-based). This second-generation anticoagulant toxin is effective against mice, rats, hedgehogs, and possums, and is commonly used in New Zealand aerial baiting operations. Brodifacoum is preferred as it represents a novel toxin in this environment.

5.2.2. Aerial Baiting (Pindone)

The pindone operation will target rabbits exclusively within the Bendigo Sanctuary during February-March, approximately eight months after the brodifacoum application. Both operations will follow identical management processes and application protocols, with the exception that pindone will be applied on screened cut carrot bait, while brodifacoum will be applied in pellet form.

The discharge of pindone will be carried out as a permitted activity, as it will be used in a manner that meets permitted activity conditions in both the Regional Water Plan and Regional Air Plan. Further details of how this activity meets permitted activity status can be found in the rules assessment prepared by Mitchell Daysh, a copy of which is provided in Part H of the substantive application documents.

5.2.3. Aerial Baiting Protocols

Prior to bait application:

- A dedicated project manager will be engaged to manage the project
- All required landowner permissions will be secured
- Water supplies and stock water troughs will be disconnected or covered

[2] Pestoff® Rodent Bait 20R is a toxic bait used on offshore islands and mainland sanctuaries. Its application is governed by a formal Code of Practice, currently Operating Plan 63.

- Public notification will be completed via newspaper publication at least two weeks before application
- All livestock will be removed from adjacent paddocks as required
- The aerial operation will use directional sowing within 25 metres of boundaries and will not occur when wind speeds exceed 20 kilometres per hour toward boundaries

Aerial baiting will consist of one pre-feed and three rounds of toxic baiting, spaced approximately 10 days apart. Following initial broadcast treatment, targeted species-specific control measures will be implemented. A detailed Operational Plan will specify exact timings, flight plans, bait quantities, hand-sowing areas, personnel requirements, and all other operational aspects related to aerial baiting, developed in accordance with Operating Plan 63 requirements.

5.3. Targeted Ground Control (0-6 months)

5.3.1. Ground-based shooting operations

Ground-based night shooting operations will start one month after aerial pindone baiting to achieve the following:

- Remove surviving possums and evaluate success of aerial baiting operations for round 1.
- Remove rabbits and hares, which are targeted by pindone aerial baiting operation.

Shooting will be done in 'rounds', with each round consisting of at least three nights of shooting over a two-week period. Operators must hold current New Zealand firearms licenses, demonstrate professional hunting experience, and be equipped with firearms suitable for the target species and terrain. There will be a minimum of three weeks between shooting rounds.

5.3.2. Lagomorph shooting, burrow fumigation and/or trained ferrets

Following the pindone aerial baiting operation, ground-based shooting will target remaining rabbits. It will follow a structured cycle of three shooting nights with minimum three-night intervals between shooting events, followed by a one-month rest period. The same operators and equipment used for lagomorph ground shooting using the same contractors and techniques described in the Mammalian Pest Management Plan (MPMP) will ensure operational consistency.

Burrow fumigation using MagToxin will be done between each shooting round, targeting areas of high rabbit activity within each sanctuary. After completing three operational

cycles, a comprehensive review will assess efficacy. Should rabbits persist following the three rounds of shooting and fumigation, a trained and certified ferret team will be deployed to systematically clear remaining burrows within the sanctuary. This programme will continue until rabbits are eradicated from the sanctuaries.

5.3.3. Intensive bait station network

Following aerial bait operations, rodent bait stations will be deployed on a 25m x 25m grid network as indicated on Figure 3~~Figure 2~~ and Figure 4~~Figure 3~~. These target mice with small station spacing recognising that mice can have very small home ranges (Fitzgerald *et al.,* 1981; Mackay *et al.,* 2011).

Bait stations must be weatherproof and rodent specific. Stations with larger entrances, such as the Novacoil, deliver greater success than those with smaller entrances (Bowie *et al.,* 2010).

Each station will contain 0.02 g/kg brodifacoum pellets, consistent with the aerial baiting operations. These pellets are highly effective and will simultaneously target both mice and rats.

Timing and Frequencies

The following deployment and monitoring schedule will be rolled out for bait stations at each location:

- Week 2 post-aerial baiting: Deploy unbaited stations to allow animals to get used to the new objects
- Week 3 post-aerial baiting: Load stations with bait
- Week 4 post-aerial baiting: First bait station check
- Weeks 6 and 8: Fortnightly checks for two rounds
- Weeks 11+ until 6 months: Three-weekly checks

Bait Management

Baits will be replenished as required. Uneaten bait must be removed to prevent spoilage, as stale bait is unlikely to be consumed by rodents. Typically, bait should not remain in stations longer than four weeks.

Adaptive Monitoring

If bait consumption indicates inadequate checking frequency (i.e., stations empty when checked), station re-fill frequency should be increased accordingly.

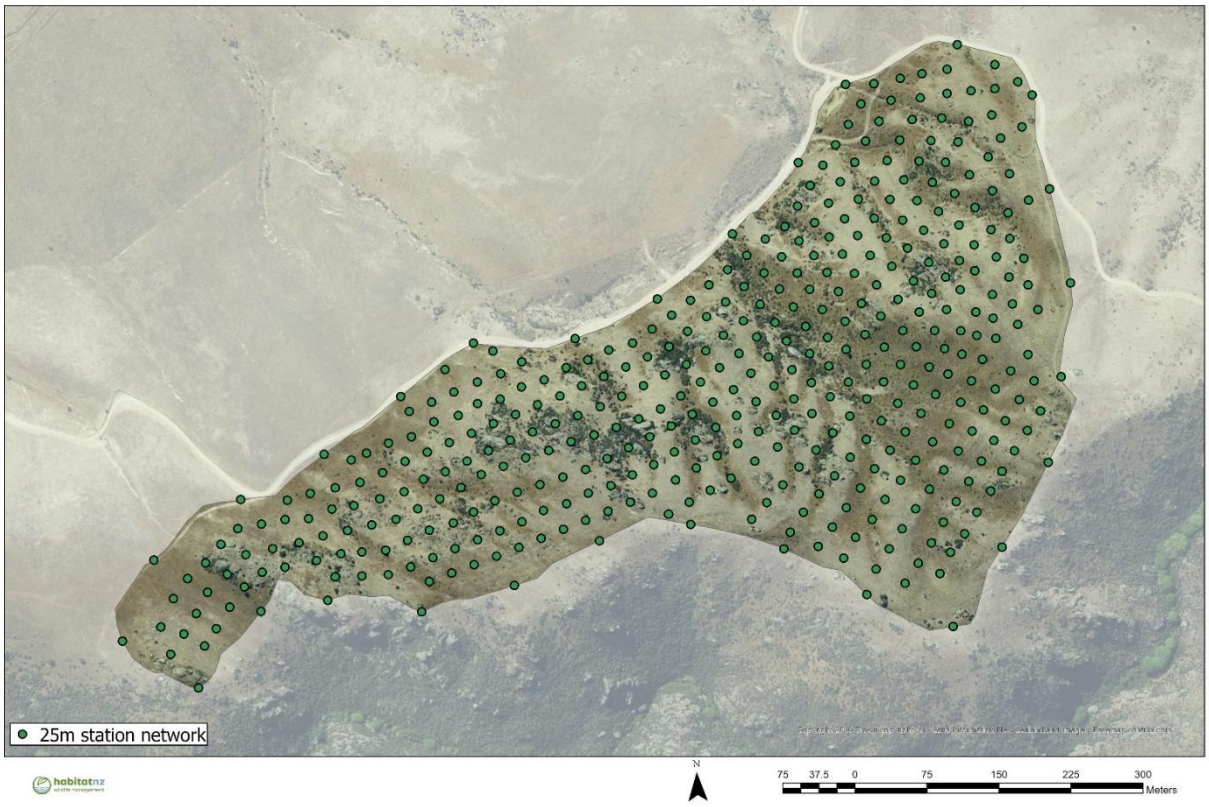


Figure ~~33~~2: Rodent specific bait stations within Bendigo Sanctuary.

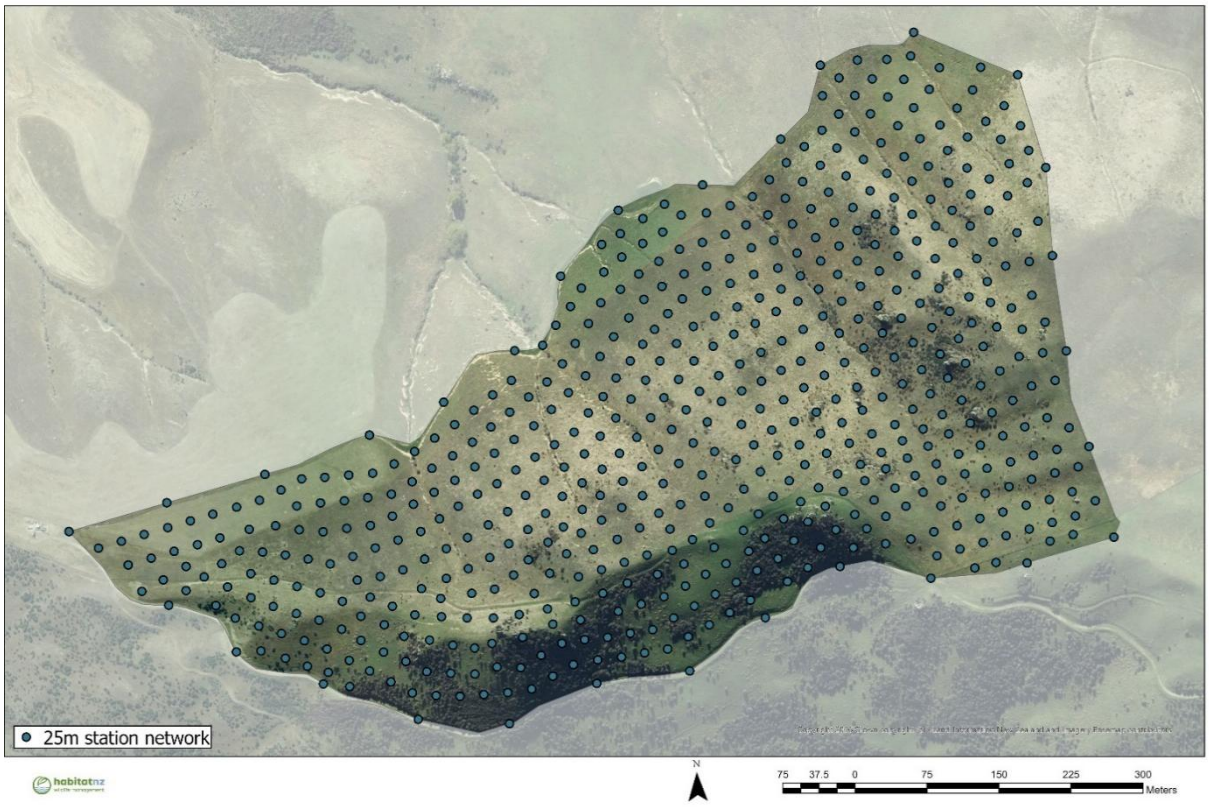


Figure ~~44~~3: Rodent specific bait stations within Ardgour Sanctuary.

5.3.4. Intensive trapping network (0-6 month)

Kill traps will be deployed two weeks after final aerial baiting at integrated stations (Figure 5~~Figure 4~~ and Figure 6~~Figure 5~~) to target feral cats, possums, hedgehogs, and mustelids not targeted during aerial operations. These traps require rapid dispatch and less frequent monitoring.

All traps must meet National Animal Welfare Advisory Committee (NAWAC) animal welfare standards and be approved for target species. Current approved traps are listed on the Bionet website[3].

Each station will include traps targeting feral cats, possums, hedgehogs, and mustelids. Recommended configurations follow, though alternatives may be considered:

- Kill trap targeting feral cats and possums, such as the SA2 Kat Trap
- Kill trap targeting hedgehogs and mustelids, such as the DOC 250 which is currently the only NAWAC-approved option capable of controlling both stoats and ferrets within a single device

Alternative configurations may be considered provided they encompass all target species, particularly if new traps or information becomes available. This could include the use of the Critter Solutions AI trap, which is a self-resetting and multi-species kill trap. While rats may also be caught in DOC series traps, rodents will be specifically targeted using the bait stations.

Goodnature A24 traps are not recommended for the eradication programme as they have had poor success for eradicating (versus reducing) target populations. There are also concerns they may inadvertently impact non-target species including birds (Gillies *et al.*, 2014).

After one year of trapping, the network will transition to a targeted programme with reduced stations in locations of previous high activity or highly suitable habitat, provided catch rates remain low. If trap rates remain high, a review will be conducted to determine why the catch rate is not reducing.

[3] https://www.bionet.nz/rules/performance-traps

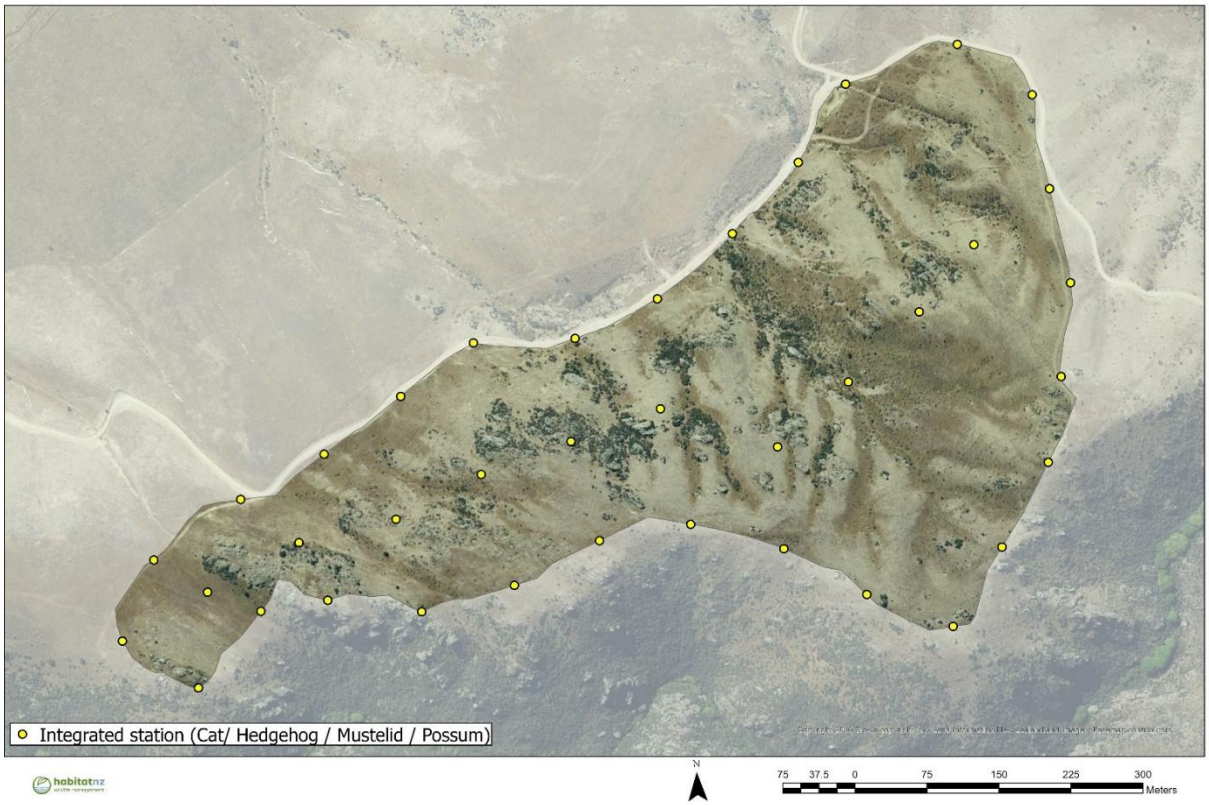


Figure ~~554~~: Integrated stations within Bendigo Sanctuary.

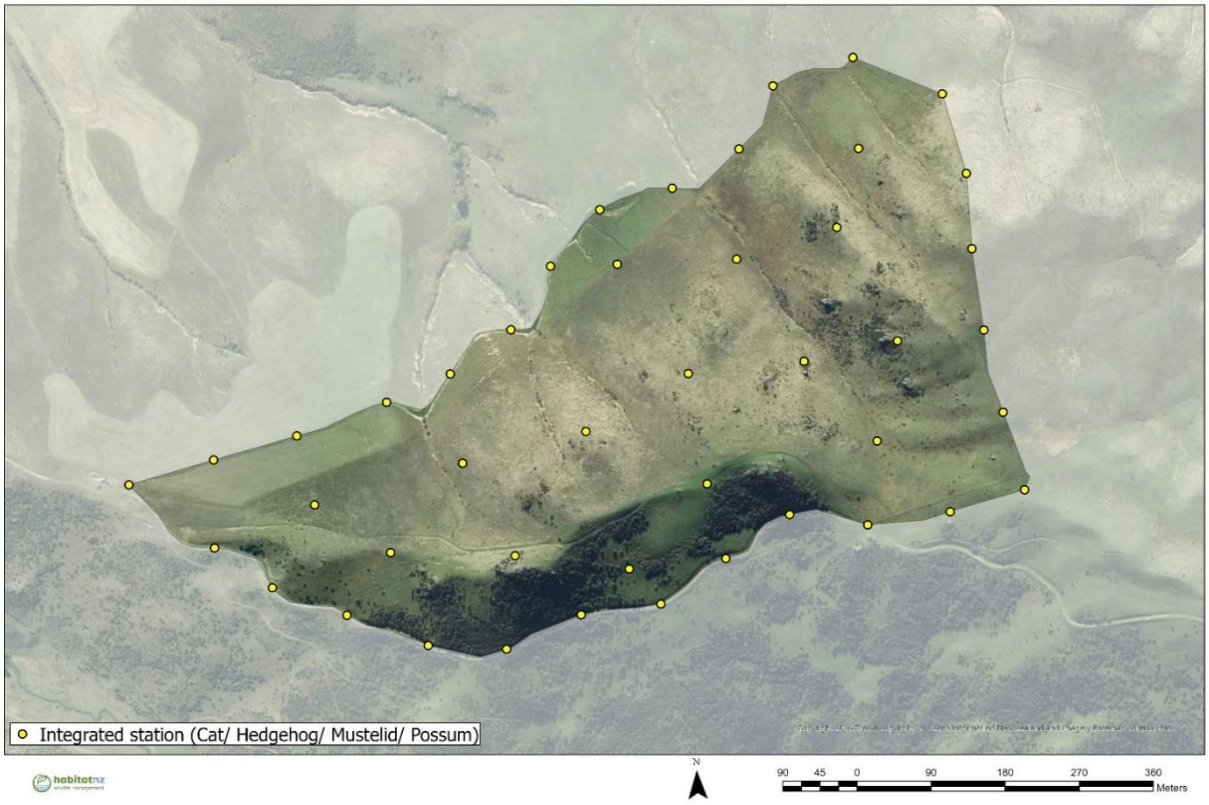


Figure ~~665~~: Integrated stations within Ardgour Sanctuary.

