



Wildlife Act Authority for wildlife on non-public conservation land

Authorisation Number: 82376-FAU

THIS AUTHORITY is made this 9th day of June 2020

PARTIES:

The Director-General of Conservation and where required the Minister of Conservation (the Grantor)
AND

Wellington Water Limited (the Authority Holder)

BACKGROUND:

- A. The Director-General of Conservation is empowered to issue authorisations under the Wildlife Act 1953.
- B. The Authority Holder wishes to exercise the authorisation issued under the Wildlife Act 1953 subject to the terms and conditions of this Authority.

OPERATIVE PARTS

In exercise of the Grantor's powers the Grantor **AUTHORISES** the Authority Holder under Section 53 (1)-(2) of the Wildlife Act 1953, subject to the terms and conditions contained in this Authority and its Schedules.

SIGNED on behalf of the Grantor by Jack Mace
Operations Manager Kapiti Wellington District Office
acting under delegated authority

in the presence of:


Witness Signature

A copy of the Instrument of Delegation may be inspected at the Director-General's office at 18-32 Manners Street, Wellington.

SCHEDULE 1

1.	<p>Authorised activity (including the species, any approved quantities and collection methods). (Schedule 2, clause 2)</p>	<p>a. Activity –</p> <ul style="list-style-type: none"> i. to catch alive and liberate the absolutely protected wildlife listed under Schedule 4 of this Authority for the purpose of species management subject to Schedule 3.1 ii. to kill for the purpose of being unable to remove from the construction zone, the absolutely protected wildlife listed under Schedule 4 of this Authority subject to Schedule 3.1 <p>b. Quantity – as required</p> <p>c. Method –</p> <ul style="list-style-type: none"> i. catch alive <ul style="list-style-type: none"> a. by hand b. by pitfall trap
2.	<p>The Land (Schedule 2, clause 2)</p>	<p>Within the footprint of Prince of Wales Park, Mount Cook, Wellington</p>
3.	<p>Personnel authorised to undertake the Authorised Activity (Schedule 2, clause 3)</p>	<p>Amanda Healy</p>
4.	<p>Term (Schedule 2, clause 4)</p>	<p>10 years, commencing on and including ____ and expiring on and including ____</p>
5.	<p>Authority Holder's address for notices (Schedule 2, clause 8)</p>	<p>The Authority Holder's address is: 25 Victoria Street Petone Lower Hutt 5012 Email: mel.wykes@beca.com</p>
6.	<p>Grantor's address for notices</p>	<p>The Grantor's address for all correspondence is: Christchurch Permissions Team 161 Cashel Street Christchurch Email: permissionschristchurch@doc.govt.nz</p>

SCHEDULE 2

STANDARD TERMS AND CONDITIONS OF THE AUTHORITY

1. Interpretation

- 1.1 The Authority Holder is responsible for the acts and omissions of its employees, contractors or, agents. The Authority Holder is liable under this Authority for any breach of the terms of the Authority by its employees, contractors or agents as if the breach had been committed by the Authority Holder.
- 1.2 Where obligations bind more than one person, those obligations bind those persons jointly and separately.

2. What is being authorised?

- 2.1 The Authority Holder is only allowed to carry out the Authorised Activity in the Land described in Schedule 1, Item 2.
- 2.2 The Authority Holder must advise the Department of Conservation's local Operations Manager(s) one week prior to carrying out the Authorised Activity in the District, when the Authority Holder intends to carry out the Authorised Activity.
- 2.3 Any arrangements necessary for access over private land or leased land are the responsibility of the Authority Holder. In granting this authorisation the Grantor does not warrant that such access can be obtained.
- 2.4 The Authority Holder and Authorised Personnel must carry a copy of this Authority with them at all times while carrying out the Authorised Activity.
- 2.5 The Authority Holder may publish authorised research results.
- 2.6 The Authority Holder must immediately notify the Grantor of any taxa found which are new to science. In addition, the Authority Holder must lodge holotype specimens and a voucher specimen of any new taxa with a recognised national collection.

3. Who is authorised?

- 3.1 Only the Authority Holder and the Authorised Personnel described in Schedule 1, Item 3 are authorised to carry out the Authorised Activity, unless otherwise agreed in writing by the Grantor.

