

BEFORE THE EXPERT PANEL

FTAA-2507-1089

**UNDER
IN THE MATTER**

Fast-track Approvals Act 2024
of the Bendigo-Ophir Gold Project

**STATEMENT OF GEOFFREY ROGERS ON BEHALF OF SUSTAINABLE
TARRAS**

Dated 7 September 2026

Julian Miles KC
Richmond Chambers
miles@richmondchambers.co.nz

SALLY GEPP KC

M +64 21 558 241 — SALLY.GEPP@MILLSLANE.CO.NZ
MILLS LANE CHAMBERS, 3 BROOKSIDE, NELSON 7010
PO.BOX 537 SHORTLAND ST, AUCKLAND 1140. MILLSLANE.CO.NZ

TO THE EXPERT PANEL

Introduction

1. My name is Geoffrey Malcolm Rogers (Dr). I am a retired botanical and ecological researcher, previously with Manaaki Whenua-Landcare Research (now Bioeconomy Science Institute) and the Science & Research Division of the Department of Conservation.
2. I have been requested to produce a further statement on behalf of Sustainable Tarras on the Bendigo-Ophir Gold Project Fast Track Application. This statement:
 - a. Addresses Minute 40, and in particular responds to the 2025 Spring Annual Report contained in Minute 40.
 - b. Responds to MGL's further information in response to the Panel's RFI 11 Question 11 – Measures of Success for Rehabilitation of Cushionfields and Spring Annuals.
 - c. Responds to MGL's further information in response to the Panel's RFI 11 Question 10 – Alternative Approaches for Managing Effects on Lizards.

Qualifications and Experience and Code of Conduct

3. I refer to my original Statement of Evidence of March 2026 on behalf of Sustainable Tarras and the qualifications and experience set out at paragraphs 1—5.
4. In providing this further statement of advice, I confirm I abide by the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 as set out in my previous statement in paragraphs 9—10.

RESPONSE TO MINUTE 40

5. In accordance with Panel Minute 40,¹ my evidence below responds to the 2025 Spring Annual Report.

Multiple surveys

6. Sequentially, the 2023, 2024 and 2025 surveys for spring annual herbs demonstrate progressive refinement in methodology and knowledge toward the goal of a robust and reliable account of the conservation status of this plant guild. Each survey has shown that the population status of the group is considerably greater than portrayed in the preceding report. Yet, the 2025 report does not comprehensively cover all the prime habitat in the entire DDF or that of the wider project area. We still have a poorly resolved understanding of the most conservationally significant guild of plants and their attendant habitat within the project site, and considerably more survey is recommended for 2026 (see comment below).
7. Further, as my original evidence highlighted, a robust and confident appraisal of spring annuals requires multi-year, repeatable surveys because of their inconsistent annual appearances (paragraphs 29, 31a).

¹ https://www.fasttrack.govt.nz/data/assets/pdf_file/0014/30470/FTAA-2507-1089-Minute-40-of-the-Panel.pdf at [9]

Relevance to assessment of effects

8. The 2025 report highlights a wider distribution of major populations than quantified in the original application. Populations of at least equivalent value to those of the Come-In-Time Pit zone warrant avoidance in consent conditions. Accordingly, the new data brings into question the overall reliability of the assessment of effects and the design of the proposed consent conditions.

Another Threatened spring annual species not included

9. Another threatened spring annual species recorded once in the 2023 survey has been overlooked entirely in the 2024 and 2025 spring annual surveys. *Daucus glochidiatus*, the native carrot, has a similar threat ranking (Threatened – Nationally Vulnerable) to *Myosotis brevis*, which was included in the survey. *D. glochidiatus* is known from just one other site in Otago (Luggate) and has a regional threat ranking of Regionally Critical. I recommend it be incorporated in any further spring annual survey.