5.4. Reduced intensity control (6-12 months)

5.4.1. Bait Stations

After six months of ground based control within each sanctuary, the bait station density will be reduced to a 50m x 50m grid network (Figure 7~~Figure 6~~ and Figure 8~~Figure 7~~), effectively halving the number of active stations. Unused stations will remain physically in place as 'inactive' units (unbaited) for rapid reactivation if needed.

Active stations will be baited and managed identically to the intensive network and checked at three-weekly intervals. If bait consumption is detected at any station, a reactionary grid will be implemented around that location. Reactionary grid specifications and operational duration are detailed in section 5.4.3.

5.4.2. Kill traps

The kill trap network will continue to operate during the 0-6 month programme, with checks coinciding with three-weekly bait station inspections.

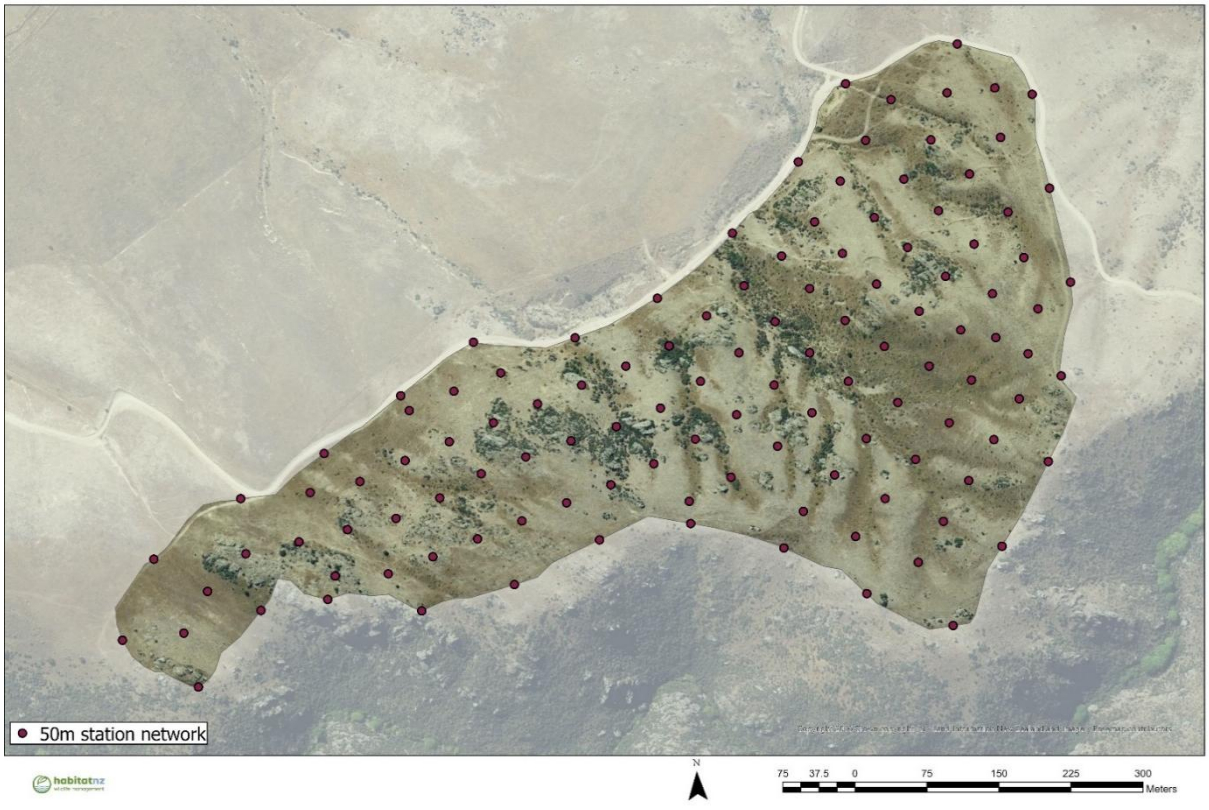


Figure 7~~6~~: Reduced intensity bait station location for Bendigo Sanctuary.

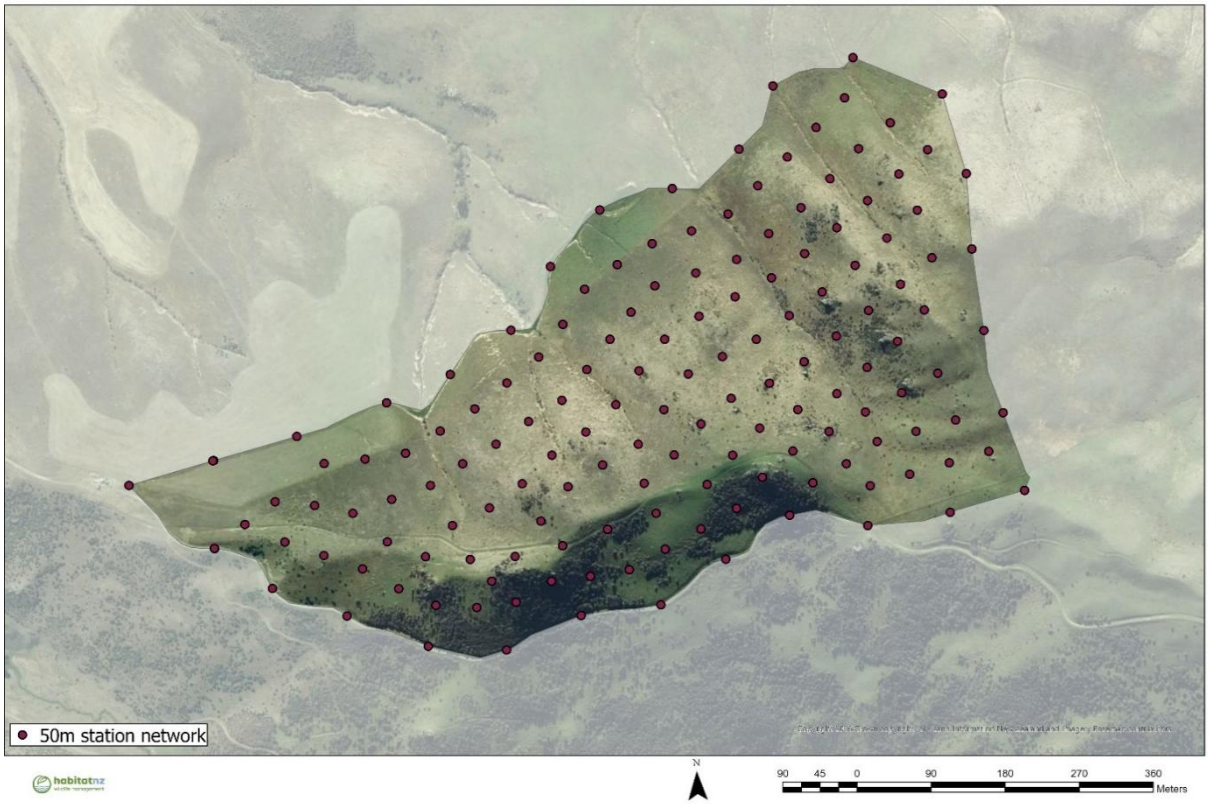


Figure ~~8~~8~~7~~: Reduced intensity bait station location for Ardgour Sanctuary.

5.4.3. Reactionary grid

During the 6–12-month period, bait consumption detection at any 50m x 50m grid station will trigger reactivation of inactive 25m stations within a 2-station radius (see diagram). The response protocol follows:

- Minimum 3 weeks of weekly monitoring
- If consumption stops: maintain bait for additional 3 weeks
- If consumption continues: resume weekly monitoring cycles
- If consumption persists beyond 6 weeks: conduct review to assess population persistence and identify enhanced control measures.

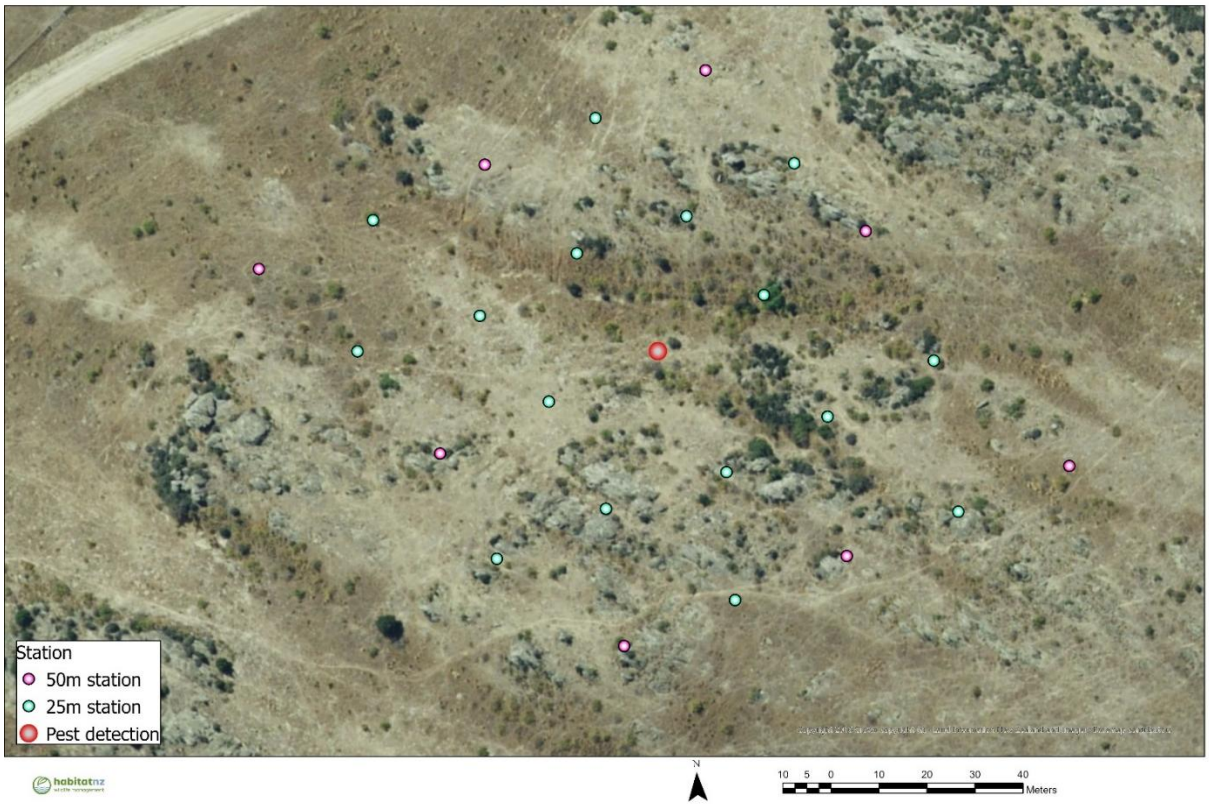


Figure ~~99~~8: Example of a reactionary grid, centered around bait take at a 50x50 m station.

5.5. Reduced intensity ground control network

5.5.1. Mop-up phase (12 months until eradication is achieved)

Bait stations and traps remain deployed at the integrated station locations, and also additional areas of previous high-activity or areas of highly suitable habitat. Any rodent sign will trigger the reactive grid around the area, regardless of where the sign was found (e.g. scat found near a kill trap or monitoring device), while any mustelid, hedgehog, cat or possum sign will result in a trigger reactive grid being established for that species.

This will continue until there has been no sign of target species inside the sanctuary for a continuous 18-month period.

Note, bait consumption is not the only indicator of surviving target species within the sanctuary. Other clear signs of mammalian pest presence include:

- Fresh scat in or around stations, or elsewhere within the sanctuaries
- Chewing or gnawing marks on bait stations or monitoring devices
- Digging or scuff marks on the ground
- Hair or fur.

It is essential to document when chew marks are discovered on stations or monitoring devices to distinguish new damage from existing marks. Rodent droppings can be clearly identified and differentiated between species.

5.6. Eradication Completion Criteria

Complete Elimination Requirement

Eradication success requires the complete elimination of every individual of each targeted species within the sanctuary boundaries, considering individual behaviours, habitats, and home ranges. As stated in the programme overview, partial population reduction will not constitute success. Control methods must ensure no individual escapes exposure to achieve true eradication status.

Timeline Requirements

Complete elimination of all target pest species must be achieved within each fenced area within 3 years of fence completion, as specified in management objective 3.1. The sanctuary will then maintain pest-free status through rapid response eradication of any target species incursions, with complete removal achieved within 6 months of detection.

Confirmation Period

Pest-free status must be confirmed through continuous monitoring showing no sign of target species inside the sanctuary for 18 consecutive months. This confirmation period ensures that seasonal variations in activity, breeding cycles, and detection probability do not result in prematurely declaring eradication success.

Species-Specific Success Indicators

Clear, measurable indicators have been developed for each target species to determine when eradication has succeeded (see Appendix B). These indicators are divided into primary indicators, which must be met for confirmation of eradication, and secondary indicators, which provide additional supporting evidence. All species require an 18-month confirmation period with no detection across multiple monitoring methods.

Special Consideration for Ardgour Sanctuary

Rabbits will be managed through population control rather than eradication to maintain beneficial grazing on cushionfield ecosystems. Success criteria will focus on maintaining optimal population levels rather than elimination and will be directed by learnings from the ARP. If rabbit population control is found to be unachievable, the contingency programme described in Section 5.1 applies: rabbits are eradicated and replaced with managed sheep grazing, subject to the quarantine and biosecurity protocols set out in that section.

6. PLANT PEST CONTROL

6.1. Overview

To achieve the conservation objectives for Bendigo and Ardgour Sanctuaries, pest plant control will happen alongside the predator eradication. This plan will closely follow those detailed in the Biosecurity and Pest Plant Management Plan (BPPMP) which prescribes objectives, methods and timings for pest plant management in the wider BOGP landscape.

Sanctuary area plant pest control is managed under this MSMP to ensure a holistic approach to all areas within the predator-proof fencing. The smaller sanctuary areas, relative to those under the BPPMP, may allow removal of most unwanted plants, not just those specifically identified as pests within the BOGP.

This section describes strategies for managing existing pest plants and responding to new pest plant incursions within both Bendigo and Ardgour Sanctuaries.

6.2. Implementation

6.2.1. Pre-control survey

Plant pest control will start within six months of completing the final aerial baiting operation in each sanctuary. The first step being a comprehensive pest plant survey. Since fence construction timelines may affect plant pest types and numbers compared to the initial assessments, an updated survey will be done at or near fence completion. This survey will identify current pest plant species and inform operational requirements and treatment specs for each area.

6.2.2. Operational plan development

An Operational Plan (OP) will be developed prior to starting plant pest control work. It will use methods specified in the BPPMP for relevant plant species identified by the survey in the sanctuaries. While this plan may operate separately from the BPPMP Annual Operational Plan (AOP) due to differing scales, the work will be coordinated with broader BOGP operations where practical and beneficial to the sanctuaries. Initial control work will target significant reductions of all woody plant pest species and selected herbaceous species as outlined in the BPPMP.

Approved control methods and seasonal timing for each species are detailed in Appendix D of the BPPMP. To avoid duplication, this information is not restated in this MSMP as the approved methods for each pest plant species remain consistent. These methods are developed based on species biology, habitat sensitivity, and seasonal factors.

Control methods will be integrated into the Operational Plan before implementation. Any new species identified during pre-control surveys will be assessed and incorporated into the plan, with control methods developed by qualified personnel.

Species and habitat specific management

There are some species and habitat specific pest plant management that apply to both sanctuaries as follows:

- Application methods where spraying is required. Hand or drone application is recommended over vehicle-based methods to minimise incursion risks (particularly small rodents concealed under vehicle carriages) and reduce risks of vehicles damaging rare plants, ground-dwelling invertebrates, and lizards.
- Ragwort will be selectively removed only if it presents issues for revegetation, or if the Otago Regional Pest Management Plans (RPMP) good neighbour rule is enacted (see Appendix A). This recognises the host plant relationship, the magpie moth (Nyctemera annulata) has with both native and introduced daisies including invasive ragwort (Singh and Mabbet, 1976). If native daisies are planted in the area, ragwort control may be carried out.
- A hybrid approach will be required for Ardgour Sanctuary due to the presence of cushionfields in some areas. Specifically, only "light touch" control methods will be used until otherwise directed under ARP outcomes. Spraying will not occur near cushionfields, with sufficient distance maintained to prevent overspray issues.

7. BIOSECURITY AND PEST PREVENTION

7.1. Overview

New biosecurity protocols will prevent the introduction of mammalian pests, invasive plant species, and potential pathogens into the predator-proof sanctuaries. These sanctuary-specific measures supplement the broader BOGP biosecurity protocols outlined in the BPPMP and are mandatory for all personnel, contractors, researchers, and visitors to maintain sanctuary ecological integrity.

Biosecurity management addresses the following risks:

- Personnel and visitor management
- Access control systems
- Vehicle and equipment protocols
- Management of materials into the Sanctuary
- Surveillance and potential management of redback spiders.

A detailed description of each key risk and management protocols are provided in Appendix D.

7.2. Implementation

Until the predator fence is complete, biosecurity management follows the general BPPMP requirements, which set protocols for all materials, vehicles and equipment used across the BOGP.

Sanctuary-specific protocols for Bendigo and Ardgour Sanctuaries (separate from broader BPPMP requirements) will begin following fence completion and maintain high intensity throughout the sanctuaries' operational lifespan.

Modified protocols may be implemented during prolonged adverse weather periods to sustain surveillance and prevent interruptions in risk management. When standard monitoring or rapid response actions can’t be done safely due to severe weather, activities will resume immediately once safe conditions return and effective intervention is possible.

