

Rangitooopuni

Lizard Management Plan

for: Rangitooopuni Developments Limited Partnerships



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1 INTRODUCTION

This Lizard Management Plan (LMP) has been prepared for Rangitooopuni Developments Limited Partnership to minimise potential effects on native lizards (skinks and geckos) prior to and during removal of their potential habitats as part of the proposed development. The project area is entirely clear-felled pine, including large areas beyond bulk earthworks that would be protected and revegetated, and which may also support indigenous lizards. Vegetation clearance is proposed to be undertaken as part of standard rotational harvest, and the baseline conditions for lizard management are represented in Figure 1 and Figure 2 and below. Figure 3 depicts the identified vegetation types within the project area. However, it is anticipated that some stages across the project area will have regenerated prior to proposed earthworks, and therefore some areas may have young (<6 years) regenerating weedy growth. Lizard management will need to be completed prior to each stage of earthworks, including slash removal and potentially young weedy ground cover growth.



Figure 1. Example of potential lizard habitat in clear-felled pine at Rangitooopuni-Riverhead Forest



Figure 2. Rangitoopuni-Riverhead Forest baseline condition post-harvest.

The entire site is a commercial pine plantation, and management would respond to ecological values that are associated with a post-harvest baseline (e.g. Figure 1, Figure 2. Rangitoopuni-Riverhead Forest baseline condition post-harvest.). Within this environment, bulk earthworks will generally be confined to infrastructure (e.g. roads) and building platforms within Lots 1 and 2. The remainder of the site will be permanently restored with 222 ha of permanent, pest controlled, indigenous vegetation (Figure 3). Further, the site currently supports a network of watercourses and wetlands, all of which would be protected and enhanced as a result of the development.

