REPORT

Tonkin+Taylor

Lake Pūkaki Fast Track Consent Substantive Application

Lizard Management Plan

Prepared for
GHD Limited
Prepared by
Tonkin & Taylor Ltd
Date
April 2026
Job Number
1097626 v3

Together we create and sustain a better world
www.tonkintaylor.com

Document control

Title: Lake Pūkaki Fast Track Consent Substantive Application – Lizard Management Plan		
Date	**Version**	**Description**
September 2025	0.1	Draft for RMA Ecology review
October 2025	0.2	Draft for Environment Canterbury Review
October 2025	0.3	Draft for DOC review
November 2025	1.0	Final for submission
November 2025	1.1	Update following lizard surveys. Compensation Management Plan added. Draft for review by RMA Ecology.
December	1.2	Updated following RMA Ecology review. Draft for review by GHD and Meridian.
December	2	Final for submission
April	3	Updated following Section 53B response from DOC

Distribution:

GHD Limited	1 copy
Tonkin & Taylor Ltd (FILE)	1 copy

Table of contents

1 Introduction

Meridian Energy Limited (Meridian) hold consents to operate the Waitaki Power Scheme (WPS) for hydroelectric power generation. Lake Pūkaki is part of the WPS and is in the Mackenzie Basin of the South Island of New Zealand.

Meridian is seeking approval under the Fast Track Approvals Act (FTAA) to temporarily enable access to water stored in Lake Pūkaki below 518 m RL, without the currently applicable security of supply triggers. In addition, Meridian is seeking consent to undertake associated dam armouring works at the dam face of Lake Pūkaki during periods of lower water level, when the works zone can be accessed. The consenting period sought for the dam armouring works is 35 years.

Ecological assessments of the Project site have been undertaken to inform the FTAA application (T+T 2025). Native lizards have been identified as present in the project area as determined through targeted lizard surveys.

All native lizards are protected under the Wildlife Act (1953). This Lizard Management Plan (LMP) has been prepared for the Wildlife Approval Application to accompany the FTAA Substantive Application. Schedule 7 of the FTAA includes a list of information required for wildlife approval. Section 1.6 outlines the information requirements set out in Clause 2(1) of Schedule 7 and the relevant section of the LMP where the information requirement is addressed.

This work has been undertaken in accordance with Variation 01 (VO1) dated 27 June 2025[1] to the original contract (Letter of Engagement (LOE) dated 19 December 2024).[2]

1.1 Purpose and scope

This LMP outlines the lizard ecological values at the site, potential adverse effects on native lizards, salvage methods and recommended effects management actions in accordance with the effects management hierarchy as per the National Policy Statement for Indigenous Biodiversity 2023 (NPS-IB). The NPS-IB does not apply to renewable electricity generation but provides a useful framework for the assessment and management of native lizards. The LMP includes the following key sections:

- Wildlife approvals sought under the FTAA (Section 1.4)
- Lizard ecological values (based on desktop assessment) and potential adverse impacts (Section 2)
- Lizard survey methods (Section 3)
- Lizard survey results (Section 4)
- Lizard salvage methods (Section 5)
- Effects management measures (Section 6)
- Compensation Management Plan (Appendix E)

The LMP has been developed in accordance with recommendations described in the Project Ecological Impact Assessment (EcIA) (T+T, 2025).

1.2 Associated documents

This report should be read in conjunction with the Ecological Impact Assessment (EcIA) for the project (T+T, 2025).

[1] T+T (27 June 2025). Variation 01: Fast Track Substantive Reporting. Job no. 1097626.0000.
[2] T+T (19 December 2024). Letter of Engagement. Blue Cascade: Lake Pūkaki technical assessments. Job no. 1097626.0000.

1.3 Description of project activities that may impact lizards

To enhance the Pūkaki Dam's resilience, protective riprap on the face of the dam will be installed on the slopes of the Pūkaki Dam's Main Dam Face (High Dam) and Left and Right Abutments (Figure 1.1). Construction works will involve the following:

- Constructing access tracks and ramps
- Transporting rock armour from the current location to a designated stockpile area
- Constructing work benches
- Constructing toe/key along High Dam
- Rock placement on High Dam
- Rock placement on abutments
- Temporary building
- Taking of materials from local stockpile sites
- Temporary stockpiling of material adjacent to works areas
- Decommissioning of the site

These works are proposed to occur during periods where the dam water level is at a sufficiently low level to access the works area. Material for the riprap will be sourced from nearby stockpile areas located off Twizel Town Tracks and Tekapo-Twizel Road (Figure 1.1). The stockpile areas are approximately 6.3 ha and 0.8 ha in size.

1.3.1 Works areas terminology and map references

For the purposes of this report, the following terms are used to describe the various works areas:

- Access tracks and dam resilience works areas: Access tracks, ramps, work benches, constructing toe along High Dam, rock placement on High Dam, rock placement on abutments.
  - North access refers to the 'left abutment' shown in Figure 1.1 below.
  - South access refers to the 'right abutment' shown in Figure 1.1 below.
- North and South stockpile laydown area: Stockpile laydown areas beside North and South access (refer to Appendix A Figure 1 and Figure 3).
- South stockpile: 6.3 ha stockpile site (refer to Appendix A Figure 2)
- North stockpile: 0.8 ha stockpile site (refer to Appendix A Figure 4)
- Adjacent habitats: Lizard survey site to the east of the North stockpile (refer to Appendix A Figure 4)
- Control site: Lizard survey site 1 km south of North stockpile (refer to Appendix A Figure 5)

Figure 1.1: Dam armouring works preliminary design footprint and stockpile locations (GHD, August 1, 2025)

1.4 Statutory context and approvals sought

Native lizards are protected by the Wildlife Act 1953. A project referred for FTC may apply to the Environmental Protection Authority (EPA) for a wildlife approval under section 42(4)(h) of the Fast-track Approvals Act 2024 as part of a Substantive Application.

Wildlife approvals authorise activities that would otherwise be an offence under the Wildlife Act 1953. Specifically, the wildlife approvals requiring authorisation for this project relate to protected native lizards and include:

- Kill wildlife (incidental)
- Catch and handle wildlife on site (including salvage and relocation)

1.5 Term

The term for which the wildlife approval is sought is 35 years. This timeframe allows for the term sought for the dam armouring resource consents.

A request for a 35 year term is sought but with a review of this LMP and dam armouring works progress every 10 years. A short report will be prepared and delivered to DOC every 10 years with a request to continue to manage the works under the existing wildlife approval.

1.6 Schedule 7 of the Fast Track Approvals Act requirements

Schedule 7 of the Fast Track Approvals Act outline the necessary information required to assess a Wildlife Approval. These are outlined in Table 1.1 below along with the associated Section of this LMP (or other document) where the information is provided.

Table 1.1:Fast Track Approvals Act Schedule 7 requirements

Schedule 7 requirement	Where this requirement has been addressed and/or justification
(1) For the purposes of section 43(3)(h), an application for a wildlife approval must— (a) specify the purpose of the proposed activity:	Section 1.3
(b) identify the actions the applicant wishes to carry out involving protected wildlife and where they will be carried out (whether on or off public conservation land):	The actions requested include: • Kill wildlife (incidental) • Catch and handle wildlife on site (including wildlife salvage)
(c) include an assessment of the activity and its impacts against the purpose of the Wildlife Act 1953:	The purpose of the Wildlife Act 1953 is to protect wildlife and manage game bird hunting in New Zealand. The Wildlife Act 1953 provides absolute protection to all native lizard species. The project activity relating to dam armouring works may result in injury or mortality to native lizards. Effects management measures include avoid, minimisation, remedy and compensation measures (Section 4).
(d) list protected wildlife species known or predicted to be in the area and, where possible, the numbers of wildlife present and numbers likely to be impacted:	Refer to Section 2.1.
(e) outline impacts on threatened, data deficient, and at-risk wildlife species (as defined in the New Zealand Threat Classification System):	Refer to Section 2.2
(f) state how the methods proposed to be used to conduct the actions specified under paragraph (b) will ensure that best practice standards are met:	Surveys were undertaken in accordance with DOC Herpetofauna Inventory and Monitoring Toolbox for lizard survey and salvage.
(g) describe the methods to be used to safely, efficiently, and humanely catch, hold, or kill the animals and identify relevant animal ethics processes:	Surveys were undertaken in accordance with DOC Herpetofauna Inventory and Monitoring Toolbox for lizard survey and salvage.
(h) state the location or locations in which the activity will be carried out, including a map (and GPS co-ordinates if available):	[redacted]

Schedule 7 requirement	Where this requirement has been addressed and/or justification
	Refer to Appendix A Figures which outline lizard management areas.
(i) state whether authorisation is sought to temporarily hold or relocate wildlife:	Relocation is proposed, refer to Section 5.
(j) list all actual and potential wildlife effects (adverse or positive) of the proposed activity, including effects on the target species, other indigenous species, and the ecosystems at the site:	Refer to Section 2.2. Refer to the Ecological Impact Assessment (EcIA; T+T, 2025) for a full assessment of actual and potential effects of the proposed activity.
(k) where adverse effects are identified, state what methods will be used to avoid and minimise those effects, and any offsetting or compensation proposed to address unmitigated adverse effects (including steps taken before the project begins, such as surveying, salvaging, and relocating protected wildlife):	Refer to Section 5.
(l) state whether the applicant or any company director, trustee, partner, or anyone else involved with the application has been convicted of any offence under the Wildlife Act 1953:	The applicant and company direct, trustee, partner or anyone else involved have not been convicted of any offence under the Wildlife Act 1953.
(m) state whether the applicant or any company director, trustee, partner, or anyone else involved with the application has any current criminal charges under the Wildlife Act 1953 pending before a court:	The applicant and company direct, trustee, partner or anyone else involved do not have any current criminal charges under the Wildlife Act 1953 pending before a court.
(n) provide proof and details of all consultation, including with hapū or iwi, on the application specific to wildlife impacts:	Refer to the full application.
(o) provide any additional written expert views, advice, or opinions the applicant has obtained concerning their proposal.	The project received a response from DOC during the referral application. This response is provided in Appendix E.

2 Summary of lizard ecological values, impacts and impact management

2.1 Lizard ecological values

Lizard ecological values were assessed through desktop assessment and field assessments. Field surveys were conducted between 27 and 31 October 2025. Detailed lizard survey methods and results are presented in Sections 3 and 4, respectively. Refer to Appendix D for photographs of the project footprint and lizard habitat values.

2.1.1 Lizard habitat values

For the purposes of dam armouring works, the project footprint includes (Table 2.2; Appendix A Figure 1-5):

- South access track
- North access track

- Material laydown areas including the South laydown area (near the Punatahu Visitor Centre) and North laydown area (near the North access track) (Appendix A Figure 1 and Figure 3)
- Material stockpile sites (North and South stockpiles)

Lizard habitat was assessed through a visual assessment of each footprint area. Higher-value areas were considered those that comprised small cobbles and gravels with interstitial spaces suitable for protection from pest mammals and other predators. Effective gecko habitat generally comprised rocks with 1-3 cm crevices and small piles or rocks with sediment and grasses formed on top of rock stacks.

Lizard habitat values and species records are summarised in Table 2.1 below. Lizard habitat was recorded in all of the potential impact areas. Lizard habitat values outlined below were assigned a qualitative measure of low, moderate or high based on the rock/cobble size and availability, interstitial micro-habitat availability and level of disturbance.

Overall, habitat quality was considered to be low to moderate, with the North and South stockpiles providing the higher quality lizard habitat compared to access tracks.