8. ONGOING MONITORING, SURVEILLANCE AND MAINTENANCE SYSTEMS

8.1. Overview

Ongoing monitoring is essential for complete predator eradication within the fence and to ensure rapid response to any detected incursions. Fence maintenance, incursion management, and regular monitoring will start following construction completion and continue for the 35-year life of consent.

The following sections outline:

- Maintenance and surveillance for maintaining an effective predator-proof fence
- Monitoring for animal and plant pest incursions
- Incursion response protocol for suspected breaches.

8.2. Fence Maintenance and Surveillance

The fence will include an automatic monitoring system for major failures. As new smart technology becomes available, these systems may be upgraded and enhanced accordingly.

Fence infrastructure must still be manually and systematically checked, with regular maintenance, so total eradication can be achieved and maintained. The following checks will be carried out:

- **Post storm event monitoring:** Trained personnel will do drive-around inspections to identify major fence damage and check water drainage structures within 24 hours of every rain event of 15mm or greater.
- **Weekly Inspections:** Trained personnel will do walk or drive-around inspections to identify major fence damage including culverts/stormwater flows.
- **Monthly Inspections:** Trained personnel will do comprehensive walkdowns of the entire fence perimeter, documenting and immediately repairing any damage, holes, gaps, or deterioration, and checking gate functionality.
- **Bi-annual Vegetation Clearance:** If required, maintenance crews will clear woody vegetation adjacent to the outside of the fence using mechanical cutters and approved herbicide application to prevent pest animal access and reduce fence damage from plant growth.
- **Annual Assessment:** An experienced predator proof fence contractor will evaluate all fence components, including mesh integrity, post foundations, junction boxes, and specialised features, generating a prioritised preventative maintenance schedule for the following year.

Staff and contractors will be trained in pest identification and reporting protocols, with all monitoring data recorded to track detection patterns and evaluate system efficacy. The surveillance system will work with fence inspection activities, creating an integrated approach linking fence condition with pest detection.

A comprehensive surveillance database will be maintained to track fence condition assessments, maintenance issues, and pest detections. This database will provide historical data analysis to identify vulnerability patterns, predict maintenance needs, and optimise resource allocation. The system will strengthen long-term sanctuary security management through data-driven insights.

8.3. Monitoring – post-eradication operation

Conventional monitoring techniques will be used throughout the life of the sanctuaries to detect any potential breaches and to confirm the pest-free status of the sanctuary. At least 18 months of monitoring without detections is required to confirm a successful eradication, following the eradication operation.

The regular monitoring tools below will be used during the eradication programme and throughout the sanctuary's operational lifetime to maintain pest-free status:

- Trained pest detection dogs
- Camera trap monitoring
- Non-toxic bait stations monitoring
- Modified McClean Scale monitoring
- Plant pest surveys
- Ad-hoc staff reporting system

This monitoring operates independently from ecological outcome monitoring required under the Biodiversity Outcome Monitoring Management Plan (BOMP). The following sections detail requirements for each monitoring method.

8.3.1. Trained pest detection dogs

Certified detection dogs will be an ongoing monitoring tool to facilitate complete eradication and achieve predator-free status, while also detecting incursions. These specially trained dogs can identify target species through scent detection (scat, urine, ground scent, live or dead animals). Detection dogs are known to be particularly valuable where mustelid eradication is required (NPCA 2018).

Frequency and Timing of Detector Dog Use

- First year of eradication programme: quarterly sweeps

- Second year of eradication programme: six-monthly sweeps
- Year three onwards: annual sweeps conducted during summer or autumn periods to align with peak mustelid activity

8.3.2. Camera trap and automatic surveillance tools

Monitoring will use automated surveillance technology including camera traps and smart AI tools such as CritterPic AI.

Devices will be deployed at indicative locations shown in Figure 10~~Figure 9~~ and Figure 11~~Figure 10~~ below. Given the relatively small, fenced areas, compared to typical broad-scale monitoring, standard line spacing and techniques are not needed. Cameras will be placed at approximately one device per 3 hectares density, sufficient to ensure at least one camera operates within the home range of any target species.

Camera trap placement will follow best practice standards for clear animal pest imaging and must meet the following requirements:

- Cameras positioned on secure vegetation or steel Y posts with lures placed within the camera's field of view to increase detection probability (Glen et al. 2013)
- Camera orientation avoiding direct sun exposure to prevent glare and false triggers (Meek et al. 2012)
- Vegetation cleared within detection zones to reduce false triggers from wind, acknowledging this as a recognised limitation of camera trap technology (Glen et al. 2014)

Deployment methods may be updated as information and research advances, with recommendations likely to evolve over time.

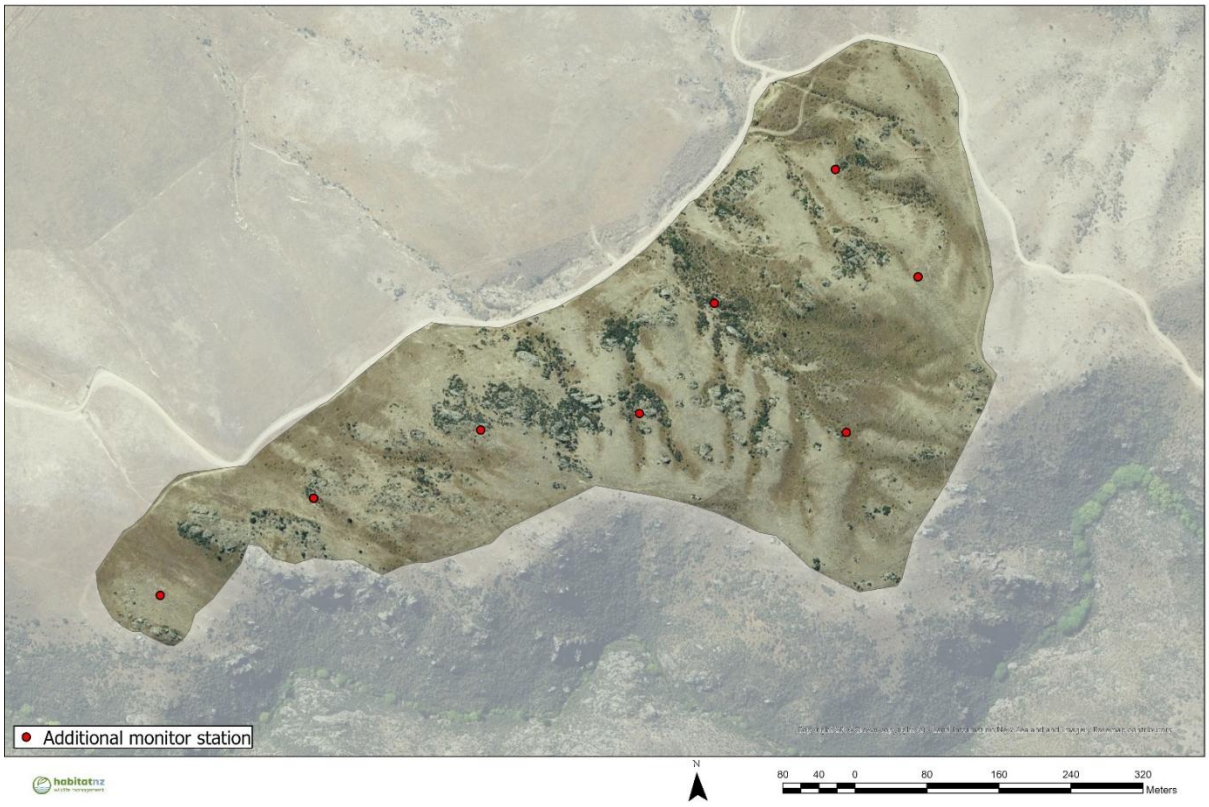


Figure 10~~09~~: Monitoring locations within Bendigo Sanctuary.

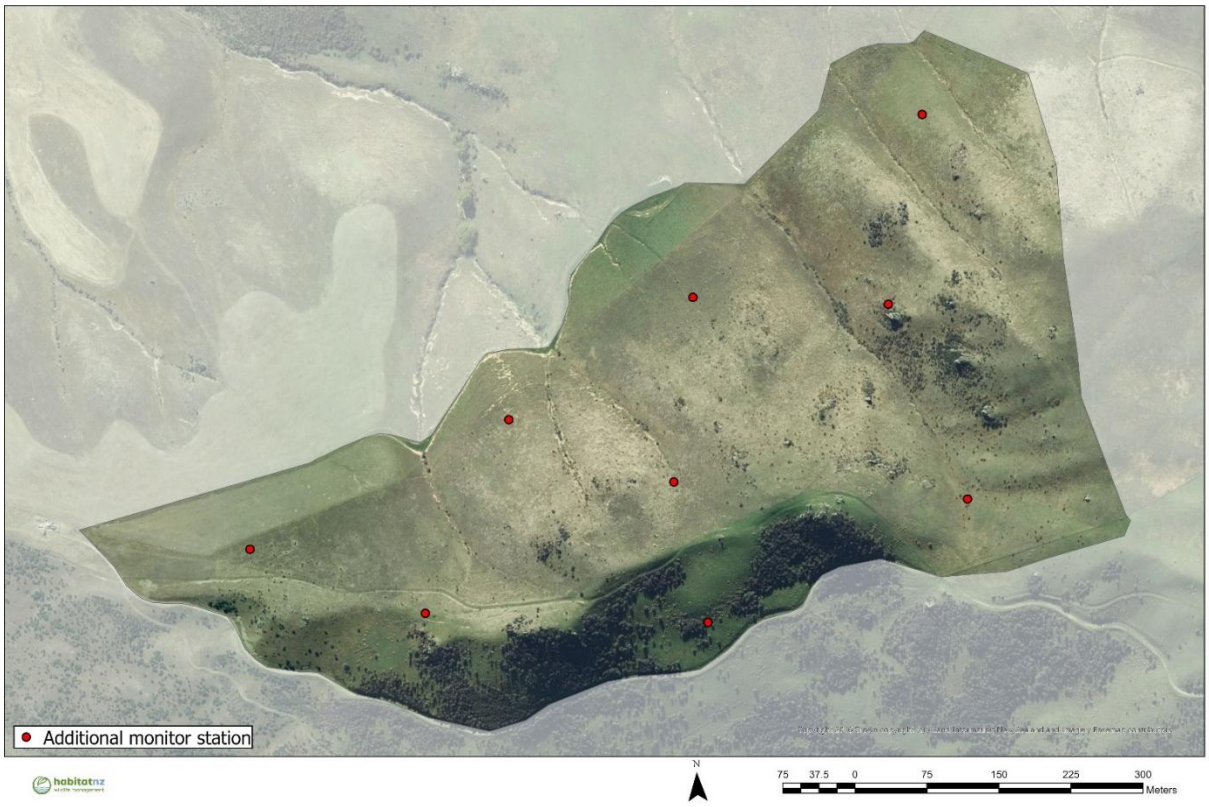


Figure 11~~10~~: Monitoring locations within Ardgour Sanctuary.

8.3.3. Non-toxic bait stations

Rodent monitoring will use permanent bait stations placed at targeted locations, particularly where there was previously high bait take or suitable habitat. Bait will be refreshed as necessary and will be checked every three weeks.

Invertebrates may consume the non-toxic bait, so it is important to look for additional signs of rodents around the monitoring stations (such as droppings or chew marks on the bait stations) as established by Mokomoko Sanctuary protocols.

8.3.4. Modified McClean Scale monitoring

Description

The Modified McLean Scale (Appendix F) will be used to monitor rabbits in the Ardgour Sanctuary. The Modified McLean Scale provides a standardised visual method for quantifying rabbit abundance and grazing impact across pastoral and open landscapes (National Pest Control Agencies 2012). This technique is practical and cost-effective for monitoring rabbit populations over large areas where traditional methods such as spotlight counts, or pellet counts may be impractical or less reliable (McLean et al. 2006, Norbury 2001). The method generates relative abundance indices that correlate well with actual rabbit densities and provides consistent results across different observers when properly calibrated.

At least 3 assessment transects will be required within each Sanctuary. Each transect will have multiple observation points spaced at regular intervals, with McLean Scale ratings recorded at each point. Assessments will be done during good visibility, typically mid-morning hours when grazing impacts are most apparent.

Observers will undergo an initial “calibration” to ensure that the scale is applied correctly and consistently. This can be done with multiple observers assessing the same location and comparing results. New observers will require this calibration process before beginning monitoring to maintain reliable assessments and accuracy.

8.3.5. Plant pest surveys

Plant pests require continuous maintenance due to proximity to other landholdings and areas with plant pest species not yet found within the BOGP.

- Monitoring: Six-monthly vegetation surveys throughout both sanctuaries, with additional targeted inspections of high-risk incursion points (gates, recently disturbed sites). Photographic monitoring of treated locations records control effectiveness. Surveys will align with flowering periods for optimal species identification.

- Response: New pest plant detection triggers rapid identification and assessment to determine if control is appropriate, and what methods will be used if control is warranted, based on species biology, location sensitivity, and seasonal factors.

8.3.6. Ad-hoc staff reporting system

Any personnel entering the sanctuaries may find or notice signs of pest incursions during their visit, regardless of the original intention. Any sign or suspected sign should be immediately reported to the Project Ecologist who will then begin an investigation and carry out incursion protocols.

Staff and contractors will also receive training in plant pest species identification. Opportunistic seedling removal during routine fieldwork will prevent establishment of plant pests and reduce future control costs.

8.4. Incursion Response

A detailed 'Incursion Response Plan' will be developed prior to the completion of each fence and will contain details for key personnel to be contacted in case of a suspected breach.

When pests are detected or fence breaches suspected, a structured response will activate:

- **Fence Inspection and Repair:** Respond to and start repairs to any defects with identified breaches within 12 hours of detection. Although repairs may take time to fully complete, temporary measures will maintain predator-proof protection until all repairs are finished
- **Alert and Mobilisation**: All key personnel alerted within 24 hours, including management team and any pest control contractors who may be required for response. The incident is reported to the designated response coordinator who mobilises necessary resources.
- **Rapid Assessment:** Assessment team determines target pest species, approximate numbers, and location within the fenced area using cameras, chew cards, species-appropriate traps, and detector dogs where available.
- **Species-Specific Control Deployment**:
  - Rodents: Live capture traps, kill traps, detection dogs, and localised toxic control if necessary
  - Mustelids and hedgehogs: Live capture traps, DOC250 kill traps with various lure types
  - Feral cats: Live capture traps, specialised kill traps (SA2 Kat traps, Timms traps), and night shooting

  - Larger species: Shooting operations for ungulates, rabbits and hares
- **Intensive Monitoring:** Continues until successful eradication is confirmed, extending for up to two months after the last individual is believed eliminated, or three months if toxic methods were employed.
- **Post-Incursion Review:** Documents the event, analyses fence vulnerabilities, evaluates response effectiveness, and identifies improvements to fence design and pest management practices.

Equipment and resources will be maintained on-site or nearby to enable response actions within 48 hours of detection. The complete incursion response plan with key personnel contact details will be kept on-site along with the Eradication Operational Plan**,** with all staff receiving regular briefings on procedures.

9. HABITAT ENHANCEMENT AND SPECIES MANAGEMENT

The sanctuaries include the same diverse lizard and invertebrate species found across the BOGP site, which are locally abundant in suitable habitat. Successful habitat management requires:

- establishing shelter through appropriate rocks and structural plants such as tussocks,
- food sources including invertebrates and plants
- suitable temperature and moisture regimes across connected territories.

Existing habitat complexity differs between the two sanctuaries, with the Bendigo Sanctuary already containing more structurally complex habitat while the Ardgour Sanctuary features less structurally complex habitat. Specialised habitat features, including constructed rock stacks, will be established to provide microhabitats for lizard, invertebrate, and plant species. The habitat enhancement methods referred to in this section employ the same rock stack construction approach as the Landscape and Ecological Rehabilitation Management Plan (LERMP). Revegetation with native plant species will increase structural complexity and food availability, supporting native invertebrates and lizards through the food web.

9.1. Implementation Framework

This section establishes methods and success criteria for developing optimal lizard and invertebrate habitat including dense tussock zones, individual rocks, and rock refugia systems with appropriate native plants. Visual documentation illustrates target outcomes versus unacceptable results, with efficacy measured through systematic monitoring of habitat colonisation and population dynamics over time.

The sanctuary management approach integrates habitat enhancement strategies, with novel techniques to create resilient, self-sustaining lizard and invertebrate populations within the sanctuaries.

9.2. Habitat enhancement

Lizard and invertebrate habitats will be improved across both sanctuaries by installing specific "Lizard Habitat Features" (LHF) as described in the LERMP. Each feature will include a rock stack and surrounding sparse rocks with clusters of planted tussocks and shrubs.

Rock refugia density is fundamental to lizard population size, particularly geckos. This activity will be emphasised in the Ardgour Sanctuary due to its less structurally complex state compared to the Bendigo Sanctuary, though both sanctuaries will receive

appropriate improvements. Strategic placement of stable rock outcrops and constructed rock stacks will provide centuries of shelter, creating essential microclimate refugia and supporting diverse plant communities.

Rock stacks and outcrops function as plant refuges, creating and sustaining both plant diversity and invertebrate populations critical during fires and climatic extremes. Rock placement will complement natural landscape patterns to maintain authenticity while optimising habitat function.

This plan establishes the high-level strategy and guidance framework for LHF placement. It does not substitute for on-ground ecological assessment prior to construction. Constructed rock stacks and rubble pits placed without reference to existing ecological values risk damaging rather than enhancing sanctuary values, for example, by burying intact cushionfield, disturbing existing invertebrate habitat features such as natural schist outcrops with established communities, or interrupting drainage patterns that support spring annual flora. Before LHF construction commences in each sanctuary, a qualified ecologist must carry out a pre-construction survey to identify existing high-value habitat features and define exclusion zones or modified placement criteria to prevent this "leakage" effect. The outputs of this survey will guide the exact siting, configuration, and density of LHFs on the ground, superseding the general density targets set out in this plan where conflicts with existing values are identified.

Tussock management represents the second fundamental component, as tussock presence directly influences skink density. Management involves protecting existing mature tussocks and establishing new areas using nursery-propagated plants in areas identified on Figure 12~~Figure 11~~ and Figure 13~~Figure 12~~.

9.3. Revegetation

Predator-proof sanctuaries facilitate natural vegetation enhancement by reducing browsing pressure. Revegetation accelerates restoration where natural regeneration is insufficient, reinforcing established populations and re-establishing historically present species. Priority is given to species supporting food webs for terrestrial invertebrates, lizards, and birds.

