Before the Expert Panel appointed under the Fast-track Approvals Act 2024

Under	the Fast-track Approvals Act 2024 (**Act**)
And	
In the Matter of	an application for approvals by Matakanui Gold Limited to establish, operate, rehabilitate and ultimately close an open pit and underground gold mining operation known as the Bendigo-Ophir Gold Project

Statement of Evidence of **Graham Thomas Ussher** on behalf of **Matakanui Gold Limited** in response to Section 53 Feedback

Terrestrial Ecology: Lizards

Dated**:** 17 April 2026

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INTRODUCTION

1. My full name is Graham Thomas Ussher.

2. I am a Principal Ecologist at RMA Ecology Ltd, and have held that position for 10 years, since I established the company in 2016.

3. I hold the qualifications of Bachelor of Science (Zoology) (1993), Master of Science (Conservation Ecology) (1995) and Doctor of Philosophy (Conservation Management) (2000) from the University of Auckland, New Zealand.

4. I have over 32 years' experience in environmental research and consulting, with a particular focus on land-based ecology and methods for providing improvements to indigenous biodiversity. I am a specialist herpetologist and have undertaken survey, effects management, salvage, and research, on lizards and tuatara, with some work on native frogs, across New Zealand for over 35 years.

5. I have previously been employed as:

   (a) A lecturer in Environmental Science at the University of Auckland (2000 – 2003).

   (b) Regional Ecologist for the (former) Auckland Regional Council (2003 – 2007), with a focus on projects that managed species and ecosystems, and the restoration of Auckland coastal parklands.

   (c) A Principal Ecologist at Tonkin & Taylor Ltd, Environmental and Engineering consultants, Auckland (2007 – 2016) where I was a senior-level ecologist. Over my period of employment at Tonkin & Taylor Ltd, I managed, undertook fieldwork, reported on, or reviewed in excess of 120 projects involving ecological effects assessments and management and ecological mitigation / restoration in New Zealand spanning small to large scale effects, and covering all aspects of land use.

6. I founded RMA Ecology Ltd in 2016. In my role as principal ecologist, I have undertaken approximately 260 projects since 2016 that have involved site assessment; impact evaluation; effects management design (including offsetting); management plan preparation construction management, including lizard, fish and plant salvage and stream reconstruction; and ecological monitoring and reporting.

7. My project experience spans land development, infrastructure, power generation, resource extraction, water management, and roading sectors. My involvement in projects ranges from pre-purchase due diligence, preliminary / concept development

design, precinct and private plan change assessments, resource consent applications, and construction supervision, implementation, monitoring and reporting.

8. This statement is given as part of Matakanui Gold Limited's (**MGL**) response to comments on the Bendigo-Ophir Gold Project (**BOGP**) made under Section 53 of the Fast-Track Approvals Act 2024 (**FTAA**).

9. My original findings are provided in full in the BOGP:

   (a) B.15A RMA Ecology Lizard Values Assessment; and

   (b) within the Offset Modelling Assessment report that is appended to the Ecological Effects Assessment report (part B.08 - Alliance Ecology Consulting - Assessment of Ecological Effects).

10. The Lizard Values Assessment has not been informed by any of the other technical reports that are a part of the substantive application, but it should be read in conjunction with all of the ecology-related reports for a fulsome understanding of the ecological values at the site, the effects on those values, and the management of those effects.

11. I have prepared this statement in the limited time available for MGL to respond to comments under the FTAA. Due to time constraints, I have focused my response on the issues I consider most material. The absence of comments on other matters should not be taken as agreement or acceptance. If the Panel requires elaboration on any of the matters raised in this statement, I am available to provide further information on request.

12. Although this is not an Environment Court proceeding my confirmation of compliance with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 is included in Substantive Application Document A0.2B.

SUMMARY

13. Although several briefs of evidence from parties invited to comment refer to lizards, most use information and conclusions reached by reports or evidence prepared by Dr Mandy Tocher (on behalf of the Director General of Conservation (**DOC**))[1] and by Trudy Anderson (on behalf of Otago Regional Council (**ORC**))[2]. Additional comment is provided by Samual Purdie[3] on behalf of the Royal Forest and Bird Protection Society.

[1] Tocher, MD. 19 March 2026. Statement of evidence: Dr Mandy D Tocher: Technical Advisor Herpetofauna. 28 pp.
[2] E3Scientific. 18 March 2026. Matakanui Gold terrestrial ecology – technical review terrestrial ecology: Final response 18/03/2026
[3] Purdie, S. 10 April 2026. Statement of evidence by Samuel Purdie (lizards). 16 pp.

14. Matters that I agree with the parties invited to comment on are listed below:

(a) There are three species of native lizard within the Direct Disturbance Footprint (**DDF**): Kawarau gecko, McCann's skink, and southern grass skink.

(b) The site is home to many thousands of these lizards, with total numbers probably in the range of 500,000 – 750,000.

(c) Salvage and relocation of all lizards from the site will be a practical impossibility; any discussion of salvage should focus on a subset of the numbers present.

(d) Relocation and release of even a small portion of lizards salvaged within the footprint to a release site elsewhere carries a risk of displacing resident lizards, and there is uncertainty over whether relocated lizards will survive.

(e) The mitigation and offset proposed for lizards – which includes salvage-relocation, release into part of the Ardgour Restoration Area, the rehabilitation of much of the DDF including with lizard-specific rock areas and plantings, and separately, the creation of two pest-proof sanctuaries, will be insufficient to address adverse effects on lizards to a no-net-loss level. The mitigation and offset actions described above may address around 20 % of the scale of loss of lizards within the site (in accordance with offset accounting approaches), over time.

(f) The residual adverse effects on Kawarau gecko and grass skink (both of which are At Risk listed species) will likely be significant following all applied mitigation, site rehabilitation, and offsetting actions.

A potential alternative to the approach currently proposed by MGL for mass salvage and relocation to the Ardgour Restoration Area was canvassed at the Lizard Workshop[4] between experts from MGL, ORC and DOC, and has merit from an ecological perspective. That proposed alternative approach was to focus salvage effort on Kawarau gecko and southern grass skink, and to release them into a pest-proof fenced or pest-controlled area that supports appropriate habitat.