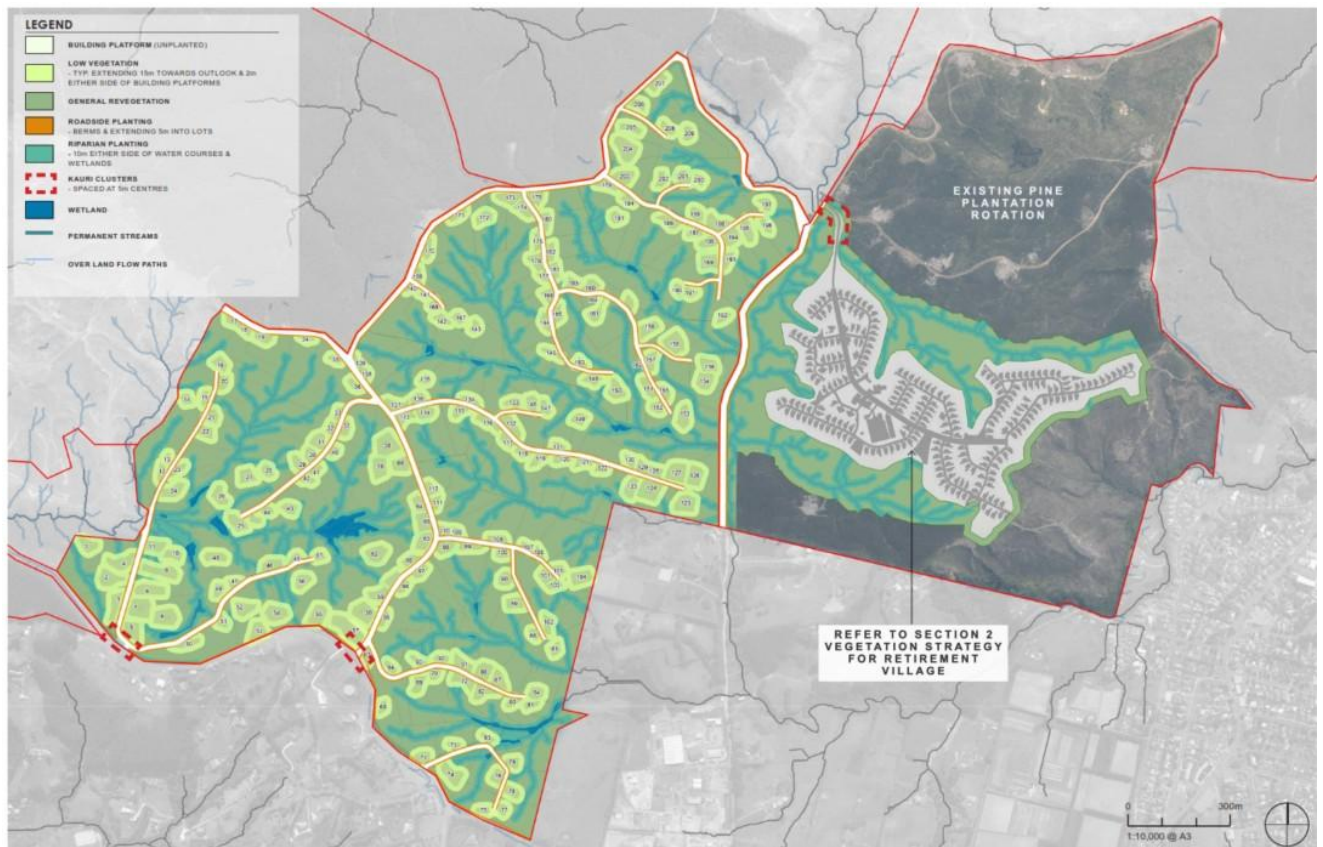


Figure 3. Rangitootupuni-Riverhead Forest Countryside living proposal showing large areas of ‘General Revegetation’ around localised building platforms and infrastructure. These areas would be restored and pest-controlled, and would support relocated lizards, during staged works. Image courtesy of Boffa Miskell (2025).

1.1 Potential Lizard habitat

At Risk (high value) **copper skinks** (*Oligosoma aeneum*) are considered to potentially be present. Copper skinks have not been recorded but are assumed to be present because they have been reported within or around the edges of other pine plantations and are widespread within the Auckland Region, including within young weedy vegetation such as rough roadside grasses. It is considered that their abundance throughout a harvested pine environment is likely to be very low, on the basis that their populations may persist within and around the edges of rotational harvest, however are unlikely to be abundant in these highly disturbed environments, particularly in the presence of a full suite of predators (birds, rats, mice, hedgehogs and mustelids). Some population expansion may occur as the forest matures, however, copper skinks are generally considered to be in gradual decline throughout their range (Hitchmough et al. 2021) and in Auckland (Melzer et al. 2022).

This Plan should be read in conjunction with the Project's EclA (Bioresearches, 2025a), and Ecological Management Plan (Bioresearches, 2025b).

