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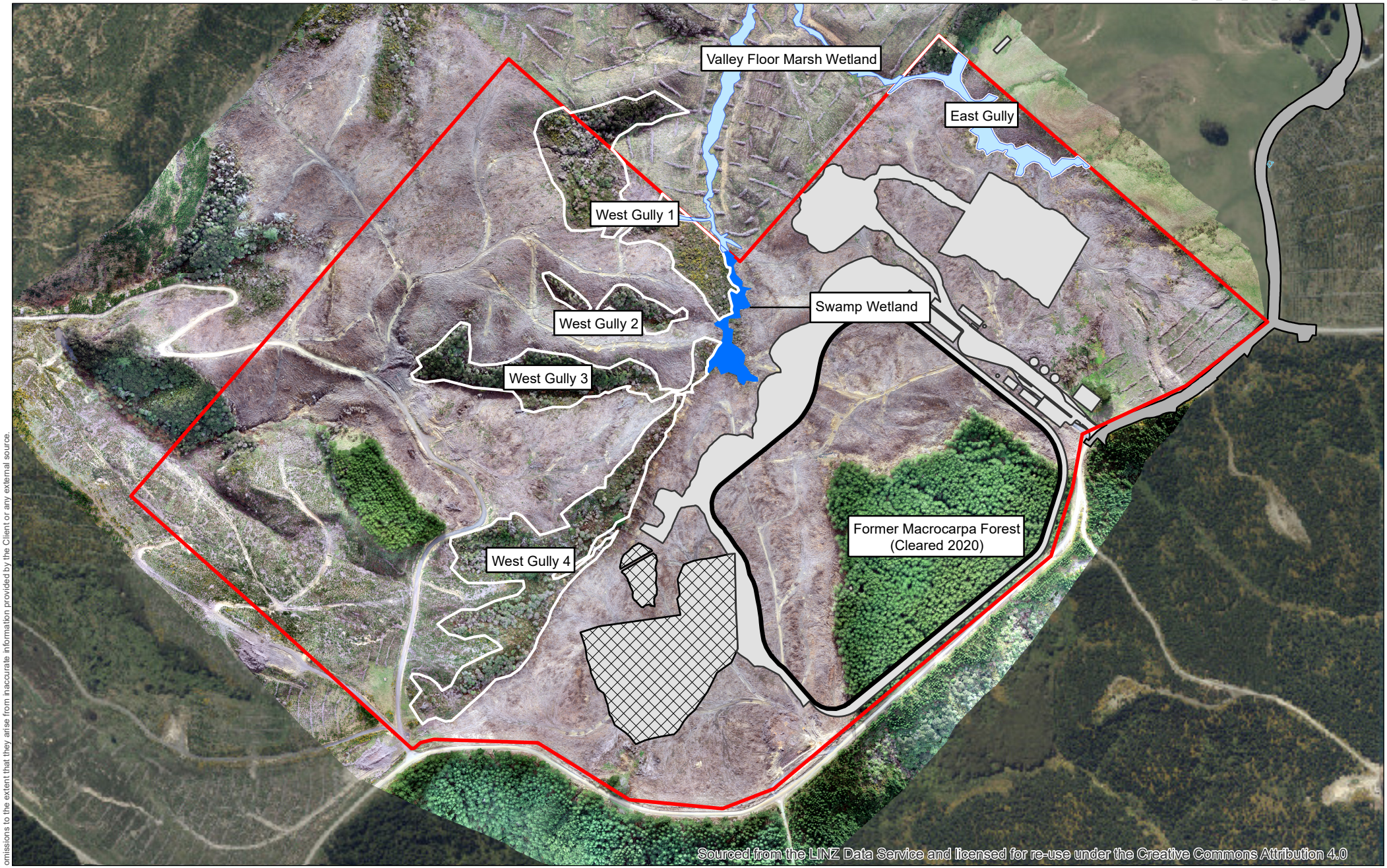

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Data Sources:
Designation sourced from DCC 2GP online
Landfill design and road footprint sourced from GHD

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Smooth Hill Designation (2GP)
- Operations Area
- Access Road
- Landfill Footprint
- Stockpile

SMOOTH HILL LANDFILL

Location Names Used in this Report

Date: 20 May 2021 | Revision: 0

Plan prepared for DCC by Boffa Miskell Limited

Project Manager: rachael.eaton@boffamiskell.co.nz | Drawn: BMc | Checked: JMo

Figure A1.1

Appendix 2: Site and Vegetation Photographs

Figure A2.1. Smooth Hill Reserve central area. Wetland offset area at the base of West Gully 4 at left, and in the base of West Gully 3 top right, swamp wetland at centre.

