Boffa Miskell

Mananui Lizard Surveys

Lizard Survey Assessment
Prepared for WMS Group

13 December 2023

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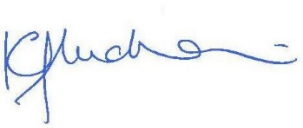
Reviewed by:	Katherine Muchna Senior Herpetologist/ Senior Principle Ecologist Boffa Miskell Limited	
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1.0 Background

WMS Group are preparing an application for a potential sand mine located in Ruatapu on the West Coast, c. 8 km south of Hokitika. The Site consists predominantly of grazed pastural grassland, with small, fragmented pockets of indigenous kamahi/hinau and kahikatea treeland.

Boffa Miskell was approached to determine if lizards are present or the likelihood that they are present within the Site. This report details the methodology and results of a lizard survey conducted at the proposed sand mining site in November 2023.

All lizard survey work was conducted by Boffa Miskell herpetologist, Matt Turner.

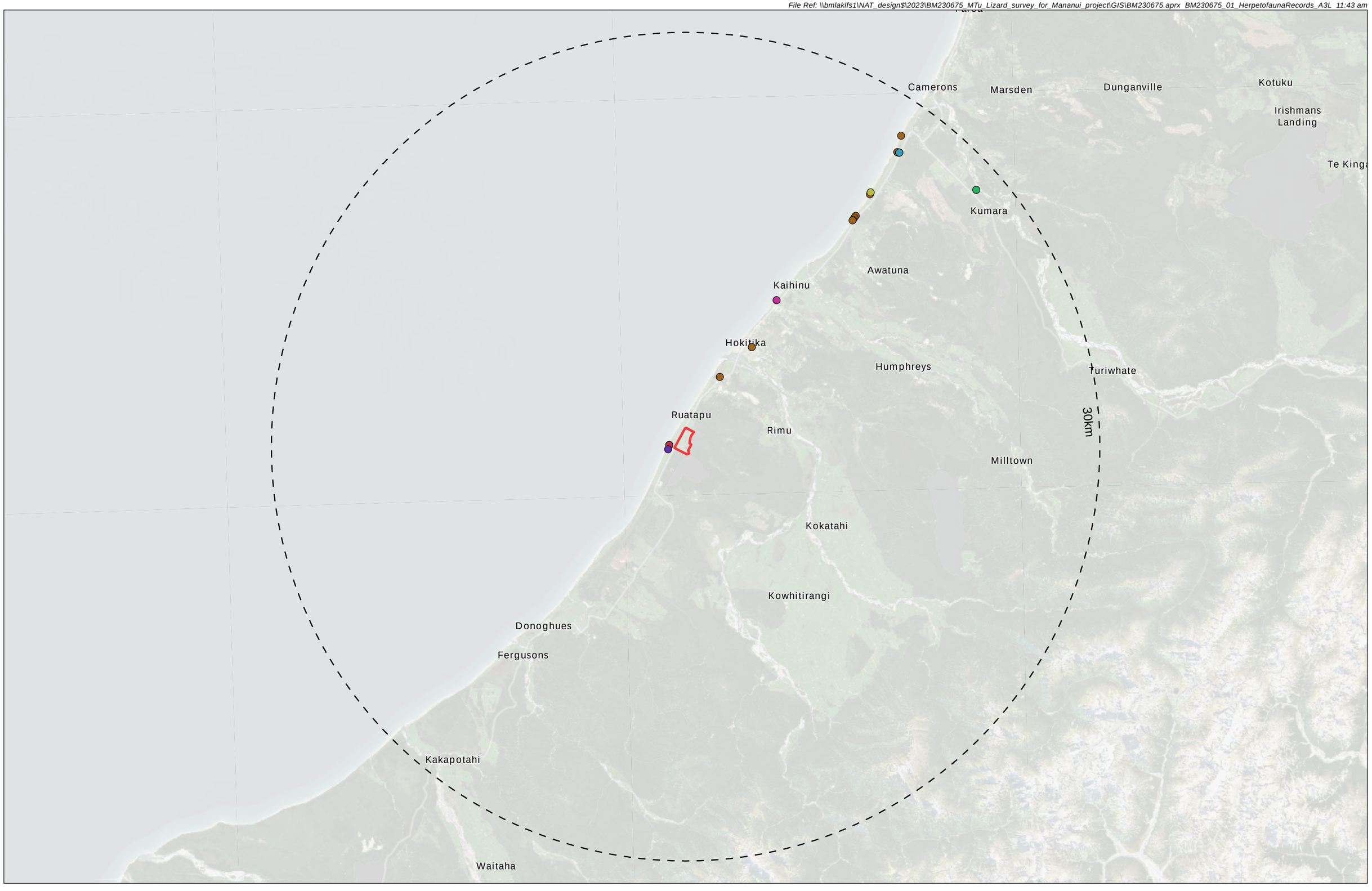
2.0 Desktop Assessment

The Department of Conservation Bioweb Herpetofauna Database records were reviewed to inform our assessment of the potential lizard fauna within and surrounding the proposed Mananui Sand Mine. Records were refined by excluding records more than 30 km from the Project Site and older than 20 years as these will likely not be representative of the current species composition (Figure 1).

Species potentially present within the sand mine footprint include the West Coast green gecko (*Naultinus tuberculatus*), forest gecko (*Mokopirirakau granulatus*), Newman's speckled skink (*Oligosoma newmani*) and Canterbury grass skink (*O.* aff. *polychroma* Clade 4; Table 1). Potentially present within the wider area of the sand mine includes the Hokitika skink (*O.* aff. *infrapunctatum* "Hokitika") and Kapitia skink (*O. salmo*). Both species (and the Newman's speckled skink) are part of "speckled" cryptic skink complex, where multiple species maybe present within a relatively small area. These species are often indistinguishable without genetic analysis.

Hokitika and Kapitia skink are classified as Threatened – Nationally Critical (Hitchmough et al. 2021), only known from a few individuals/populations. West Coast green gecko are classified as Threatened – Nationally Vulnerable and forest gecko, Newman's speckled skink and Canterbury grass skink are At Risk – Declining.

