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wildlife management

Bendigo-Ophir Gold Project

Mammalian Pest Survey

September 2025

Prepared for:

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Abbreviation List

Abbreviation	Term	Meaning
ANOVA	Analysis of Variance	Statistical test that analyses the variance both between two or more groups, and within them, in order to compare their means
AEE	Assessment of Environmental Effects	Report that will be informed by the surveys completed by Habitat NZ
BOGP	Bendigo-Ophir Gold Project	Is the topic of this resource consent application and covers approximately 550 ha
CH	Camera Hours	Number of hours that a camera trap was active and recording
CCI	Chewcard Index	Percentage of devices found with bite marks on each line, averaged within each survey zone
CIT	Come-In-Time	Area of land with gold resource containing a Mineral Resource Estimation (MRE) (2021) of 59,000oz of gold at a grade of 1.5g/t
DDF	Direct Disturbance Footprint	550ha area of land within the BOGP study area covering gold mining and ancillary activity areas that cause direct habitat loss. Includes a 150m buffer
DOC	Department of Conservation	New Zealand government agency charged with conserving natural and historic heritage within the country
eDNA	Environmental DNA	Emerging technique that analyses the genomic make-up of a sample (e.g. water, sediment, animal gut) to see what organisms may have been present
ELF	Engineered Landform	Overburden rock stack where rock is placed, engineered to achieve geochemical outcome
EPA	Environmental Protection Authority	New Zealand government agency responsible for regulating activities within the country that affect the environment
ESA	Ecological study area	5,000ha area of land composed of a mix of grazing lands, leasehold Crown land, and Crown land, with the 1,300ha BOGP study area in the centre. For the reports, it is further divided into PSA/DDF and SL areas
MGL	Matakanui Gold Limited	New Zealand company, wholly owned subsidiary of Santana Minerals Ltd
MRE	Mineral Resource Estimation	Evaluation estimating the grade and tonnage of an ore in a deposit
PSA	Project Study Area	Area of land expected to be significantly impacted or altered by the planned BOGP, at the time of study design (Nov 2023). This was later modified to the DDF.
RAS	Rise and Shine	Area of land with gold resource containing a MRE (2024) of 2,217,000oz of gold at a grade of 2.3g/t
RMA	Resource Management Act	Resource Management Act 1991
RPMP	Regional Pest Management Plan	Strategic framework established by regional councils to manage pest species within their region
SE	Standard error	Estimate of the difference between the sample mean and population mean

Abbreviation	Term	Meaning
SL	Surrounding Landscape	Area within the ESA that is not part of the DDF/PSA or BOGP. Provides the ecological context to these areas
SRE	Srex East	Area of land with gold resource containing a MRE (2021) of 11,000oz of gold at a grade of 1.3g/t
SRX	Srex	Area of land with gold resource containing a MRE (2021) of 174,000oz of gold at a grade of 1.1g/t
TSF	Tailings Storage Facility	Engineered structures designed and constructed to hold mineral waste (tailings) generated after the gold has been recovered at the processing plant

Executive Summary

This report is a comprehensive mammalian pest survey across the Bendigo-Ophir Gold Project (BOGP) Ecological Study Area (ESA) to inform the Assessment of Environmental Effects (AEE) for the project. This report concludes that the mammalian pest survey provides a detailed baseline of the mammalian pest community within the ESA. The investigation revealed significant mammalian pest presence, with dietary analysis confirming threats to native biodiversity across vegetation, vertebrate, and invertebrate communities. The data will support the development of effective minimisation, rehabilitation, offset and compensation measures for the project.

Matakanui Gold Limited (MGL) is proposing to establish the BOGP, which comprises a new gold mine, ancillary facilities and environmental mitigation measures on Bendigo and Ardgour Stations in the Dunstan Mountains of Central Otago. The project site is located approximately 20 km north of Cromwell and will have a maximum disturbance footprint of 550 hectares.

The BOGP involves mining four identified gold deposits referred to as Rise and Shine (RAS), Come in Time (CIT), Srex (SRX) and Srex East (SRE). The resources will be mined by open pit methods at each deposit within the project site, with underground mining methods also proposed to be utilised at RAS to access the deeper gold deposits. The majority of the mining activities, ancillary facilities and associated infrastructure will be located in the Shepherds Valley – which includes a conventional gold processing plant and water treatment plant, a tailing storing facility, two engineered landforms, internal haul roads, topsoil stockpiles, water pipelines, underground utilities and electrical supply – with non-operational infrastructure located on the adjoining Ardgour Terrace. The BOGP also involves the taking of groundwater from the Bendigo Aquifer for use in mining-related activities and the realignment of Thomson Gorge Road via Ardgour Station.

Habitat NZ Ltd conducted a comprehensive mammalian pest survey of the ESA to inform the AEE for the project. The ESA spans approximately 5,000 hectares and comprises two zones, the Project Study Area (PSA) and the Surrounding Landscape (SL) for this survey. This survey evaluated mammalian pest populations and potential predation impacts on native species within the ESA. The assessment focused on two key objectives:

- Documenting the presence and relative abundance of pest species across the site through camera traps, chewcards, aerial surveys and Modified McLean Scale surveys
- Assessing predation risks to protected native fauna through Environmental DNA (eDNA) analysis of gut samples taken from key predator groups conducted over the 2023/2024 and 2024/2025 summer field seasons.

Key Findings

- **Mammalian pest presence:** mammalian pests found across the ESA included feral cats (*Felis catus*), feral deer (*Dama dama* and *Cervius elaphus*), feral goats (*Capra hircus*), feral pigs (*Sus scrofa*), hares (*Lepus europaeus occidentalis*), hedgehogs (*Erinaceus europaeus*), mice (*Mus musculus*), mustelids (ferrets- *Mustela putorius furo, stoats- M. erminea*, and weasels- *M. nivalis*), possums (*Trichosurus vulpecula*), rabbits (*Oryctolagus cuniculus*) and rats (species unknown although assumed to be *Rattus rattus* and/or *Rattus norvegicus*)
- **Mammalian pest presence:** all species except weasels and rats were detected across both survey zones, with weasels and rats being found only in the SL.

- **Mammalian pest relative abundance:** excluding weasels, rats and stoats, mammalian pest species showed no differences in relative abundance between the PSA and SL for camera trap and chewcard surveys.
- **Low abundance of stoats, weasels, and rats**: a chewcard survey showed rats were sparse across the site, with none found in the PSA. This was corroborated by the lack of rats identified on cameras during the camera trap survey and the absence of rats from gut analyses of ferrets and feral cats. Stoats and weasels were also detected in low numbers across the ESA. Weasels were only found in the SL, and while stoats were only detected on cameras in the PSA, they were visually sighted in the SL while fieldwork was being carried out.
- **Impact on vegetation**: eDNA diet analyses indicated hedgehogs and mice were eating *Olearia traversiorum* (At Risk – Declining). Multiple pest species showed evidence of consuming plants from the *Myosotis* and *Daucus* genera, that include 'Threatened' and 'At Risk' species recorded across the ESA; however, further genetic analysis confirmed that the consumed plants were not threatened species. Native beech trees from two genera were recorded from diet analyses of mice and possums.
- **Predation impacts on native vertebrates:** eDNA diet analyses of target species indicates predation of native skinks by feral cats, ferrets, and hedgehogs across the site. This included the eDNA detection and gut remains of several tussock skinks (‘At Risk – Declining’) in the gut of one ferret and one cat. Additionally, McCann’s skink (‘Not Threatened’) remains were found in one feral cat, three ferrets and three hedgehogs.
- **Predation impacts on native invertebrates:** eDNA diet analyses show that all target mammalian pests, particularly hedgehogs and mice, are eating a variety of native invertebrates. This includes an *Agrotis* moth (one ‘At Risk’ species recorded on site), a *Harpalus* beetle (only one new species recorded on site), as well as other species such as endemic ground wētā. The taramea consumed by feral pigs is also an important habitat for native weevils, including a new species of *Inophloeus* and is of cultural importance.

Conclusion

This mammalian pest survey provides a detailed baseline of mammalian pests' presence and relative abundance within the ESA. The findings highlight the presence of mammalian pests across the area and their potential negative impacts on native species. The data will inform the Assessment of Environmental Effects (AEE) and support the development of effective conservation and mitigation measures to protect the site's biodiversity.

1 Introduction

1.1 Bendigo-Ophir Gold Project description

Matakanui Gold Limited (MGL) is proposing to establish the Bendigo-Ophir Gold Project (BOGP), which comprises a new gold mine, ancillary facilities and environmental mitigation measures on Bendigo and Ardgour Stations in the Dunstan Mountains of Central Otago. The project site is located approximately 20 km north of Cromwell.

The BOGP is located within the footprint of Minerals Exploration Permit 60311, which is held by MGL under the Crown Minerals Act 1991. MGL also has land access agreements with Bendigo and Ardgour Stations. The BOGP is located adjacent to land administered by the Department of Conservation (DOC), including the Bendigo Historic Reserve, the Bendigo Conservation Area and the Ardgour Conservation Area.

The BOGP involves mining four identified gold deposits named Rise and Shine (RAS), Come in Time (CIT), Srex (SRX) and Srex East (SRE). The resources will be mined by open pit methods at each deposit within the project site, with underground mining methods also proposed to be utilised at RAS to access the deeper gold deposits. The majority of the mining activities, ancillary facilities and associated infrastructure will be located in the Shepherds Valley, with an additional general and administration area located on the adjoining Ardgour Terrace.

Figure 1 provides an overview of the footprint associated with the establishment, operation and rehabilitation of the BOGP, which includes a maximum disturbance footprint of 550 hectares.

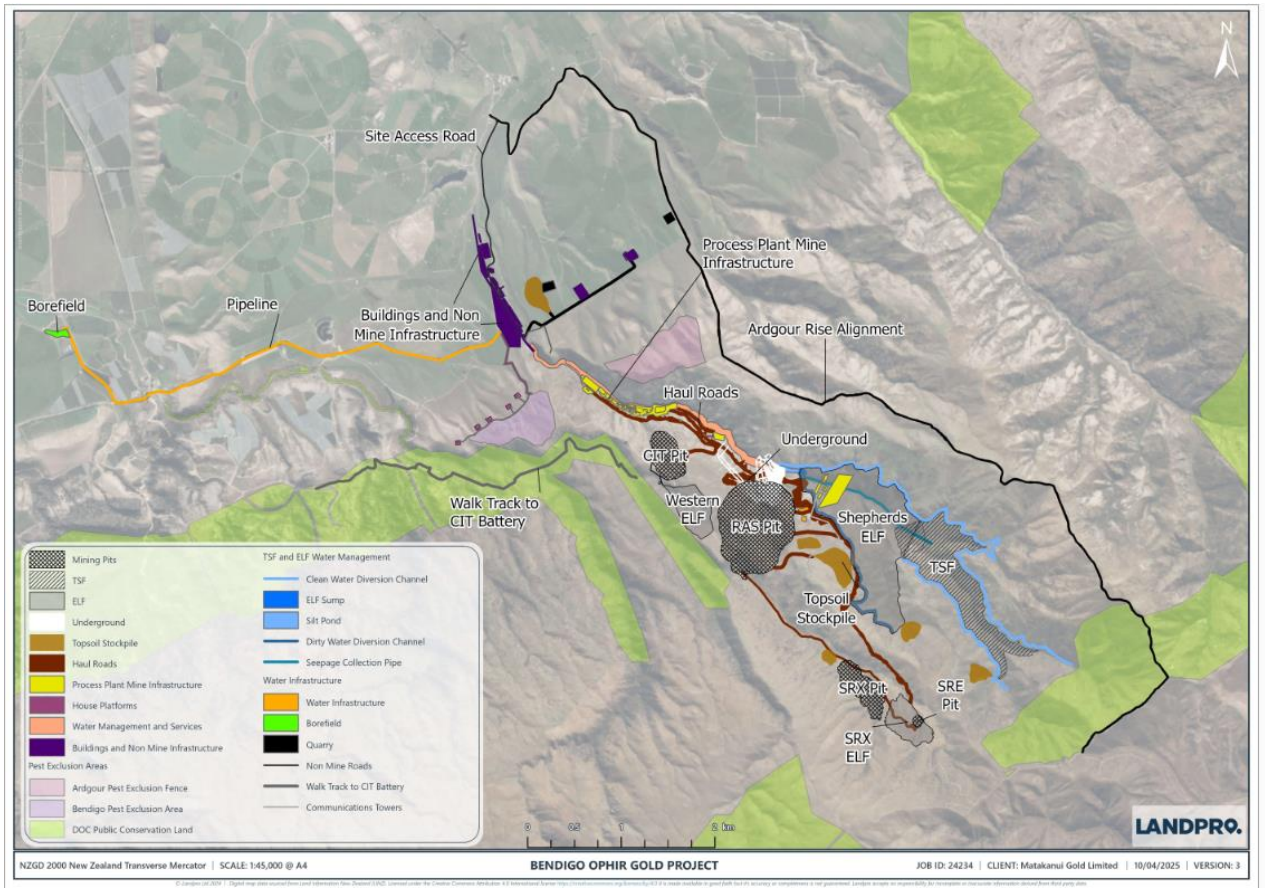

Figure 1: Overview Site Layout of the Bendigo-Ophir Gold Project

A full description of the various activities comprising the establishment, operation and rehabilitation of the BOGP is provided in the Assessment of Environmental Effects (AEE) prepared by Mitchell Daysh Limited. However, by way of summary, the BOGP includes the following components:

- The establishment of the RAS Open Pit and Underground Mine and SRX Open Pit, which will be rehabilitated to pit lakes at closure
- The establishment of the CIT Open Pit, which will be progressively backfilled with waste rock from the RAS Open Pit and rehabilitated to native herb fields (to integrate with the surrounding area) at the completion of mining activities
- The establishment of the SRE Open Pit, which will be progressively rehabilitated with waste rock before becoming an engineered landform for the adjoining SRX Open Pit (SRX ELF)
- A conventional hard rock gold processing plant and water treatment plant in the lower reach of Shepherds Valley, along with associated processing infrastructure and ancillary activities, including mine offices, carparking, workshops and equipment servicing infrastructure, a goods warehouse and a fuel depot. The establishment of this mining operations area will also include the realignment of Shepherds Creek
- The establishment of a water storage tank near to the processing plant
- The establishment of a Tailings Storage Facility (TSF) in the upper reach of Shepherds Valley (including clean water diversion drains), which will utilise waste rock from mining activities within the project site
- The establishment of engineered landforms in the Shepherds Valley (Shepherds ELF) and Rise and Shine Valley (SRX ELF) to permanently store overburden waste rock
- The establishment of temporary and permanent topsoil stockpiles and biological rehabilitation resource storage areas around the project site
- The taking of groundwater from the Bendigo Aquifer for use in mining-related activities, which will be conveyed to the processing plant via a pipeline over a distance of approximately 6.5 km
- The establishment of supporting infrastructure / activities within the project site, such as the upgrade of Ardgour Road and the extension of Thomson Gorge Road to provide improved access to the BOGP, internal mine access and haul roads, water pipelines and underground utilities, and electricity supply to the project site from Lindis Crossing via a new 66kV overhead powerline that will follow the existing road reserve corridor
- The realignment of Thomson Gorge Road, via Ardgour Station, to provide public access through to the Manuherikia Valley
- Main explosives magazines and emulsion mixing facilities (located outside the project site on Ardgour Station)
- The establishment of non-operational infrastructure associated with the BOGP on the Ardgour Terrace, including an administration office, high voltage substation and temporary construction workers accommodation
- The establishment of a construction and demolition landfill within the Shepherds ELF.

1.2 Report purpose and scope

MGL commissioned a suite of ecological studies, to inform the project AEE. To this end, Habitat NZ Ltd was engaged to survey mammalian pests across the 5,000 ha Ecological Study Area (ESA) (see Section 2).

This report presents findings from baseline mammalian pest surveys conducted across the ESA during the 2023-2024 summer season, November 2024 and August 2025. Field surveys were designed and implemented according to the original project boundaries established at the time of survey implementation (original boundaries are shown in the maps throughout this report, while current boundaries are displayed in Figure 1). We have maintained representation of the original management area blocks for most animal pests because modifying these would compromise the validity of our results. This approach aligns with specific animal pest monitoring protocols and does not affect the overall validity of findings, as the primary purpose of these surveys was to determine the mammalian pest species present at the site, along with their relative abundance.

Results from these surveys will inform the AEE on the current ecological state of the ESA and guide the effects management package proposed for rehabilitating, offsetting, or compensating for residual adverse effects that can't be avoided or minimised.

This survey verified the presence and assessed the relative abundance of the following suite of mammalian pests that are known or were expected to be present across the BOGP site including:

- Feral cats (*Felis catus*)
- Feral deer (*Dama dama* and *Cervius 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*)
- Rats (assuming *Rattus rattus* and *Rattus norvegicus*).

The diets of cats, ferrets, mice and pigs were examined using eDNA analyses to better understand the predation risks these species pose to indigenous fauna.

2 Ecological Study Area

The ESA comprises two survey zones:

- Project Study Area (PSA) – which is the footprint of the proposed Bendigo-Ophir gold mining operations, which were proposed to be significantly impacted and/or modified by the project, at the time of study design (Nov 2023).
- Surrounding Landscape (SL) – which is land outside the area of direct impact from the proposed mining operations which may be used for offsetting or compensation purposes.

The ESA covers approximately 5,000ha, as shown in Figure 2, and is comprised of sheep and beef grazing lands and conservation estate with a rich gold mining history.

The area has moderate topography, with hills rising from the Bendigo terraces at 370mRL in the west to approximately 1200mRL on the face of Mt Moka in the east. A mosaic of grey scrub, tussock, and other low-growing vegetation provides a range of habitats for prey species and mammalian predators. For a full description of vegetation and habitats see Bendigo-Ophir Gold Project: Vegetation Assessment (RMA Ecology 2025a). The site also contains wetlands and streams, details of which can be found in the Bendigo-Ophir Gold Project: Wetland Assessment (RMA Ecology 2025b).