Table 2.1: Project areas, lizard habitat features and species suitability and records

Project area	Lizard habitat features and comparative habitat value	Lizard species recorded and potential lizard species present
Southern access track	Large boulders. Few small interstitial spaces, but suitable skink habitat on the margins where boulders adjoin with exotic grass bank. Marginal but potential gecko habitat where boulders form crevices 1-3 cm wide. **Low quality habitat**	McCann's skink (*Oligosoma maccani*; Not Threatened; Hitchmough et al. 2021) recorded. Potential habitat for Southern Alps gecko (*Woodworthia "*Southern Alps*"*; At Risk – Declining).
Northern access track.	Bank comprises small rocks and boulders embedded in soft sediment, providing effective lizard habitat. **Moderate quality habitat**	McCann's skink and Southern Alps gecko recorded.
Material laydown areas.	Punatahu laydown area: Rank and short exotic grasslands, with occasional small-leaved pohuehue (*Muehlenbeckia complexa*) clumps. Regular disturbance from site management and people likely. **Low quality habitat** Northern laydown area: Short grassland with very few boulders/rocks. Disturbed area due to historic landuse impacts. **Low quality habitat**	McCann's skink likely to be present.
South stockpile of 6.3 ha.	Generally comprised large boulders with interstitial spaces unsuitable for lizards. Some piles comprised small boulders, cobbles, gravels and concrete rubble suitable for skinks and geckos. **Moderate quality habitat**	McCann's skink and Southern Alps gecko present across the area. Southern grass skink may be present.
North stockpile of 0.8 ha.	Generally comprised large boulders with interstitial spaces unsuitable for lizards. A couple of smaller piles comprised small boulders, cobbles, and gravels suitable for skinks and geckos.	McCann's skink and Southern Alps gecko recorded across the area. Southern grass skink (*O. aff. polychroma* Clade 5; At Risk –

	Soft sediment and vegetation had formed in some of the boulder crevices which provided effective gecko habitat. Boulders and rocks embedded into grass across the site provided effective skink habitat. Vegetation was dominated by short exotic grasses. Occasional exotic shrubs (*Rosa rubiginosa*) were present. *Muehlenbeckia complexa* was present in isolated patches, scrambling over the boulders and providing effective lizard cover. **Moderate quality habitat**	Declining) recorded in immediately adjacent habitat.
Adjacent habitats/control sites	Mix of short and medium-length grassland, various sized boulders, cobbles, and gravels, and occasional shrubs. *Muehlenbeckia complexa* was present in isolated patches, scrambling over the boulders and providing effective lizard cover. **High quality habitat**	McCann's skink, Southern Alps gecko, Southern grass skink, Mackenzie skink *O. prasinum;* Threatened – Nationally Vulnerable) recorded.

2.1.2 Lizard species

Lizard surveys were conducted between 27 and 31 October 2025. Lizard surveys comprised manual searches, funnel trapping, Visual Encounter Surveys (VES), and eDNA surveys. Surveys were undertaken in project footprint areas, adjacent habitats and at a control site.

Two native species were detected across all footprint areas:

- McCann's skink (*Oligosoma maccanni*; Not Threatened) (Hitchmough et al. 2021).
- Southern Alps gecko (*Woodworthia "*Southern Alps"; At Risk – Declining).

In addition, Southern grass skink (*O. polychroma* Clade 5; At Risk – Declining) was recorded adjacent to the stockpiles and may be present in the stockpiles.

Due to their Conservation Status and in accordance with EIANZ criteria (Roper-Lindsay et al. 2018), McCann's skink is of **low** ecological value, while Southern Alps gecko and Southern grass skink are of **high** ecological value. Of note, Mackenzie skink (*O. prasinum;* Threatened – Nationally Vulnerable) were recorded within 100 m of the North stockpile.

A full list of potential lizard species in the wider area as determined through desktop assessment is provided in Table 2.2 below.

2.1.3 Density estimates

Native lizard density estimates vary by habitat type and quality, and factors such as predation, historical site disturbance and immigration/emigration dynamics. Without detailed mark–recapture data, the reliability of density estimates is considered low.

Nonetheless, an attempt at estimating lizard densities at the site has been made to address Wildlife Approval Schedule 7 1(d).

Density estimates are available for Southern grass skink and McCann's skink (Wilson et al. 2017). In high quality habitat, Southern grass skink can reach up to 9,200 skinks per ha. McCann's skink can

similarly reach high numbers in high quality habitat, with density estimates of up to 2,250 skinks per ha.

The stockpile areas comprise 7.1 ha of moderate-quality habitat. Including the dam access and stockpile laydown areas, the total lizard habitat availability is approximately 7.3 ha.

Given the low to moderate habitat quality with no pest mammal management, a rough estimate of 500 skinks per ha could be expected. This would equate to 3,650 skinks in the project footprint and potentially affected by project works.

Density estimates of Southern Alps have not been formally published as of 21 November 2025. Studies on similar species *Woodworthia* spp. have reported densities of tens of individuals per ha (Towns et al. 2007).

Based on the above estimates, and low to moderate quality habitat, 50 individuals per ha may be an appropriate estimate. As such, 365 Southern Alps gecko could be expected across the project footprint areas.

Table 2.2: Lizard species list recorded on Pūkaki River and wider area (30 km radius) (Boffa Miskell, 2022), conservation status and ecological value. Shaded cells indicate species recorded in the direct project footprint.

Common name	Species name	Conservation status (Hitchmough et al. 2021)	Ecological value (Roper-Lindsay et al. 2018)	Habitat preference (from NZHS, 2025)
Lakes skink	*Oligosoma* aff. *chloronoton* "West Otago"	Threatened – Nationally Vulnerable	Very high	Terrestrial/ saxicolous, and typically inhabit lowland or alpine tussock grassland, riverine debris (eroded stone), and screes/talus with woody vegetation.
Roamatimati skink	*Oligosoma* aff. *chloronoton* "southern"	At Risk - Declining	High	Saxicolous, rocky habitats in alpine environments (screes, gravel or boulder talus slopes, dry streambeds, and rock piles amongst low growing vegetation).
Cryptic skink	*Oligosoma inconspicuum*	At Risk - Declining	High	Terrestrial, variety of habitats. Rocky habitats, including rocky beaches, shrubland, screes, and tallus, although they do also occur in heavily-vegetated habitats.
McCann's skink	*Oligosoma maccanni*	Not Threatened	Low	Inhabit rock tor systems, boulderfields, tallus, scree, rocky herbfield, exotic grasses, herbfield, and tussockland.
Mackenzie skink	*Oligosoma prasinum*	Threatened – Nationally Vulnerable	Very high	Open/sunny areas such as open grassy areas, tussock grassland, rock piles, and scree slopes.
Southern grass skink	*Oligosoma* aff. *polychroma* Clade 5	At Risk - Declining	High	Wetlands, grassland, shrublands, rocky shrubland/herbfield, screes, tussock, stony river beds.
Scree skink	*Oligosoma waimatense*	Threatened – Nationally Vulnerable	Very high	Boulderfields, screes, tallus, stoney river terraces and banks, rocky shrubland, and rocky bluffs.
Jewelled gecko	*Naultinus gemmeus*	At Risk - Declining	High	Indigenous forests, shrublands, and tussock grasslands.
Southern Alps gecko	*Woodworthia "*Southern Alps"	At Risk - Declining	High	Terrestrial and saxicolous. Stable bases of scree slopes, rocky river terraces and shattered outcrops in dry sub-alpine.
Korero gecko	*Woodworthia* "Otago/Southland Large"	At Risk - Declining	High	Beech forest, podocarp/hardwood forests, rocky grasslands, and rocky alpine areas.

2.2 Potential impacts on lizards

Potential impacts of dam armouring works on native lizards include:

- Access tracks: temporary impacts to up to 1,200 m^2 of exposed boulder rock revetment lizard habitat to be removed and remediated following works.
- North and South laydown areas: temporary impacts to approximately 915 m^2 of lizard habitat comprising sparsely distributed shrubland and short-stature grassland, to be remediated following works.
- Two areas of approximately 6.3 ha and 0.8 ha of boulder material stockpiles will be drawn from for construction use (Figure 1.1). The areas comprise exotic grasslands where rock material has been stockpiled.
- Disturbance, injury or mortality during the armouring of the dam.
- Displacement: The existing rock stockpiles were first established in 2014 and are continuously added to as suitable local material becomes available. During this time, the stockpiles have incidentally provided effective lizard habitat. This lizard habitat will be lost for the purposes of dam remediation works. Lizards present may be displaced into adjacent areas potentially less suitable.

2.3 Lizard management measures

To address potential adverse impacts on lizards, the following measures are recommended:

- Avoidance, minimisation and remedying measures:
  - Lizard salvage across the North stockpile (refer to Section 5).
  - Lizard exclusion fencing around the North stockpile.
  - Remediation includes re-instating access tracks and laydown areas following works.
- Offsetting effects to lizards is challenging as it requires quantitative data, typically long-term information using mark-recapture studies.
- Compensation is proposed to address adverse residual effects to native lizards (refer to Section 6.2).

Note that the South Stockpile is an operational area on Meridian landholdings. The area would be challenging to exclude lizards from with fencing due to the large size of the area, and frequent operational access requirements. As such, lizards would be expected to re-colonise the stockpiles following any salvage attempt. Salvage would therefore be ineffective at protecting lizards. Based on the advice f Meridian, the site operates as a working hydroelectricity site of national significance. The ongoing addition of material to the stockpile means that the presence of fences would impede their operations and create unnecessary constraints. Instead, the compensation package has been proposed to address adverse impacts on lizards injured or killed during stockpile use.

The magnitude of effect on lizards, after efforts to avoid, minimise and remedy effects is considered to be **moderate** due to the loss of habitat and injury or mortality during construction. The magnitude of effect takes into account the quality of the habitat (low to moderate) and that the stockpiles have been developed in the past 14 years and have likely had a temporary 'positive' effect on the lizard population since that time. McCann's skink, Southern grass skink and Southern Alps gecko are also relatively abundant in the wider abundant (as determined by desktop assessment, surveys in a control site and surveys in adjacent habitats).

The overall level of effect depends on each species' conservation status and is as follows:

- For McCann's skink a **low** ecological value combined with a **moderate** magnitude of effect results in a **low** overall level of effect.
- For Southern Alps gecko and Southern grass skink, a **high** ecological value combined with a **moderate** magnitude of effect results in a **high** overall level of effect.

3 Lizard survey methods

Lizard surveys were undertaken to address the following questions and inform effects management for lizards:

1 Are any lizards using the rock stockpiles or proposed access track and stockpile laydown areas.

2 Are At Risk or Threatened species using the rock stockpiles or proposed access track/stockpile laydown areas and how are they distributed.

3 What is the level of usage of rock stockpiles and access track areas/stockpile laydown areas by lizards compared to nearby 'natural' areas.

Lizard surveys were undertaken in general accordance with the Principles of Lizard Management (Appendix C; DOC Technical Advisory Group, 2019; Appendix C) as outlined in the following Sections and outlined in Table Appendix C.1. Where survey methods varied from the principles, justification is provided in Table Appendix C.1.

3.1 Wildlife Act Authority

All survey methods and reporting requirements were undertaken in accordance with Wildlife Act Authority (WAA) (Authorisation no. 119794-FAU made out to Graham Ussher). All lizard handling undertaken under the direct supervision Graham Ussher.

3.2 Personnel undertaking lizard surveys

All surveys were undertaken by Graham Ussher (RMA Ecology), Holly Madden (RMA Ecology) and Sam Heggie-Gracie (T+T). All three ecologists are suitably qualified and experienced in lizard surveys, handling and identification (refer to Appendix B for experience summaries).

3.3 Survey locations

Surveys were undertaken across all potential dam armouring works management areas (Appendix A Figures 1-5). In addition, control surveys were undertaken adjacent to North stockpile and approximately 1 km downstream of North stockpile. In summary, surveys were undertaken across the following areas:

- North laydown area
- South laydown area
- North stockpile area
- South stockpile area
- Two control sites:
  - North stockpile adjacent habitat
  - Control site approximately 1 km downstream from the North stockpile adjacent to the Pūkaki River margin.

Refer to Appendix A Figures 1-5 for detailed survey designs for each area listed above.

3.4 Survey timings and weather conditions

Lizard surveys were undertaken from 27 to 31 October 2025. From 27 to 29 October, surveys were undertaken by three ecologists, and from 30 to 31 October, surveys were undertaken by two ecologists.

