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Habitat Restoration and Enhancement Management Plan for Southland Wind Farm

Contract Report No. 6656i

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Wildlands

Habitat Restoration and Enhancement Management Plan for Southland Wind Farm

Contract Report No. 6656i

August 2025

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Contents

1.0 Introduction

1.1 Overview

This Habitat Restoration and Enhancement Management Plan (HREP) sets out procedures for how the Southland Wind Farm ('wind farm' or 'Project') will offset or compensate for significant residual adverse effects on terrestrial and wetland values and associated species.

This HREP has been developed in accordance with the proposed resource consent conditions for the Southland Wind Farm (EC47 to EC59). These consent conditions will be addressed through the implementation, monitoring and reporting procedures set out in this HREP and the interlinking plans. The purpose, specific objectives, performance measures and monitoring relevant to this HREP are summarised in Table 1.

Table 1 – Purpose, specific objectives, performance measures and monitoring relevant to this HREP

Purpose	The purpose of the HREP is to address the following residual adverse effects of the Southland Wind Farm: a) The loss of significant woody indigenous vegetation and copper tussock dominant vegetation from within the Project Footprint; b) The loss of indigenous wetland from within the Project Footprint; c) The loss of mātātā / South Island fernbird habitat from within the Project Footprint; d) Potential harm to indigenous birds from the operation of the Southland Wind Farm; e) Loss of habitat and/or harm to indigenous lizards and invertebrates; and f) Fragmentation of habitats.
Specific Objectives	The objective of the HREP is to achieve the targets set out in the resource consent conditions to offset and compensate for residual effects on terrestrial and wetland ecological values to achieve a net indigenous biological diversity gain (offsets) or net positive outcomes (compensation, where offsetting cannot be demonstrably achieved).
Performance Outcomes	This HREP has been prepared by a suitably qualified and experienced ecologist and includes the: • Timing of habitat restoration and enhancement works; and • Methods for restoring and enhancing ecological values.
Monitoring	• Compliance monitoring to verify that stated restoration and enhancement activities have been undertaken. • Biodiversity outcome monitoring to verify that expected gains in ecological values from the habitat restoration and enhancement measures have been realised.
Reporting	• A biodiversity outcome monitoring report will be submitted once every five (5) years following the commissioning of the wind turbines for a period of 15 years (a total of three (3) reports). • Annual reports will be submitted that summarise the results of pest plant and animal management actions.

1.2 Responsibilities and competencies

Delivery of, and compliance with this HREP, will be the responsibility of the Consent Holder. Its implementation will require the involvement of the Environmental Manager and respective technical experts and contractors (as required).

The implementation of the HREP will be under the direct supervision of the Project Ecologist. All ecological specialists, who will contribute to the implementation of the HREP, shall be suitably qualified in the development and implementation of restoration and habitat enhancement activities. This includes, but is not limited to fencing, wetland restoration, plant nursery operations, planting and plant maintenance and pest plant and animal management and biodiversity outcome monitoring.

The Environmental Manager, Project Ecologist, respective technical experts, site manager, site engineer(s) and lead earthworks contractor must read and understand the HREP so that the protocols are adhered to correctly during restoration and enhancement works.

The responsibilities of the Environmental Manager include but are not limited to:

- Reading and understanding the HREP;
- Advance communications to ensure that suitable plants are available at appropriate times, and this may involve (for example) ensuring lead-in times are considered for seed collection and propagation;
- Facilitating a Project start-up meeting with the Project Ecologist, relevant lead technical experts, the site manager, site engineers and relevant contractors prior to commencement of the respective habitat restoration and enhancement activities;
- Maintaining clear lines of communication with the Project Ecologist, relevant technical experts, the site manager, site engineers and relevant contractors (e.g. nursery, planting and weed management contractors) regarding changes in the works schedule; and
- Briefing new personnel about their responsibilities under this plan.

1.3 Plan structure

The HREP is set out as follows:

- Section 1 – Introduction (this section).
- Section 2 – Residual effects and effects management summary and approach.
- Section 3 - Habitat Restoration and Enhancement Plan overview.
- Section 4 – Mānuka forest and scrub habitat enhancement.
- Section 5 – Onsite Copper tussock enhancement (terrestrial).
- Section 6 – Offsite Copper tussock wetland restoration and enhancement.
- Section 7 – Onsite habitat enhancement within fauna relocation areas.
- Section 8 – Pest plant and animal management and monitoring.
- Section 9 – Monitoring and reporting.
- Section 10 – Biodiversity outcome monitoring.

2.0 Residual Effects and Effects Management Summary

Detailed information on ecological values, effects and effects management associated with the Project, is provided in the ecological evidence prepared by Wildland Consultants (2025[1]).

As set out in this report, the type and quantum of restoration and habitat enhancement activities for addressing significant residual adverse effects was determined in accordance with offsetting and compensation principles set out in the Southland Regional Policy Statement (RPS). To this end, the habitat restoration and enhancement activities set out in this plan primarily address the following significant residual effects:

- The loss of 58.50 hectares of indigenous dominant woody vegetation and 5.24 hectares of terrestrial copper tussock-dominant vegetation;
- The loss of 0.94 hectares of bog wetland;
- The loss of 1.08 hectares of fen wetland;
- The loss of 0.01 hectares of copper tussock/rautahi marsh;
- The loss of mātātā/South Island fernbird habitat (which is included in the 58.50 hectares above);
- Potential harm to indigenous birds from wind farm operation;
- Loss of habitat and/or harm to indigenous lizards and invertebrates; and
- Fragmentation of habitats for notable invertebrate species.

The habitat restoration and enhancement actions undertaken to address the above significant residual effects will have broader benefits. They will also address those residual effects on indigenous ecological features assessed as non-significant effects (i.e. residual effects assessed as 'Low' or lower under the EcIAG). It is noted that the quanta of affected vegetation listed above is subject to change, depending on final design, and in some cases may be reduced or shifted to lower value vegetation. The final design will also further consider minimising the impact of the Project Footprint on indigenous vegetation, including on the Jedburgh Plateau.

3.0 Habitat Restoration and Enhancement Plan overview

The overarching objective of the proposed restoration and enhancement actions is to address significant residual effects on terrestrial and wetland biodiversity values in accordance with consent condition requirements, which includes the requirement to achieve 'Net Gain' (offsets) or 'Net Positive' outcomes (compensation) where offsetting cannot be demonstrably achieved. An overview of the locations in which restoration and enhancement measures will be implemented is presented in Figure 1.

Key habitat restoration and enhancement measures include:

i. Covenanting in perpetuity, excluding stock and feral ungulates from a 245-hectare area at Jedburgh Station, and undertaking enhancement and revegetation planting **(Jedburgh Station Ecological Enhancement Area**, Figure 2);

ii. Undertaking *c*.8.7 hectares of revegetation planting and assisted regeneration along tracks and firebreaks within the **Jedburgh Station Ecological Enhancement Area**;

[1] Statement of evidence of N. Goldwater and K. Lloyd, Wildland Consultants (2025). Southland Wind Farm Technical Assessment: Terrestrial and Wetland Ecology. Contract Report No. 6656r. Prepared for Contact Energy Ltd.

iii. Covenanting in perpetuity and enhancing copper tussock grassland at Matariki Forest within the **Copper Tussock Enhancement and Skink Protection Area** (*c*.8 hectares, Figure 3);

iv. Covenanting in perpetuity, restoring copper tussock/rautahi marsh wetlands, on land owned by Contact Energy (the **Davidson Road Wetland Restoration Site**, Figure 4);

v. Undertaking wide-scale aerial and/or ground-based pest control using toxic baits across 1,400 hectares at Jedburgh Station (the **Jedburgh Station Pest Control Area**, Figures 1 and 2);

vi. Implementing ground-based rodent control (bait stations) and predator trapping in the 55-hectare **Plateau Fauna Enhancement Area** (Figure 2);

vii. Pest plant control; and

viii. Undertaking habitat enhancement to benefit terrestrial invertebrates, including planting of appropriate indigenous species (Figure 5).

The measures are summarised in Table 2.

Table 2 – Summary of habitat restoration and enhancement measures and associated consent conditions.

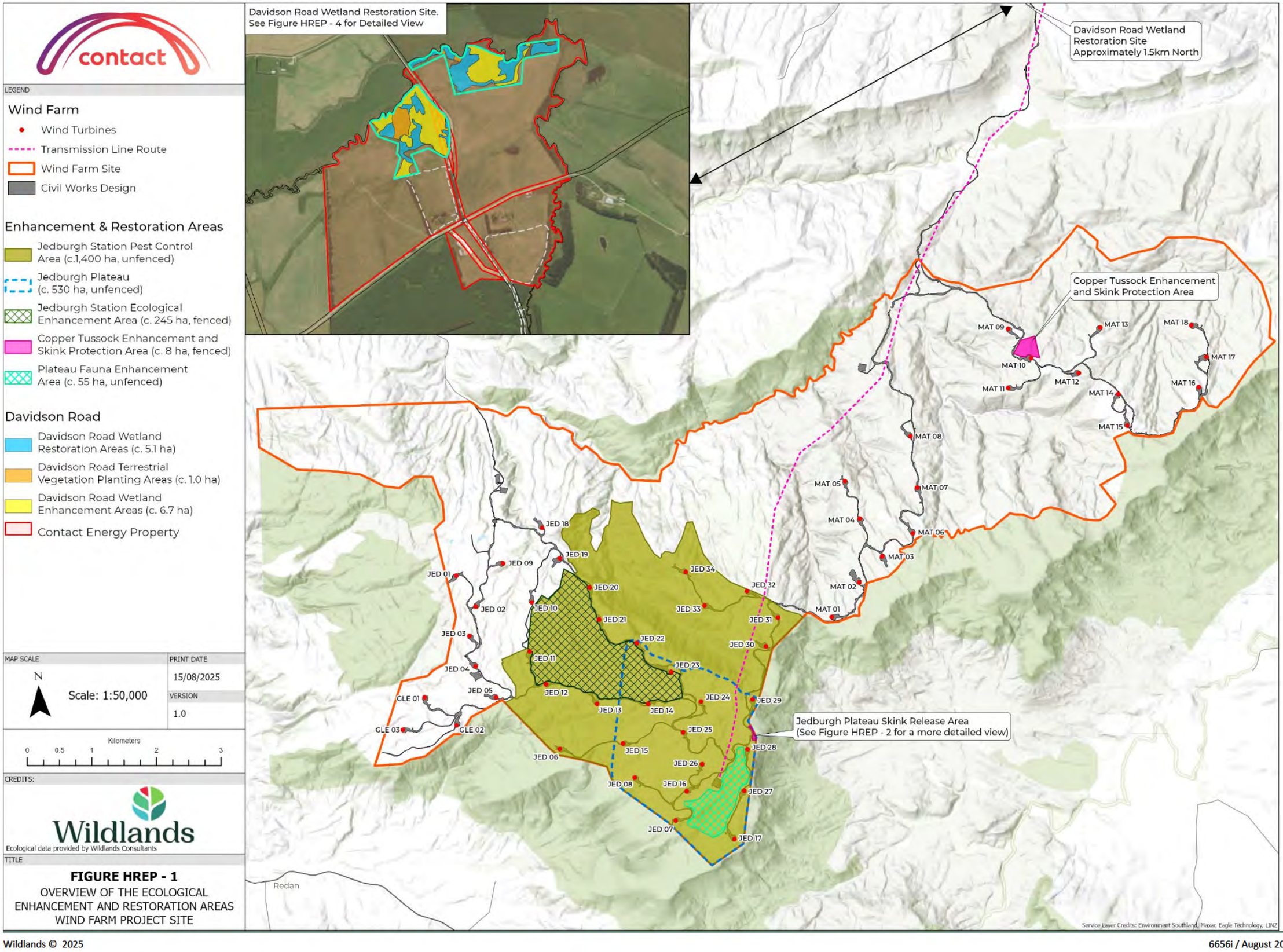
Habitat restoration and enhancement actions	Relevant draft consent conditions	Relevant plan(s)
Section 4 – Onsite mānuka forest and scrub habitat enhancement	EC51, EC52	HREP
Section 5 – Onsite copper tussock terrestrial habitat enhancement		
Section 6 – Offsite copper tussock wetland restoration and enhancement		
Section 7 – Onsite fauna habitat enhancement	EC14, EC21, EC23	LMP, TIMP, SBMP, HREP
Section 8 – Pest plant and animal management	EC40, EC52, EC54	BMP*, HREP
Section 9 and 10 – Biodiversity outcome monitoring and reporting	EC50(j), EC56, EC57, EC58, EC58A	HREP