Recent records of lizards include observations of West Coast green geckos and Canterbury grass skink within 500 m of the proposed site at Mananui Bush and Beach walk (Department of Conservation land).



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Data Sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors, Stats NZ, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS, Department of Conservation

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

Lizard Species

- Kapitia skink
- Hokitika skink
- West Coast green gecko
- Forest gecko
- Lizard species (undetermined)
- Newmans speckled skink
- Canterbury grass skink
- Project footprint
- 30km

MANANUI LIZARD SURVEY

Figure 1. Herpetofauna Records within 30km Radius

Date: 01 December 2023 | Revision: 0

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Table 1. Lizard species potentially present within the wider area (within 20 km; source DOC Bioweb herpetofauna database).

Species	Common Name	Threat Classification[1]	Nearest Record	Preferred Habitats
Naultinus tuberculatus	West Coast green gecko	Threatened – Nationally Vulnerable	Mananui Bush and Beach walk	Scrubland, coastal forest
Mokopirirakau granulatus	Forest gecko	At Risk – Declining	Kumara	Scrubland, coastal forest, rock outcrops
Oligosoma newmani	Newman's speckled skink	At Risk – Declining	115 Golf Links Road	Coastal scrubland, rank grassland, rocky outcrops /cobble banks
***Oligosoma* aff. *polychroma* Clade 4**	Canterbury grass skink	At Risk – Declining	Mananui Bush and Beach walk	Open grassland, coastal scrub
***Oligosoma* aff. *infrapunctatum* "Hokitika"**	Hokitika skink	Threatened – Nationally Critical	Acre Creek	Coastal scrubland, rank grassland, rocky outcrops /cobble banks
Oligosoma salmo	Kapitia skink	Threatened – Nationally Critical	Chesterfield Beach	Coastal scrubland, rank grassland, rocky outcrops /cobble banks

3.0 Lizard Survey Methodology

Lizard surveys were carried out between 6 and 8 November 2023 to determine presence of species within or near the Project Site. The lizard survey used passive techniques[2] consisting of diurnal and nocturnal visual encounter surveys (VES), manual searches and tracking tunnels.