(g) I support that potential alternative initiative and agree that it could offer a viable alternative to the approach laid out in the draft Lizard Management Plan for addressing adverse effects on lizards because it would target effort on species most in need, and provide greater assurance of survival and long-

[4] Workshop held on 13 March 2026 with representatives from MGL, DOC and ORC present (in person or online).

term benefits. I acknowledge however there are other practical considerations in relation to this option outside ecological ones.

15. Matters where I do not agree with the parties invited to comment are listed below:

(a) Commenters contend that there could be additional species of lizards on the site. Our survey was robust and comprehensive. The likelihood of other lizards such as jewelled gecko, lakes skink, and orange-spotted gecko is extremely low, such that there is no need for further survey for these species. At most, I would support an Accidental Lizard Discovery Response Protocol as part of the Lizard Management Plan, that addresses unexpected species discoveries.

(b) Commenters contend that there could be or has been misidentification between McCann's skink and southern grass skink during my surveys. Re-assessment of site investigation photographs, and further work on the site in March 2026, together with information supplied by commenters, shows that the likelihood that southern grass skinks have been omitted through misidentification as McCann's skink is unlikely.

(c) Commenters contend that there will be few or no benefits to the management of the Ardgour Restoration Area or the Mine Regeneration Zones (**MRZ**) as a restoration site for lizard recovery, or that the site rehabilitation programme will provide viable habitat for skinks and geckos. I disagree, and contend that changes expected to habitat within the Ardgour Restoration Area and MRZ will provide benefits for resident lizards, and that rehabilitation surfaces will provide habitat for skinks and geckos to colonise naturally over time, or through assisted repatriation.

I disagree that the outcome of the rehabilitation programme will be a lack of habitat for lizards, or that populations of Ardgour Station lizards will be so impacted by uncontrolled pest animals that no benefits will arise.

I also disagree with the commenters that the proposed offset, restoration and rehabilitation package will address only approximately 20 % of the adverse effects on lizard species and habitats.

(d) Commenters contend that my approach of including rehabilitation outcomes in the biodiversity offset models that I prepared for some lizards and some other ecology features of the site mixes potential outcomes and benefits across rehabilitation and offsetting. I disagree and contend that the way in which I have developed the offset models aligns with good practice, is precautionary, and provides redundancy to how risk is managed in the

models. My approach is extremely conservative because I have applied offsetting standards to rehabilitation (including adding risk and time lag multipliers), when it could be argued that rehabilitation need only be subject to a 1:1 replacement ratio.

(e) Commenters contend that the conclusions from the offset models that I have developed to account for losses and gain for vegetation communities and some elements of biodiversity have been overstated and are potentially erroneous where no-net-loss or net-gain is predicted. I disagree and I am confident that the experienced experts who have provided advice on restoration and rehabilitation approaches, management design, and expected responses of ecological systems on which I have based my calculations have provided well-reasoned, conservative, and well-justified numerical estimates. All offset models provide educated guesses about future states and gains. Assurance of likely outcomes for this project is informed by extensive field and academic research by contributors. The Panel can be confident that the information upon which these offset models are based, and the conclusions reached with regard to net outcomes for biodiversity are well informed and robust.

SPECIFIC RESPONSE TO COMMENTS

Key Issues

16. The Summary above provides a list of matters where I agree with the parties invited to comment. I do not canvas those issues in any further detail.

17. The issues with which I disagree with the position taken by the parties invited to comment are listed below and are discussed further in this evidence:

    (a) commenters contend that there could be additional species of lizards on the site;

    (b) commenters contend that there could be or has been misidentification between McCann's skink and southern grass skink from my surveys;

    (c) commenters contend that there will be few or no benefits for lizards from the proposed rehabilitation and ecological restoration programmes; and

    (d) commenters contend that my approach to biodiversity offset modelling is flawed, and that the benefits and outcomes are overstated.

18. I also raise other matters that relate to broader ecological management proposed for the site.

Potential for Additional Lizard Species

19. Otago Regional Council (section 2.3 of the E3scientific report) and DOC (paragraphs 24, 27, 30 and 31 of Dr Tocher's evidence) contend that the lizard surveys did not comprehensively cover all potential habitats for rare species such as jewelled gecko, lakes skink, and orange-spotted gecko, and that the presence of these species cannot be discounted from the site.

20. Surveys by myself and others in my team were robust and amounted to approximately 620 person hours within the DDF and surrounding Ecological Survey Area (**ESA**). The surveys included multiple methods of active, passive, and trapping techniques. In my opinion, the effort expended at this site is both comprehensive and is appropriate for a site of this large size.

21. A lack of maps showing all lizard captures across the site and a map showing incidental search effort (compared to formal survey device/ method effort) has been highlighted by commenters, and that providing this would help satisfy their concerns regarding search areas, detections and habitat separation between species. I agree, and I have provided this information as **Appendix A** to my evidence.

22. The **Appendix A** maps show the areas searched by timed hand searching, set area basking searches, and where artificial cover objects (**ACO**), Gees minnows and pitfall traps were deployed. While most are located on ridges, spurs and valley sides, many are located on the margins or within valley bases and wetter areas where southern grass skink and lakes skink might be expected, if they were present at the site.

23. Almost all areas of valley bottom and margins were searched during the 2024-2025 lizard surveys. Most of that work was undertaken by myself and involved visual basking surveys (separate from the fixed location basking survey areas), crevice searching, and hand searching under rock and through boulderfield accumulation areas. This search effort is regarded by me as 'casual searching' and is not shown on the **Appendix A** maps which record formal fixed search areas. The search effort included margins of streams and wetlands and densely covered scrub areas at gully heads, although in those cases survey was limited to visual basking survey (hand searching was less useful in those locations).

24. Commenters note that survey should have been more focused on wet margins and boulderfields that provide habitat for southern grass skink, lake skink, and orange-spotted gecko elsewhere. In my opinion, survey effort was focussed in some areas of wet margins and found only the species already confirmed from the site, with a bias towards grass skink in these wetter areas.

25. While I agree that good examples of boulderfield and dense wet margin habitat are favoured by these species, the site simply does not provide good examples of these types of habitats. I have personally spent around 100 hours looking for lizards at this site, and have deliberately sought to target good examples of typical habitat for these species. Most stream and wetland margins are grazed to low vegetation, are pugged, and lack dense swards of refuge for wet-habitat lizards. Despite searching every gully on the DDF, I could find only one small natural boulder scree area, which was over a small area (ca. 50 m^2) – and at that site we (myself and RMA Ecology colleagues) installed and operated pitfall traps, gees minnows, ACOs, and undertook manual search, with no sign of lakes skink or other lizards not already found at the site. The DDF does not support deep screes or gravel banks that could be refuge areas for large lizards such as lakes skink. In contrast, Ardgour Station to the north supports a geology that is more favourable for supporting rock screes, and some trapping amongst boulder screes on riparian margins was undertaken there (outside of the DDF footprint).