*Biosecurity Management Plan

The following areas that are subjected to offset and compensation enhancement will be protected in the form of covenants or other title instruments:

- 245-hectare block of mānuka forest and scrub (the Jedburgh Station Ecological Enhancement Area);
- 8-hectare area of copper tussock grassland at Matariki Forest (the Copper Tussock Enhancement and Skink Protection Area); and
- Davidson Road Wetland Restoration Site (offsite, Kaiwera Downs).

Note that the area of the proposed covenant at the Davidson Road Wetland Restoration Site is indicative. The final boundary will be determined following discussion with the Gore District Council.



LEGEND

Wind Farm

- Wind Turbines
- Transmission Line Route
- Wind Farm Site
- Civil Works Design

Enhancement & Restoration Areas

- Jedburgh Station Pest Control Area (c.1,400 ha, unfenced)
- Jedburgh Plateau (c. 530 ha, unfenced)
- Jedburgh Station Ecological Enhancement Area (c. 245 ha, fenced)
- Copper Tussock Enhancement and Skink Protection Area (c. 8 ha, fenced)
- Plateau Fauna Enhancement Area (c. 55 ha, unfenced)

Davidson Road

- Davidson Road Wetland Restoration Areas (c. 5.1 ha)
- Davidson Road Terrestrial Vegetation Planting Areas (c. 1.0 ha)
- Davidson Road Wetland Enhancement Areas (c. 6.7 ha)
- Contact Energy Property

MAP SCALE	PRINT DATE
N Scale: 1:50,000	15/08/2025
	VERSION 1.0

Kilometers: 0 0.5 1 2 3

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FIGURE HREP - 1

OVERVIEW OF THE ECOLOGICAL ENHANCEMENT AND RESTORATION AREAS WIND FARM PROJECT SITE

4.0 Mānuka Forest and Scrub Habitat Enhancement

4.1 Overview

To address the residual effects of removing *c.*58.50 hectares of indigenous dominant woody vegetation (a mix of forest, scrub and shrubland types), Contact is proposing to covenant in perpetuity, and construct a deer fence around a 245-hectare block at Jedburgh Station that comprises mānuka forest and scrub, [mānuka]/tauhinu-inaka-*Veronica odora* scrub and shrubland, fens, and bogs (the Jedburgh Station Ecological Enhancement Area, Figure 2). Terrestrial vegetation in this area is currently in a state of stalled succession due to stock and feral animal browsing that is preventing the regeneration of palatable indigenous trees (Plate 1). Once the fence has been constructed, stock will be removed and any feral deer and pigs within the area will be eradicated. Following the removal of ungulates, enhancement planting of indigenous species will be undertaken at a rate of 20 plants per hectare.

Plate 1 – Browsed understorey of Mānuka forest and scrub. 25 October 2024.

The aim is to protect this area from browsing mammals (stock, deer, and pigs) and restore successional processes to increase floristic diversity and enhance and promote the development of complex forest structure, as well as protect *c.*19 hectares of fen and bog habitat from browsing ungulates.

It is proposed to erect the deer fence following the completion of the construction of all wind turbines within 150m of the deer fence due to logistical and health and safety considerations when installing the wind turbines.

4.2 Deer fence specifications

The deer fence should be at least two metres tall, with post spacing typically between 5-7 metres, with the bottom wire position as close to the ground as possible (i.e. no more than 70 mm). For mesh wire fences, the first one metre above ground level should have netting with a maximum spacing of 150 millimetres, and above one metre, the spacing can be up to 250 millimetres. In order to exclude pigs, two barbed wires should be placed at the bottom of the fence.

Fencing that spans gullies and waterways is at high risk of animals pushing through it and of damage during floods and therefore requires special consideration. These high-risk areas can be fenced independently of the adjoining fences using separate end assemblies and materials that are designed to lay down, fold over or even break away in the event of a flood, e.g. treated wooden boards or concrete reinforcing mesh to prevent deer and pigs getting under the fence. Section of the exclusion fence that span gullies and waterways need to be inspected as soon as possible after heavy rainfall events.

Note that same specifications will apply to the proposed fence at the Copper Tussock Enhancement and Skink Protection Area.

4.3 Deer fence inspection and maintenance

Red deer are large, strong animals capable of breaching weak points in a fence. In areas with high deer densities, pressure on fences can be significant—especially during seasonal movements or food shortages. Regular inspections are required to ensure prompt detection and repair of breaches or damage.

Routine fence inspections should be undertaken every three months (minimum). It is recommended that inspections are also undertaken after extreme weather events. Particular attention should be paid to stream crossings and narrow, incised gullies.

4.4 Enhancement planting

Enhancement planting with indigenous canopy and sub-canopy tree and shrub species will be undertaken throughout the ungulate exclusion area once the fence has been erected the eradication of deer and pigs has been confirmed. All cattle and sheep will be removed from the site prior to the completion of the fence.

A total of 5,000 plants comprising 12 species will be distributed throughout the fenced area, averaging approximately 20 plants per hectare. The selection of tree species includes both slow-growing long-term canopy and emergent trees, and fast-growing broadleaved subcanopy trees. Plants will be located in more open or disturbed areas (e.g. canopy gaps) as well as semi-shaded areas beneath the existing canopy. The purpose of this planting will be to more quickly establish successional processes throughout the area through subsequent regeneration from these widespread 'seed trees'. Planting will take place in the first autumn following the confirmed eradication of feral ungulates. The ungulate exclusion area is not far from mature indigenous forest and will receive bird-dispersed seeds and fern spores dispersed by wind, that will establish readily beneath mānuka forest.

An indicative plant schedule is provided in Table 3 below.

Table 3 – Indicative plant schedule for mānuka forest and scrub enhancement planting based on a total of 5,000 plants

Species name	Common name	Category	Number of plants
Carpodetus serratus	piripiriwhata	Dicot tree	400
Dacrydium cupressinum	rimu	Podocarp	300
Metrosideros umbellata	southern rātā	Dicot tree	400
Pterophylla racemosa	kāmahi	Dicot tree	400
Griselinia littoralis	Kāpuka	Dicot tree	600
Fuchsia excorticata	kōtukutuku, tree fuchsia	Dicot tree	500
Podocarpus laetus	Hall's totara	Podocarp	400

Species name	Common name	Category	Number of plants
Prumnopitys ferruginea	miro	Podocarp	400
Pseudopanax crassifolius	horoeka, lancewood	Dicot tree	400
Pseudopanax colensoi	mountain five finger	Dicot tree	450
Pseudowintera colorata	horopito	Dicot tree	300
Raukaua simplex		Dicot tree	450
Total			**5,000**

4.5 Revegetation planting and assisted regeneration

To help offset the residual effects of fragmentation, *c.*8.7 hectares of existing tracks and firebreaks will be restored with indigenous species within the proposed 245-hectare enhancement area (as per condition EC51). The aim is to create a continuous indigenous canopy across the entire 245 hectares, which in turn will promote the movement and dispersal of less mobile species and make the site more resistant to weed invasion. This will be achieved through a combination of revegetation planting with pioneer species and assisted regeneration, the latter of which promotes the natural regeneration of species such as mānuka by controlling rank grass and light demanding pest plants such as gorse.

Pest plant control and site preparation requirements will be determined during a site inspection at least three months prior to planting.

An indicative plant schedule is provided in Table 4 below. Plant numbers are based on spacings of four metres.