Recommendation for a Spring 2026 Survey

10. About 1400ha of additional land of potentially very high conservation value is recommended for survey in spring 2026 to address incomplete survey coverage of the DDF, the Ardgour Restoration Area, elsewhere on Ardgour Station and on adjacent private land. At an estimated 700 hours of field work² this represents three times the 230 field hours expended on the 2025 survey. Because of spring annual phenology, survey needs to extend to late October–early November. With subsequent reporting, this appears impractically late for stakeholder consideration and the panel's judgement and reporting timeline for the application.
11. Recognising the time constraint, prioritising the 2026 survey effort to the vegetation type supporting the highest concentration of spring annuals – depleted herbfield and grassland and its cushionfield subset seems compelling. However, there are three caveats to that approach:
 - a. Resolving uncertainties with the relative significance of populations on the DDF and the CITP in relation to the entire 5386 ha Ecological Study Area (ESA), substantially Ardgour Station and the Bendigo Conservation Covenant (BCC) argues for comprehensive coverage across both land designations. At present, the revocation area of the BCC represents the most significant population of *Ceratocephala* nationally.
 - b. Because the 2025 report records substantial proportions of spring annual populations amongst vegetation types other than depleted cushionfields, all implicated types should be targeted.
 - c. Confidence in the calculation of ecological values and residual adverse effects on species and habitats relies on comprehensive, robust data. Despite three surveys, confidence remains elusive. As

² Per Max Crowe evidence responding to the 2025 Spring Annual Report discussed in Minute 40 of the Panel

corroboration, paragraphs 16 and 17 of the Joint Witness Statement – Ecology, Terrestrial Vegetation candidly recognise the present mapping and status data underestimates impacts on spring annuals and confounds compilation of adverse residual effects.

Biodiversity compensation measures inimical to spring annual survival

12. The highly Threatened status of the affected spring annuals means adverse effects should be avoided. My comments below on compensation do not detract from my opinion on avoidance being required.

Fenced sanctuaries are inimical to sustaining spring annuals

13. Much discussion and several iterations have attempted to optimise the biodiversity benefits of fenced sanctuaries, now resolved to Bendigo and Battery Hill. Although excluding herbivorous animals will accelerate recovery of palatable plants, the inevitable proliferation of woody vegetation and ground cover will be detrimental to spring annual survival. The 2025 survey shows relatively small populations of *Ceratocephala* and *Myosotis brevis* within the footprint of the two fenced exclosures (originally proposed) but they are not inconsequential and will vanish as scrub canopies coalesce and light gaps disappear with the removal of herbivores.

Replacement of a farming land use with biodiversity protection practices

14. Based on current knowledge, the present 5386 ha Ecological Study Area supports a dispersed, spring annual ecosystem of unsurpassed conservation value – aggregated across all contributing species and their habitats. A combination of a dry exposed environment and a long-history of low-input farming land use has driven the repetitive pattern of degraded spur tops and north-facing slopes that so strongly support the spring annual guild. However, destocking commensurate with mining operations and subsequent creation of biodiversity restoration zones such as the proposed Ardgour Conservation Covenant of 2881 ha will result in loss of key ecosystem processes that maintain this prime spring annual habitat – removal of farm stock mediation of disturbed and bare ground and faeces-derived nutrient delivery.

Stabilisation of ablated pavements with pasture grasses

15. Some of the initial spring annual populations could not be relocated amongst invasive exotic grasses in 2025 (pg. 22). The authors point to the potential smothering effects on spring annuals of exotic grasses used for soil stabilisation. Thus, containment of erosion and sedimentation during mining and at completion by seeding exotic grasses will harm spring annuals.

Summary

16. The 2025 report substantially improves the quantitative foundation for assessing effects on spring annual species. Nevertheless, recommendations for 1400 ha of further survey and significant areas of the 7010 ha BCC not included in that suggestion, emphasise the shortcomings of not being able to reliably rank or judge the relative conservation significance of all populations across the ESA and the BCC after three survey years.
17. Based on present knowledge, habitat loss across the DDF and on the relevant areas of the revocation portion of the BCC will destroy the nationally strongest population of *Ceratocephala* and significant populations of the other

species and their habitats. Conceptualising it as a spring annual ecosystem, this represents an irredeemable loss of an internationally significant conservation taonga.

