

**ENVIRONMENTAL PROTECTION AUTHORITY
BEFORE AN EXPERT CONSENTING PANEL**

**IN THE MATTER OF THE FAST-TRACK APPROVALS ACT 2024
AND IN THE MATTER OF AN APPLICATION BY MATAKUNUI GOLD
LIMITED UNDER SECTION 42 OF THE FTAA
FOR THE BENDIGO-OPHIR GOLD PROJECT**

APPLICATION NO: FTAA-2507-1089

Hearing: Held in Monarch Room, Willeston Conference Centre,
11-15 Willeston Street, Wellington Central

Date: 19 June 2026

Panel: Hon Matthew Muir KC (Chair)
Gina Sweetman
Peter Kensington
Roger MacGibbon (via AVL)

Counsel: Joshua Leckie and Mia Turner, Lane Neave, for the Applicant
Pene Williams for Department of Conservation

Expert: Dr Mandy Tocher (Ecology) for Department of Conservation

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- 1 **Mr Muir:** Well, good afternoon counsel and good afternoon Dr Tocher. Savour the
2 moment. This is probably the only time in your professional life you're going to
3 have the undivided attention of your – of a panel and not have to compete with other
4 experts. So Dr Tocher, we are most appreciative that you have been able to organise
5 your schedule to provide us with your input and we understand your particular area
6 of speciality within the general topic of ecology and have noted your very significant
7 input at the joint conferencing in relation particularly to the subject of lizards. And
8 we have on the board there the sub-issues that we reflected on – I think it was
9 probably one week today that we had our ecology concurrent hearing. And the
10 format that we're going to adopt today is we're going to now just work through those
11 sub-issues with you. We would invite you to make a brief comment, perhaps three
12 or four minutes or thereabouts, about each of these issues. We will then ask any
13 questions that emerge out of that and then I will pass it over to Mr Leckie to see
14 whether he has any cross-examination and we'll come back ultimately to the Panel
15 before we move on to the next topic. But that said, Dr Tocher, this is a fluid and
16 dynamic process and we're really just here – the bottom line is to have a conversation
17 about these issues such that we emerge better informed and with the benefit of your
18 very considerable professional expertise in this area. Is that alright with you?
- 19 **Dr Tocher:** That sounds great, thank you. And thanks for accommodating me too. You
20 know, I appreciate the opportunity.
- 21 **Mr Muir:** We built a schedule – we just necessarily thought that we would have to
22 have a little bit of wriggle room because, you know, herding cats would be an

1 inadequate metaphor to describe the challenges of the last several weeks and we are
2 appreciative – enormously appreciative of the parties and their experts in the way
3 that they have accommodated our somewhat uncompromising timetable. Thank you.
4 Right.

5 **TOPIC 1: SPECIES PRESENT AND UNCERTAINTY**

6 **Mr Muir:** So this is an important issue that we start with. The species present and
7 uncertainty. Would you like to address us on that please.

8 **Dr Tocher:** On that list, this is one I wouldn't want to spend too much time on and I
9 don't really have a big problem. I think there's general consensus these two species
10 are very common. I think the numbers were reasonable, noting they didn't include
11 unborn young. New Zealand lizards give birth to live young so every female gecko
12 has two on board so it's three animals – every skink can have up to six. So the
13 numbers if we consider the unborn young go up. Lake skink – myself and Trudy
14 Anderson for Council – there wasn't huge disagreement. We were just saying the
15 habitats are there for some of these rarer things that are really hard to find. Jewelled
16 geckos for example were thought to be extinct at a site in the Rangitata Gorge – that's
17 a specialist area of searching – I went up there and plucked two off the trees where
18 people hadn't found them for years. So the extensive shrublands in those deep
19 gullies, they could still be there. And so there's – I don't think there's much point
20 labouring the point. I think Graham – Dr Ussher in the joint witness statement and
21 in his response are happy to work through accidental discovery protocols, as am I. I
22 guess my only comment from DoC's perspective is it's best to do it before the fact
23 rather than find something rare and ring up the local DoC office and put the burn on
24 them to try to sort it under time pressures because the mine presumably will have to
25 temporarily stop. I'd suggest in terms of conditions that perhaps a temporary stop is
26 appropriate if a threatened species is found, rather than a novel at risk declining, but
27 there seems to be general agreements on those protocols.