Table 4 – Indicative plant schedule for revegetation planting tracks and firebreaks

Species name	Common name	Spacing (m)	% of mix	Number of plants
Cordyline australis	tī kōuka	4	15	925
Leptospermum scoparium	mānuka	4	60	3,700
Pittosporum tenuifolium	kōhūhū	4	15	925
Weinmannia racemosa	kāmahi	4	10	615
Total				**6,165**

contact

LEGEND

Wind Farm

- Wind Turbines
- Transmission Line Route
- Surplus Fill Disposal Sites
- Wind Farm Site
- Civil Works Design

Indicative Traps and Bait Stations

- DOC150 Traps
- DOC200 Traps
- Cat Kill Traps
- Rodent Bait Stations (100m X 50m Grid)

Enhancement & Restoration Areas

- Jedburgh Station Pest Control Area (c.1,400 ha, unfenced)
- Jedburgh Plateau (c. 530 ha, unfenced)
- Jedburgh Station Ecological Enhancement Area (c. 245 ha, fenced)
- Jedburgh Plateau Skink Release Area (c. 0.48 ha, unfenced)
- Plateau Fauna Enhancement Area (c. 55 ha, unfenced)
- Invertebrate Habitat Enhancement Areas (c. 1.6 ha, unfenced)
- Tautuku Gecko Soft Relase Pen (c. 2.6 ha, temporary fence)

MAP SCALE	PRINT DATE
N Scale: 1:20,000	15/08/2025
	VERSION
	1.0

Kilometers
0 0.13 0.25 0.5 0.75 1 1.25

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Ecological data provided by Wildlands Consultants

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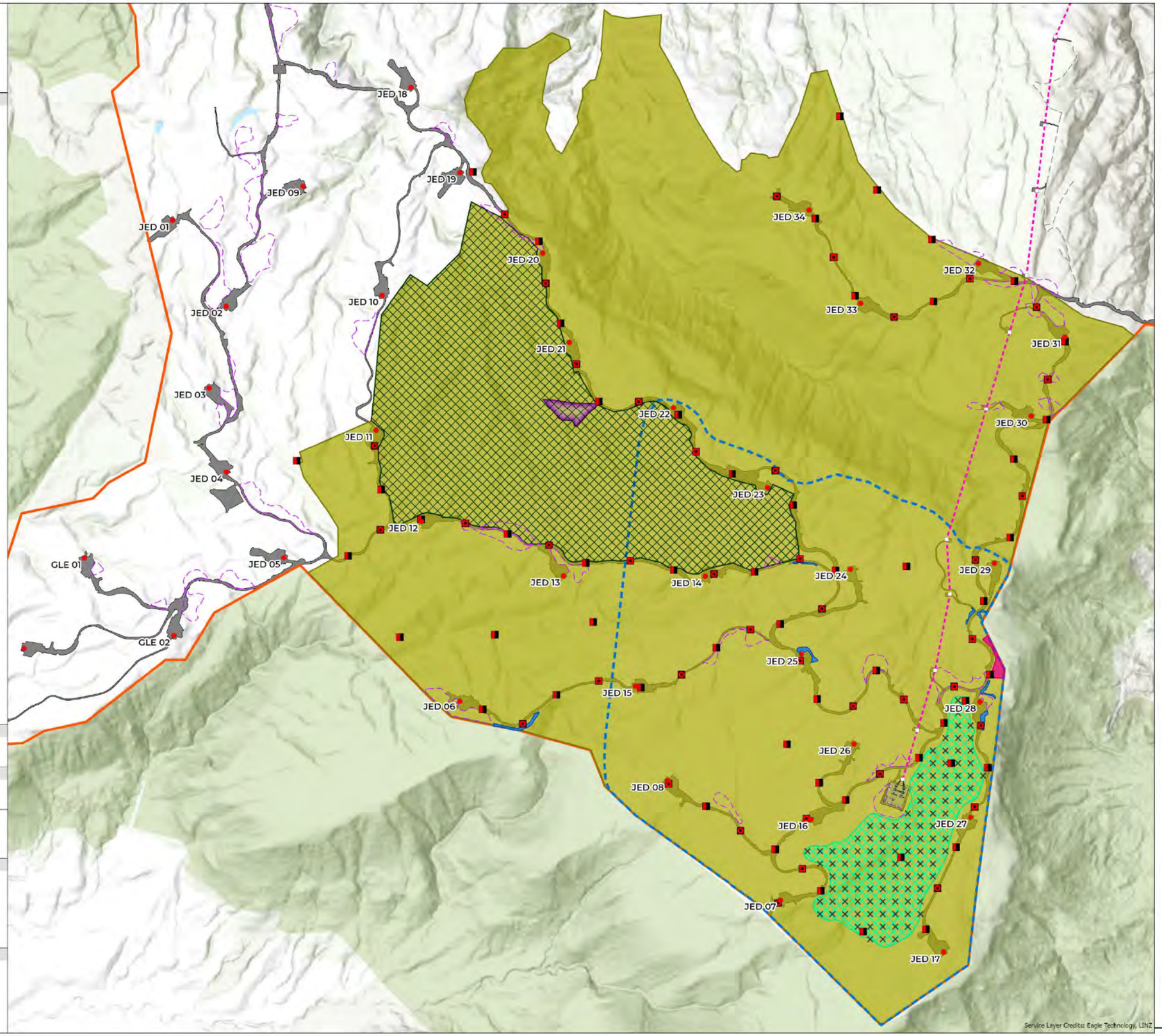
FIGURE HREP - 2

ECOLOGICAL ENHANCEMENT AND RESTORATION AREAS ON JEDBURGH STATION



5.0 On-site Copper Tussock Terrestrial Restoration and Habitat Enhancement

5.1 Overview

To offset the significant residual effects of removing 5.24 hectares of copper tussock-dominant terrestrial vegetation, a minimum of eight hectares of degraded copper tussock vegetation at Matariki Forest will be covenanted and enhanced (the Copper Tussock Enhancement and Skink Protection Area, Figure 3). It is not necessary to plant the entire area; rather, enhancement planting will take place in areas where pest plants have been controlled and also scattered in and amongst existing indigenous vegetation.

This site will also form the larger of the two skink relocation sites. In the absence of browsing animals, this area of copper tussock will naturally revert to indigenous forest, most likely pāhautea/southern rātā-kāmahi forest - a process that will take decades.

Stock do not have access to the proposed restoration and enhancement area (due to the current use of the site for forestry), although deer are common and hares are highly likely to be present. The key restoration actions include excluding deer and controlling pest plant species such as gorse and wilding conifers. It is proposed to construct a deer fence to permanently exclude deer and other browsing ungulates from the restoration site.

In order to help protect resident and relocated skinks at the enhancement site a grid of bait stations will be deployed to control rats and mice. Given that the deer fence cannot be constructed prior to the bait stations being deployed (due to safety and logistical reasons related to the movement of wind farm earthwork equipment and infrastructure), the bait stations will need to be attached to wooden or aluminium/steel posts driven into the ground (see Section 8.2.4). This will minimise the effects of interference by deer and pigs. The posts will also act as a visual reference, making the bait stations easy to locate for contractors.

The deer fence will also need to exclude feral pigs and will be built to the specifications described in Section 4.2.

The methodology and timing for pest animal and plant control is described in Section 8 of this plan.

5.2 Enhancement planting specifications

An indicative planting schedule for copper tussock enhancement planting is presented in Table 5. Plant numbers will be determined once the proposed enhancement areas have been fully ground-truthed and pest plants have been controlled. It is noted that copper tussock plants will need careful nursery rearing for a couple of years, by which time they are at least 50 centimetres in height and can be planted out. Alternatively, ramets[1] can be harvested from tussocks that are excavated and planted elsewhere.

[1] A ramet is a genetically identical individual derived from a larger plant.

Table 5 – Specifications for copper tussock enhancement planting

Species name	Common name	Category	Spacing (m)	% of mix	Number of plants
Chionochloa rubra subsp. *cuprea*	Copper tussock	Grass	1	70	TBC
Coprosma dumosa		Dicot shrub	5-10	10	TBC
Dracophyllum longifolium	Inaka	Dicot shrub	5-10	10	TBC
Phormium cookianum	Whahariki	Monocot herb	1.4-3	10	TBC


MAT 09
MAT 10
LEGEND
Wind Farm
Wind Turbines
Civil Works Design
Enhancement & Restoration Areas
Post Release Monitoring Traps
Ungulate Exclusion Fence
Copper Tussock Enhancement and Skink Protection Area (c. 8 ha)
MAP SCALE
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Scale: 1:2,000
PRINT DATE
15/08/2025
VERSION
1.0
Meters
0 12.5 25 50 75 100 125
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Wildlands
Ecological data provided by Wildlands Consultants
TITLE
FIGURE HREP - 3
COPPER TUSSOCK ENHANCEMENT AND SKINK PROTECTION AREA ON MATARIKI FOREST
Service Layer Credits: Environment Southland, Maxar, Eagle Technology, LINZ

6.0 Offsite Copper Tussock Wetland Restoration and Enhancement

6.1 Overview

Environmental compensation is proposed to be undertaken off-site on land owned by Contact at Davidson Road, approximately six kilometres north of the Wind Farm Site (Figure 4) (**Davidson Road Wetland Restoration Site**). These works will address the loss in extent of the following wetland types caused by wind farm development:

- Fen (1.08 hectares) located on the Jedburgh Plateau;
- Bog (0.94 hectares) located on the Jedburgh Plateau; and
- Copper tussock/rautahi marsh (0.01) located at Matariki Forest.

Stock will be removed from the Davidson Road Wetland Restoration Site and grazed areas of exotic grassland with hydric (i.e. wetland) soils will be partially revegetated with copper tussock, rautahi and harakeke. This will restore 'natural wetland' status to areas that currently are exempted from natural wetland status because of a dominance of improved pasture species. The outcome will be an overall increase in the extent of natural wetlands in Southland. Enhancement planting will also be undertaken throughout existing areas of degraded copper tussock-rautahi marsh.

Opportunities to enhance wetland hydrology will also be explored, including the option of filling/blocking drains.

Stock will be excluded by a five-wire post and batten fence, with a barbed bottom wire recommended to deter pigs. The fence will be constructed prior to restoration works commencing at the site, and the area will be covenanted in perpetuity.

6.2 Planting

6.2.1 Overview

Three broad planting areas and typologies are proposed for the wetlands at Davidson Road:

- Area 1: **revegetation of exotic wetland** (up to 5.1 hectares).
- Area 2: **enhancement wetland planting** (c.6.7 hectares).
- Area 3: **terrestrial revegetation planting** (minimum planting area of 1 hectares).

Up to 5.1 hectares of exotic wetland will be revegetated with indigenous species, which corresponds to almost twice the area of wetland to be lost at Jedburgh Station. Enhancement planting within existing indigenous-dominated natural wetland will also be undertaken, targeting existing gaps in the canopy as well as spaces remaining following pest plant control. A small oxbow is present in the eastern wetland, which holds more water than the rest of the wetland. This feature would benefit from shading by planting harakeke.

In addition, the stream that runs along the northern boundary of the wetlands would benefit from planting woody indigenous tree and shrub species within the riparian margin. The total area for wetland enhancement planting will be determined after a preliminary site inspection.

Indicative plant schedules for wetland revegetation, wetland enhancement planting, and terrestrial revegetation planting are provided in Tables 6 to 8.

As part of site preparation activities, areas of existing wetland that are dominated by exotic species will be sprayed with herbicide and planted in indigenous wetland plants. Pest plant control will be undertaken throughout the wetlands and immediate environs, and enhancement planting will be carried out within existing indigenous natural wetland vegetation.

6.2.2 Plant stock availability

All plants should be sourced from the Waipahi and Tahakopa ecological districts where practical. Plants should be ordered from a nursery specialising in supply of indigenous revegetation grade plants for ecological restoration projects. To ensure supply of the required species from the specified ecological district(s), plants should be ordered well in advance, noting there is also the opportunity to harvest ramets from copper tussock at the Davidson Road Wetland Restoration Site and grow them on at a nursery.