RESPONSE TO RFI 11 – QUESTION 11

18. My evidence below responds to the Applicant's Response to the Panel's memorandum RFI 11 – Measures of Success for Rehabilitation of Cushionfields and Spring Annuals, which consists of Part A and Part B.

“Part A: The consensus expert position is that the propagation techniques for spring annuals are experimental and likely success unknown. What is a suitable measure of success for rehabilitation of cushionfields and spring annuals?”

Spring annuals

19. The Applicant now proposes three modified criteria as measures of success for rehabilitation of spring annuals, which I comment on below

Criterion 1. Increase the net number of discrete sub-populations (groups) of Ceratocephala pungens within the landscape managed by MGL over 10 years by establishing new sub-populations of this species in the ecological rehabilitation and habitat enhancement areas (i.e. areas managed by MGL, also referred to as the offset/compensation areas), that area outside and /or inside the DDF.

20. **Response:** The Applicant notes (pg. 1): “While the 2025 spring annuals survey results do not change the threat status of any of the spring annuals, including the critically threatened *Ceratocephala pungens*, they significantly increase the area over which management interventions can be trialled, allowing faster progress by increasing the number of interventions tested.” Yet there is no elaboration of those intervention techniques, their likely efficacy, their trade-off costs on resident ecological values or how the proposed success measure – numbers of sub-populations – can incorporate those treatments.

21. Moreover, the key habitat characteristics and ecosystem processes that regulate *Ceratocephala* populations are entirely unknown except for its strong dependence on disturbance from farm stock and rabbits. That knowledge is required for artificial habitat mediation and will be time-consuming to acquire. As the Applicant concedes: “Because so little is known about the biology of *C. pungens*, further work – including monitoring of individual plants – will be needed to build an understanding of its phenology (longevity and seasonal turnover patterns, interannual variation, and dispersal)” (2025 Spring Annual report). This understanding of species biology will precede habitat intervention, bringing into question the feasibility of a 10-year working timeframe.

Criterion 2. Develop methods for ex-situ (nursery) propagation and establishment of Ceratocephala pungens over 6 years that result in more than 200 individuals reaching maturity over 2 successive seasons.

22. **Response:** 200 individuals is a very conservative outcome from six years of plant propagation trials, and quantitatively well short of the amount of seed required for achieving a net gain in sub-populations from offsetting/compensation after destruction of thousands of plants on the DDF. I suspect that this conservatism reflects the knowledge gaps surrounding to

species' wild biology and ecology. Also, a six year timeframe seems optimistic in relation to the species' inconsistent annual appearance.

23. The Applicant's response also notes: "Combined with new knowledge on numbers of seeds per capsule and numbers of capsules per plant, the ability to progress propagation techniques is also enhanced due to the feasibility of collecting thousands of *Ceratocephala pungens* seeds from relatively large sub-populations." Yet, the effects of such collection on one of the most threatened plants in the flora, especially its impacts upon population viability across sub-populations, has not been assessed.
24. I fail to see how methods for the wild establishment of nursery-raised seed will be any different from methods for wild "on-site propagation" if the later fails.

Criterion 3. Deliver a net increase in the areas over which subpopulations or groups of Myosurus minimus subsp. novae zealandiae and the two native Myosotis species are present within the landscape managed by MGL over 10 years.

25. **Response:** Other than area, the Applicant's experts have avoided defining or dimensioning sub-population success criteria for the spring annual species other than *Ceratocephala* – "The proportion of other species that should be measured should be informed by the 2025 and 2026 surveys and is likely to be lower" (pg 3). Much uncertainty and imprecision remains:
 - a. Does a net increase in area include accounting for the complete loss and non-replacement of spring annuals on the DDF? I believe it should.
 - b. The absence of the spring 2026 data, which will inform the success criteria. Survey will cover at least 1400 ha (and should cover more – my response to the 2025 Spring Annual Report) and is not expected until late 2026.
 - c. A net area increase requires dimensioning the cover of each and every sub-population, which is likely an impractical undertaking because: a) judging the spatial extent of each sub-population is highly subjective in terms of the repeatability of a centroid and radius defined area as populations migrate; and b) classifying mixed species populations involves different but somewhat overlapping spatial distributions for each (?multiple centroids).
 - d. Missing is an account of net area increase in terms of the different habitat enhancing treatments necessary for the different species' populations. And some of those treatments will be difficult to engineer, for instance *Myosurus* is strongest on topography that is perpetually wet in winter and early spring and will require season-long water application to create new habitat.