Figure A2.2. (Pūrei) / (Yorkshire fog – cocksfoot) – rautahi sedgeland bordering harakeke – gorse / (pūrei – rautahi) flaxland in the swamp wetland (Zone A.1).

Figure A2.3. (Large-leaved pohuehue) / (Himalayan honeysuckle) – gorse scrub on hill slopes above the swamp wetland (zones A.1, A.2 foreground, F.1, F.2 at rear).

Figure A2.4. Harakeke – gorse / (pūrei – rautahi) flaxland in the swamp wetland (Zone A.1).

Figure A2.5. Recent (2019) forestry works created a break between the wetland habitat at the base of West Gully 4 (not visible, left of frame) and the connected wetland habitat that includes the swamp wetland (upper areas visible at far right) and similar habitat at the base of West Gully 3 (centre of photo). Kānuka forest in West Gully 3 centre rear, and a large planting area (Zone E) visible at right.

Figure A2.6. (Pūrei) / (Yorkshire fog – cocksfoot) – rautahi sedgeland in the wetland offset area below West Gully 4 (Zone O).

Figure A2.7. Willows and large radiata pine in the wetland offset area below West Gully 4 (Zone O).

Figure A2.8. Kānuka forest at the west end of West Gully 3 (Zone E in foreground, Zone C.1 at rear).

Figure A2.9. Diverse understory species in the kānuka forest in West Gully 3 (Zone C.1).

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Auckland, Hamilton, Tauranga, Wellington, Christchurch, Dunedin and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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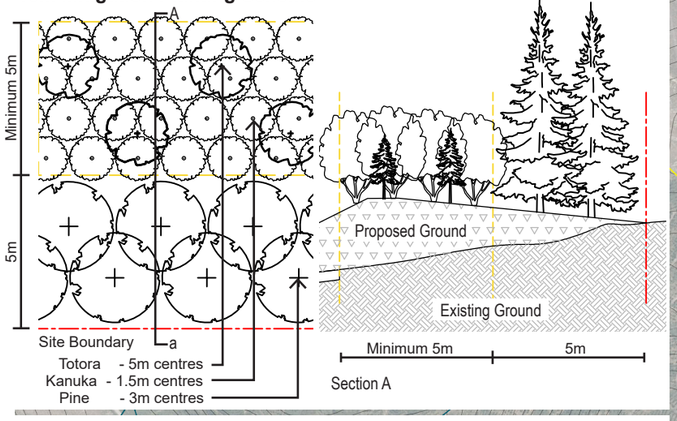
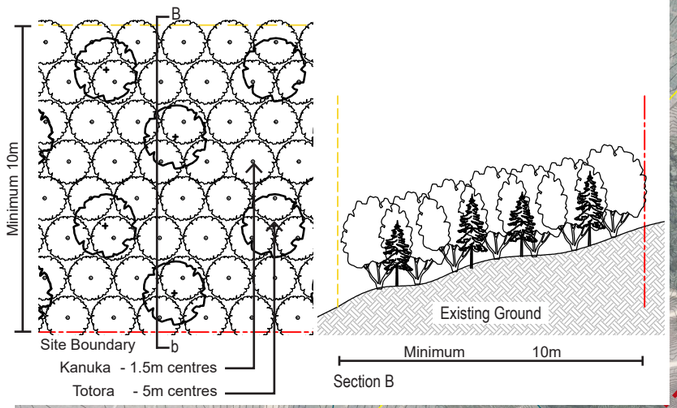
Appendix 3: Landscape Mitigation Plan

10m Mitigation Planting Scheme





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LEGEND

- Cadastre boundary
- Designation Boundary (Incorporating stopped road)
- Landfill - operational extent
- Landfill - final cap extent Stages 1-4 (~40 year life)*

* Refer to GHD Drawings C210-C214 for staging plans

- Water Courses
- Existing wetlands (to be retained)
- Existing native vegetation (to be retained)
- Proposed native revegetation/enhancements
- Screen planting - native (planted at Stage 1)
- Screen planting - pine (planted at Stage 1)
- Existing pine retained for screening
- ①–② Rural- Residential Neighbours

SMOOTH HILL LANDSCAPE AND VISUAL ASSESSMENT

Landscape Mitigation Plan

Date: August 2020 (Updated May 2021)

