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Mark Williams
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cc: Kat Bulk

9th April 2023

LIZARD SURVEY - GOLD TAILINGS, QUEENSTOWN TRAIL (SUNSHINE BAY TO WILSONS BAY)

Dear Mark,

I have now completed the lizard survey of two areas of gold tailings along the Queenstown Trail between Sunshine Bay and Wilsons Bay/ Twelve Mile Recreation Reserve, depicted in Figure 1. Below I present the methods and results of a lizard survey carried out 26th-27th March 2023,

This survey detected two species of lizards over the Sunshine Bay tailings, but nothing was found at Wilsons Bay.

1. Background to the Project

The Queenstown Trails Trust (QTT) plan to construct the *c.* 7 km Queenstown Trail through public conservation land along the Lake Whakatipu shoreline between Sunshine Bay and Wilsons Bay (Figure 1). Ultimately the trail will extend from Queenstown to Glenorchy. The alignment takes in forest & shrubland habitats, and areas of gold tailings (rock piles). As I understand it, construction and maintenance of the trail is subject to Queenstown Lake District Council (QLDC) and Department of Conservation (DOC) approval. For both approvals, an ecological assessment is required to inform the two overlapping processes.

Several indigenous lizard species may occur along the alignment, and within the gold tailings. Gold tailings, and indeed any areas of rock can provide a refuge for lizards from fire and predators. An

assessment of the tailings was, therefore, required to inform the ecological assessment being prepared by Dawn Palmer, *Natural Solutions for Nature Ltd*.