26. The Applicant proposes rejecting two criteria (pg. 3):

1. *"A criterion requiring establishment of spring annuals within mined areas of the DDF. Not including this criterion allows establishment to focus on the places where most successful outcomes are most consistently achieved."*

27. **Response:** While the Applicant provides no rationale for their concept of "most successful outcome", avoiding the DDF is highly regrettable because it

presently supports the highest value (plant numbers and density) population nationally. There may be opportunities for restoration of *Ceratocephala* on 500 ha of engineered bare pavement.

2. “An ‘abundance’ criterion for individual spring annual herb species. This is because the focus of mitigation is to increase the number of sub-populations of *Ceratocephala pungens* and area of sub-populations for other spring herb species. Increasing sub-populations is likely to provide more resilience. It may also be more efficient to monitor.”
28. **Response:** I disagree: Success metrics should include number and density of the target species, along with measures of reproductive and recruitment behaviour. Sub-populations of small numbers or sparse distribution can indicate population decline.

Summary

29. I see several shortcomings in the Applicant's proposed measures of success for spring annuals:
- a. No accounting for the loss of resident native plant values from experimental intervention management for spring annuals.
 - b. No quantification in net gain accounting for the progressive loss of the baseline, in-situ populations within areas managed for restoration of taller vegetation.
 - c. A conservative success measure for ex-situ cultivation of *Ceratocephala* that bears no relevance to the seed quantities required for establishing enduring new populations.
 - d. Imprecision with the definition and field delineation of the area success measure of the non-*Ceratocephala* species.

Cushionfields

30. To begin, the Applicant's Applied Research Plan (ARP) for Cushionfield acknowledges that there is virtually no existing research, knowledge or experience of management actions that have established, enhanced and maintained rehabilitated cushionfield. Research is required to reduce the uncertainty and define and refine management interventions for like-for-like offsetting.
31. From that knowledge vacuum, the Applicant has separate cushionfield success criteria for the mined and unmined zones.

Mined area

32. The Applicant proposes establishing de novo a minimum of 19 ha of cushionfield principally using *Raoulia australis* on the 510 ha of the DDF proposed for restoration. A second criterion uses proportions of monitoring plots of estimated cover classes as condition scores.
33. Dealing with the first criterion, attempting to establish 19 ha of homogeneous, monospecific cushionfield removed from its wider community context, principally depleted herbfield and grassland avoids that important functional context. Success criteria (area and condition) centred on planting mainly one species denies the subtle compositional richness of wild cushionfield

contributed by many other dryland herbs and grasses (see B. 13A RMA Ecology Vegetation Survey Assessment). Further, cushionfield is a mosaic component of other vegetation types (albeit often at smaller scales) and so restoration planting and reporting should incorporate that natural landscape-scale dimension of the community (see their Appendix 3 images).

34. In terms of topographic relief, the larger areas of *R. australis* cushionfield are on steep rock-strewn pavements stripped of topsoil. However, there is no detail on whether the 19 ha will be distributionally skewed across any variation in topographic relief that attempts to recapitulate the DDF's original landforms and their proportional expression. Also missing from the 19 ha success criterion is the habitat treatment methods that might be used to maintain it long-term. Success in terms of habitat treatments seems essential.
35. I also have an issue with the condition criterion of success. At 10-years the first planted cohort of *Raoulia* will likely be dying and daughter clones establishing via centrifugal spread. It is unclear whether a simple cover class metric for *Raoulia* can shed light on this important aspect of population turnover and its enduring presence.