6.2.3 Maintenance

Planted areas should be visited at least three times during the first two years following planting. During these visits, plants should be released from exotic vegetation to ensure they are able to receive sufficient sunlight to thrive. As the plants become established, they will begin to out compete other exotic species and the frequency of releasing will decrease. After five years no further releasing should be necessary.

Limited infill planting may be required during the next planting season depending on plant survival over the first summer. Infill plants should be of the same grade as those used in the initial planting. The number and species of infill plants should be identified in February or March preceding the infill planting season.

Table 6 – Planting specifications for wetland revegetation (*c.*5.11 hectares)

Species name	Common name	Category	Spacing (m)	% of mix	Number of plants
Carex coriacea	Rautahi	Sedge	1.4	30	8,750
Chionochloa rubra subsp. *cuprea*	Copper tussock	Grass	2	60	7,300
Phormium tenax	Harakeke	Monocot herb	3	10	1,200
Total					**17,250**

Table 7 – Plant schedule for wetland enhancement planting (*c.*6.67 hectares)

Species name	Common name	Category	Spacing (m)	% of mix	Number of plants
Coprosma elatirioides		Dicot shrub	5	20	TBC
Coprosma propinqua	Mingimingi	Dicot shrub	5	25	TBC
Olearia bullata		Dicot shrub	5	15	TBC
Olearia hectorii		Dicot shrub	5	15	TBC
Olearia lineata		Dicot shrub	5	15	TBC
Phormium tenax	Harakeke	Monocot shrub	5	10	TBC

Table 8 – Plant schedule for terrestrial planting (based on planting minimum of 1.08 hectares)

Species name	Common name	Category	Spacing (m)	% of mix	Number of plants
Aristotelia serrata	Wineberry	Dicot shrub	2	11	315
Cordyline australis	Tī kōuka	Monocot tree	2	15	430
Dacrycarpus dacrydioides	Kahikatea	Gymnosperm tree	5	2	10
Griselinia littoralis	Broadleaf	Dicot tree	2	10	285
Hoheria angustifolia	Narrow-leaved houhere	Dicot tree	3	15	190
Leptospermum scoparium	Mānuka	Dicot shrub	2	20	570
Plagianthus regius	Lowland ribbonwood	Dicot tree	3	10	125
Prumnopitys taxifolia	Matai	Gymnosperm tree	5	2	10
Sophora microphylla	Kōwhai	Dicot tree	3	15	190
Total					**2,125**

LEGEND

Wind Farm

- Temporary Laydown Areas
- Contact Energy Property

Enhancement & Restoration Areas

- Davidson Road Wetland Restoration and Covenant Area (c. 15 ha, fenced)
- Davidson Road Wetland Restoration Areas (c. 5.1 ha)
- Davidson Road Terrestrial Vegetation Planting Areas (c. 1.0 ha)
- Davidson Road Wetland Enhancement Areas (c. 6.7 ha)

Note
All areas shown above are subject to further discussion with Gore District Council about the paper road through the Contact Energy property.

MAP SCALE	PRINT DATE
N Scale: 1:3,500	15/08/2025
	VERSION
	1.0

Meters
0 25 50 100 150 200

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Wildlands
Ecological data provided by Wildlands Consultants

TITLE

FIGURE HREP - 4

DAVIDSON ROAD WETLAND RESTORATION SITE AND PROPOSED COVENANT

7.0 Onsite Habitat Enhancement within Fauna Relocation Areas

7.1 Overview

This section focuses on on-site habitat enhancement for relocated lizards and invertebrates to compensate for significant residual effects on ecological values because of vegetation clearance and habitat loss during the construction phase of the Project.

All indigenous lizards are protected under the Wildlife Act (1953). As wind farm construction activities potentially impact on resident lizard populations, management strategies to mitigate these effects are required. Without mitigation, offsetting or compensation, lizard populations may be permanently reduced, due to accidental death, loss of habitats, and reduced habitat connectivity.

In contrast to lizards, legal protection for invertebrates is extremely limited. The vast majority of invertebrates are not protected under the Wildlife Act (1953), and threat status offers no legal protection either. The invertebrate community is valuable to biodiversity and ecosystem function, and a high percentage of indigenous species, and high indigenous species diversity, are valued as important attributes for most diversity criteria. As there are so many invertebrates, most of which are poorly known, we can use 'notable invertebrates' to help protect invertebrate communities and biodiversity as a whole. 'Notable invertebrates' meet at least one of the following criteria:

- Protected under the Wildlife Act; or
- Taonga species for Ngāi Tahu; or
- Threatened or At Risk, having been assessed under the New Zealand Threat Classification System; or
- Locally endemic; or
- Large-bodied and reliant on a specific indigenous habitat type.

Two key habitat enhancement strategies are planned for relocated lizards and invertebrates. These are transfer of woody debris from impact sites and targeted rodent control. These are supported by comprehensive monitoring programmes. In addition, it is recommended that excavated copper tussock is replanted along the boundaries of selected wetlands to improve buffering and connectivity for skinks and invertebrates.

7.2 Relocation of lizards and invertebrates from impact sites

7.2.1 Overview

Various mechanisms will be used to salvage and relocate lizards and invertebrates from impact sites. These are outlined in the Lizard Management Plan (LMP) and Terrestrial Invertebrate Management Plan (TIMP) (including the Stag Beetle Management Plan (SBMP)), and are dependent upon the species and the nature of the habitat at the impact sites.

For the lizards, the presence of the tussock skink (*Oligosoma chionochloescens*, At Risk – Declining) and Tautuku gecko (*Mokopirirakau* "southern forest", At Risk – Declining) has been confirmed. The presence of herbfield skink (*Oligosoma murihiku*; At Risk – Declining) is considered possible. It is possible, although considered unlikely, that green skink (*Oligosoma chloronoton*; Threatened – Nationally Critical) is present at the site.

Wildlands surveys have detected at least ten 'notable invertebrate' species at the wind farm site. Helms' stag beetle (*Geodorcus helmsi*, At Risk – Declining) is the only species detected to date that is protected under the Wildlife Act (1953). Several species found at the wind farm site appear to be locally endemic: Ngaokeoke or peripatus (*Peripatoides* sp.), the large ground beetle *Megadromus meritus*, a trapdoor spider (*Cantuaria* sp.), a ground beetle (*Holcaspis* sp.), a most likely undescribed species of red and black *millipede* (*?Icosidesmus* sp.) and two species of leaf-veined slug (Athoracophoridae). Other notable invertebrate species include the short-horned grasshopper (*Sigaus campestris*, At Risk – Declining) and giant springtail (*Platanurida* sp).

The suitability of the three proposed lizard release sites has been considered based on Principle 6 of the lizard salvage guidelines (DOC 2019). Thus, the sites will be ecologically appropriate, contain suitable habitat, and will be protected from predators and future human disturbance. Similar criteria have been used to determine the suitability of invertebrate release sites, noting that where appropriate, the lizard release sites will also be used to receive salvaged invertebrates.

Two main strategies will be employed to enhance the habitat for lizards and invertebrates within the relocation areas. These are the transfer of woody debris and other vegetation from impact sites, and targeted rodent control, noting that the relocation areas within the Jedburgh Station Ecological Enhancement Area and the Copper Tussock Enhancement and Skink Protection Site (at Matariki Forest) will also be protected by ungulate-proof fences. The success of these strategies will be evaluated by monitoring the biodiversity outcomes.

7.3 Transfer of woody debris and other vegetation from impact sites

7.3.1 Overview

Felled trees and already fallen logs (herein coarse wood) are ecologically important to forest regeneration processes and as habitat for a wide range of species including lizards and invertebrates. As such, coarse wood will be salvaged and stockpiled where practicable for the purposes of transfer into the lizard and invertebrate release sites in accordance with condition EC54(f). Coarse wood will be placed into small and compact windrows within defined areas for a week to give invertebrates a chance to transfer to the new habitat. Stockpile locations will be determined via consultation with the construction engineer(s), vegetation clearance contractors, Environmental Manager, and Project ecologist(s). Coarse wood will not be placed in locations where material could move and enter streams. In forest areas, smaller volumes of material can be placed with minimal damage to existing sub-canopy and ground cover vegetation.

For forest ecosystems, priority coarse wood for stockpiling includes large (> 60-centimetre diameter) felled logs or trunks of indigenous (preferably) or exotic trees. These should be cut up into manageable portions (0.5 – 3 metre sections). The quantities of coarse wood to be stockpiled and relocated into the lizard and invertebrate release sites will be determined on-site by the Project Ecologist.

7.3.2 Relocation of coarse wood

Coarse wood will be relocated to the lizard and invertebrate release sites via machinery wherever this can be undertaken without adverse effects on vegetation outside the wind farm footprint. Deployment is to be directed by the Environmental Manager in consultation with the Project construction engineer(s) and earthworks contractors. Care will be taken to ensure that the nature of the habitat from which the coarse wood is collected is congruent with the habitat into which it is being transferred.

Sub-fossil wood can be used for this purpose. Large quantities of sub-fossil wood will be excavated on the Jedburgh Plateau during the construction stage. This can be stacked or formed into piles to create durable habitat for skinks and invertebrates.

7.3.3 Species benefiting from the relocation of coarse wood

The use of imported resources that mimic those from previously established ecosystems should benefit lizards (skinks and geckos) as well as numerous invertebrates at the relocation sites. It will provide habitat and refuges for ground-dwelling lizards and invertebrates, and enhance ecosystem processes such as predation, herbivory, pollination, decomposition and nutrient recycling.

7.4 Indigenous planting to enhance habitat for invertebrates

To help compensate for the residual loss of vegetation on the Jedburgh Plateau, approximately eight discrete areas (totalling 1.6 hectares) will be planted adjacent to the wind farm infrastructure and fill disposal sites (Figure 5). The aim of the planting is to provide improved structural habitat for invertebrates as well as enhance connectivity between existing habitats where infrastructure would otherwise act as an obstacle.

Table 9 – Indicative planting schedule for invertebrate habitat enhancement on the Jedburgh Plateau

Species name	Common name	Category	Spacing (m)	% of mix	Number of plants
Chionochloa rubra subsp. *cuprea*	Copper tussock	Grass	1	70	TBC
Coprosma dumosa		Dicot shrub	5-10	10	TBC
Dracophyllum longifolium	Inaka	Dicot shrub	5-10	10	TBC
Phormium cookianum	Whaririki	Monocot herb	1.4-3	10	TBC

7.5 Targeted mouse control

Feral mice (*Mus musculus*) are often overlooked as causes of biodiversity declines or as targets of predator control; however, there is evidence to demonstrate the mice are important predators of lizards and invertebrates in New Zealand. Control of mice is therefore a critical component of habitat enhancement for relocated lizards and invertebrates (see Section 8.2.2 for control methodology).