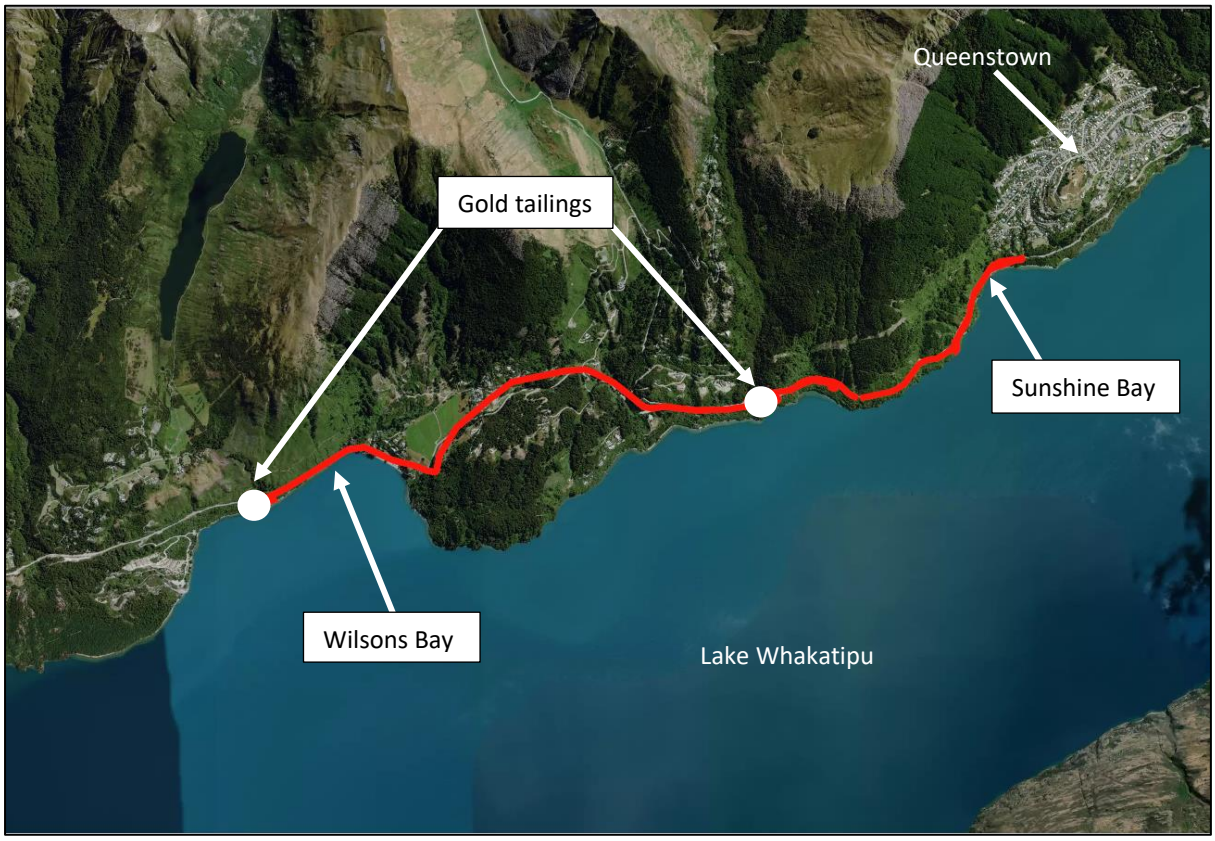

***Figure 1**: Site location of the Queenstown Trail between Sunshine Bay and Wilsons Bay (red line). Locations of gold tailings are shown by white dots.*

2. Lizard Assessment -Methods

A 4-hour walk-through/visual-encounter lizard survey was carried out over the two gold tailings area over March 26th-27th 2023 by the author and a junior assistant. Weather conditions experienced during the survey were ideal for lizard activity, being warm (maximum of 18 and 21 °C maximum air temperature, 25th and 26th March respectively) and generally sunny with only intermittent cloud cover.

Lizard survey involved the lifting of rocks throughout the two tailings sites to detect lizards or their sign such as droppings or sloughed skins (geckos). Visual searching for active lizards was also carried out over sunny periods. The lizard survey was carried out

under a Wildlife Act permit issued to the author for public conservation land (35130-FAU).

3. Lizard Assessment - Results

Lizard Habitat Description

Tailings at the Sunshine Bay site (Figure 1) were extensive (≥ 1850 m^2) and had a mix of rock sizes, perfect for both skinks and geckos (Figure 2). Almost all the rocky habitat was unshaded (evidenced by the sun-loving lichen on rocks), except for rock at the extreme edge of the tailings. Rock habitat for the most part was deep (≥ 1 m) and layered providing multiple retreat opportunities for lizards.

At the Wilson's Bay site, rock tailings were very small (*c.* 4 m^2) and were all shaded, with moss replacing lichen on the rocks (Figure 3). This site did not constitute lizard habitat and at the time of survey, the tailings were covered by a tree fall that was partially removed ahead of survey to enable access to the site. The tree fall had resulted from the falling over of a large tree that was growing to the northwest of tailings and had apparently only recently improved the light to the site (Figure 3).

Figure 2: *View across the Sunshine Bay tailings site showing open sunny areas of rock of many sizes.*

Figure 3: *View across the Wilson's Bay tailings site showing a small area of shaded habitat with no value for lizards.*

Lizards of the Site

Lizards were only found at the Sunshine Bay tailings site and here they were encountered very easily (Figure 4). The nocturnal south-western large gecko (*Woodworthia* "south-western large") (Figure 5) was relatively more common than the diurnal McCann's skink (*Oligosoma maccanni*) (Figure 6) and both were found beneath the numerous quality rocks of the site. No lizards were found in the shaded rocks at the edges of the tailings. Many of the south-western large gecko detections shown in Figure 6 were of sloughed gecko skins rather than of geckos themselves (e.g., Figure 7). For this reason, it is possible a second *Woodworthia* species could be present e.g., Kawarau gecko (*Woodworthia* "Cromwell"), but I believe this is unlikely.

Although the habitat appeared to have potential for the southern grass skink (*Oligosoma* aff. *polychroma* clade 5[1]), no evidence of this species was found despite very small areas of exotic grass occurring at places on the edge of the Sunshine Bay tailings.