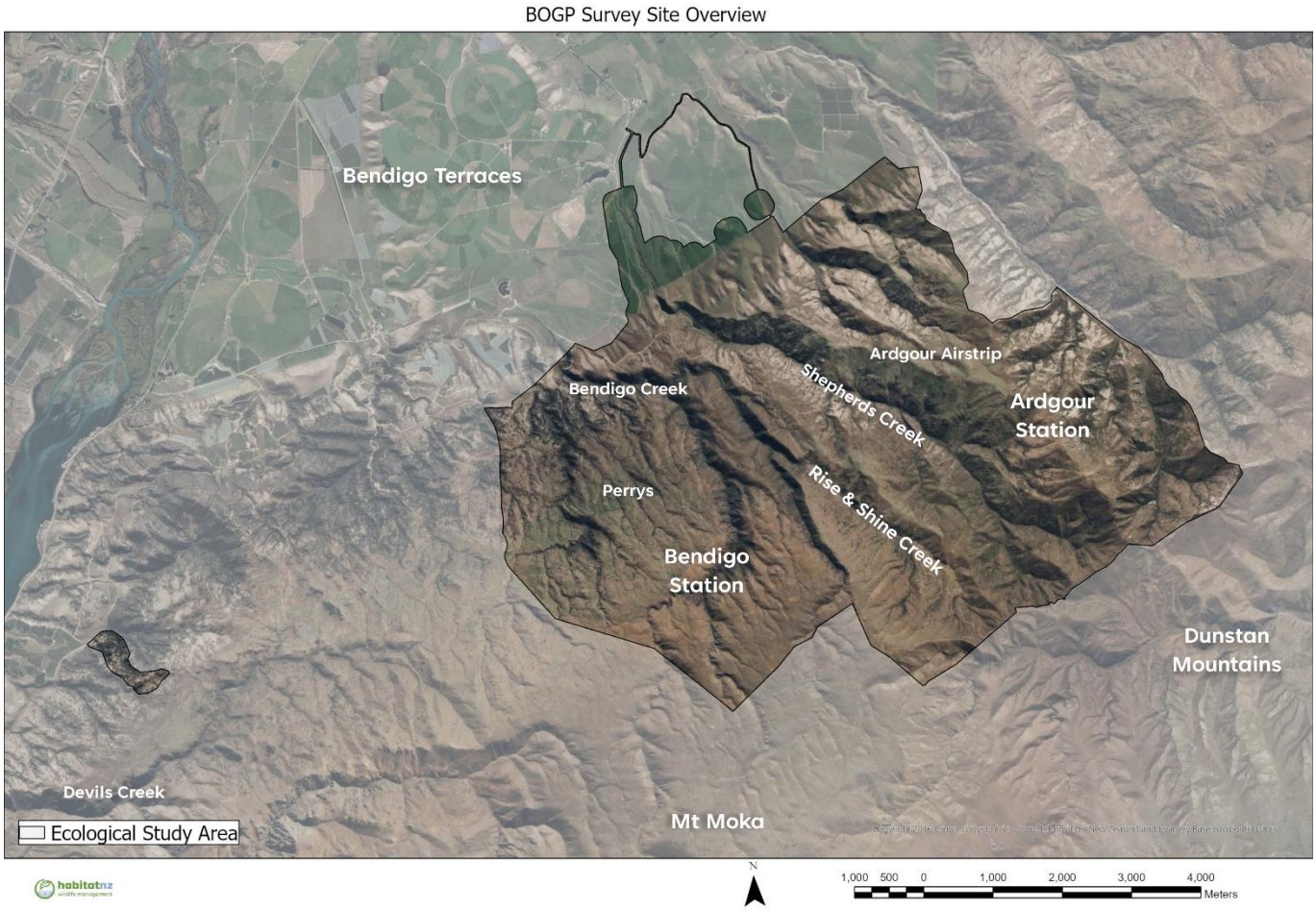

Figure 2. Ecological Study Area (ESA) with key locations for the Bendigo-Ophir Gold Project[1]

[1] The study area boundary presented here is accurate at publication and provided for reference purposes only. All subsequent maps in this document represent the boundary when surveys were designed and conducted.

3 Methodology

This section outlines the techniques used to capture/collect survey data and the processes used to analyse results for each of the survey methods, including:

- Overview and description of each survey method
- Field sampling methods, equipment, deployment techniques and considerations for baseline surveys of mammalian pest species
- Analysis methods, calculations and statistical tests to determine species' presence and relative abundance, as well as genetic testing methods to identify diet.

3.1 Overview

Four mammalian pest survey methods were used across the ESA to establish mammalian pest species' presence and relative abundance and dietary behaviours. These include:

- Chewcard lines, targeting mice, possums and rats
- Camera traps, targeting cats, mustelids and hedgehogs
- Aerial surveys for ungulates such as feral deer, goats and pigs
- Modified McClean Scale survey for rabbits
- eDNA samples identifying the diet of mammal predators.

These methods were chosen based on:

- Effectiveness in detecting and differentiating the target species
- Suitability to survey multiple species
- Level of information the technique can provide
- Established protocol and calibration for the target species
- Resource, cost, and time efficiency for establishing baseline information
- Innovative technology to provide details not available using traditional methods.

Each method is discussed below, including the target species and the advantages and disadvantages over other survey techniques.

3.1.1 Camera traps

Camera traps are motion-activated trail cameras pointed at set bait stations. They are designed to capture images of animals moving within the camera's field of view. Camera traps are an effective and increasingly used survey tool for determining the presence and relative abundance of mammalian pests in New Zealand (Gillies and Brady 2018, Glen *et al.* 2013, Glen *et al.* 2014). They are more successful at detecting various large (cats and ferrets) and cryptic (stoats) pest species compared to traditional monitoring methods such as tracking tunnels (Smith and Weston 2017), live-traps (Gillies and Brady 2018), and kill traps (Glen *et al.* 2014). Camera traps can also provide more detailed information on target species besides detection rates, such as group behaviour and the time-of-day animals are most active and provide more reliable differentiation between stoats and weasels (Dilks *et al.* 2020). Camera traps have been used to monitor many species, including native wildlife (Tansell 2023).

The Department of Conservation (DOC) best practice protocol for camera traps has been developed and calibrated for cats, mustelids, and rats, but not hedgehogs (Gillies 2023). However, several studies suggest camera traps are suitable for monitoring hedgehog relative abundance (Glen *et al.* 2014, Nottingham *et al.* 2020), and may be more effective than traditional monitoring techniques (Anton *et al.* 2018).

Cameras have recorded the presence of hedgehogs that failed to be detected by tracking tunnels (Anton *et al.* 2018), the latter being a common method for multi-species monitoring of small mammals. Camera trap indices of hedgehogs have also been positively correlated with chewcard indices (Nottingham *et al.* 2020), although they have been difficult to compare to those of kill traps due to biases in both methods (Glen *et al.* 2014).

A range of measures have previously been used to assess the relative abundance of hedgehogs from camera trap records, with no consistent approach across studies. Applying the camera trap index in the DOC protocol to hedgehogs provides a consistent measure of relative abundance suitable for this survey. However, caution is required when interpreting hedgehog camera trap monitoring results, as the index has not been calibrated with absolute population density (Glen *et al.* 2014).

3.1.2 Chewcards

Chewcards are corflute cards baited with peanut butter and are intended to entice mammalian pests to bite them. They are a cost-effective and widely used multi-species monitoring method for detecting mammalian pest presence and activity throughout New Zealand, including possums, rats, and mice (Burge *et al.* 2016, Forsyth *et al.* 2018). Like camera traps, they provide a relative abundance measure rather than an estimate of actual population density and are useful even when pest densities are low (Sweetapple and Nugent 2011).

Chewcards detect possum and rodent activity more effectively than conventional pest monitoring protocols, including waxtags, and tracking tunnels (Burge *et al.* 2016, Forsyth *et al.* 2018, Sweetapple and Nugent 2011). Possums cannot be surveyed using other standard rodent monitoring protocols, such as tracking tunnels, because possums, being larger, often cannot fit through tunnels. As such, it is more cost-effective and time-efficient to utilise methods that effectively survey multiple species at once rather than include an additional and intensive method for surveying possums (e.g. leghold traps).

3.1.3 Aerial surveys

Aerial surveys involve the use of fixed-wing aircraft or helicopters to count conspicuous animals visible in daylight hours over large spatial areas. Aerial surveys provide a repeatable and straightforward indication of animal populations over broad-scale areas (Mitchell and Balogh 2007). This method is utilised for many terrestrial species, including ungulates (Mitchell and Balogh 2007).

Aerial surveys can provide a more robust approach over large, open areas with low human densities compared to other available methods, such as pedestrian or vehicle counts (Mitchell and Balogh 2007). Helicopters generally have better detection rates than fixed-wing aircraft, particularly for deer (Mitchell and Balogh 2007).

The detectability of ungulates can be reduced dramatically with increasing vegetation cover (McMahon *et al.* 2021), and in areas with repeated exposure to helicopter aerial culling (Bayne *et al.* 2000). Given the relatively open nature of the ESA, vegetation cover was not expected to be a major issue, but previous feral goat culling by helicopter on Ardgour Station may increase the evasiveness of feral goat behaviour (Bayne *et al.* 2000).

There is currently no standardised protocol for aerial surveys in New Zealand. The particular methodology applied by a study often depends on the characteristics of the site and the preferred measurable outcome (McMahon *et al.* 2021, Mitchell and Balogh 2007).

3.1.4 Modified McLean Scale survey

The Modified McClean Scale provides a standardised visual assessment tool used for assessing the relative abundance of rabbits over a landscape. It can be used for long-term population trend monitoring and establishing whether control efforts reach a specific target. This method was chosen as the Modified McLean Scale is used nationally, and the Otago Regional Pest Management Plan (Otago Regional Council 2019) sets compliance thresholds for rabbits based on this method. Land occupiers within Otago are legally required to maintain rabbit densities at a level 3 or below on the Modified McLean Scale.

This technique offers a practical, cost-effective approach for monitoring rabbit populations over large areas where traditional methods such as spotlight counts, or pellet counts may be impractical or less reliable (National Pest Control Agencies 2012). They are also used for measuring whether a control threshold has been reached. This method generates a relative abundance index and provides consistent results across different observers when properly calibrated.

3.1.5 Environmental DNA analysis

Environmental DNA (eDNA) is an emerging tool that uses advanced sequencing techniques to analyse a sample's genomic makeup and provide an overview of taxonomic information (Taberlet *et al.* 2018). Samples can be taken from sediments, water, faeces, or an individual animal's gut (Taberlet *et al.* 2018). They have been used to assess the biodiversity of an ecological system (Nørgaard *et al.* 2021), or to target a single species (Duarte *et al.* 2023), often complementing other field observation studies to inform management decisions (Taberlet *et al.* 2018).

Diet analysis involves analysing an animal's gut contents or faecal matter to determine its diet (Taberlet *et al.* 2018). Conventional diet analysis relies on samples having undigested food items remaining in the digestive system or faeces, which are then identified under a microscope. This is unnecessary for eDNA analysis which can provide a higher resolution of prey species even when the gut appears 'empty' (Nørgaard *et al.* 2021).

Using eDNA for diet analysis is a relatively novel technique to investigate predator impact on native species. It has rarely been used in this context in New Zealand – typically being applied to freshwater systems to investigate at-risk and exotic species distributions (Bird *et al.* 2024, Steiner *et al.* 2023) and changes in biodiversity after disturbance (Waters *et al.* 2024). However, overseas, eDNA has been used in various predatory species, from spiders to bears, to assess their diets and impact on environments (Saqib *et al.* 2022, Taberlet *et al.* 2018).

eDNA analysis provides a suitable method to investigate mammalian pests' (cats, ferrets, mice and feral pigs) predation across the ESA, particularly if they actively predate at-risk or threatened species. It is particularly useful when prey species are cryptic, such as many lizard and invertebrate species.

3.2 Deployment locations and timing

Camera traps and chewcard lines were dispersed across the ESA, ensuring data capture in both the PSA and SL survey zones. Aerial surveys covered a predetermined flight path over the ESA. Surveys were carried out during summer months, which is when the target species tend to be most active and at their highest abundance (Breedt 2017, Caley and Morris 2001, King 1983). The timing of each survey method was as follows:

- Chewcard lines from 19th – 28th February 2024
- Camera traps from 11th March – 4th April 2024
- Aerial surveys on two fine weather days from September – December 2024
- Modified McLean Scale survey in August 2025
- eDNA at various dates including:
  - Ad-hoc capture at various dates in December 2023 and January, February, March and May 2024
  - Leghold and mouse trap lines in November 2024.

The species sampled by each monitoring method, along with the number of monitoring lines and devices deployed in each survey zone, are detailed in

Table 1 and Table 2. The surveyed area for the Modified McLean Scale survey includes the Lagomorph Control Zone and the two predator-exclusions fenced areas proposed for the effects management package.

Figure 3 shows the chewcard and camera trap device locations across the two survey zones, Figure 4 shows the pre-determined helicopter flight path used for aerial surveys, and Figure 5 shows locations of Modified McLean Scale survey lines.

Table 1. Target species for camera traps and chewcards, with the number of lines and devices in each survey zone

Monitoring Method	Target Species	No. of lines (Total no. of devices)		
		PSA	SL	Total
Camera trap	• Feral cat (*Felis catus*) • Ferret (*Mustela putorius furo)* • Hedgehog (*Erinaceus europaeus*) • Stoat (*M. erminea*) • Weasel (*M. nivalis*)	6 (24)	8 (32)	14 (56)
Chewcard	• Mouse (*Mus musculus*) • Possum (*Trichosurus vulpecula*) • Rat (*Rattus rattus* and *R. norvegicus*)	16 (160)	25 (250)	41 (410)
Aerial surveys	• Feral deer (*Dama dama* and *Cervus elaphus*)	Pre-determined flight path		n/a
	• Feral goat (*Capra hircus*)			
	• Feral pig (*Sus scrofa*)			
Modified McLean Scale survey	• Rabbits (*Oryctolagus cuniculus*)	24 lines (120 plots) across Lagomorph Control Zone		24

Table 2. Target species and number of individuals sampled for eDNA diet analysis

Monitoring Method	Target Species	No. of individuals
eDNA analysis	• Feral cat (*F. catus*)	5
	• Feral pig (*S. scrofa*)	13
	• Ferret (*M. putorius furo*)	35
	• Hedgehog (*Erinaceus europaeus*)	8
	• Mouse (Mus musculus)	6
	• Possum (*Trichosurus vulpecula*)	9