Survey weather conditions are described in Table 3.2 below. A qualitative assessment of lizard activity and basking opportunity is provided below. Despite cool weather conditions early in the survey week, the weather improved later in the week resulting in a number of survey days with good suitability for lizard detection.

Table 3.1: Weather conditions[3] during the lizard survey

Date	Overnight low (°C)	High (°C)	Weather	Qualitative assessment of lizard activity and basking opportunities based on rock temperatures and sunlight availability
27 October 2025	0.1	11.4	Overcast, showers	Low – no sunshine
28 October 2025	-0.8	6.4	Overnight snow. Clear and sunny.	Moderate. Basking opportunities limited by snow on rocks, particularly on south-facing rock piles where snow was not melted. Temperatures low limiting lizard activity, however, sun on exposed rocks resulted in relatively warm rock temperatures. Southern grass skinks at a nearby site (used for training purposes) were observed basking, indicating at least moderate basking conditions.
29 October 2025	-1.5	15.6	Clear and sunny.	High – full sun
30 October 2025	2.1	16.9	Clear and sunny.	High– full sun
31 October 2025	1.5	18.8	Clear and sunny.	High– full sun

3.5 Pre-construction survey methods

3.5.1 Survey methods

The methods for the lizard survey included manual habitat searches, visual surveys and deployment of eDNA tunnels. The specific methods were designed to survey the suite of potential lizard species known in proximity to the site. They allowed for the detection of nationally Threatened species. The methods used are summarised below and in Table 3.2.

[3] Weather data from MetService Twizel data (https://www.metservice.com/rural/regions/canterbury-high-country/locations/twizel)

3.5.1.1 Manual habitat searches

Manual habitat searches were undertaken in accordance with standard systematic searching protocols (DOC, 2012a). Manual habitat searches were undertaken from 29 to 31 October and included the turning of cover objects. The majority of available cover objects (small and medium size rocks) were turned on the edges of access tracks, laydown areas and stockpiles. Approximately 26 person-hours of manual searches were completed.

3.5.1.2 Visual Encounter Surveys

Visual Encounter Surveys (VES) targeted rock stockpiles using binoculars. VES were used to identify lizards basking or moving about habitat, targeting morning and late afternoon periods. VES surveys comprised slow walk transects across the edges of rock stockpiles and other potential habitats. Refer to Appendix A Figures 1-5 for the locations of all VES surveys.

3.5.1.3 Funnel trapping

Funnel traps were established in lizard habitats across the North and South stockpiles and at the control site. Funnel trapping was undertaken in accordance with standard protocols (Department of Conservation, 2012b). Funnel trapping comprised deployment of shaded Gee's minnow traps (Photograph 3.5) and longitudinal funnels (dimension 18cm x 18cm x 79cm) (Photograph 3.6). A single Gee's minnow and longitudinal funnel were deployed together in pairs (32 funnel traps total).

Funnel traps were deployed with torn grass and fruit jelly. Each trap was covered with shade cloth to ensure shading and encourage use, and rocks were used to hold traps in place. Traps were checked daily (every 24 hours).

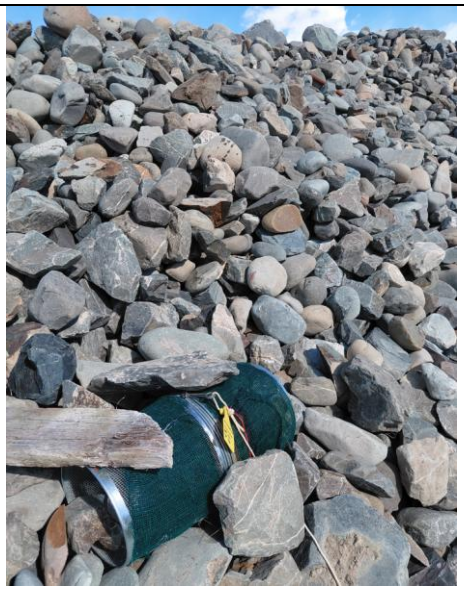
3.5.1.4 eDNA

A total 8 eDNA tunnels were deployed at the North and South stockpiles for five days (refer to Appendix A Figures for locations). In addition, lizard scat was collected into pottles for eDNA analysis.

Table 3.2: Summary of lizard survey methods across dam armouring management areas

Location	Search method and level of effort	eDNA methods
Access tracks and laydown areas	Manual habitat search **Total effort:** **6 person-hours**	
Stockpiles	Manual habitat search: **Total effort:** **26 person-hours** Funnel trapping: • North stockpile: 8 funnel traps checked daily for four days. • South stockpile: 24 funnel traps checked daily for four days. Visual encounter survey Undertaken 29 October and 30 October: • 50 m long transects for binocular basking search each morning and/or late afternoon.	Lizard scat: • Lizard scat collection across rock stockpiles. Approximately 8 collection sites across all rock stockpiles with aggregation of samples from specific clusters or rock stockpiles. eDNA tunnels • Deployment of 3 tunnels in the South stockpile and 5 tunnels in the North stockpile.

Location	Search method and level of effort	eDNA methods
	• 16 transects split across 4 stack clusters[4], with interior and exterior stockpiles within each cluster. Refer to Appendix A Figure 1-5. **Total effort: 4.75 person-hrs**	
Adjacent habitat • Habitat adjacent to the North stockpile comprising exotic grasses, occasional boulders and cobbles.	Manual search: • Sampling of non-rock stack areas. • Opportunistic searches **Total effort: 2 person-hrs** Visual encounter surveys: Undertaken 30 and 31 October: • Opportunistic afternoon basking search. **Total effort: 3 person-hrs**	
Control site • Cobbled river margin habitat 1 km downstream of north stockpile (control site)	Funnel trapping: • 8 funnel traps checked each day for four days. Visual encounter surveys: Undertaken 30 October: • 50 m long transects for binocular morning and afternoon basking search. **Total effort: 1.5 person-hrs**	



Photograph 3.1: Funnel trap (Gee's minnow)

Photograph 3.2: Funnel trap (longitudinal funnel)

3.6 Data collection

Each native lizard captured was assigned a number and the following information was recorded:

[4] Stack clusters defined as a general group of rock stockpiles. There is one cluster at the northern stockpile site, and three clusters across the southern site.

- Date and time of capture.
- Weather conditions at time of capture.
- Capture methodology.
- GPS location.
- Age class.
- A minimum of one photograph of each captured lizard.

4 Lizard survey results

Across all surveys, four lizard species, and 78 individuals were recorded (Table 4.1). eDNA results are summarised in Appendix G.

4.1 Project footprint

Two lizard species were recorded in the project footprint:

- Southern Alps gecko (At Risk – Declining)
- McCann's skink (Not Threatened)

Adults, sub-adults and juveniles were recorded for both species indicating breeding populations.

Most lizards were detected through manual searches. VES surveys did not result in any lizard detections in the project footprint areas. Funnel traps resulted in one capture of a McCann's skink in the project footprint.

VES methods were likely unsuccessful due to the general lack of suitable basking habitats in the boulder stockpiles. Boulders were generally too large and disconnected from suitable grass habitat for lizards to safely access and retreat from. VES surveys at adjacent habitats were successful in detecting native lizards, supporting the find of low-quality basking habitat at the stockpiles.

Lizard scat was recorded from two locations at the South stockpile (Appendix A Figure 2). Scat samples were collected and sent for eDNA analysis (Appendix GTable Appendix G.1). Gecko sloughed skin was also recorded. Gecko skink was likely from Southern Alps gecko based on size of skink and the gecko species found during the survey.

eDNA tunnel results recorded a skink species (unknown) in the North stockpile (Appendix G). eDNA samples from scat resulted in detections of McCann's skink in the South and North stockpile.

In general, McCann's skink and Southern Alps gecko are likely to be present in low to moderate abundance across all potential footprint areas. Southern grass skink may also be present in footprint areas (detected in immediately adjacent habitat and suitable habitat is present).

4.2 Control site and adjacent habitats

In total, four lizard species were detected in the adjacent habitats and control site:

- Southern Alps gecko (At Risk – Declining)
- McCann's skink (Not Threatened)
- Southern grass skink (At Risk – Declining)
- Mackenzie skink (Threatened – Nationally Vulnerable)

At the downstream control site (Appendix A Figure 5), one Southern grass skink was captured in a funnel trap. McCann's skink and Southern Alps gecko were recorded in this area through manual

searches and incidental observations. VES surveys did not detect any lizards in this area. eDNA results recorded McCann's skink and Southern Alps gecko in at the downstream control site.

Both manual and VES surveys detected Mackenzie skink within 50 m of the North stockpile (Appendix A Figure 4). Manual and VES surveys also resulted in records of Southern Alps gecko, Southern grass skink and McCann's skink.

Table 4.1: Lizard results by survey area (Appendix A Figures 1-5).

Detection record	North access and laydown	North stockpile	South stockpile	South access and laydown	Control site (adjacent habitat to North stockpile)	Control site (downstream of North stockpile)	Total
Gecko sp. (scat)			1				1
Gecko sp. (skin)			2				2
Mackenzie skink					4		4
Mackenzie skink (deceased)					1		1
McCann's skink	4	4	41	1	4	1	55
Scat			1				1
Skink sp.*		3					3
Southern Alps gecko	1	4	1		1	2	9
Southern grass skink					1	1	2
Total	**5**	**11**	**46**	**1**	**11**	**4**	**78**

*note: missed skinks – considered to be Southern grass or McCann's skink based on size and dorsal colouration.

4.2.1 Mackenzie skink records at the control site (adjacent habitats)

Mackenzie skink was recorded within 50 m of the North stockpile (Appendix A Figure 4). On the 29 October, a large dead and degraded skink body was found beneath a rock stack. It was assumed it was a Mackenzie skink based on the large size. A live adult individual was subsequently recorded underneath a nearby boulder. Manual searches for Mackenzie skink stopped in this area so as not to further disturb the population. Further searches were undertaken downhill, south of the North stockpile on the spillway batter to assess their wider distribution. An additional live adult individual was recorded in a cluster of small to medium cobbles surrounded by medium-length grassland.

On the 30 and 31 October, VES were conducted across the known Mackenzie skink locations. A further two individuals were recorded basking on the spillway batter on the 30 October (Appendix A Figure 4). One individual (potentially one of the same individuals as recorded on 30 October) was also recorded on the 31 October. Both individuals were basking among small to medium cobbles and medium-length grassland.

4.2.2 Comment on likelihood of Mackenzie skink presence in project footprint areas

No Mackenzie skink individuals or sign (i.e. scat) were recorded in any of the project footprint areas. The access track and laydown areas are not considered to comprise effective Mackenzie skink habitat. The habitat in these areas comprise large boulders, managed grasslands and generally isolated and/or highly modified habitat. These areas are also divided from the known Mackenzie skink population by a busy motorway.

The habitats in the South stockpile are also not considered likely to support Mackenzie skink. This is due to surrounding habitats being highly modified, no records during surveys, general lack of effective habitat, and lack of connectivity to suitable Mackenzie skink habitat.

Given the records of Mackenzie skink near the North stockpile, this is the most likely footprint area they may be present. The Mackenzie skink is a highly specialised lizard. It is likely to seek out those habitat features which match its specific thermal requirements while also protecting them from mammalian predators. It is possible the large rock boulders in the North stockpile do not meet these specific niche conditions.

The presence of the stockpiles for approximately 14 years is considered long enough to allow Mackenzie skink to colonise the area if the habitat was suitable. Their preferred refuges of open grassy areas, scree slopes and small-medium cobble piles reduce their likelihood of presence in the North stockpile footprint, which largely comprised short exotic grassland and large boulder piles with wide interstitial spaces. Mackenzie skink were also found on steep slopes. It may be the North stockpile, being flat, does not drain water as quickly, resulting in sub-optimal (damper) micro-habitat conditions for Mackenzie skink.

Mackenzie skink were readily identified through manual and visual surveys in nearby habitat. If present in the North stockpile, we consider it likely they would have been detected during the targeted visual and manual searches. Given the above, we do not consider Mackenzie skink to be present in the South stockpile.