Figure 4: *Lizard detections across the Sunshine Bay tailings site. Blue dots=McCann's skinks and yellow dots= south-western large gecko.*

Figure 5: *An adult south-western large gecko found under rocks at the Sunshine Bay gold tailings area.*

[1] A new skink species, the tussock skink *Oligosoma chionochloescens* n. sp. has recently been split from *O.* aff *polychroma* clade 5 and this new species maybe present over the Queenstown Trail. Reference: Jewell, T. 2022. Discovery of an abrupt contact zone supports recognition of a new species of grass skink in southern New Zealand. Jewell Publications Occasional Publication #2022B 12 February 2022.

Figure 6: *An adult McCann's skink found under rocks at the Sunshine Bay gold tailings area.*

Figure 7: *McCann's skink, with an example of a* Woodworthia *skin slough, in this case a skin from schist gecko (*Woodworthia *"Central Otago") near Alexandra.*

Woodworthia "south-western large" has a national threat ranking of At Risk – Declining, and McCann's skink is Not Threatened.[2] Notwithstanding these threat rankings, along the shores of Lake Whakatipu, lizards are scarce meaning the Sunshine Bay population is locally important. Moreover, under the QLDC Plan and Otago Regional Policy Statement, the presence of a population of south-western large gecko triggers fauna habitat 'significance' (pursuant to Section 6c, RMA, 1991).

4. Conclusions & Recommendations

Both gold tailings sites were surveyed by an experienced herpetologist in ideal weather conditions for lizard activity. Two lizard species were detected, but only at Sunshine Bay tailings where much rock habitat was present that was deep, unshaded and stable. All indigenous lizards are protected under the Wildlife Act (1953) meaning a permit from DOC and accompanying Lizard Management Plan (additional to a concession/community agreement) would be required to construct the trail if the Sunshine Bay tailings rock needed to be disturbed. In this context 'disturb' means any works, including the hand removal of rock, that impacts on the lizard habitat of the tailings, i.e., any rock that is unshaded and has a lichen covering.

I recommend that the Queenstown Trail alignment avoids all rock that is open and unshaded. To be sure no lizards are affected by trail construction and ongoing maintenance, I further recommend the trail is setback from the edge of any sunny rock habitat by at least 3 m. These recommendations apply not only to the area surveyed for this report, but to all open, sunny rocky areas of the alignment through to Glenorchy. As an example, a quick visual assessment of the alignment from Sunshine Bay to Wilsons Bay highlighted 10 areas that may provide habitat for lizards and thus should be avoided, and if not, be surveyed ahead of construction (Figure 8).

[2] Hitchmough *et al*. 2021. Conservation status of New Zealand reptiles, 2021. New Zealand Threat Classification Series 35. Department of Conservation, Wellington. 15 p.

Figure 8: *Potential lizard habitat between Sunshine Bay and Wilsons Bay (red dots) that were identified as rocky/open areas from google earth imagery. Areas already surveyed at Sunshine and Wilsons Bay are shown by green dots.*

Given the number of sites that have potential lizard habitat over the short *c.* 7 km stretch shown in Figure 8, I suspect other open, sunny rocky areas will be present over the entire alignment to Glenorchy, and with this in mind I see three options for "next steps" as follows:

1. Engage a herpetologist to carry out a desktop assessment of potential lizard habitat along the entire alignment with the purpose of aligning the trail to avoid all areas identified.
2. Engage a herpetologist to carry out a rapid lizard habitat survey over the remainder of the trail to accurately identify potential lizard habitat and its extent. Given the purpose of this option is to simply identify potential habitat to avoid, the survey could be carried out at any time of year.
3. Carry out a lizard survey over the entire alignment over the lizard active season (late spring to early autumn), focussing on areas first identified by a desktop assessment.

I recommend option 3 as it will appropriately inform a Lizard Management Plan required by DOC should some areas of lizard habitat be required to be disturbed by works to construct the trail.

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Dr Mandy Tocher, Herpetologist, LizardExpertNZ