4. How long is the Authority for - the Term?

- 4.1 This Authority commences and ends on the dates set out in Schedule 1, Item 4.

5. What are the liabilities?

- 5.1 The Authority Holder agrees to exercise the Authority at the Authority Holder's own risk and releases to the full extent permitted by law the Grantor and the Grantor's employees and agents from all claims and demands of any kind and from all liability which may arise in respect of any accident, damage or injury occurring to any person or property arising from the Authority Holder's exercise of the Authorised Activity.
- 5.2 The Authority Holder must indemnify the Grantor against all claims, actions, losses and expenses of any nature which the Grantor may suffer or incur or for which the Grantor may become liable arising from the Authority Holder's exercise of the Authorised Activity.
- 5.3 This indemnity is to continue after the expiry or termination of this Authority in respect of any acts or omissions occurring or arising before its expiry or termination.

6. What about compliance with legislation and Grantor's notices and directions?

- 6.1 The Authority Holder must comply with all statutes, bylaws and regulations, and all notices, directions and requisitions of the Grantor and any competent Authority relating to the conduct of the Authorised Activity. Without limitation, this includes the Conservation Act 1987 and the Acts listed in the First Schedule of that Act and all applicable health and safety legislation and regulation.

7. When can the Authority be terminated?

- 7.1 The Grantor may terminate this Authority at any time in respect of the whole or any part of Authorised Activity if:
- (a) the Authority Holder breaches any of the conditions of this Authority; or
 - (b) in the Grantor's opinion, the carrying out of the Authorised Activity causes or is likely to cause any unforeseen or unacceptable effects.
- 7.2 If the Grantor intends to terminate this Authority in whole or in part, the Grantor must give the Authority Holder such prior notice as, in the sole opinion of the Grantor, appears reasonable and necessary in the circumstances.

8. How are notices sent and when are they received?

- 8.1 Any notice to be given under this Authority by the Grantor is to be in writing and made by personal delivery, by pre paid post or email to the Authority Holder at the address, fax number or email address specified in Schedule 1, Item 5. Any such notice is to be deemed to have been received:
- (a) in the case of personal delivery, on the date of delivery;
 - (b) in the case of post, on the 3rd working day after posting;
 - (c) in the case of email, on the date receipt of the email is acknowledged by the addressee by return email or otherwise in writing.

8.2 If the Authority Holder's details specified in Schedule 1, Item 5 change then the Authority Holder must notify the Grantor within 5 working days of such change.

9. What about the payment of costs?

9.1 The Authority Holder must pay the standard Department of Conservation charge-out rates for any staff time and mileage required to monitor compliance with this Authority and to investigate any alleged breaches of the terms and conditions of it.

10. Are there any Special Conditions?

10.1 Special conditions are specified in Schedule 3. If there is a conflict between this Schedule 2 and the Special Conditions in Schedule 3, the Special Conditions will prevail.

11. Can the Authority be varied?

11.1 The Authority Holder may apply to the Grantor for variations to this Authority.

SCHEDULE 3

SPECIAL CONDITIONS

1. The authority holder must undertake all authorised activities in accordance with the Lizard Management Plan titled "*Omāroro Reservoir: Lizard Management Plan. Report prepared by Boffa Miskell Limited for Wellington Water dated 12 May 2020 version 3*", submitted to the Grantor by the authority holder with the application to obtain this authority.
2. The Lizard Management Plan titled "*Omāroro Reservoir: Lizard Management Plan. Report prepared by Boffa Miskell Limited for Wellington Water dated 12 May 2020 version 3*" forms part of this authority
3. Schedule 2 clause 5 terminated
4. A new clause 7.1 (c) is added to Schedule 2, to read as follows:
"Or for any other reason that the Grantor may decide".

Killing wildlife

5. The Authority Holder is permitted to kill wildlife provided reasonable efforts have been made to meet all of the terms and conditions expressed and implied in this Authority.