4.3 Pest mammals

Cat and possum scat was recorded across the North and South stockpiles. No pest mammal management is undertaken across these areas. Cats are known predators of native lizards and are likely impacting the lizard populations in these areas. It is likely that other pest predators of lizards are present such as rats and mice.

5 Lizard salvage plan

Lizard salvage is proposed across the North Stockpile prior to rock material use. Lizard salvage will only commence following the establishment of lizard exclusion fencing around the North Stockpile.

If, following 10 years, material in the North Stockpile remains, an additional lizard survey will be undertaken to determine if lizards have re-colonised the area. If lizards are present, another salvage effort, in accordance with this LMP, will be undertaken.

Similarly for the South Stockpile, where rock material remains after 10 years, a survey in accordance with this LMP will be conducted to quantify and assess the lizard population present.

5.1 Lizard exclusion fencing

Lizard exclusion fencing of the North Stockpile will be implemented to minimise lizards entering the North Stockpile, where Mackenzie skink was recorded within 50 m (Appendix A Figure 6). A lizard exclusion fence of approximately 200 m will be established to separate the known Mackenzie skink habitat areas and the North stockpile.

The fence will be constructed so that it sits approximately 50 cm off the ground and will be dug approximately 50-100 mm into the ground with a lip so that lizards cannot dig under the fence. Stakes will be established approximately 2 m apart to support the fence. A gate will form part of the fence to allow access to the rock material. The gate will need to be constructed in accordance with the rest of the fence specifications to prevent lizard access.

The fence will be maintained until all rock material from the North stockpile has been utilised. Annual inspections are recommended to ensure the fence continues to function as intended.

The construction method is described below and is consistent with a spotted skink fence established at Orana Wildlife Park[5]. The exact method may be changed to accommodate different material or construction methods that achieve the same outcome (exclusion of lizards from the North Stockpile). The method may also be updated to incorporate new technologies/methods (best practice lizard exclusion construction methods are still changing).

1. Plane a 60mm stripe down the edge of the post prior to driving it

2. Mark out the location of the posts and drive the posts into the desired depth

3. Dig a 400mm wide, 100mm deep ditch on the outer side of the posts and remove excess fill.

4. Cut & install the HDPE membrane 'bandage' by wrapping it around the post and secure it with 65mm gun nails into the post. The fence will not comprise silt-fencing or geotextile fabrics (lizards can climb these materials).

5. Roll out the HDPE membrane to allow for it to be installed 700mm high with the remainder as the buried skirt. There is a join at every second post, so the membrane needs to be measured and cut to ensure the joins meet on the post. They will be nailed in place using 65mm gun nails.

6. On every join post an alloy strip is used to sandwich the membrane to the flat surface of the post where it has been planned. The alloy strips have had holes predrilled in them.

7. Import appropriate aggregate to back fill the ditch and plate compact in place on the outside of the fence line.

8. Backfill and tamp the inside of the fence line with a pneumatic tamper.

Maintenance will need to be at least annual to ensure the fencing continues to mitigate lizard colonisation.

Further information, including specifications and example photographs are provided in Appendix H.

5.2 Lizard salvage protocols

Lizard salvage will be undertaken in general accordance with the Principles of Lizard Management (Appendix C; DOC Technical Advisory Group, 2019) as outlined in the following Sections. Where this plan varies from the principles, justification is provided in Table Appendix C.1.

5.2.1 Salvage footprint

The salvage footprint will comprise the North Stockpile as outlined in Appendix A Figure 6.

[5] Fencing Contractors NZ, Certified Fencer (n.d.). Central Fencing Lincoln. Spotted Skink Enclosure Fence at Orana Wildlife Park.

5.2.2 Seasonal constraints and weather requirements

Lizard survey and salvage will be undertaken between October and April inclusive during suitable weather. Suitable weather will comprise:

- Minimum 12°C for daytime salvaging.
- Maximum of 25°C for daytime salvaging.
- Overnight minimum temperature (i.e. for funnel trapping salvage) of 10°C.
- General weather conditions that are fine, overcast or with light showers.

5.2.2.1 Best endeavour salvage approach

The North Stockpile may require access during May to September 2026. Where stockpiles require access during this period, a 'best endeavour' salvage will be implemented. This salvage will not need to meet the above listed seasonal and weather constraints. The salvage will be implemented to salvage as many lizards as practicable given potential weather constraints and lizards potentially in torpor.

Only where weather conditions are suitable will funnel and pitfall trapping be implemented. Where overnight temperatures are too low to safely trap lizards, trapping may be able to be successfully completed during the day time, with traps opened in the morning and checked/closed in the evening. Artificial Cover Objects (ACOs) checks and manual searching methods will likely be effective methods.

5.2.3 Artificial Cover Objects

Artificial Cover Objects (ACOs) will be established and checked in general accordance with standard protocols (Department of Conservation, 2012). ACOs will be established at least 8 weeks prior to ACO salvage commencing.

ACOs will be installed in suitable lizard micro-habitats and installed as double and triple layered ACOs. ACOs will be deployed at a minimum of 10 m spacings along the edges of the stockpiles. ACOs will be checked for four consecutive days.

5.2.4 Funnel trapping

Funnel trapping will be undertaken in general accordance with standard funnel trapping protocols (Department of Conservation, 2012).

Funnel traps will be installed every 10 m in suitable lizard micro-habitats. Funnel traps will be installed on the ground and on rock piles (to target both ground lizards and geckos higher up rock piles). Funnel traps will be deployed with torn grass in each end, and two slices of pear per trap. Each trap is to be covered with grass to ensure shading and encourage use, and rocks may be used to hold trap in place. A damp sponge is to be deployed in each trap to avoid lizard desiccation. Traps are to be baited with tinned pear.

Where mice are captured in traps it will be assumed that they are likely exploiting native lizards caught in traps. If this occurs, traps will be removed and salvage will focus on manual searches and ACO salvage.

5.2.5 Pitfall trapping

Pitfall trapping will be undertaken in accordance with standard pitfall trap protocols (Department of Conservation, 2012).

Pitfall traps will comprise 4L buckets dug flush with the ground. A layer of rocks will be placed in the traps to provide shelter for lizards. Traps are to be baited with tinned pear or fruit jelly. A damp sponge shall be deployed in each trap to reduce lizard desiccation. Several holes (less than 5 mm diameter) shall be drilled into the base of traps to prevent flooding.

Pitfall traps will be deployed in locations deemed suitable by the lead lizard ecologist. They will be targeted on the edges of stockpiles targeting the best micro-habitats, every 10 m.

Traps shall be checked daily (every 24 hours) for a minimum of four consecutive days.

Where mice are captured in traps it will be assumed that they are likely exploiting native lizards caught in traps. If this occurs, traps will be removed and salvage will focus on manual and construction-assisted salvage.

Where the ground is too hard to dig pitfall traps in, funnel traps may be placed instead.

5.2.6 Manual searches

Manual and destructive salvaging will comprise the turning of rocks on the edges or in-between stockpiles. Hand rakes can be used to search through grass or small cobble habitats.

Southern Alps gecko are often situated on the tops of stockpiles. Where it is safe to do so, rocks may be climbed to check for and salvage native geckos.

5.2.7 Level of effort

The level of effort is tailored to each of the salvage methods implemented as outlined in Table 5.1.

Table 5.1: Level of effort required for each salvage method across the North Stockpile.

Salvage method	Level of effort
Artificial Cover Objects	• Deployment of ACOs a minimum of every 10 m on the edges of stockpiles. • ACO checks for four consecutive days.
Funnel trapping	• Deployment of traps every 10 m. • Funnel traps will be deployed for four nights and checked every 24 hrs.
Pitfall trapping	• Deployment of traps every 10 m. • Pitfall traps will be deployed for four nights and checked every 24 hrs.
Manual salvage	A minimum of two person-hours per 100 m of stockpile edge will be undertaken.

5.2.8 Data collection

Each native lizard captured will be assigned a number and the following information will be recorded:

- Date and time of capture.
- Weather conditions at time of capture.
- Capture methodology.
- Capture and release locations (GPS coordinates), broad habitat types and microhabitat types.

- Species, sex (where possible), reproductive status for females, age class, snout to vent length (SVL), tail status (regenerating or original tail) and overall health and condition.
- A minimum of one photograph of each captured lizard, including at least one photograph showing the dorsal surface clearly.
- Photographs of the salvage site and release site.

5.3 Lizard relocation protocols

5.3.1 Capture, handling and transport

The following steps will be undertaken to ensure appropriate handling of lizards occurs. Capture, handling and relocation of lizards will be undertaken in accordance with the below methods:

- All field equipment that indigenous lizards may come into contact with (e.g. plastic enclosures, collection bags, scales, etc.) will be sterilised.
- Hand sterilisation will be undertaken.
- Salvaged lizards will either be transported in cloth bags or in suitably ventilated plastic containers.
  - Care will be taken so that the bags and containers are kept at a constant ambient temperature.
  - Grass will be added to plastic containers to shelter and protect lizards during transportation.
  - Different species will be kept in separate holding bags or containers.
  - Larger individuals will not be placed in the same container as smaller individuals to prevent aggressive interactions or predation.
  - Any injured skinks will be kept separately from healthy skinks.
- Cloth bags and/or containers will be kept in the shade prior to transportation to the relocation site.
- Lizards will not be held for more than three hours before release.

5.3.2 Relocation site description

Native lizards will be relocated [redacted]

Key characteristics of the relocation site include:

- The habitat is contiguous with an additional 19 km of riparian margin habitat suitable for the species in the footprint.
- The habitat comprises river gravels and boulders, shrubland habitat, and rank grass. It is also contiguous with river terrace risers (Photograph 5.3).
- There is abundant micro-habitat availability in the form of rank grass, shrubs, rocks, screes of various sizes, and differing hillslope angles and basking opportunities.
- Southern Alp's gecko, Southern grass skink and McCann's skink were recorded in this habitat (indicating habitat suitability).

Photograph 5.3: [redacted] *suitable for lizard relocation. Southern Alps gecko, Southern grass skink and McCann's skink were all recorded in this habitat during original surveys.*

6 Effects management measures

Effects management measures are provided below. The proposed measures aim to manage impacts to lizards to the extent practicable given the works constraints. The works constraints include:

- Access to stockpiles at short notice at any time (likely winter or early spring), in any given year for the life of consent.
- Seasonal constraints around lizard management (lizards are usually only salvaged October to April inclusive during suitably warm weather).

6.1 Avoid, remedy and minimise

Measures to avoid, remedy and minimise potential adverse effects are proposed. These measures are outlined in Table 6.2 and summarised below:

- A one-off lizard salvage is proposed to salvage lizard from the North Stockpile. Prior to the salvage, a lizard exclusion fence will be established around the salvaged zone, to prevent lizards from re-colonising the area.
- If, following 10 years, rock within the North Stockpile area has not all been removed, an additional lizard survey will be undertaken to understand if lizards are still present within the stockpile (despite the lizard exclusion fence present). If lizards are present, another salvage effort, in accordance with this LMP, will be undertaken.

6.2 Residual impacts management measures

Residual adverse effects on lizards occurs due to:

- Lizard injury or mortality during stockpile use and/or salvage outside of the active lizard season (to be avoided where practicable).
- Loss of lizard habitat.

Compensation is proposed to address residual adverse impacts and address impacts to lizards protected by the Wildlife Act 1953.

The recommended compensation contributions are provided in Table 6.1. Increasing contributions reflect higher impacts to those species with greater threat conservation statuses.

As nationally 'At Risk' species are present in the project footprints, it is recommended that a $30,000 compensation fund is ring-fenced for lizard management. This fund will be used to implement the Compensation Management Plan (CMP; Appendix E).

Table 6.1: Proposed lizard compensation threshold table. Nationally 'At Risk' species were recorded in the footprint and therefore this compensation threshold has been recommended (greyed cell).

Pre-construction survey results	Proposed financial contribution (one-off payment)
No lizards recorded	No financial contribution required
Not Threatened species recorded	$20,000
At Risk species recorded	$30,000
Threatened species recorded*	$40,000

*Note: Threatened Mackenzie skink was detected within 50 m of the north stockpile but not in the footprint itself.