26. Artificial boulderfields (old sluicing boulder piles) exist along the southern margins of the substantial Rise and Shine valley wetland (within and adjoining the DDF) and offer good potential habitat for rare lizard species. I undertook hand searches (manual search through boulder banks) of these areas in 2024, but did not undertake trapping or any substantial time on basking searches. To rectify this, I undertook further survey in March 2026 along the southern margins of this wetland (and within parts of the wetland interior) using gees minnow traps, visual basking searches, and further hand searches of boulderfield areas. This is shown on the map in **Appendix B**. The results of that additional survey were that only Kawarau gecko, southern grass skink, and McCann's skink were found. There was no evidence (live animals, dead animals, large scat, slough) to indicate any other lizard species.

27. In combination, these surveys recorded lizards across most parts of the site The distribution of species recorded at the site is discussed in section 3.6.2 of the B.15 RMA Ecology Lizard Values Assessment report. An absence of maps showing records of locations of lizard is raised by ORC (section 2.3 of the E3scientific report) and DOC (paragraph 24 of Dr Tocher's evidence). **Appendix C** provides maps that show the locations of lizards caught or detected through all of the survey methods.

28. In addition, recent work undertaken by MGL to obtain baseline biodiversity condition measures across the site and surrounding areas also found no new species of lizard. That work included checks of manual searches across 282 sites for a total effort of 282 person hours across the DDF and the Ardgour Restoration Area. 1,765 lizards were recorded, of which 271 were geckos, and 1,382 were skinks (with 96 lizards unidentified due to partial sightings of fleeing animals). Lizards were not handled for positive identification; however size of lizard and colouration was noted, and the

ecologists undertaking that work were alert to any instances of substantially larger lizards (e.g. adult lakes skink), or skinks or geckos with patterning or coloration that differed from the typical lizards seen on the site.

29. The site is large, and while I am confident that there is a low risk that other lizard species could be present in addition to the species that I have recorded at the site, there is always a chance that other species may be present in very low numbers in discrete patches not subject to my survey. It seems prudent to plan for possibly encountering these during site works. The most appropriate means of addressing this is through the addition of an Accidental Lizard Discovery Response Protocol as part of the Lizard Management Plan, such that works in an area halt upon discovery of a species not listed on the Wildlife Act Authority for the site, and DOC is consulted with regarding holding and identification of a specific release site for any unexpected individuals.

30. Commenters note that surveys should have been more focused on wet margins and boulderfields that provide habitat for southern grass skink, lake skink, and orange-spotted gecko elsewhere. In my opinion, survey effort was focussed in some areas of wet margins and found only the species already confirmed from the site, with a bias towards grass skink in these wetter areas.

Misidentification of skink species

31. Otago Regional Council (section 2.3 of the E3Scientific report), DOC (paragraph 21 of Dr Tocher's evidence) and Forest and Bird Protection Society (paragraph 17(V) of the evidence of Samuel Purdie) contend that possible skink misidentification between McCann's skink and southern grass skink could undermine the reliability of the lizard survey, in particular by potentially underestimating the numbers and misassigning habitat use for the At Risk southern grass skink.

32. I agree that misidentification poses the risks outlined by Dr Tocher. I further note that the mislabelling of Plates 45 and 46 in my Lizard Values Assessment, where head photos of two McCann's skinks are labelled as being of southern grass skinks has added to the confusion (and is an unfortunate error on my part), and probably explains some of the concerns raised by commenters.

33. However, I believe, for the reasons outlined below, that there is a low risk that this has occurred at this site.

34. Accurate separation of grass skinks and McCann's skinks in the Central Otago/ Mackenzie Basin area has been an issue that has been recognised for many years. For this survey at BOGP site, I used identification keys and diagnostic features listed in recent keys, and assisted by diagnostic features identified from work by Dr Tocher

in 2003,[5] despite those keys noting that they do not resolve every instance of cryptic individuals in all cases.

35. Since this BOGP site, I have had further discussions with Dr Tocher on several other projects. She has provided me with updated keys that she uses to distinguish between the two species in this region, albeit with some features again not being 100 % diagnostic, and with an acknowledgment that for some specimens a collective assessment using diagnostic features combined with habitat use may be needed to provide an accurate result. I have applied these keys recently to a site in the Mackenzie Basin and agree that while some ambiguity still exists, the keys plus habitat is probably the most accurate indicator of whether an individual is a grass skink or a McCann's skink. This is likely to only apply to a small portion of individuals in a population, as most appear to conform to readily identifiable characteristics and provide a clear-cut classification.

36. I observe that a different, also very experienced, herpetologist that I discussed this with recently uses a different set of identification features to distinguish between grass and McCann's skink where primary characters appear unclear or cross over between species. Further, I see from Mr Purdie's evidence (paragraph 17(V)) that he uses a 'test' that is again different to these other two herpetologist – that of head morphology – to distinguish between the two species in these locations where these skink's patterns can intergrade.

37. My conclusion is that the challenge of distinguishing these two species in some locations can be difficult, and that herpetologists have developed their own individual means of distinguishing between these species. I have not tested all methods against each other so I do not know which is the most reliable. I suspect that only individual genetic testing would really tell the difference with certainty, and that has not been applied at this site, as to do so at a meaningful level involving hundreds of individuals would be prohibitively expensive.

38. Nonetheless, I am heartened from reading commenter's evidence that I interpret as meaning that it is unlikely that I have misidentified southern grass skink (the rarer of the two species) as McCann's skink (more common species). I reach that conclusion because:

    (a) Mr Purdie references only an issue with misidentifying McCann's skink as grass skink (and not vice versa).

    (b) Dr Tocher refers to the results of a survey at the nearby Rocky Point site (paragraph 54 and Figure 1 of Dr Tocher's evidence) that she has recently

[5] Tocher M and Reardon JT (2003). Diagnostic morphometrics of the skink species, *Oligosoma maccanni* and *O. nigriplantare polychroma* from South Island, New Zealand. DOC Science internal series.

undertaken. At that site she found only McCann's skink. Presumably she applied a rigorous testing of each lizard caught to assess whether grass skink could be masquerading as McCann's skink and found none. The proximity of the site to the BOGP site, and its connection at a landscape level, support the BOGP site being unlikely to support grass skink masquerading as McCann's skink on similar dry spurs, ridges and slopes.

