

IN THE MATTER of the Fast-Track Approvals Act 2024

AND

IN THE MATTER of an application for consents for Mining activities in the Waihi and
Wharekirauponga areas by OceanaGold Ltd

STATEMENT OF EVIDENCE OF HAMISH DAVID KENDAL
ON BEHALF OF COROMANDEL WATCHDOG OF HAURAKI
ECOLOGY
19 August 2025

Introduction

- 1) My name is Hamish Kendal; I am a consultant ecologist of 24 years with Natural Solutions (www.ecologist.nz). I have a Postgraduate Diploma (with Distinction) in Parks, Recreation and Tourism, majoring in Ecology (1997).
- 2) I am a member of the NZ Ecological Society, National Wetland Trust, Waikato Botanical Society, and NZ Biosecurity Institute.
- 3) I am based on the Coromandel Peninsula and am very familiar with the ecology of the area. I have experience in threatened species monitoring and management, animal and plant pest management, and ecological planning and design of development initiatives.

Code of Conduct

- 4) I confirm that I have read the Environment Court Practice Note 2023 - Code of Conduct for Expert Witnesses (Code), and have complied with it in the preparation of this memorandum. I also agree to follow the Code when participating in any subsequent processes, such as expert conferencing, directed by the Panel. I confirm that the opinions I have expressed are within my area of expertise and are my own, except where I have stated that I am relying on the work or evidence of others, which I have specified.

Scope of Statement

- 5) These comments on this application are supplied to help inform the Coromandel Watchdog of Hauraki submission to the Fast-track Panel. Due to time constraints, I have read only the documents relating to my area of expertise and have skimmed others. These comments are my expert opinion as an ecologist.
- 6) Some of the concerns I have about the potential adverse effects rely on the expertise of others to confirm the scale and severity from the activities (e.g. geo-hydrologist for dewatering, vibration expert for blasting effects).
- 7) Expert reports are referred to by their code number.
- 8) I have focused on the Wharekirauponga area above the underground mineshaft (Environmental Monitoring and Enhancement Area, C01 Fig 1), the 632ha proposed areas of pest control WAPMA (as mitigation), and the 18,870ha voluntary Biodiversity Project Area (C09 Fig 1).
- 9) I have read the Conditions of consent as proposed by the governing agencies (section D), and the Updated proposed conditions.

Vibrations from underground blasting

- 10) OceanaGold acknowledges that vibrations from blasting are likely to adversely affect Archey's frog – hence their research to understand the percentage of area of the frog population that will be affected (in B41).
- 11) The severity and scale of this effect is unknown, but an area of 3.15km² has been supplied as the area of potential effect from vibration that will last 11 years. The area of effect is defined by vibrations of >2mm/s, but if frogs are affected by vibrations less than this then the actual area of adverse effect could be much greater. If the evidence for this becomes clear, then the potential effects on frogs will need to be reassessed.
- 12) The B41 report supplies evidence that the potential effect on the Archey's frog population will be limited to 1% or less of the area that the frogs are found on the Coromandel peninsula. Nonetheless, the adverse effect on this threatened species is acknowledged as unavoidable and 'compensation' is proposed (in B37) in the form of pest control in the area exposed to vibration (314ha) and immediately adjacent (318ha).
- 13) However, the estimate of the Archey's frog population from the OceanaGold expert has been questioned by independent experts as being grossly over-inflated.¹
By overestimating the population, the potential effect of the mining activity on the local population has been minimized. This is a dangerous presumption to make when managing a threatened species with a sensitivity to vibrations from mining, and especially combined with the likely and more permanent loss of frog habitat from dewatering (see later).
- 14) The B41 report shows that Archey's frog densities in the area of >2mm/s vibrations are very high compared with other areas of good frog habitat. This is likely to reflect that this is an area where they can survive well, and therefore the mining activity will be negatively affecting a stronghold area of the species resulting in a potentially disproportionately large effect on the population.
- 15) The B38 report acknowledges the adverse effects from the vibrations in the mining footprint. The report suggests from modelling that pest control in both the mining footprint and surrounding offset area (632ha total) will enable a net gain of the frog population.
- 16) What is not acknowledged in the B38 report is that regardless of the number of frogs that are in the area of mining footprint, if they are affected by the vibrations to their detriment (i.e. not able to communicate or breed), then it will affect all of the frogs in that area regardless how many there are. This will be particularly devastating with the