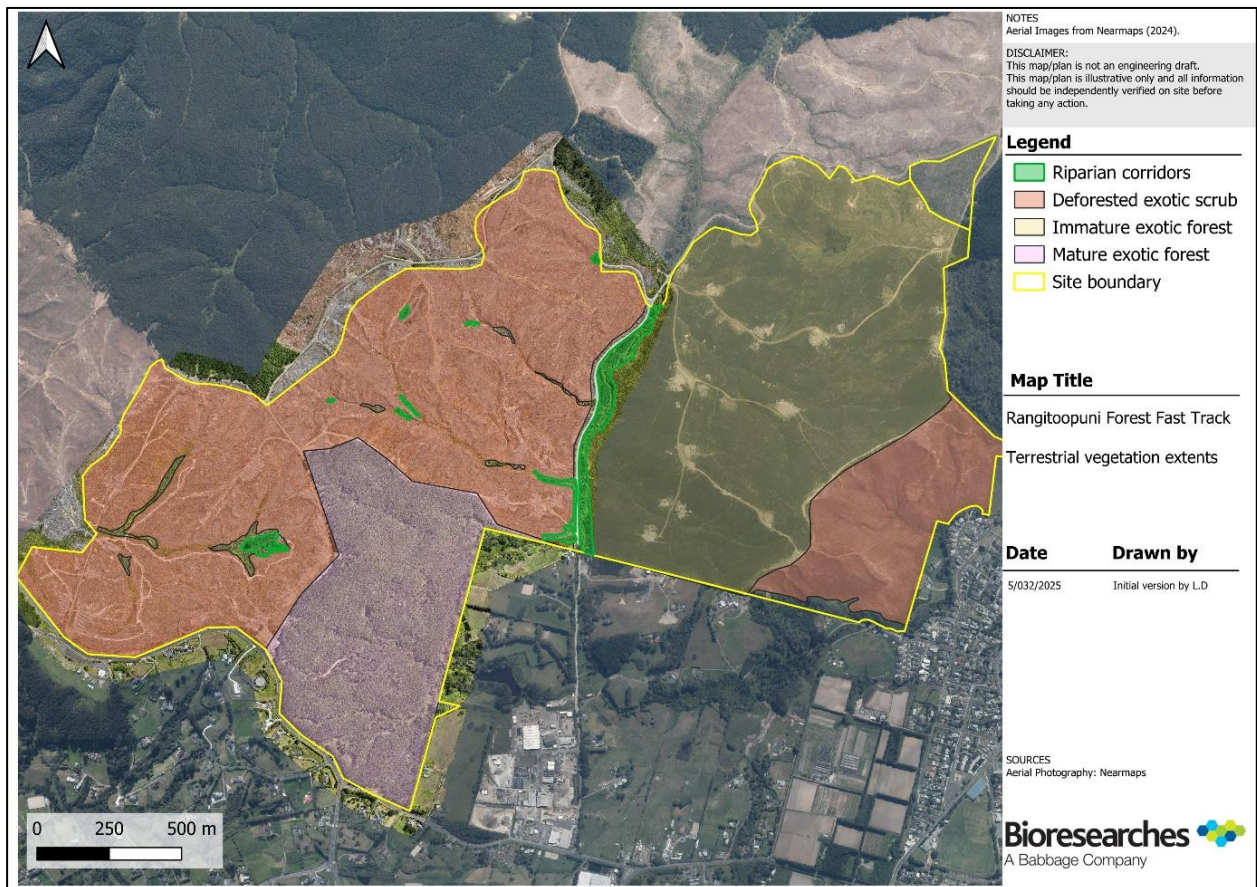


Figure 4. Identified terrestrial vegetation types within the Project Area

1.2 Objectives

The objectives of the LMP are to minimise potential adverse effects on native lizards within the construction footprint by way of capturing and relocating any indigenous lizards prior to and during vegetation removal, and providing habitat enhancement and pest control, where appropriate. Further, this LMP aims to achieve the following:

- The population of each species of native lizard or invertebrate present on the site at which vegetation clearance is to occur (impact site) shall be maintained or enhanced at an appropriate alternative site; and
- The habitat(s) that lizards and invertebrates are transferred to (release site) will support viable populations for all species present pre-clearance.

These objectives will be achieved by:

- Using current best practice to capture native lizards from vegetation in the footprint prior to and during vegetation clearance and relocating any captured individuals to safe and suitable habitats;
- Applying recognised surveying and monitoring protocols that are to be followed, using the Department of Conservation's (DOC) Natural Heritage Management System's Herpetofauna Inventory & Monitoring Toolbox and/or using new advances in tools and techniques not yet incorporated into the toolbox; and
- Meeting requirements of the Wildlife Act (1953) and Resource Management Act (1991).

This LMP addresses the following:

- A summary of the affected habitat and species covered by the plan;
- Capture and relocation procedures;
- A summary of the recommended release site;

1.3 Statutory context

Herpetofauna (reptiles and amphibians) comprise a significant component of New Zealand's terrestrial fauna, and more than 85% of the 135 taxa have a conservation status of 'Threatened' or 'At Risk' (Hitchmough et al., 2021). All native reptiles and amphibians are legally protected under the Wildlife Act (1953), and subsequent amendments, vegetation and other features that provide significant habitat for native herpetofauna are specifically recognised by section 6(c) of the Resource Management Act 1991.

Statutory obligations require management of protected reptile and amphibian populations where they or their habitats are threatened by land-use changes. Management recommendations are usually addressed in an LMP such as this, which provides a site-specific plan to avoid or minimise adverse construction effects and to ensure that all necessary measures for successful relocation are identified and implemented to protect and/ or enhance their habitats. This LMP may only be implemented under a valid Wildlife Authority, issued by the Department of Conservation (DOC) to a suitably qualified herpetologist.

The Project Herpetologist may be aided by suitably qualified and experienced ecologist/s, who would assist with aspects of the salvage/ relocation. The credential and contact details for the Project Herpetologist are provided in Table 1. A checklist, to ensure this LMP is implemented in line with statutory requirements, is provided in Table 2.

Table 1. Details of Project Herpetologist

Credentials and Contact Details of Project Herpetologist	
Project Ecologist / Herpetologist	Chris Wedding
Credentials	MSc; 18 years herpetological experience
Wildlife Authority	Applied via Fast Track Approvals

Table 2. Lizard Management Plan Checklist

Project start-up	Required of:	Completed
Lizard Management Plan Approval	Auckland Council	
Approved Lizard Released Sites	Landholder / Auckland Council	
Pre-works management		
Pre-works lizard capture and site preparation	Herpetologist / Ecologist	
Works lizard management		
Machine assisted habitat searches (where required)	Herpetologist, clearance contractor	
Post Works		
Works completion report to client, Auckland Council, and DOC	Herpetologist	

1.4 Key Principles for Lizard Salvage and Transfer

The Department of Conservation's *Key principles for lizard salvage and transfer in New Zealand* guidelines require consideration of the following nine guidelines when selecting a receiving site (Table 3).