Nocturnal VES (spotlighting) for arboreal geckos were conducted across three nights (6, 7 and 8 November) along forest margins within and directly adjacent to the Project Site. Surveys consisted of slowly scanning forest edges for emerged geckos using powerful head and hand torches. The survey area is identified in Figure 2.

Diurnal VES for diurnal (day active) geckos and skinks were conducted in conjunction with the deployment of the tracking tunnels and habitat assessment, scanning vegetation edges for emerged/basking lizards. Manual searches during the day were also undertaken opportunistically across the site (e.g., under logs and vegetation, and around pockets of sunlight).

[1] Hitchmough R, Barr BP, Knox C, Lettink M, Monks JM, Patterson GB, Reardon JT, van Winkel D, Rolfe J, Michel P 2021. Conservation status of New Zealand reptiles, 2021. Wellington, Department of Conversation. 15 p

[2] Passive survey techniques do not require a Wildlife Act Authority (WAA) issued by the Department of Conservation. During passive surveys, lizards cannot be trapped or handled.

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Data Sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors, LINZ, Stats NZ, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Tracking Tunnel Locations
- Spotlighting
- Project footprint

MANANUI LIZARD SURVEY

Figure 2. Lizard Survey Effort

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In total, forty tracking tunnels were deployed across the site for 10 consecutive days (Figure 2). The individual microhabitat placement of each of the tracking tunnels was selected to maximise the likelihood of detecting terrestrial skinks, including forest edges and clearing and rank grass margins. Tunnels were baited with pureed pear.

A walkover habitat assessment was also undertaken across the site to determine the likelihood of lizard presence on site based on habitat quality, connectivity and refuge availability.

Acknowledgement of the limitations of lizard survey methods

Lizard surveys may have poor detection rates because of typically low population densities (particularly in mainland populations), species' cryptic colouration, inherent difficulty in surveying preferred habitats (e.g. dense, tall and/or visually complex vegetation) and behaviour/activity patterns. As such, even intensive lizard surveys using a variety of active and passive methods may not detect any individuals in the population or, possibly, all species present.

4.0 Survey Results

4.1 Lizard surveys

No arboreal geckos were detected within or along the bordering forest edges across the three nights of nocturnal VES. Weather conditions for the two nights were considered suitable for gecko emergence and are detailed alongside survey effort in Table 2.

Diurnal VES and manual hand searching were conducted opportunistically throughout the proposed Project Site. This included scanning vegetation edges for emerged lizards and lifting logs or other woody debris for skinks or stripping bark for arboreal geckos or skinks. No lizards were detected.

Tracking cards were installed on 7 November and left for 10 consecutive days. No lizard footprints were detected. Of the 40 tracking tunnels, 10 cards were missing, and a number of cards were found removed from the tunnels (likely by weka) or trampled by cattle. Of the 30 cards collected, 11 had exotic pest footprints including rats, mice and hedgehogs.

Table 2. Nocturnal VES survey effort summary.

Date	Species Detected	Activity and effort	Weather
06/11/2023	No lizards detected	Spotlighting (4.25 person hours)	Calm, 14.3 – 9.4 °C. No wind
07/11/2023	No lizards detected	Spotlighting (4.5 person hours)	Calm, 15.1 – 12.5 °C. No wind
08/11/2023	No lizards detected	Spotlighting (4.25 person hours)	Calm, 13.7 – 11.1 °C. No wind

4.2 Habitat Assessment

An assessment of lizard habitat from within the sand mine footprint determined that quality lizard habitat was sparse and patchy. Historical forest clearance has resulted in a number of isolated fragments of indigenous treeland throughout the Project footprint (Figure 3).

We provide a qualitative assessment of the habitat quality of the habitats within the Project footprint for arboreal geckos and terrestrial skinks. This assessment was based on fragment size, structural complexity, vegetation species composition and connectivity.

Middle and southern fragments:

Geckos:

Complex mature forest fragments (middle and southern forest fragments, see Figure 3) provide suitable, high-quality habitats for forest gecko (especially within larger epiphyte clumps, ferns tree crevices; Figure 4 to 6) and less so for West Coast green gecko (along vegetation edges). These fragments are likely within dispersal distance from Lake Mahinapua Scenic Reserve (Department of Conservation Land), a large, intact forest which geckos are considered to be present. Despite no geckos being detected during surveys, we consider there remains a **moderate likelihood** that these species are present in the middle and southern fragments.