¹ Dr Jo Monks, PhD, Ecology Lecturer Otago University Department of Zoology (*pers. comm.*)

cumulative and permanent potential effect of dewatering of the groundwater affecting the forest, wetlands and streams. Undertaking pest control to help frogs assumes that the effect of pests is the only negative effect on the population, which in this case it is patently not. Therefore, the population will not necessarily increase with pest control when it is limited by the effects of vibrations and dewatering. Models are only as good as the information fed into them; so there needs to be evidence that this proposal will maintain or enhance the frog population if it is to have any credibility at all.

- 17) The B47 report in the final paragraph (p37) suggests there will be a net gain in ecological value. However, any gain in the populations of common species in the pest control areas has very little weight against the decrease of threatened species populations. Also, If the frog populations inside the affected areas crash due to vibrations or dewatering then this is a significant weighting of negative value in that area, which pest control will not reverse because there may be no frogs to protect from predation. Also, the pest control program will be flawed if its design doesn't actually help increase the frog population (see later).

Groundwater dewatering

- 18) OceanaGold acknowledges that there will be an effect of creating the mine shaft on dewatering the groundwater in the Wharekirauponga catchment (see report B32 Hydrology Modelling, p47):

"The results indicate the 7-day MALF could be reduced at current monitoring locations within the catchment between 2 to 13% because of base flow reduction as a result of mining. All other flow metrics calculated also indicate a reduction between the pre-mining and mining scenarios."

- 19) The scale of the dewatering, and the effect of this on the ecology and native species is likely to be significantly under-estimated for the following reasons:
- a. The estimated range of 2-13% reduction is based on a model that has a series of assumptions that with any small change could multiply the negative effect of dewatering.
 - b. The effect of dewatering is only related to stream flow, but the negative effects of dewatering surface or shallow groundwater on forest ecosystems will be potentially felt across the whole area, and this has enormous negative ramifications for the moist habitat requirements of frogs. It is of course a negative effect on the forest itself and other native species inhabiting it.
 - c. The B46 report on wetlands (p12) suggests that:

“Wetlands fed by surface water or shallow groundwater are highly unlikely to be impacted by the dewatering; only wetlands fed by deeper groundwater are.”

There is no evidence provided as to why this is ‘highly unlikely’, therefore as a precautionary measure it would be expected to consider that surface and shallow ground water will be affected by the dewatering from the mining activity. The table from p16 shows that the wetlands classed as ‘surface water’ cover a significant total area. Also, the B32 hydrology report does not make this conclusion, so there is no evidence provided that the surface or shallow groundwater systems will not be affected.

- d. The B46 report (p20) lists weeds present already in the area. Disturbance resulting in drying and dieback of forest, and subsequently less canopy shade, will provide an advantage to weeds. This could result in weeds dominating larger areas. Also, new weed species could take hold where the seed may already be present but the moisture and shade from canopy cover prevents them from establishing. The chance of weeds being inadvertently introduced also increases.
- 20) The potential adverse effects of dewatering on native frogs are grossly underestimated. This is a significant potential effect that has been given little weight in the assessments. There has been no attempt to avoid this effect, and the methods to mitigate the effects (after they have been detected) are inadequate (grouting, supplementary water, reinjection) and have no evidence to support that they will work. The mitigation or offsetting is not focused on the whole area of forest where frogs require moist microhabitats to be maintained for their population to remain stable or increase.

Wetlands

- 21) The first point to recognise is made in report B46 (table 2 p23):
- “2.8% of the original wetland extent remains within the Coromandel area... and wetlands vegetated with mature forest are also far rarer than they would historically have been.”*
- Therefore, with much less than the national average remaining wetlands (around 10%), every small, forested wetland is even more significant in this area.
- 22) Report B46 (p7) introduces the Area of Investigation, which in a footnote explains:
- “For the purposes of this report, the ‘Area of Investigation’ is the modelled area within which it was determined that risks to wetlands were greatest.”*
- Several points about this:
- a. The purpose of the B46 report (p6) is to provide *“an assessment of the potential ecological impacts of the proposed WUG mine upon wetlands present within the Area of Investigation”*. However, it does not explain why the assessment is limited to

this area only, therefore the purpose of the report has been limited to this area when the effects of the activity will certainly be wider than this.