Table 3. Nine principles for lizard salvage and transfer in New Zealand

Principle #	Principle	Location of information
1	Lizard species' values and site significance must be assessed at both the impact (development) and receiving sites.	Lizard species' value and significance: Earthworks areas: Section 1.4.1 Receiving environments: Section 2.3.1
2	Actual and potential development-related effects and their significance must be assessed.	Section 5.2 of the EclA : S 5.2.1 Deforested exotic Scrub S 5.2.5 Effects on fauna
3	Alternatives to moving lizards must be considered.	No alternatives, but note that the proposal impacts exotic clear-felled pine forest, most of which will be permanently reforested with indigenous species.
4	Threatened lizard species require more careful consideration than less-threatened species.	No threatened species are assessed as having the potential to be present, however, contingency measures are discussed in Section 2.2.5
5	Lizard salvage, transfer and release must use the best available methodology.	Section 2.1 of this LMP provides brief overview of standard DOC biodiversity toolbox methods for lizards and addresses a two-phase approach to salvage.

		Release site is pest-managed and restored with indigenous species, resulting in a better long-term outcome for potentially present populations because rotation harvest will no longer impact established habitats.
6	Receiving sites and their carrying capacities must be suitable in the long term.	Section 2.3 of this LMP Release site is pest-managed and restored with indigenous species, resulting in a better long-term outcome for potentially present populations because rotation harvest will no longer impact established habitats.
7	Monitoring is required to evaluate the salvage operation.	Section 3.1 of this LMP identifies monitoring triggers, objectives, and methods.
8	Reporting is required to communicate outcomes of salvage operations and facilitate process improvements.	Section 4 of this LMP provides requirements for reporting salvage outcomes and monitoring.
9	Contingency actions are required when lizard salvage and transfer activities fail.	Section 5 of this LMP provides a discussion of contingency for outcome monitoring, noting that both failure and success are likely to be difficult to determine with a low likelihood of large numbers of lizards to conclude outcomes from.

1.4.1 Lizard species covered by the plan

No native lizards have been recorded within Rangitooopuni-Riverhead Forest, however, a suite of six native lizard species is considered to have some potential to be present within and around potential habitats associated with mature and clear-felled pine environments. Three of these species have been recorded within 5 km of the project, although two of these (Pacific gecko and forest gecko) have strong associations with indigenous forest habitats that are not associated with the proposal.

It is considered that native lizard abundance throughout a harvested pine environment is likely to be very low, on the basis that their populations may persist within and around the edges of rotational harvest, however are unlikely to be abundant in these highly disturbed environments, particularly in the presence of a full suite of predators (birds, rats, mice, hedgehogs and mustelids). Some population expansion may occur as the forest matures, however all of these species are assessed as being in gradual decline throughout their range nationally (Hitchmough et al. 2021) and in Auckland (Melzer et al. 2022).

Of these species, **copper skinks (*Oligosoma aeneum*)** have not been recorded but are assumed to be present because they have been reported within or around the edges of other pine plantations and are widespread within the Auckland Region, including within young weedy vegetation such as rough roadside grasses. Copper skink numbers within earthworks areas throughout Lots 1 and 2 **are estimated to be less than 100 individuals**. This estimate considers that no native lizards were identified during onsite searches, and that no copper skinks or any other native lizards were recorded from systematic searches

of pine plantation at Dome Valley, following 11 days of fauna habitat searches over February-March 2025 (Bioresearches, unpublished data).

Other species listed in Table 4 could potentially be expected to be encountered on an incidental basis, if at all. **Less than 20 individuals of other skinks or gecko species** are expected to be encountered within the project area. This estimate considers the above search results, and including that other species are less likely to be represented in any native lizard community at the site.