39. In order to obtain some clarity on the matter, I undertook limited additional sampling of skinks at the BOGP site in March 2026 around the Rise and Shine wetland complex. The purpose of the work was to obtain a sample of skinks within dry lands, and also within wetter land areas, and then apply diagnostic keys to them to see if McCann's skink and southern grass confirm completely to accepted identification key, or whether there is the possibility of overlap/ cryptic species mixing within the skink populations at the site. The results of this are presented in **Appendix D**.

In summary, I captured several specimens of lizards in dry lands and in wetter lands. Each group of species could be clearly separated using the keys provided by Dr Tocher, which also aligned with the visual markings typically used to distinguish the species elsewhere.

40. Overall, that gives me confidence that:

(a) if the specimens that I caught are representative of others of this type on the site, then the risk that I have misidentified grass skinks as McCann's skinks or vice versa is low; and

(b) the trapping results, together with the hand searching and basking lizard visual survey that I undertook in March 2026 confirm that McCann's skink is restricted to drier areas of the site (dry margins, slopes), and southern grass skink is found within wetter areas such as wet wetland margins and wetland interiors that are not flooded.

41. These results further confirm the pattern of southern grass skink occurrence at the site – that species appears to be mostly confined to wetter valley bottoms, and margins of stream and wetlands. Such habitats are reasonably plentiful on the DDF site (See **Appendix B** map). These wet areas are far less expansive on Ardgour Station where dry valleys predominate, and are far more common and extensive in the adjoining Bendigo Station outside of the DDF (to the west towards Lake Dunstan), where almost every shallow dip or gully has a wetland, stream, or thick wet-adapted vegetation.

42. In conclusion, while I can understand the concern of the commenters around possible misidentification, I believe that there is a low risk that this has occurred at this site. The implications of misidentification would be important if the proposed approach to

lizard salvage – whereby minimum numbers of each species will be collected for relocation – and if relocation sites are not suitable for, in particular, southern grass skink which appear to require wetter valley bases and wet margins in this environment.

43. Given my support for a potential alternative salvage and relocation approach raised in the Lizard Workshop, whereby salvage effort could be targeted at habitat for Kawarau gecko and southern grass skink (i.e. tors, rock areas, wet margins and valley bases rather than dry slopes and spurs), and release into a pest-free area that contains wetter habitat and rock areas suited to these species, the risk of not salvaging a southern grass skink and consigning it to unsuitable habitat is considerably reduced.

Few or no Benefits from the Ecological Restoration Programmes

44. Commenters contend that there will be few or no benefits from the proposed Ardgour Restoration Area programme, or the rehabilitation programme proposed for the Tailings Storage Facility (**TSF**). Specifically:

    (a) ORC has concerns that lack of mouse control will create effects more adverse for lizards than the status quo (OCR Sections 3.1.3, 3.2.5, and 3.2.7); and

    (b) Dr Tocher has concerns that selective pest control will result in meso-predator release of mice that may worsen lizard declines (Dr Tocher paragraphs 16, 62, 72 and Appendix 5).

45. I am not a mouse control expert. I understand that mouse control is not proposed across large areas of the Ardgour Restoration Area, or across all of the rehabilitation site. Mouse eradication is proposed within the two predator-free fenced sanctuaries; however, these are not proposed to be used for the release of salvaged lizards.

46. I am aware that the staged removal of stock that is planned for parts of the Ardgour Restoration Area and the MRZ is very likely to provide tussock regeneration, pasture grass growth, and vegetation growth around tors, all of which will provide a substantial increase in the amount of viable habitat available for lizards, in particular McCann's skink and Kawarau gecko. As there are fewer wet gully areas within the Ardgour Restoration Area, the consequential benefits for southern grass skink may be less that within the more extensive wetter areas of the MRZ.

47. I predict that the changes expected at the Ardgour Restoration Area will be similar - structurally – to the changes that I have observed from a multi-year lizard release and monitoring programme in the dry hill country of North Canterbury. There, lizard species that are analogous to the species at this project site - Waitaha gecko and Canterbury grass skink – have increased dramatically in relative abundance (by 2-3 times over 4 years) within small areas subject to cessation of stock gazing, and implementation of pest control in those sites. Pest monitoring shows that mice are at

low levels (ca. 3 -5 % tracking rates compared to 40-50 % tracking rates in non-pest-controlled areas). Mouse eradication is not needed to encourage considerable benefits for these lizards, and structural improvements following stock removal may be equally important as pest control in generating substantial benefits.

48. For the TSF rehabilitation surface, the creation of lizard habitat has been a focus. As explained in the evidence of Dr Simcock and in the Landscape and Ecological Rehabilitation Management Plan, there has been a focus on providing created rock tor features ('rock stacks'), rubble pits, scattered rock (to achieve a minimum 5 % cover), and plantings amongst the wetland, margin and dryland parts of the TSF surface. I have worked with Dr Simcock to design these lizard habitat areas.

49. Dr Tocher doubts that the TSF will provide habitat for lizards (her paragraphs 58 – 60), based on her experience with attempts at artificial lizard refuge creation at Macraes Mine. The rehabilitation at Macraes Mine focusses on rehabilitation to an agricultural endpoint with lizard habitat scattered throughout. The rehabilitation at the BOGP TSF focusses on ecological restoration and will provide a substantial area of lizard habitat across a wide landscape, with little focus on agricultural reinstatement of grazed pastures. The effort at Macraes Mine is not a good yardstick by which to assess the probable success of the BOGP rehabilitation.

50. Kawarau gecko inhabit a range of environment across the site in its current state, from rock tors through to rock slabs, rabbit burrows, roadside discarded spoil, rock piles used to weigh down rabbit fencing, and rock piles discarded at the edge of paddocks. They inhabit these sites – many of which must have been recently colonised by geckos moving in from elsewhere - despite the presence of uncontrolled mammalian pests. Analogous species in the Mackenzie Basin (Southern Alps gecko) occupy discarded farm waste piles, and rubble pits (personal experience). Other similar species (e.g. Waitaha gecko in dryland North Canterbury) are recorded as occupying artificial refuges (ACOs) where there is no habitat within several hundred metres, indicating that ground-dwelling geckos may be moving across the landscape constantly and seeking out/ occupying viable vacant habitat.