Additional plantings will align with surrounding management areas. Ardgour Sanctuary targets gullies unlikely to support cushionfields, focusing on small kowhai nodes for avifauna habitat plus other forest plantings described in the Ardgour Restoration Area Management Plan (ARAMP). Bendigo Sanctuary will create diverse grey scrub habitats with high food-value species for native fauna using LERMP methods and species in areas identified on Figure 12~~Figure 11~~ and Figure 13~~Figure 12~~.

Flexible planting will adapt species selection to microsite characteristics and incorporate lessons from previous works. Sanctuary plantings will start later in the project timeline (from year 2 onwards), if needed.

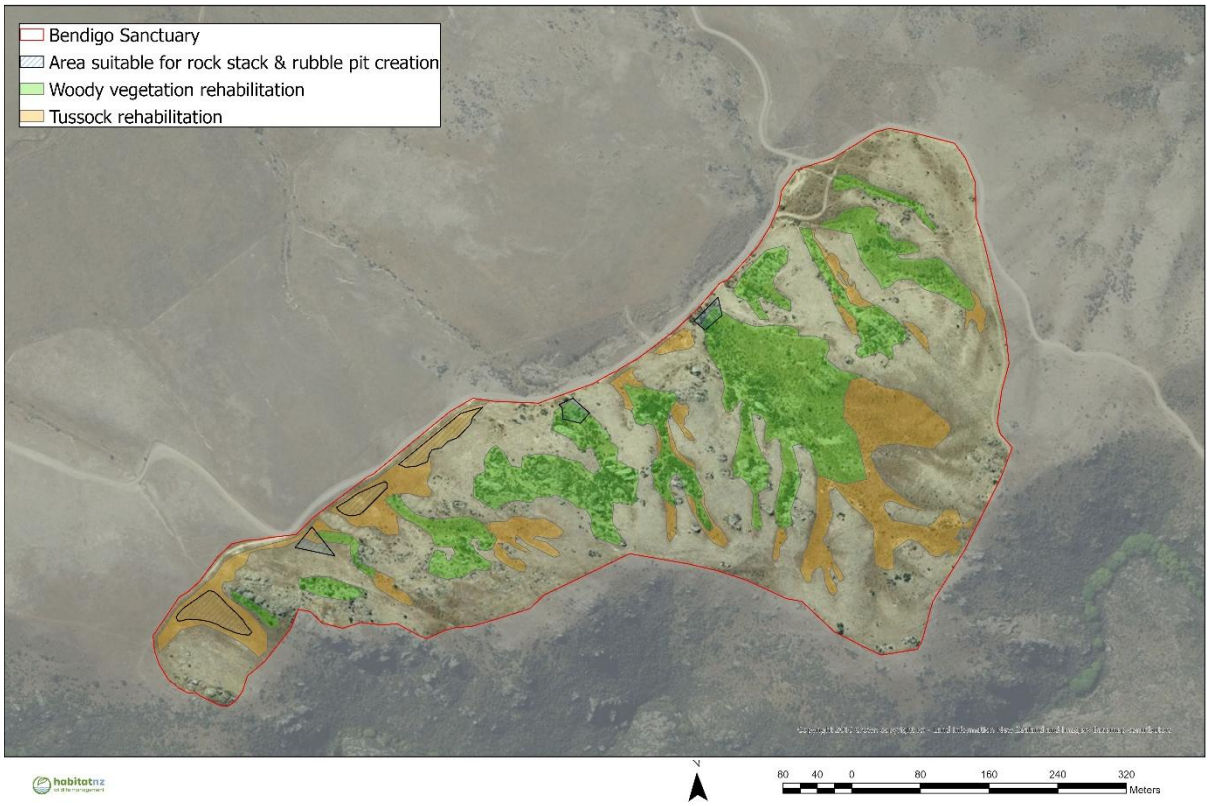


Figure 12~~11~~: Potential Bendigo Sanctuary rehabilitation areas.

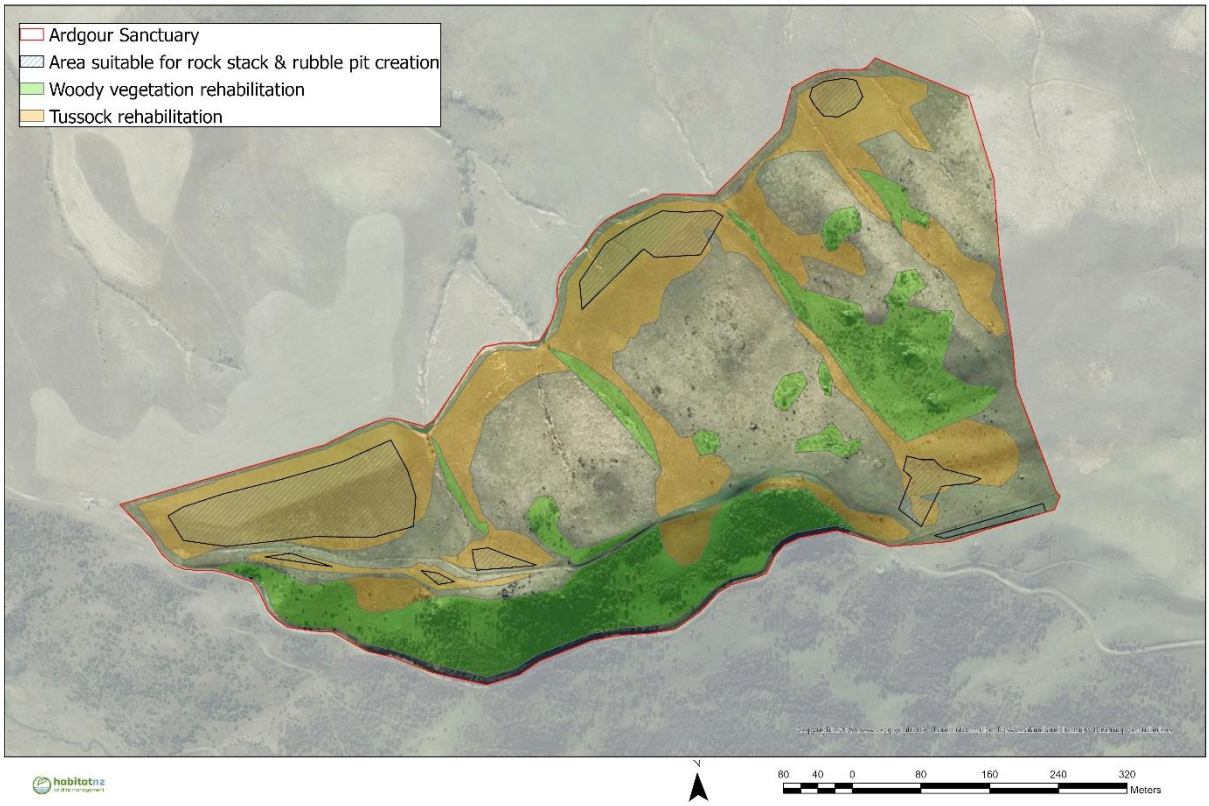


Figure 13~~13~~12: Proposed Ardgour Sanctuary rehabilitation areas.

A formal annual monitoring programme will determine planting success throughout the five-year maintenance period for each planted area. Monitoring will start at the end of the first full growing season and continue at seasonal intervals to track progress and inform adaptive management. Note that this monitoring is different from the outcome monitoring under the BOMP programme.

Further detail on the proposed planting & monitoring programme for success is provided in Appendix G.

9.4. Native species relocations from salvage operations

Native species salvage and relocation will be done prior to vegetation/habitat clearance both within the DDF and during fence construction.

The following species may be relocated into the sanctuaries:

- The short-horned grasshopper (*Phaulacridium otagoense*) which is nationally classified as 'At Risk-Declining', recovered from any salvage and relocation operation
- Native lizards **recovered during fence construction** will be relocated into the area enclosed by the newly built fence.

These salvage and relocation efforts will be carried out according to the described method and intensity in the LMP (Lizard Management Plan) and Terrestrial Invertebrate Management Plan (TIMP). Including collection methods, handling protocols, site selection criteria, and monitoring requirements.

The following species will not be relocated into either sanctuary:

- Native lizards from salvage and relocation operations **outside of the fence construction** (i.e. within the mining and ancillary earthworks). As doing this may make it difficult to assess how much the sanctuary benefits existing lizard populations for compensation evaluation
- New species of weevil (*Inophloeus* new sp.) from any salvage and relocation operation, as its host plant (Taramea) does not naturally occur at elevations below approximately 800m ASL.

10. BIODIVERSITY OUTCOMES

The sanctuary programme must provide measurable conservation benefits through predator exclusion, vegetation enhancement and habitat creation. This section describes required biodiversity outcome monitoring and potential relocation programmes for critically endangered skinks within the Otago region. The programme is designed to deliver measurable benefits across multiple taxa, not lizards alone. The specific outcomes sought across taxon groups are:

- **Lizards:** Population recovery of lizard species within the sanctuaries, with conditions suitable for the translocation of critically threatened skinks within six years of eradication completion. Mouse eradication must be confirmed as complete before any lizard translocation proceeds (see Section 10.2).
- **Invertebrates:** Measurable increase in native invertebrate diversity and abundance within both sanctuaries relative to baseline. Management for invertebrates will be treated as a distinct objective from lizard management: while the two often overlap, lizard habitat requirements and invertebrate habitat requirements may differ, and management decisions will not assume that outcomes beneficial to lizards are automatically beneficial to invertebrates.
- **Vegetation:** Increased cover and diversity of native vegetation species, particularly those supporting native food webs. For Ardgour Sanctuary, measurable maintenance and enhancement of cushionfield extent and condition, with specific monitoring of spring annual flora communities, is required.
- **Birds:** Detectable increases in native bird species presence and abundance within sanctuary boundaries relative to baseline, with results interpreted with appropriate caution given small sanctuary size and monitoring constraints.

10.1. Terrestrial Biodiversity Outcome Monitoring

Biodiversity outcome monitoring for both sanctuaries is fully described in the BOMP. The BOMP will be the key document that manages this monitoring as time passes, and any changes to that document will result in changes to the monitoring within the sanctuaries. With that said, an overview of the monitoring programme (at the time of writing July 25) is presented in Appendix G.

In broad terms, this monitoring involves:

- **Vegetation**: Photo points, species richness, basal area, density assessments, herbaceous cover
- **Lizards**: Artificial Cover Objects (ACOs) and manual searching

- **Invertebrates**: Live pitfall trapping, timed searches, light traps at select stations
- **Bird monitoring:** 5-minute bird counts (results may be limited due to small sample sizes resulting from the required 200m minimum spacing between stations.

The monitoring and reporting schedules are as follows:

Baseline Monitoring Schedule

- Begins at least 12 months prior to starting ecological rehabilitation or offset/compensation actions
- Timing varies - some work cannot begin until introduced mammalian predators are eradicated from within each Sanctuary.

Reporting Schedule

- Baseline report at completion of baseline monitoring (Year 0)
- Five-yearly reports in tandem with BOGP annual compliance report
- Final biodiversity outcome report upon completion of monitoring programme (35 years after commencement).

10.2. Threatened Species Recovery Programme

A key reason and benefit for creating these sanctuaries is to provide secure environments for relocating critically endangered wildlife. This section outlines the benefits of sanctuary-based threatened species ~~recovery, and~~recovery and shows why this site would be suitable for such programmes, along with the most appropriate species to target for the future. This is not a formal relocation proposal.~~,~~ Any potential relocation initiatives will be designed, assessed, and implemented in full partnership with the relevant DOC Threatened Species Recovery Groups.

This collaborative approach ensures sanctuary relocation efforts align with national species recovery priorities. It also provides the use of best-practice methods, and effective contribution to broader conservation strategies. All relocation proposals will undergo evaluation by established DOC protocols to ensure programmes complement existing conservation efforts while maintaining the highest standards of species welfare and recovery outcomes.

10.2.1. Prerequisites for Lizard Translocation

Before any lizard translocation into either sanctuary is approved, the following prerequisites must be formally verified:

- **Mouse eradication confirmed:** Complete mammalian predator, particularly mouse eradication within the sanctuary must be confirmed prior to any lizard

translocation. This is the single most critical prerequisite. Without effective mouse eradication, predation pressure on hatchlings and juveniles will directly compromise translocation outcomes. Confirmation requires 18 continuous months with no rodent sign within the sanctuary, as per the eradication completion criteria in Section 5.6.

- **Release site suitability assessed:** Habitat within the receiving sanctuary must be independently assessed as suitable for the target species prior to translocation, including verification that sufficient food resources, refuge structures, and appropriate vegetation cover are established.
- **DOC and Recovery Group approval:** Any translocation proposal must be developed in partnership with the relevant DOC Threatened Species Recovery Group and receive formal approval before implementation. Translocation of critically threatened species requires a formal translocation proposal, species identification verification, and independent assessment of sanctuary carrying capacity.

~~10.2.1.~~10.2.2. Priority Species: Critically Threatened Skinks

While numerous critically endangered species could benefit from sanctuary relocation, skinks represent the most suitable candidates for successful establishment. Large lizards have been successfully relocated to predator-proof environments. The Mokomoko Sanctuary has proven this by successfully establishing populations of grand skinks (*Oligosoma grande*) and Otago skinks (*Oligosoma otagense*), using a validated methodology.

Large-bodied skinks offer optimal relocation characteristics: physical resilience during handling, territorial behaviour promoting site retention, and habitat preferences matching sanctuary features. Given their critically threatened status and documented success at Mokomoko, these skinks are ideal sanctuary candidates, offering maximum conservation impact while generating research insights for other recovery initiatives.

~~10.2.2.~~10.2.3. Programme Potential and Benefits

The potential critically threatened skink relocation programme is a key conservation initiative that would create additional breeding populations of native lizard species in predator-free habitat. Benefits include:

- preserving genetic diversity,
- risk distribution across multiple sites enabling comparative studies ~~and~~
- an enhanced research platform for advancing skink ecology and management.

The sanctuaries high-value habitat (constructed rock refugia, native vegetation restoration, integrated predator management) creates optimal conditions for successful establishment and population growth. This initiative directly helps species recovery while serving as a flagship programme that demonstrates effective habitat restoration and species management, for future conservation efforts across New Zealand.

~~10.2.3.~~10.2.4. Target Species for Future Consideration

Two species of critically endangered skink that historically have been found in the Otago region are:

- Otago Skink (*Oligosoma otagense*): New Zealand's largest skink species, classified as Threatened – Nationally Critical. Found primarily in the Otago region in tussock grasslands and rocky outcrops.
- Grand Skink (*Oligosoma grande*): Classified as Threatened – Nationally Critical, this skink is found in similar habitats to the Otago skink in Central Otago's dry tussock grasslands and rocky areas.

One species of gecko that historically has been found in the Otago Region is:

- Jewelled Gecko (*Naultinus gemmeus*): Classified as At Risk – Declining, and can be found throughout Otago's forests and shrublands, but has not been found at the BOGP site.

These species are endemic to New Zealand and face severe population decline due to habitat loss, predation, and fragmentation of their remaining habitat. They are among New Zealand's most endangered reptiles, with populations restricted to small, scattered locations primarily in Central Otago's schist landscapes.

~~10.2.4.~~10.2.5. Species Suitability Factors

These Critically Threatened skinks and At Risk gecko species are exceptionally well-suited to relocation within fenced sanctuaries for the following reasons:

- **Proven Relocation Success:** All three species have shown successful establishment within predator-proof fenced environments, as evidenced by the Mokomoko Sanctuary programme. This provides confidence in relocation method and expected outcomes for new sanctuary sites.
- **Predator Vulnerability:** All species are highly vulnerable to introduced mammalian predators (particularly mustelids, cats, and hedgehogs) that have decimated wild populations. Predator-proof fencing eliminates this threat, allowing populations to recover without constant predation pressure.

- **Habitat Specialisation:** These species thrive in specific habitat elements that sanctuaries can provide - extensive rock refugia, native tussock grasslands, and appropriate microclimates. Their preference for rocky outcrops and crevices makes them ideal candidates for constructed rock stack habitats.
- **Large Body Size Advantage (for skinks):** As New Zealand's largest skinks, they are more resilient to handling and relocation stress compared to smaller lizard species. This improves their chance of survival during capture, transport, and establishment.
- **Territorial Behaviour:** Their relatively sedentary nature and strong site fidelity means they are likely to remain within sanctuary boundaries once established. Thereby reducing dispersal losses and making population monitoring more effective.
- **Research Benefits:** Their size and markings make them easier to study by radio-tracking, behavioural observation, and health monitoring, providing valuable data to refine relocation techniques for other threatened reptiles.
- **Conservation Impact:** Given how endangered these species are, a successful sanctuary would provide immediate, measurable conservation benefits with high public and scientific value, justifying the major investment in predator-proof fencing.

~~10.2.5.~~10.2.6. Species recovery summary and future potential

The sanctuary's threatened species recovery programme represents a significant opportunity to contribute to New Zealand's conservation efforts for critically endangered reptiles. The predator-proof environment and habitat enhancement create an ideal space for species recovery initiatives and serves as a model for future programmes.

Focus on critically threatened skinks using proven methods while addressing urgent conservation needs through secure breeding, research, and public support. Success will depend on careful planning and collaboration with DOC's Threatened Species Recovery Groups to ensure alignment with national priorities while maintaining the highest welfare and scientific standards. The sanctuaries represent both opportunity and responsibility to preserve New Zealand's biodiversity heritage.

12. DATA MANAGEMENT AND RECORDING REQUIREMENTS

Maintaining clear, accurate and timely records of every eradication and monitoring action underpins effective sanctuary management. This enables accurate performance assessments, supports compliance auditing and facilitates decision making.

This section outlines the data management system and data collection requirements expected under the eradication and surveillance programmes.

12.1. Data Management System

All eradication and monitoring data must be entered into a single, cohesive data management system during field operations.

Staff and subcontractors will record field data in real-time, ensuring accurate location information and prompt reporting. For areas without mobile coverage, data collection sheets will be provided with subsequent digital entry required within 48 hours of field operations.

The system will be designed to ensure that no data collection is missed and must incorporate the following:

- Ability to capture data using mobile/tablets
- Configuration with GIS/GPS coordinates for pre-existing or new deployed devices
- Device assigned unique id codes and classified by device type/area
- Clear and consistent processes for inputting all data collection
- Zone boundaries and user roles clearly defined within the system
- Daily or session-end synchronisation of field data to the centralised database to ensure real-time data availability for management
- All data storage uses centralised, searchable formats with backup protocols.