Salvage relocation and habitat enhancement

6. The Authority Holder must perform actions as set out in the contingencies/adaptive management sections of the Lizard Management Plan to ensure adequate mitigation of effects has been achieved.
7. During wildlife salvage operations or construction, if wildlife other than those listed in Schedule 1 (1) are found within the footprint of the development or within the release site, the Authority Holder must contact the DOC Operations Manager Jack Mace (+64 27 201 7394). The Authority Holder must transfer the wildlife to an approved captive holding facility until a suitable release site is identified by DOC. A separate application to translocate non-authorised species may be required. The costs of care and subsequent release are the responsibility of the Authority Holder.
8. The Authorised Personnel must ensure all gorse is cleared from both release sites listed in the Lizard Management Plan titled "*Omāroro Reservoir: Lizard Management Plan. Report prepared by Boffa Miskell Limited for Wellington Water dated 12 May 2020 version 3*", using methods that will minimise disturbance to rank grass and minimise trampling to resident skinks. The preferred method is manual cutting and stump spraying. Salvage must not take place until gorse clearance is undertaken.
9. The authority holder shall ensure lizards are distributed between both release sites at the discretion of the Authorised Personnel and taking into account conservative

estimates of carry capacity and taking into account possible resident lizards in the release areas.

10. If the number of lizards salvaged is greater than 150, works must halt immediately and the authority holder must contact the Wellington District Office on 027 275 5689 to seek a written approval for additional release areas.

Ownership of absolutely protected wildlife

11. This Authorisation gives the Authority Holder the right to hold absolutely protected wildlife in accordance with the terms and conditions of the Authorisation, but the wildlife remains the property of the Crown. This includes any dead wildlife, live wildlife, any parts thereof, any eggs or progeny of the wildlife, genetic material and any replicated genetic material.
12. Unless expressly authorised by the Grantor in writing, the Authority Holder must not donate, sell or otherwise transfer to any third party any wildlife, material, including any genetic material, or any material propagated or cloned from such material, collected under this Authority.

Lizard capture and handling

13. Lizards must only be handled by Authorised Personnel Amanda Healy, or under the direct supervision of the Authorised Personnel.
14. Lizard capture, handling and relocation should be undertaken at a suitable time of year (September – April) when lizards are active, as advised by a suitably experienced herpetologist
15. Capture and handling of lizards must involve only techniques that minimise the risk of infection or injury to the animal.
16. Capture and handling methods shall follow those described in the Herpetofauna inventory and monitoring toolbox <http://www.doc.govt.nz/our-work/biodiversity-inventory-and-monitoring/herpetofauna/>
17. The Authority Holder must ensure all live capture traps are covered to protect lizards from exposure and minimise stress. Damp leaf litter or other material must be provided to reduce desiccation risk and the bottom of the pit-fall trap must be perforated to allow drainage of water.
18. The Authority Holder must ensure all live capture traps, (e.g. pitfall traps and G-minnow traps), are checked at least every 24 hours.
19. The Authority Holder must sterilise any instruments that come in contact with the lizards and/or are used to collect or measure lizards between

each location. A separate holding bag must be used for each animal. All gear should be thoroughly cleaned and dried between sites.

20. The Authority Holder must ensure lizards are temporarily held individually in a suitable container (e.g. breathable cloth bag) and held out of direct sunlight to minimise the risk of overheating, stress and death.

Death of wildlife associated with salvage activities

21. If any lizards should die during the authorised activities of catch, transfer or liberate, the Authority Holder must:
 - a. inform the Grantor within 24 hours; and
 - b. chill the body if it can be delivered within 72 hours, or freeze the body if delivery will take longer than 72 hours; and
 - c. send the body to Massey University Wildlife Post Mortem Service for necropsy, along with details of the animal's history; and
 - d. pay for any costs incurred in investigation of the death of any lizard; and
 - e. if required by the Grantor, cease the Authorised Activity for a period determined by the Grantor.

Euthanasia

22. If any lizards are found injured as part of the Authorised Activity, the Authority Holder shall contact Authorised Personnel listed under Schedule 1(3) to get advice on management of the lizard. The Authority Holder is authorised to euthanise injured lizard(s) on recommendation of the Authorised Personnel listed under Schedule 1(3) or a veterinarian.