Plan prepared for Dunedin City Council by Boffa Miskell Limited

Project Manager: rhys.girvan@boffamiskell.co.nz | Drawn: ETa | Checked: RGi

Figure 8

Appendix 4: Lizard Management Plan

Boffa Miskell

Smooth Hill Landfill - Lizard Management

Draft Management Plan
Prepared for Dunedin City Council

4 June 2021

Document Quality Assurance

Bibliographic reference for citation: Boffa Miskell Limited 2021. *Smooth Hill Landfill - Lizard Management: Draft Management Plan*. Report prepared by Boffa Miskell Limited for Dunedin City Council.		
Prepared by:	Samantha King Ecologist Boffa Miskell Limited	
Reviewed by:	Tanya Blakely Senior Ecologist | Senior Principal Boffa Miskell Limited	
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File ref: BM200252_007b_Smooth_Hill_Lizard_Management_Plan_20210604.docx

Cover photograph: Smooth Hill designation site © Boffa Miskell, 2020

Executive Summary

This Lizard Management Plan has been prepared for the Dunedin City Council. It is one of a suite of ecological management plans and is to be read in conjunction with the draft Landfill Management Plan (LMP, Boffa Miskell 2021a), which has been prepared to support the construction, operation, closure and aftercare of the Smooth Hill Landfill. This plan should also be read in conjunction with the Smooth Hill Vegetation Restoration Management Plan (Boffa Miskell 2021b), which details the enhancement and ongoing protection of a small regenerating forest area and degraded natural wetland, including lizard specific habitat enhancement and creation.

This plan will provide sufficient detail for evaluation of the project by Dunedin City Council (DCC) and Otago Regional Council (ORC) for resource consents for the Smooth Hill Landfill and associated upgrade to McLaren Gully and Big Stone roads; and the Department of Conservation (DOC) and their mandate under the Wildlife Act (1953). This plan is designed to explicitly address the 'Nine Principles for lizard salvage' (DOC 2019). This plan describes the primary tool of lizard management as lizard salvage (i.e. a mitigation-driven translocation) and describes how and why this approach was chosen.

This Lizard Management Plan addresses:

- the lizard values of the designation site and along McLaren Gully and Big Stone roads (habitat and species present, or likely present);
- actual and potential effects of the development on lizard habitat and lizards;
- evaluation of alternatives to salvaging lizards;
- methodology for lizard salvage, transfer and release;
- lizard release site characteristics;
- on-going lizard monitoring;
- reporting requirements; and
- contingency actions for lizard release.

CONTENTS

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Figures

1.0 Introduction

This Lizard Management Plan is designed to explicitly address the 'Nine Principles for lizard salvage' (Department of Conservation, 2019). This plan describes the primary tool of lizard management as lizard salvage (i.e. a mitigation-driven translocation) and describes how and why this approach was chosen.

This Lizard Management Plan is one of a suite of ecological management plans and is to be read in conjunction with the Landfill Management Plan (Boffa Miskell 2021a), which has been prepared to support the construction, operation, closure and aftercare of the Smooth Hill Landfill.

This plan should also be read in conjunction with the Smooth Hill Vegetation Restoration Management Plan (Boffa Miskell 2021b), which details the enhancement and ongoing protection of a small regenerating forest area and degraded natural wetland, including lizard specific habitat enhancement and creation.

1.1 Background

1.1.1 Site location and context

The Smooth Hill Landfill site is situated in the hill country between the Taieri River plains and the coastline, 28 km south of Dunedin, seven kilometres from the sea-side township of Brighton and eleven kilometres from Waihola. The site is accessed off McLaren Gully Road and Big Stone Road, from State Highway 1. The designation site sits within the Tokomairiro Ecological District.

A range of vegetation types are present within the Smooth Hill Landfill footprint, the designation site, downstream areas, and areas adjacent to McLaren Gully and Big Stone roads that may be widened. These include highly modified plantation forestry areas, with areas of exotic grassland and plantation forestry that may be cleared as a result of the landfill, wetland habitats, and regenerating / secondary indigenous forest habitat. Regenerating forest gullies at the designation site (outside the landfill footprint) contributes to a local mosaic of forest fragment habitats in the wider area.

1.1.2 Statutory framework

All native lizard species are 'absolutely protected' under the Wildlife Act (1953, s63 (1) (c)), and lizard habitats are protected by the Resource Management Act (1991), administered by the Department of Conservation (DOC) and local authority Dunedin City Council, respectively.