Unmined area

36. The Applicant proposes increasing the net area by >10%, along with improvements in condition. They also state: "The cushionfield definition should include the other vegetation types [within which cushionfield occurs] up to a specific maximum area as it is not proposed to remove short tussock or indigenous shrubland to 'create' cushionfield."
37. **Response:** As with spring annuals, implicit here is an expansion of *Raoulia* at the expense of other resident community values, which should be incorporated into success criteria. Exotic plant communities might be targeted but that is not stated in the LERMP guidelines.
38. Also, quantifying "specific maximum area" of cushionfield nested within other vegetation types will be a highly subjective process devoid of a real understanding of the spatial and functional dynamics of the intergrading relationships. The relationship will vary between and within the different vegetation types and change over time and, thus will be quite computationally problematic for reporting.
39. In using plot-based and potentially remote imagery for monitoring, they propose to focus on the *Raoulia*, bare ground and weeds but a more rewarding understanding of success would include population recruitment and simple measures of increasing community richness because a monoculture is a crude approximation of cushionfield's wild state.
40. Programme reviews at the 3 and 5 year timelines are proposed as are adaptations to the programme resulting from this. But the planting programme relies on guidance from the Applied Research Plan, which will likely take 5 years minimum. There is little detail on success-failure criteria (other than simple cover metrics), the thresholds that may trigger review, particularly in relation to real indices of plant performance (growth, reproduction and recruitment), and community health and resilience other than cover. The Applicant foresees "implementing actions that result in effects similar to overgrazing combined with removal or prevention of smothering weeds" but there is no mechanistic substance to the "actions"

concept. In the absence of technical detail on recognised land management techniques for manipulating bare ground, I feel the programme is quite hypothetical and suggests reliance on a 'suck-it-and see' approach.

Summary

41. So much of the operational part of the cushionfield programme relies on uncertain outputs and timeframes of an Applied Research Plan.
42. Within the DDF, I see 19 ha of mono-specific *R. australis* cushionfield, contiguous or dispersed, as a simplistic and unrepresentative rendition of its original landform and community composition context.
43. Again, there is no accommodation in the success criteria of losses to resident native plant values from additional habitat creation in the MRZ and ARA.
44. Also missing from the success criteria for both spring annuals and cushionfields is an attempt at integration because: a) they strongly overlap in the wild; b) are somewhat mediated by similar succession-halting, ecosystem processes; and c) will likely receive the same habitat intervention treatments for their perpetuation or creation in MGL's rehabilitation/restoration zones.

Part B: If rehabilitation is not successful (after the expiration of a reasonable period during mine operation), what alternative form of compensation will be offered?

1. Compensation measures

45. MGL proposes that "sufficient progress" be defined as achievement of at least 80% of the success criteria. Logically, achievement of only a portion of success criteria means failing to achieve the criteria.
46. For spring annuals, dimensioning and reporting on achievement of 80% will be very challenging because:
 - a. Populations have inconsistent annual appearance.
 - b. They are mobile over time.
 - c. Imprecision and subjectivity with judging what is a new or a reconstituted existing population from artificial disturbance.
 - d. Difficulty with incorporating health or status trends within populations.
 - e. The comparatively short timeframe (6 or 10 years) demanding a very steep learning curve for a novel proposition.
 - f. No measures of impact costs upon resident native communities in attempting creation of new populations or of the large amounts of wild seed collection.
47. There are also uncertainties and risks in this approach because:
 - a. There are no deviation limits to the 80%. Is it a make-or-break figure?
 - b. There is no stipulation to use independent consultants.
48. Overall, I foresee substantial difficulty and imprecision with reporting on success for spring annuals and with determining the quantum of

compensation based on their net loss in numbers of populations and sustainable condition.