Table 4. Native herpetofauna potentially present within Rangitooopuni-Riverhead Forest

Common name	Scientific name	New Zealand Threat Classification (Robertson <i>et al.</i> , 2011)	Regional Threat Classification (Melzer <i>et al.</i> , 2022)	Recorded within 5 km of Project area
Copper skink	<i>Oligosoma aeneum</i>	At Risk - Declining	At Risk –Declining	✓
Ornate skink	<i>Oligosoma ornatum</i>	At Risk - Declining	At Risk –Declining	
Moko skink	<i>Oligosoma moco</i>	At Risk - Relict	At Risk –Relict	
Forest gecko	<i>Mokopirakau granulatus</i>	At Risk – Declining	At Risk – Declining	✓
Elegant gecko	<i>Naultinus elegans</i>	At Risk – Declining	At Risk – Declining	
Pacific gecko	<i>Dactylocnemis pacificus</i>	Not threatened	At Risk –Declining	✓

2 LIZARD SALVAGE AND RELOCATION PROTOCOLS

2.1 Brief method overview

Potential lizard habitats within clear-felled pine forests are highly disturbed environments and exposed to high thermal fluctuations, rainfall, wash-outs, erosion, and sedimentation. These landscapes often feature deep piles of debris, which are challenging to trap using standard devices such as artificial retreats, pit traps, and funnel traps. Given the low abundances of indigenous lizards expected to be present within these environments, capture methods rely on pre-works systematic searches, as well as machine-assisted searches during earthworks.

The lizard salvage would be implemented as two Phases, including pre-works, works, and post-works phases. This would be carried out within each stage of vegetation clearance. Activities undertaken during these phases are detailed below. A summary of the LMP activities has been provided as a checklist in Table 5.

Relocated native lizards will be released immediately into adjacent habitats beyond earthworks areas that will be subject to restoration planting and pest predator control. Capture and release methods are detailed below. Post-work search will involve the searching of cleared land for any remaining lizards.

Table 5. Lizard Management Plan Checklist.

Project start-up	Required of:	Completed
Lizard Management Plan Approval	Department of Conservation	
Approved Released Sites	Landholder / Auckland Council	
Pre-works management (minimum 10 days prior to staged vegetation clearance)		
Pre-works lizard capture and site preparation	Herpetologist / Ecologist	
Works lizard management		
Machine-assisted habitat searches	Herpetologist, clearance contractor	
Post Works		
Works completion report to client, council and DOC	Herpetologist	

2.2 Timing of the salvage and relocation

The lizard salvage and relocation programme is expected to take place over a 2-6 week period per stage, within the generally accepted North Island 'lizard salvage season' (October to May, inclusive), on days where ambient temperatures range between 12–22°C.

Table 6. General timing for management actions required by the LMP.

Management Action	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lizard salvage												

The following activities are to be completed before any vegetation removal can take place as part of the project works:

- Local iwi representatives are to be notified and provided opportunities for involvement in all aspects of capture, relocation, translocation of skinks and geckos, as well as any ongoing monitoring.
- Lizard salvage is required prior to vegetation removal within potential lizard habitat October 1st to April 31st.
- May 1st to May 31st –vegetation clearance and lizard salvage within potentially suitable lizard habitat is dependent on approval from Auckland Council during this time.
- No clearance of vegetation is permitted from June to September within potential lizard habitat.
- Release site occurs in an appropriate site approved by the herpetologist near the Site.

2.2.1 Activities During and Immediately Post-Vegetation Clearance

- Destructive searches for lizards will take place as vegetation is being cleared within potentially suitable lizard habitat.
- All felled trees will be stacked aside and remain in situ for at least one month to allow for further searches of canopy vegetation.

2.2.2 Phase 1: Pre-Clearance systematic searches for native lizards

Prior to the commencement of earthworks, a herpetologist(s) will carry out a systematic search-and-salvage operation that will involve active searches for lizards in all identified habitats within the earthworks footprint. These searches will be carried out over a **minimum of two weeks preceding earthworks**, according to the stages/timings of removal.

Phase 1 efforts will only be undertaken on days with suitable weather conditions (i.e., daytime temperatures >12°C, precipitation-free). All captured lizards would be processed (sex, age, and condition should be recorded) and relocated to an identified relocation site.

2.2.3 Phase 2: Earthworks Searches

Once the project herpetologist is satisfied that Phase 1 systematic searches have covered all searchable habitats, Phase 2 of the programme will commence. Phase 2 will involve the **salvage of lizards during earthworks** activities.

The implementing herpetologist will work with machine operators to target areas of large and/or deep log piles that could not be searched effectively during phase 1.

Excavators undertaking Phase 2 searches will be fitted with a toothed bucket or root-rake attachment (Figure 5).