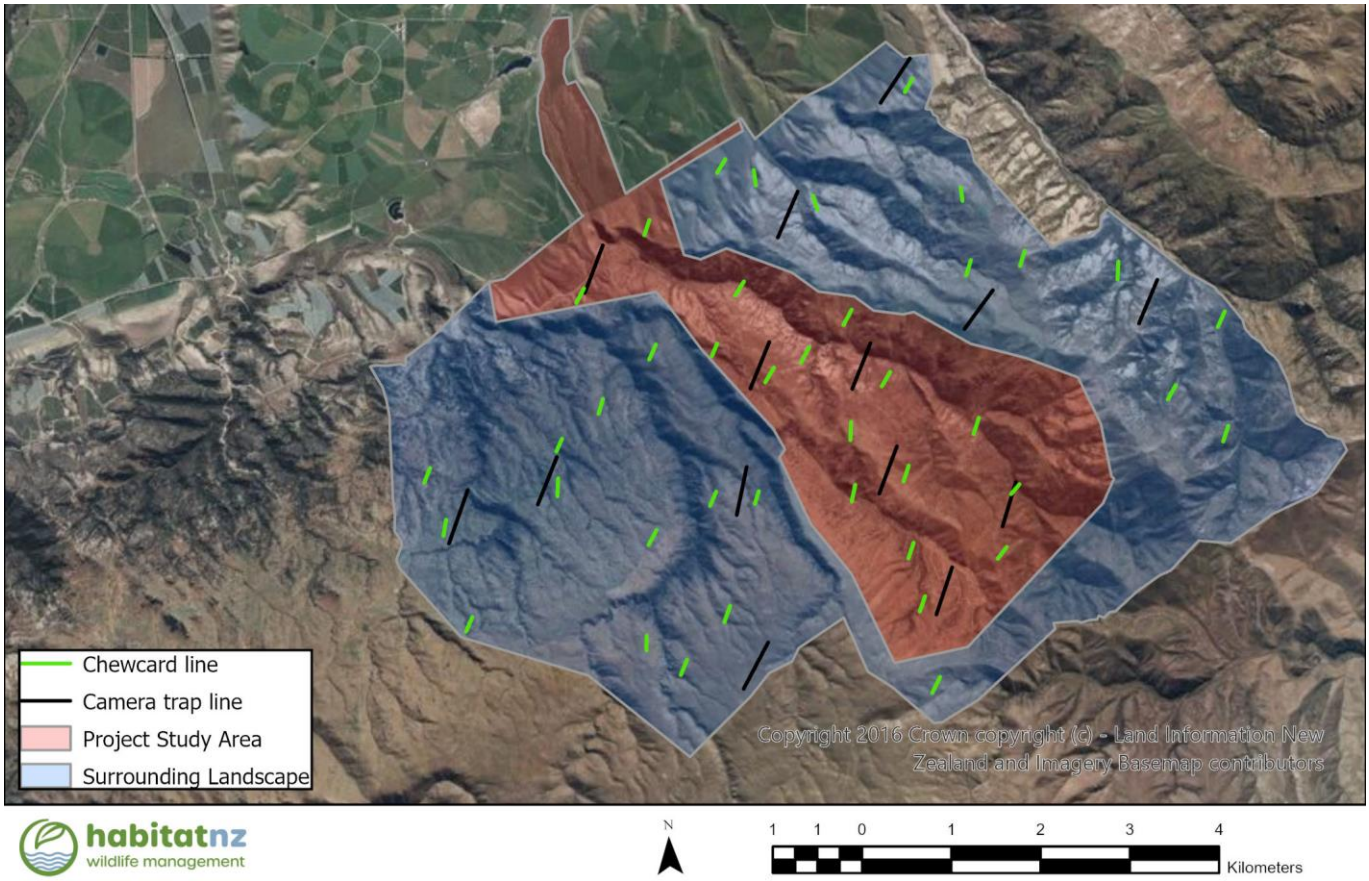

Figure 3. Camera trap and chewcard locations

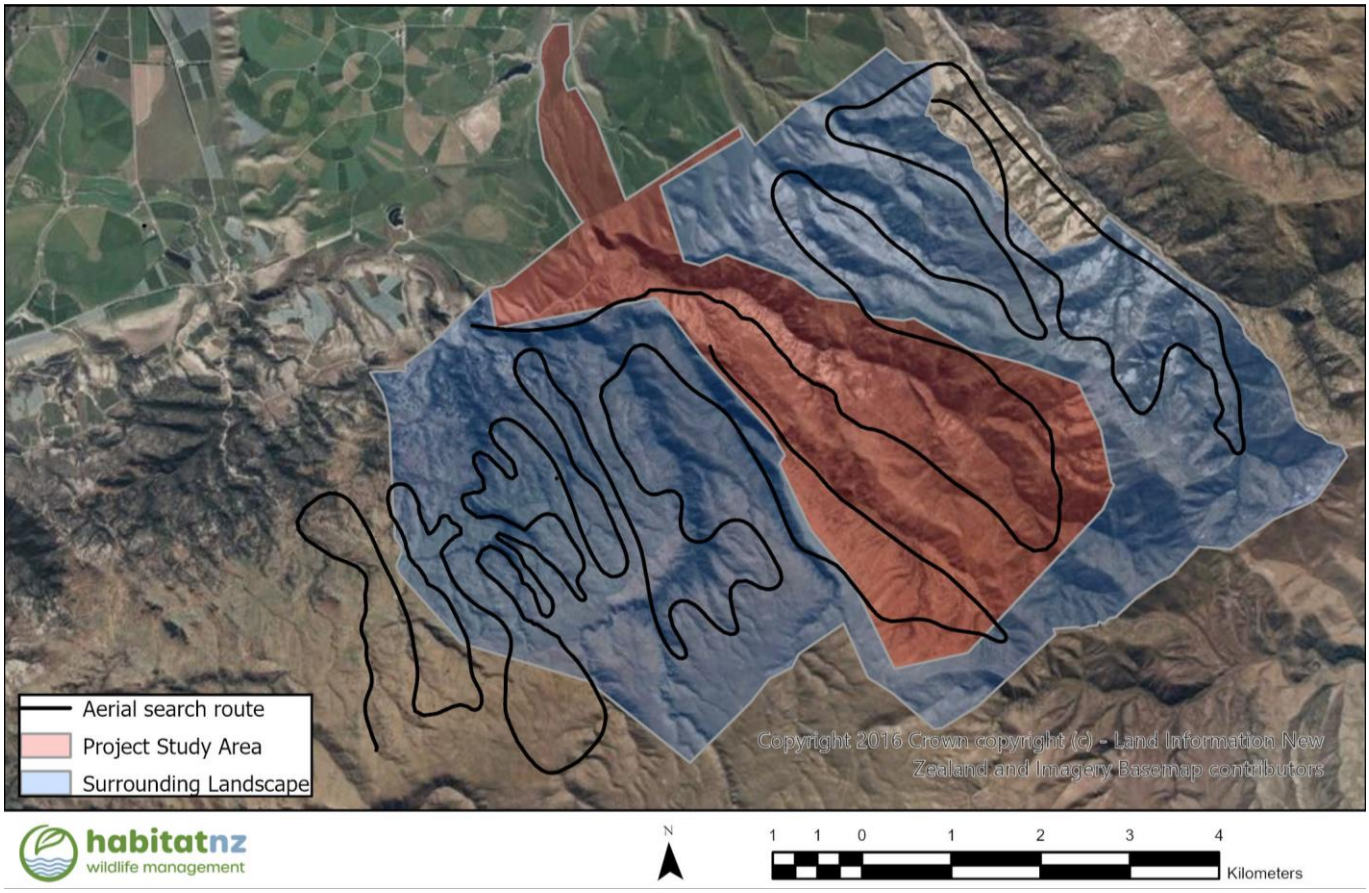

Figure 4. Pre-determined flight path for aerial surveys

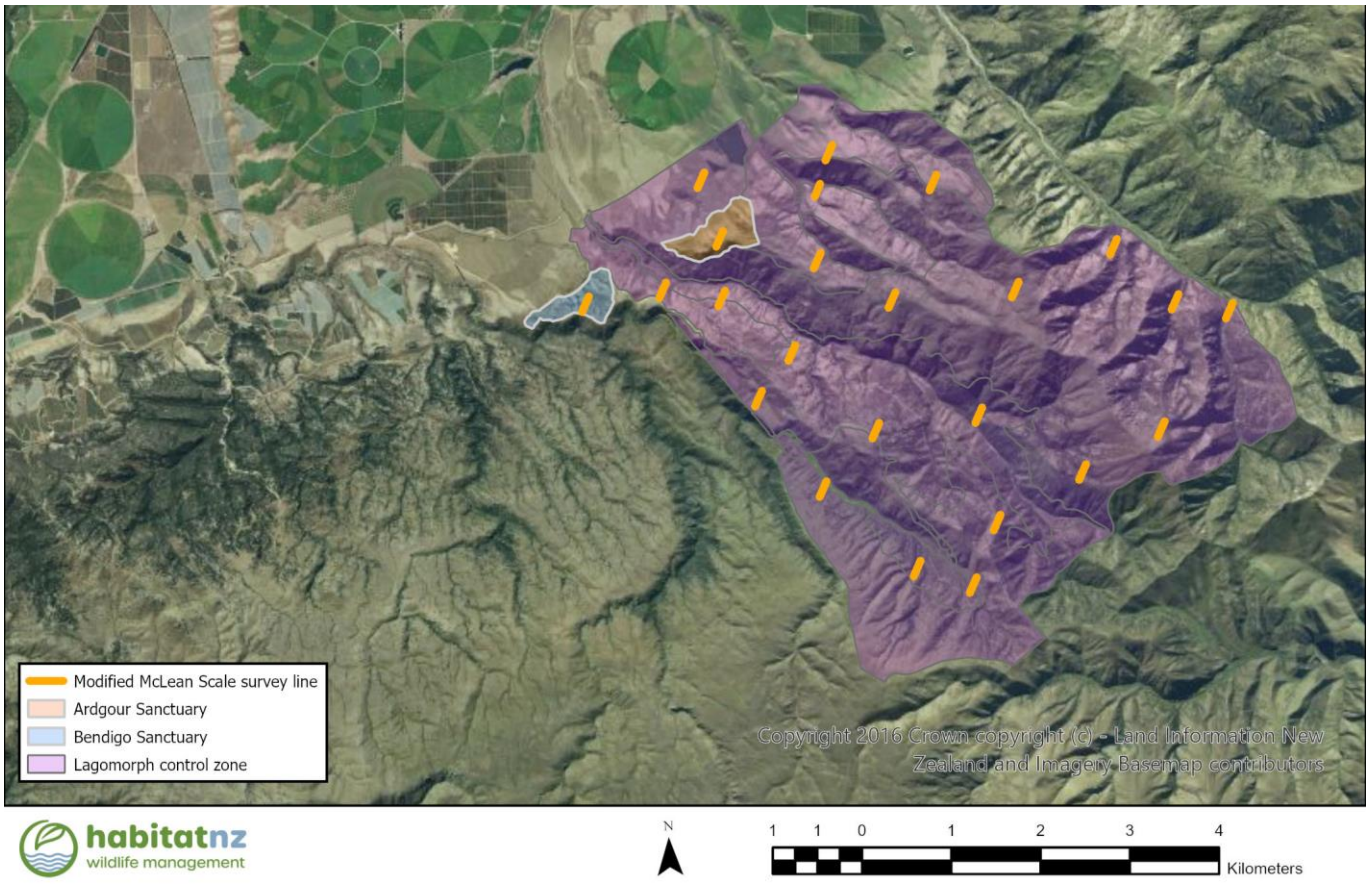

Figure 5. Modified McLean Scale survey lines and control zone proposed for the effects management package

3.3 Field sampling methods

3.3.1 Camera trap field sampling

Camera trapping monitoring was generally performed within best practice guidelines outlined in the Interim DOC Trail Camera Guide protocol (Gillies 2023). The predecessor of this document (v1.1.0, April 2012), was used until the March 2023 update became available although there were minimal changes.

'PoaUku' scented long-life lures[2] were used instead of fresh rabbit meat or peanut butter to avoid rapid deterioration of bait during the (summer) survey period. These lures remain attractive to cats and mustelids in the field for several weeks (Boffa Miskell Limited 2021).

Browning Spec Ops Elite HP5 cameras[3] were configured to capture two-photo bursts with a 30-second delay between trigger events and were set up to avoid sunstrike and false triggers. This included, where possible, orienting the camera away from the sun, clearing potential obstructing vegetation, and ensuring the bait was centred in the device's field of view.

Due to the limited availability of trees across the study site and the potential to be trampled by livestock if left close to the ground, cameras were secured onto 1m high waratahs hammered into the ground (see Figure 6 below). Cameras were distanced further from the target area than recommended in the protocol based on suggestions for capturing higher detection rates of cats and mustelids (Glen *et al.* 2013).

As per protocol requirements, cameras were arranged in lines of four, 200m apart and were deployed for 21 nights in each round. Cameras were aligned facing away from the sun and potentially obstructing vegetation cleared to limit instances of false triggers. However, false triggers are a common issue for camera traps (Glen *et al.* 2014).

[2] Sourced from *https://www.connovation.co.nz*

[3] Sourced from *https://browningtrailcameras.com*

Figure 6. Example camera trap configuration with camera mounted on waratah pointed at bait station (white)

Weather conditions

There are no specific weather requirements for camera trap deployment under the camera trap protocol (Gillies 2023). However, camera traps were deployed during forecasted 'fine weather' periods to minimise the impact of heavy rain and wind on image quality. Despite efforts to time deployments during favourable weather, adverse weather conditions are occasionally unavoidable due to the long-term nature of the deployment.

3.3.2 Chewcard field sampling

Deployment of chewcards[4] in the ESA generally followed the seven-night monitoring specifications in the best practice guidelines for chewcard monitoring (Bionet 2020).

In some cases, woody vegetation was sparse across the site. Where no suitable trees were present, chewcards were set out by securing them onto metal stakes hammered into the ground (Figure 7 below) as areas of tussocks and grasslands without woody trees were considered habitat for mammalian pests.

[4] Sourced from https://www.connovation.co.nz

Figure 7. Example chewcard configuration

Weather conditions

The standard chewcard methodology requires survey lines to be deployed when weather forecasts are expected to be 'fine', although some variation is allowed for seven-night surveys (Bionet 2020). A 'fine weather night' is generally accepted as a night with no rain within the first four hours after sunset and where weather is unlikely to lessen mammalian pest activity significantly (Bionet 2020).

3.3.3 Aerial survey sampling

Aerial surveys were completed using a helicopter, flown at a consistent speed at approximately 100m above ground on a predetermined flight path across the ESA. Surveys were conducted on two separate days, following the same flight path. Aerial surveys were only completed during fine weather days with little wind, both for aircraft safety and to control for environmental biases between surveys. The timing of the surveys was generally between 8am and 11am.

Because observer bias can significantly influence detection rates (Mitchell and Balogh 2007), the same observer and pilot were used for both aerial surveys. Both the observer and pilot were experienced with locating ungulates in aerial surveys.

All mammals sighted were counted, including the species, number of individuals, and any physical identifiers (colouration or markings) were noted where possible. Physical markings or colourations can assist in differentiating individuals or groups of goats and pigs.

3.3.4 Modified McLean Scale survey sampling

Rabbit surveys using the Modified McLean Scale method followed good practice guidelines for monitoring and control of pest rabbits (National Pest Control Agencies 2012).

A total of 24 survey lines were established, with each line containing 5 sample plots at approximately 50m intervals. The location and density of lines were determined as per NPCA guidelines (National Pest Control Agency 2012) with consideration to the lagomorph control zone and predator-fenced areas proposed in the effects management package.

At each plot, the area underwent visual assessment and the distance between 20 pairs of rabbit pellets was measured to generate a Modified McLean Scale score. Observations encompassed faecal pellets and their overall distribution, as well as rabbit indicators including scratches, buck heaps, burrows, and live rabbit sightings.

The Modified McLean Scale assessment scale is as follows:

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 likely to be seen in large numbers over the whole area.

3.3.5 eDNA sample collection

eDNA samples were taken from mammalian pests that had been captured, euthanised and then dissected. Target mammalian pests were captured using a variety of methods, including:

- Leghold traps and mouse traps set overnight, clustered in groups of 10 (five of each trap) in areas of good habitat. These were collected and euthanised in the morning (ferrets, hedgehogs, mice and possums)
- Ad-hoc live capture traps set overnight, collected and euthanised in the morning (feral cats and ferrets)
- Shot by foot hunters (ferrets and cats) or from helicopter (pigs)
- Caught with dogs (pigs).

Leghold traps were baited with a mix of ocean fish, such as herring and sprats, and production hen eggs; mouse traps were baited with peanut butter; and ad-hoc live traps were baited with PoaUku mustelid lures.

Animals were either dissected fresh on the day or frozen to collect samples at a later date. They were dissected ventrally from the lower body up to the rib cage to expose the digestive organs. A fresh razor blade, gloves, and dissection sheeting were used for each individual to avoid cross-contamination of samples. Using the pre-prepared Wilderlab eDNA sampling kits, a small amount of matter was scooped out from multiple places in the gut and intestinal tract to make up the recommended sample ratio of approximately ½ a cubic centimetre. For the initial samples (December 2023 – May 2024), stomach contents were placed directly into solution. For later samples (November 2024), Wilderlab provided an updated 'specimen sampling' kit, which was used after their internal investigations suggested the new technique provided more accurate genetic sequencing of animal stomach contents. Samples were safely stored before being sent to Wilderlab for eDNA metabarcoding analysis.

Guts were also visually searched during dissection for the remains of animals such as skinks and invertebrates with details noted if found.

Given eDNA for diet analyses is a novel technique with no standard methodology for sample collection, most individuals had content collected from several areas of the digestive system, including the stomach, large intestine and colon. This was to avoid missing important taxa. Contents were aggregated to form the sample for the animal.

3.4 Data analyses

3.4.1 Camera traps

Classification

A total of 880,000 images, were recorded, a number that was impractical to manually process. Images were therefore first passed through the artificial intelligence software Megadetector (Beery *et al.* 2019), to separate 'empty' false-trigger images from those with animals.

Megadetector assigned each image as 'empty' or 'animal' alongside an associated confidence level for correct identification. This information is stored in a file that describes the detection for each image, also known as a 'recognition' file. The recognition file was processed using Timelapse (Greenburg 2024), a classification software for trail cameras, that allows specific subsets of images to be selected at a time based on the information provided by Megadetector.

Images assigned to 'animal' (120,000) were manually processed and classified to a species level or corrected as false triggers. Approximately 2,500 of these images contained animals, with many images capturing the same individual multiple times. A randomised subset of 20,000 images classified as 'empty' was generated using a Timelapse function to assess the rate of false negatives in the first pass. This gave an error rate of 1/20,000 for hedgehogs, while no false negatives were found for feral cats or mustelids in this subset of images.

Identification of most mammalian pest species is straightforward. However, stoats and weasels can present a challenge due to their physical similarities in colour and size, particularly if the animal is moving or the camera lens has rain on it. Animals of the same species were treated as a single detection if they occurred within the same 15-minute period unless they could be unequivocally differentiated.

False triggers caused by vegetation moving in the wind were unavoidable and resulted in approximately 760,000 'empty' images.

Camera Trap Index

For each target species, a camera trap index was calculated for each camera line to give an estimate of relative abundance and then averaged for each survey zone using the following equation:

$$Detections\ per\ 2000\ CH\ (camera\ hours) = \frac{number\ of\ detections}{number\ of\ camera\ trap\ hours} \times 2000$$

If a camera was suspected to have malfunctioned before retrieval, the duration of the malfunction was excluded from the total number of active camera trap hours. This includes periods of consecutive false triggers, hours where storage capacity was exceeded, or malfunctions as a result of animal interference.

If no images were recorded, it was assumed to have failed and was removed from analysis. Any instances where weather affected camera trap functionality and potentially led to missed target species were accounted for by excluding affected hours from the total working camera trap hours.

Weighted mean

Where site-wide averages are presented, weighted means were calculated to accurately represent site-wide average values and account for the variation in survey zone sizes and sampling efforts across the ESA. Although not explicitly required under camera trap protocols (Gillies 2023), this is a standard methodology for other monitoring techniques, such as chewcards (Bionet 2020), and it avoids statistical issues associated with uneven monitoring zone sizes.

The following weighted mean calculation was adapted from DOC's chewcard data analysis methodology in the Biodiversity and Monitoring Reporting System (Bionet 2020), and modified to work with camera trap data by replacing the relative abundance index with detections/2000 CH:

$$Combined\ weighted\ mean$$

$$= \left(\frac{habitat\ area\ stratum\ 1}{total\ habitat\ area} \times \frac{detections}{2000\ CH\ stratum\ 1}\right)$$

$$+ \left(\frac{habitat\ area\ stratum\ 2}{total\ habitat\ area} \times \frac{detections}{2000\ CH\ stratum\ 2}\right) + (\,)etc\ to\ \text{“}n\text{”}\ strata$$

Standard errors for the weighted mean were calculated similarly, using each monitoring block's standard error. All standard errors were multiplied by 1.96 to calculate 95% confidence intervals.

Statistical tests

Two-way Analysis of Variance (ANOVAs) were performed using log-transformed data to assess the effect of survey zone and species on the camera trap detections/2000 CH. These were performed using the statistical software program RStudio (Posit team 2024).

3.4.2 Chewcards

Bite marks on the cards were identified by an experienced operator with current certification as a Bionet Designer and Field Operative and recorded as present or absent for each target species. Relative abundance estimates were calculated by finding the percentage of devices with bite marks on each line and then averaging this within each survey zone. This is expressed as a Chewcard Index (CCI) and was calculated separately for each target species. Standard errors were multiplied by 1.96 to give 95% confidence intervals.

Weighted mean

Where site-wide averages are presented, weighted means and standard errors were calculated as required in the protocol using the following calculation:

$$\begin{aligned} &Combined\ weighted\ mean \\ &= \left(\frac{habitat\ area\ stratum\ 1}{total\ habitat\ area} \times\ CCI\ stratum\ 1\right) \\ &+ \left(\frac{habitat\ area\ stratum\ 2}{total\ habitat\ area} \times\ CCI\ stratum\ 2\right) +\ (\,)etc\ to\ \text{“}n\text{”}\ strata \end{aligned}$$

Statistical tests

Two-way ANOVAs were performed to assess the effect of survey zone and species on CCI, data was log-transformed to account for non-normality. These were performed using the statistical software program RStudio (Posit team 2024).

3.4.3 Aerial survey

Total counts of target mammalian pest species are provided for each aerial survey, with notes on the presence or size of groups the animals were in. An average density estimate for each target mammalian pest species was obtained by calculating the number of individuals per kilometre of flight path (total of 53km flight path). Influences from environmental conditions and observer biases were considered in the sampling methodology.