- b. The report limiting its assessment to where the effects on wetlands are the 'greatest'. What does this mean? The potential effects on other wetlands will still potentially be significant and adverse, so they need to be included. This indicates the evidence is woefully lacking in its coverage, missing a large area where significant damage is likely to wetlands (considered of Very High value) from mining activity.
- c. Modelling often lacks real data and relies on underlying assumptions that can skew judgment. Therefore, the Area of Investigation line needs to be used as a guide and as a precaution the consideration of potential adverse effects on wetlands needs to be much wider.

23) The B46 report (p22) identifies 8 wetlands with 'higher susceptibility' to being affected by dewatering. Two points:

- a. On p23 of the B46 report it clearly states:
"The wetlands within the site are considered to have 'very high' ecological value."
This is ALL the wetlands, so it would be prudent for an assessment to include those with 'medium' and 'low' susceptibility because of the potential significant adverse effect should errors be found in modelling assumptions.
- b. There is a suggestion that a linkage between groundwater and surface water could be found, which implies that any drainage of groundwater could affect surface water levels. This is acknowledging that the 'highly unlikely' dewatering of wetlands fed by surface water directly (made on p12) could actually be dewatered indirectly via a link with groundwater. There is not enough evidence here to satisfy concerns that the negative effects on surface water-fed wetlands could not occur.

Streams

24) The B47 report (p22, para 3) acknowledges that the Wharekirauponga stream and tributaries have 'Very High' freshwater values, including threatened fish species'. The assessment of streams is lacking in evidence to support the proposal to offset/compensate when little weight has been given to the methods of avoiding the adverse effects as a priority.

25) The B48 report by NIWA is reliant on hydrology data in terms of the scale of dewatering effects on instream habitat (from Executive Summary):

"The results focused on the effect of reductions to the 7-day Mean Annual Low Flow (7-day MALF) and changes to median flow according to detailed groundwater (FloSolutions 2023a, b) and surface water modelling (GHD 2024)."

So, if there is any question about that modelling evidence then the NIWA assessment of effects on streams will need to be done again.

Frogs

- 26) Archey's frog are listed by the IUCN as Critically Endangered, which is the category just below Extinct in the Wild², and have an At Risk – Declining conservation status in New Zealand³.
- 27) Hochstetter's frog in the southern Coromandel are an At Risk - Declining threatened species⁴.
- 28) Archey's and Hochstetter's frogs' habitats are slightly different but overlap. They both utilise stream/wetland margins and cool, moist, shady areas of the forest. Archey's rely more on leaf litter as a refuge and are associated in higher population densities with more mature forests that have dense understory vegetation. Hochstetter's frogs prefer damp environments under stones and woody debris. Both species rely on moist, stable microhabitats which makes them vulnerable to changes in forest structure and hydrology.
- 29) Archey's frog populations suffered heavily from chytrid fungus that decimated the population down to levels they are today. This was a catastrophic event from which the populations haven't recovered and is another reason that they have a highly threatened species status. The cumulative effect of disease on top of predation and habitat loss is the reason that many threatened species' are in trouble, and why they usually can't withstand any further pressures.
- 30) Archey's and Hochstetter's frogs have a variety of threats recognized by the Department of Conservation⁵ including:
 - a. Rats
 - b. Mice
 - c. Drying of the forest understory habitat from climate change
 - d. Drying of streams from lower water flows
 - e. Increase of the severity of storms contributing to floods and slips that destroy stream habitat

These last 3 threats can also be caused by the dewatering effects of mining that dry the forest interior and reduce leaf litter; and destabilise the catchment increasing the potential for slips in storms that degrade frog habitat.