Lizard Salvage Reporting

23. A report is to be submitted in writing to the DOC Operations Manager, Wellington District Office, by 30 June each year for the life of this Authorisation, summarising outcomes in accordance with the Lizard Management Plan. Each report must include:
 - a. the permission number; and
 - b. the species and number of any animals collected and released; and
 - c. the GPS location (or a detailed map) of the collection point(s) and release point(s); and
 - d. results of all surveys, monitoring or research; and
 - e. description of how the Lizard Management Plan was implemented including any difficulties encountered with capture and handling, how release sites were assessed, post release monitoring and what contingency actions were required.

24. Completed Amphibian and Reptile Distribution System (ARDS) cards for all herpetofauna sightings and captures (<http://www.doc.govt.nz/conservation/native-animals/reptiles-and-frogs/species-information/herpetofauna-data-collection/ards-card/>) must be sent to Herpetofauna, Department of Conservation, National Office, PO Box 10420 Wellington 6143 or herpetofauna@doc.govt.nz.

SCHEDULE 4

Common name	Scientific name
Northern grass skink	<i>O. aff. polychroma</i> (Clade 1a)
Copper skink	<i>Oligosoma</i> <i>aeneum</i>
Glossy brown Skink	<i>O. zelandicum</i>
Ornate skink	<i>O. ornatum</i>
Raukawa gecko	<i>Woodworthia</i> <i>maculata</i>
Minimac gecko ²	<i>Woodworthia</i> "Marlborough mini"
Ngahere gecko	<i>Mokopirirakau</i> sp. 'Southern North Island'
Barking Gecko	<i>Naultinus</i> <i>punctatus</i> <i>punctatus</i>

Omāroro Reservoir

Lizard Management Plan

Prepared for Wellington Water

12 May 2020



Document Quality Assurance

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Reviewed by:	Stephen Fuller Senior Ecologist Boffa Miskell Limited	
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1.0 Introduction

Wellington City Council is proposing to build a new 35 million litre buried water storage reservoir above Prince of Wales Park. This will serve Wellington City's Low-Level Water Supply Zone, including the CBD, Mount Cook, Newtown and Thorndon. The reservoir will be buried to limit modification to the landscape and will sit on the ridge above the sports field adjacent to Rolleston Street in Mt Cook. The temporary construction site for the reservoir is anticipated to encompass the full extent of the buried reservoir site including a 10 m working buffer area, and Prince of Wales Park's upper and lower playing field areas.

The construction of the proposed reservoir will require the clearance of areas of potential lizard habitat. This Lizard Management Plan (LMP) contains guidelines and programmes for the mitigation and monitoring of effects of the proposed reservoir on lizard fauna within and adjacent to the footprint.

1.1 Purpose

This management plan has been developed to provide guidance for the management of lizards in all areas within the footprint and for the duration of clearance works. The audience includes contractors, the Project Environmental Manager, ecologists carrying out the work and compliance staff to ensure delivery of consented outcomes.

1.2 Consent conditions

Condition DC.35 of the Designation Conditions issued by Wellington City Council states that:

- a) *Prior to any vegetation clearance occurring, a lizard survey is to be undertaken of the project site and surrounding area by a herpetologist.*
- b) *If any lizards are found or their presence is suspected measures must be developed to minimise the effect of the project on the lizard population, this may include lizard relocation prior to vegetation clearance, and habitat re-creation associated with post construction site remediation and landscaping. These measures must be included in Landscape and Ecology Management Plan required under conditions DC.32 and DC.33.*

2.0 Potential lizard species

2.1 Desktop investigation

2.1.1 DOC Herpetofauna Database

The DOC administered herpetofauna database (BioWeb) holds no records for lizards within the Prince of Wales park itself, though it does have records of the northern grass skink in the neighbouring Central Park. Within the wider area (10 km radius from study site), eight species have been recorded¹; these are described below in Table 1. The most commonly recorded species are the northern grass skink and the Raukawa gecko. Northern grass skink is the species we consider to be most likely present at the location of the Omāroro Reservoir site. Many of the others favour habitats not found at this location.

