# Technical Review

| | | | |
|---|---|---|---|
| **To:** | Alexandra Smith | **Date:** | 8/11/2024 |
| **Authority:** | Environment Southland | **Ref:** | 24116_2 |
| **Consent:** | Waikaka Gold Mines LTD | | |

| **From** | **Role in Audit** | **Internal Reviewer** |
|---|---|---|
| Mark Hamer | Freshwater Ecology Review | Bryony Miller |
| | | |
| | | |

## 1 Project Summary

Waikaka Gold Mines LTD proposes to establish a gold mine near the Waikaka Stream in Southland and has applied for resource consents to Environment Southland (ES) and the Gore District Council. ES have engaged e3Scientific to complete a freshwater ecological audit of the freshwater ecology aspects of the application considering specific questions outline in Section 2.

### 1.1 Activity

The applicant proposes to mine gold from a 95 ha site located near 972 Waikaka Road. The sites surface water features comprise the Waikaka Stream, Shepherds Creek and unnamed ditches and ponds. The applicant proposes to disturb the land, take water, discharge to water and to divert the Waikaka Stream as part of the gold mine operation.

### 1.2 Ecology

The Waikaka Goldmines Ltd Aquatic Ecology Survey (Dungey, 2021) outlines that longfin eel, brown trout, upland bully and *Gollum galaxias* were found in the Waikaka Stream.

Longfin eel, shortfin eel, perch and koura were present across the various ponds. The ditches were also described as having longfin eel, brown trout, upland bully and *Gollum galaxias*. The ditches appear to be good habitat for Gollum galaxias as they were considered "common" in the ditches.

The quality of the Waikaka Stream as indicated by MCI and QMCI was generally considered to be of "good" quality.

*Gollum galaxias* are incorrectly referred to as "At-Risk Declining" in the Ecology report (Dungey, 2021). *Gollum galaxias* are considered "Nationally Vulnerable" (Dunn et al 2018).

# 2 Audit Questions

## 2.1 Ecology

There is no assessment of the ecological value, magnitude, or level of effect of the proposed activity on the surface water bodies (Waikaka Stream, Shepherds Creek, unnamed ditches, ponds and wetlands) across the site within Dungey's (2021) report. Therefore, I cannot adequately assess the potential or actual effects of the proposed activity on the aquatic ecology and habitat present.

Further to this, without seeing the proposed rehabilitation plan within the application it is not possible to assess if the currently undefined ecological effects will be appropriately mitigated and managed.
"*The Applicant will provide a detailed rehabilitation channel design, construction methodology, planting and habitat creation specification and monitoring plan prior to the rehabilitation of diverted sections of the Waikaka Stream and Shepherd's Creek.*"

Based on this, further assessment of the level of effects of the activity and appropriate mitigation is required. It is proposed that within this assessment the following questions be answered:

1. What is proposed for the drains/ditches surface water as these appear to be important habitat for the "Threatened - Nationally Vulnerable" Gollum galaxias. Will diversions reduce the length of ditches present? What gradient will they be etc. Will fish salvage in the ditches be undertaken? Where will Gollum galaxias be released? What mitigation or offsetting is proposed to

ensure no net loss of these species and associated habitat occurs? Is increased predation of Gollum galaxias fry expected?

2. Diversion length – Will the proposed temporary loss of stream length and associated habitat be addressed by offsetting or management actions? If so what?
3. Details on restoration and habitat creation methods in the diversion channels and the reinstated channel sections.
4. What fish are upstream and likely to migrate through this reach is not mentioned in the ecology report. This requires a fish passage and migration timing assessment.
5. An assessment of the number or area of pool, run, riffles in the Waikaka Stream, Shepherds Creek and unnamed ditch reaches to be diverted and how many will be established in the temporary diversion channels and the restored channels.
6. An assessment of the number of undercut banks in the Waikaka Stream, Shepherds Creek and unnamed ditch reaches to be diverted and how many will be established in the restored channel.
7. What time of year are diversions proposed to occur? This is relevant to the migration timings of the fish potentially present and the spawning timings of fish known to be present.
8. Are any management actions or offsetting proposed for removal and delay in growth of effective riparian shading and associated warmer water temperatures in the diversion reaches and restored reaches?
9. Wetlands appear to be present on the true left of the Waikaka River, no wetland delineation or assessment in relation to wetland effects has been made.
10. How will a "better" standard in the rehabilitated channel be achieved and measured.
11. Are freshwater mussels (*Echyridella menziesii*)(Declining) present in the reaches to be diverted and is it proposed to collect and release freshwater mussels and koura (*Paranephrops zealandicus*)(Declining) (Grainger, et al., 2018).