8.0 Pest Plant and Animal Management

8.1 Overview

This section outlines the management actions and performance targets required to control pest animal species within (i) Jedburgh Station (onsite) and (ii) land owned by Contact at Davidson Road (the Davidson Road Wetland Restoration Site; offsite). Key pest species at Jedburgh Station include feral deer, pigs, cats, stoats, possums, hedgehogs, rats, mice, hares, and potentially invasive wasps. Potential pest species at the Davidson Road Wetland Restoration Site include rabbits and hares. A combination of hunting, trapping and poisoning will be used to manage pest animals at all sites.

8.2 Pest animal management areas

8.2.1 Jedburgh Station and Matariki Forest

Aerial pest control

Wide-scale aerial pest control targeting deer, possums, rats, stoats, and hedgehogs will be undertaken across the Jedburgh Station Pest Control Area (*c.*1,400 hectares) on a three-yearly basis (Figure 1) as per consent condition EC54. Each aerial operation will be undertaken in April-May, where practical.

The Environmental Manager will work with a reputable and experienced contractor during the planning and implementation stages of the aerial pest control operations.

If there are practical constraints on the use of helicopters, hand sowing of baits will be undertaken as required.

Targeted deer control

Aerial shooting of wild deer from a helicopter is proposed at Jedburgh Station, targeting pasture–forest margins, open scrub and shrubland, and where indigenous forest is sufficiently open to allow deer to be seen and shot. Thermal infrared imaging – technology that is able to detect the body heat of warm-blooded animals - could be incorporated into aerial (and ground) control of wild deer in areas where it can be safely used and is predicted to increase kill rates. It is proposed to undertake targeted deer control every six months for two years following the commencement of the wind farm construction, and every three years following that (as per consent condition EC54).

Aerial poisoning can be highly effective for controlling deer, particularly in aerial baiting operations for possum or rabbit control in New Zealand, although the proportion of wild deer killed by toxic baits sown from the air can be variable across populations (Veltman & Parkes 2002). In order to enhance the effectiveness of deer control using aerial poisoning, Contact will seek advice from Environment Southland to introduce carrot baits and/or use baits that do not contain deer repellent.

Wind farm roads

Once the wind farm is operational, a total of 41 DOC150 traps, 55 DOC200 traps, and 21 SAR-4 cat kill traps will be deployed along the wind farm roads within the 1,400-hectare Jedburgh Station Pest Control Area, spaced at approximately 250-300 metres (Figure 2) (as per consent condition EC54(b)). An additional ten DOC200 traps will be deployed within the Jedburgh Station Pest Control Area in order to enhance the control of stoats, which can cover large distances.

DOC200 traps will be baited with a combination of fresh eggs and dried rabbit, and the cat traps will be baited with a combination of salted rabbit and fish. A salmon aerosol lure will be used to increase the attractiveness of the DOC200 and Steve Allan SA2 traps.

Plateau Fauna Enhancement Area (c.55 hectares)

Following the commencement of construction activities, a grid of 114 Philproof bait stations spaced on a 100-metre x 50-metre grid will be established within the Plateau Fauna Enhancement Area as illustrated in Figure 2 (as per consent condition EC54(b)). It is recommended that Pestoff® Rodent Bait 20R is used to control rodents.

In addition, a line of four DOC200 traps will be deployed inside the Plateau Fauna Enhancement Area to target stoats. The traps will be baited with a combination of fresh eggs, peanut butter, mayonnaise lure, and dried rabbit, and the cat traps will be baited with a combination of salted rabbit and fish.

8.2.2 Lizard and invertebrate relocation areas

Three sites are proposed to receive relocated lizards (see Figure 3 in the Lizard Management Plan). Targeted control of rodents will be undertaken in the three lizard release sites. This will be achieved by establishing a 25m x 25m bait station grid at each site. It is recommended that Pestoff® Rodent Bait 20R is used to control rodents. A peanut oil lure will be used to increase the attractiveness of each bait station in the larger lizard enhancement area.

contact

LEGEND

Wind Farm

- Wind Turbines
- Transmission Line Route
- Surplus Fill Disposal Sites
- Civil Works Design
- Wind Farm Site

Enhancement & Restoration Areas

- Jedburgh Station Pest Control Area (c.1,400 ha, unfenced)
- Jedburgh Plateau (c. 530 ha, unfenced)
- Jedburgh Station Ecological Enhancement Area (c. 245 ha, fenced)
- Jedburgh Plateau Skink Release Area (c. 0.48 ha, unfenced)
- Plateau Fauna Enhancement Area (c. 55 ha, unfenced)
- Invertebrate Habitat Enhancement Areas (c. 1.6 ha, unfenced)
- Tautuku Gecko Soft Relase Pen (c. 2.6 ha, temporary fence)

MAP SCALE	PRINT DATE
N Scale: 1:15,000	15/08/2025
	VERSION 1.0

Kilometers
0 0.13 0.25 0.5 0.75 1

CREDITS:

Wildlands

Ecological data provided by Wildlands Consultants

TITLE

FIGURE HREP - 5

INDICATIVE HABITAT ENHANCEMENT PLANTING AREAS ON JEDBURGH STATION

JED 21 JED 22 JED 23 JED 14 JED 24 JED 25 JED 15 JED 06 JED 08 JED 16 JED 07 JED 17 JED 26 JED 27 JED 28 JED 29 JED 30 JED 31 MAT 01

Service Layer Credits: Environment Southland, Maxar, Eagle Technology, LINZ

8.2.3 Davidson Road Wetland Restoration Site

Rabbit/hare management

Rabbits (*Oryctolagus cuniculus*) and/or hares (*Lepus europaeus*) are likely to be present at the Davidson Road Wetland Restoration Site. These species have the potential to hinder the establishment of indigenous plantings. Rabbits and hares browse on the foliage of plants and may damage the stems and root balls.

In order to determine the presence/abundance of rabbits and/or hares at the site, at least two spotlighting surveys should be undertaken prior to planting. The best time to spotlight for rabbits and hares is within the first 1–2 hours after dusk, particularly on calm, cloudy, moonless nights when dew is beginning to settle, as this is when the animals are most active and feeding. Ideal conditions also include minimal wind and no rain, which encourage more movement and improve visibility.

Seasonally, autumn and early winter (March–June) offer optimal conditions due to cooler temperatures and shorter days, which promote early evening activity. Spring (September–November) can also be effective due to increased numbers from recent breeding, though taller grass may reduce visibility.

Post-planting monitoring should also be undertaken, to determine if these species are having an impact. Regardless of rabbit/hare densities, it is recommended that biodegradable plant guards are placed around plant species that are vulnerable to rabbit and hare browse (e.g. the 450 FiberGuard available from www.advancelandscape.co.nz).

Rabbit/hare control

Rabbit/hare control should be undertaken if they are common in and around the planting area prior to planting. Spotlight shooting at night is the most effective option to control rabbits and hares, preferably using a .22 calibre rifle with a suppressor. All personnel undertaking shooting needs to hold a current firearms license and be skilled and experienced in undertaking spotlight shooting control operations. Any close neighbours should be notified prior to any control operation.

8.2.4 Tampering of control devices by deer and pigs

All traps and bait stations should be attached to wooden or aluminium/steel posts or waratahs (*c*.1.2 metres in length) that have been driven into the ground. Existing fences and trees can be used, if available. This will minimise the effects of interference by deer and pigs, and will also make it easier for contractors to locate the pest control devices. If using metal waratahs, coloured plastic caps should be used as per the Plate 2 below in order to improve their visibility.

Cat kill traps should be mounted to the top of wooden ramp up to 45 degrees. The ramp is then screwed to a tree approximately 75 centimetres off the ground (Plate 3). Fence posts (strainer posts) or tree stumps can also be used.

Plate 2 – Examples of steel waratahs with plastic caps. Photo sourced from www.waratahfencing.co.nz.

Plate 3 – SA2 feral cat trap mounted on wooden ramp. Photo sourced from steveallantraps.co.nz.

8.2.5 Timing of pest animal control

The indicative timing of pest animal control is outlined below, noting that there may be practical and operational constraints which restrict when these activities can occur:

- **Poisoning** – baits will be sowed in April/May by helicopter (where practicable) and/or by hand on the ground every three years for the duration of the operation of the Southland Wind Farm.
- **Targeted deer and pig hunting** – undertaken twice a year in spring and late summer. The frequency of control efforts will be reassessed at the end of each year.
- **Trapping for predators** – traps will be checked and serviced ten times per year for the first two years following the commissioning of the wind farm, with frequency to be reassessed based on trapping rates. Trapping will occur for the duration of the operation of the Southland Wind Farm.
- **Rabbit/hare control** – undertake night shooting immediately prior to planting. Continue to monitor effectiveness of the plant guards. If rabbit/hare browse is still evident, undertake a minimum of 2-3 rounds of shooting and continue to monitor until plants have established.
- **Bait stations for rodent control in the two skink release areas, the gecko release area, and Plateau Fauna Enhancement Area** - baits will be pulsed on a quarterly basis during March, June, September, and December (to be undertaken prior to, during and for a minimum period of five years after skinks relocation operations cease and six months after gecko relocation operations cease).
- **Note that the requirement for filling bait stations will depend on bait take and rodent tracking tunnel indices.**

8.2.6 Wasp control

Control of invasive social wasp species such as German wasp (*Vespula germanica*) and common wasp (*V. vulgaris*) can have deleterious effects on indigenous birds, reptiles, and invertebrates. Wasp control is recommended should high wasp numbers be detected during post-construction fauna surveys. Vespex bait stations are the most effective tool to control wasp populations. These baits are typically deployed in March-April, when wasps are foraging for protein. Bait stations can be attached to fence posts and trees.

8.3 Species targeted and reduction targets

Industry standard pest species target reductions will be applied to the control of possums, stoats, rats, and mice (Table 10 and EC57). The wind farm site will be subject to ongoing reinvasion of deer and pigs if there is no control in surrounding areas of private and conservation land. For deer and pigs, a performance-based contract may be suitable when engaging professional hunters, although targets for wild deer and pigs (if deemed necessary) need to be agreed with professional hunters. A protocol will then need to be developed to independently evaluate whether or not a defined outcome has been achieved.

Table 10 – Summary of management targets, thresholds for initiating additional control and monitoring timings for each target pest species within the pest management area.