51. I do not subscribe to the view held by others (e.g. the evidence of Matt Dale (on behalf of Kāi Tahu; para 52 and 53) that Kawaru gecko need crevices of a certain diameter within schist rock to survive. The results of my surveys of the site, and of highly modified land around the site on the edge of vineyards and road margins suggests that Kawarau geckos disperse naturally across the landscape, and use all manner of habitats.

52. I have no doubt that Kawarau geckos will naturally inhabit rock areas (tors and scattered rock) across the TSF when it becomes available, especially as considerable effort will be placed on constructing these to mimic natural tors, and piles of

boulderfield and rock where this species is most often found currently on the site. Monitoring of this would be prudent, and if necessary, relocating geckos from adjoining release sites as propagules could speed establishment on the TSF.

53. For southern grass skink, I am less certain of the rate of natural recolonisation of the TSF. The TSF will have extensive wet areas (6 ha + of wetland and margins, and wet swales) and plantings, in particular on wetland margins, that should provide dense habitat. The restricted distribution of southern grass skink on the site, and the apparent low numbers of them mean that colonisation from nearby areas may be slow. For this species, there may be a need to assist recolonisation through transfers into the TSF once vegetation has been judged to be adequately established.

54. The monitoring of the TSF for habitat establishment (as is proposed within the within the Biodiversity Outcome Monitoring Plan), and the relocation of groups of lizards to the rehabilitated TSF (if necessary) should form an action in, and be added to, the Lizard Management Plan.

55. With regard to the TSF, I have included predictions for Kawarau gecko and McCann's skink in the biodiversity offsets models that these species will attain their pre-mine-development level of abundance across the TSF within 20 years. In some cases, that may require active release (especially for southern grass skink) if the benefits of the TSF rehabilitation project are sought for some lizard species (e.g. Kawarau gecko and southern grass skink) over others (i.e McCann's skink).

56. The improvements that I have assumed for the purpose of offset modelling for Kawarau gecko and McCann's skink for the Ardgour Restoration Area assume an increase in lizard numbers by 1.5 times over 35 years for both species, and for the rehabilitation TSF simply a return to the pre-development abundance for all species after 20 years following completion of rehabilitation physical works and planting. I have also assumed an increase in lizard numbers in the extensive MRZ zones (1.5 x abundance over 35 years), and within the fenced sanctuary areas (3 x abundance over 35 years). In my opinion, these assumed increases do not seem unreasonable.

57. The results of the offset modelling are also relevant in relation to a misinterpretation made by Dr Tocher (para 51 of her evidence) that the effects-management package will only address about 20 % of the adverse effects on lizard species and habitats, leaving approximately 80 % unmanaged as residual effect. The origins of that number (20 %) are not as quoted by Dr Tocher. The number was put forward by me during the Lizard Workshop in which I attempted to provide an estimate for the percentage contribution that rehabilitation on the TSF for lizards is estimated to contribute towards addressing adverse effects on Kawarau geckos across the DDF.

58. For clarity, the proposed rehabilitation and restoration does not achieve no-net-loss for either of the two lizards for which offset modelling was undertaken (Kawarau gecko and McCann's skink). That is clearly shown in the offset models themselves, and in Table 4 of the Biodiversity Offset Modelling report attached as an appendix to the Effects Assessment Report prepared by Alliance Ecology Ltd.

59. When a hypothetical no-net-loss solution of a larger area of restoration is modelled (in addition to the package of areas proposed by MGL), the contribution of the TSF rehabilitation programme to addressing effects on Kawarau gecko is estimated to be 20.95 %. Further:

    (a) when the anticipated benefits from the Bendigo and Ardgour Sanctuaries is added to the TSF rehabilitation, 31.6 % of effects on the gecko is addressed;

    (b) when the anticipated benefits from the Ardgour Restoration Area is added to the TSF rehabilitation and sanctuaries, 54.2 % of effects on the gecko is addressed; and

    (c) when the anticipated benefits from the MRZ zones restoration work is added to the TSF rehabilitation, sanctuaries, and Ardgour Restoration Area, 68.1 % of effects on the gecko is addressed.

60. Therefore, for Kawarau gecko it is predicted that the combined package of restoration and rehabilitation will address up to ca. 70 % of the adverse effects on Kawarau gecko. The percentage by which the restoration and rehabilitation programme will contribute to the achievement of no-net-loss for other aspects of ecology on the site has not been calculated, although Table 4 of the Biodiversity Offset Modelling report shows that 100 % of adverse effects can be managed for some aspects, including taramea, woody shrubland, and marsh/ swamp wetlands.

Flawed Offset Modelling Approach

61. I prepared the biodiversity offset accounting models (**BOAM**) for lizards, wetlands, and vegetation/habitat recovery at the compensation and rehabilitation sites that are subject to habitat re-creation, rehabilitation, and enhancement measures.

62. Max Crowe (on behalf of DOC) contends the way in which the offset models incorporate the rehabilitated TSF area counts towards offsetting of effects in violation of the normal use of this model type (paragraph 61 of Mr Crowe's evidence).

63. He also notes his ability to assess the offsetting calculations is constrained because the models have not been made available (paragraph 59 of Mr Crowe's evidence). Report B.08 prepared by Alliance Ecology Ltd was lodged with the substantive application. I understand that my Biodiversity Offset Modelling Report was

inadvertently omitted as an appendix. Report B.08 was relodged on 10 March 2026 as part of an RFI response to include the missing appendix.

64. I prepared excel spreadsheet BOAM models to support the Biodiversity Offset Modelling Report. While these were not attached to my report at the workshop held on 17 – 20 February 2026 which Mr Crowe attended the excel spreadsheet was offered to be provided to the parties at their request. I understand that no party requested the spreadsheet.

65. In terms of the use of rehabilitation in the models, this is good practice, irrespective of what the BOAM user guide manual states. The alternative to not including the rehabilitation in the model is that the rehabilitation success would be subject only to the ability to achieve an outcome on the rehabilitation surface without the accompanying considerations of time lag, uncertainty and risk that are normally applied to residual effects (offsetting).

66. Also, even though the TSF works are classed as rehabilitation by the rehabilitation expert (Dr Simcock), for the purposes of offsetting, one interpretation is that a vertical displacement such as occurs here may not meet the standard of 'rehabilitation within the same footprint' as it is usually taken when considered as part of the mitigation hierarchy and thresholds for the application of biodiversity offsetting.