This Lizard Management Plan has been developed to follow the principles provided in "Key principles for lizard salvage and transfer in New Zealand" (hereafter "Lizard Salvage Guidelines", (Department of Conservation, 2019). These guidelines outline the requirements that enable the outcome of a successful lizard salvage. These include a thorough assessment of the lizard values and site significance both at the site of impact and potential release sites, the actual and potential effects of the construction impact.

Further, this Lizard Management Plan addresses the potential impact on threatened species and the options of using salvage as mitigation tool. Following the Lizard Salvage Guidelines, the release sites have been assessed, and monitoring and reporting will be undertaken.

1.2 Draft Conditions

This Lizard Management Plan follows the draft consent conditions[1] drafted at lodgement of consent, as below:

- A Lizard Management Plan (based on this Draft Smooth Hill Lizard Management Plan prepared by Boffa Miskell Ltd, dated May 2021) shall be prepared by a suitably qualified ecologist prior to the commencement of construction, to ensure effects on any lizards during the construction of stages 1 – 4 of the landfill are avoided or minimised. The plan shall be developed in consultation with Te Rūnanga o Ōtākou. As a minimum the plan shall include:

  a. Background information on the lizards that may be present.

  b. Responsibilities for lizard management.

  c. Mitigation measures.

  d. Enhancement of lizard habitat for translocated lizards.

  e. Monitoring.

  f. Review and updating of the plan.

  The plan shall be provided to ORC for approval that it addresses the requirements in this condition prior to construction commencing. The plan is to be implemented for the duration of any landfill construction works.

- A Plant and Animal Pest Control Programme shall be prepared prior to the commencement of construction, to ensure adverse effects on vegetation, avifauna, and herpetofauna from exotic pest plant species, and mammalian pests (rodents and mustelids) due to construction and operation of the landfill operation are minimised. The plan shall be developed in consultation with Te Rūnanga o Ōtākou. The programme shall be provided to ORC prior to construction and shall be implemented during construction and operation of the landfill.

This Lizard Management Plan has been developed by herpetologist Samantha King (Boffa Miskell Limited) based on field work completed by herself and lizard survey work completed by Mandy Tocher (Ryder Environmental Limited) under Wildlife Act Authority (WAA) [81987 - FAU].

Any lizard salvage and future surveys will be conducted under a lizard salvage permit (WAA), following the conditions set out in this plan. All lizard surveys and salvage will be implemented by a suitably qualified herpetologist.

[1] Draft consent conditions to be finalised following issuing of consents

1.2.1 Conditions of Lizard Management Plan implementation

This Lizard Management Plan is considered a draft until timeframes for construction of the landfill and road widening have been confirmed. Lizard survey and salvage methods, knowledge, and the extent of works may change over this time and will require a thorough review prior to implementation.

The following details the matters that must be considered when finalising this plan in order for the Lizard Management Plan to be submitted to DOC as part of the WAA application.

1. Consult with Te Rūnanga o Ōtākou on the revised plan;
2. Consult with DOC on confirmed release site;
3. Review the herpetofauna database and update desktop review, as required;
4. Review potential lizard habitats within the landfill footprint and road widening;
5. Review survey methods to be undertaken, including any salvage methods, to ensure these meet DOC best practice guidelines;
6. Review extent of disturbance and construction.

1.3 Lizard management approach

Any lizard management must be carried out in consultation with Te Rūnanga o Ōtākou, DOC, ORC and DCC. At present, we consider mitigation including translocation, habitat enhancement and pest control a viable option for this site given the surrounding landscape, likelihood of lizards persisting / thriving and long-term management. This Lizard Management Plan has been developed to follow the principles provided in the Lizard Salvage Guidelines, (Department of Conservation, 2019)).

2.0 Lizard values

2.1 Literature review

The DOC online database for herpetofauna (DOC Bioweb Herpetofauna Database) was accessed in May 2021, along with iNaturalist records, to determine if there were any records of herpetofauna within a 20 km radius of the designation site. Data older than 20 years was excluded from analysis because they are not considered representative of the likely lizard fauna within the Landfill Designation.

In addition to this interrogation of the database records, the known distributions of indigenous lizards were analysed to determine if these distributions overlapped with the designation site.

Based on the Bioweb records (Table 1), lizards potentially present within the designation site and in habitats adjacent to McLaren Gully and Big Stone roads include four At Risk – Declining species (two geckos: korero and jewelled; and two skinks: cryptic and southern grass skink), and one Not Threatened species (McCann's skink). There are several records from undetermined *Oligosoma* skinks within the 20 km radius. A northern grass skink was also

recorded 7.5 km from the designation site; we consider that this species was misidentified and was in fact a southern grass skink (the distribution of northern grass skink does not extend south-east beyond the Nelson region).