3.4.4 Modified McLean Scale survey

A score for each line was determined by averaging the scale values recorded across the five plots per line, with results rounded to the nearest whole number. Overall results are presented as the percentage of lines achieving each Modified McLean Scale score. This methodology was selected because, although site-wide averages are valuable for long-term trend analysis, they are not typically employed for reporting comprehensive property assessments within a single year (National Pest Control Agencies 2012).

3.4.5 eDNA

After eDNA metabarcoding analysis, Wilderlab delivered a report identifying unique DNA sequences found in each gut sample. Each sequence corresponds to specific organisms or groups of organisms.

eDNA results vary in taxonomic resolution; some sequences are identified to high resolution, such as species or genus level, while others are only identified to broad categories, such as “metazoan.” Broad identifications are less informative for dietary analysis; consequently, only those with sufficient detail were used in the analysis. Bacteria were excluded from the study as they do not contribute meaningfully to the target species' diets and are not useful in this survey.

Figure 8 is an example of an eDNA sample report output. Each sequence's number of 'reads' provides how many times a given sequence was found in the sample. The number of sequence reads has been used as a semi-quantitative measure linked to fish biomass in New Zealand (David *et al.* 2021) and overseas freshwater systems (Hänfling *et al.* 2016), although the reliability of this has been questioned (Ruppert *et al.* 2019). In a diet analysis context, the number of reads cannot be reliably linked to the proportion of food items in a gut sample (Deagle *et al.* 2013). Instead, 'reads' were overlooked, and a qualitative measure of presence or absence was used for analysis.

Data is presented as a 'frequency of occurrence' for each target species, i.e., the percentage of target species containing each food item. Any species of interest or concern, such as native or threatened species, are also discussed. There is no reliable way to identify if taxa were consumed directly as prey, indirectly as a by-product of carrion consumption, or otherwise. Regardless, all taxa, except for low-resolution categories discussed above and endoparasites, are considered a potential 'food item'.

Sequence	Target	ScientificName	Rank	TaxID	Group	541726	539499	541701	541730	541728
ATCCTTCTTTCCGAAAACAAAATA	TP	Trifolium	genus	3898	Plants	17524	0	24021	21494	1769
CTAGCCCTAAACCCAAATAGTTA(	RV	Sus scrofa	species	9823	Mammals	15076	21561	17831	26030	17443
TTTAATTAACTATTCCAAAAGTTA	WV	Sus scrofa	species	9823	Mammals	13616	19397	19151	13593	11713
TTTATCTTCTAATATTGCTCATGGA	CI	Calliphora	genus	7372	Insects	8604	0	0	0	0
AAAAAAAACCACAATAGAGTTA/	LG	Sus scrofa	species	9823	Mammals	6039	2968	8649	8630	6523
ATCCGTGTTTTGAGAAAACAAGG	TP	Poeae	tribe	147387	Plants	2387	0	46	0	0
ATCCGTGTTTTGAGAAAACAAAG	TP	Poeae	tribe	147387	Plants	2009	61	0	44	0
GTCCACACCGTAAACGATGATCA	UM	Eubacteriales	order	186802	Bacteria	1307	42	159	209	28

Figure 8. Example report generated by Wilderlab

A 'basic multispecies panel' was completed for gut samples from ferrets and feral cats as this targets DNA of terrestrial mammals, birds, and reptiles, making it suitable for diet analysis of predators that only eat animals. However, a 'comprehensive multispecies panel' assessment was used for feral pigs, hedgehogs, mice and possums. This was to include assays for targeting terrestrial and aquatic plants; an important dietary component for these animals (Norbury et al. 2013, Nugent et al. 2000, Thomson and Challies 1988). Figure 9 shows the taxonomic groups each eDNA analysis panel targets and the specific gene region to which these relate.

Target Group	Target Details	Assay Code	Gene Region	Basic Panel	Comprehensive Panel
Vertebrates	Fish, mammals, lizards, frogs, and birds	WV	mt16S	✓	✓
Vertebrates	Fish, mammals, lizards, frogs, and birds	RV	mt12S-V5	✓	✓
Fish	Improved sensitivity and taxon resolution for most fish species	LG	mt12S (Modified MiFish)	✓	✓
Invertebrates	Developed for freshwater insects, but detects a broad range of other invertebrates	CI	COI	✓	✓
Vascular plants	Broad range plant assay	GV	ITS1		✓
Vascular plants	Focus on invasive macrophytes	TP	trnL		✓
Eukaryotes	Broad range of eukaryote taxa including molluscs, crustaceans, protists, and fungi	BX	18S		✓
General eukaryotes	Important for TICI - broad range	BE	18S-V9		✓
Microbes and general eukaryotes	Important for TICI - broad range	BU	18S-V9		✓
Microbes	Important for TICI - broad range	UM	18S-V9		✓
Venerid clams	Invasive golden clam, *Corbicula fluminea*, and *C. australis*	WG	mt16S		✓
Crustaceans	Freshwater and marine decapods	HD	mt16S		✓

Figure 9. Taxonomic groups targeted in basic (for cats and ferrets) and comprehensive (for feral pigs) multispecies eDNA gut sample analyses (sourced from wilderlab.co.nz)

4 Results

4.1 Camera traps

All target species (feral cats, mustelids and hedgehogs) were detected during camera trap baseline monitoring, alongside several other pest mammals, including rabbits, hares, hedgehogs, feral pigs, possums, and mice. Goats and rats were not detected using camera traps.

Although the camera trap protocol is not calibrated to estimate the relative abundance of hedgehogs, hedgehogs were detected on every survey line. In contrast, feral pigs were only detected on three of the 14 lines.

Camera traps also recorded native birds including the New Zealand falcon (*Falco novaeseelandiae*), introduced birds, and skinks. Example camera trap images of target mammalian pests captured in this survey are provided in Appendix C.

4.1.1 Camera trap index

Data pooled across the entire BOGP site showed ferrets had the highest weighted average detections/2000 camera hours (2000 CH) of 5.7 followed closely by 5.4 for hedgehogs. Feral cat detection levels were lower at 1.1 detections (2000 CH), and stoat and weasels were 0.1 and 0.07 detections (2000 CH) respectively.

Despite visual differences in the mean detection index of ferrets and to a lesser extent, hedgehogs, camera trap detections did not significantly differ between the survey zones for any species (ANOVA, $P > 0.76$) (Figure 10). Camera traps detected significantly more ferrets (ANOVA, $P < 0.001$) and hedgehogs (ANOVA, $P < 0.001$) than feral cats, stoats, and weasels. There was no statistically significant difference in the camera trap index between cats, stoats, and weasels.

Ferrets had an average detection of 8.3 (2000 CH) in the PSA and 4.8 (2000CH) in the SL. Hedgehogs were detected at lower rates in the PSA, with an average of 4.3 detections (2000 CH), which was, similar to those for the SL, 5.8 detections (2000 CH).

Feral cats were detected on camera traps less frequently, with an average of 1.5 and 1.0 detections (2000 CH), for the PSA and SL respectively. Stoats and weasels were rarely detected using camera traps, with stoats only detected in the PSA, and weasels only in the SL.

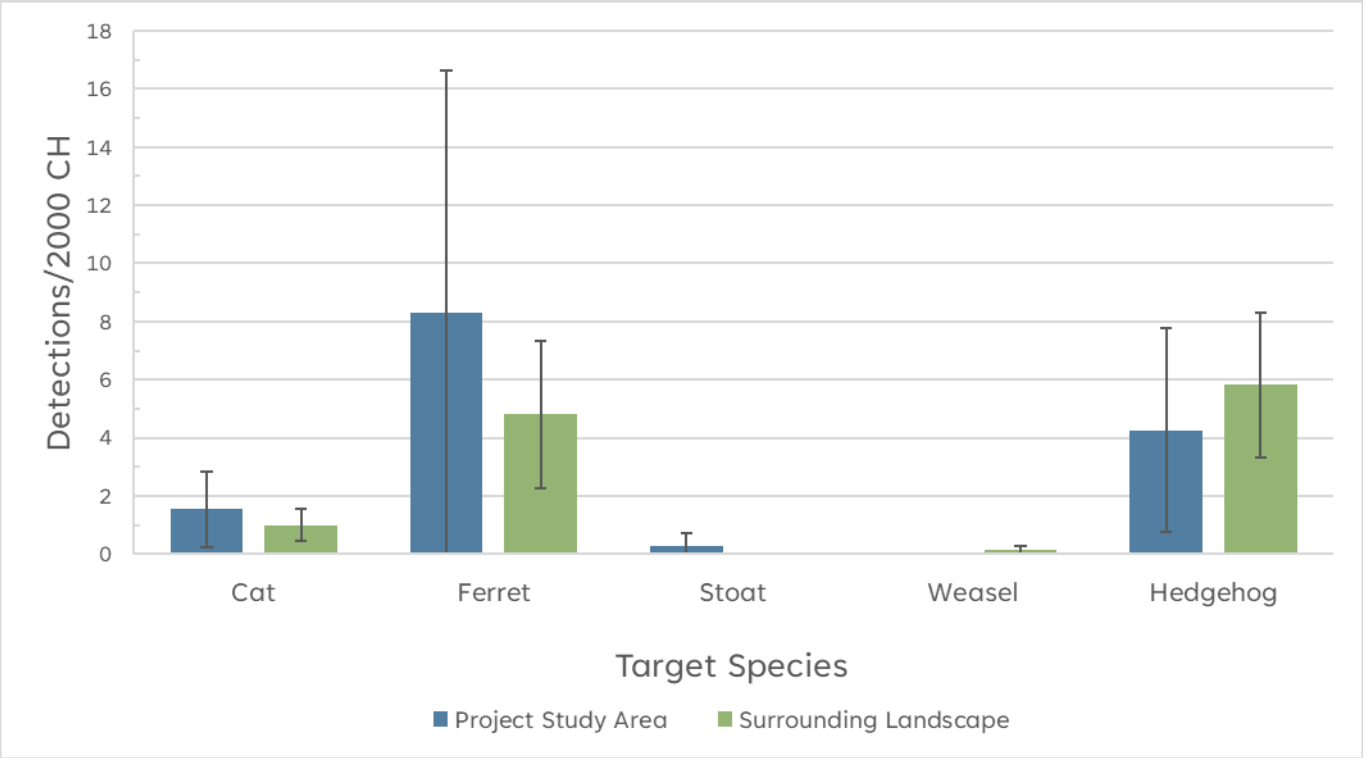

Figure 10. Mean camera trap index (detections per 2000 camera hours) for target species by survey zone (error bars show 95% confidence intervals)

No stoats were detected in the SL using camera traps, although one was sighted near an invertebrate survey point, approximately 1,100–1,400m away from the nearest two survey lines. Stoats are known to have neophobic tendencies, where they are reluctant to approach new objects in the environment, however, camera traps are suspected to incur less of a neophobic response (Smith and Weston 2017). Although pest species could be detected without direct interaction with the bait objects, the conspicuous nature of the bait stations may have deterred stoats from entering the camera trap's field of detection.

For the duration of the camera trap survey, no weasels were detected in the PSA, and only two were detected in the SL, both being detected on different camera trap lines.

During the camera trap survey, an average of 49% of camera hours were excluded from the total number of working hours, ranging from 8% to 69% for individual trap lines. These included periods of consecutive false triggers, storage capacity exceedance, and the following animal interferences:

- Possums climbing on cameras and altering their angles away from the bait station
- A bait station being moved by sheep
- An unidentified animal toppling over a camera.

Six images were too blurry or only partially captured animals, most likely being possums climbing on cameras.

Full camera trap index results, including identifications of other mammalian pests, can be found in Table 6 provided in Appendix B.

4.1.2 Detections during daylight and darkness

An average of 83% of target species detections were at night, although this varied depending on the species. The percentage of target species detected during darkness was as follows:

- Hedgehogs – 96.7%
- Ferrets – 91.2%
- Stoats – 66.7%
- Weasels – 50%
- Feral cats – 42.9%.

4.1.3 Shared habitat between mouse and native species

On one of the cameras, photos showed a skink sitting on a rock, with a second photo several days later showing a mouse in nearly the exact location (Figure 11). While this does not indicate a direct relationship between the two species, it does show that mammalian pests share very close spaces with native species within the same habitat.

Figure 11: Images captured using camera traps showing a native skink (left) and a mouse (right) in the same location several days apart

4.2 Chewcards

During the seven-night survey period, chewcard monitoring detected all three target species:

- Possums and mice across both PSA and SL
- Rats only within the SL.

With data pooled across the entire survey area, the weighted average CCI was 28.4% for possums, 0.8% for rats, and 10.1% for mice.

Figure 12 shows mean CCI values for the PSA and the SL. There was no evidence that CCI differed between Survey zones for any target species (ANOVA, $P > 0.4$), whereas mean CCI levels were significantly different between species (ANOVA, $P < 0.001$).

Possums had the highest density ranging from an average of 31.9% in the PSA to a slightly lower 27.2% within the SL. This was followed by mice, with an average density of 12.5% and 9.2% for the PSA and SL respectively. Almost no rats were detected throughout the survey, with an average of only 1.2% found in the SL, and none within the PSA.

While the presence of possums during chewcard surveys can interfere with the detection rates of rats, this impact is significantly lessened for longer (seven-night) surveys (Burge *et al.* 2016). The sparsity of rats across the site is also supported by camera trap data, as no rats were detected at any point during the survey. Possums and mice, on the other hand, were plentiful on both the cameras and chewcard lines, with possums detected on all but one chewcard monitor line, and mice on over half of the chewcard lines.

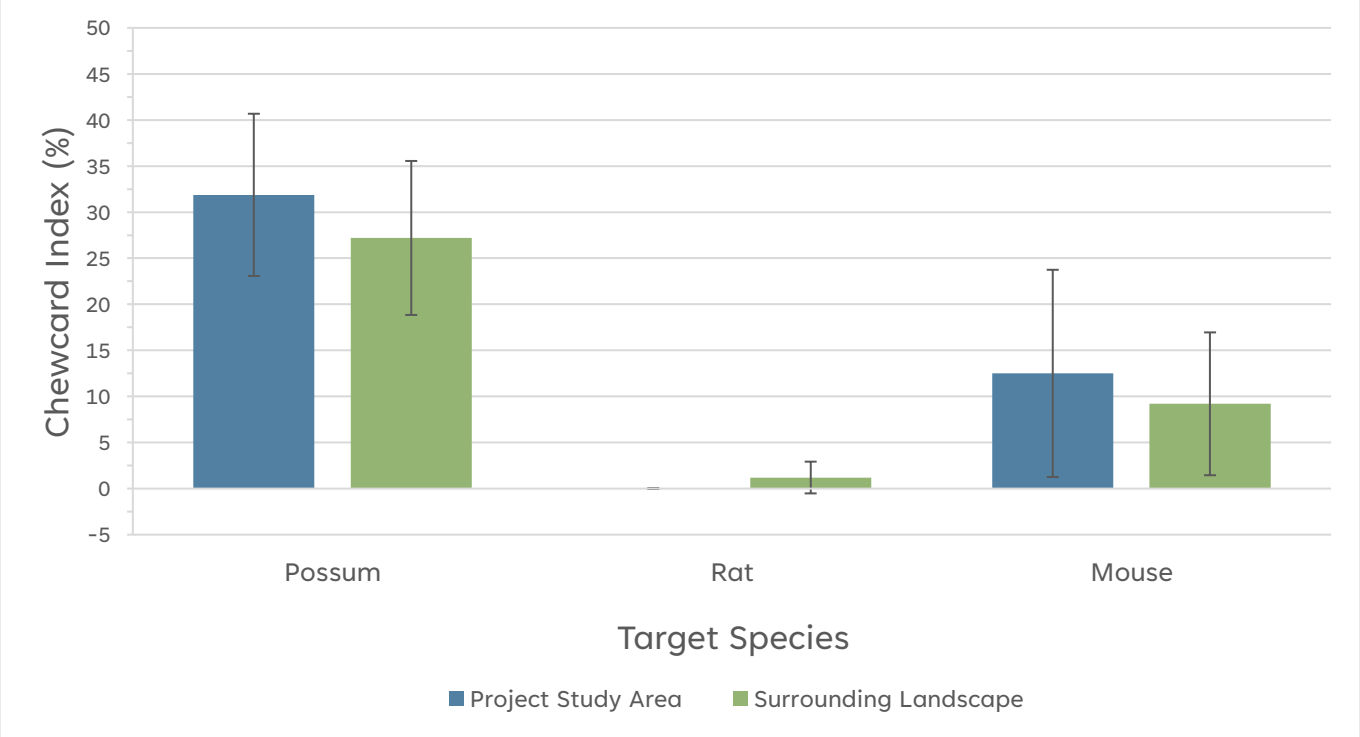

Figure 12. Mean chewcard index for possums, rats, and mice by survey zone (error bars show 95% confidence intervals).

Overnight rainfall conditions were considered acceptable for the duration of the survey despite two nights of light rain within the first four hours after sunset (Appendix A). All chewcards were retrieved from the field and only one bitemark on line 5 could not be determined. Full chewcard index results by sample line can be found in Table 7 provided in Appendix B.

4.3 Aerial surveys

A total of 51 individuals from nine groups/herds were recorded during two rounds of aerial surveying. All observed animals were identified to species and their numbers recorded (Table 3).

Table 3. Overview of mammalian pest detections and relative abundance from two aerial surveys across the ESA.

Mammalian pest species	Survey	Recorded groups	Total no. individuals	Total abundance/km	Location
Feral deer	Survey one	• Group of 18 fallow	18	0.34	• Ardgour Station (PSA)
	Survey two	• 1 fallow hind • 1 spiker	2	0.04	• Bendigo (SL) • Bendigo (SL)
	Total		20	0.377	
Feral goats	Survey one	• Group of 3 • Group of 7	10	0.19	• Ardgour Station (SL)
	Survey two	• Group of 3 • Group of 3 • Group of 6 • Group of 9	21	0.40	• Ardgour Station (SL) • Ardgour Station (SL) • Ardgour Station (SL) • DOC land (SL)
	Total		31	0.59	

For the first aerial survey, the group of deer were found on the Ardgour Station section of the PSA, whereas both groups of goats were recorded within Ardgour Station's SL area.

Two additional groups of goats were sighted during a terrestrial invertebrate survey several days prior to the first aerial survey but were not seen during the aerial survey itself. The group of 18 fallow deer seen during the first aerial survey were also seen several days beforehand. While deer do not have unique physical markings like feral pigs and goats, given that the group was found in the same location with similar characteristics and numbers of individuals, it was assumed they were the same group.