² <https://www.iucnredlist.org/species/11450/66654575>

³ <https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs44entire.pdf>

⁴ <https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs44entire.pdf>

⁵ <https://www.doc.govt.nz/news/media-releases/2025-media-releases/frogs-impacted-by-predators-climate-change/>

31) The B47 report (table on p29) suggests a net gain in frog populations from modelling. The modelling however excludes the potentially most significant effect to frog populations from the assessment, which is the dewatering of groundwater effects on the habitat of Archey's and Hochstetler's frogs throughout the forest areas. This is aside from also being detrimental to their habitat in the streams and wetlands and their margins. This potential and likely effect needs to be included in the assessment of the risk to frogs of the mining activities.

Other species

32) If potential adverse effects on native species' are identified that are likely and unavoidable, and they are more than minor, then the Precautionary Principle needs to be applied to avoid the effects as a priority. This particularly pertains to any threatened species or ecosystem, and especially on land designated for conservation purposes.

33) Swamp maire (*Syzygium maire*) is a tree of wetlands that is Nationally Vulnerable, and ramarama (*Lophomyrtus bullata*) is Nationally Endangered (c)⁶. Both have suffered serious decline from the effects of Myrtle rust, and have the added pressure of climate change which will also negatively affect them. Any change in their habitat towards a dryer environment will exacerbate the negative effects on the survival of the trees that remain. Therefore, the significant potential effects of dewatering on wetland and forest drying are a substantial 'nail in the coffin' for these species in this area. This is acknowledged in report B46 (p27).

34) When the forest is in drought conditions, from a very dry summer; increasing effects of climate change; or from dewatering of groundwater, the forest vegetation is under more stress and cannot provide the seasonal food resources to the native fauna that are dependent on it. This is acknowledged in report B46 (p27).

Avoiding adverse effects

35) The 'residual adverse effects' referred to in the B47 report (p26) in RMA terminology are the 'unavoidable adverse effects' of the activities. The potential for this to occur is dependent on the likelihood of dewatering of the wetlands and streams and the relative humidity of their margins from the lowering of groundwater. But more significantly the effect of dewatering on lowering the moisture in the forest, which provides the largest area of suitable habitat for both Archey's and Hochstetter's frogs.

36) In report B46 section 5.4 (p28) the project is considered to have a Low magnitude of effect on wetlands based on the evidence provided by OceanaGold's hydrology experts

⁶ <https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs43entire.pdf>

under the Ecological Impact Assessment guidelines. In Table 6 of Appendix A this equates to a Moderate Magnitude of Effect (MoE). Several points about this:

- a. The Moderate MoE is only for 8 wetlands, but the assessment should be much wider encompassing all the wetlands (as explained above).
- b. This table is also relevant for threatened plant species of wetlands including swamp maire which are rated Very High value for Rarity (p23).
- c. The report B43 (Pii) states that *“The freshwater habitats surveyed within the Wharekirauponga Stream and its tributaries are of Very High ecological value. All habitats are classified as significant, providing habitat and migratory pathways to a number of Threatened and At-Risk native fish species.”*
- d. Any of the above could easily tip into the Very High level of effect with a High MoE that this report has not anticipated.
- e. Similarly, the adverse effects on Archey’s and Hochstetter’s frogs could easily tip into the High MoE causing this to be a Very High effect.
- f. The footnote of p28 states that it is accepted by ecologists that a significant ecological effect is triggered by a Moderate, High or Very High level of effect (i.e more than minor). All the above effects are at least Moderate and would easily become Very High when the potential effects of the mining activity become reality.
- g. The footnote of p28 also states that *“It is usual for a ‘Very High’ level of effect to trigger re-design or avoidance.”* This is considered a prudent decision to be made before any adverse effect can occur.

So, without any confidence in the evidence supplied, any one of the adverse effects will trigger re-design or avoidance, which is accepted as a precautionary pathway by experts using this effects system.