Table 1: Native lizard species recorded within 10 km of the study site (DOC BioWeb Database). Conservation status and nomenclature follows Hitchmough et al. (2016)

Common Name	Scientific Name	Conservation Status	Habitat Preferences	Functional group
Northern grass skink	<i>O. aff. polychroma</i> (Clade 1a)	Not Threatened (CD)	Dry open areas with low vegetation or debris such as logs or stones for cover.	Terrestrial skink
Copper skink	<i>Oligosoma aeneum</i>	Not Threatened	Open and shaded areas where sufficient cover is available (e.g., rock piles, logs, dense vegetation).	Terrestrial skink
Glossy brown skink	<i>O. zelandicum</i>	At Risk – Declining (CD, PD)	Forest or densely vegetated and damp areas in forest, scrub, grassland, gardens and coastlines.	Terrestrial skink
Ornate skink	<i>O. ornatum</i>	At Risk – Declining (CD, PD)	Open and shaded areas where sufficient cover is available (e.g., rock piles, logs, dense vegetation).	Terrestrial skink
Raukawa gecko	<i>Woodworthia maculata</i>	Not Threatened (CD, PD)	Forest, scrub, grassland and coastal areas.	Terrestrial/arboreal gecko
Minimac gecko ²	<i>Woodworthia</i> “Marlborough mini”	Not Threatened (DP)	Boulder beaches, screes, river terraces, boulderfields and rocky outcrops.	Terrestrial gecko
Ngahere gecko	<i>Mokopirirakau</i> sp. ‘Southern North Island’	At Risk – Declining (DP, PD)	Forest and scrub, especially kanuka / manuka, and creviced clay banks	Arboreal gecko
Barking Gecko	<i>Naultinus punctatus punctatus</i>	At Risk – Declining (DP, Sp)	Forest and scrub, especially kanuka / manuka.	Arboreal gecko

¹ Excluding species only found on islands and/or Zealandia within the 10 km radius

² Only recorded at coastal sites.

2.1.2 Site-specific surveys

A lizard survey of council-administered reserves in the Wellington region was undertaken in 2013/2014, which included Prince of Wales Park (Melzer & Bell, 2014). The surveys undertaken as part of this study included spotlighting, pitfall trapping and day searches. No lizards or lizard signs were observed at the park during these surveys, nor at the adjacent Central Park.

These results indicate that if lizards were present at the time of the surveys, they would have been in low/undetectable densities. In the time since, lizard communities within the area are unlikely to have changed notably, given the low reproductive rate and slow dispersal of New Zealand lizard species. The potential exceptions to this would be the more mobile terrestrial species, primarily the northern grass skink.

2.2 Habitat types

Habitats within the footprint are considered to be predominantly poor to marginal quality for native herpetofauna, although there are areas of higher quality habitat present. Potential habitats are described below.

2.2.1 Managed grassland

Managed grasslands (sports fields, mowed tracks) comprise a high proportion of the footprint (approx. 2.3 ha, or 60%). This provides unsuitable habitat for lizards due to the lack of refugia and the frequent disturbance. It is recommended that management of these areas continues until clearance begins, to limit rank grass growth and potential colonisation.

2.2.2 Exotic forests and treelands

Exotic treelands comprise approximately 10% of the site (0.4 ha) and are primarily made up of pines and eucalypts. These are not considered to be high quality habitat for arboreal species; however, the leaf litter and debris below them may provide habitat for terrestrial species.

2.2.3 Gorse and native planting shrublands over rank grasses

There are areas of gorse shrubland throughout the footprint, some of which contains recent native planting (planted around 2012). This comprises approximately 16% of total clearance area (0.7 ha). The rank grass throughout these shrublands provides good quality habitat to some terrestrial skink species, primarily the northern grass skink. Given the young age of the plantings in these areas, it is unlikely that they provide suitable habitat for arboreal species.

2.2.4 Regenerating native forest and native plantings

Areas of seral forest and scrub (0.18 ha) and maturing native planting (0.15 ha) together comprise approximately 8% of the total clearance area. These communities may provide habitat for arboreal species (ngahere gecko and barking gecko), though they are not expected to be present in high numbers given the age of the vegetation. There is also habitat for terrestrial species in the leaf litter and debris on the forest floor.