Pest Species	Management Target	Threshold
Possums	< 5 % Residual Trap Catch	≥ 10 % Residual Trap Catch
Rats	< 5 % Tracking Tunnel Index	≥ 10 % Tracking Tunnel Index
Mice (in lizard release areas only)	< 10 % Tracking Tunnel Index	≥ 15 % Tracking Tunnel Index

Leg-hold traps (checked within 24 hours of being set) will be used to collect data on possum abundance. This is considered a more accurate method than using chew cards or wax tags in that it prevents individual possums from visiting multiple monitoring stations (i.e. avoids double-counting).

Management targets and thresholds have not been set for mustelids due to their transient nature and generally sparse densities. Instead, all mustelid species trapped within wind farm road trap network will be recorded so that captures per 100 tap-nights (C100TN) can be calculated. Over time, it is anticipated that mustelid captures will trend downwards. The same approach will be used for hedgehogs and feral cats.

8.4 Record keeping and reporting

8.4.1 Overview

Records of all pest animal control operations should be maintained in line with industry best practice. A summary of the pest animal control work needed to maintain the planting areas during each year of the programme should be presented to Environment Southland on an annual basis. This will be included in the annual monitoring report described in Section 9 below and include, but is not limited to:

- Timing of control rounds;
- Weather conditions during control rounds;
- A record of shooting nights undertaken and all pest animals shot; and
- A record of correspondence (if any) regarding the pest animal control operation.

8.4.2 TrapNZ

TrapNZ[1] is an application that provides project coordinators, contractors, volunteers, and landowners the ability to establish trapping and bait station networks, record trapping results, and produce reports and maps. It is proposed to create a TrapNZ project for ground-based trapping at the Jedburgh Station Pest Control Area along the wind farm roads and inside the Plateau Fauna Enhancement Area. All traps and bait stations will be assigned a unique identifying code (e.g. JED1-DOC200, JED2-DOC250). The Project Ecologist will work with the nominated trapping contractor to develop and maintain the project. One of the advantages of using TrapNZ is that it allows stakeholders such as Environment Southland and TAMI to access the Southland wind farm trapping project and view the most recent results.

8.5 Pest plant management

8.5.1 Overview

Pest plants[2] recorded on site have been identified as posing a threat to the health of the proposed enhancement and restoration plantings. Pest plant control will be undertaken in three general zones:

1. Indigenous-dominated habitats located within 50 metres of all roads and structures for a minimum of three years once the wind farm has become operational.
2. Within the Copper Tussock Enhancement and Skink Protection Area (within Matariki Forest) (minimum of ten years once the wind farm has become operational).
3. Offsite wetland restoration and enhancement areas at the Davidson Road Wetland Restoration Site (minimum of five years from the completion of the first planting season).

[1] https://trap.nz/index.html
[2] Southland Regional Pest Management Plan 2019-2029 (SRPMP).

Control of gorse within the 245-hectare Jedburgh Station Ecological Enhancement Area is not generally required, given that gorse will eventually be outcompeted by indigenous canopy species, but control may be necessary locally for access.

Key pest and weed plant species recorded to date are detailed in Table 11.

Table 11 – Ecological pest and weed plant species to be controlled in the four abovementioned zones (species in Southland Regional Pest Management Plan 2019-2029)

Species name	Common name	Control (until indigenous plantings dominate)
Cytisus scoparius	Broom	Hand-pull seedlings and small plants. Cut and stump paint with glyphosate or metsulfuron. Spray with herbicide penetrant between spring-autumn.
Ulex europaeus	Gorse	
Pinus spp.	Wilding pines	Hand-pull seedlings and small plants. Ring-barking. Application of herbicide via drill and inject. Dispose of pine cones offsite (if encountered)
Pseudotsuga menziesii	Douglas fir	Hand-pull seedlings and small plants. Ring-barking. Application of herbicide via drill and inject. Dispose of pine cone offsite (if encountered)

8.6 Pest control methods

Pest plant species shall be controlled in summer to autumn (January - March inclusive) to a low-level prior to planting. Spot spraying should be carried out in planting spots to remove exotic grasses in planting areas and riparian margins to limit the use of chemicals around waterways. Manual release of plantings or weed trimming is recommended where appropriate, particularly in wetland planting areas. Repeated treatment rounds may be required to achieve full control of some species.

Control will be via a combination of hand pulling, cut and paste/spray, foliar spray, and drill and fill methods, depending on species, location, and age class. Pest plant tree species that are over five metres in height (e.g., pines) should be controlled using the drill and fill method and left to break down *in situ*. All chemical control will be carried out by qualified contractors trained in chemical application for weed control and adhere to NZS 8409:2004 "Management of Agrichemicals"[1] and rules 9-10 in the proposed Southland Water and Land Plan (and subsequent provisions).

8.7 Disposal of material

It is essential that plant seeds, tubers, and fragments are not dispersed from the current infestation areas as some species can easily be spread by seed (e.g. gorse and broom) or fragments (e.g. crack willow). Where controlled vegetation is to be left on site. Flowering gorse and broom that has been felled can be left to break down in shaded areas (under the forest canopy). If practicable, any cones from wilding pines should be removed from the site and either burned or sent to landfill to avoid new infestations establishing.

[1] New Zealand Standard (2004). Management of Agrichemicals, NZS 8409:2004.

8.8 Implementation schedule

An indicative works programme for the first ten years for pest plant control, pest animal control, and planting work is provided in the tables below. Timing is based on the financial year of 1 July to 30 June. This programme is provided for the first ten years from the commencement of construction. Note that it is indicative only and may need to be adjusted, depending on weather, resource or contract availability and when construction of the wind farm commences and will be subject to any practical and operational constraints.

Notes:

- Aerial pest animal control within the Jedburgh Station Pest Control Area will be undertaken every three years, starting at Year 1.
- Targeted deer control will be undertaken twice a year in Years 1 and 2, then every three years after that.
- Rodent control at the lizard relocation sites should be undertaken every three months for the first five years of the operation of the wind farm, with the frequency/duration to be determined based on the results of the reduction target monitoring (EC54(h)).
- Monitoring of planted sites will be undertaken annually for the first three years, and then every three years until canopy closure (up to ten years). Reports will be submitted after each monitoring round.

Year 1 – Indicative Implementation Schedule: [Dates to be confirmed] (construction phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Soft release pens for geckos and skinks	Construct soft release pens at least two months before vegetation clearance at Jedburgh and Matariki.						Timing TBC						
Stock-exclusion	Construct stock-proof fence at Davidson Road Wetland Restoration Site.						Timing TBC						
Pest animal control	Undertake baseline pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).[1]			✓									
	Undertake first aerial pest animal control operation.		✓	✓									
	Establish 25 x 25m grid of bait stations within lizard soft release pens at Jedburgh Station Ecological Enhancement Area, Copper Tussock Enhancement and Skink Protection Area, and the Jedburgh Plateau Skink Release Area.										✓		
	Establish grid of bait stations and trap line in Plateau Fauna Enhancement Area.										✓		

[1] First round of baseline monitoring will occur prior to the first aerial pest animal control operation.

Year 2 – Indicative Implementation Schedule: [Date to be confirmed] (construction phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pest animal control and monitoring	Service bait stations at Jedburgh Station Ecological Enhancement Area, Copper Tussock Enhancement and Skink Protection Area, and Jedburgh Plateau Skink Release Area.			✓			✓			✓			✓
	Service bait stations and traps in Plateau Fauna Enhancement Area			✓			✓			✓			✓
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Planting	Undertake planting at Davidson Road Wetland Restoration Site.									✓	✓		
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									

Year 3 – Indicative Implementation Schedule: [Date to be confirmed] (construction phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pest animal control and reporting	Service bait stations at Jedburgh Station Ecological Enhancement Area*, Copper Tussock Enhancement and Skink Protection Area, and Jedburgh Plateau Skink Release Area.			✓			✓			✓			✓
	Service bait stations and traps in Plateau Fauna Enhancement Area			✓			✓			✓			✓
	Hare/rabbit control at Davidson Road Wetland Restoration Site (if required).			✓			✓			✓			✓
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Pest plant control, planting maintenance, and monitoring	Post-planting maintenance at Davidson Road Wetland Restoration Site.			✓			✓				✓		
	Monitoring to measure success of plantings (e.g. photopoints, animal browse) at Davidson Road Wetland Restoration Site.										✓		
Infill/replacement planting (if required)	Davidson Road Wetland Restoration Site.									✓	✓		
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									

*Note: rodent control will not be required in the Gecko Soft Release Pen (in the Jedburgh Station Ecological Enhancement Area) if relocated geckos have already been at the site for six months (as at Year 3).

Year 4 – Indicative Implementation Schedule: [Date to be confirmed] (operational phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Deer-proof fences	Commence construction of deer fences around Jedburgh Station Ecological Enhancement Area and Copper Tussock Enhancement and Skink Protection Area.					✓	✓	✓	✓	✓			
	Undertake perimeter checks of both fences.										✓		
Pest animal control and monitoring	Undertake second aerial pest control operation at the Jedburgh Station Pest Control Area.		✓	✓									
	Service bait stations within soft release pens at the Copper Tussock Enhancement and Skink Protection Area and Jedburgh Station Skink Release Site.			✓			✓			✓			✓
	Service traps along roads and in Plateau Fauna Enhancement Area.		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
	Service bait stations in Plateau Fauna Enhancement Area.			✓			✓			✓			✓
	Commence eradication of deer and pigs from Jedburgh Station Ecological Enhancement Area and Copper Tussock Enhancement and Skink Protection Area once fences are constructed.						Timing TBC						
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Pest plant control, planting maintenance, and monitoring	Undertake pest plant control within 50 metres of all roads and structures. Undertake control of pest plants in Copper Tussock Enhancement and Skink Protection Area and Davidson Road Wetland Restoration Site. Undertake monitoring and control of wilding conifers in wetlands and indigenous-dominated terrestrial habitats at the Wind Farm Site.			✓					✓				
	Post-planting maintenance at Davidson Road Wetland Restoration Site and Copper Tussock Enhancement and Skink Protection Site			✓			✓				✓		
	Undertake enhancement planting at Jedburgh Station Ecological Enhancement Area and Copper Tussock Enhancement and Skink Protection Area (once eradication of ungulates is confirmed).										✓	✓	✓
	Monitoring to measure success of plantings (e.g. photopoints, animal browse).										✓		
Infill/replacement planting (if required)	Davidson Road Wetland Restoration Site.											✓	✓
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									