6.2.1 Effects management summary

Effects management considerations in accordance with the effects management hierarchy (Roper-Lindsay et al. 2018) are summarised in Table 6.2 below. The proposed effects management measures may be subject to change following survey results.

Table 6.2: Effects management measures for native lizards

Effects management	Action	Justification
Avoid and minimise	Native lizards were detected throughout the project footprint areas. A one-off lizard salvage is proposed for the North Stockpile.	The North Stockpile will be fenced to prevent Mackenzie skink colonisation. A salvage in the North Stockpile is feasible as lizard recolonisation will be minimised due to the exclusion fence. A one-off lizard salvage would be ineffective in this area due to continual lizard re-colonisation.
Remedy	No remediation works are proposed for the stockpile areas. Dam armouring access tracks, temporary building, and stockpile laydown areas will be remediated following works.	All rock material is required for the dam armouring works. The stockpile areas are otherwise operational areas. Remediating these areas for lizards would result in future adverse impacts to lizards.
Offset	No offset is proposed.	Implementing offset for native lizards is difficult due to their cryptic nature and the difficulty in obtaining robust, quantifiable information required for offsetting.
Compensate	Compensation fund to support targeted lizard monitoring and management in accordance with the Compensation Management Plan. Increased compensation amounts have been provisioned for species with a higher Conservation Status (Hitchmough et al. 2021).	Compensation measures have been proposed to address impacts to native lizards protected by the Wildlife Act 1953. A Compensation Management Plan has been prepared and is outlined in Appendix E.

7 Changes to this LMP

To achieve the best outcomes for native lizards, and to align with any future changes to the Wildlife Act, including changes to the specific species protected by the Act, changes may need to be made to this LMP. The rationale behind any changes must be based on robust management techniques consistent with DOC guidelines, changes to legislation and only following confirmation from the Project Ecologist. Any changes to the LMP will also require confirmation with DOC.

8 Reporting requirements

This report will be submitted to DOC and Environment Canterbury following completion of lizard pre-construction surveys. A post-salvage report will also be prepared following salvage works at the North Stockpile.

The report will include the following:

- Confirmation that lizard surveys were undertaken in accordance with the LMP.
- Survey and salvage results.
- Representative photographs of the survey and salvage methodologies and lizards captured.
- Any other additional reporting requirements stipulated in the relevant consent and wildlife authority.
- Confirmation of the compensation financial contribution.

An Amphibian and Reptile Distribution Scheme (ARDS) card will be completed following the lizard survey and sent to DOC.

9 Applicability

This management plan has been prepared for the exclusive use of our client GHD Limited and Meridian Energy Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application under the Fast-track Approvals Act 2024 and that an Expert Panel as the consenting authority will use this report for the purpose of assessing that application. We understand and agree that this report will be used by the Expert Panel in undertaking its regulatory functions.

Compliance with the Environment Court Practice Note 2023: Sam Heggie-Gracie

I confirm that, in my capacity as author of this report, I have read and abided by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses contained in the Practice Note 2023.

I am a Senior Ecologist at Tonkin & Taylor Ltd (T+T), where I specialise in terrestrial and wetland ecology. I have worked at T+T since 2017. Prior to joining T+T, I was an ecologist at Auckland Council.

I have 10 years' experience in terrestrial and wetland ecology. I am a Member of Birds New Zealand and the New Zealand Plant Conservation Network (NZPCN).

Recent relevant projects and services that I have been involved with include:

- Belfast to Pegasus Motorway and Woodend Bypass Fast-track Approvals Act application.
- Auckland Regional Landfill consent application.
- The reconsenting of the water discharge consents at the NZ Steel Glenbrook Steel Mill.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
	
.....	.....
Sam Heggie-Gracie	Rob Van de Munckhof
Senior Ecologist	Project Director

t:\christchurch\tt projects\1097626\secure2099\workingmaterial\05 emp\05 update april 2026\260401_lmp_lake pūkaki - ns only.docx

10 References

Baber, M, Dickson, J, Quinn, J, Markham, J, Ussher, G, Heggie-Gracie, S, and Jackson, S (2021). A Biodiversity Compensation Model for New Zealand – A User Guide(Version 1). Prepared by Tonkin & Taylor Limited. Project number 1017287.0000P.

Boffa Miskell (2022). Waitaki Power Scheme – Terrestrial Ecology of Braided Rivers Existing Environment Report. Prepared for Meridian Energy Limited.

Department of Conservation (2012a). Herpetofauna: systematic manual searches. Version 1.0. Prepared by Kelly M. Hare.

Department of Conservation (2012a). Herpetofauna: funnel trapping. Version 1.0. Prepared by Kelly M. Hare.

Department of Conservation (2012c). Herpetofauna: Artificial Cover Objects. Version 1.0. Prepared by Kelly M. Hare.

Department of Conservation (2012d). Herpetofauna: Pitfall Trapping. Version 1.0. Prepared by Kelly M. Hare.

Department of Conservation (2025). Revised Draft Kahu Ora Strategic Action Plan. DOC-10229173.

Hitchmough, R., Barr, B., Knox, C., Lettink, M., Monks, J. M., Patterson, G. B., Reardon, J. T., van Winkel, D., Rolfe, J., Michel, P. (2021). Conservation status of New Zealand reptiles, 2021. New Zealand Threat Classification Series 35. Department of Conservation, Wellington. 15 p.

Maseyk, F. J. F., Barea, L. P., Stephens, R. T. T., Possingham, H. P., Dutson, G., & Maron, M. (2016). A disaggregated biodiversity offset accounting model to improve estimation of ecological equivalency and no net loss. Biological Conservation, 204, 322-332.

Rebergen, A., Keedwell, R., Moller, H., & Maloney, R. (1998). Breeding success and predation at nests of banded dotterel (*Charadrius bicinctus*) on braided riverbeds in the central South Island, New Zealand. New Zealand Journal of Ecology, 33-41.

Robertson, H. A., Baird, J. E., Elliott, G. P., Hitchmough, R. A., McArthur, N. J., Makan, T. M., Miskelly, C. M., O' Donnell, C.J., Sagar, P. M., Scofield, P., Taylor, G. A. & Michel, P. (2021). Conservation status of birds in Aotearoa New Zealand, 2021. New Zealand Threat Classification Series 36. Department of Conservation, Wellington. 43 p.

Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. (2018). Ecological impact assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.

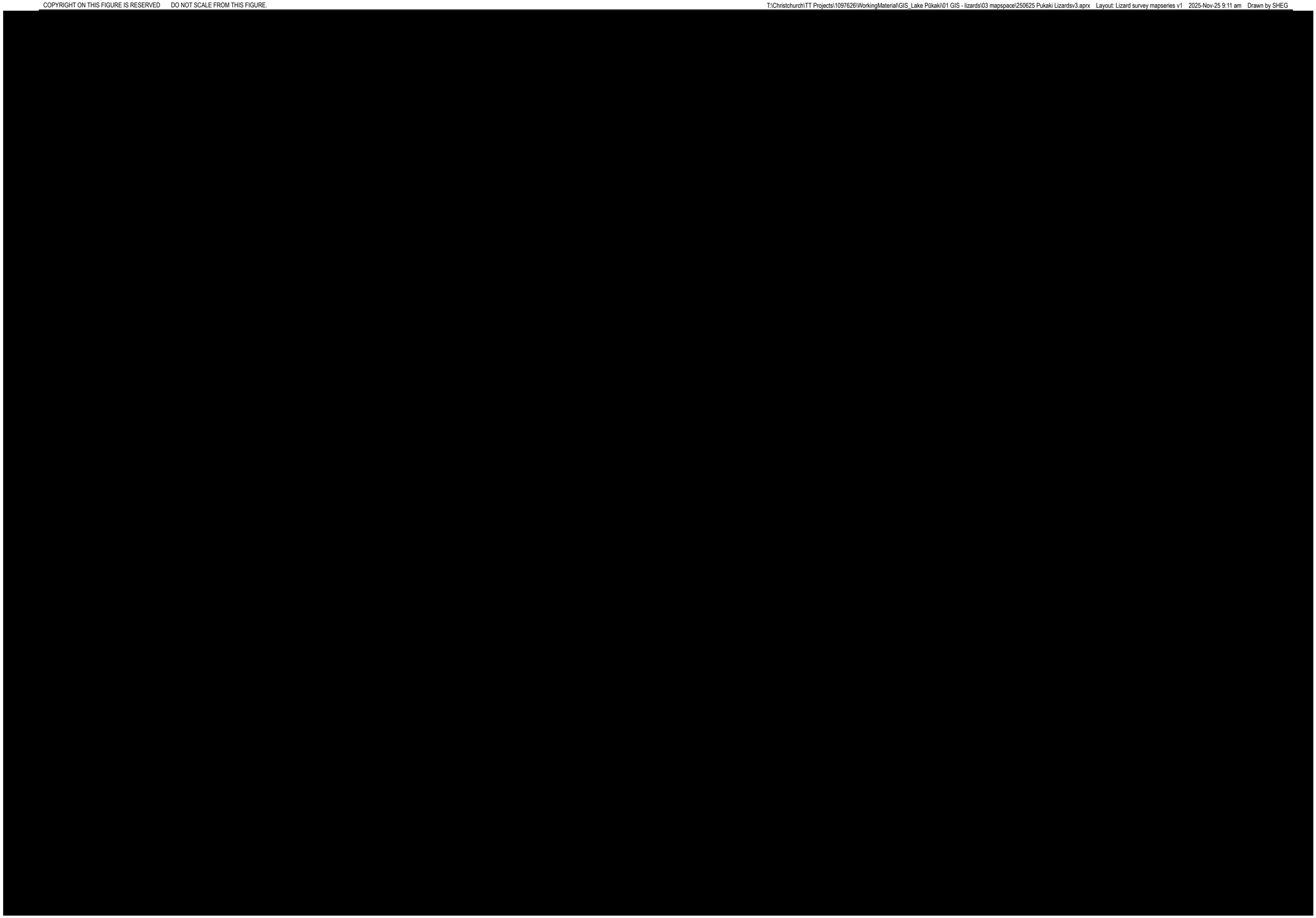
Tonkin & Taylor Ltd. (2025). Ecological Impact Assessment for Lake Pūkaki Fast Track Consenting. Prepared for Meridian Energy Ltd.

Towns, D. R., Elliott, G., & Reese, A. (2007). Reptile conservation in New Zealand. New Zealand Journal of Ecology, 31(1), 1–2

Wilson, D. J., Mulvey, R. L., Clarke, D. A., & Reardon, J. T. (2017). Assessing and comparing population densities and indices of skinks under three predator management regimes. *New Zealand Journal of Ecology*, *41*(1), 84-97.