2.3 Summary

In summary,

- Lizards are not expected to be present in high densities at the Prince of Wales Park. The BioWeb database indicates that no lizards have been previously recorded at the site, and surveys at the park have returned no lizard observations (Melzer & Bell 2014). However, all potentially suitable habitats will be treated as though lizards are present, and salvage will be undertaken accordingly.
- We do not expect there to be populations of lizards within the managed grasslands and do not propose to carry out sampling or salvage within this habitat.
- The gorse scrub over rank grass may provide habitat for terrestrial skink species, primarily the northern grass skink.
- The exotic trees have a low likelihood of arboreal lizard presence; however, survey and salvage efforts will include spotlighting these areas.
- The regenerating native vegetation and native plantings may have some potential to provide habitat for arboreal gecko species; however, it is expected that if present they would be in very low densities. There is also potential for terrestrial lizards to be present in the leaf litter and debris on the forest floor (e.g. copper or ornate skink).

3.0 Lizard management

This LMP seeks to identify key habitats that have the highest likelihood of lizard occupation within the footprint and focus salvage efforts in these areas. Key considerations include:

- **Wildlife Act Authority:** All native lizard species are ‘absolutely protected’ under the Wildlife Act (1953). Therefore, a Wildlife Act Authority (“permit”) must be obtained prior to any works which disturb lizards or their habitats.
- **Training:** All staff likely to be involved in vegetation clearance and habitat salvage must be trained in how to recognize and respond if lizards are present. Health and Safety training regarding working around equipment, manual handling and working in on uneven terrain is required for staff working in these environments.
- **Animal welfare:** Captured lizards will be placed into holding boxes immediately. Vegetation, soil and leaf litter from the capture site will be placed in the box to provide cover and protection from desiccation during containment. Lizards will be released in appropriate release sites within 24 hours of capture.
- **Animal threat classification:** Only species classified as ‘Not Threatened’ or ‘At Risk’ will be released. Where threatened lizards are found within the footprint, or during salvage operations, DOC will be contacted, and the lizard(s) will be transferred to an approved holding facility until a suitable release site is identified. This release site will be confirmed in consultation with DOC, and permits will be applied for as appropriate.

Management will primarily be focused on two components; lizard salvage to minimise direct effects on lizards present within the project footprint, and habitat replacement and enhancement, to mitigate for the effects of habitat loss through clearance. Should a sufficient number of lizards be salvaged (>20 of a given species), a post-release monitoring plan will also be developed and implemented.

3.1 Salvage

Salvage will be focused on areas of moderate or high-value habitat, i.e. salvage will not be undertaken in the managed grassland areas. All salvage will be conducted under the supervision of a suitably qualified and permitted herpetologist, and only by ecologists named on the permit. Salvage methods are described below.

3.1.1.1.1 Pitfall Trapping

Baited pitfall traps will be set throughout the rank grass and regenerating forest to survey for and salvage any terrestrial lizard species present in the area. Pitfall trapping will be undertaken for a minimum of one week and will continue until no lizards are caught for three consecutive fine weather days, or otherwise to the satisfaction of the Project Herpetologist.

3.1.1.1.2 Manual searches

Areas of leaf litter and natural or artificial debris will be hand-searched, and where possible removed from the clearance area, prior to any works. Leaf litter and small debris will be raked, and larger debris overturned to search for refuging lizards.

3.1.1.1.3 Spotlighting

Prior to clearance of the native forest, maturing plantings or exotic trees, two nights of spotlighting will be undertaken within the clearance site to survey for (and salvage where possible) any arboreal lizards. Spotlighting will only be undertaken on fine weather nights with low wind and temperatures greater than 10°C.

3.1.1.1.4 Vegetation searches

At the time of clearance, two suitably qualified ecologists will be present to hand search felled vegetation for lizards. The proportion of the vegetation that is searched will depend on the results of spotlighting – 10-20% if no lizards are seen during spotlighting, and 100% if arboreal lizards are seen (to be confirmed in writing by the Project Herpetologist at the conclusion of spotlighting).