Year 5 – Indicative Implementation Schedule: [Date to be confirmed] (operational phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pest animal control and reporting	Service bait stations at the Copper Tussock Enhancement and Skink Protection Site. Hand broadcasting bait at the Jedburgh Plateau Skink Release Area.			✓			✓			✓			✓
	Service traps along roads and in Plateau Fauna Enhancement Area.		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
	Service bait stations in Plateau Fauna Enhancement Area.			✓			✓			✓			✓
	Undertake targeted deer control (twice a year in late winter/early spring and late summer/early autumn).		✓							✓			
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Pest plant control, planting maintenance, and monitoring	Undertake pest plant control within 50 metres of all roads and structures. Undertake control of pest plants in Copper Tussock Enhancement and Skink Protection Area. Undertake monitoring and control of wilding conifers in wetlands and indigenous-dominated terrestrial habitats at the Wind Farm Site.			✓					✓				
	Post-planting maintenance at Davidson Road Wetland Restoration Site and Copper Tussock Enhancement and Skink Protection Area.			✓			✓				✓		
	Monitoring to measure success of plantings (e.g. photopoints, animal browse).										✓		
Deer-proof fences	Undertake perimeter checks of both fences.	✓			✓			✓			✓		
Infill/replacement planting (if required)	Davidson Road Wetland Restoration Site and Copper Tussock Enhancement and Skink Protection Area.											✓	✓
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									
Biodiversity outcome monitoring	Undertake first round of biodiversity outcome monitoring (includes remeasuring 10x10m plots throughout the Project Site).								✓				

Year 6 – Indicative Implementation Schedule -: [Date to be confirmed] (operational phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pest animal control and monitoring	Service bait stations at the Copper Tussock Enhancement and Skink Protection Site. Hand broadcasting bait at the Jedburgh Plateau Skink Release Area.			✓			✓			✓			✓
	Service traps along roads and in Plateau Fauna Enhancement Area.	Frequency to be determined depending on catch rate											
	Service bait stations in Plateau Fauna Enhancement Area.			✓			✓			✓			✓
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Pest plant control, planting maintenance, and monitoring	Undertake pest plant control within 50 metres of all roads and structures. Undertake control of pest plants in Copper Tussock Enhancement and Skink Protection Area. Undertake monitoring and control of wilding conifers in wetlands and indigenous-dominated terrestrial habitats at the Wind Farm Site.			✓					✓				
	Post-planting maintenance at Davidson Road Wetland Restoration Site and Copper Tussock Enhancement and Skink Protection Site.			✓						✓			
	Monitoring to measure success of plantings (e.g. photopoints, animal browse).									✓			
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									
Deer-proof fences	Undertake perimeter checks of both fences.	✓			✓			✓			✓		

Year 7 – Indicative Implementation Schedule: [Date to be confirmed] (operational phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pest animal control and monitoring	Undertake third aerial pest control operation across the Jedburgh Station Pest Control Area.		✓	✓									
	Service bait stations at Copper Tussock Enhancement and Skink Protection Area Jedburgh Plateau Skink Release Area.			✓			✓			✓			✓
	Service traps along roads and in Plateau Fauna Enhancement Area.	Frequency to be determined depending on catch rate											
	Service bait stations in Plateau Fauna Enhancement Area.			✓			✓			✓			✓
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Pest plant control, planting maintenance, and monitoring	Undertake control of pest plants within the Copper Tussock Enhancement and Skink Protection Area. Undertake monitoring and control of wilding conifers in wetlands and indigenous-dominated terrestrial habitats at the Wind Farm Site.			✓					✓				
	Post-planting maintenance at Davidson Road Wetland Restoration Site and Copper Tussock Enhancement and Skink Protection Area.			✓						✓			
	Monitoring to measure success of plantings (e.g. photopoints, animal browse).									✓			
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									
Deer-proof fences	Undertake perimeter checks of both fences.	✓			✓			✓			✓		

Year 8 – Indicative Implementation Schedule: [Date to be confirmed] (operational phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pest animal control and monitoring	Service bait stations at the Copper Tussock Enhancement and Skink Protection Area and Jedburgh Plateau Skink Release Area.			✓			✓			✓			✓
	Service traps along roads and in Plateau Fauna Enhancement Area.	Frequency to be determined depending on catch rate											
	Service bait stations in Plateau Fauna Enhancement Area.			✓			✓			✓			✓
	Undertake targeted deer control (twice a year in late winter/early spring and late summer/early autumn).		✓							✓			
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Pest plant control, planting maintenance, and monitoring	Undertake control of pest plants encountered in the Copper Tussock Enhancement and Skink Protection Area. Undertake monitoring and control of wilding conifers in wetlands and indigenous-dominated terrestrial habitats at the Wind Farm Site.			✓					✓				
	Check enhancement planting survival at Jedburgh Station Ecological Enhancement Area.									✓			
	Monitoring to measure success of plantings (e.g. photopoints, animal browse).									✓			
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									
Biodiversity outcome monitoring	Undertake second round of biodiversity outcome monitoring (includes remeasuring 10x10m plots throughout the Project Site).								✓				
Deer-proof fences	Undertake perimeter checks of both fences.	✓			✓			✓			✓		

Year 9 – Indicative Implementation Schedule: [Date to be confirmed] (operational phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pest animal control and monitoring	Service bait stations at Copper Tussock Enhancement and Skink Protection Area and Jedburgh Station Skink Release Site.			✓			✓			✓			✓
	Service traps along roads and in Plateau Fauna Enhancement Area.	Frequency to be determined depending on catch rate											
	Service bait stations in Plateau Fauna Enhancement Area.			✓			✓			✓			✓
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Pest plant control, planting maintenance, and monitorin	Undertake control of pest plants encountered in the Copper Tussock Enhancement and Skink Protection Area. Undertake monitoring and control of wilding conifers in wetlands and indigenous-dominated terrestrial habitats at the Wind Farm Site.			✓					✓				
	Check enhancement planting survival at Jedburgh Station Ecological Enhancement Area.									✓			
	Monitoring to measure success of plantings (e.g. photopoints, animal browse).									✓			
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									
Deer-proof fences	Undertake perimeter checks of both fences.	✓			✓			✓			✓		

Year 10 – Indicative Implementation Schedule: [Date to be confirmed] (operational phase)

Task		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pest animal control and monitoring	Undertake fourth aerial pest control operation within Jedburgh Station Pest Control Area.		✓	✓									
	Service traps along roads and in Plateau Fauna Enhancement Area.	Frequency to be determined depending on catch rate											
	Service bait stations in Plateau Fauna Enhancement Area.			✓				✓			✓		✓
	Undertake annual post-control pest animal monitoring (FPI for deer and pigs; TTI for rodents; RTC for possums and mustelids).			✓									
Pest plant control, planting maintenance, and monitoring	Undertake control of pest plants encountered in the Copper Tussock Enhancement and Skink Protection Area. Undertake monitoring and control of wilding conifers in wetlands and indigenous-dominated terrestrial habitats at the Wind Farm Site.			✓					✓				
	Check enhancement planting survival at Jedburgh Station Ecological Enhancement Area.									✓			
	Monitoring to measure success of plantings (e.g. photopoints, animal browse).									✓			
Reporting	Submit annual Southland Wind Farm Enhancement Monitoring Report that summarises enhancement activities and results to date.			✓									
Deer-proof fences	Undertake perimeter checks of both fences.	✓			✓			✓			✓		

9.0 Monitoring and Reporting

9.1 Jedburgh Station Ecological Enhancement Area

Annual (1 July to 30 June) inspection surveys will be undertaken during normal conditions to monitor the following:

- Condition of the deer fence, including evidence of any breaches (for the life of the Project, noting that deer fence checks will be carried out on a quarterly basis);
- Presence of wild deer and/or pigs (every year until the eradication of all deer and pigs has been confirmed);
- Estimated survival of enhancement plants (for five (5) years); and
- Evidence of browse by hares or rabbits on enhancement plants (for three (3) years).

Findings will inform management requirements for the subsequent year.

A Southland Wind Farm Enhancement Monitoring Report will be submitted to the Consent Authority(s) every year (by 30 September) from the initial planting for ten years post the construction of the ungulate exclusion fence and subsequent eradication of deer and pigs from within the exclosure. A target survival rate of 90% after ten years is required for the enhancement planting. The monitoring report shall include:

- Baseline photopoints at 20 locations throughout the enhancement area;
- Representative photos showing progress of enhancement plants;
- Representative photos showing recovering of ground tier and understorey vegetation;
- Information/data on plant survival and pest animal management requirements; and
- Information on incidents and adaptive management responses, e.g. deer/pig incursions.

9.2 Other ecological enhancement sites

Annual inspection surveys will be undertaken in the Copper Tussock Enhancement and Skink Protection Area and Davidson Road Wetland Restoration Site to monitor the following:

- Identify pest plants;
- Identify pest animal damage;
- Estimate enhancement planting survival and replacement; and
- Estimate canopy coverage of copper tussock and infill planting requirements.

The following additional parameters will be measured at the Davidson Road Wetland Restoration Site:

- Wetland hydrology/hydric soils within wetland induced areas; and
- Estimate of planting survival and densities of facultative wetland species in wetlands and all terrestrial plants within habitat restoration sites.

Findings will inform any further planting activities to replace lost plants, and the types of pest plant and animal management requirements for the subsequent year.

Results of the monitoring will be included in the annual Southland Wind Farm Enhancement Monitoring Report. The reporting timeframe will commence from the initial planting establishment until all plants are 10 years in age and a target of 90% indigenous canopy cover has been met. The report will include:

- Representative photos showing progress of revegetation/enhancement sites, including photos of sites where plantings are 10 years in age and 90% canopy cover has been achieved (where applicable);
- Information/data on plant survival, infill planting, and progress towards 90% canopy closure targets and weed and animal pest management requirements;
- Representative photos and vegetation data showing evidence of wetland hydrology/hydric soils within induced areas (at the Davidson Road Wetland Restoration Site); and
- Information on incidents and adaptive management responses.

9.3 Mammalian pest monitoring and reporting

Baseline pest monitoring is required prior to mammalian pest control to customise and refine the approach based on actual data on pest animal densities with which to benchmark results and outcomes (as per Table 5 in Condition EC52 and Table 6 in Condition EC57). Reduction target monitoring using standard methodologies will be undertaken to verify that reduction targets have been achieved for target species. This will include:

- A Faecal Pellet Index (FPI) protocol for deer and pigs.
- Tracking Tunnel Indices (TTI) for rats and mice.
- Chew Card Index (CCI) for possums.
- Residual Trap Catch (RTC) for possums and mustelids.

An indicative plan for implementing these methodologies is outlined below:

1. <u>Faecal Pellet Index (FPI) – Deer and Pigs</u>

   Purpose: Estimate relative abundance of large herbivores (deer, pigs) based on pellet groupings.