- 37) In the table on p29 of the B46 report, under Temporal Scale and Duration and reversibility, the mine is proposed to operate for 14 years. Then, it is suggested that any effects on the groundwater from the mining activity will return to ‘normal’ within ‘about 10 years’. This times nicely with the definition for a ‘permanent effect’ which is over 25 years. However, there is no evidence to support this suggestion, and there is an acknowledgement in the table that there will be permanent adverse effects on vegetation if the dewatering is significant enough. This also confirms that these experts are not confident that the dewatering will not have this effect.
- 38) Also, in the table under Risk and Uncertainty, is the statement *“it is impossible to predict with certainty how the wetlands may be affected.”* This throws uncertainty over the entire assessment that other wetlands would not be significantly and adversely affected by the dewatering.

- 39) At the bottom of the table the overall Magnitude of Effect is assigned as ‘Low’, despite the significance of the effects outlined. This is the result of a subjective interpretation of a string of weak evidence, which has been highlighted here.
- 40) On p30 of the B46 report the effects management hierarchy is tabled, but there is no clarification that the hierarchy prioritises avoidance over minimisation which is a priority over offsetting. In the referred ‘Guidance on Good Practice Biodiversity Offsetting in New Zealand’ (New Zealand Government, 2014)⁷, under 2.1:
- “...what differentiates biodiversity offsetting from other forms of impact management is that it requires: A mitigation hierarchy to be followed, i.e. offsetting significant residual effects after appropriate avoidance, minimisation and on-site rehabilitation activities have taken place...”*
- 41) On p30 of the B46 report there is a statement that adverse effects on wetlands cannot be avoided nor minimised. This is a fait accompli, because there is no evidence that another method or site has been considered that would avoid adverse effects, or at least have more/less adverse effects than the method/site proposed. Also, given that the adverse effects are expected before the project begins, the clear alternative is not to undertake the mining activities at this high value site. The applicant is acknowledging but not avoiding the significant adverse effects but has not demonstrated a clear need for the activity other than private economic gain.

Proposed mitigation for effects of dewatering

- 42) It is important to plan to monitor the wetlands as per s5.3 of the B46 report (p27). However, the evidence that the proposed mitigation methods for reversing the adverse effects of dewatering is very weak and it is questionable whether the mitigation has a high likelihood of being successful. There must be emphasis to provide evidence of a method that is proven to avoid a negative effect before dewatering occurs. This is necessary because wetlands and streams of Very High value are at stake, as well as other very significant adverse effects on the forest and its associated terrestrial and instream fauna including the threatened species of frogs, fish and plants.
- 43) P31 of the B46 report suggests Grouting as a Remedial Action should dewatering into the mine shaft occur, which claims to maintain shallow groundwater under the site. There are many issues with this proposal that render it ineffective:
- Grouting cracks will only is going to shift the water to emerge somewhere else, it won’t necessarily maintain the groundwater above;
 - The mineshaft is to be back-filled, so there won’t be access to maintain grouting;

⁷ <https://www.doc.govt.nz/about-us/our-policies-and-plans/guidance-on-biodiversity-offsetting/>

- c. Vibrations from further drilling, or earthquakes will open gaps in the grouting and create further gaps;
 - d. The grouting is a temporary solution that will eventually allow water through, so the negative effect of dewatering groundwater will occur even if it is somewhat delayed by grouting.
 - e. Who will be responsible for ensuring the protection of surface and groundwater once the mining consent expires?
- 44) P31 of the B46 report suggests Supplementary Water and Reinjection methods as a Remedial Action should dewatering into the mine shaft occur, which claims to return water to maintain shallow groundwater under the site. There are many issues with this proposal that render it ineffective:
- a. This is a temporary fix at best, requiring manual pumping of and management of water, which will have gaps in its delivery that will have dewatering effects, and only after the monitoring has noticed this already occurring;
 - b. The method will only operate during the mining phase, and not after it has closed, effectively delaying the adverse effects of dewatering until the mining has finished;
 - c. The backfilling of the mine shaft will not give access to the water for it to be pumped out;
 - d. The water in the pumping process will be warmed, creating a warming affect in the groundwater with its associated adverse effects;
 - e. There will potentially be contaminants in the managed water that could adversely affect highly sensitive frogs where it is pumped back into the system;
- 45) S6.2 of the B46 report outlines Offsetting or Compensation measures should the Remedial methods not function as needed, or the sites are too remote. This will be the default for all the wetlands because of the reasons outlined, and all the sites are remote. Again, it is a fait accompli that this proposal has defaulted to compensation without adequate consideration of Avoidance as a priority for wetlands that are of Very High value.
- 46) P32 of the B46 report concludes that with remedial and compensation actions the ecological effects of dewatering are Negligible and the level of effect is Low. This is, again, a highly subjective interpretation of a string of weak evidence. At the very least it is clear that following the end of mining activity the ongoing adverse effects are going to be Very High, and this is unacceptable to have temporary compensation for permanent adverse effects.
- 47) The B47 report (p35) states that their ecological enhancements “...will achieve clear net-benefits that substantially exceed the value and extent of areas modified or removed.” However, ‘substantially’ is a grossly subjective interpretation of the balance that is hoped for, when the true potential is that threatened frog and tree species,