# 3 Proposed Conditions

There is no Erosion and Sediment Control Plan (ESCP) mentioned with respect to the waterway diversions. I suggest a ESCP condition is added as a requirement to help minimise sediment mobilisation.

Condition 2. The consent term shall be for 20 years. The information supplied suggests the earthworks will be undertaken over 8 years. Further explanation of why a 20 year term is sought would be beneficial to the application.

Condition 12. a. "The entry into and passage across the bed of the Waikaka Stream and Shepherd's Creek by vehicles and machinery, and any associated bed disturbance".
I suggest altering condition 12a to "*Condition 12. a. The entry into and passage across the bed of the Waikaka Stream and Shepherd's Creek by vehicles and machinery for the purposes of creating flow diversions, and ~~any~~ associated bed disturbance.*"

Condition 12 f. "Discharge of the entire flow of the Waikaka Stream and Shepherds Creek and resultant entrained sediment, via the temporary diversion channels, to re-join the existing Waikaka Stream".
Suitable sediment conditions with appropriate criteria to be met can be a condition elsewhere. Therefore, I suggest altering condition 12 f to "*Discharge of the entire flow of the Waikaka Stream and Shepherds Creek ~~and resultant entrained sediment~~, via the temporary diversion channels, to re-join the existing Waikaka Stream*.

I suggest new Conditions 12 g is added that outlines the diversion of ditches/drains, and 12 h outlines the removal of ponds and wetlands.

Condition 14 c, there would be a lot of information here to consider within 15 days.
I suggest increasing the time period.

*Condition 22. "The Consent Holder shall ensure that all reasonable steps are taken to minimise the release of sediment to water."*
I suggest this condition should be altered to meet some suitable criteria. Perhaps the lowland hardbed criteria from Appendix E of the ES Water and Land Plan.

Condition 23. "*The diverted and rehabilitated sections of the Waikaka Stream and Shepherd's Creek shall be reconstructed to achieve the objective of at least the same habitat quality and ecological values as pre-mining*."

As stated in Section 2 above, there is currently no qualitative measure of habitat quality in the Ecological report or AEE. I suggest an assessment of the number or area

of pools, runs and riffles in the Waikaka Stream, Shepherd's Creek and unnamed ditches is undertaken. Then condition 23 could be adjusted to;

Condition 23. The diverted and rehabilitated sections ~~of the Waikaka Stream and Shepherd's Creek~~ shall be reconstructed to achieve ~~the objective of~~ at least the same habitat quality and ecological values as pre-mining. Namely the Waikaka Stream shall have x pools, x runs, x riffles, x undercut banks and x boulder clusters reinstated. The Shepherd's Creek shall have x pools, x runs, x riffles, x undercut banks and x boulder clusters reinstated. The unnamed ditches shall have x pools, x runs, x riffles, x undercut banks and x boulder clusters reinstated.

Alternatively, Condition 24 could be adjusted to state how many of each structure type would be installed in each of Waikaka Stream, Shepherd's Creek and the unnamed ditches.

Condition 25 should be altered to be more specific on what parameters will be measured, what methods will be used to measure them, what the pre-mining conditions are that they are being compared to and the locations to be sampled.

Condition 28, it was my understanding from the application that mining would occur within 20 m of Waikaka and Shepherd's Creek. If so, this condition may need to be altered.

Condition 49 should be altered to reflect the percentage change as outlined in Appendix E of the ES Water and Land Plan.

Condition 52 should be altered to reflect the parameters outlined in Appendix E of the ES Water and Land Plan.

Condition 90 c should be altered to include;
"*Provide for ecological enhancement of diverted sections of the Waikaka Stream, unnamed ditches/ponds and Shepherd's Creek*."

Condition 91 should also include the number of each habitat type, the width of the fenced riparian zone and a planting plan or planting density. 91 f should include a statement such as "within 1 year of completion".

Condition 92 should include an earlier date for the restoration of diverted stream, creek and ditch sections. As Condition 92 is currently worded the reach diverted in year one would not have to be restored until up to 19 years after diversion, which is not appropriate to protect ecological values at the site.