   Method:

   - Establish transects (100 m length) spaced evenly across monitoring areas.
   - Along each transect, record all pellet groups (defined as ≥10 pellets within 1 m²) within 2 m width (1 m either side).
   - Clear all existing pellets before initial survey (calibration pass).
   - After 2–4 weeks, repeat survey to count new pellet groups.

   Frequency:

   Baseline monitoring prior to first round of aerial pest control, then monitor annually.

2. <u>Tracking Tunnel Index (TTI) – Rats and Mice</u>

   Purpose: Detect and index the abundance of rodents with the three lizard release sites and the Plateau Fauna Enhancement Area.

   Method:

   - Deploy tracking tunnels (e.g. Black Trakka cards) in a 5 × 5 grid with 50-metre spacing, with number of tunnels to be commensurate with each monitoring site.
   - Bait with peanut butter.
   - Set tunnels for one fine night.
   - Collect and analyse prints using identification guides.

Frequency:

Baseline monitoring prior to first round of aerial pest control, then annually.

3. Residual Trap Catch (RTC) – Possums and Mustelids

Purpose: Measure relative abundance of possums and mustelids, primarily for assessing control effectiveness.

Method:

- For possums: Set Victor leg-hold traps (No. 1) at 20 trap sites within the southern rātā-kāmahi forest, spaced 150–200 metres apart, for 3 fine nights. Use apple + cinnamon lure.
- For mustelids: Use DOC200 or DOC250 traps, baited with rabbit or hen eggs, placed along lines or at key habitat edges. Record captures and calculate catch per unit effort (note that RTC for mustelids will be recorded during monthly checks of traps on the Jedburgh Plateau).

Frequency:

Baseline monitoring prior to first round of aerial pest control, then monitor annually.

4. Data Management and Reporting

- All monitoring data will be recorded using standard field sheets or digital tools (e.g. Survey123, Excel).
- Results will be summarised as indices (e.g. % tracking, pellet counts/transect, % chew cards bitten, RTC%).

Following the first round of aerial pest control and targeted deer and pig control and the eradication of ungulates from within the two ungulate exclusion fences, if monitoring identifies that the thresholds for control targets have not been achieved, this will trigger a requirement for further control. This use of thresholds facilitates adaptive management, and ensures that pest populations are continuously and effectively suppressed.

An annual report (which will form part of the overall Southland Wind Farm Enhancement Monitoring Report) will be prepared by a Suitably Qualified and Experienced Person and include:

- A summary of all mammalian pest management activities and corresponding results (i.e. contract hunting results) undertaken within the Pest Management Areas in the preceding 12 months, detailing dates, and methods of each control activity;
- A summary of pest monitoring results and adaptive management responses where thresholds for control targets have not been achieved (including data collected as per above);
- Any challenges/issues encountered in undertaking control or monitoring, and how these difficulties were overcome or if they remain ongoing; and
- Any new tools, technologies and methods deemed likely to improve the efficiency and effectiveness of pest control should be incorporated into the following years' pest management practice if practicable. The tools recommended for use in this plan are based on those currently available at the time of writing, which should be supplemented or replaced with improved tools with proven efficacy as those come to market, where there is benefit in doing so.

9.4 Pest plant management monitoring and reporting

In order to benchmark results and outcomes, baseline pest plant monitoring is required prior to pest plant management within the Copper Tussock Enhancement and Skink Protection Area and Davidson Road Wetland Restoration Site.

This monitoring will enable the approach to be customised and refined based on actual pest plant composition and abundances within the area.

No mature (flowering or fruiting) pest plants should be remaining in the control areas by the end of the first year of control. All newly established pest plants, or regrowth of unsuccessfully controlled pest plant species, will be controlled during regular follow-up control visits.

Following the first round of pest plant control, an annual report (which will form part of the overall Southland Wind Farm Enhancement Monitoring Report) will be prepared by the weed contractor/manager appointed by Contact, and provided to Environment Southland. Each annual report (submitted by end of September each year) needs to include:

- A summary of all pest plant management activities and corresponding results undertaken within the pest plant management area in the preceding 12 months, detailing dates, and methods of each control activity;
- A summary of pest plant monitoring results and responses where thresholds for control targets have not been achieved;
- Any challenges/issues encountered in undertaking pest plant control or monitoring, and how these difficulties were overcome or if they remain ongoing; and
- Any new tools, technologies and methods deemed likely to improve the efficiency and effectiveness of pest control should be incorporated into the following years' pest management practice if suitable. The tools recommended for use in this plan are based on those currently available at the writing of this plan, but they should be supplemented or replaced with improved tools with proven efficacy as those come to market, where there is benefit in doing so.

10.0 Biodiversity Outcome Monitoring

10.1 Overview

A biodiversity outcome monitoring programme will be implemented to inform the ongoing approach to pest control and pest management practice and verify whether the expected gains in ecological values from the habitat restoration and enhancement measures have been realised (as per Condition EC50(j). Specifically, the programme will assess the degree to which performance targets set out in Table 5 of consent condition EC52 are being achieved and the ability to adjust biodiversity management to ensure that gains are achieved and maintained for the long term. This will include remeasuring 10m x 10m vegetation plots at Jedburgh Station, Matariki Forest, and the wetland complex at the Davidson Road Wetland Restoration Site (refer to Figure 1 of the Ecology Report). Five-minute bird counts and acoustic bird surveys will also be undertaken, following the same methodologies as outlined in the Avifauna Management Plan.

The monitoring of terrestrial invertebrates (including Helms' stag beetles) following vegetation clearance and the relocation of individuals will be included as part of the biodiversity outcome monitoring.

10.2 Monitoring study areas

The monitoring programme will be undertaken across representative impact and habitat restoration areas at the following sites:

a. The wind farm footprint (area of physical works).

b. The sites that will be subject to habitat restoration and enhancement measures, which include:

- Onsite Copper Tussock Enhancement and Skink Protection Area at Matariki Forest.
- Onsite kāmahi-rātā/plateau cloud forest restoration and habitat enhancement site (wetland and terrestrial habitats) (Jedburgh Station Ecological Enhancement Area).
- Shrubland and wetland habitats on the Jedburgh Plateau.
- Offsite Davidson Road Wetland Restoration Site.

c. Sites where terrestrial invertebrates (including Helms' stag beetles) have been relocated and invertebrate habitat has been enhanced.

10.3 Terrestrial invertebrate monitoring (including Helms' stag beetles)

10.3.1 Overview

The terrestrial invertebrate monitoring requirements set out here are the same as (and not additional to) those set out in the Terrestrial Invertebrate Management Plan (including the Stag Beetle Management Plan).

Monitoring the success of mammalian predator control and habitat restoration combined with monitoring terrestrial invertebrates, lizards (see the LMP) and avifauna (see the AMP) will provide an integrated picture of the impact of the development and the results of effects management.

10.3.2 Enhanced habitat invertebrate surveys, including Helm's stag beetles

Invertebrate community monitoring, including light trapping, live-capture pitfall trapping[1], and hand-search transects by day and night, should be undertaken over approximately two weeks in summer once every three years after construction, for ten years (three surveys). Representative areas within enhanced terrestrial invertebrate habitat (refer to Sections 3, 4, 5 and 7) should be surveyed. This includes the eight restored habitat patches on Jedburgh Station (totalling 1.6ha in area), the Jedburgh Station Ecological Enhancement Area and the Copper Tussock Enhancement and Skink Release Area.

Terrestrial invertebrate monitoring will aim to detect trends in the following:

- Abundance of terrestrial invertebrates.
- Species diversity of terrestrial invertebrates.
- Abundance of Helms' stag beetle.

10.3.3 Monitoring relocated Helms' stag beetles

If more than 20 Helms' stag beetles are salvaged and translocated, then monitoring relocated Helms' stag beetle is necessary. The monitoring programme should include:

[1] Live-capture pitfall trapping will use funnels in traps to prevent capture of lizards and Helms' stag beetles so that no Wildlife Approval is required for monitoring. Funnels should have an opening of approximately 1.5 mm.

- Hand-searching transects at night, with a total of four hours' effort in the Jedburgh Station Ecological Enhancement Area and two hours' effort at the Copper Tussock Enhancement and Skink Protection Area at Matariki Forest (the Matariki Release Site; as per the HREP) split between two fine nights.
- Searching the stacked relocated vegetation piles for signs they are being used by Helms' stag beetles.
- Mark-recapture of salvaged beetles[1], using a paint pen to number individuals as has previously been done for Canterbury knobbled weevils (Fountain et al. 2013).

Monitoring should take place once every **three months** (evenly spaced as far as practicable in light of weather constraints) for the **twelve months** following salvage and release (**four** monitoring periods). Seasonal variation in activity appears to be slight in Helms' stag beetles but should be accounted for in data analysis and interpretation.

If a student is incorporating this monitoring into their research, using funds provided as part of compensation, then they may refine these methods in consultation with the Project Ecologist. However, any extra expenses caused by refining the methods should be taken out of the student's research funding.

The Helms' stag beetle monitoring will inform the research into salvage and relocation techniques, which will benefit Helms' stag beetle in relation to future projects (funded through compensation: Section 6.2.4). Monitoring results should be shared freely with the student conducting research into salvage and translocation methods. If no student is available to take the funding, results should be accessible by any researcher seeking to study effects management for Helms' stag beetles.

10.4 Timing of monitoring

10.4.1 Vegetation plots and faecal pellet counts

The first round of biodiversity outcome monitoring will commence once every **three years** following the commencement of the implementation of habitat restoration and enhancement measures for a period of **12 years** (as per EC58). Monitoring can only take place once the restoration and enhancement sites have been (i) fenced and herbivores controlled; (ii) pest plants have been controlled: and (iii) planting has taken place.

10.4.2 Terrestrial invertebrates, including Helms' stag beetles

Invertebrate community monitoring described in Section 10.3.2 should take place in the summer. Monitoring rounds should occur once every three years after construction, for ten years (three surveys).

10.4.3 Reporting

Vegetation

A biodiversity outcome monitoring report will be submitted to Environment Southland/SDC following the completion of each round of monitoring. The purpose of this review shall be to ensure that these actions have been achieved or sufficient progress has been made in order to achieve the performance targets set out in Condition EC52. Following the initial 12 years, the review shall then occur at years 15, 20 and 25.

[1] Mark-recapture of captured beetles requires Wildlife Approval.

Terrestrial invertebrates

Reporting requirements for general terrestrial invertebrates and Helms' stag beetles are outlined in the Terrestrial Invertebrate Management Plan.

10.5 Contingency response

Should the results against the performance targets set out in Table 5 of consent condition EC52 indicate that Net Positive outcomes are unlikely to be achieved in the stated time frames, additional offsetting and/or compensation measures will be provided in an updated HREP as per Condition EC58A.

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