Of the species that may be present within the designation site and in habitats adjacent to McLaren Gully and Big Stone roads, the following information is a summary of the types of habitats they are likely to occur. Jewelled gecko are typically confined to scrub and forest and may occupy the remnant patches of kānuka forest within the Smooth Hill Landfill designation site. McCanns skink and korero gecko, if present, are likely to use rock and scrub habitat within the area. Cryptic skink may occupy gully systems, wetlands and scrubland within the designation, but this species has not previously been recorded from this area. Southern grass skink may occupy all of these habitats mentioned above, but this species is likely to be more abundant within rank grassland, weedy areas of cutover pine forest, and regenerating scrub areas of the designation site, and along McLaren Gully and Big Stone roads. Southern grass skinks, McCann's and cryptic skinks are all similar species in terms of morphology and may be easily confused.

Table 1: Lizard species potentially present within the site, according to the DOC Bioweb Herpetofauna Database (Accessed May 2021). Threat classification based on Hitchmough et al. (2016), which is under review as of May 2021.

Common name	**Species**	**Threat classification**	**Nearest record**	**Preferred habitats**
Southern grass skink	*Oligosoma* aff. *polychroma* Clade 5	At Risk – Declining (Taxonomically Indeterminate)	7.5 km	Rank grassland, weedy areas of cutover pine forest, marginal habitats
McCann's skink	*Oligosoma maccannii*	Not Threatened	None recorded	Rank grassland, weedy areas of cutover pine forest, cobble / rock outcrops
Jewelled gecko	*Naultinus gemmeus*	At Risk - Declining	15 km	Scrub, forest
Cryptic skink	*Oligosoma inconspicuum*	At Risk - Declining	None recorded	Scrub, rock outcrops
Korero gecko	*Woodworthia* "Otago/Southland large"	At Risk – Declining (Taxonomically Indeterminate)	7 km	Rock outcrops, schist, scrub

2.2 Lizard survey results

Samantha King (Ecologist, Boffa Miskell), Tanya Blakely (Senior Ecologist | Senior Principal, Boffa Miskell) and Alex Gault (Ecologist, Boffa Miskell) carried out a site visit on 8 October 2019. Weather conditions on site were cool and drizzly (Table 2). The objective of this first site visit was to assess the quality of potential lizard habitat within the designation site. Habitat quality varied across the site. The main potential lizard habitat noted was rank grassland found both within the harvested pine forest and along road margins.

145 double layer onduline Artificial Cover Objects (ACO) were deployed within this potential lizard habitat in the designation site (Figure 1), on 8 October 2019.

The ACOs were left in place and checked once and collected on the same day on 24 & 25 March 2020. The ACOs were checked and collected by herpetologist, Mandy Tocher (Ryder Environmental), Tanya Blakely and Jaz Morris (Ecologist, Boffa Miskell) on 24-25 March 2020. At the time, New Zealand was in COVID-19 Alert Level 3 restrictions and about to move to Level 4 restrictions, which meant that inter-regional travel was not allowed and the project's Auckland-based herpetologist, Samantha King, was unable to be on site when the ACOs were checked.

Samantha King revisited the designation site and walked the alignment of the proposed upgrade of McLaren Gully and Big Stone roads on 7 May 2021. During this time, Samantha gathered general information on habitat condition within the designation site and adjacent to the road and carried out limited hand searching for lizards within road-side vegetation.

Weather conditions on 24 March were poor, with a cold southerly wind bringing occasional showers. On 25 March, conditions were cool with little wind or cloud cover. Weather conditions on 7 May 2021 were sunny and warm (20 degrees Celsius) (Table 2).

No lizards were found during ACO checks, however, the weather conditions were not ideal for surveys, consisting of overcast cool, and drizzly conditions (Table 2).

Table 2: Lizard survey effort and weather conditions.

Date	Weather	Activity & effort	Species detected
8 October 2019	Overcast, light drizzle	ACO set up	n/a
24-25 March 2020	Overcast, drizzle (>13 degrees)	ACO checks	Scat, lizard sign
7 May 2021	Sunny, warm (20 degrees)	Manual searches	none

Acknowledgement of the limitations of lizard survey methods

Lizard survey methods currently available may have poor detection rates because of typically low population densities, species' cryptic colouration, difficulty in surveying preferred habitats and behaviour / activity patterns. As such, even intensive lizard surveys are unlikely to detect all individuals in the population or, possibly, all species present.