

# Omāroro Reservoir



## Lizard Management Plan

Prepared for Wellington Water

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## Document Quality Assurance

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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 recorded<sup>1</sup>; 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 <sup>2</sup>	<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

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

<sup>2</sup> 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