67. The approach that I have taken is to include rehabilitation within the offset calculations as an integral part of assessing the residual adverse effect after rehabilitation and offsetting combined. The alternative is to separate out rehabilitation from the offsetting models and run the models only with the residual loss of biodiversity after all rehabilitation is assumed to be in place and successful. That will result in a much-reduced scale of effects management required, including elevating the percentage achievement of biodiversity replacement for some vegetation communities and lizards considerably (e.g. from the current estimate of ca. 70 % of adverse effects addressed for Kawarau gecko referred to in paragraph 59, to something in the order of 95% or greater achievement).

68. I consider the approach that I have taken to be precautionary. If the Panel disagrees and favours the approach implied by Mr Crowe, then it should recognise that the offset models are extremely conservative in their outputs of assumed achievement of biodiversity gains for some adverse effects caused by the project. Accordingly, the amount of land area under restoration management or the intensity of duration of offset management should accordingly be adjusted to be less.

Overstated Offset Modelling Outputs

69. Experts for DOC,[6] Forest & Bird Protection Society,[7] ORC[8] and EDS[9] have raised concerns that the biodiversity offset models that I have developed for tussockland, taramea, and woody indigenous vegetation, as well as for wetlands and some lizards overplay potential gains that could arise due to restoration activities proposed at the Ardgour Restoration Area, MRZ zones, Sanctuaries and the TSF rehabilitation area. In turn, these commenters regard the model outputs as unreliable, and question where outputs communicate a likely no-net-loss or net-gain biodiversity outcomes.

70. The models have been developed using iterative process involving most of the ecologists engaged by the MGL:

(a) The first step was to agree on areas that will be impacted and those available or restoration activities. That required in-depth assessment of the level of conservatism applied to the impact footprint, and also to the future management of parts of the TSF, MRZ and Ardgour Restoration Area, as well as design for the two sanctuary areas. Not all areas available for rehabilitation or restoration have been included in the models, despite it likely that there will be some ecological gains in those areas omitted.

(b) The second step was to agree potential trajectories with the agreed suite of management tools available and the timeframes over which management will be applied. This required very in-depth consideration of previous project experience by experts, both for successful projects elsewhere and where projects failed (and why), and with consideration of the environmental constraints of the areas proposed for restoration. The output of this was a series of predicted uplift estimates for species and ecological communities/ vegetation assemblages, and iterations of discussion to arrive at agreed, conservative estimates.

(c) The third step was to translate uplift estimates into predicted changes in areal extent of habitat and distribution on the ground over time, and to agree metrics for measuring change that would best communicate success or failure at the level of population health, structure, functioning and composition (depending upon the ecological feature under consideration).

(d) The last step is to input the baseline and prediction statistics into the model, which then generates the loss: gain statics and overall balance. It is important

[6] Giejsztowt J. April 2026. Santana Bendigo-Ophir gold mine compensation and offsetting assessment. 24 pp.
[7] Purdie, S. 10 April 2026. Statement of evidence of Samuel Purdie: Lizards. 16 pp
[8] E3scientific. 18 March 2026. Matakanui Gold Terrestrial Ecology: technical review terrestrial ecology: Fina response 18/03/2026
[9] Head N. 10 April 2026. Statement of evidence of Nicholas John Head: Terrestrial ecology. 40 pp.

ot emphasise that the offset model automatically applies set discounting penalties to address time lags, and uncertainty and risk multipliers from user-selected options.

(e) The point that I make with points (a) – (d) above, is that the conclusions around probable net-loss or possible net-gain for biodiversity components modelled through the offset models has involved the input of many experts and many conversations for this project. The inputs and expected levels of uplift have generated in-depth discussion and have lent on the collective wisdom of over nearly 100 person years of expert experience in the fields of rehabilitation ecology, restoration ecology and species management.

(f) All offset models provide educated guesses about future states and gains. Assurance of likely outcomes for this project is informed by extensive field and academic research by contributors. The Panel can be confident that the information upon which these offset models are based, and the conclusions reached with regard to net outcomes for biodiversity are well informed and robust.

(g) The breadth of the issues raised by commenters in relation to offset modelling and overall net outcomes form offsetting and compensation cannot be dealt with solely through evidence. These are matters that are best traversed during workshopping or conferencing of experts.

Other matters

71. I endorse the suggestions by Mr Harding (paragraphs 29 and 31 of his evidence) for formation of a Biodiversity Advisory Group and the establishment of a non-wasting endowment fund (or similar instrument) to provide certainty for the long-term management of the Ardgour Restoration Area.

Dr Graham Thomas Ussher

17 April 2026

APPENDIX A

Maps showing the areas searched by timed hand searching, set area basking searches, and where artificial cover objects (ACOs), Gees minnows and pitfall traps were deployed, relative to mapped wetland areas (indicative of wet areas, wet margins, valley bases and streams), and the DDF.

Figure A1. Northern part of the DDF (light blued shading) with the location and extent of lizard survey techniques shown – manual search cover object lifting, pitfall traps, ACOs, basking lizard searches. Wetlands and approximate pathway of watercourses are also shown.

Figure A2. Central part of the DDF (light blued shading) with the location and extent of lizard survey techniques shown – manual search cover object lifting, pitfall traps, ACOs, basking lizard searches. Wetlands and approximate pathway of watercourses are also shown.

Figure A2. Southern part of the DDF (light blued shading) with the location and extent of lizard survey techniques shown – manual search cover object lifting, pitfall traps, ACOs, basking lizard searches. Wetlands and approximate pathway of watercourses are also shown.

APPENDIX B

Map showing additional lizard survey over the Rise and Shine wetland complex using baited funnel traps, manual search (through boulderfields), and visual basking survey.

The dates of this survey were from 20 – 22 March 2026 and involved setting out of 19 x baited gees minnows traps for 3 nights. Traps were modified for lizard survey including making the entrance larger, adding silicone gel to sharp protruding wires, and adding shade coverings to traps. Bait used was a mix of fruit pieces in jelly and mashed banana.

Total search time for basking and manual search was approx.12 person hours – all of which was expended on the margins of the Risse and Shine wetland.

Weather conditions were fine clear skies with little or no wind, and with 8 degrees Celsius in the morning warming to 20 degrees mid-afternoon. These conditions were ideal for lizard activity and early morning basking.