Appendix A Figures

T:\Christchurch\TT Projects\1097626\WorkingMaterial\GIS_Lake Pūkaki\01 GIS - lizards\03 mapspace\250625 Pukaki Lizardsv3.aprx Layout: Lizard survey mapseries v1 2025-Nov-25 9:11 am Drawn by SHEG

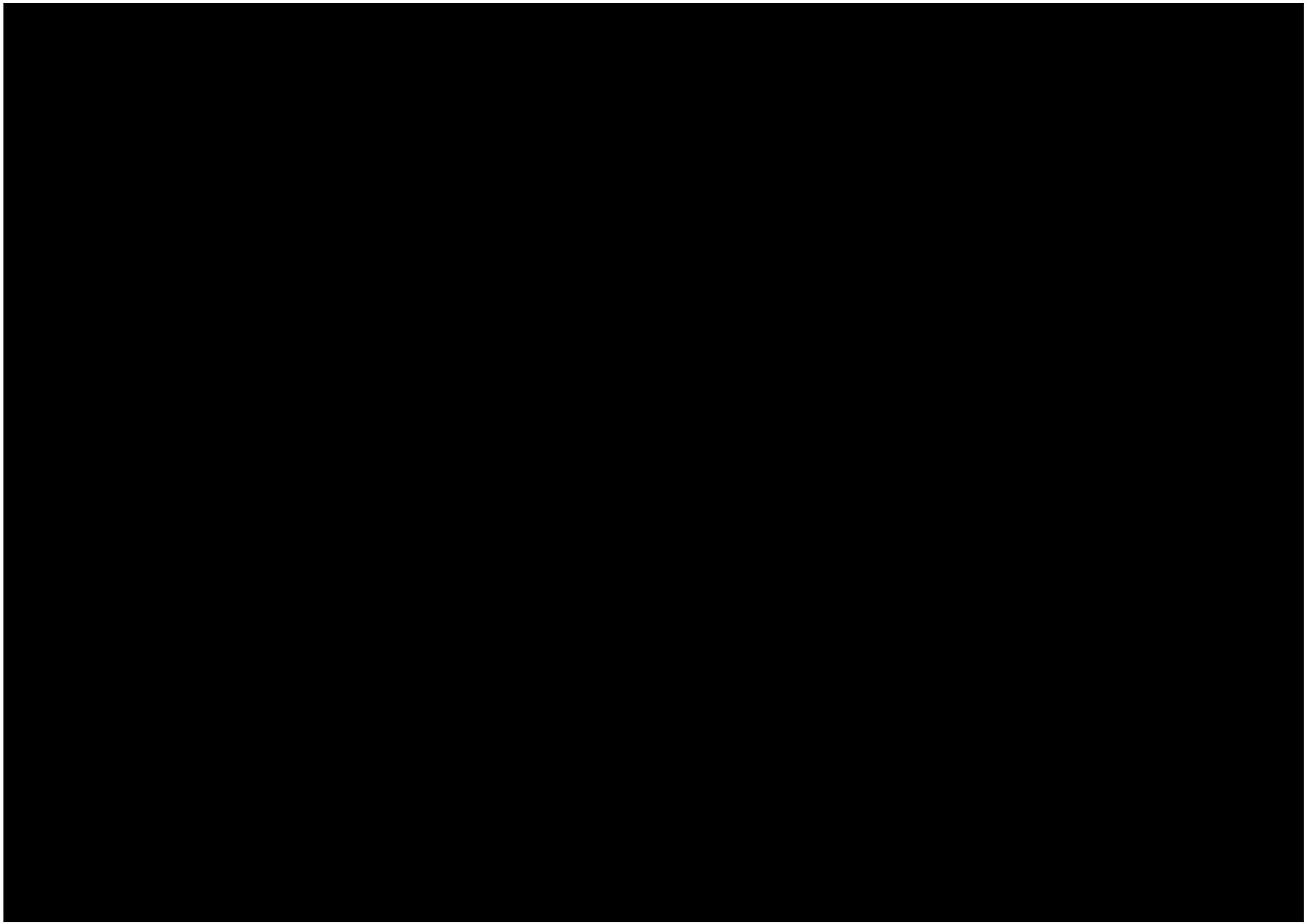


[redacted]

[redacted]

[redacted]

[redacted]



Appendix B Suitably qualified ecologists

B1 Summary

Lead ecologists led the initial survey works and be available for assistance where required. A lead ecologist was named on the Wildlife Act Authority under which the lizard survey of the site was undertaken. Support ecologists supported the lead ecologist during the initial stages of survey. Support ecologists were approved to lead surveys following the first three days of survey.

Lead ecologists

Graham Ussher – PhD (Conservation Ecology); MSc (1st Class Hons – ecology), BSc (ecology)

- 30 years' experience surveying reptiles and frogs in NZ, including for DOC, Councils, and commercial developers.
- Qualifications: PhD (Conservation Ecology) University of Auckland.
- Affiliations/ membership; SRARNZ, NZ Eco Society, EIANZ.

Previous/ Current Authorities held (in the name of Graham Ussher):

- Auckland Region Survey & salvage/ relocation: DOC file ref NHS 02-28-03; Permit number AK-13724 FAU; and DOC permit 37031 FAU NHS-12-03, 47967 FAU and 78350- FAU. Current regional Authority for Auckland is 101814- FAU, and 119558-FAU.
- Wellington/ Nelson Region: survey only 91417-FAU
- Wellington salvages: 91371-FAU, 118190-FAU, 119475-FAU, 119897-FAU, 119503-FAU
- Tasman (Pohara) salvage: 97668-FAU
- Mt Cass windfarm: multi-programme salvage: 81670-FAU and 86276-FAU
- Mackenzie Basin survey: 91677-FAU
- Current survey permits (as of October 2025)
  - Auckland
  - Waikato- Taranaki 117741-FAU
  - Hawkes Bay 119797-FAU
  - Wellington 117825-FAU
  - Nelson/ Top of South 117824-FAU
  - Canterbury 117740-FAU
  - Otago/ Southland 119794-FAU
  - West Coast 117742-FAU

Experience summary:

- Project manager & field lead for tuatara translocations to Whale Island (1996), Tiritiri Matangi (2003) and Motuihe Islands (2012).
- Lizard island surveyor (on contract) for DOC Auckland (1993 – 2000) undertaking spotlight, pitfall, ACO surveys of rare and threatened lizards on Mercury Islands, Alderman Islands, Hen & Chickens Islands and other outer Hauraki Gulf islands.
- Lizard surveys in Otago, Canterbury (Mt Cass wind farm) and MacKenzie Basin sites for windfarm and irrigation projects during 2003-2007.

- Currently managing major lizard survey, salvage, relocation, post-release monitoring and research programmes at sites in Christchurch (Mt Cass wind farm), Wellington (various land development projects), and Otago (Matakanui Gold Mine project).

Graham has undertaken approx. 75 other survey, salvage, rescue/relocations on private property from 2007 – 2025.

Graham has prepared more than 80 lizard management plans for consented development projects and has undertaken salvage works for most of those (some consented developments have not gone ahead).

Support ecologists

Sam Heggie-Gracie – MSc (Biosecurity and Conservation), CEnvP (General):

Sam holds a MSc in Biosecurity and Conservation and has eight years' experience as an ecological consultant. Sam is experienced in undertaking lizard salvaging on large construction projects such as the Pūhoi to Warkworth Motorway, Matawii Water Storage Reservoir and O Mahurangi - Penlink. Sam's experience surveying skinks and geckos has included a number of techniques including spotlighting, manual habitat searching, construction-assisted salvaging, tracking tunnels, Artificial Cover Objects, pitfall trapping, closed cell foam covers and funnel trapping. Sam has experience with a variety of species including copper skink, ornate skink, southern grass skink, Canterbury grass skink, striped skink, egg-laying skink, shore skink, Raukawa gecko, Pacific gecko, and forest gecko, with training experience from herpetologist Dr. Matt Baber. Sam has also undertaken monitoring and habitat mapping of Hochstetter's frog with Dr. Matt Baber and herpetologist Dylan Van Winkel. Sam has authored Lizard Management Plans including those for large construction projects such as Te Ahu a Turanga: Manawatū Tararua Highway, Te Ara o Te Ata – Mt Messenger Bypass and Auckland Regional Landfill.

Sam holds a personal lizard survey permit for the Auckland region (117239-FAU). Sam is a Certified Environmental Practitioner – General (CEnvP) and holds a Certificate in Tikanga (Mātauranga Māori) Level 3.

Holly Madden (BSc Env Sci):

Holly is a passionate ecologist with a background in field conservation and 5 years' experience in the ecological consulting, pest management, and biosecurity sectors. Her technical skills and experience span terrestrial and freshwater ecology including wetlands, streams, freshwater fauna, botany, herpetofauna, and avifauna, from base inventory surveys, through to effects assessments, construction monitoring, and compliance reporting.

Holly is lead ecologist/ herpetologist on several complex dam, wind farm, and mining projects, and has a personal portfolio of smaller projects where she provides end-to-end delivery. While she works across New Zealand, her focus is on infrastructure, extraction, energy generation, and land development in the South Island.

Holly strives to deliver positive ecological outcomes and forges strong relationships with clients and stakeholders. She is very organised, efficient, and applies a laser focus to client's needs.

Holly has a growing breadth of skills and experience with New Zealand herpetofauna, having worked solidly on lizard projects over the past three years, from small scale surveys and salvage, through to managing wind farm lizard salvage and monitoring programmes and a large mine site (survey area 4,300 ha) in Otago that has involved many of the same species of lizards as possibly present at this Lake Pukaki site.

For lizard projects, Holly has undertaken surveys, habitat assessments, post-release monitoring programmes, salvage and relocations, and overseen the establishment of habitat creation within

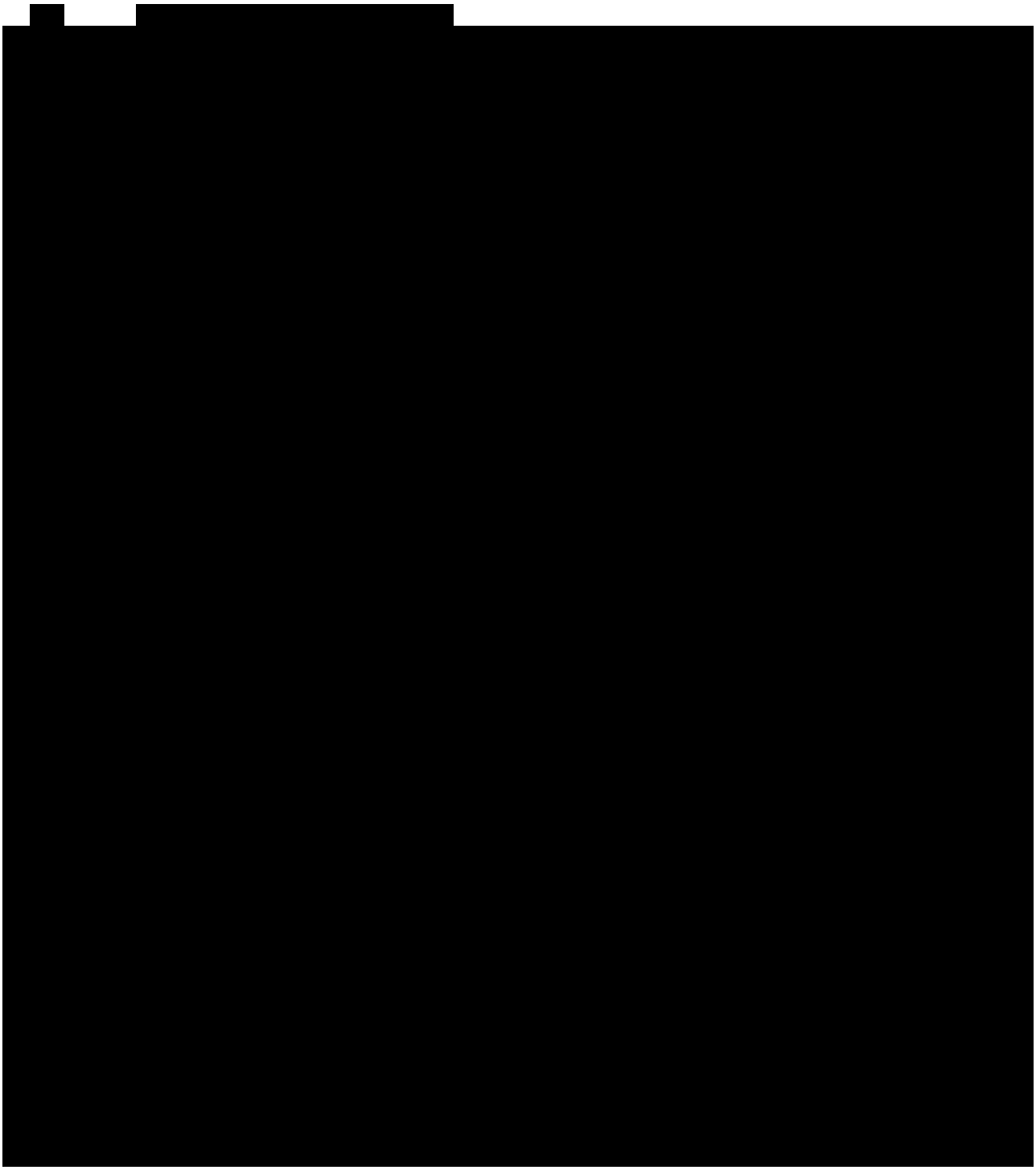
lizard release sites on small and large-scale projects. She has prepared many lizard management plans and completed dozens of lizard-focussed technical reports. Holly has been exposed to a wide range of lizard species, in particular across the Canterbury and Otago regions, and has used this knowledge to adapt methods and techniques to ensure best practise standards are met for each target species, including helping develop new techniques and trial new lizard sampling technologies.