The second aerial survey also observed goats across the SL (Ardgour Station, DOC land and Bendigo Station), however, very few deer were seen. Professional hunters were seen on and around the ESA during the second aerial survey and may have influenced the number of ungulates observed. A group of 39 fallow deer were seen moving from DOC land to Ardgour Station three days after the second aerial survey.

No pigs were seen during either aerial survey. Four hares and two rabbits were also seen across the ESA during the first survey. No deer seen on the initial aerial survey were re-seen on the second survey.

4.4 Modified McLean Scale survey

Rabbits were generally detected at low levels across most of the surveyed landscape, with 92% of survey lines having an average Modified McLean Scale of 3 or less (Table 4). These results are expected given the landscape aerial poison operation conducted in winter 2023.

There were few areas with high rabbit densities where only 8% of lines scored a 4 on the Modified McLean Scale, and no lines were greater than this. Only a single plot on one line neared a score of 5, however measurements of pellet distance confirmed a score of 4. There were also very few areas where absolutely no rabbits or signs were seen along an entire line.

Where signs of rabbits were visible, the type and frequency of the sign varied over the landscape. Signs included light scuffing or scratching marks, rabbit pellets and buck heaps, actively used burrows and sightings of actual rabbits.

Areas scored at scale 4 are currently above the RPMP Plan Rule rabbit density requirements set by the Otago Regional Council for land occupiers, although these areas are few and patchy. Rabbit populations are notorious for their rapid fluctuations, and while this data provides a baseline density for potential control operation planning, rabbit ecology should be considered.

Seven of the survey lines included cushionfield habitat which contain a number of threatened plants – the protection of these habitats is a component of the effects management package. The quality of the cushionfields that intersected survey lines ranged from low to very high[5] and rabbits were scored at an average of 3 on the Modified McLean Scale for all but one line, where it scored a 4.

Table 4. Overview of the number and percentage of lines (24 total) at each score of the Modified McLean Scale for rabbit survey across the ESA

Modified McLean Scale Score	Number of lines	Percentage of lines
Scale 1	3	13%
Scale 2	8	33%
Scale 3	11	46%
Scale 4	2	8%
Scale 5+	0	0%

The score of each plot along a single line (averaged to give the final line score) were generally very similar and the overall results of this survey would not differ if results were expressed as a percentage of plot scores instead of line scores. Full results and Modified McLean Scale scores by plot, and line averages, are provided in Appendix B.

4.5 eDNA

eDNA analysis returned a total of 783 unique genetic sequences with a total of 31,996,000 'reads' from 66 individual mammalian pests captured across the site, including:

- 5 feral cats
- 13 feral pigs
- 25 ferrets
- 6 mice
- 8 hedgehogs
- 9 possums

Full eDNA results for target species, including the number of 'reads' for each unique genetic species DNA sequence, can be found in Table 9 provided in Appendix B.

[5] Vegetation and cushionfields were mapped by RMA Ecology, details are provided in the Vegetation Values Assessment prepared for the BOGP.

4.5.1 Feral cats

Rabbits were the predominant prey item across the feral cats sampled across the study area at 60% frequency of occurrence, followed by 40% for both invertebrates and mice. Tussock skink (*Oligosoma chinochloescens*)[6] ('At Risk – Declining') and McCann's skink (*Oligosoma maccani*) ('Not Threatened') were present in the gut of one feral cat captured in the Ardgour Station part of the SL. eDNA of birds and various other mammals were also present in samples from some feral cats (see Figure 13 below).

These results are generally consistent with previous conventional diet studies in New Zealand, where small mammals were the most frequently eaten (Fitzgerald and Karl 1979, Langham 1990, Nottingham *et. al* 2014).

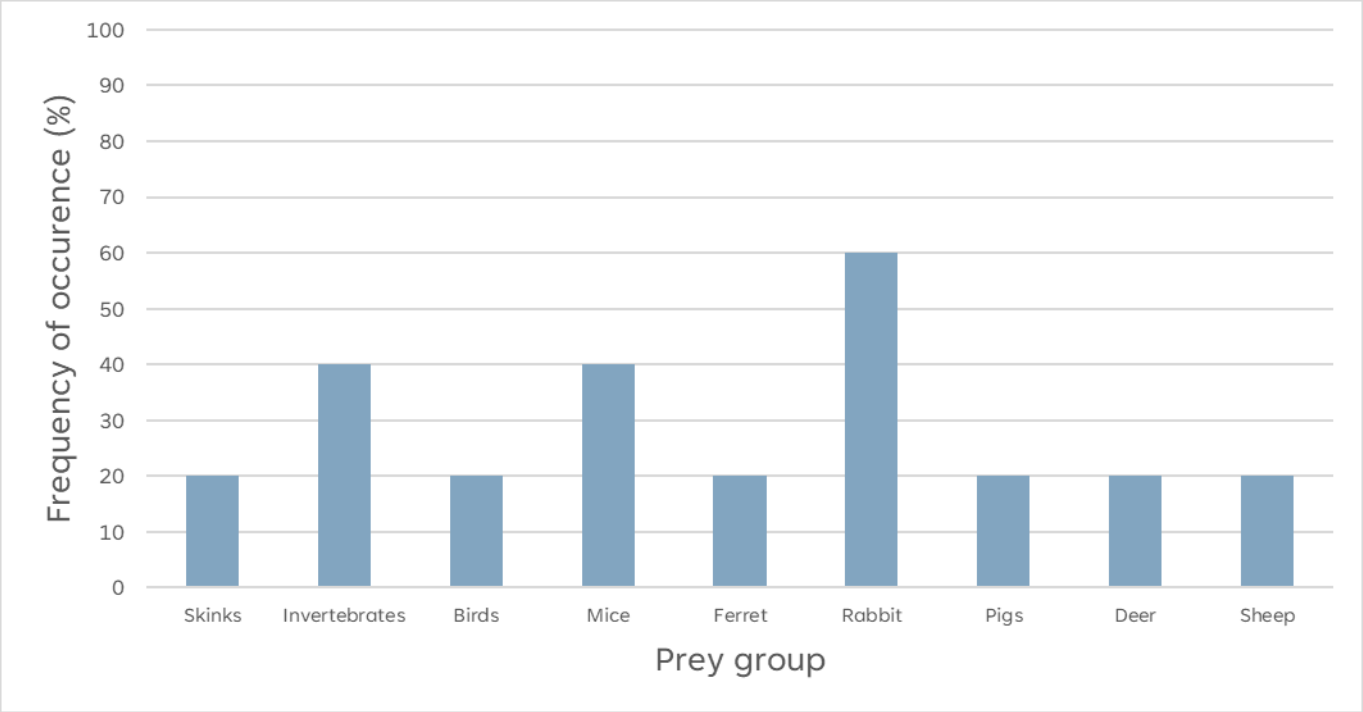

Figure 13. Frequency of occurrence (percentage of cats containing each food item) for feral cats caught across the BOGP site, determined using eDNA analysis (n=5)

Mammal remains were present in the gut of all feral cats sampled, but the number and composition of species differed between individuals. Three feral cats had eaten only a single mammal species, and two feral cats had evidence of three mammal species.

The feral cats with only a single mammal species in their gut contents each had a different species; rabbit, mouse, or sheep. The feral cats that had eaten three species each had consumed a) rabbit, deer, and ferret or b) rabbit, feral pig and mouse. Livestock, in particular sheep (Langham 1990), have been found scavenged by feral cats and it is likely feral cats were scavenging the remains of the larger mammals.

The same cat that had eaten rabbit, deer, and ferret, was also found to have eaten Tuna fish. This feral cat was caught on the edge of the study area between the Bendigo Terraces and the PSA and likely had been fed canned food or scavenged domestic rubbish.

[6] Although DNA was matched initially to *Oligosoma aff. polychroma Clade 5,* this is likely *Oligosoma chinochloenescens (RMA Ecology 2025c).*

The identified birds consumed by the sampled feral cats included a Dunnock (*Prunella modularis*), which is not native to New Zealand, and the passerine order which could include native or introduced species.

Very few of the invertebrates eaten by feral cats could be identified at the species level. The orders Lepidoptera (moths and butterflies) and Hymenoptera (sawflies, wasps, bees and ants), as well as phorid flies, and the St. John's Wort beetle (*Chrysolina hypericin*) were present in the gut of a single feral cat. The only other invertebrate found was identified to the superorder level 'Endopterygota'.

4.5.2 Feral Pigs

A total of thirteen feral pigs were captured from three general locations, and from several distinct sounders (a group of pigs that include older animals):

- the Devil Creek sounder with six individuals
- the sounder east of the deer fence with three individuals
- one individual from a sounder in Lower Perrys
- one individual from lower Bendigo Creek
- and two individuals caught in upper Bendigo Creek.

Plants were present in 100% of gut samples, and invertebrates in 85% of gut samples (Figure 14). Fungi were present in 53% of feral pig gut samples and included above-ground fruiting bodies, as well as moulds and yeasts that were likely not directly consumed as food or were from the animals' internal stomach system.

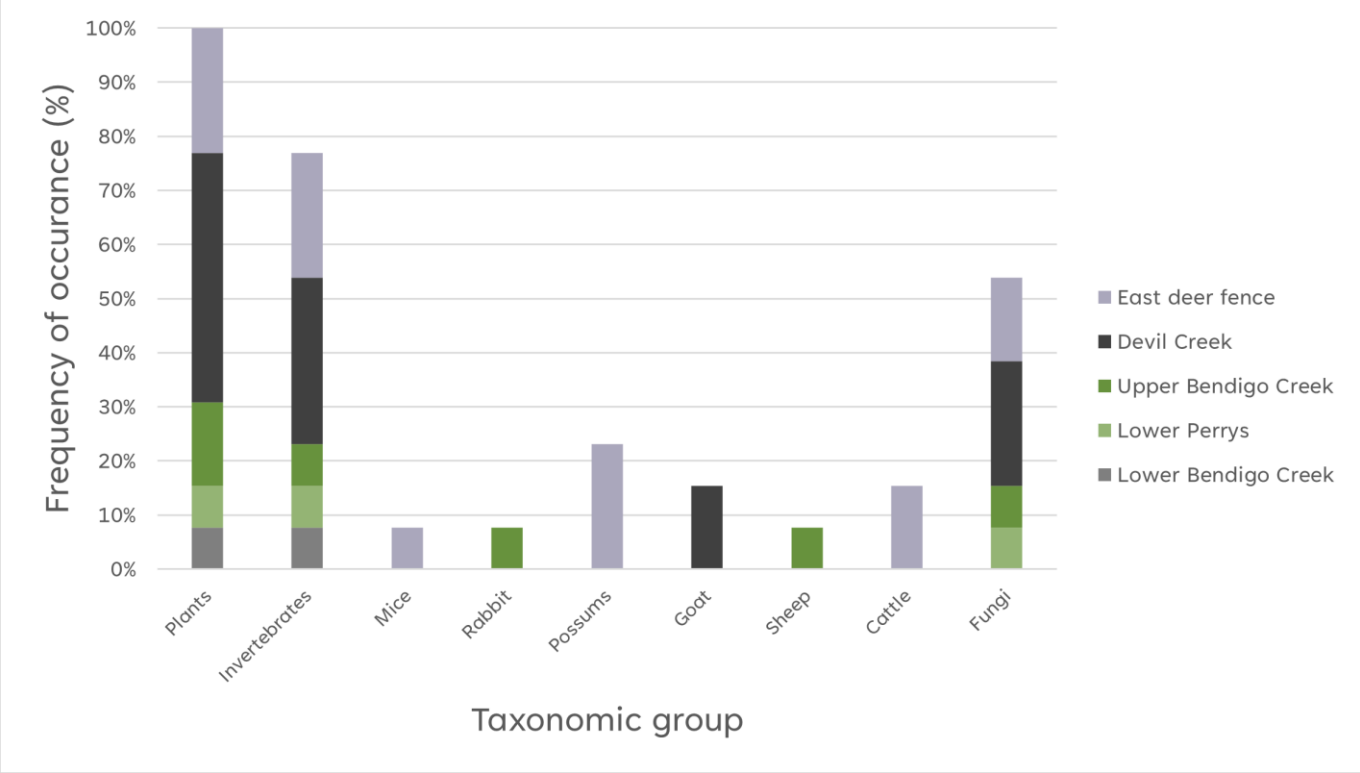

Figure 14. Frequency of occurrence (percentage of target species containing each food item) for feral pigs caught across the BOGP site, determined using eDNA analysis (n=13 within 5 sounders).

A variety of plants were identified, including grasses, shrubs and herbaceous flowering plants, brassicas, and several wetland species including algae. Of the plants identified to the species level, only two were native; a rush (*Isolepis caligenis*) and taramea (*Aciphylla aurea*). Whilst neither are threatened plant species, the taramea is important for invertebrate habitat (Hoare *et al.* 2016, Patrick *et al.* 1992, Schöps *et al.* 1999) and is recognised as a taonga in New Zealand Law under the Ngāi Tahu Treaty of Waitangi Tribunal (Waitangi Tribunal 1991) claim and subsequent Ngāi Tahu deed of Settlement and Ngāi Tahu Claims Settlement Act (Ngāi Tahu Claims Settlement Act 1998).

Of the invertebrates eaten by feral pigs, only a small number of earthworms and an endemic, but not threatened, grass grub (*Costelytra zealandica*) could be identified. The remaining invertebrates were comprised of Coleoptera (beetles), Lepidoptera (moths and butterflies), and flies; the latter presumably related to scavenging carrion.

DNA from several mammal species was isolated in the eDNA samples of feral pigs. There was evidence on site that livestock carcasses had been directly scavenged by feral pigs which is a behaviour seen in other gut analyses (Thompson and Challies 1988). However, it is also possible this was from secondary ingestion of faeces while hunting for invertebrates or plant matter. Some mammal species were found at a higher frequency in pig diets, such as possum at 23% occurrence. Goats, sheep, and cattle were found at 15% frequency, and mice and rabbits at 8% frequency of occurrence.

Our results are consistent with other studies, that indicate it is not uncommon for feral pigs to have wide variety in diet composition, with the relative importance of plants, invertebrates, fungi, and mammal carrion differing considerably between sounders (Chimera *et al.* 1995, Parkes *et al.* 2015, Thompson and Challies 1988).

4.5.3 Ferrets

Invertebrates were present in 65.7% (24 of 35) of ferret gut samples. Hare DNA was present in 31.4% of samples, and rabbit DNA in 24% of samples. Native skinks were present in 8.6% (3 of 35) of ferret gut samples, with pig, sheep, and introduced bird DNA also being present in some samples (Figure 15). Even though the guts of several ferrets appeared to be empty during dissection, eDNA analysis isolated food items in every ferret, indicating the value of this technique.

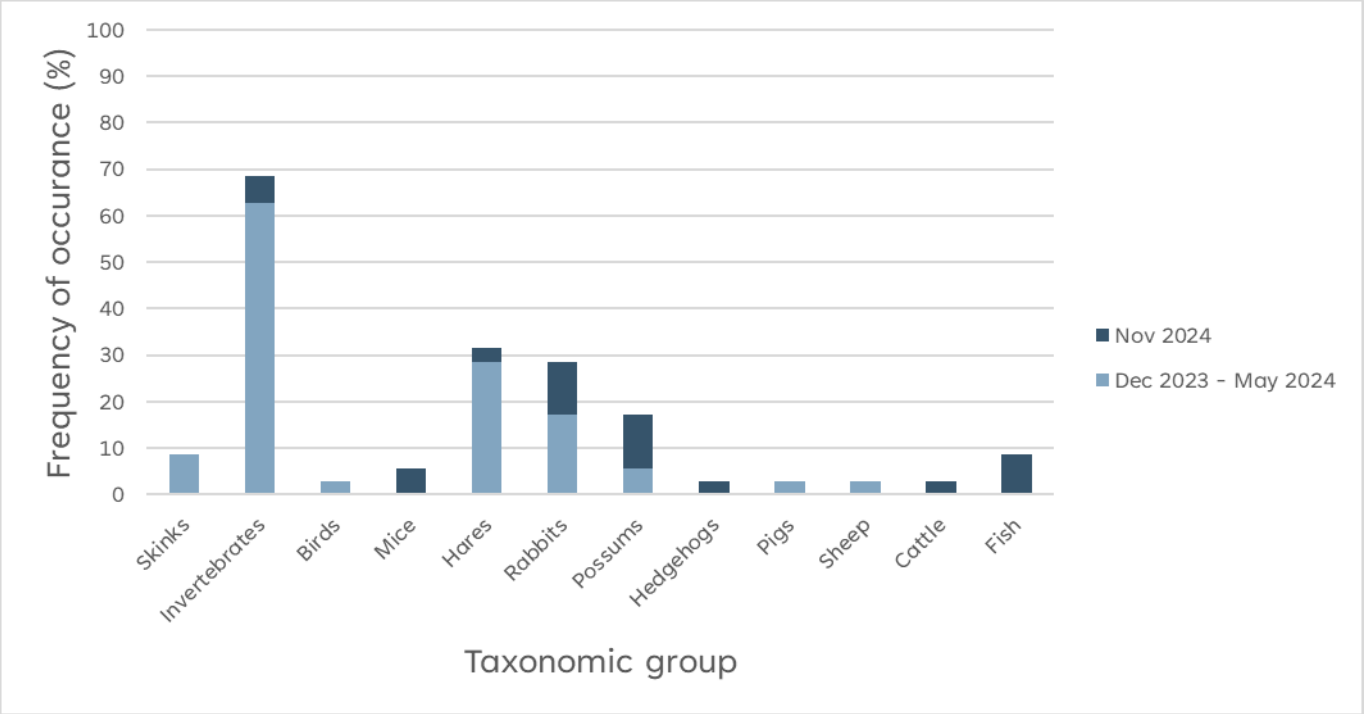

Figure 15. Frequency of occurrence (percentage of ferrets containing each food item) for ferrets caught across the BOGP site during two field seasons, Dec 2023 – May 2024 (n=25) and Nov 2024 (n=10), determined using eDNA analysis.

Of the three ferrets that had eaten native skinks, all contained DNA from McCann's skink ('Not Threatened'), and one ferret also had DNA from the tussock skink ('At risk – Declining') in its gut contents. Several McCann's skinks were visually identified in the gut of one ferret during sampling, and skink remains were observed in another, although these remains were too digested to visually determine the species or number of individuals (Figure 16). Skink eDNA and remains were only recorded from ferrets found during February and May 2024, with none found in the later November 2024 round of sampling.