Plates B1- 3. Sluicing boulder piles along the Rise and Shine wetland set back from the wetland edge by ca. 5-10m distance, and along side tributaries to the wetland. Manual search and basking lizard visual searches recorded only McCann's skink.

Plates B4-7. Representative photos of the Rise and Shine wetland including interior vegetation and edge communities. 19 gees minnow traps were set in groups (see Figures B1-B2) and operated for 3 days in March 2026. Only southern grass skink were recorded within the dense rush/ grass areas of the wetland.

Figure B1. The northern part of the Rise and Shine wetland (green polygon) with the DDF extents also shown (light shaded blue). Location of Gees minnow trap clusters are shown as purple dots. Manual and basking search areas through boulder fields are shown as yellow boxes. Locations of McCann's skinks (as assessed by diagnostic characters in the hand, or by observing basking behaviour and colouration) are shown as yellow dots. Southern grass skink (as judged by capture and diagnostic features) are shown as green dots).

Figure B2. The southern part of the Rise and Shine wetland (green polygon) with the DDF extents also shown (light shaded blue). Location of Gees minnow trap clusters are shown as purple dots. Manual and basking search areas through boulder fields are shown as yellow boxes. Locations of McCann's skinks (as assessed by diagnostic characters in the hand, or by observing basking behaviour and colouration) are shown as yellow dots. Southern grass skink (as judged by capture and diagnostic features) are shown as green dots).

APPENDIX C

Map showing locations of lizards recorded.

The below maps show the locations of southern grass skink and of Kawarau gecko that were recorded from the site from the formal survey methods and from casual searching between sites.

McCann's skink records are not shown, as they were detected absolutely everywhere on the site, apart from in the middle of formed roads, and in within managed agricultural fields.

For all lizard sightings, sightings are clustered in places where observers looked for them. No part of the DDF or surrounding ESA was comprehensively surveyed at a large scale, hence there are gaps between sightings because search effort was not expended in those areas. At most these maps show the general association of lizards with topographical features including gullies, streams, wetlands, and rock outcropping areas.

The maps show:

- Southern grass skinks were recorded from only a small portion of the 550 or so formally sampled sites through manual search, ACOs, pitfall traps, gees minnows traps, and basking lizard surveys. Some were additionally caught during casual walkover and opportunistic searches along gully areas. Most were caught at or near the bottom of valleys or gullies, and most were in close association with wet pasture, wet margins, or gully bases that support dense ground vegetation.

- Kawarau geckos were most frequently caught in association with tors; however, they were also found in any place where was small pieces (slabs down to 0.25 m x 0.25 m) rock strewn on the ground, especially where rock was layered on rock. Geckos were found on ridges, spurs, slopes and gully bases. They were also found alongside roads under sidecast rock from recent road construction, and under rocks used to weigh down rabbit netting, as well as inside collapsed rabbit burrows.

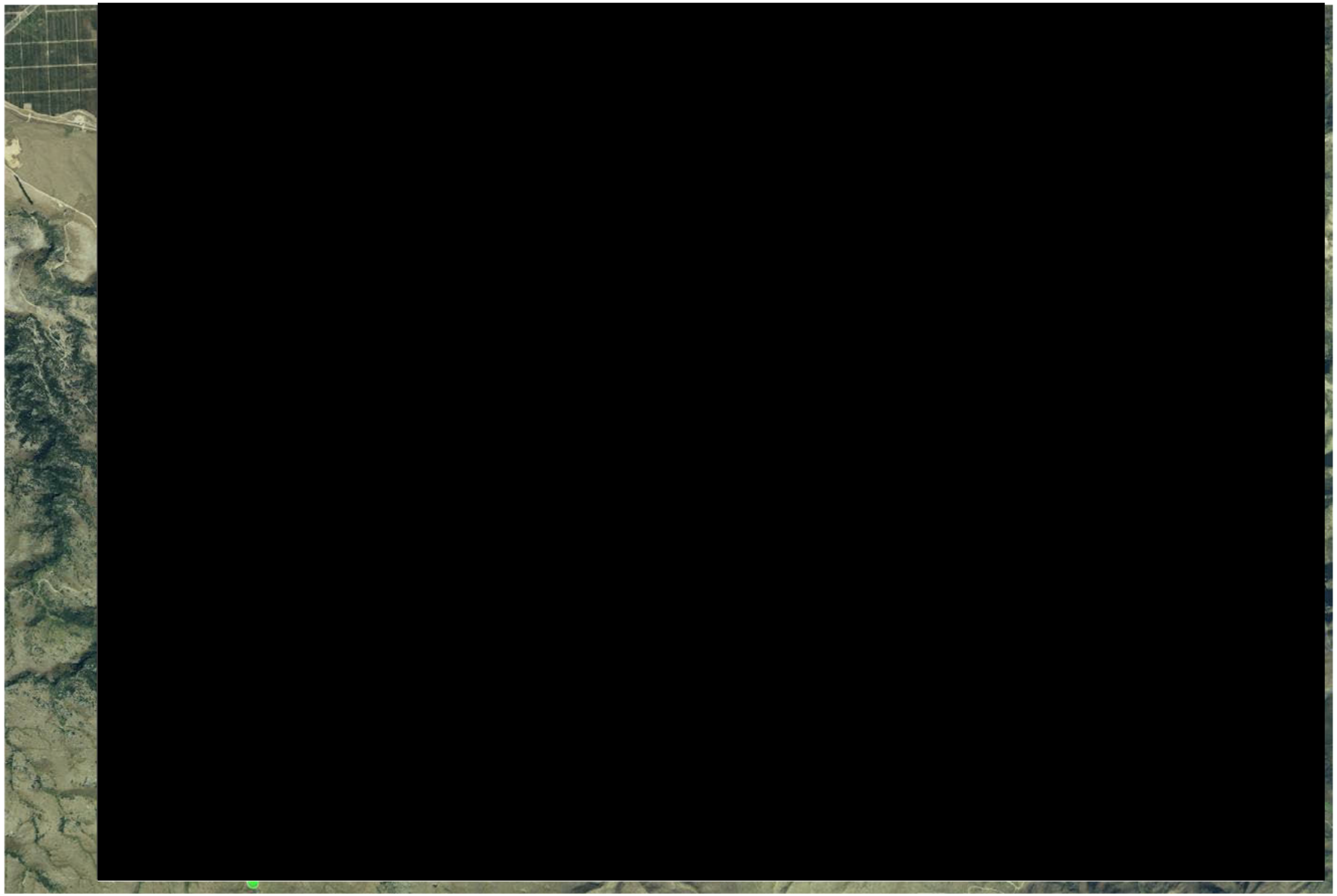


Figure C1. Records of southern grass skinks (green dots) from across the DDF (blue shaded polygon) and surrounding ESA. Turquoise polygons are mapped wetlands. Some locations represent multiple records.