It is recommended that the system has clear reference tables covering approved methods, trap models, bait formulations, device settings and field ID guides for target species.

12.2. Data Collection

All field activities require standardised data capture covering core operational information and activity-specific details. Detailed requirements for specific programme activities are provided in Appendix H.

Key data elements of all recorded information include:

- **Device Information:** Unique identifiers for all traps, bait stations, and monitoring devices with precise location data and device specifications
- **Visit Records:** Complete documentation of all device checks including both successful captures and "no catch" events
- **Bait and Lure Data:** Detailed recording of all bait applications including substance type, quantity deployed, uptake rates, and replacement frequency
- **Species Data**: Detailed information on captured pests including species, sex, and age where determinable
- **Operational Details:** Documentation of device status changes and maintenance activities.

Data integrity depends on robust validation and systematic quality assurance processes. Field-level validation through mandatory field requirements and verification within mobile applications can prevent data entry errors at source. Regular quality assurance audits reconcile field logs with database entries and GIS layers to ensure data integrity and identify systematic issues requiring correction.

13. REPORTING SCHEDULE AND FORMATS

This MSMP has several reporting requirements including a dedicated section within the BOGP Annual Ecological Monitoring Report, which consolidates monitoring and outcomes from all BOGP ecology components. Additional reports are required regularly throughout the year and when events occur that could immediately affect management (i.e. incursions).

All reports are intended to maintain effective management of the Bendigo and Ardgour Sanctuaries and guide conservation decision making. Requirements for each report are detailed as follows:

- Monthly operational reports prepared by contractors provide a summary of work undertaken within the previous month including
  - Operations carried out
  - Species captures and bait take
  - Documentation of all toxin applications (including quantities)
- Quarterly Review of contractor monthly reports and work undertaken to evaluate emerging patterns and address any issues in a timely manner
- BOGP Annual Ecology Monitoring Report prepared by various management areas, the MSMP section must include
  - Statistical analysis of catch rates, bait consumption, detection frequencies on monitoring devices and changes in pest distribution over time
  - Statistics should be presented to clearly display potential temporal/spatial trends or patterns
  - Details of possum and rabbit ground control operations
  - Details of biosecurity breaches or incursions/response works, if applicable
  - Comprehensive evaluation of the pest control programme against management objectives with recommendations for improvement
- Incursion Reports to provide detailed documentation of any breaches or incursions within 7 days of resolution

14. VERIFICATION FRAMEWORK

The term 'verification' describes activities required by this MSMP, that maintain clear distinction from outcome monitoring conducted at the BOGP site under the BOMP monitoring programme. Auditing processes ensure MSMP implementation efficacy, regulatory compliance maintenance, and provide reliable information for adaptive management decision-making across all MSMP work phases.

14.1. Verification and Compliance Overview

A comprehensive verification and compliance framework ensures all pest management activities meet regulatory requirements and operational standards. This systematic approach covers all phases of implementation from pre-work prep through ongoing operational compliance. The auditing framework operates at four levels:

- Pre-implementation verification ensures programme delivery meets all regulatory and operational requirements before field activities start
- Implementation verification confirms work follows approved plans along with evaluation of programme effectiveness
- Record keeping verification ensures data quality, consistency and accessibility
- Compliance verification ensures all regulatory requirements are followed and the compliance tracking register is maintained.

This approach provides accountability while supporting ongoing programme improvement. It also ensures all pest management activities maintain the highest standards of regulatory compliance, operational safety, and environmental protection while providing robust documentation for adaptive management and future planning decisions.

Detailed verification and compliance procedures are provided in Appendix I.

15. ADAPTIVE MANAGEMENT

The Bendigo Sanctuary will be completed and eradication operations commenced prior to final completion of the Ardgour Sanctuary. This approach provides significant operational and learning benefits to achieve the objectives, allowing real-time improvements to eradication methods based on field experience and performance data for the site.

All operational data, challenges, and successes from the Bendigo Sanctuary eradication will be documented and analysed to inform the Ardgour Sanctuary programme. This includes:

- Effectiveness of different control methods across varying terrain and habitat
- Optimal timing and frequency of monitoring activities
- Equipment performance and deployment strategies
- Species-specific behavioural responses to control measures
- Logistical challenges and operational refinements.

15.1. Programme Reviews and Triggers

Regular performance assessments will ensure programme efficacy and continuous improvement:

- 6 Monthly Reviews (Years 1-2 for each sanctuary): Assessment of eradication progress, control method efficacy, monitoring data analysis, and protocol adjustments based on performance.
- Annual Reviews (Year 3+): Assessment of programme efficacy, long-term trend analysis, technology updates, and strategic planning.
- If standard protocols don't achieve the desired results, specialized reviews will assess the situation and programmes may be modified. Such reviews may be triggered by events like:Target species detection beyond 6 months post-eradication
- Multiple incursions of the same species within 12 months
- Failure to achieve eradication within target timelines
- Repeated incursions in the same location
- Detection of previously unidentified pest species.

Specialised reviews will be tailored to the respective trigger(s) and may include an assessment of fence integrity, habitat factors, detection timeframes, biosecurity protocols, and alternative control methods.

APPENDIX A. RPMP PLAN RULES AND REQUIREMENTS

Table ~~4~~43. RPMP Plan Rules relating to mammalian and plant pest species across the BOGP

Rule	Description from RPMP	Explanation of rule from RPMP
Rabbits		
Plan Rule 6.4.6.1	An occupier within the Otago region shall control feral rabbit densities on the land they occupy to at or below Level 3 on the Modified McLean Scale. A breach of this rule creates an offence under section 154N(19) of the Act.	The reason for this rule is to maintain the population levels of feral rabbits to that which prevents adverse effects on the economic values of occupiers, and in so doing, prevent the possible adverse effects on wider environmental values.
Plan Rule 6.4.6.2	An occupier within the Otago region shall, upon receipt of a written direction from an Authorised Person, control feral rabbit densities on their land to at or below Level 3 on the Modified McLean Scale within 500m of the property boundary where the occupier of the adjoining property is also controlling feral rabbit densities at or below Level 3 on the Modified McLean Scale within 500m of that boundary. A breach of this rule creates an offence under section 154N(19) of the Act.	The reason for this rule is to manage the spread of feral rabbits causing unreasonable costs to the adjacent occupier where active feral rabbit management is being undertaken by that occupier. Any written direction pertaining to non-compliance will only be initiated upon a complaint from the adjoining affected occupier.
Plan Rule 6.4.6.3	Other than under the instruction or supervision of an Authorised Person, no person shall discharge a firearm within or across a property prior to a control operation involving bait or where a control operation involving bait is being undertaken on the property to manage feral rabbits. A breach of this rule creates an offence under section 154N(19) of the Act.	The purpose of this rule is to prevent human interference prior to any necessary control operations by Otago Regional Council.
Nodding thistle		
Plan Rule 6.4.4.1	Note: This is designated a good neighbour rule.	The reason for this rule is to manage the spread of nodding thistle causing unreasonable costs to an adjacent occupier who is undertaking active nodding thistle management within 100m of their property boundary. Any action pertaining to non-compliance will only be initiated upon a complaint.

	All occupiers in the Otago region on rural zoned land shall eliminate nodding thistle infestations on their land within 100m of the property boundary where the occupier of the adjoining property is eliminating nodding thistle infestations within 100m of that boundary. For the purpose of this rule, eliminate means the permanent preclusion of the plant's ability to set viable seed. A breach of this rule creates an offence under section 154N(19) of the Act.	
Broom		
Plan Rule 6.4.3.1	All occupiers within the Gorse and Broom Free Areas as shown on Map 2 in Appendix 3 shall, eliminate all broom infestations on the land that they occupy. This rule shall not have legal effect within the New Gorse and Broom Free Areas as illustrated on Map 2 in Appendix 3 until 31 October 2024. For the purpose of this rule, eliminate means the permanent preclusion of the plant's ability to set viable seed. A breach of this rule creates an offence under section 154N(19) of the Act.	The reason for this rule is to maintain the past investment by occupiers in establishing areas clear of broom within properties. Otago Regional Council will proactively support all land occupiers within the New Gorse and Broom Free Areas to clear these areas prior to Rule 6.4.3.1 having legal effect from 31 October 2024.
Gorse		
Plan Rule 6.4.3.3	All occupiers within the New Gorse and Broom Free Areas as shown on Map 2 in Appendix 3 shall eliminate all gorse infestations on the land that they occupy. This rule shall not have legal effect for the New Gorse and Broom Free Areas as shown on Map 2 in Appendix 3 until 31 October 2024. For the purpose of this rule, eliminate means the permanent preclusion of the plant's ability to set viable seed. A breach of this rule creates an offence under section 154N(19) of the Act.	The reason for this rule is to maintain the past investment by occupiers in establishing areas clear of gorse within properties. Otago Regional Council will proactively support all land occupiers within the New Gorse and Broom Free Areas to clear these areas prior to Rule 6.4.3.3 having legal effect from 31 October 2024.
Ragwort		

Plan Rule 6.4.4.2	Note: This is designated a good neighbour rule. All occupiers in the Otago region on rural zoned land shall eliminate ragwort infestations on their land within 50m of the property boundary where the occupier of the adjoining property is eliminating ragwort infestations within 50m of that boundary. For the purpose of this rule, eliminate means the permanent preclusion of the plant's ability to set viable seed. A breach of this rule creates an offence under section 154N(19) of the Act.	The reason for this rule is to manage the spread of ragwort causing unreasonable costs to an adjacent occupier who is undertaking active ragwort management within 50m of their property boundary. Any action pertaining to non-compliance will only be initiated upon a complaint from the adjoining affected occupier.
Wilding conifers		
Plan Rule 6.3.4.2	Within the Otago Region occupiers shall eliminate all wilding conifers, contorta, Corsican, Scots, mountain and dwarf mountain pines and/or larch present on land they occupy within 200m of an adjoining property boundary prior to cone bearing, if; a) wilding conifers, contorta, Corsican, Scots, mountain and dwarf mountain pines and/or larch have previously been eliminated through control operations on the adjoining property; and b) the control operations on the adjoining property were within 200m of the boundary and were undertaken since January 2016. A breach of this rule or any part thereof creates an offence under section154N(19) of the Act.	Over the duration of the Plan, to ensure that the spread of wilding conifers, contorta, Corsican, Scots, mountain and dwarf mountain pines and/or larch does not cause unreasonable costs to the occupiers of adjoining properties, where wilding conifers, contorta, Corsican, Scots, mountain and dwarf mountain pines and/or larch have previously been eliminated through control operations on the adjoining property.
Plan Rule 6.3.4.3	Note: This is designated a good neighbour rule. Within the Otago Region occupiers shall eliminate all wilding conifers, contorta, Corsican, Scots, mountain and dwarf mountain pines and/or larch present on land they occupy within200m of an adjoining property boundary prior to cone bearing where: a) the adjoining land has previously been cleared through control operations since January 2016; and	Over the duration of the Plan, to ensure that the spread of wilding conifers, contorta, Corsican, Scots, mountain and dwarf mountain pines and/or larch does not cause unreasonable costs to the occupiers of adjoining properties, where wilding conifers have previously been eliminated through control operations on the adjoining property and the adjoining occupier is undertaking active wilding conifer management.

	b) the occupier of that adjoining land is taking reasonable steps to manage wilding conifers, contorta, Corsican, Scots, mountain and dwarf mountain pines and/or larch on their land, within 200m of the boundary. A breach of this rule creates an offence undersection 154N(19) of the Act.	The rule is required in addition to Plan Rule 6.3.4.2 as the National Policy Direction requires that before a rule can be identified as a good neighbour rule, the Otago Regional Council must be satisfied that the adjacent occupier is taking reasonable measures to manage the pest or its impacts.
Plan Rule 6.3.4.4	Note: This is a pest agent rule. Within the Otago region occupiers shall, on receipt of written direction from an Authorised Person, eliminate any Pest Agent Conifer that is present on land they occupy within 200m of an adjoining property boundary prior to cone bearing where: a) wilding conifers; contorta, Corsican, Scots, mountain and dwarf mountain pines and/or larch have previously been eliminated through control operations on the adjoining property; and b) the control operations on the adjoining property were within 200m of the boundary and were undertaken since January 2016. For the purpose of this rule Pest Agent Conifer means any introduced conifer species that is capable of contributing toward the establishment and spread of wilding conifers and is not located within a plantation forest. This may include but is not limited to the conifer species listed in Table 3. Plantation forest means a forest deliberately established for commercial purposes, being at least 1 hectare of continuous forest cover of forest species that has been planted and has or will be harvested or replanted. Forest species means a tree species capable of reaching at least 5 metres in height at maturity where it is located. A breach of this rule creates an offence under section 154N(19) of the Act.	Introduced conifer species are capable of contributing toward the establishment and spread of wilding conifers present a risk for wilding conifer management. This rule ensures that over the duration of the Plan new infestations or reinfestation of wilding conifers and contorta, Corsican, Scots, mountain or dwarf mountain pines, larch and/or other planted conifer species are prevented at sites where wilding conifers, contorta, Corsican, Scots, mountain or dwarf mountain pines, larch and/or other planted conifer species have previously been eliminated through publicly funded control operations.
Old man's beard		

Plan Rule 6.3.2.6	All occupiers within the Otago region shall eliminate old man's beard infestations on the land that they occupy. For the purpose of this rule, eliminate means the permanent preclusion of the plant's ability to set viable seed. A breach of this rule creates an offence under section 154N(19) of the Act.	The reason for this rule is to ensure infestation levels are reduced and threats to environment values are minimised.
Plan Rule 6.3.2.7	Note: This is designated a Good Neighbour Rule All occupiers within the Otago region shall, on receipt of a written direction from an Authorised Person, eliminate old man's beard infestations on their land within 20m of the property boundary where the occupier of the adjoining property is eliminating old man's beard infestations within 20m of that boundary with the intention of protecting environmental values. For the purpose of this rule, eliminate means the permanent preclusion of the plant's ability to set viable seed. A breach of this rule creates an offence undersection 154N(19) of the Act.	The reason for this rule is to manage the spread of old man's beard having unreasonable costs to an adjacent occupier where active old man's beard management is being undertaken by that land occupier. Any written direction pertaining to non-compliance will only be initiated upon a complaint in writing from the adjoining affected occupier.

APPENDIX B. SPECIES SPECIFIC SUCCESS INDICTORS FOR ERADICATION

Table 554. Success indicators and special considerations for determination of successful eradication within Bendigo and Ardgour Sanctuaries.

Species	Primary Indicators	Secondary Indicators	Special Considerations
Rodents (Mice, Rats)	• Zero bait consumption at monitoring stations for 18 consecutive months • No fresh droppings detected in or around stations, monitoring devices, or during site inspections • No chewing or gnawing marks on bait stations or monitoring devices (new damage must be distinguished from existing marks) • No captures in monitoring traps during confirmation period	• No digging or scuff marks on ground around monitoring stations • No camera trap detections • No evidence of food caching or nesting activity	Documentation Requirements: • Monthly photographic documentation of monitoring stations to distinguish new damage from existing marks • GPS-logged scat locations if found, with species identification confirmation • Clear documentation of when chew marks are discovered to establish timeline of activity
Mustelids (Stoats, Ferrets, Weasels)	• No captures in DOC 250 kill traps for 18 consecutive months • No scat or scent detections by certified detector dogs during quarterly sweeps • No tracks or sign detected during monthly fence inspections • No camera trap detections during confirmation period	• No predation evidence on native species (bird nests, lizard remains) • No denning sign or territorial marking detected • No response to lure stations during intensive monitoring	• Seasonal activity patterns require year-round monitoring to account for breeding seasons • Detector dogs provide highest confidence for final confirmation due to scent detection sensitivity
Possums	• No captures in SA2 Kat Traps or similar devices for 18 consecutive months • No browse sign on preferred vegetation species	• No claw marks on trees or fence posts • No denning sign in suitable habitat	• None

Species	Primary Indicators	Secondary Indicators	Special Considerations
	• No scat detections during routine inspections • No camera trap detections, spotlight survey sightings or indications by detection dogs	• No response to preferred food lures	
Larger Mammals (Feral Cats, Deer, Goats, Pigs)	• No visual sightings for 18 consecutive months • No camera trap detections across monitoring network • No track or sign evidence during monthly inspections • No scat detections during routine monitoring	• No predation evidence on native species (for cats) • No browse damage on vegetation (for herbivores) • No wallows, rubs, or territorial marking (for pigs) • No response to species-specific lures or calls	• Large mammals are not considered likely to be in either pest fence area
Hedgehogs	• No captures in DOC 250 traps for 18 consecutive months • No scat detections during inspections • No camera trap detections • No characteristic digging sign or insect predation evidence	• No denning sign in suitable habitat	• Hedgehogs are active feeders so should be obvious if persisting inside either sanctuary
Rabbits and Hares	• No visual sightings for 18 consecutive months • No camera trap detections • No fresh pellet groups detected • No browse damage on vegetation	• No digging or scraping activity • No track sign in suitable substrates • No response to spotlight surveys	Special Consideration for Ardgour Sanctuary: Rabbits will be managed through population control rather than eradication to maintain beneficial grazing pressure on cushionfield ecosystems. Success criteria will focus on maintaining optimal population levels rather than elimination.

APPENDIX C. BENEFITS OF SANCTUARY BASED CONSERVATION

Sanctuaries are crucial for threatened species recovery programmes because they address the main threats that made species critically endangered and create optimal conditions for population recovery:

- Complete Predator Exclusion: Eliminates all introduced mammalian predators including mustelids, cats, rats, hedgehogs, and possums that are the primary cause of native species decline, creating a safe environment for population recovery.
- Controlled Environment Management: Allows management of habitat, food, and environmental stressors without outside interference, creating optimal conditions for species to establish and breed successfully.
- Population Monitoring Capability: Enables population tracking, health monitoring, and behavioural studies without animals dispersing beyond observation boundaries, providing critical data for adaptive management.
- Breeding Programme Security: Creates secure breeding environments where reproductive success is maximised without predation loss. This is particularly important for critically endangered species with low reproductive rates.
- Genetic Management Control: Allows for planned genetic management through controlled breeding programmes and strategic introduction of new individuals to maintain genetic diversity and prevent inbreeding.
- Disease Prevention: Provides biosecurity control to prevent introduction of pathogens and diseases that could devastate small populations, with ability to quarantine and health-screen all animals.
- Habitat Quality Assurance: Ensures habitat enhancements (rock refugia, native plantings, food sources) remain intact and benefit target species rather than being used by competing introduced species.
- Research Platform: Creates controlled conditions for scientific research on species ecology, behaviour, and conservation techniques that can inform broader recovery programmes and future translocations.
- Long-term Population Viability: Provides secure, permanent habitat that can support populations indefinitely, reducing ongoing management costs and ensuring conservation investment delivers lasting benefits.
- Public Engagement Opportunities: Offers safe, controlled environments for education and advocacy programmes that build public support for conservation.