Figure 16. Skink remains found in the gut of two ferrets in the BOGP site

When comparing this study's results with previous studies of predator diets in Otago and Southland, Lagomorphs have typically been found at higher frequencies, and invertebrates at much lower frequencies (Ragg 1998, Smith *et al.* 1995). It is important to note that previous studies have relied on data collected through visual gut content analysis of live-trapped ferrets and collected faecal matter, as opposed to eDNA samples.

This difference may be a function of prey availability or because eDNA allows higher-resolution sampling that can detect more taxa (Nørgaard *et al.* 2021). This is especially so for invertebrates, as they are small, quickly digested, and thus difficult to identify visually in gut samples. Additionally, most live trapped ferrets in our study had visually empty stomachs when autopsied, which contrasted with the ferrets which were shot. Little useful information would have been yielded if the survey had relied on a traditional visual gut content analysis.

Of the invertebrates eaten by ferrets, roughly half could not be identified to greater resolution than being an insect or arachnid, with the remaining invertebrate detections predominated by flies. Other than flies, invertebrates eaten by ferrets included aphids, arachnids, slaters, barklice, rat fleas, ants, worms, and bumble bees, alongside a single ferret that had Lepidoptera (moth) DNA recorded in its gut sample.

Ferrets from the later sampling (November 2024) had no birds, no skinks, and notably fewer insects detected in their gut samples, with many having stomachs that were visually completely empty. Despite this, these ferrets had similar proportions of mammal detections and included mice that were not detected in the first round (December 2024 – May 2024) of ferret eDNA sampling.

4.5.4 Hedgehogs

Plants and invertebrates were detected in the gut samples of all eight hedgehogs (Figure 17), followed by possums which were detected in 50% of hedgehogs (4 of 8). Native skinks were present in 37.5% (3 of 8) of samples. Birds (mallard duck and California quail), livestock, and small mammals such as mice and mustelids were also present in hedgehog gut samples, ranging from detection in 12.5% (1 of 8) to 37.5% (3 of 8) of samples.

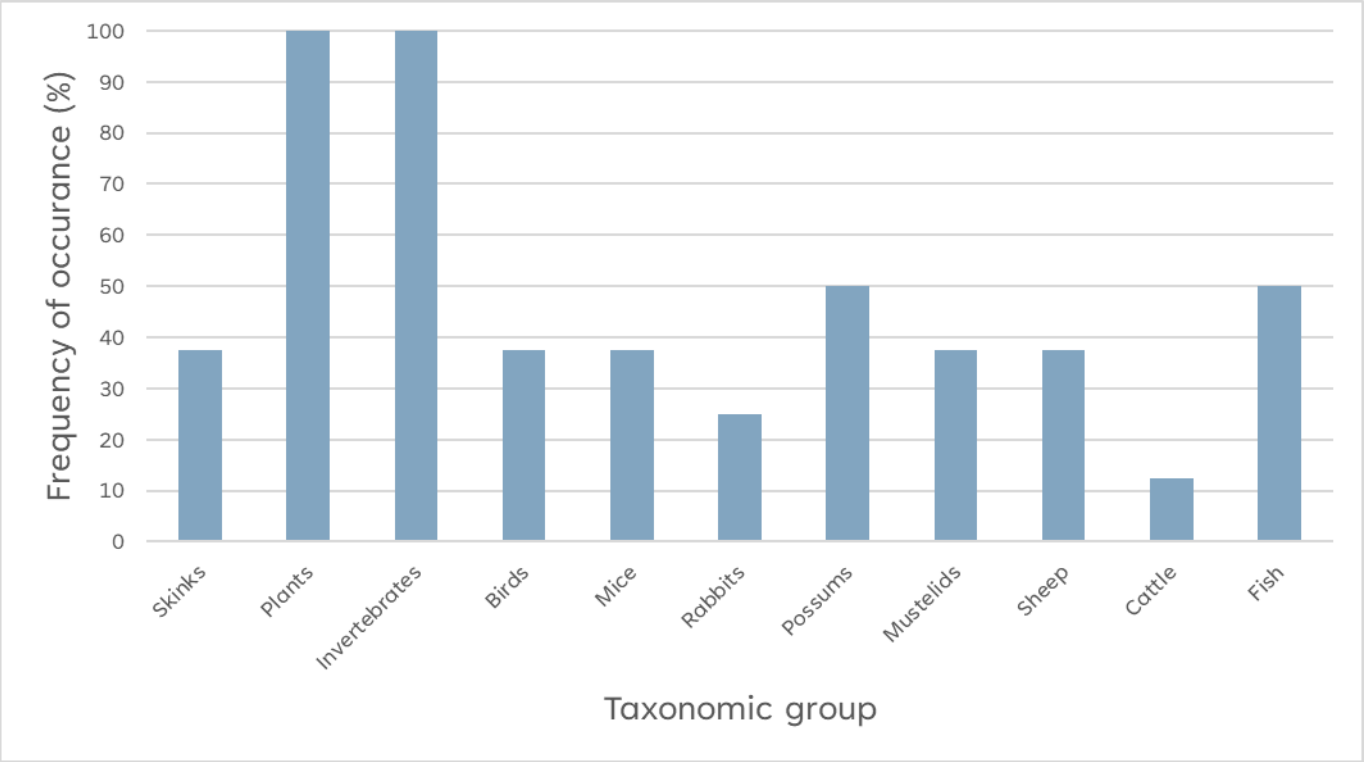

Figure 17. Frequency of occurrence (percentage of hedgehogs containing each food item) for hedgehogs caught across the BOGP site during one field season (Summer 2024 – 2025), determined using eDNA analysis (n=8).

While the skinks eaten by hedgehogs in this survey were all McCann's skinks, hedgehogs may also prey on the Tussock (At Risk – Declining) given their ability to feed on a range of species in an area. This is evidenced through a conventional diet analysis of hedgehogs from Macraes Flat, which found that hedgehog predation was not limited to a single species of skink, and included the McCann's skink, common skink (*Oligosoma nigriplantare polychroma*), and even a gecko (Spitzen–van der Sluijs *et al.,* 2009).

Hedgehogs sampled in this survey had consumed a diverse range of native and exotic plants, with most identified to family or genus level. Notably, two hedgehogs had eaten material from the endemic shrub *Olearia traversiorum,*[7] which is classified as 'At Risk – Declining' in the New Zealand Threat Classification System. These hedgehogs were found in SRX East and Shepherds Creek.

[7] Listed by Wilderlab as its old name *Olearia traversii*.

Myosotis (forget-me-not flower) DNA was detected in four hedgehog gut samples. This finding warranted further investigation because a 'Threatened – Nationally Vulnerable' species of *Myosotis* was recorded in the ESA during the 'Bendigo-Ophir Gold Project: Vegetation Values Assessment' (RMA Ecology 2025a). Samples of both the threatened and common *Myosotis* varieties were sent to Wilderlab for comparative genetic analysis. DNA sequencing results indicated that the gut samples contained common, non-threatened *Myosotis* species rather than the threatened variety. While direct consumption of the threatened plant species cannot be definitively ruled out as it is present in the ESA, genetic evidence suggests hedgehogs are consuming more abundant, non-threatened *Myosotis* varieties. Two of these hedgehogs were the same individuals that had consumed *O. traversiorum*, while the remaining two were found at the Bendigo Creek and Shepherds Creek.

The potential exists for hedgehog diets to have included 'At Risk' species of four other plant genera found in hedgehog gut samples. Whilst 'At Risk' species of these genera are present on site; these four genera also have introduced and not-threatened species within the ESA.

Seven out of eight samples (87.5%) included traces of Lepidoptera (moths), although most could not be identified to a species classification level. This included the widespread and abundant *Wiseana* moth[8] and the *Proteuxoa* genus, of which three species have been recorded in the ESA during the BOGP Terrestrial Invertebrate Survey (Habitat NZ 2025). The moths that were identified were either introduced or not threatened (R. Hoare, *pers comm*, July 2024).

A *Harpalus* beetle was present in one hedgehog gut sample. The only *Harpalus* beetle recorded in the BOGP Terrestrial Invertebrate Survey (Habitat NZ 2025) was '*Harpalus* new species', listed as a notable species and found in both the PSA and SL, though not in the specific location where this hedgehog was collected. While eDNA analysis cannot definitively confirm if the consumed beetle was the same '*Harpalus* new species', no other *Harpalus* species were recorded during the BOGP Terrestrial Invertebrate Survey (Habitat NZ 2025).

Other invertebrates present in hedgehog gut samples included aphids, bumble bees, carabid beetles, earwigs, flies, fungus beetles, ground wētā, mealy bugs, slugs and snails.

Hedgehogs are predominantly insectivorous and consume other food groups when available (Jones *et al*., 2005). This is consistent with the findings from the gut samples. Studies have shown that Lepidoptera, particularly larvae, form a significant part of hedgehog diets (Brockie *et al*., 1959; Campbell *et al*., 1973; Jones *et al*., 2005). Additionally, one study indicates that although hedgehogs have low predation on herpetofauna, their presence can have considerable impacts if their population density is high (Jones *et al*., 2005).

4.5.5 Mice

Among the six mice sampled, all samples (100%) contained plants, invertebrates, and possums. Hares were present in 34% (2 of 6) of the samples, while birds, rabbits, ferrets, sheep, and cattle were identified in one (17%) of the gut samples (see Figure 18 below).

[8] Recorded as *Wiseana cerrinata* which is not found in Central Otago, likely mis-identified and is a closely related species local to the area (R. Hoare, *pers comm*, December 2024)

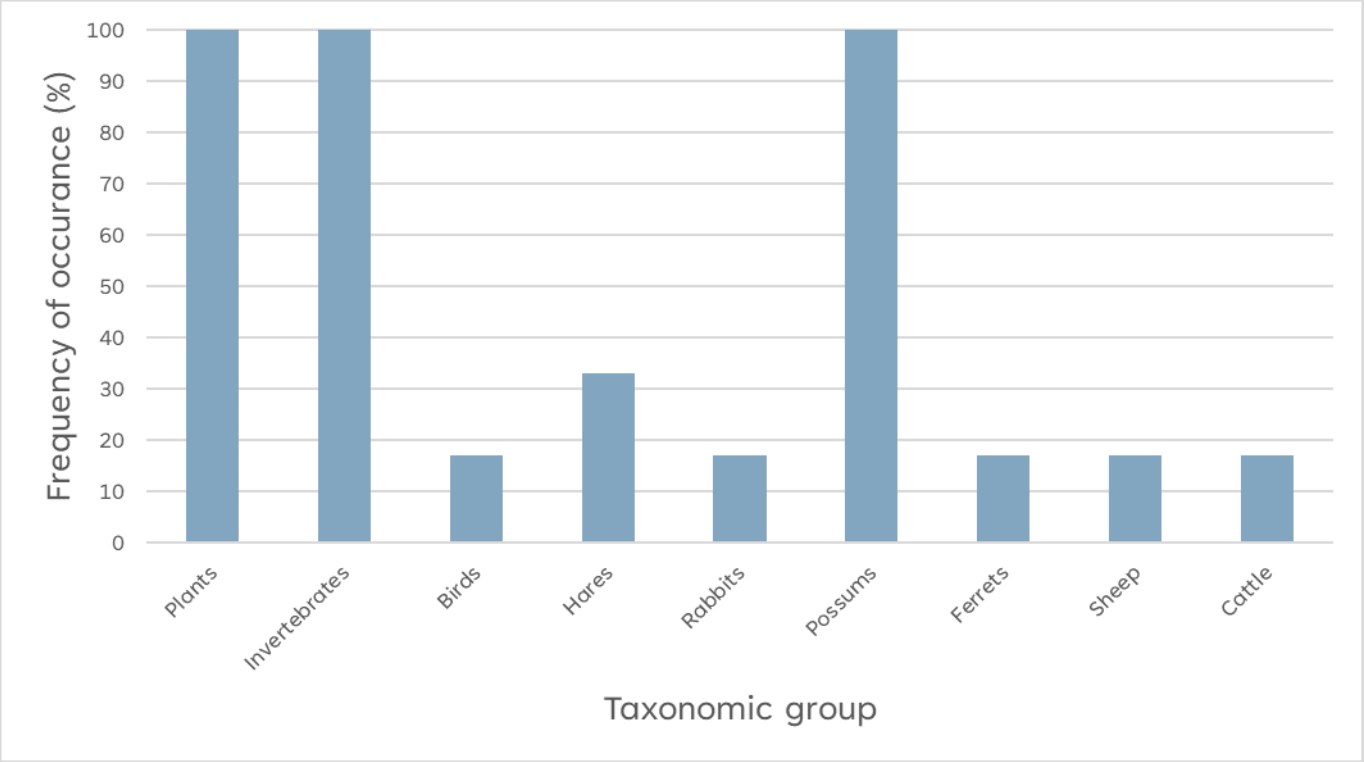

Figure 18. Frequency of occurrence (percentage of mice containing each food item) for mice caught across the BOGP site during one field season (Summer 2024 – 2025), determined using eDNA analysis (n=6).

Moths were present in all mouse gut samples, including an *Agrotis* moth and the common *Epyaxa*[9] moth identified in some samples. Two species of *Agrotis* moth have been recorded in the BOGP Terrestrial Invertebrate Survey (Habitat NZ 2025) – one of which, *Agrotis admirationis,* is 'At Risk-Declining'. Mice had also eaten other insects such as honeybees, aphids, leaf beetles, ants, flies, wētā and broad-nosed weevils were identified in the mice gut samples.

Mice had eaten a variety of native grasses and flowering plants, as well as many introduced and weed species, generally identified to the family or genus taxonomic rank. One genus of an endemic beech tree, *Fuscospora*, was present in the gut sample of one mouse. This mouse also had varieties of *Myosotis* DNA recorded, which was included in the further investigations to rule out predation on the rare variety. Further investigaton revealed these *Myosotis* to be common and non-threatened species. Another six genera found in mouse gut samples also contain 'At Risk' species recorded during 'Bendigo-Ophir Gold Project: Vegetation Values Assessment' (RMA Ecology 2025a). This is similar to the hedgehog eDNA samples, and these genera also contain introduced and not threatened species also present in the ESA.

Our findings are consistent with existing research on mouse diet, which identifies invertebrates and plants, particularly seeds with fewer instances of plant leaves, as main food sources for mice (Miller and Webb 2001). Studies indicate that mice can act as selective predators, potentially affecting the composition of invertebrate communities (Bertoia *et al*. 2024). This effect has been noted in several studies, where mice are known to primarily target larger-bodied invertebrates such as adult moths, moth larvae, and weevil larvae (Bertoia *et al*. 2024, Miller and Webb 2001, Smith *et al*. 2002).

[9] Recorded as *Epyaxa sodaliata* which is not found in New Zealand, likely mis-identified and is the closely related *E. rosearia* or *E. lucidata* (R. Hoare, *pers comm*, December 2024)

4.5.6 Possums

All nine possums had eaten various plants and invertebrates, with only 12.5% (1 of 9) to 25% (2 of 9) of possums having eaten birds, mustelids, and livestock (Figure 19).

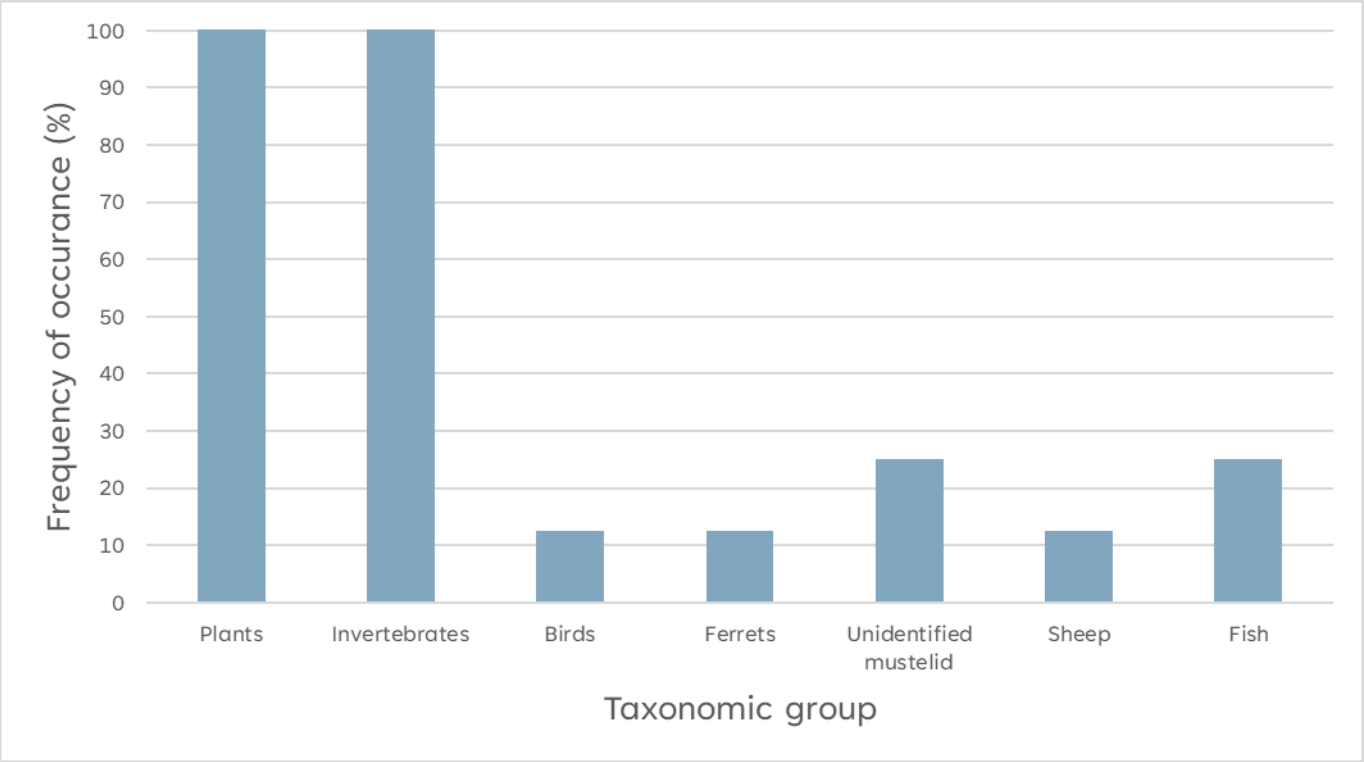

Figure 19. Frequency of occurrence (percentage of possums containing each food item) for possums caught across the BOGP site during one field season (Summer 2024 – 2025), determined using eDNA analysis (n=9).