Skinks:

Suitable habitat was observed to be patchy, caused by widespread cattle grazing reducing the height of grasses and ground cover around and within the forest fragments (Figure 7). Small pockets or ranks grass are present where populations of skinks may persist at low numbers, however, these areas are accessible to grazing cattle. We consider the potential for skinks to be present in these fragments to be a **low likelihood.**

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Data Sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Low quality habitat
- High quality habitat
- Public Conservation Land (DOC)
- Project footprint

MANANUI LIZARD SURVEY

Figure 3. Arboreal Gecko Habitat Quality

Date: 04 December 2023 | Revision: 0

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Figure 4. Epiphyte habitat suitable for forest geckos in the southern forest fragment.

Figure 5. Vegetation type (mixture of mature podocarp and broadleaf) present within the southern forest fragment.

Figure 6. Middle forest fragment containing complex canopy and refugia sites (tree ferns and climbing rata) for geckos

Figure 7. Middle forest fragment understory exposed to cattle grazing.

Northern forest fragments:

Geckos:

These areas are less suitable for arboreal geckos as these are either more isolated, or smaller and more exposed fragments of forests (Figure 8). Natural refugia was scarce, and as such we consider there to be a **low likelihood** geckos are present.

Skinks:

Suitable habitat for skinks, such as complex groundcovers, natural refugia was scarce in these sites because of heavy cattle grazing and trampling throughout the forest fragments (Figure 8). Additionally, these areas were frequently “wet”, with the forest fragments following a shallow watercourse which appears to flood periodically during wetter months. We consider the potential for skinks to be present in these fragments to be a **low likelihood.**

Figure 8. Northern forest fragment exposed canopy and understory. Area subject to previous cattle grazing.

Figure 9. Northern forest fragment understory exposed to cattle grazing throughout. Watercourse seen in the rear of the image. A family of stoats was also observed moving amongst the debris.

Grassland habitats

Pastural grassland covers most of the site. These areas were heavily grazed and considered to provide poor quality habitat for terrestrial skinks. No lizards were observed within this habitat. As such we consider there to be a **very low likelihood** skinks are present in the pastural grassland.

During the site visit, it was evident that there had been recent (c. 1-2 years) removal of scrub habitats (exotic rank grasslands/gorse; Figure 10). These areas may have provided suitable habitat for terrestrial skinks previously. It is possible if skinks were present in these areas that they could have moved to less suitable habitat following the clearance (into forest fragments), however, no skinks were observed during the survey in any habitats.

Figure 10. Open area where scrub habitats (exotic rank grasslands/gorse) were cleared.

Lake Mahinapua Scenic Reserve

Lake Mahinapua Scenic Reserve (Department of Conservation Land) which runs along the southern and eastern border of the Project Site is considered to have a high likelihood of arboreal geckos being present, despite no geckos being observed. Lake Mahinapua Scenic Reserve consists of a large intact forest fragment with high quality and complex forest communities, similar to that of Mananui Bush which has a known population of West Coast green geckos.

Figure 11. Arboreal gecko habitat in Lake Mahinapua Scenic Reserve along the southern margin, outside of the project site.

5.0 Key Findings

No arboreal geckos or terrestrial skinks were detected during the lizard surveys. Due to the low detectability of lizards and the limited ability of current monitoring tools to detect these species, coupled with the low density of lizard species on the West Coast, we cannot exclude that lizards may be present on site. Vegetation within the site was assessed as suitable for both forest geckos and West Coast green geckos, and less so for terrestrial skinks. Further, the surrounding Department of Conservation land may act as a source population for lizards.

The distributions of Hokitika and Kapitia skink are poorly understood as they are only known from very few locations. However, both species are listed as Threatened – Nationally Critical and it is possible (but unlikely) that they could be present on the site given the habitats available, and that the site is within their potential range. We consider the potential presence of these species is a risk to the viability of the project because the loss of individuals through site development could have population-level effects for the species and would be a very high level of effect.

We recommend that additional surveys are undertaken to delineate lizard habitat areas and to direct comprehensive management for lizards. We note that lizard management should provide a protective benefit for lizards (if present).

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