APPENDIX D. BIOSECURITY CONTROLS

D.1. Personnel and visitor entry protocols

Risk: Re-incursions of predators and entry of pest plants may be facilitated by any person entering the sanctuaries. This will be managed by:

- All individuals entering the sanctuaries must complete site induction including biosecurity requirements, sign biosecurity registers, and undergo annual refresher training.
- Entry procedures include
  - Inspect clothing, footwear and personal equipment (particularly bags and pockets) and remove any stowaway animals or seeds/plant fragments
  - Clean footwear at designated decontamination/wash stations
  - Complete entry and exit register at gate
  - No outside food is permitted except sealed items
  - Proceed through interlocking gate or raised pedestrian gate(ensure these are functioning with only one gate open at any time)
- Footwear decontaminated/wash station must be refreshed regularly

D.2. Access systems

Risk: Re-incursions of predators and entry of pest plants may happen through poorly designed and maintained access points. These will be managed by:

- Signs summarising key biosecurity protocols installed at all entry points, indicating breach reporting processes and contact personnel
- Dual interlocking gates with mechanical or electronic mechanisms to ensure only one gate operates at any time
- Gates remain locked when not in active use, with controlled access lists maintained for authorized personnel
- Visitor access requires pre-approval and a trained personnel escort, with emergency contact procedures established for after-hours access
- Emergency access points remain locked during regular works.

D.3. Vehicle and equipment protocols

Risk: unwanted pest plant materials or animal stowaways, particularly rodents in vehicle undercarriages, can enter the sanctuaries through vehicles or equipment being used for management work. This will be managed by:

- Vehicle entry is minimised to reduce incursion risk, with preference for hand or drone spraying over vehicle-based operations.
- When vehicles are necessary, inspections must be done to check for stowaway animals and must be free from soil and plant materials, check must include undercarriages, wheel wells and cargo areas.
- All equipment must be thoroughly inspected and cleaned of soil, plant material, and debris before entry.

Emergency service vehicles will be exempt from full protocols during urgent response activities. This should be recorded and noted as a potential risk of re-incursion.

D.4. Materials entering the sanctuary

Risk: unwanted pests, particularly plants, enter the sanctuaries through materials being used for habitat enhancement, revegetation or species relocation . This will be managed by:

- Materials entering sanctuaries must be sourced through approved channels with appropriate documentation and chain of custody records (materials may have undergone checks under the broader BPPMP)
- Screening of soil and organic material for pest contaminations
- Detailed documentation for audit and traceability purposes

D.5. Redback spider management

Risk: Redback spiders (*Latrodectus hasselti*) present both ecology and human safety risks to BOGP site operations. While their current presence within the immediate project area is unconfirmed, they occur in the surrounding landscape and pose documented threats to native species including the Cromwell Chafer Beetle (Bryan, 2014, Spencer *et al.*, 2017) and McCann's skinks. The species' preference for rabbit burrows as habitat (Spencer *et al.*, 2017) creates direct link between mammalian pest management and spider control requirements in high-risk areas. The potential risk will be managed by:

- Annual surveys using ACOs to assess redback spider presence, surveys will be conducted during October – November with minimum two-week deployment periods (Bryan 2014)

Potential management protocols include direct control, habitat modification (infilling burrows), and emerging technologies such as pheromone-based control systems if spiders establish within sanctuary boundaries. Management will be confirmed if presence is detected and assessed to be an issue for conservation objectives.

APPENDIX E. LIZARD HABITAT FEATURE (LHF) CREATION PROTOCOL

Lizard habitats will be improved in both sanctuaries by installing specific "Lizard Habitat Features" (LHF) as described in the LERMP. Each feature will include a rock stack and surrounding sparse rocks with clusters of planted tussocks and shrubs. Features will be installed within the Bendigo and Ardgour Sanctuary at an average density of 1 per hectare across the sanctuaries, though these may be aggregated for ease of construction, delivering a minimum total of 62 stacks within the Sanctuaries (combined between both Sanctuaries).

Individual truckloads of rock will be unloaded over trenches at least 1m deep and excavated into final landforms. An excavator with grapple may be used to stack rocks creating clean, horizontal crevices, and place or throw less suitable rocks (smaller or rounder) from the pile into adjacent areas. At least >100 rocks/ha will be exposed on surfaces by either 'throwing' rocks from piles or 'rock picking' from spread soil where they contain adequate rock, or by adding additional rock.

Rubble pits will be created at a minimum density of 1 per 5 ha. These will not need to be associated with rock outcrops/stacks.

E.1. Strategic Vegetation Establishment

- Establish vegetation at habitat nodes through strategic planting of tussocks, shrubs and vines within and adjacent to rock stacks, generally concentrated in areas with greater shelter and where runoff concentrates. Create groups of more than 50 tussocks with interplanted olearia positioned away from rock outcrops and stacks in more sheltered, higher-moisture areas such as shallow bowls, slope transitions from steep to gentle gradients, and swales where runoff concentrates.

Siting constraint:, ~~—~~

A~~a~~voiding leakage to existing values: This appendix sets out the construction methodology for LHFs but does not determine their precise placement. Siting decisions must be made on the ground by a qualified ecologist prior to construction. I~~The risk of "leakage" — i~~nadvertent damage to existing ecological values through poorly sited features or "leakage" ~~—~~ is ~~real~~a risk in both sanctuaries. Specific risks include placement over intact cushionfield or spring annual flora communities, disturbance of natural schist outcrops already supporting invertebrate communities, and disruption of drainage or microclimate features that support existing values. A pre-construction ecological survey must be completed for each sanctuary before LHF installation begins, identifying areas where placement must be excluded or modified. The outputs of this

survey take precedence over the general density and placement guidance in this appendix.

- Taramea plants will not be relocated or planted around LHFs in both Bendigo and Ardgour Sanctuaries as the elevation is too low for the plants to survive and establish.

E.2. Advanced Habitat Node Inoculation

- Inoculate habitat nodes using salvaged live tussock from mine working areas combined with invertebrate-supporting materials.

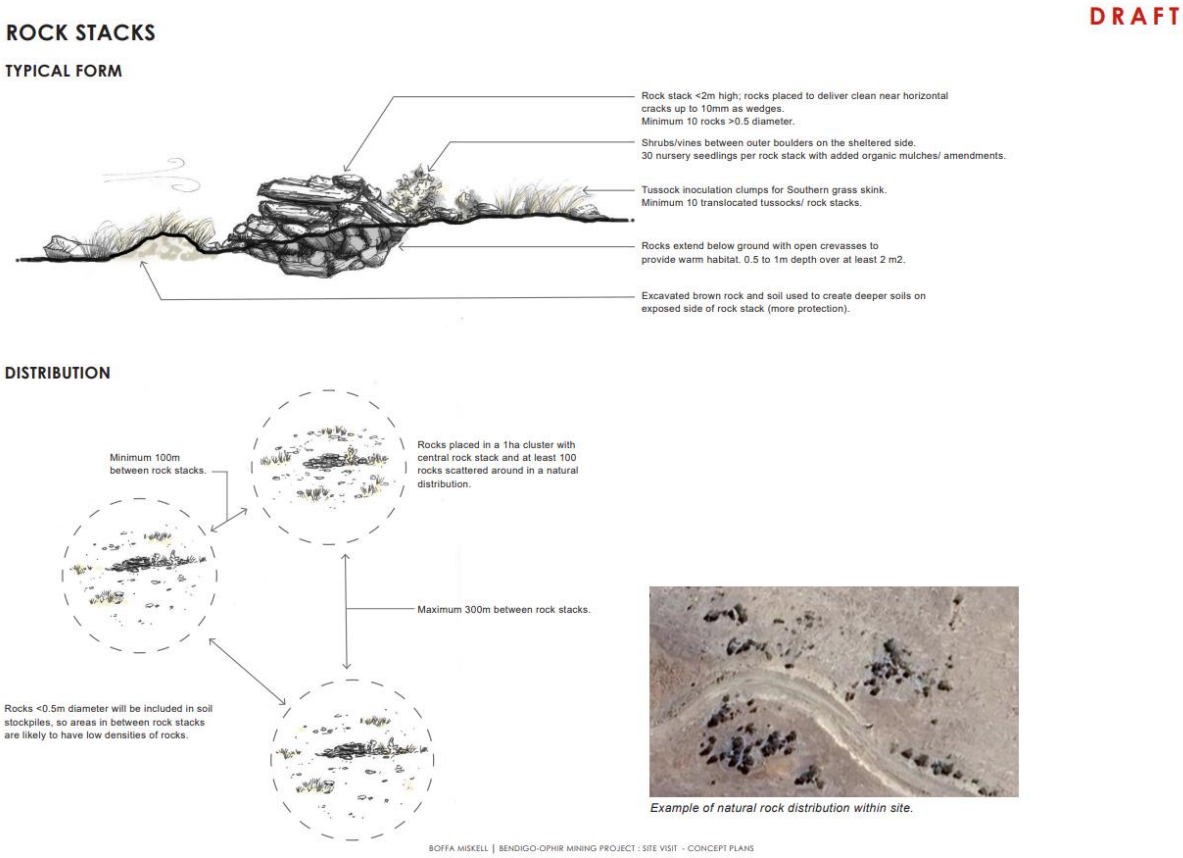


Figure ~~14~~ ~~14~~13: Typical Lizard Habitat Feature construction.

Herbert et al (2025) note 'With high initial and ongoing resources required for effective predator control, creation of self-sustaining, high-quality habitats is an attractive complementary strategy for conserving New Zealand's endemic lizard fauna (Norbury et al. 2014). Habitat enhancement is encouraged for lizard conservation in New Zealand and has been used to attempt to mitigate adverse effects of land use change or development on lizards.

APPENDIX F. MODIFIED MCLEAN SCALE PROTOCOL

The Modified McLean Scale assesses rabbit abundance through visual evaluation of grazing pressure indicators, including vegetation height, pasture composition, and visible browse damage. The following list describes the Modified McLean Scale for monitoring rabbit population levels as per the RPMP requirements:

1. No sign found. No rabbits seen.
2. Very infrequent sign present. Unlikely to see rabbits.
3. Odd rabbits seen; sign and some buck heaps showing up. Pellet heaps spaced 10 metres or more apart on average.
4. Pockets of rabbits; sign and fresh burrows very noticeable. Pellet heaps spaced between 5 metres and 10 metres apart on average.
5. Infestation spreading out from heavy pockets. Pellet heaps spaced 5 metres or less apart on average.
6. Sign very frequent with pellet heaps often less than 5 metres apart over the whole area. Rabbits may be seen over the whole area.
7. Sign very frequent with 2-3 pellet heaps often less than 5 metres apart over the whole area. Rabbits may be seen in large numbers over the whole area.
8. Sign very frequent with 3 or more pellet heaps often less than 5 metres apart over the whole area. Rabbits are likely to be seen in large numbers over the whole area.

APPENDIX G. BOMP MONITORING WITHIN SANCTUARY AREAS

15.1.1. Monitoring Station Setup

- **Ardgour Sanctuary**: 37 monitoring stations within a 100m x 100m grid network
- **Bendigo Sanctuary**: 28 monitoring stations within a 100m x 100m grid network

Each monitoring station centres on a 10m x 10m vegetation plot

- Plots delineated with permanent H3 25 x 25 mm wooden stakes at centre and four corners
- GPS recording taken at centre of each plot

15.1.2. Terrestrial Vegetation Monitoring

Data Collection Methods:

- **Vegetation photo points**: Photographs taken from plot centre on NW, NE, SW, and SE bearings
- **Indigenous vegetation species richness**: Composition of all seedlings >30cm, saplings, and trees >2.5cm DBH within 10m x 10m plots
- **Native tree basal area**: Measurement of all native trees (>2.5cm DBH) within plots
- **Seedling and sapling density**: Density for each native species within 5m x 5m subplots
- **Herbaceous cover**: % cover of herbaceous vegetation within four 2m x 2m subplots in each corner

15.1.3. Terrestrial Bird Monitoring

Limitations: Bird monitoring stations must be minimum 200m apart, so the replication needed to track changes in bird numbers within the Ardgour and Bendigo pest exclusion fence areas **cannot be achieved**.

Method (where applicable):

- 5 Minute Bird Counts (MBC) following Hartley and Greene (2012) protocol
- Only native species recorded
- Distance sampling protocol used
- Annual monitoring in March

- Environmental conditions recorded (temperature, weather, wind, noise)

Data Collection:

- Species composition and number of individuals
- Type of observation (aural, visual, or both)
- Distance classifications: 0-19m, 20-39m, 40-99m, >100m

15.1.4. Lizard Monitoring

Method:

- Checking of eight double layer ACOs (Artificial Cover Objects)
- One person-hour of manual searching via:
    - Lifting rocks or coarse wood
    - Checking crevices with torch
    - Visual observations of basking lizards
- **Invertebrate Monitoring**

Method (placeholder details):

- 8 pitfall traps (loaded with water mixture and checked daily)
- 60 minutes timed searches
- Light traps at select monitoring stations only (3-6 light traps per treatment with minimum 200m spacing)
- Targeted monitoring at select habitats

15.1.5. Threatened Species Translocation Monitoring

Ardgour Eco-sanctuary only:

- Monitoring in accordance with specific translocation applications
- Target species include:
    - Minimum of three lizard species
    - One invertebrate species
    - One plant species

APPENDIX H. DATA RECORDING REQUIREMENTS

All field activities require standardised data capture covering core operational information and activity-specific details. Standard fields for all activities include:

- Date and time of service or monitoring activities
- Operator identification and relevant licensing information
- Device identification and GPS coordinates
- Environmental context including weather conditions and habitat notes
- General comments addressing device damage, maintenance issues, or operational anomalies.

Specific activities also have specific additional data recording requirements, such as:

Trapping

Trapping operations require additional documentation of:

- Trap station identification and GPS coordinates
- Trap status (set, sprung, damaged)
- Species caught with target or non-target classification
- Numbers and biological details where determinable
- Lure type and refresh status.

Baiting

Bait station operations must record:

- Bait station identification and GPS coordinates
- Bait type, formulation, and quantities deployed
- Bait-take volumes and consumption patterns
- Any non-target interactions observed.

Ground-based shooting

Ground-based shooting operations require additional records including:

- Shooter identification and current licence verification
- Weapon and calibre specifications
- Target species identification and confirmed kill counts
- Operational conditions and safety compliance.

Monitoring activities

Monitoring using chewcards and tracking tunnels require:

- Deployment and collection dates with GPS coordinates
- Calculated index scores and raw data
- Quality control notes and weather impacts.

Monitoring using camera traps require:

- Image batch metadata including timestamps and storage details
- Species identification, count data, and any required statistics (e.g. detections per 2000 camera hours)
- Equipment functionality and maintenance records.

APPENDIX I. PROGRAMME VERIFICATION AND AUDITING REQUIREMENTS

I.1. Pre-implementation verification

Comprehensive preparation ensures programme delivery meets all regulatory and operational requirements before field activities start. Contract review processes verify:

- Contractor agreements specify approved control methods and required reporting formats
- Environmental protocols and legal obligations are clearly defined
- Firearms licensing requirements and safety protocols are documented
- Performance standards and quality assurance measures are established.
- All contractors entering predator-proof sanctuaries have completed mandatory inductions that include biosecurity protocols

I.2. Implementation verification

Implementation verification confirms work has been completed according to approved plans. This is distinct from efficacy evaluations of management methods. Contractors may correctly follow all specified procedures using appropriate methods and timing yet still fail to achieve expected results due to factors beyond their control such as unexpected biological responses or environmental conditions.

Method adherence verification includes:

- Checks that entry/exit logs are being completed
- Check any biosecurity incident reports are completed as required
- Confirmation of authorised techniques and equipment use
- Verification of approved trap types, bait formulations, and lure combinations
- Assessment of deployment protocols and safety compliance
- Review of operator competency and certification currency

Spatial accuracy validation ensures:

- GPS-logged device locations correspond with submitted maps
- Treatment areas align with approved control plans
- Zone boundaries and restrictions are properly observed
- Mapping accuracy supports reliable performance assessment

I.3. Record keeping verification

Comprehensive data integrity audits examine completeness and consistency of records including date stamps, species data, and effort metrics.

Data quality assessment covers:

- Completeness of required data fields and metadata
- Consistency of recording formats and terminology
- Accuracy of species identification and count data
- Proper documentation of environmental conditions and operational notes

Non-target capture logs receive particular attention to ensure:

- Incidents are properly recorded with supporting photographic evidence
- Veterinary actions are documented where applicable
- Appropriate escalation notifications to the Technical Lead (Mammalian Pests) Project Ecologist, Environmental Manager and Mine Manager
- Follow-up actions and resolution measures are tracked

System accessibility verification

Data management system verification includes:

- Data storage in searchable formats with robust backup protocols
- Availability for analysis, reporting, and future planning requirements
- Metadata compliance with essential contextual details
- Operator identification and equipment specifications are recorded

Physical works

Comprehensive records are maintained for all activities including required control effort per Sanctuary, GPS records of target species locations and treatments, quantities of toxins or herbicides used with application details, and documentation of control success or failure with specific techniques. This information provides the foundation for adaptive management and future planning decisions.

I.4. Compliance verification

Regulatory compliance verification addresses all legal requirements through systematic review processes.