3.1.2 Incidental finds

Should incidental finds of lizards occur outside of the proposed rescue/salvage programme:

- The project herpetologist will be notified as soon as possible.
- If the lizard(s) is not at immediate risk, works in the area will halt until the herpetologist can arrive and salvage the lizard.
- If the lizard is at immediate risk of injury or death due to on-site activities, it will be salvaged by the construction team and placed into a container (with air holes, vegetation and food) until the herpetologist can arrive.
- Guidance will be provided to the construction team on this process by the herpetologist.

3.2 Relocation and habitat enhancement

Any lizard salvaged from the site will be immediately relocated into suitable nearby habitat of equal or better quality than the source location, as assessed by a suitably qualified herpetologist. For arboreal lizards the release site(s) will be searched prior to relocation to ensure no resident lizards are present, to avoid competition.

Habitat enhancement will be undertaken to mitigate for the loss of both terrestrial and arboreal habitats. As terrestrial lizard species are the most likely to be encountered, terrestrial habitat enhancement will be undertaken prior to any salvage to create a suitable relocation site. Arboreal habitat replacement and enhancement (as well as further terrestrial enhancement) will be undertaken post-clearance, through mitigation plantings and pest control.

3.2.1 Pre-clearance terrestrial habitat enhancement

To ensure that the release site has suitable habitat values, some habitat enhancement will be undertaken prior to any salvage occurring. Pre-clearance enhancement will primarily involve the construction of woody debris piles, which increase refuge availability and food sources (invertebrates) at the site.

The proposed site for terrestrial habitat enhancement is shown below in Figure 1. This location is outside of the affected area but is sufficiently close that any resident lizard populations would likely be contiguous with those in the footprint. The site is currently vegetated with gorse over rank grass. A lizard-proof fence (likely a polypropylene “silt fence”, embedded in the ground) will be erected between the clearance area and the release site prior to salvage, to discourage any relocated lizards from moving back into the footprint.

Figure 1: Location of proposed habitat enhancement, outlined in red.



3.2.1.1 Constructed woody debris piles:

Woody debris piles provide both refugia and invertebrate food sources to native lizards. The wood piles should be constructed using logs and branches of varying sizes; larger logs should be used to help stabilise the pile and reduce ongoing disturbance, and smaller limbs should be incorporated throughout to reduce the size of the refuges (interstitial spaces) and exclude pest species. Soil and leaf litter from the surrounding scrub and forest should also be added throughout the piles to increase the abundance of invertebrates which act as a food source for lizards. A thick layer of soil should be placed on top of the piles, allowing shallow-rooted vegetation (e.g. grasses) to grow on top of the debris piles. Figure 2 shows an example of a wildlife debris pile, which is a reasonable facsimile of what is recommended here (though we recommend smaller twigs and branches to reduce cavity size).

In the first instance, two debris piles of approx. 2 m by 4 m in area are recommended; however, should salvage numbers be higher than expected, construction of additional piles may be required. This will be determined by the project herpetologist based on initial salvage results.

The piles will be built in conjunction with staff at Wellington City Council who have offered to supply materials and labour. Depending on COVID-19 lockdown levels, we are aware that community conservation groups are also interested in being involved.

Figure 2: An example of a log pile which may provide lizard habitat.



3.2.2 Secondary release sites

Only low numbers of lizards, if any, are expected to be found within the project footprint. However, due to previous cases in Wellington of unforeseen high numbers of lizards (primarily terrestrial skinks) being salvaged, secondary release sites have been identified in case they are needed. These are shown below in Figure 3. These sites are of similar community composition (gorse over rank grass) as the areas where we expect to salvage terrestrial lizards.

Should lizards be relocated to these secondary sites, some enhancement will also occur here. This may include planting of lizard-friendly plant species (those that provide food and cover, such as *muehlenbeckia*, *Coprosma propinqua*, native grasses) or the addition of debris or rock piles, depending on what species are salvaged. An enhancement plan will be prepared by the project herpetologist once it is determined that one or both of these sites will be required.

Figure 3: Secondary release sites for terrestrial lizards.



3.2.3 Post-clearance habitat replacement/enhancement

After construction of the reservoir is completed, habitat replacement and/or enhancement will occur as part of ecological mitigation and landscape planting. A planting plan and species list are provided in Appendix A.