Possums had consumed a diverse range of native and introduced vegetation, with some individuals having eaten several dozen different plant taxa. One possum collected from Bendigo Creek had eDNA from the endemic beech tree genus *Lophozonia* in its gut contents, a different genus from the *Fuscospora* beech found in mouse samples. As with hedgehogs and mice, common varieties of *Myosotis* (forget-me-not) DNA were found in one possum gut sample, also collected from Bendigo Creek. Plants from five other genera found in possum gut samples include 'At Risk' species documented in the ESA (RMA Ecology 2025a). Limitations of current eDNA processes prevent identifying these to the species level.

Moths were present in five of the nine possum gut samples, although none of these were identified to species level. Possums had also eaten other invertebrates such as flies, aphids, thrips, beetles and slugs.

Research suggests that the possum diet largely consists of foliage consumption, with invertebrates and fruit being important components as well (Owen and Norton 1995). With plants making up the bulk of possum diets, this is known to present an indirect impact on invertebrates due to competition for habitat and food sources (Innes 1995).

Appendix A Weather conditions

Weather data sourced from the Harvest website for the Srex, Come in Time, and Clearview weather stations, situated across the Bendigo-Ophir Gold Project survey area (Table 5).

Table 5. Overnight rainfall data for chewcard surveys, from three weather stations across the Bendigo-Ophir Gold Project site

Date	Official sunset time	Total rainfall 4h after sunset		
		Srex	Come in time	Clearview
19-Feb-24	20:48	0	0	0
20-Feb-24	20:46	0	0	0
21-Feb-24	20:45	0	0	0
22-Feb-24	20:43	0	0	0
23-Feb-24	20:41	0	0	0
24-Feb-24	20:04	0	0	0
25-Feb-24	20:38	0	0	0
26-Feb-24	20:36	0	3.2	0.8
27-Feb-24	20:35	1.8	0.2	0

Appendix B Detailed survey results

Table 6. Camera trap detections (per 2000 camera hours) per line for each target species, and other mammalian pests, with averages and standard errors (SE) for the two survey zones (Project Study Area and Surrounding Landscape)

	Cat	Ferret	Stoat	Weasel	Hedgehog	Pig	Deer	Rabbit	Hare	Possum	Mouse	Unknown
Project Study Area												
Line 7	3.64	25.45	1.21	0.00	1.21	0.61	1.21	12.72	0.00	1.21	1.21	0.00
Line 8	0.47	12.45	0.00	0.00	0.93	0.00	0.00	2.80	0.00	0.00	4.36	0.00
Line 9	3.03	3.41	0.00	0.00	10.61	0.00	1.52	6.44	0.00	2.27	1.89	0.38
Line 10	0.40	3.61	0.40	0.00	4.41	0.00	1.60	0.00	0.80	0.00	1.60	0.40
Line 11	1.69	4.51	0.00	0.00	6.21	0.00	0.00	2.26	4.51	1.13	1.13	0.00
Line 12	0.00	0.45	0.00	0.00	2.23	0.00	0.00	0.00	0.89	4.46	4.46	0.00
Mean	1.54	8.31	0.27	0.00	4.27	0.10	0.72	4.04	1.03	1.51	2.44	0.13
SE	0.66	4.24	0.24	0.00	1.78	0.12	0.36	2.22	0.88	0.43	0.60	0.10
Surrounding Landscape												
Line 1	0.00	4.04	0.00	0.00	12.12	0.58	0.00	0.58	8.66	0.00	92.96	0.00
Line 2	2.40	1.60	0.00	0.00	8.82	0.00	1.60	0.80	0.00	0.00	34.46	0.00
Line 3	0.00	3.07	0.00	0.00	5.74	0.00	0.00	3.69	6.15	16.60	30.12	0.61
Line 4	1.14	0.00	0.00	0.57	6.85	1.14	0.00	0.00	3.42	8.56	2.28	0.00
Line 5	0.93	9.25	0.00	0.46	0.93	0.00	0.00	3.70	0.46	6.48	0.46	0.00
Line 6	1.07	5.37	0.00	0.00	2.68	0.00	1.61	11.81	1.61	0.54	1.07	0.00
Line 13	0.87	4.33	0.00	0.00	3.47	0.00	0.00	0.87	0.00	4.33	0.00	0.00
Line 14	1.62	10.77	0.00	0.00	5.92	0.00	0.00	1.08	0.00	0.00	1.08	0.81
Mean	1.00	4.80	0.00	0.13	5.82	0.21	0.40	2.82	2.54	4.56	20.30	0.18
SE	0.28	1.29	0.00	0.09	1.26	0.15	0.26	1.38	1.16	2.08	11.53	0.12
Combined												
Weighted mean	1.14	5.72	0.07	0.10	5.41	0.19	0.49	3.13	2.15	15.65	3.77	0.17
Weighted SE	0.38	2.06	0.06	0.06	1.40	0.14	0.29	1.60	1.09	8.68	1.65	0.11
95% CI	0.74	4.03	0.12	0.12	2.74	0.28	0.56	3.13	2.13	17.02	3.24	0.22

Table 7. Chewcard indices (CCI) per line for each target species, with averages and standard errors (SE) for the two survey zones (Project Study Area and Surrounding Landscape)

Line no.	Possum Chewcard Index	Rat Chewcard Index	Mouse Chewcard Index
Project Study Area			
26	0.4	0	0
27	0.2	0	0
28	0.3	0	0.1
29	0.3	0	0
30	0.6	0	0
31	0.2	0	0.3
32	0.1	0	0
33	0.5	0	0.6
34	0.5	0	0
35	0.6	0	0
36	0.5	0	0
37	0.2	0	0.7
38	0	0	0
39	0.2	0	0
40	0.3	0	0
41	0.2	0	0.3
Mean	31.88	0.00	12.50

Line no.	Possum Chewcard Index	Rat Chewcard Index	Mouse Chewcard Index
SE	4.49	0.00	5.74
Surrounding Landscape			
1	0.6	0	0
2	0.3	0	0
3	0	0	0
4	0.3	0	0.4
5	0.5	0	0
6	0.5	0	0.1
7	0.4	0	0
8	0.4	0	0
9	0.3	0	0.1
10	0.2	0	0.3
11	0.6	0	0
12	0.1	0	0.1
13	0.2	0	0.1
14	0.3	0	0.1
15	0	0.2	0.2
16	0.1	0	0
17	0	0	0
18	0.1	0	0
19	0.6	0	0
20	0.2	0	0
21	0.4	0	0
22	0	0.1	0
23	0.1	0	0
24	0	0	0.9
25	0.6	0	0
Mean	27.2	1.2	9.2
SE	4.26	0.88	3.95
Combined			
Weighted mean	28.42	0.89	10.06
Weighted SE	4.32	0.65	4.42
95% CI	8.47	1.27	8.66

Table 8. Modified McLean Scale scores for each plot and average for each line, an asterix (*) indicates a line that intersected mapped cushionfield habitat.

Line Number	Modified McLean Scale score					
	A	B	C	D	E	Average (rounded to nearest score)
R01*	3	3	3	2	2	3
R02	2	2	2	2	2	2
R03	2	2	1	2	2	2
R04	2	3	3	3	2	3
R05	2	2	2	2	2	2
R06	2	1	3	2	2	2
R07	1	1	1	1	1	1
R08*	3	3	3	3	3	3
R09	2	1	1	1	2	1
R10*	3	3	3	3	3	3
R11	1	1	1	1	1	1

Line Number	Modified McLean Scale score					
	A	B	C	D	E	Average (rounded to nearest score)
R12	2	2	3	3	4	2
R13*	3	3	3	2	2	3
R14	4	4	3		4	4
R15*	3	3	3	3	3	3
R16	3	2	3	4	3	3
R17	2	2	2	1	1	2
R18	2	1	2	2	3	2
R19	4	3	3	3	2	3
R20	3	3	4	3	2	3
R21*	4	4	4	4	3	4
R22	2	2	3	2		2
R23	4	3	4	4	1	3
R24	3	2	3	3	2	3

Table 9. Presence (indicated by 'Y') of unique DNA sequences in gut samples of target mammalian pest species using eDNA analysis

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
Vertebrates								
Birds	order	Passeriformes	Y					Y
	subfamily	Phasianinae			Y			
	species	*Anas platyrhynchos*				Y	Y	
		Callipepla californica				Y		
		Passer domesticus				Y		
		Prunella modularis	Y					
Fish	order	Clupeiformes				Y		
	family	Bagridae				Y		
		Clupeidae				Y		Y
	genus	*Clupea*			Y	Y		Y
		Sprattus			Y	Y		Y
		Thunnus	Y					
	species	*Clupea harengus*			Y	Y		Y
Mammals	class	Mammalia	Y	Y	Y			
	order	Diprotodontia						Y
		Lagomorpha				Y		
		Rodentia				Y		
	family	Bovidae					Y	
		Felidae	Y					
		Leporidae				Y		
		Phalangeridae						Y
	subfamily	Caprinae				Y		
		Erinaceinae				Y		

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Felinae	Y					
	genus	*Erinaceus*			Y	Y	Y	
		Felis	Y					
		Lepus	Y					
		Mustela			Y	Y		Y
		Oryctolagus	Y		Y	Y		
		Sus		Y				
	subgenus	*Mus*				Y	Y	
	species	*Bos taurus*		Y	Y	Y		
		Capra hircus		Y				
		Dama dama	Y					
		Erinaceus europaeus			Y	Y	Y	
		Felis catus	Y					
		Lepus europaeus			Y			
		Mus musculus	Y	Y	Y	Y	Y	
		Mustela putorius	Y		Y		Y	Y
		Oryctolagus cuniculus	Y	Y	Y	Y	Y	
		Ovis aries	Y	Y	Y	Y	Y	Y
		Sus scrofa	Y	Y	Y			
		Trichosurus vulpecula		Y	Y	Y	Y	Y
Reptiles	species	*Oligosoma chinochloescens*	Y		Y			
		Oligosoma maccanni	Y		Y	Y		
Invertebrates								
Arachnids	class	Arachnida			Y			
Arthropods	phylum	Arthropoda	Y	Y	Y			
Crustaceans	species	Porcellio scaber			Y		Y	
Flatworms	class	Cestoda					Y	
	order	Tricladida				Y	Y	
Insects	class	Insecta	Y	Y	Y			
	infraclass	Neoptera						Y
	cohort	Endopterygota	Y		Y	Y		
	order	Coleoptera		Y		Y	Y	Y
		Diptera			Y	Y	Y	Y
		Hemiptera						Y
		Hymenoptera	Y		Y		Y	Y
		Lepidoptera	Y	Y	Y	Y	Y	Y
		Orthoptera				Y		
		Thysanoptera						Y
	infraorder	Cucujiformia				Y	Y	
	superfamily	Pentatomoidea				Y		
	family	Aphididae			Y			Y

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Asilidae						Y
		Carabidae				Y		
		Cecidomyiidae						Y
		Formicidae					Y	
		Lepidopsocidae			Y			
		Pseudococcidae				Y		
		Staphylinidae			Y			
		Thripidae						Y
	subfamily	Aphidinae			Y	Y	Y	Y
		Calliphorinae			Y			
		Chrysomelinae					Y	
		Entiminae					Y	
		Microgastrinae						Y
		Thripinae						Y
	tribe	Macrosiphini						Y
	genus	*Acizzia*						Y
		Acyrthosiphon						Y
		Agrotis					Y	
		Anaphothrips						Y
		Aptinothrips						Y
		Bombus			Y			
		Brachycaudus						Y
		Calliphora		Y	Y	Y		
		Forficula				Y		
		Harpalus				Y		
		Hypoponera			Y			
		Lucilia				Y		
		Megaselia				Y		
		Metopolophium						Y
		Philaenus						Y
		Proteuxoa				Y		
		Spelobia					Y	
		Stenotarsus				Y		
		Talitropsis					Y	
	subgenus	*Pyrobombus*				Y		
	species	*Acyrthosiphon kondoi*				Y	Y	Y
		Acyrthosiphon pisum				Y		Y
		Aphis craccivora				Y		
		Apis mellifera				Y	Y	
		Athetis tenuis					Y	
		Chaetosiphon tetrarhodum						Y
		Chrysolina hyperici	Y					

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Costelytra zealandica		Y		Y		Y
		Cotesia sp. jft91				Y		
		Dialectica scalariella			Y			
		Epyaxa sodaliata					Y	
		Hemiandrus maia				Y		
		Hypoponera opacior			Y			
		Lepidoptera sp. NZAC 03012277				Y		
		Merophyas divulsana						Y
		Myzus persicae						Y
		Nearctaphis bakeri						Y
		Nosopsyllus fasciatus			Y			
		Phoridae sp. BOLD:AAU5541	Y			Y		
		Powellia discariae						Y
		Thrips tabaci						Y
		Wiseana cervinata				Y		Y
	species subgroup	*pseudoobscura subgroup*		Y				
	no rank	Calyptratae		Y	Y	Y		
	clade	Obtectomera				Y		
Mites and ticks	order	Sarcoptiformes		Y	Y		Y	
	family	Tydeidae						Y
	tribe	Aceriini				Y	Y	Y
	genus	*Aceria*						Y
		Tetranychus						Y
		Tyrophagus				Y		
	no rank	unclassified Balaustium			Y			
		unclassified Eupodidae						Y
		unclassified Triophtydeus						Y
		unclassified Tydeidae						Y
Molluscs	order	Stylommatophora				Y		
	genus	*Arion*		Y				
		Deroceras		Y				
		Milax		Y				
	species	*Deroceras reticulatum*		Y		Y		Y
	clade	Helicina				Y		
Nematode	phylum	Nematoda			Y			

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
Roundworms	class	Chromadorea	Y	Y	Y			
	order	Rhabditida	Y					
	family	Capillariidae				Y		
	genus	Mesodorylaimus		Y				
		Syphacia					Y	
		Trichostrongylus						Y
Spiders	suborder	Mygalomorphae					Y	
	species	*Anoteropsis hilaris*		Y				
		Notocosa bellicosa					Y	
Springtails	order	Poduromorpha				Y		Y
	family	Entomobryidae		Y				
	species	*Entomobrya multifasciata*			Y			Y
Worms	order	Crassiclitellata		Y			Y	
	family	Lumbricidae		Y		Y		
		Megascolecidae		Y		Y	Y	
	subfamily	Lumbricinae		Y		Y		
	species	*Aporrectodea caliginosa*		Y		Y		
		Aporrectodea trapezoides		Y				
		Lumbricus rubellus				Y	Y	
		Octolasion cyaneum		Y			Y	
		Potamothrix bavaricus			Y			
Plants and algae								
	phylum	Streptophyta	N/A	Y	N/A			
Green algae	order	Chlamydomonadales	N/A		N/A	Y		
	family	Trebouxiaceae	N/A		N/A	Y		
	genus	*Trebouxia*	N/A		N/A		Y	
	species	*Trebouxia aggregata*	N/A		N/A	Y		
	no rank	unclassified Trebouxia	N/A		N/A	Y		
	clade	core chlorophytes	N/A		N/A		Y	
Green plants	kingdom	Viridiplantae	N/A	Y	N/A			
Heterokont algae	family	Blastocystidae	N/A		N/A			Y
	genus	*Blastocystis*	N/A	Y	N/A			Y
	clade	Blastocystis sp. subtypes	N/A	Y	N/A			
Higher plants	clade	Embryophyta	N/A	Y	N/A			
Liverworts	species	*Marchantia polymorpha*	N/A		N/A		Y	
Mosses	family	Pottiaceae	N/A		N/A	Y		

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	genus	*Funaria*	N/A		N/A		Y	
Plants	class	Magnoliopsida	N/A	Y	N/A	Y	Y	Y
	subclass	Petrosaviidae	N/A		N/A	Y	Y	Y
	order	Asparagales	N/A	Y	N/A			
		Asterales	N/A	Y	N/A	Y	Y	Y
		Brassicales	N/A		N/A	Y		Y
		Caryophyllales	N/A	Y	N/A	Y	Y	Y
		Cucurbitales	N/A		N/A	Y		
		Fabales	N/A		N/A	Y	Y	
		Fagales	N/A		N/A	Y	Y	
		Gentianales	N/A		N/A			Y
		Geraniales	N/A		N/A		Y	
		Lamiales	N/A		N/A	Y	Y	Y
		Malpighiales	N/A		N/A	Y	Y	Y
		Poales	N/A	Y	N/A	Y	Y	Y
		Rosales	N/A		N/A	Y	Y	Y
		Sapindales	N/A		N/A	Y		
		Vitales	N/A	Y	N/A			
		Zingiberales	N/A		N/A		Y	
	family	Apiaceae	N/A	Y	N/A	Y	Y	Y
		Araceae	N/A	Y	N/A			
		Asteraceae	N/A	Y	N/A	Y	Y	Y
		Betulaceae	N/A		N/A			Y
		Boraginaceae	N/A	Y	N/A	Y	Y	
		Brassicaceae	N/A		N/A	Y		Y
		Caryophyllaceae	N/A		N/A	Y	Y	Y
		Convolvulaceae	N/A		N/A	Y	Y	Y
		Cucurbitaceae	N/A		N/A	Y	Y	
		Cupressaceae	N/A		N/A	Y	Y	
		Fabaceae	N/A	Y	N/A			Y
		Fagaceae	N/A		N/A	Y	Y	
		Geraniaceae	N/A	Y	N/A	Y	Y	Y
		Hypericaceae	N/A	Y	N/A			Y
		Juglandaceae	N/A		N/A	Y		
		Linaceae	N/A	Y	N/A			
		Moraceae	N/A		N/A		Y	
		Orchidaceae	N/A		N/A			Y
		Pedaliaceae	N/A	Y	N/A		Y	
		Poaceae	N/A	Y	N/A	Y	Y	Y
		Podocarpaceae	N/A		N/A		Y	
		Primulaceae	N/A		N/A		Y	
		Rosaceae	N/A	Y	N/A	Y	Y	Y
		Rubiaceae	N/A	Y	N/A	Y	Y	Y
		Theaceae	N/A		N/A	Y		