Figure 5. *Machine-assisted lizard searches. Herpetologist supervising the scraping of terrestrial vegetation.*

2.2.4 Lizard capture

Native lizards will be captured and handled by / or under the supervision of a DOC-authorised herpetologist only. All native lizards captured prior to and during vegetation clearance operations will be placed immediately into containment boxes or cloth bags for no more than 24 hours before release.

For each native lizard, the following information will be recorded:

- Species, and demography (assessed as male/female/juvenile)
- Date of capture, including method (Phase 1 / 2 search)
- Location of capture
- Location of Release

2.2.5 Incidental discovery

In the unlikely event that a native lizard is found that is not identified in Table 4, the implementing herpetologist will **notify the Department of Conservation**. It is noted that species not identified in Table 4 would likely represent threatened species beyond their known range or have other significance within the regional context. While such species are highly unlikely, any such encounters should be able to be accommodated under this Plan because most potential habitats would be protected and enhanced.

2.3 Release site

This Plan requires immediate transfer of salvaged lizards from earthworks areas to receiving areas to minimise handling and ensure the best possible outcome for lizard salvage-relocation programmes. The Department of Conservation's key principles for lizard salvage and transfer guidelines require consideration of the following components when selecting a receiving site(s):

1. The site must be ecologically appropriate and have long-term security.
2. The habitat at the site must be suitable for the salvaged species and support their capacity.
3. The site must provide exotic predator management, and
4. The site must be protected from future human disturbance.

2.3.1 Release Site Description

All captured lizards will be released into adjacent habitats beyond localised earthworks areas. These areas are generally mapped as 'general revegetation' in **Error! Reference source not found.** and reproduced as Figure 6 below.

The release areas comprise a much larger extent of the same environment, all of which are expected to support low (if any) native lizard numbers (and refer to section 0 for a discussion of lizard abundance within these areas). Because the proposal would result in a land-use change from rotation pine forest to low-density residential use within a permanently reforested environment (including pest control and domestic cat ban), the resulting habitats are expected to be of much higher quality and capacity.