amongst other species, will become locally extinct after their habitat is permanently degraded from dewatering.

Pest control

- 48) In B40 it is stated that *“The primary compensation measure to address these potential residual effects is wide scale intensive pest control over an area of 633 ha.”*
- 49) In B35 (P3) OceanaGold propose an 18,870ha Biodiversity Project of ‘predator’ control surrounding the Waihi North Project, for which OceanaGold states: *“Importantly, the Project is not mitigation or compensation for an adverse effect of the WNP.”* The Biodiversity Project is offered *“to offset potential impacts to native frogs from the effects of vibration.”*
- 50) Firstly, in the Effects Management Hierarchy, Avoidance or Mitigation of adverse effects in the Waihi North Project Area is not proposed. The priority of Avoiding adverse effects has not been investigated, and the last resort of Compensation has been chosen preferentially. This neglects the applicant’s responsibilities to rule out the possibilities of methods to avoid the adverse effects.
- 51) In the B47 report (p35, second para) – regardless of whether additional compensation ‘usually forms’ part of the ecological package (no evidence is provided for this), the applicant has already declared that the Biodiversity Project is not part of the mitigation for adverse effects, therefore it is not available for considering weighting of values in this consent application.
- 52) The B47 report (p27 bullet), by proposing this research, acknowledges that they don’t know if pest control as currently proposed would help frogs. Indeed, it is assumed that predation of frogs is a significant issue, but it requires research at this site to prove that it is, and if the proposed pest control will help. Therefore, where is the evidence that it can confidently be offered as compensation for adversely affecting the frog population?
- 53) In B47 (p35) under Additionality, it is stated that: *“All of the component parts of the effects management package involve activities or actions that would not have been otherwise undertaken by OGNZL or other agencies...”*. Since the B47 report (Feb 2025) there has been aerial 1080 pest control work undertaken by the Department of Conservation in the same area in 2025.⁸ Therefore the proposed Biodiversity Project is additional to this pest control already being undertaken. Further, of course, nobody else is offering to provide all these unavoidable adverse effects!

⁸ <https://maps.doc.govt.nz/externalmaps/index.html?viewer=pesticidesummary>

54) The pest control proposed is only for the life of the mining project. After that point in time everything reverts to the current status quo and nothing will have been achieved, and the negative effects from the mining activities will remain.

Pigs

55) Pigs are known to predate Archey's and Hochstetter's frogs⁹. In this study 44-66% of pigs had visible evidence of frogs in their guts. One pig had 56 individual frogs. DNA analyses revealed a higher number of pigs had consumed frogs, but they did not have visible remains. It is unknown how much time it takes for pigs to digest frogs to when they are unrecognizable, and therefore how many days of feeding that these numbers represent. Regardless, this number of frogs predated, multiplied by the number of pigs feeding on them, multiplied by the number of days this occurs per year is a significant potential effect relative to the estimated population size of frogs.

56) It is questionable how pig control can be effective over a large area such as the areas proposed, for the following reasons:

- a. Even professional hunters with trained dogs find it difficult to kill many pigs in a pack;
- b. Pigs cover large distances so can turn up in the project area from elsewhere in a short time;
- c. Pigs that are hunted may move to another area where they are just as likely to be feeding on native frogs;
- d. 1080 operations will not kill all of the pigs in that area;
- e. Following 1080 operations there can be a ban on dogs in the area or reluctance to use them for a long time, which removes the hunting pressure on pigs so they can return;
- f. Any residual or transitory pig population may still have a significantly large adverse effect on the local frog population.