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Urticaceae	N/A		N/A		Y	
		Vitaceae	N/A	Y	N/A			
	subfamily	Amygdaloideae	N/A		N/A		Y	Y
		Apioideae	N/A	Y	N/A	Y	Y	
		Asphodeloideae	N/A	Y	N/A			
		Asteroideae	N/A		N/A	Y	Y	
		Carduoideae	N/A		N/A		Y	
		Chenopodioideae	N/A		N/A		Y	
		Cichorioideae	N/A		N/A	Y		
		Danthonioideae	N/A		N/A			Y
		Lamioideae	N/A		N/A			Y
		Lemnoideae	N/A	Y	N/A			
		Malvoideae	N/A		N/A	Y		
		Papilionoideae	N/A	Y	N/A		Y	Y
		Polygonoideae	N/A	Y	N/A	Y	Y	Y
		Pooideae	N/A	Y	N/A	Y	Y	Y
		Rosoideae	N/A		N/A	Y	Y	Y
		Rubioideae	N/A		N/A	Y	Y	
	tribe	Alsineae	N/A	Y	N/A	Y	Y	Y
		Arenarieae	N/A		N/A	Y	Y	Y
		Astereae	N/A		N/A			Y
		Camelineae	N/A		N/A	Y		
		Cardueae	N/A		N/A	Y		
		Danthonieae	N/A		N/A	Y	Y	
		Galegeae	N/A	Y	N/A			
		Hypericeae	N/A		N/A			Y
		Lithospermeae	N/A	Y	N/A			
		Poeae	N/A	Y	N/A	Y	Y	Y
		Polygoneae	N/A	Y	N/A	Y	Y	Y
		Potentilleae	N/A		N/A	Y	Y	
		Rubieae	N/A		N/A	Y		
		Saliceae	N/A		N/A	Y	Y	
		Trifolieae	N/A		N/A	Y		
		Triticeae	N/A		N/A	Y		
	subtribe	Agrostidinae	N/A	Y	N/A			
		Crepidinae	N/A	Y	N/A	Y		Y
		Fragariinae	N/A		N/A	Y	Y	
		Hieraciinae	N/A		N/A	Y		Y
		Hordeinae	N/A		N/A	Y	Y	
		Sanguisorbinae	N/A	Y	N/A	Y	Y	Y
		Scandicinae	N/A		N/A	Y	Y	Y
		Thelymitrinae	N/A		N/A			Y
	genus	*Acaena*	N/A	Y	N/A	Y	Y	Y
		Achillea	N/A		N/A	Y		

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Aciphylla	N/A	Y	N/A	Y	Y	
		Agrostis	N/A	Y	N/A	Y		
		Anacardium	N/A		N/A	Y		
		Anthoxanthum	N/A	Y	N/A	Y	Y	Y
		Arachis	N/A		N/A		Y	
		Brassica	N/A	Y	N/A		Y	
		Bromus	N/A	Y	N/A	Y	Y	Y
		Broussonetia	N/A		N/A	Y		
		Cerastium	N/A	Y	N/A	Y	Y	
		Chrysanthemum	N/A		N/A	Y	Y	
		Cicer	N/A		N/A	Y		
		Cirsium	N/A		N/A		Y	
		Conium	N/A		N/A	Y	Y	
		Convolvulus	N/A		N/A	Y		
		Coprosma	N/A		N/A	Y	Y	Y
		Corchorus	N/A	Y	N/A	Y	Y	Y
		Coriandrum	N/A		N/A	Y		
		Crassula	N/A		N/A		Y	
		Crataegus	N/A	Y	N/A			
		Crepis	N/A	Y	N/A	Y		Y
		Cucurbita	N/A		N/A		Y	
		Dactylis	N/A	Y	N/A	Y	Y	
		Dichondra	N/A		N/A	Y		
		Dodonaea	N/A		N/A		Y	
		Echium	N/A	Y	N/A	Y		
		Epilobium	N/A		N/A	Y		
		Erodium	N/A	Y	N/A	Y	Y	Y
		Euphorbia	N/A		N/A			Y
		Fallopia	N/A		N/A		Y	
		Festuca	N/A	Y	N/A	Y	Y	Y
		Fuscospora	N/A		N/A		Y	
		Galium	N/A		N/A	Y		Y
		Geranium	N/A		N/A			Y
		Glyceria	N/A	Y	N/A			
		Hieracium	N/A	Y	N/A	Y		Y
		Holcus	N/A	Y	N/A	Y		
		Hordeum	N/A		N/A	Y		
		Humulus	N/A		N/A			Y
		Hypericum	N/A	Y	N/A		Y	Y
		Ipomoea	N/A		N/A	Y	Y	
		Juncus	N/A	Y	N/A	Y		
		Lens	N/A		N/A	Y		
		Lolium	N/A		N/A	Y	Y	
		Lonicera	N/A		N/A	Y		

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Lophozonia	N/A		N/A			Y
		Malus	N/A		N/A			Y
		Malva	N/A		N/A	Y	Y	
		Medicago	N/A	Y	N/A			Y
		Melicytus	N/A		N/A	Y	Y	Y
		Microtis	N/A		N/A	Y		
		Muehlenbeckia	N/A	Y	N/A	Y	Y	Y
		Myosotis	N/A		N/A	Y	Y	Y
		Olearia	N/A		N/A	Y	Y	
		Orobanche	N/A		N/A	Y		
		Osmorhiza	N/A		N/A	Y		
		Oxalis	N/A		N/A		Y	Y
		Pimelea	N/A		N/A			Y
		Pisum	N/A		N/A	Y	Y	
		Plantago	N/A		N/A	Y	Y	Y
		Poa	N/A	Y	N/A		Y	
		Polygonum	N/A	Y	N/A		Y	
		Potentilla	N/A		N/A	Y	Y	
		Ranunculus	N/A	Y	N/A			
		Rosa	N/A	Y	N/A	Y	Y	Y
		Rubus	N/A	Y	N/A	Y		Y
		Rumex	N/A	Y	N/A	Y	Y	Y
		Rytidosperma	N/A		N/A		Y	
		Schismus	N/A		N/A	Y	Y	
		Selenicereus	N/A		N/A	Y		
		Stellaria	N/A		N/A	Y	Y	Y
		Trifolium	N/A	Y	N/A	Y	Y	Y
		Urtica	N/A		N/A		Y	
		Verbascum	N/A		N/A	Y	Y	Y
		Veronica	N/A		N/A	Y	Y	Y
		Vicia	N/A		N/A	Y		
		Vitis	N/A	Y	N/A			
		Zoysia	N/A		N/A	Y		
	subgenus	*Rumex subgen. Acetosa*	N/A	Y	N/A	Y	Y	Y
		Veronica subgen. Chamaedrys	N/A		N/A	Y		Y
	section	*Daucus sect. Daucus*	N/A		N/A	Y	Y	
		Euphorbia sect. Tithymalus	N/A		N/A			Y
	species	*Achillea millefolium*	N/A		N/A	Y		
		Alchemilla arvensis	N/A		N/A	Y	Y	
		Ananas comosus	N/A		N/A	Y		
		Anthoxanthum odoratum	N/A		N/A	Y		Y

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Anthoxanthum sp. MP-2014	N/A		N/A	Y		Y
		Anthoxanthum sp. PT-2016	N/A		N/A			Y
		Arenaria serpyllifolia	N/A		N/A	Y		Y
		Azadirachta indica	N/A	Y	N/A			
		Bellis perennis	N/A		N/A		Y	
		Brassica oleracea	N/A		N/A	Y		
		Camellia sinensis	N/A		N/A	Y		
		Cerastium glomeratum	N/A		N/A	Y		
		Cicer arietinum	N/A		N/A	Y	Y	
		Cirsium vulgare	N/A		N/A		Y	
		Conium maculatum	N/A		N/A	Y		
		Cynosurus cristatus	N/A	Y	N/A			Y
		Dactylis glomerata	N/A	Y	N/A	Y		
		Dichondra repens	N/A		N/A	Y		
		Draba verna	N/A		N/A	Y		
		Echium vulgare	N/A	Y	N/A	Y		
		Erodium brachycarpum	N/A		N/A	Y		Y
		Festuca myuros	N/A		N/A	Y		Y
		Festuca rothmaleri	N/A		N/A	Y		
		Galium aparine	N/A		N/A	Y		
		Glyceria declinata	N/A	Y	N/A			
		Hieracium stelligerum	N/A		N/A	Y		
		Holcus lanatus	N/A	Y	N/A			
		Hypochaeris glabra	N/A		N/A			Y
		Hypochaeris radicata	N/A		N/A	Y		Y
		Isolepis caligenis	N/A	Y	N/A			
		Kengyilia laxiflora	N/A		N/A			Y
		Malus domestica	N/A		N/A			Y
		Malva nicaeensis	N/A		N/A	Y		
		Medicago sativa	N/A	Y	N/A			Y
		Melicytus alpinus	N/A		N/A	Y	Y	Y
		Myosotis bracteata	N/A		N/A	Y		
		Olearia traversii	N/A		N/A	Y	Y	
		Pisum sativum	N/A		N/A	Y	Y	
		Plantago lanceolata	N/A		N/A	Y		
		Poa colensoi	N/A		N/A		Y	
		Poa trivialis	N/A	Y	N/A			
		Reseda luteola	N/A		N/A			Y
		Salix alba	N/A		N/A		Y	
		Stellaria media	N/A		N/A	Y	Y	Y

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Stellaria neglecta	N/A		N/A	Y		
		Thelymitra longifolia	N/A		N/A			Y
		Trifolium arvense	N/A	Y	N/A	Y	Y	Y
		Trifolium repens	N/A	Y	N/A	Y		Y
		Veronica arvensis	N/A		N/A	Y		
		Veronica verna	N/A		N/A			Y
	varietas	*Bromus diandrus var. rigidus*	N/A		N/A	Y	Y	Y
	no rank	*Rosoideae incertae sedis*	N/A	Y	N/A	Y	Y	Y
		unclassified Erodium	N/A		N/A	Y		Y
	clade	apioid superclade	N/A	Y	N/A	Y	Y	
		asterids	N/A	Y	N/A	Y		Y
		Campanulids	N/A	Y	N/A	Y		
		dalbergioids sensu lato	N/A		N/A		Y	
		Mesangiospermae	N/A	Y	N/A	Y	Y	Y
		NPAAA clade	N/A	Y	N/A	Y		Y
		PACMAD clade	N/A	Y	N/A			
		Pentapetalae	N/A	Y	N/A	Y	Y	Y
		Poeae Chloroplast Group 2 (Poeae type)	N/A	Y	N/A	Y	Y	Y
		Spermatophyta	N/A		N/A	Y	Y	Y
Fungi								
Fungi	phylum	Ascomycota	N/A	Y	N/A	Y	Y	Y
		Basidiomycota	N/A	Y	N/A	Y	Y	Y
		Mucoromycota	N/A		N/A	Y		
	class	Agaricomycetes	N/A	Y	N/A	Y	Y	
		Microbotryomycetes	N/A	Y	N/A		Y	
		Tremellomycetes	N/A	Y	N/A	Y	Y	
	subclass	Dothideomycetidae	N/A		N/A			Y
	order	Agaricales	N/A		N/A			Y
		Chaetothyriales	N/A		N/A	Y		
		Dothideales	N/A	Y	N/A		Y	Y
		Hypocreales	N/A		N/A	Y		
		Mucorales	N/A		N/A	Y		
		Pleosporales	N/A	Y	N/A			Y
		Saccharomycetales	N/A	Y	N/A			
		Tremellales	N/A		N/A	Y		
		Ustilaginales	N/A		N/A	Y		
	family	Entomophthoraceae	N/A		N/A	Y		
		Erysiphaceae	N/A		N/A			Y
		Glomeraceae	N/A		N/A	Y		

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Mrakiaceae	N/A		N/A	Y		
		Mucoraceae	N/A		N/A	Y	Y	
		Phaeosphaeriaceae	N/A		N/A	Y		
		Saccharomycetaceae	N/A		N/A			Y
		Serendipitaceae	N/A		N/A	Y		
	genus	*Aspergillus*	N/A	Y	N/A			
		Cystofilobasidium	N/A	Y	N/A		Y	
		Filobasidium	N/A	Y	N/A			
		Kazachstania	N/A		N/A	Y		
		Komagataella	N/A	Y	N/A			
		Leohumicola	N/A		N/A			Y
		Melampsora	N/A		N/A			Y
		Metschnikowia	N/A	Y	N/A			
		Mucor	N/A		N/A		Y	
		Pseudogymnoascus	N/A		N/A		Y	
	no rank	Helotiales incertae sedis	N/A		N/A			Y
		unclassified Ascomycota	N/A		N/A	Y	Y	
		unclassified Cryptococcus (in: basidiomycete fungi)	N/A	Y	N/A			
		unclassified Hormonema	N/A		N/A			Y
		unclassified Metschnikowia (in: budding yeasts)	N/A	Y	N/A			
Single-cell organisms								
Amoebae	genus	Entamoeba		Y				
Rotifers	class	Eurotatoria		Y	Y	Y		
	species	Adineta vaga complex sp. E JFF-2016		Y				
	no rank	cellular organisms		Y				
Chordates	phylum	Chordata	Y	Y	Y			
Ciliates	class	Spirotrichea				Y		
Diatoms	genus	Pinnularia						Y
Eucaryotes	superkingdom	Eukaryota		Y				
Metazoans	kingdom	Metazoa	Y	Y	Y			
Oomycetes	genus	Albugo				Y		
Other								
Other	superkingdom	Eukaryota				Y	Y	Y
	kingdom	Fungi				Y		
		Metazoa			Y	Y	Y	Y
		Viridiplantae				Y	Y	Y
	phylum	Annelida				Y		

Group	Taxonomic rank	Scientific name	Feral cats	Feral pigs	Ferrets	Hedge hogs	Mice	Possums
		Apicomplexa					Y	
		Arthropoda				Y	Y	Y
		Cercozoa					Y	
		Chlorophyta				Y		
		Chordata			Y	Y	Y	Y
		Ciliophora				Y		
		Parabasalia					Y	
		Platyhelminthes				Y		
		Rotifera						Y
		Streptophyta				Y	Y	Y
	class	Actinopteri				Y		Y
		Arachnida					Y	
		Conoidasida				Y	Y	Y
		Euglenida				Y		
		Insecta			Y	Y	Y	Y
		Lepidosauria				Y		
		Mammalia			Y	Y	Y	Y
	order	Araneae					Y	
		Eucoccidiorida				Y		Y
		Eugregarinorida				Y		
	family	Monocystidae				Y		
		Neopilionidae				Y		
		Phalangiidae				Y		
	genus	*Cryptosporidium*					Y	
		Eimeria					Y	
		Monocystis				Y		
	no rank	root			Y	Y	Y	Y
	clade	Bryophyta				Y		
		Embryophyta				Y	Y	Y
Unidentified	no rank	root	Y	Y	Y			

Appendix C Camera trap images

The below images are examples of target pest species across the BOGP site, and show some variations possible within and between species, and how images captured during non-daylight hours may visually differ.

Note the black tip of the stoat tail, the distinct line between the brown coat and white underbelly colouration visible during the day (Figure 22), and then the smooth colouration and short tail on the weasel (Figure 23).

Figure 20. Example cats captured using camera traps across the BOGP site

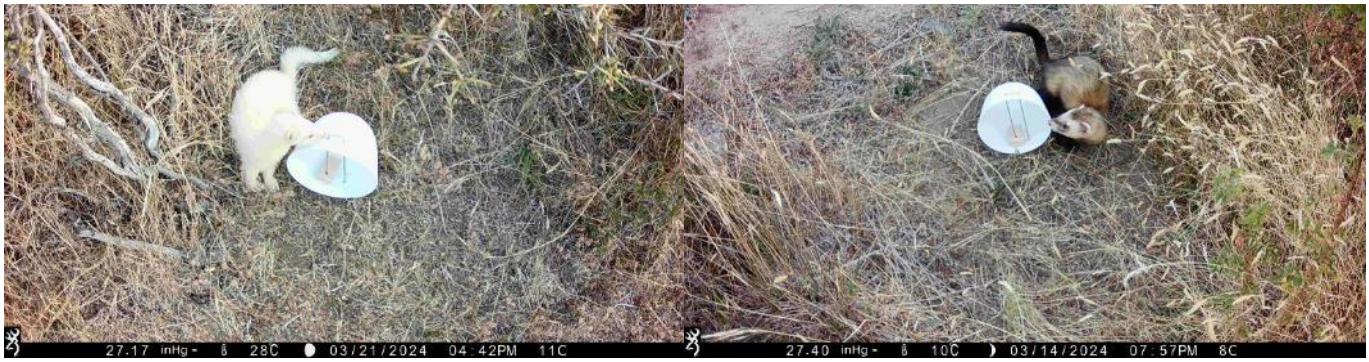

Figure 21. Example albino (left) and regular coloured ferret (right) captured using camera traps across the BOGP site

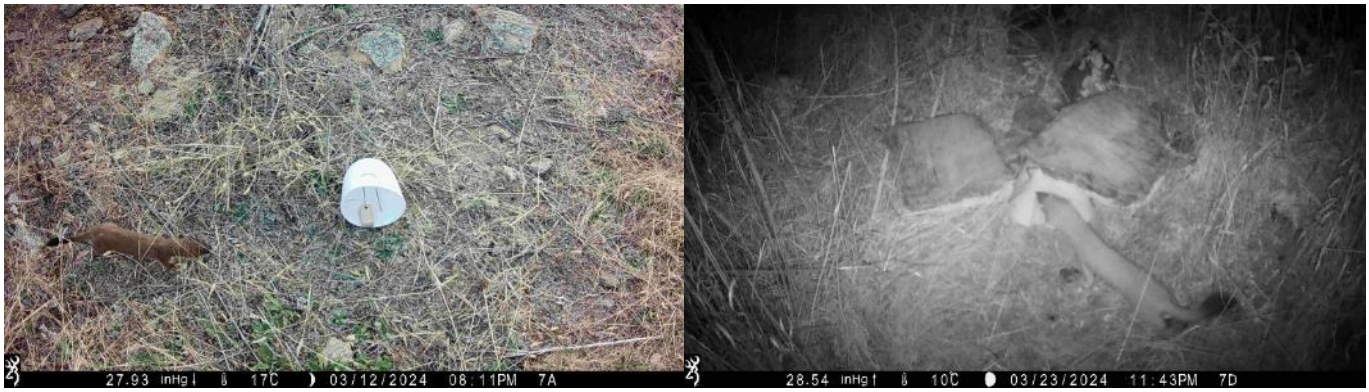

Figure 22. Example stoats captured using camera traps across the BOGP site

Figure 23. Example weasels captured using camera traps across the BOGP site

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