49. For the cushionfield community beyond the DDF, I anticipate much difficulty with quantifying it as a defined community component of the compositional vegetation mosaics it occupies. Using plot-based cover of *Raoulia* only will be a poor measure of cushionfield cover within the multiscaled cover of other vegetation types (see Appendix 3 images).
50. My reservations on success metrics and achievement measures include the cushionfield community of the DDF:
 - a. Does a planted *R. australis* monoculture really constitute a community? Missing will be all the other structural and fill-in native plant species that contribute to measures of community integrity.
 - b. A *Raoulia* cover statistic cannot be used to understand population dynamics (sustainability) such as recruitment by vegetative spread or seedling establishment. *R. australis* mostly shows mosaics of age class cohorts resulting from patch disturbance. Adult plants migrate by centrifugal spread and sometimes daughter clone persistence but cover data cannot illuminate dynamic persistence by either behaviour. Missing will be an understanding of recruitment and age classes responding to pulses of disturbance.
 - c. However, it will point to the eventual decline of a planted cohort but only at timeframes beyond about 10-years.
 - d. At the simplistic level of just one species, nothing is known about propagating and transplanting *R. australis*, especially on earthworks engineered soils without mycorrhizal associations, yet an enormous 19 ha is proffered. No detail is provided in the LERMP on simulating the landscape scale disturbances that are critical for patch persistence of *R. australis*. Apart from the serious monoculture handicap, all these population aspects of community integrity beyond area and/or condition need incorporation into meaningful success criteria and achievement thresholds as a basis for determining the quantum of compensation.

2. Compensation agreed with the Peer Review Panel, CODC and ORC

51. MGL proposes that *if, at active mine closure (Year 10), less than 80% of the cushionfield success criteria have been achieved within the DDF, indicating insufficient progress, alternative programmes of work may be developed in consultation with the Peer Review Panel, CODC and ORC to address the shortfall. Such programmes may include the establishment of alternative rehabilitation objectives for areas where cushionfield rehabilitation has not been successful, including rehabilitation to an alternative vegetation type.*
52. This proposal highlights the risks of this project for cushionfields:
 - a. It says alternative programmes *may* be developed (but may not be - failure may just remain as failure).
 - b. Such programmes *may* include alternative rehabilitation objectives, including rehabilitation to an alternative vegetation type. This would

enable cushionfield rehabilitation to be abandoned if it is not achievable (which in my opinion is extremely likely).

3. and 4. Financial compensation for cushionfield and spring annuals

53. MGL proposes that in the event that the spring annual and cushionfield success criteria are not met, MGL will identify and secure suitable spring annual and cushionfield habitat outside its managed areas through purchase and protection under an enduring legal mechanism.
54. Land purchase and legal protection of an equivalent area to the residual shortfalls will be a highly problematic undertaking because:
 - a. Pockets of ecologically equivalent spring annual and cushionfield ecosystem beyond Ardour and Bendigo Stations (both of which MGL propose purchasing) will be difficult to select on a true like-for-like ecological platform.
 - b. Private land owners have to be amenable to subdivisional sale and ongoing management access.
 - c. Farm stock and/or rabbits will need nurturing long-term as will containment of vegetation successional changes.
 - d. The Department of Conservation has purchased and/or legally protected many spring annual and cushionfield land pockets through the tenure review process and other land purchases over the last 20-years and the status of that community and its spring annuals has substantially declined or become extinct at them all. Legal protection was consistently coupled with removal of the original farm stock and/or rabbits that were critical mediating agents (Rogers et al. 2002; 2005; Rogers & Overton 2007). I refer to Chapman Rd Scientific Reserve (SR), Springvale SR, Snow River at Grampians Station and on three protected land parcels of the Otago Central Rail Trail. Further, *Ceratocephala* is now believed extinct in the Mackenzie basin due destocking of its habitat at its three known sites (Rogers 2024).
 - e. Land protection through tenure review by imposition of a conservation covenant has not proved to be enduring in the present case.
55. I appreciate the theoretical relevance of the mitigation hierarchy in consenting processes. In this case, the application of that hierarchy would require that the effect on spring annuals and cushionfields is avoided, because limits to compensation in Appendix 4 of the National Policy Statement for Indigenous Biodiversity are not met:
 - a. Due to the vulnerable and irreplaceable nature of these communities.
 - b. Because ecologically convincing compensation mechanisms are extremely hard to design and comply with. The land use history origins of spring annual ecosystems will be difficult to emulate with intervention management as a form of compensation.

RESPONSE TO RFI 11 – QUESTION 10

56. My evidence below responds to the Applicant's Response to the Panel's memorandum RFI 11 – Alternative approaches for managing effects on lizards (Question 10).