Firearms

Firearm authorisation oversight requires:

- Contractor documentation review for firearm use

- Licence verification and safe discharge zone compliance
- Adherence to Arms Act requirements and site-specific regulations
- Documentation of safety training and competency assessments

Animal welfare standards

Humane practice standards require verification and confirmation of:

- Adherence to humane kill protocols and best practice guidelines
- Appropriate handling procedures for non-target captures
- Approved disposal methods and documentation
- Compliance with Animal Welfare Act requirements

Health and safety standards

Safety protocol adherence requires continuous monitoring of fieldworker compliance including:

- Fieldworker compliance with approved safety plans
- Personal protective equipment use and maintenance
- Incident reporting protocols and response procedures
- Site hazard register maintenance and updates

Agrichemical & Vertebrate Toxic Agent (VTA) use

All chemical application operations require compliance with NZS 8409:2021 Management of Agrichemicals, while VTAA use require adherence to Label requirements, with verification processes confirming regulatory adherence and operational safety standards. Pre-work verification confirms all chemical applicators hold current, appropriate certifications and maintain up-to-date training in application techniques and safety procedures. Post-work verifications ensure all tracking requirements were adhered to, and all spray diaries were processed and filed appropriately.

Ongoing Compliance Auditing verifies contractors maintain detailed chemical usage records with complete spray record sheets documenting all required information for each application. Weather condition compliance auditing ensures applications occur within acceptable parameters for safety and effectiveness, while personal protective equipment usage and maintenance verification confirms appropriate safety protocol implementation. This comprehensive approach ensures chemical operations meet all regulatory requirements while maintaining operational safety and environmental protection standards.

Comprehensive compliance tracking

Compliance tracking maintains a comprehensive compliance register with:

- Breach documentation
- Corrective action plans and status updates
- Implications assessment for programme delivery
- External verification through independent review options

External verification options include engaging independent reviewers such as biosecurity auditors or ecological specialists to periodically assess overall programme integrity and provide governance assurance. This independent oversight enhances programme credibility and provides objective assessment of management effectiveness.

APPENDIX J. FIGURES AS A3

This section provides an enlarged version of each map provided in the MPMP in order of appearance.

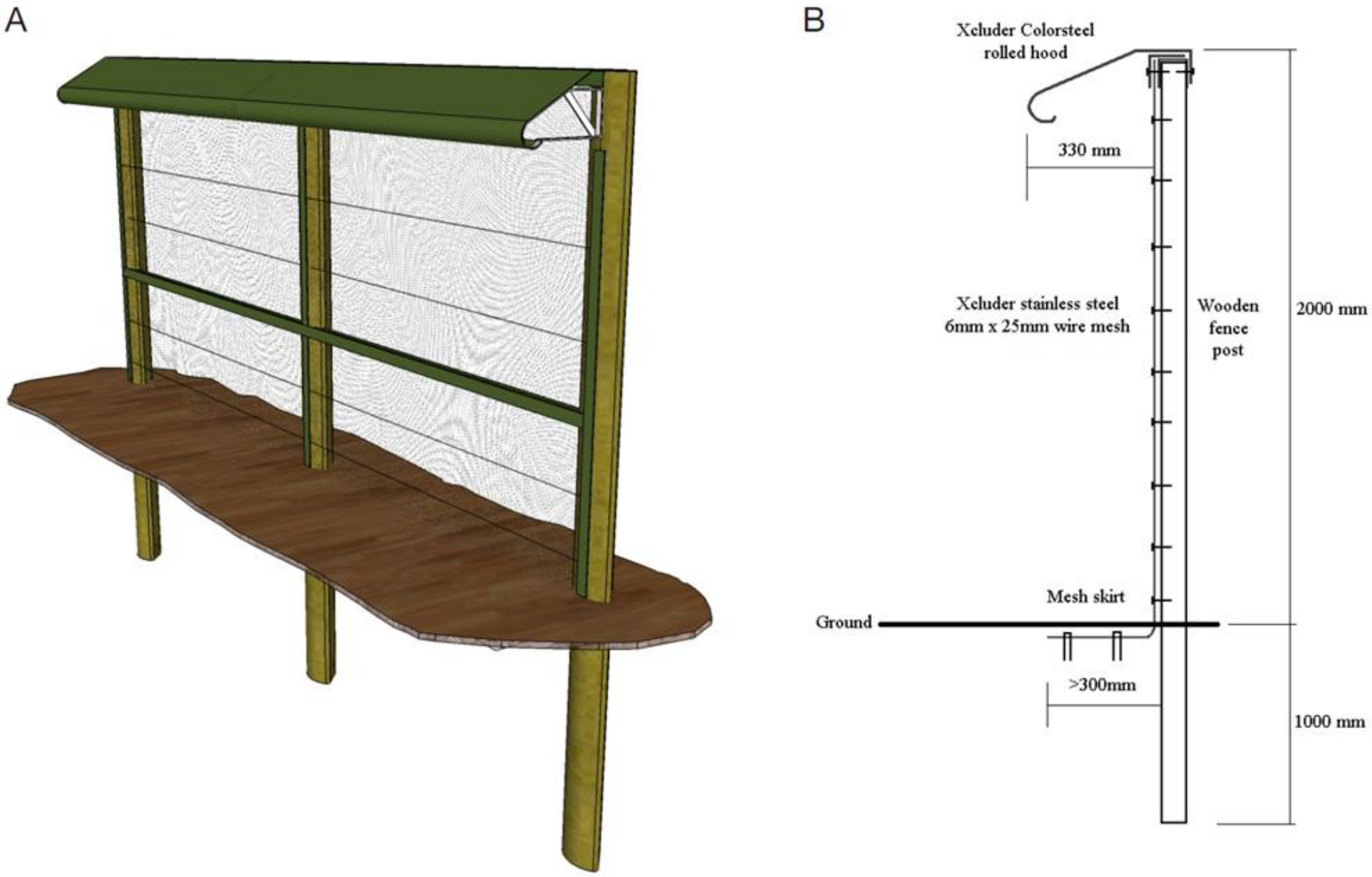


Figure ~~1514~~14. Example diagram of predator exclusion fence (A) and cross section of Xcluder® predator exclusion fence (B) (Bell, 2014).

Figure 161615: Rodent specific bait stations within Bendigo Sanctuary.

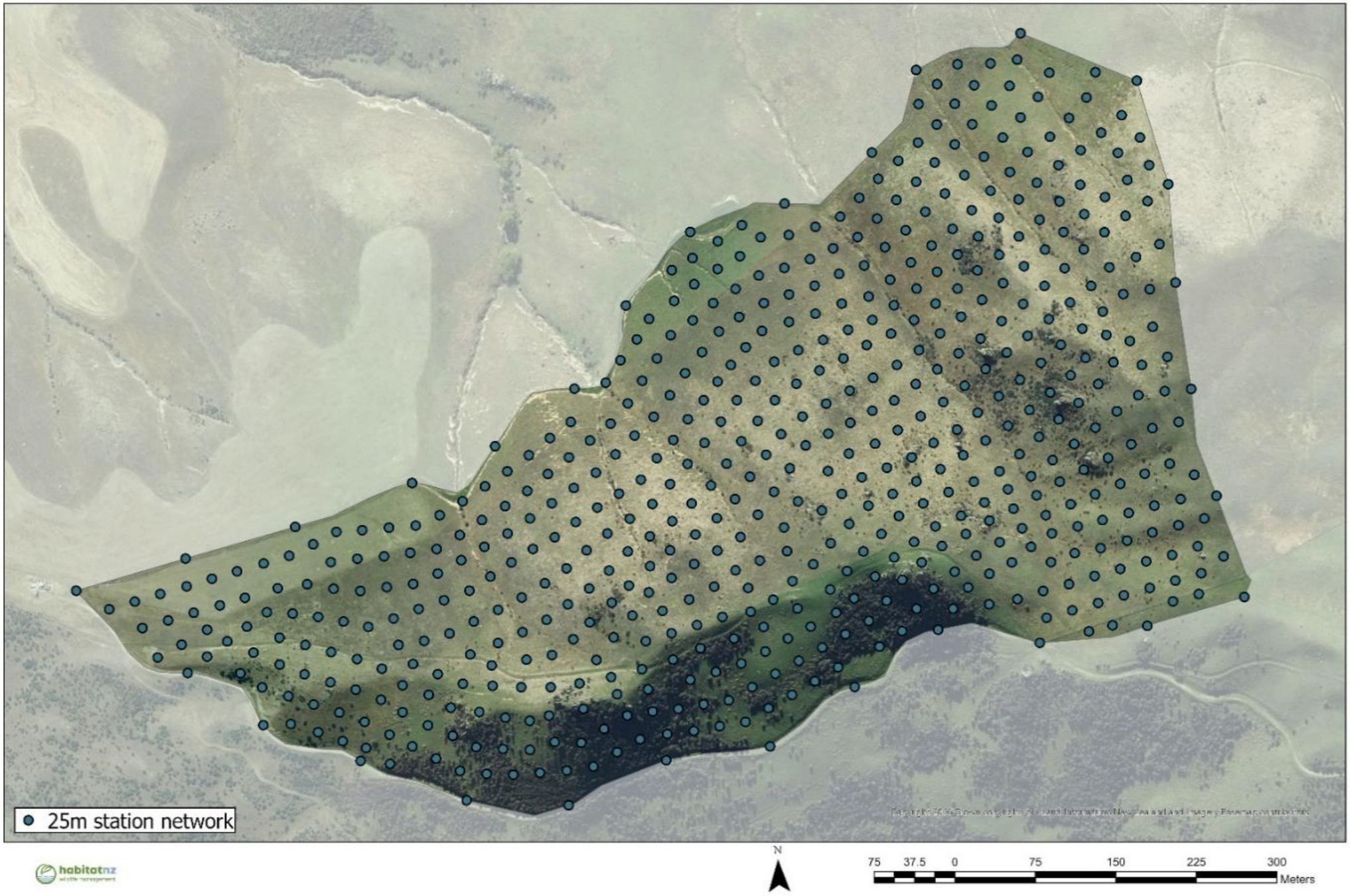


Figure 171~~716~~: Rodent specific bait stations within Ardgour Sanctuary.

Figure 18~~18~~17: Reduced intensity bait station location for Bendigo Sanctuary.

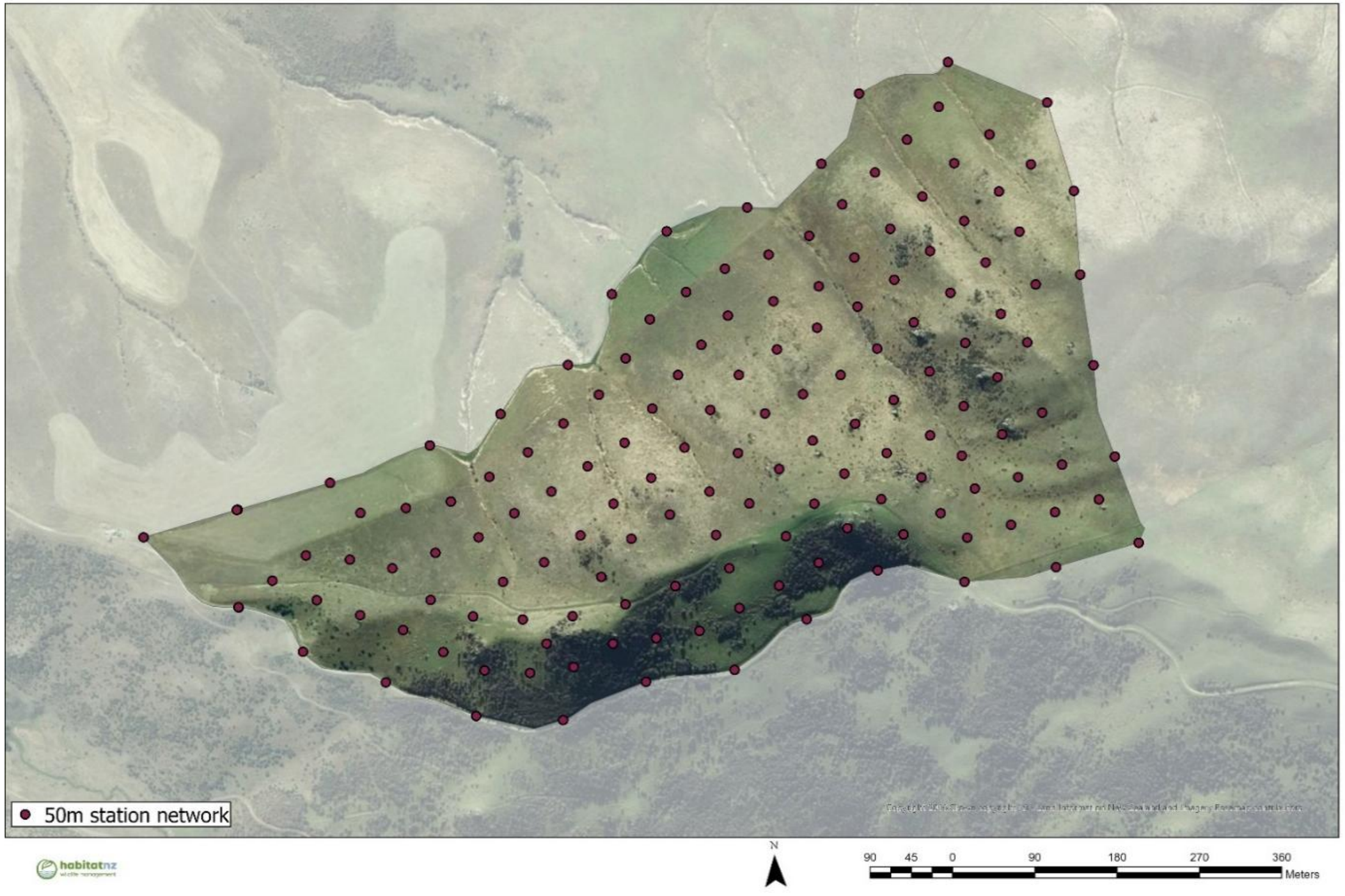


Figure 191918: Reduced intensity bait station location for Ardgour Sanctuary.

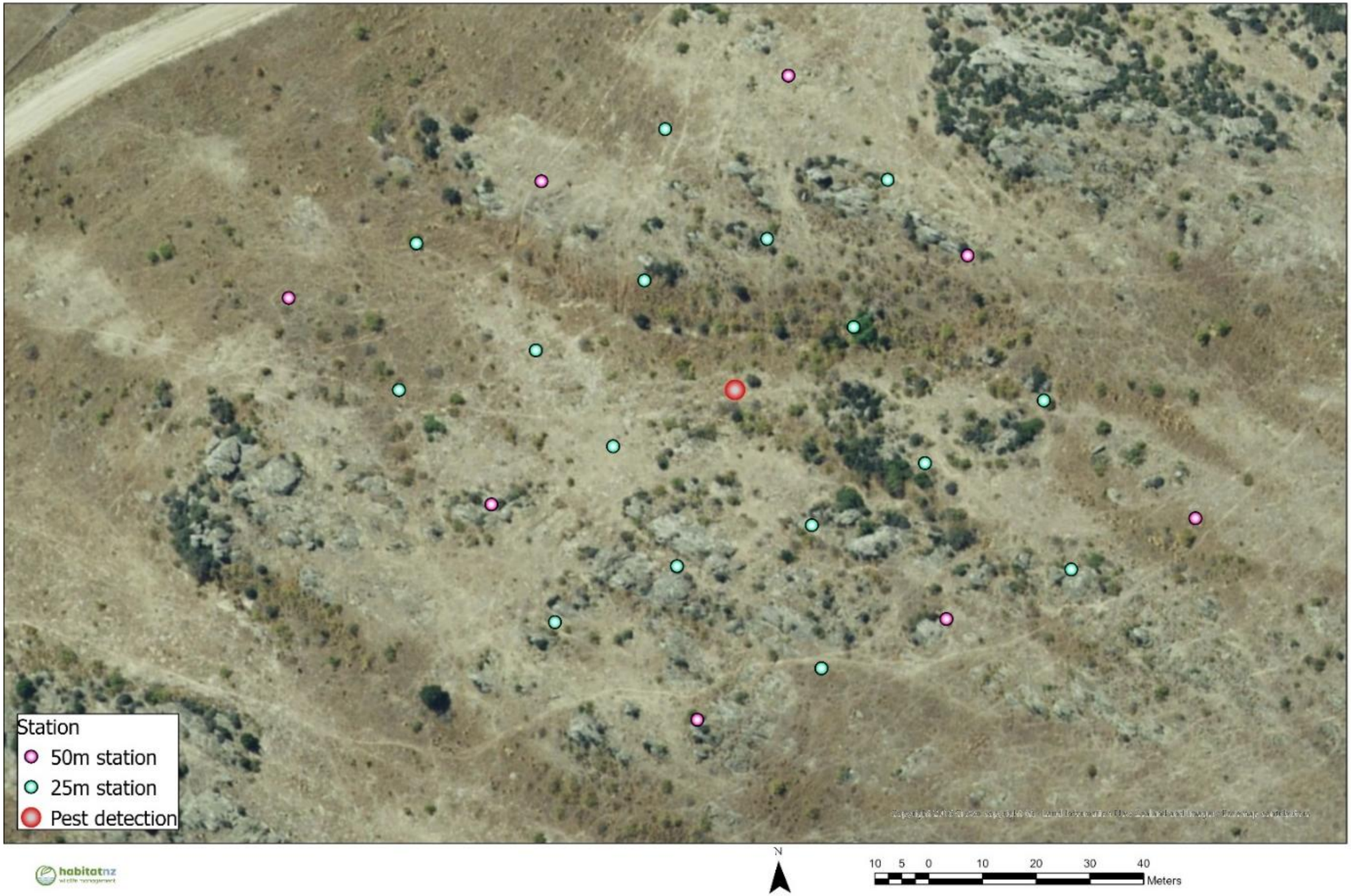


Figure 202019: Example of a reactionary grid, centered around bait take at a 50x50 m station.