Therefore, it is not conclusive whether pig control could be offered as compensation for adverse effects of mining activities on frogs.

57) There needs to be a comprehensive monitoring programme inside and outside the pest control project area that begins before pest control starts, then carries on after pest control. This will provide monitoring information on pig and frog populations in both areas. There are significant questions about unintended consequences:

⁹ <https://newzealandecology.org/nzje/3583> Hotham E,R et al, *New Zealand Journal of Ecology* (2025) 49(1): 3583: *Frog-predator interactions in Aotearoa New Zealand: observations and two case studies using molecular and visual gut-content analyses*

¹⁰ <https://www.nzgeo.com/stories/one-pig-one-night-fifty-six-frogs/>

- a. what will happen if the pig control doesn't work to help increase the frog population inside the pest control area?
- b. What will happen if the frog population outside of the pest control area falls in relationship to increasing pig numbers?

This 'management reaction to monitoring' has been set up for other aspects of the mining proposal (e.g. management of dewatering if monitoring of wetlands show they are negatively affected).

- 58) The monitoring programme needs to be extensive to cover the pest control area and an equivalent adjacent area with frogs but no pest control. There needs to be a budget set for the monitoring programme.
- 59) The management that is proposed to alleviate any unintended consequences of the pest control programme must be approved by DOC (as being proven by evidence).
- 60) There must be a budget set for this pig management, and a bond held by a third party to 150% the value of the budget to ensure that it is undertaken if the OGNZL walks away. The pig control must have targets approved by DOC that are to be reached before any bond money is released.

Mice

- 61) The B47 report (p27) suggests that pest control may not include mice. This is not acceptable because, following rat control, the mice population has been shown to increase and negatively affect frog populations. This unintended consequence was documented in the Whareorino forest¹¹ where there was reduced recruitment of young frogs due to increased predation by mice that were able to access micro-refuges of the younger frogs. Even with an increase in survival of adults, the long-term prospects for the population with reduced recruitment are not promising. The authors of the Whareorino study suggest that rat control alone may not be sufficient to recover depleted frog populations and recommend further research to understand the effects of mice.
- 62) There needs to be a budget set to control mice over the whole Biodiversity Project pest control area, and a research project funded to further understand the effects of mice on frogs inside and outside the project area. A bond must be held by a third party to 150% the value of the budget to ensure that the control and research is undertaken. The mice

¹¹ Germano, Jennifer M., et al. "Age Dependant Effects of Rat Control on Archey's Frog (*Leiopelma Archeyi*) at Whareorino, New Zealand." *New Zealand Journal of Ecology*, vol. 47, no. 2, 2023, pp. 1–12. JSTOR, <https://www.jstor.org/stable/48807004>. Accessed 14 Aug. 2025.

control must have targets approved by DOC that are to be reached before any bond money is released.

Budget

- 63) The B40 pest control plan is a high-level framework of ideas. It does not consider the practical effects of the proposed pest control on the actual biodiversity objectives and then target the management decisions and methods towards this. There is a raft of practicalities that are not in the plan which are required to resource a large pest control operation like this.
- 64) The budget provided to comprehensively undertake pest control over the Biodiversity Project area is significantly underfunded. For example, there is no consideration for huts that will be required for pest control operators. A single hut itself will cost more than \$500,000 to consent and put in place. Several of these may be required. A large outlay of resources and time will be required for the initial layout of trap and bait lines and then continued maintenance. Where is the budget for this infrastructure and other essentials such as an office base, staff and vehicles, and poison sheds, tools, ... etc? All of this must be in place before any pests are killed.
- 65) A project of this scale must be bonded to ensure that OceanaGold does not walk away from it. The bond will need to be 150% the value of all the setup costs, ongoing management and monitoring of the project area and beyond. The project must have targets approved by DOC that are to be reached before any bond money is released.