Sanctuary design

57. The location of both sanctuaries was strongly influenced by the limits to practical implementation and ongoing management imposed by the primary land use – mining – and not by the principles of conservation reserve design for dryland herpetofauna. Thus, the Bendigo Sanctuary is entirely bereft of habitat for southern grass skink and the Battery Hill Sanctuary is mainly of a shady, cool, south-east aspect, which is sub-optimal for lizard thermo-regulation.
58. Despite the Battery Hill Sanctuary offering an increased area over that of the Ardour Sanctuary, collectively, this comparatively small area of habitat enhancement is small recompense for the total loss of 610 ha of habitat on the DDF.
59. The original application lightly suggested future translocation of other threatened lizards such as grand and Otago skinks. However, the rock outcrop morphology of both proposed sanctuaries has yet to be considered in terms of the optimum characteristics of rock tors for those skink species as dimensioned at the Oceana Mine, Macraes Flat, east Otago (Aitken et al. 2025).
60. Despite the claim that the Battery Hill Sanctuary has a “high degree of certainty regarding implementation and management”, it will sit within an earthworks-modified landscape. Further, it abuts the RAS Pit and is broadly sandwiched between that and the SRX Pit. Thus, in bordering the DDF, it is:
- a. Vulnerable to expansion of the mine footprint;
 - b. Will have compromised landscape appeal as a regional mainland island;
 - c. Will suffer spill-over impacts from mining activity during intervention management.

Sanctuary management

61. Mice are widely recognised as the most problematic and challenging predator pressure to deal with for most lizard species. At best, suppression but not elimination of mice is a realistic goal for fenced sanctuaries. However, controlling mice to low impact densities can be even more difficult after the more achievable elimination of their primary predators – rats, cats and mustelids.
62. Habitat enhancement within the sanctuaries (predator control/elimination, restoration planting, etc.) will be undertaken prior to lizard release. Consequently, salvaged lizards – up to 800 southern grass skinks and 7700 Kawarau gecko – will need captive management for an unstipulated period. I note that at Oceana Gold's mine at Macrae's Flat, thousands of salvaged

geckos intended for relocation failed to survive captive management (my Statement of Evidence para 47).

Understanding benefits

63. The only way sanctuaries can reduce the magnitude of residual effects on lizards is by demonstrating high survivorship of translocated animals without detrimental impacts on the in-situ residents. Yet, without acceptable ways of identifying translocated individuals, there is no way of reliably understanding and reporting additive gains for either population.
64. Herbivores will be excluded from the sanctuaries. However, presently, there is no science to understand how the habitat quality and carrying capacity of Kawarau gecko is influenced by increasing vegetation biomass, particularly a trend toward close-canopied shrubland-low forest. How they respond to a cooler and moister understorey microclimate from shading of their preferred rock outcrop habitat needs to be understood.

Geoff Rogers

References

Aitken, E., Rufaut, C., Scott, J., Read, S., Craw, D. and Pillai, D., 2025. Otago Schist tor lithology controls on lizard habitats, East Otago, New Zealand. *New Zealand Journal of Geology and Geophysics* 68: 1176–1189.

McIndoe, KG 1932. An ecological study of the vegetation of the Cromwell District, with special reference to root habit. *Transactions of the NZ Institute* 62: 230–266.

Rogers GM, Walker S, Tubbs, Henderson J 2002. Ecology and conservation status of three "spring annual" herbs in dryland ecosystems of New Zealand. *New Zealand Journal of Botany* 40: 649–669.

Rogers GM 2024. *Ceratocephala pungens* – a conservation management report for the Plant Species on the Brink programme for the 2023-24 growing season. Report held at Invercargill Office, Department of Conservation, New Zealand.

Rogers GM, Walker S, Lee WG 2005. The role of disturbance in dryland New Zealand: past and present. *Science for Conservation* 258. Wellington, New Zealand, Department of Conservation.

Rogers G, Overton, JM 2007. Land use effects on "spring annual" herbs in rare non-forest ecosystems of New Zealand. *New Zealand Journal of Botany* 45: 317–327.