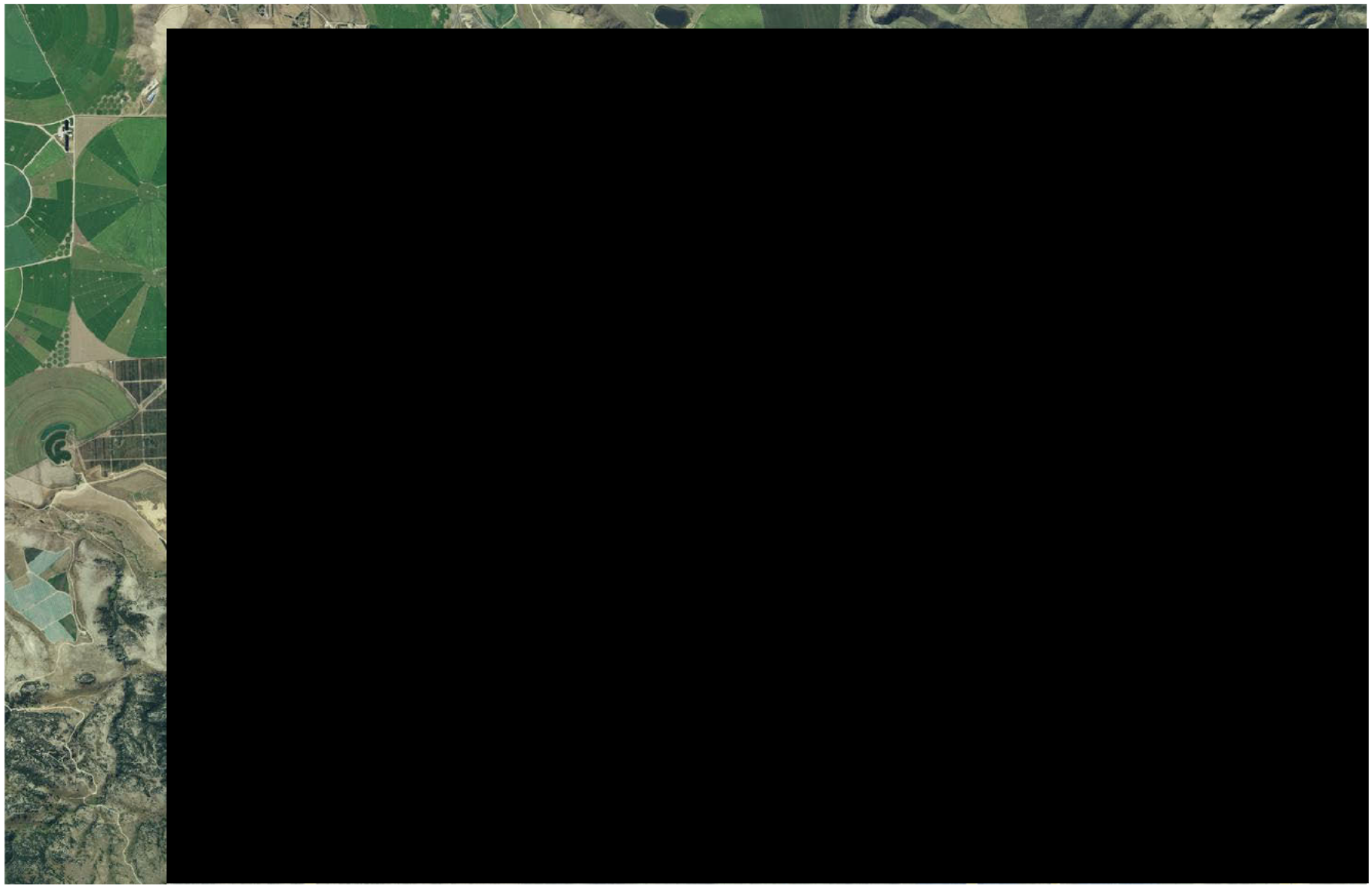


Figure C2. Northern part of the DDF/ surrounding site. Records of Kawarau gecko (yellow triangles) from across the DDF (blue shaded polygon) and surrounding ESA. Most triangles represent multiple sightings of geckos (up to 10-15 in some cases).

Figure C2. Southern part of the DDF/ surrounding site. Records of Kawarau gecko (yellow triangles) from across the DDF (blue shaded polygon) and surrounding ESA. Most triangles represent multiple sightings of geckos (up to 10-15 in some cases).

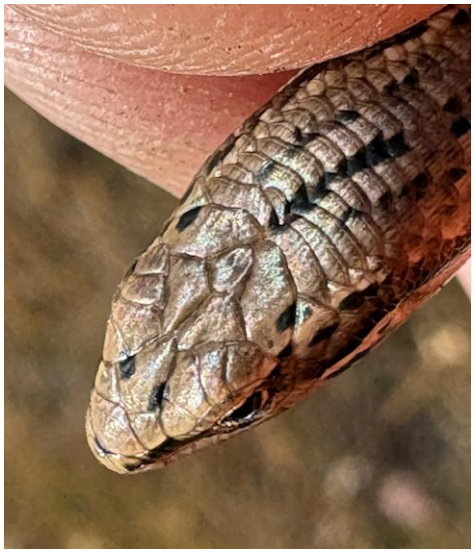
APPENDIX D

Results of species identification between southern grass skink and McCann's skink.

Photographs of species judged to be McCann's skinks and southern grass skinks are shown below. The diagnostic characters used to distinguish between the species are listed below.

- Dorsal head colour
- Ear opening diameter size compared to nostril diameter
- Ear opening with or without protruding scales on the anterior margin
- Belly yellow/ brown vs white/pale (sometimes with flecks or striations)
- Supraocular scales 3 on each side vs supraocular scales 4 on each side (can vary 3-4)

McCann's skinks – dry slopes/ boulderfields



Southern grass skink – wetland edges/ within wetland