Appendix C Principles of Lizard Management

Table Appendix C.1: Principles of Lizard Management (DOC Technical Advisory Group, 2019)

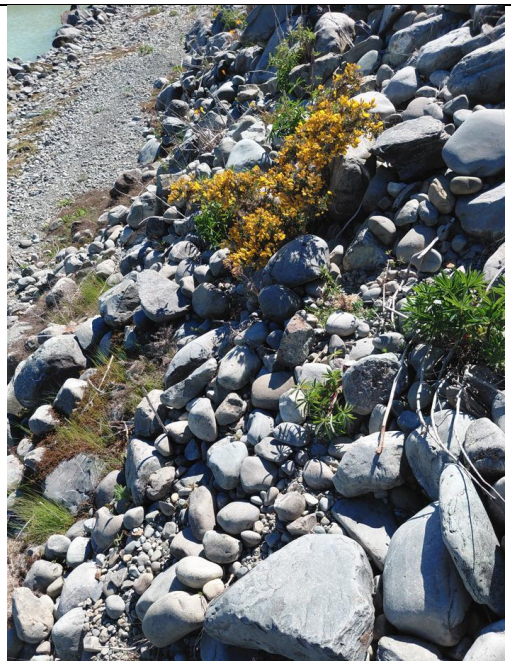
Nine Principles of Lizard Management (Department of Conservation Lizard Technical Advisory Group, 2019)	How/where each principle is addressed in this LMP [*example text*]
1. Lizard species' values and site significance must be assessed at both the impact (development) and receiving sites.	Lizard values have been assessed at the impact site through desktop assessment and on-site habitat assessment. A pre-construction survey was undertaken to determine which species were present.
2. Actual and potential development-related impacts and their significance must be assessed.	Actual and potential impacts described in Section 2.2.
3. Alternatives to moving lizards must be considered.	Rock armouring works cannot avoid potential lizard habitat. The access tracks will be kept as narrow as practicable to avoid potential lizard habitat.
4. Threatened lizard species require more careful consideration than less-threatened species.	The compensation financial contribution has been raised for At Risk species.
5. Lizard salvage, transfer and release must use the best available methodology.	Standard salvage methods are proposed. Due to project timeframes, salvage outside the standard lizard salvage season may be required, based on a 'best endeavour' approach.
6. Receiving sites and their carrying capacities must be suitable in the long term.	There is abundant habitat along the relocation site eastern margins and hillslopes of the Pūkaki River.
7. Monitoring is required to evaluate the salvage operation.	The financial contribution will be used to contribute to an existing lizard enhancement site where there is a population of lizards of the same species at the impact site. The proposed enhancement measures will benefit the Threatened Mackenzie skink.
8. Reporting is required to communicate outcomes of salvage operations and facilitate process improvements.	Reporting will be undertaken as outlined in Section 8.
9. Contingency actions are required when lizard salvage and transfer activities fail.	Financial contribution has been provided as it is acknowledged that some lizard injury and mortality will likely occur.

Appendix D Photographs



D3 Control site habitat

Photograph Appendix D.9: Control site comprising cobble habitat beside the Pūkaki River.



Photograph Appendix D.10: Control site comprising cobble habitat beside the Pūkaki River.

D4 Representative lizard photographs

Photograph Appendix D.11: Southern Alps gecko.

Photograph Appendix D.12: Southern Alps gecko skin.

Photograph Appendix D.13: Southern grass skink.

Photograph Appendix D.14: McCann's skink.

Photograph Appendix D.15: Mackenzie skink basking.

Appendix E Compensation Management Plan

E1 Introduction

As a result of the proposed activities outlined in Section 2.2, the Lake Pūkaki armouring works will result in adverse impacts to native lizards, including At Risk species.

The overall level of effect, after efforts to avoid, minimise and remedy, is **high** for Southern Alps gecko and Southern grass skink and **low** for McCann's skink.

Residual adverse effects are expected due to:

- Lizard injury or mortality during construction works and/or stockpile use.
- Loss of lizard habitat.

Compensation is proposed to address residual adverse effects and effects to lizards protected by the Wildlife Act 1953.

A compensation contribution of $30,000 is proposed to address adverse impacts on native lizards. The purpose of the fund is to provide ecological benefit to native lizards in the local environment. The compensation fund has been targeted toward the management of Mackenzie skink (Threatened – Nationally Vulnerable) but will also benefit Southern Alps gecko, Southern grass skink and McCann's skink which are also distributed across the compensation areas.

The proposed fund will be used to control wilding conifer over an area of 7.3 ha (e.g. equivalent amount of habitat impacted by the proposed works).

Any records of Mackenzie skink (or any other nationally Threatened species) during the lizard salvage works will trigger additional compensation of $10,000 to be used in accordance with this CMP.

The fund will support DOC's wilding pine management the summer immediately following stockpile use.

E2 Proposed compensation area

In discussion with local Twizel DOC Office staff (18 November 2025) a potential compensation area was identified [redacted]

Through Project River Recovery (PRR) funding, DOC has been implementing wilding pine control to enhance the habitat at this site to benefit the lizard population, which includes Mackenzie skink (Threatened – Nationally Vulnerable). Regular lizard monitoring through pitfall trapping is undertaken at the site to assess the response of the lizard community to the pine management.

Through contributing to an existing management programme, it is expected that greater biodiversity gains would be achieved compared to establishing a new compensation management regime. The input of additional funds to this site allows for a continuation and/or expansion of wilding pine management to specifically target and enhance a known native lizard population.

Lizard habitat across the compensation site includes scree slopes, rock piles and complex shrubland. Mackenzie skink and other native lizard species are present. Wilding pine invasion has resulted in the shading of lizard habitat, reducing basking habitat availability. Pine needles also smother interstitial spaces that would otherwise provide effective lizard micro-habitats. Through the control of wilding pine, the site is enhanced by increasing basking sites and reducing pine needle fall, maintaining and enhancing suitable habitat for lizards.

The total area over which Mackenzie skink are monitored is more than 80 ha (Appendix A Figure 6). Figure 3 of the Fast-track Approvals Act wildlife approval report[6] (Section 51(2)(c) presents:

- Wilding pines on LINZ land to the south/southeast of monitoring grids.
- Mackenzie skink habitat that includes 6 monitoring grids.

Wilding conifer management is proposed to target 7.3 ha of the Mackenzie skink habitat (refer to Appendix A Figure 6 for an example of the proposed management area). The target area for 7.3 ha will need to be focused across an area which ties into wider wilding conifer management in the catchment. The exact area will best be determined by DOC in coordination with the wilding pine contractor.

The exact location of wilding pine control and maintenance should be reviewed once funding is released. Wilding pine extent and maturity is constantly changing, and the management area should those areas that will maximise benefits to native lizards.

Meridian is already undertaking pine management on its landholdings. All wildling conifer management will be implemented outside existing planned management areas to meet the additionality principle of compensation.

The funding should be ring-fenced for wilding pine control in the Mackenzie skink monitoring area. Ring-fencing the funds will ensure lizards will directly benefit from the compensation (rather than the fund going toward unrelated biodiversity management).

E2.1 Wildling conifer control measures

The predominant species for control is lodgepole pine (*Pinus contorta*). Lodgepole pine can reach maturity and produce viable wind-spread seeds at 3 years of age.

The purpose of wilding conifer management comprises removal of potentially seeding wilding conifers (exotic conifers 3 years or older) across 7.3 ha, and follow-up maintenance control every 2nd year for 10 years. Works are expected to commence the summer immediately following stockpile use.

The contractor will work with DOC or a suitably qualified herpetologist to identify the areas of high quality vs low quality lizard habitat, and the most effective conifer control measure.

Across high quality lizard habitat (defined as boulder and gravel fields, often with native berry-producing shrubs), wildling conifer will be cut and poisoned. On low quality lizard habitat, dense infestations of wilding conifer can be aerially sprayed[7]. When controlling wildling conifers, effort will be made to avoid accidental impacts to native vegetation.

Initial control will require pines to be cut and poisoned. All material from wildling pine control (including cut trees from previous operations) will be removed to the base of the river terrace riser[8].

For follow-up maintenance, small seedlings less than two years old can usually be pulled up by the base. Green needles and roots need to be removed to avoid regrowth.

E2.2 Measures to avoid and minimise lizard injury and mortality

Wilding conifer control should be undertaken in a manner that avoids lizard injury and mortality to the extent practicable. This includes:

[6] Department of Conservation (23 March 2026). Fast-track Approvals Act wildlife approval report.
[7] Any aerial spraying will need to be undertaken in accordance with relevant legislation around the use of chemicals.
[8] Woody debris may be used by native lizards as additional habitat.

- Use of existing access tracks to access the site. There is an existing access track along the eastern side of the Pūkaki River to be used.
- Hand clearance and removal of wildling conifers where practicable.
- Avoid machinery tracking over high-value lizard habitat where practicable.

E3 Compensation principles

Although not a statutory requirement for renewable electricity generation assets and activities, the NPS-IB principles for compensation provide a useful framework for assessing the appropriateness of compensation measures. The principles and associated commentary related to the proposed compensation site are provided in Table Appendix E.1 below.

Table Appendix E.1: Compensation principles as detailed in the NPS-IB (Appendix 4).

Compensation principle	Description
Adherence to the mitigation/ effects management hierarchy	Refer to Section 6.
When biodiversity compensation is not appropriate	The indigenous biodiversity values are not irreplaceable and are expected to respond to habitat enhancement measures.
Scale of biodiversity compensation	The indigenous biodiversity values lost through the activity to which the biodiversity compensation applies are addressed by positive effects to indigenous biodiversity that outweigh the adverse effects. Specifically, impacts to 'Not Threatened' and 'At Risk' species will be addressed through habitat enhancement that will benefit these species, as well as the 'Threatened' Mackenzie skink.
Additionality	The compensation site is managed under a current programme of wilding pine management and skink monitoring. However, the fund will be used to expand the area of pine management above and beyond that which would be undertaken in the absence of the additional funding.
Leakage	The proposed compensation is not expected to displace or harm existing indigenous biodiversity values.
Long-term outcomes	The area is managed by DOC. The existing funding for the management of wilding pine at this site is limited. Additional funding allows for further pine management at the site.
Landscape context	The proposed compensation is located in relatively close proximity to the impact site. The compensation site is 5 km away from the impact site.
Time lags	No delay between the impact and the compensation fund becoming available is expected. Wilding conifer will be controlled in the nearest appropriate season.
Trading up	The compensation fund comprises some trading up. The species impacted by the activity (McCann's skink, Southern grass skink and Southern Alps gecko) are likely to benefit from the pine management undertaken at the compensation site. However, the specific compensation site has been selected to benefit known habitat of the Mackenzie skink, a Threatened species. As such, the indigenous biodiversity gains are expected to be greater than those lost.
Financial contributions	A financial contribution has been considered as there are limited opportunities for delivering biodiversity gains at the impact site. The contribution directly funds biodiversity values identified in and near the impact site.
Science and mātauranga Māori	The design and implementation of the enhancement measures at the compensation is being informed by science. Iwi input into the current

Compensation principle	Description
	programme (Project River Recovery) has allowed for mātauranga Māori input to the proposed compensation.
Tangata whenua and stakeholder participation	Tangata whenua should be invited to participate in any future habitat enhancement and/or skink monitoring.
Transparency	The compensation site is already being managed and results are published regularly by DOC. It is expected that the design and implementation of the compensation measures are therefore transparent.

E4 Reporting requirements

A report will be completed within 30 days of the initial wilding conifer control being completed, as well as completion of follow-up control events and submitted to DOC.