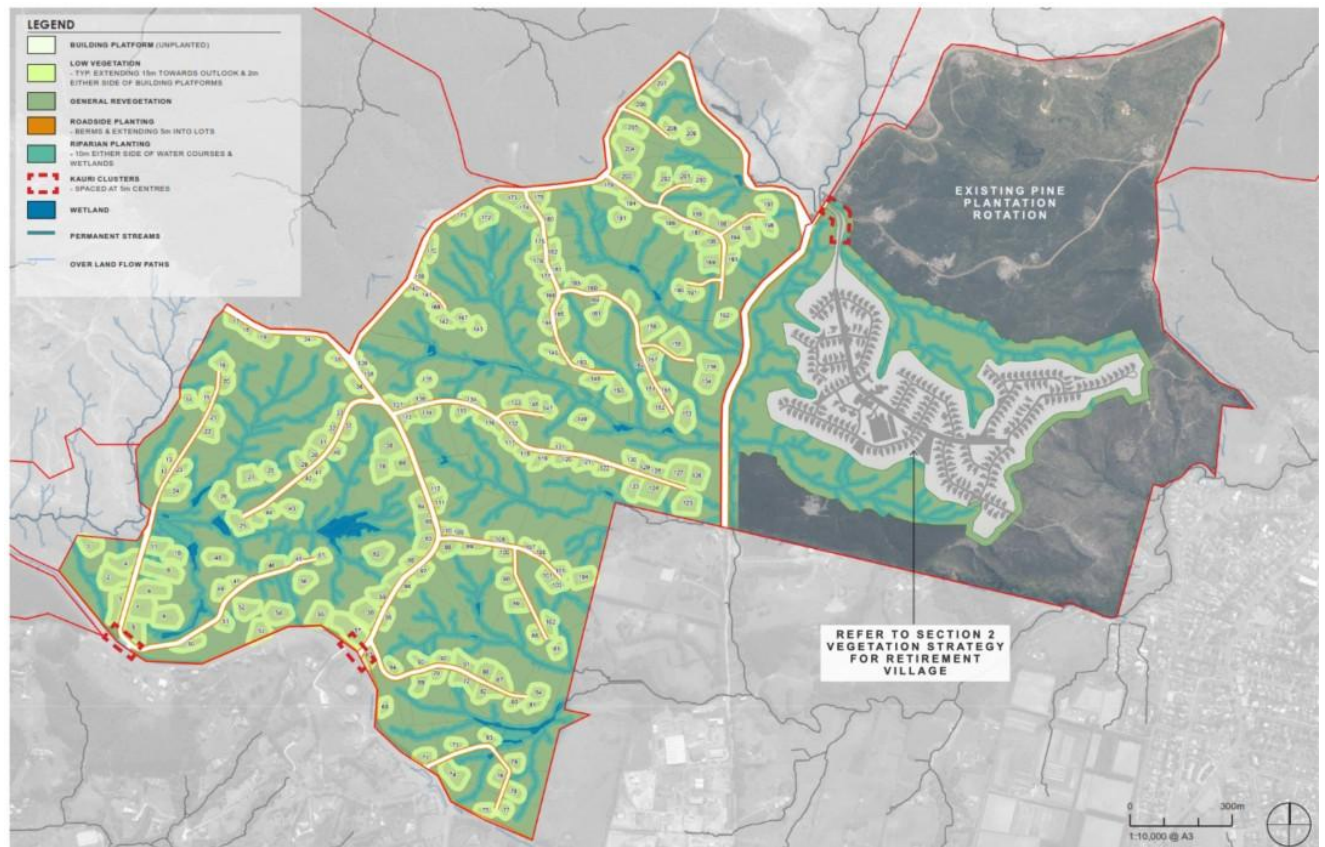


Figure 6. Rangitootupuni-Riverhead Forest Countryside living proposal showing large areas of ‘General Revegetation’ around localised building platforms and infrastructure. These areas would be restored and pest-controlled, and would support relocated lizards, during staged works. Image courtesy of Boffa Miskell (2025).

2.3.2 Release Site Enhancement

This Plan acknowledges that any potential release site may already support the full suite of species covered under this Plan. Displaced lizards have a lower likelihood of survival where the carrying capacity of adjacent habitats is stressed through increased competition for fewer resources. Further, displaced animals have a higher probability of risk of predation, and a rapid increase in lizard numbers in a given area is likely to result in a corresponding increase in predators.

At release sites, any existing native lizards are expected to be in low abundance (recently clear-felled pine), however where such areas are not earthworked, many already support some regenerating canopy cover within riparian margins (e.g., Photo 1, Photo 3, Photo 4). Within these areas, restoration planting will occur directly into slash (e.g. Photo 2), much of which **will support an abundance of refugia. Considering low lizard abundance, these locations are expected to support a very high capacity to receive additional native lizards.** In addition, these areas will also be subject to pest animal control, and future residents will be subject to a domestic cat ban. No other site-specific enhancement is therefore proposed.

Given the large-scale, staged nature of earthworks within a harvested pine plantation, and the expected low lizard abundance in these areas, capture and release mitigation will require a flexible, site-responsive approach. Although general receptor environments are outlined and mapped in **Error! Reference source not found.** and Figure 6, specific release site selection will occur **at the time of salvage**, informed by current site conditions and the herpetologist's judgment. However, to maximise the likelihood of successful establishment, the herpetologist will consider the following release site criteria:

1. Lower Disturbance History

Sites with minimal disturbance from previous harvest operations- such as riparian margins, rocky outcrops, or other buffer areas that previous plantation has avoided- will be prioritised. These areas are more likely to retain microhabitats suitable for lizard refuge and foraging.

2. Evidence of Indigenous Regeneration

Preference will be given to locations with greater levels of natural native vegetation regeneration, particularly where shrubland or early successional forest is present, which may provide higher-quality habitat structure and food availability.

3. Sufficient Ground Cover and Retreat Sites

Receptor areas should contain ample ground cover. This may include slash or other coarse woody debris, rock / log piles, or dense vegetation. Such habitat features offer lizard retreat sites and protection from predators.

4. Spatial Clustering of Release Sites

Release sites should be grouped spatially rather than dispersed. This facilitates the formation or reinforcement of local breeding populations, which is especially important in areas where baseline lizard densities are likely to be very low.

5. Proximity to Contiguous or Higher-Quality Habitat

Where possible, selected sites should be contiguous with areas of higher ecological value (e.g. native remnants, gullies, or conservation set-asides), which may act as source habitats or long-term refuges.

6. Accessibility and Practicality for Monitoring

Sites should also be logistically accessible for post-release monitoring where feasible, without compromising ecological integrity.

The **Project herpetologist** will have discretion in final site selection and may adapt criteria based on real-time field conditions, especially where ecological values, safety, or access constraints arise. All decisions should be documented to support future monitoring and reporting obligations.



Photo 1. Mixed scrub within a protected riparian corridor.



Photo 3. Riparian corridor vegetation on Deacon Stream (protected by development).