To mitigate for the clearance of 0.18 ha of seral broadleaf forest, 0.58 ha of mixed broadleaf planting will occur in the areas surrounding the reservoir – this has been designed to mimic the natural vegetation in the surrounding areas, and so should, in time, provide comparable arboreal lizard habitat but on a larger scale.

To remedy the clearance of community planting of manuka, an equivalent area of mānuka monoculture will be planted on the finished reservoir batters. Mānuka scrub is a preferred habitat for arboreal lizard species.

The proposed planting for the slopes of the reservoir itself is comprised of low-growing species (<1 m) that provide good cover and a source of food for terrestrial species. These areas will be

planted with a mix of mingimingi (*Coprosma propinqua*), pohuehue (*Muehlenbeckia complexa*), coastal shrub daisy (*Olearia solandri*), mountain flax (*Phormium cookianum*), and meadow grass (*Poa anceps*). These plantings should provide good quality terrestrial habitat in a relatively short timeframe.

3.2.4 Pest control

Pest control for rats and mustelids is currently occurring within Prince of Wales park, primarily using a local community group supported by staff at the Wellington City Council.

The current level of control will be reviewed and if necessary, supplemented to ensure adequate control of mammalian predators for five years following the completion of works.

4.0 References

Melzer S & Bell, T. (2014) Lizard survey of Wellington City Council -administered parks & reserves: final report. Unpublished EcoGecko Consultants Ltd report prepared for the Wellington Council, June 2014

Hitchmough, R., Barr, B., Monks, J., Lettink, M., Reardon, J., Tocher, M., van Winkel, D., Rolfe, J. 2016. Conservation status of New Zealand reptiles, 2015. Department of Conservation, Wellington.

Appendix A: Planting Plan



LEGEND

- Proposed Reservoir
- Metrosideros excelsa* Pohutukawa
- Eucalyptus rosacea* Gum
- Tree to be Removed
- Open Grassed Area
- Leptospermum scoparium* Mānuka
- City to Sea Walkway
- Other Recreation Track
- Timber Retaining Wall
- Existing Timber Retaining Wall
- Chainlink Fence
- Swale & Manhole
- Existing Stream
- Existing Bund
- Grass Reinforced with Plastic Cell

Green Terramesh Wall Planting

- Muehlenbeckia complexa* Mingimingi
- Poa anceps* Meadow grass
- Poa cita* Silver tussock

Native Low Planting (0 - 1 m)

- Coprosma propinqua* Mingimingi
- Muehlenbeckia complexa* Pohuehue
- Olearia solandri* Coastal shrub daisy
- Phormium cookianum* Mountain flax
- Poa anceps* Meadow grass

Native Shrubs (1.0 - 6 m)

- Coprosma propinqua* Mingimingi
- Coprosma robusta* Karamu
- Cortaderia fulvida* Toetoe
- Griselinia littoralis* Broadleaf
- Hebe stricta* Koromiko
- Phormium cookianum* Mountain flax

Native Revegetation (1.5 - 20 m)

- Aristotelia serrata* Wineberry
- Beilschmiedia tawa* Tawa
- Carpodetus serraus* Putaputaweta
- Coprosma propinqua* Mingimingi
- Coprosma robusta* Karamu
- Cortaderia fulvida* Toetoe
- Dysoxylum spectabile* Kohekohe
- Elaeocarpus dentatus* Hināu
- Fuchsia excorticata* Kōtukutuku
- Griselinia littoralis* Broadleaf
- Hebe stricta* Koromiko
- Knightia excelsa* Rewarewa
- Kunzea ericoides* Kānuka
- Metrosideros robusta* Northern Rata
- Myoporum laetum* Ngaio
- Pennantia corymbosa* Kaikomako
- Phormium tenax* Flax
- Pittosporum eugenioides* Lemonwood
- Pittosporum tenuifolium* Kōhūhū
- Podocarpus totara* Tōtara
- Prumnopitys taxifolia* Mataī
- Pseudopanax arboreus* Five Finger
- Sophora microphylla* Kōwhai

Notes:

- 1) Geogrid reinforcement or similar to be used along slopes exceeding 1:2 to facilitate revegetation.
- 2) The location and gradient of the proposed walkways to be confirmed with reference to WCC Short Walk Standards,