The report will include the following:

- Conifer control methods and results, including extent of management.
- Any issues regarding conifer control and recommendations for future conifer management.
- Recommended follow-up control areas and timings.
- Incident reporting, including any impacts to lizards or lizard habitats.

E5 Summary

The Lake Pūkaki armouring works will cause adverse impacts on native lizards, including At Risk species. Despite efforts to avoid, minimise, and remedy effects, the residual level of impact is assessed as:

- High for Southern grass skink and Southern Alps gecko
- Low for McCann's skink

Residual adverse effects include:

- Potential injury or mortality during construction and stockpile use
- Loss of lizard habitat

To address these impacts and comply with the Wildlife Act 1953, a $30,000 compensation fund is proposed. Discussions with DOC identified a compensation site [redacted] (Appendix A Figure 6), which is already part of a Project River Recovery (PRR) initiative for wilding pine control and lizard monitoring.

Key features of the compensation approach:

- Builds on an existing DOC management programme for greater biodiversity gains.
- Enhances habitat for species including Mackenzie skink (Threatened – Nationally Vulnerable).
- Site area: ~7.3 ha, comprising scree slopes, rock piles, and shrubland.
- Wilding pine removal improves basking sites and micro-habitats by reducing shading and needle fall.

Funding will be ring-fenced for wilding pine control at the identified site to ensure direct benefits to native lizards. It is considered that this compensation management adequately addresses adverse effects to the lizard community associated with impacts related to the proposed dam armouring works.

Appendix F Fast-track pre-lodgement consultation summary

Fast-Track Pre-Lodgement Consultation Summary

Purpose - This document provides a summary of information from DOC following a pre-lodgement consultation request.

Project Details

Project name:	Lake Pūkaki Hydro Storage and Dam Resilience Works
Engagement type:	Consultation for referral application
Applicant/agent:	Meridian Energy Limited
Proposal overview:	The following activities are proposed: - Permanant placement of rock armouring at Pūkaki Dam to enhance the resilience of the dam when operating at low lake levels. - Temporary approval (for three consecutive years immediately following the granting of consent) to ease access restrictions on Lake Pūkaki contingent storage, allowing it to operate between 518 mRL and 513 mRL (metres above mean sea level).
Location:	Lake Pūkaki, Mackenzie District.
Date pre-lodgement request received:	11 June 2025
Summary of pre-lodgement Consultation	
Fast track project lead DOC:	Amelia Wilkinson – Permissions Advisor – Fast-track (National Office)
DOC specialist input required:	Fast Track Project Lead RMA Planner Statutory Manager (Regional Office) Technical Advisors Ranger (Twizel)
DOC Permissions/ Approvals Identified by applicant in pre-lodgement request as potentially required:	• Authority under Wildlife Act 1953 For the disturbance of lizard habitat, and the capture, holding and relocation of any lizards present to an alternative area of established habitat.

DOC Commentary on Fast Track approvals and permissions identified: **Note DOC's role in relation to specific**	**Wildlife Act Permissions** <u>Potential issues to consider:</u> To install/construct the rock armour during lower than the status quo lake levels, several activities are proposed over habitats of indigenous lizards. These activities will have actual and potential adverse effects on lizard populations and their habitats, including mortality. The Project area and surrounds is known to provide habitat for five indigenous lizard species, four of which are At Risk or Threatened. Field surveys will be required to confirm if lizards are present within the project area. Known populations of Mackenzie skink and Lake's skink occur directly adjacent (within ca. 100 m) to both stockpiles. Given the length of time stockpiles have been present (11 years), there is a high chance these lizards have colonised the stockpiles. Disturbance of these may result in injury, death and/or displacement of lizards occupying these areas. There are multiple opportunities to avoid adverse effects on lizard populations and their habitats. Avoidance actions should be informed by robust best-practice survey and take precedence over attempts to move/relocate lizards. Avoidance of adverse effects should be prioritised over relocation for any Mackenzie or Lake's skink (both Threatened – Nationally Vulnerable) populations detected through survey. <u>To mitigate some of the highest risk activities of the proposal the following is recommended:</u> • Seek to avoid rocky habitat for stockpile sites, choose area over existing hard surfaces where no lizard habitat exists. Suggest project herpetologist to approve stockpile site. • Investigate alternative sources of rock for armouring work, if not possible appropriate methods of relocation (including identification of release site) will need to be provided. • Suggest spoil disposal sites are selected by the project herpetologist or failing this, are confined to already disturbed sites. Spoil disposal should avoid rocky areas and areas of vegetation including exotic grasslands • Consider risks that lowering of the lake for extended periods may have on lizards inhabiting the area i.e.lizards may colonise exposed rock as lake levels are lowered and be at risk of drowning if water levels are raised during winter months (when they are not active).

	Information requirements: The substantive application should contain a Lizard Managment Plan containing the information requirements specified in Schedule 7 of the Fast-track Approvals Act (including details of proposed avoidance and mitigation measures). This should adhere to relevant Department of Conservation lizard salvage principles and be informed by a best practice lizard survey. If lizard salvage is proposed a suitable release site will need to be identified. Guidance for applying for a wildlife approval under the Fast-track Approvals Act 2024 can be viewed here:Guidance for applying for a wildlife approval
Treaty partners:	DOC is aware of the following Treaty partners with interests that may be relevant to this site: • Te Rūnanga, Ngai Tahu We encourage the applicant to engage directly with relevant Māori groups as required by section 29 of the Act.
Treaty Settlement implications/considerations:	DOC is aware of the following Treaty settlement obligations that may be relevant to this site: • A Statutory Acknowledgement applies to Lake Pūkaki and provides formal acknowledgment of the relationship that Ngāi Tahu have with Lake Pūkaki. • DOC notes species known or likely to be present on the project area include Taonga Species listed in a schedule to the Ngāi Tahu Claims Settlement Act 1998 and that the Act requires DOC work together with Te Rūnanga to discuss the approach to resource management issues. • Te Rūnanga o Ngāi Tahu participates in the Species Recovery Group for kakī (a taonga species), with DOC.
Section 4 Conservation Act 1987 implications/considerations	In the time available, DOC has not carried out a process to identify section 4 implications/ considerations specifically relevant to this site
Potential Resource Management Act (RMA) considerations and effects: *Note: DOC's role in relation to 53(2)(m)(i) FTAA*	The proposed activity of lowering the lake levels may result in adverse impacts to indigenous lakeshore turf and wetland plant communities (including Threatened and At-Risk plant species). Understand the effects the activity may have on braided riverbed. If the project is referred, appropriate conditions should be included in the substantive application that ensure lake levels are managed in a way that means current time periods at high levels are maintained. Return to high

	lake levels is particularly important in Spring to minimise weed invasion and erosion. Ongoing monitoring of lakeshore turfs and wetlands, particularly those supporting threatened species, should also be a condition in order to inform lake level management strategies and minimise adverse effects.
DOC Statutory Planning Document considerations in relation to site (e.g. CGP/CMS/CMP):	The alignment of the proposed project's impacts on wildlife with statutory planning documents should be considered as part of the overall assessment, noting the site is not (but is adjacent to) public conservation land. Canterbury (Waitaha) Conservation Management Strategy 2016.
Any specific information requests to applicant(s)/agent for pre-app engagement at this point:	Recommend further engagement prior to lodging substantive application if the project progresses as this would allow us to give more focused feedback on the application.
Any further information/considerations:	Extended periods of low lake levels may impact the feeding habitat for kakī and other braided river bird species. DOC recommends that any extension of the legal operating range of Lake Pūkaki is accompanied by ongoing monitoring of the responses of kakī. Monitoring should focus on the number of kakī that use the Tasman Delta and ultimately on their survival and breeding success. Additional mitigation measures may be required to account for any observed impacts. In addition to the information required for the wildlife approval, the substantive application should also include the following information: • A full ecological assessment, including assessment of actual and potential effects on vegetation, wetlands, freshwater, and fauna including avifauna and lizards. • Proposed consent conditions, including details of lakeshore turf, wetland and avifauna monitoring and mitigation, including any adaptive management requirements.

Additional Notes:	While DOC will assist applicants as much as we can when they engage in pre-lodgement consultation, it is the applicants' responsibility to comply with the FTAA and to ensure they have applied for all permissions they need. Note that a panel will invite the statutory bodies listed in clause 4 of Schedule 7 to comment on the application (NZCA, conservation boards, Fish and Game Council, and Game Animal Council). We encourage applicants to engage with these bodies in advance of filing a substantive application. It is recommended that the information contained in the application documents addresses each of the information requirements for the various approval sought, including any additional information requirements for listed projects. A checklist of information requirements is attached, including checklist E (Wildlife Approval information requirements). Use of clear headings for each information requirement would assist with navigating the documents.

Appendix G eDNA results summary

Table Appendix G.1: eDNA results lizard summary. Numbers relate to the sequence count (the number of times a unique sequence was detected in each sample taken; a low sequence count is considered a tentative detection).

Common name	North Stockpile	North Stockpile	North stockpile	South stockpile	South stockpile	South stockpile	South stockpile	South stockpile	Control site	Control site	South stockpile	South stockpile	North stockpile
	eDNA tunnel								Scat	Scat	Scat	Scat	Specimen
McCanns skink	0	0	0	0	0	0	0	0	0	12686	22888	23836	28852
McCanns skink	0	0	0	0	0	0	0	0	0	61	885	781	6384
Southern Alps gecko	0	0	0	0	0	0	0	0	699	0	0	0	0
Skink sp.	6	0	0	0	0	0	0	0	0	0	0	0	0
Lepidosaurs	0	0	0	0	0	0	0	0	145	0	0	0	0

Appendix H Lizard exclusion fence specifications

Lizard exclusion fencing specifications are provided in Table Appendix H.1below. The exact method may be changed to accommodate different material or construction methods that achieve the same outcome (exclusion of lizards from the North Stockpile).

Table Appendix H.1: Fencing specifications for North Stockpile.

Function	Product	Dimension
Wall sheet	High Density Polyethylene (HDPE) smooth membrane 1.5mm	1m x 50m rolls
Post 'bandage'	'Permaflex' Flexible Polyethylene (PE) Geomembrane 0.3mm thick x 500mm wide	4m x 4m packs
Posts, at 2m spacing	1.8m x ~110mm. No. 2 rounds. H4.	No. 2 rounds. 1.8m x 90mm >115m. Or No. 1 rounds 1.8 x 125mm>140.
HDPE sheet end joining. Aluminium rectangular 'batten', 800mm long piece per joint.	50mm wide x 6.0mm thick x 4m long flat bar (Vulcan part No. F506MI4L)	50mm x 6mm x 800mm lengths (=5 lengths per 4m long part)
For fixing 'bandage' & wall membrane to posts.	Nail gun nails	
For fixing aluminium batten + HDPE membrane to post. Also for fixing penny washers where there is no aluminium batten.	14G X 40 CLASS 4 GALV HWF T17 TEK SCREW (Hex head washer face self tapping = "wood biters").	14G x 40mm
For fixing wall membrane to posts that don't have a wall membrane joint on them).	penny washers, stainless steel	
For fixing HDPE skirt to 200mm x 50mm x 200mm horizontal underground joiner block	14G X 40 CLASS 4 GALV HWF T17 TEK SCREW (Hex head washer face self tapping = wood biters)	14G x 40mm
Below-ground membrane skirt joint backing	200mm x 50mm x 200mm long H4 timber piece	120mm x 50mm x 200mm
Other costs include freight and labour time.		

Notes regarding fence installation include:

- Consider utilisation of back fill aggregate and tamping with a pneumatic tamper on the inside of the fence.

- Use of alloy strips 50mm x 6mm.
- Holes should be predrilled in the alloy stripes. The time it takes to install the fasteners (nails and tech screws) can reduce lowering the labour cost.
- Refer to example photographs below.

	
Photograph Appendix H.1: HDPE membrane which mitigates lizard climbing.	*Photograph Appendix H.2: HDPE membrane attached to post.*

	
Photograph Appendix H.3: Fencing establishment.	*Photograph Appendix H.4: HDPE membrane atttached to post.*

www.tonkintaylor.com