Photo 2. Abundant slash following harvest would support lizard refugia.



Photo 4. Intermittent stream reach would protected and could support additional log enhancement as required.

3 MONITORING AND REPORTING

3.1 Monitoring

Success monitoring would be initiated whereby 20 or more native lizards are relocated to adjacent habitats within a single stage of earthworks. This approach aligns with the expectation that few, potentially localised areas of native lizards would be relocated to localised release sites across the > 395 ha staged project. However, where localised release areas receive 20 or more native lizards, then five annual lizard monitoring surveys would be triggered (Table 7). **The purpose of the monitoring is to determine lizard population persistence within protected areas**, where lizard values are detected following salvage. This would be achieved by measuring/identifying the presence of native lizards within those receiving environments.

Monitoring would consist of a grid of at least 40 semi-permanent monitoring stations, consisting of pit traps within the relocation area, as defined following reporting outcomes (see Section 4 below). Locations would provide coverage of both enhanced and planted habitats. Pit traps would be installed at least four weeks before the survey period. The survey period would provide for a minimum of trap checks on fine, non-consecutive days over November-December or March-April, when lizards are most active.

Table 7. Triggers for management and post-release monitoring provisions.

	Trigger	Management provision	Monitoring
A	➤ 20 native lizards per stage	<ul style="list-style-type: none"> Immediate relocation 	Minimum of 5 annual surveys at release area, following staged earthworks
B	ANY native lizard species not identified in	<ul style="list-style-type: none"> Hold lizards and contact the Department of Conservation immediately 	Pending the outcome of direction from DOC.

4 REPORTING

Reporting is important for ensuring compliance with plans, promoting transparency and accountability, and identifying areas for improvement. For potentially present lizards within Rangitooopuni-Riverhead Forest, monitoring may also improve understanding of native lizard populations within commercial forests.

The following reports are required for lizard salvage:

1. **Report per staged earthworks:** Outcome of lizard management, including:
 - a. For each native lizard, the following information will be recorded:
 - i. Species and demography (assessed as male/female/juvenile)
 - ii. Date of capture, including method (Phase 1 / 2 search)
 - iii. Location of capture
 - iv. Location of Release
 - b. Recommendations (if any) for improved methods
 - c. Where 20 or more native lizards are salvaged, confirmation of the requirement for five annual post-relocation monitoring surveys
2. **Five reports on annual monitor surveys** (if triggered): Reports shall include:
 - a. Map of relocation area and survey equipment layout
 - b. Survey methodology
 - c. Results of survey, including a summary of the previous year's results as appropriate, including:
 - i. Species and demography (assessed as male/female/juvenile)
 - ii. Recommendations (if any) and outcome of other recommended actions (if any).

5 CONTINGENCY ACTIONS

Contingency actions are required when lizard salvage and transfer activities fail. For the Rangitootuni project, lizard salvage is generally approached as a precautionary measure, with triggers for reporting and monitoring where sufficient numbers of lizards are salvaged and relocated into localised areas of a larger site. It is acknowledged that lizard mitigation typically suffers from poorly reported results, and where such reporting is present, also reports low levels of success.

Often, this is a consequence of large numbers of mitigation projects that report on reinforcement relocations (moving species into environments where their populations already occur) of small numbers of lizards, for which monitoring results in limited ability to determine outcomes with confidence.

This Project, monitoring aims to determine lizard population persistence within retained and protected habitats, within the context of a wider landscape that is considered to have poor lizard habitat values. Where 20+ lizards are relocated during lizard management, it is envisaged that, with restoration and pest management, sufficient lizard numbers will be present following salvage to confirm population persistence in the following years. If lizards are not able to be detected from triggered monitoring, the outcome of the salvage would be considered inconclusive, acknowledging that the wider restoration initiatives are likely to have longer-term benefits.

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APPLICABILITY AND LIMITATIONS

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of Rangitootuni Developments Limited Partnerships as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such party's sole risk.

Legal Interpretation

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards, and should not be construed as legal opinions. Where opinions or judgements are to be relied on they should be independently verified with appropriate legal advice.

Maps and Images

All maps, plans, and figures included in this report are indicative only and are not to be used or interpreted as engineering drafts. Do not scale any of the maps, plans or figures in this report. Any information shown here on maps, plans and figures should be independently verified on site before taking any action. Sources for map and plan compositions include LINZ Data and Map Services and local council GIS services. For further details regarding any maps, plans or figures in this report, please contact Babbage Consultants Limited.

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