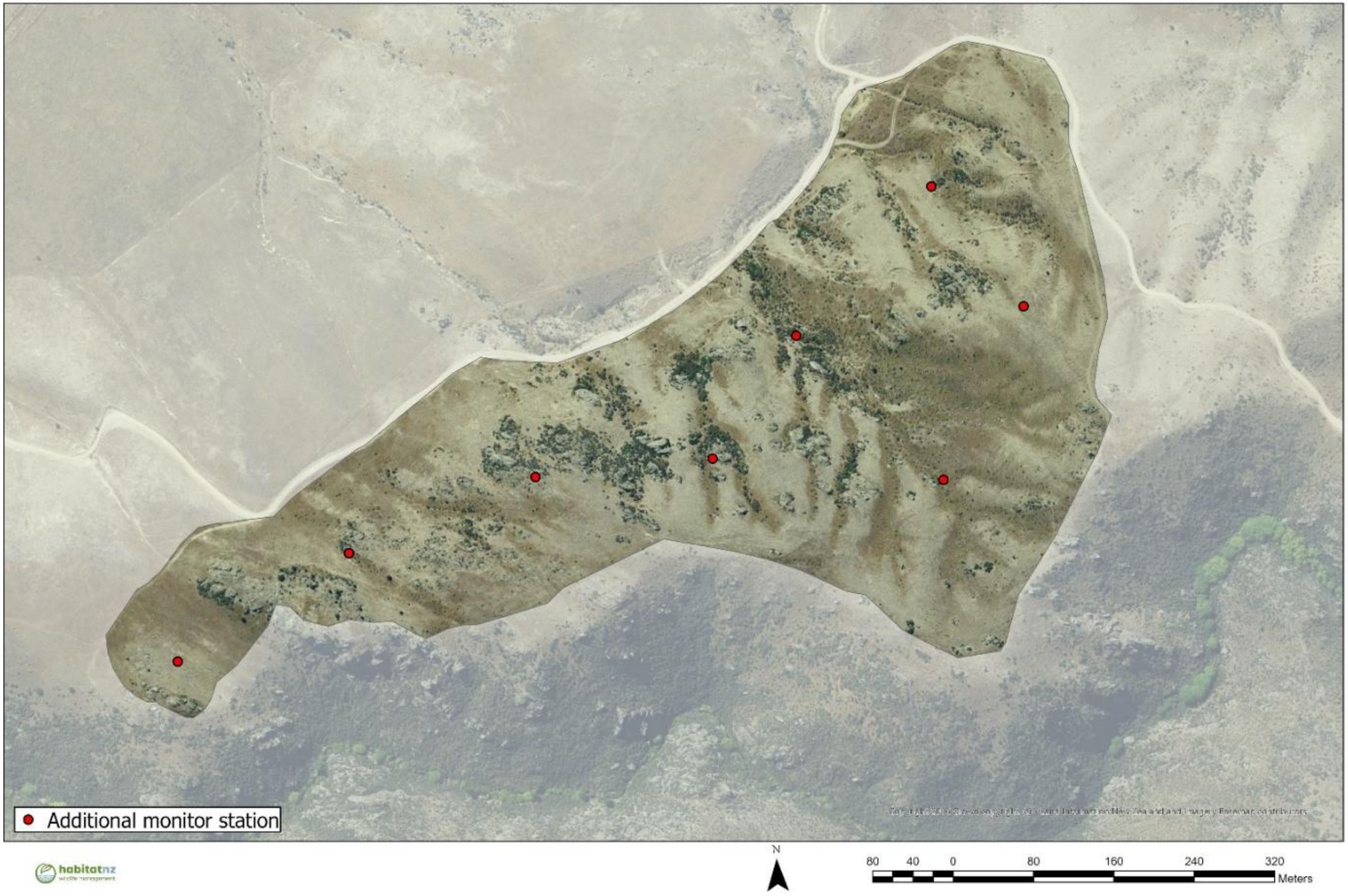


Figure 212120: Monitoring locations within Bendigo Sanctuary.

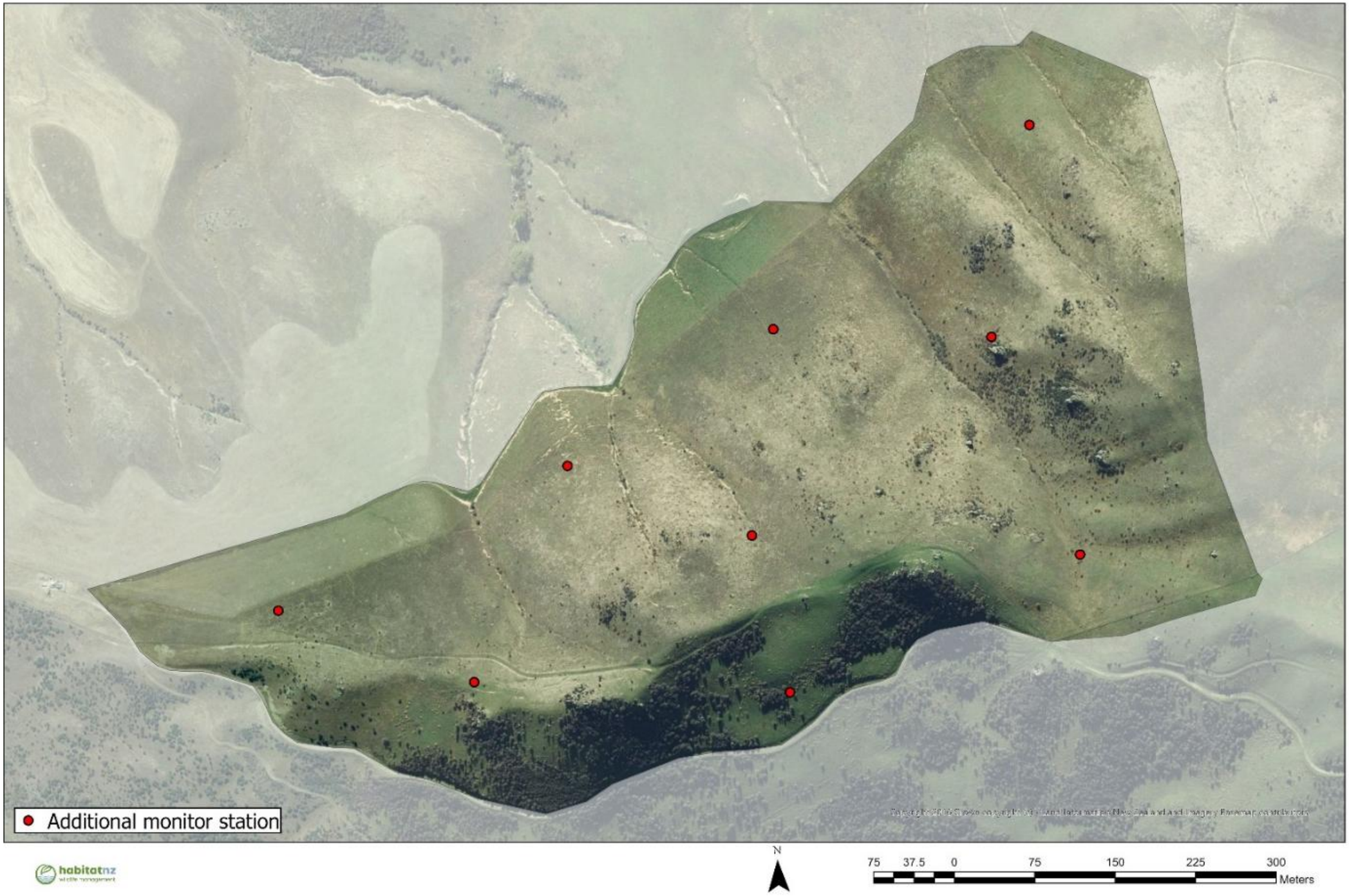


Figure 22221: Monitoring locations within Ardgour Sanctuary.

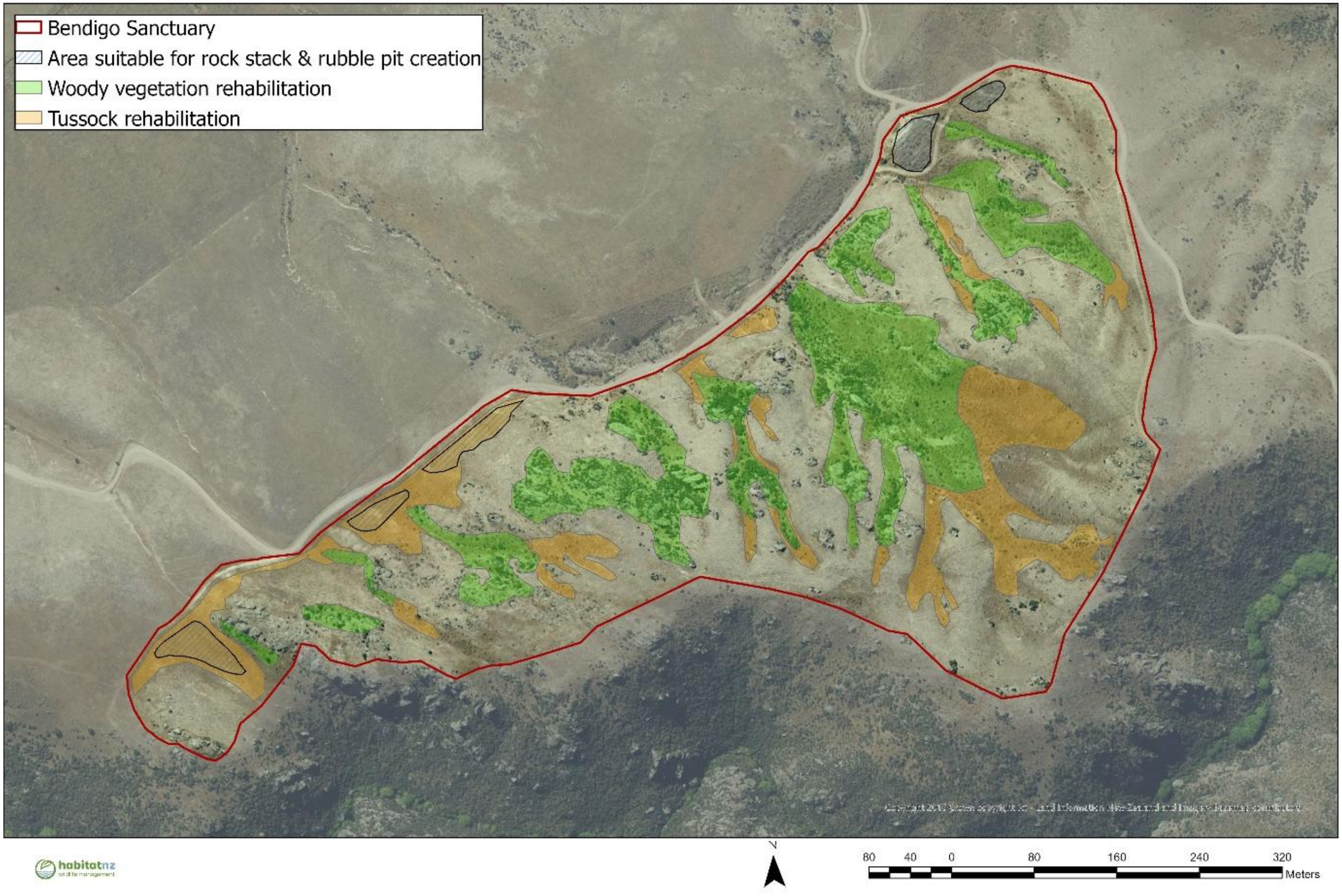


Figure ~~232322~~: Bendigo Sanctuary rehabilitation areas.

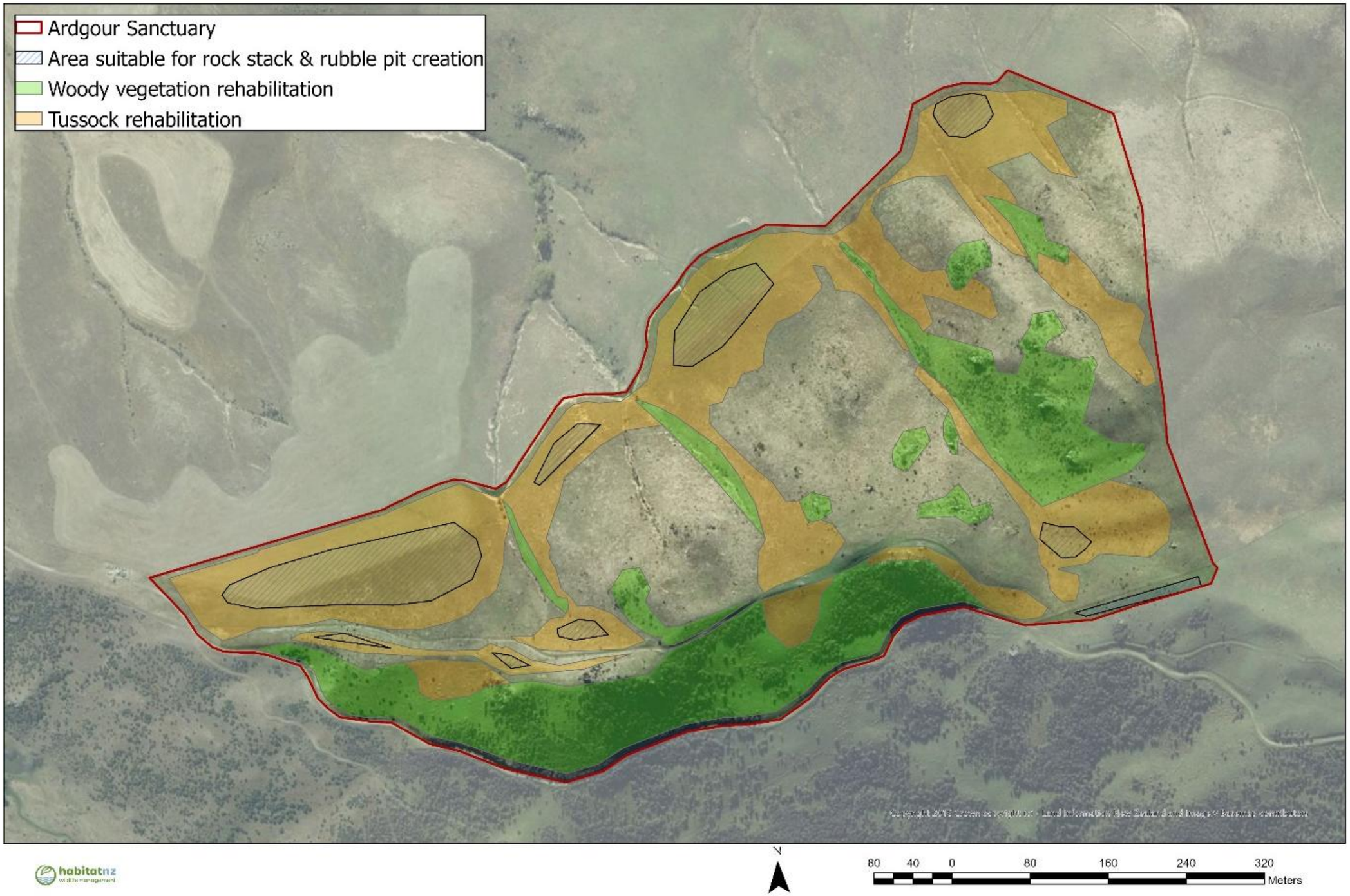
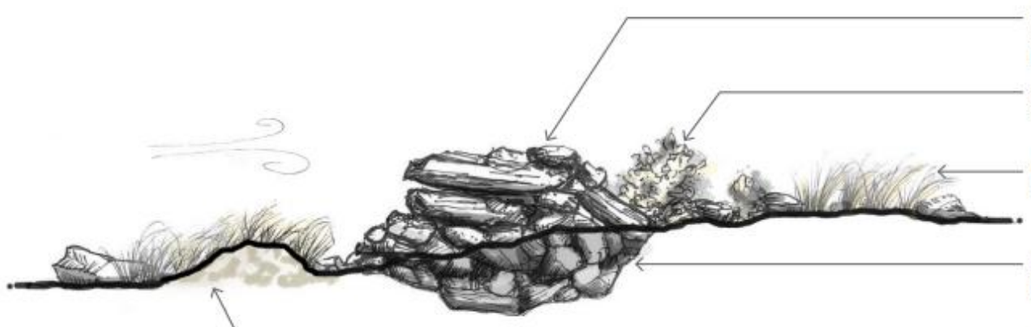


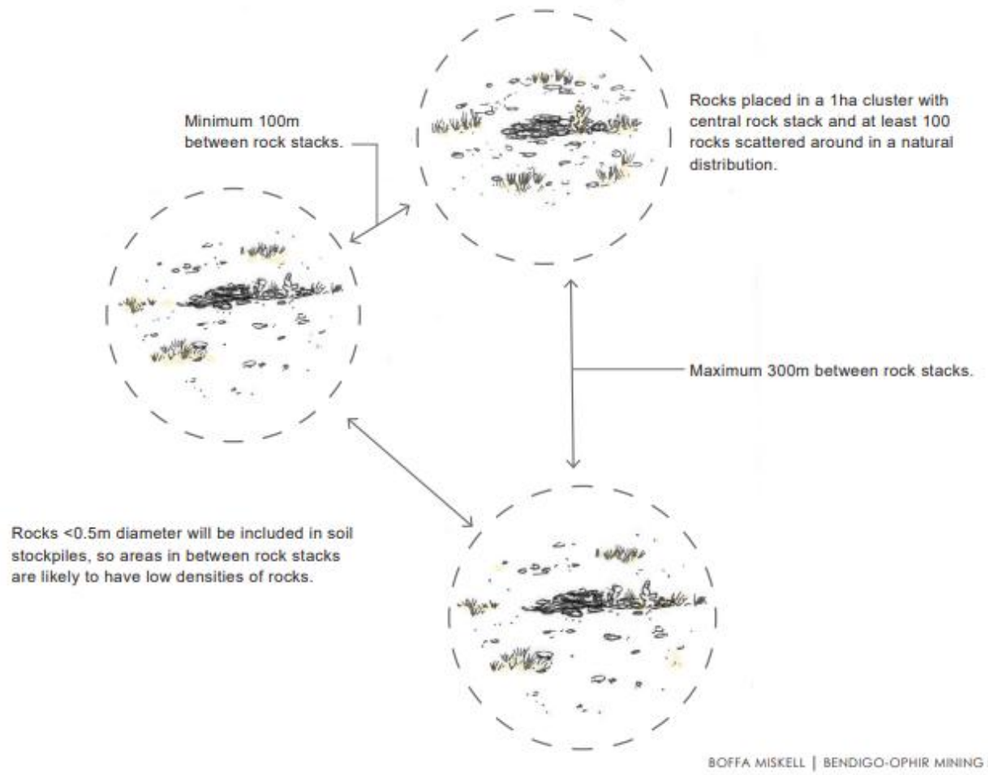
Figure 242~~423~~: Ardgour Sanctuary rehabilitation areas.

ROCK STACKS

TYPICAL FORM



DISTRIBUTION



Example of natural rock distribution within site.

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Figure 252~~524~~: Typical Lizard Habitat Feature construction.

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