28 The issue with misidentification keeps coming up and it's not something that I felt
29 comfortable raising with the applicant's ecologists. I did have a lot of sympathy for
30 them. It turns out it's a particularly tricky place and, you know, I've worked in Otago
31 for decades – I can tell them apart. But you can't expect people that aren't based
32 there to necessarily do that. But that was a surprise to them that the McCann's skink
33 looked like grass skinks and some of the grass skinks look like McCann's skinks. So
34 there's still an issue there. I don't think – I think if they mapped habitat accurately
35 for southern grass skink and estimated the numbers, the problem would just go away.
36 So it's a case of – doing that properly, I think would fix that.

37 Just to give you an idea of numbers and why I did wonder if perhaps they'd
38 underestimated the numbers for that species – that's an at-risk species – in the
39 Eglinton they can reach really high densities and I think I estimated 13 million on the
40 valley floor of the Eglinton. So you can see my concern when wetland habitats
41 weren't sampled and then the mix up at the same time. So I think it can be fixed.

1 So that's all I've got to say really on that topic.

2 **Mr Muir:** Right, okay. Questions from the Panel?

3 **QUESTIONS FROM THE PANEL:**

4 **Mr MacGibbon:** Thank you for that. The – are you comfortable – the other experts
5 discussed the accidental discovery protocol or the draft version of it. I think, am I
6 right, you were agreeing that there are probably some aspects of that that weren't
7 complete – the one that's been drafted so far?

8 **Dr Tocher:** Yeah, Dr Ussher indicated it was a "let's ring DoC and see what to do"
9 type approach. And I'm – I think that's a bit unfair. You can't expect the local office
10 to have the resources to allocate at the – in a way that's timely for a mine. So I think
11 it needs to be workable before fact.

12 **Mr MacGibbon:** So I think there has been agreement that that will be updated and more
13 proactive so hopefully that meets your needs in that regard. The other one – I know
14 you've raised this issue just now before in the joint witness statement – you feel the
15 habitat mapping for grass skink was inadequate or not complete. What would you
16 recommend is done or is there a need to do more now or soon to help with that? What
17 would you suggest should be done?

18 **Dr Tocher:** I always – when there's issues that come up quite late in the process, I
19 always think a generous approach is appropriate. So I think a desktop they could
20 easily map what is very likely to be grass skink habitat based on the work they've
21 already done and give it a number. That's something that's missing. I know
22 Ms Anderson's been asking for that as well. What's the numbers? You know, how
23 much grass skink habitat is affected and then that of course informs the effects
24 management residual effects. How much Kowarau gecko habitat is affected, how
25 much McCann's skink? It's a key variable missing and I think it leads on to the way
26 they've clumped lizards and habitats in the modelling and the mitigating offerings as
27 well. You won't see, you know, a line entry that has them divided. Like, best
28 practice would have, you know, Kowarau gecko numbers, Kowarau gecko habitats
29 and that hasn't happened. But I think it can be done without having to go out and do
30 extensive survey – more survey. I think they can still do it.

31 **Mr MacGibbon:** I think if I recall correctly you suggested that perhaps wetland areas for
32 grass skink haven't been fully represented. Is that your feeling?

33 **Dr Tocher:** That's right. That would be a great place to start. Map the habitats, map
34 the riparian areas and be generous – assume there are grass skinks there and add it
35 into the mix.

36 **Ms Sweetman:** And how long would that type of work take?

37 **Dr Tocher:** I don't think it's a big job. But there's going to be, as we go through this,
38 a lot of those things that – it just feels like it's not ready. It could be. So this is just
39 one of the things that they need to get on with I think. And I think a lot of the experts

1 have been asking – I was listening to the Friday – last Friday’s hearing online and I
2 think it was Mr Head was saying it’s really hard to disentangle the effects to the
3 mitigation package just the way it’s been presented. And you’ll see in the joint
4 witness statement for lizards, we talked about a summary table that does just that. So
5 we can actually interrogate it and see, okay, you’re saying the rehab’s going to
6 contribute this much for that species, great, you know, and then you can perhaps bat
7 it back and forwards a bit. But at the moment, it’s really hard to interrogate what
8 effect is being addressed where and by what.

9 **Mr MacGibbon:** I think we have been promised that effects table haven’t we?

10 **Mr Leckie:** Yes, correct, I’m being delivered it today.

11 **Dr Tocher:** That would be very helpful for us all.

12 **Ms Sweetman:** [Inaudible 00:21:02] to ask, is that information that we need to have now
13 to inform our decision?

14 **Dr Tocher:** I – I want it because I want to – you’ll see that there’s an unfortunate gap
15 between myself and the applicant’s herpetologist regarding the quantum of residual
16 effects or the depth I heard Mr Ussher – Dr Ussher call it yesterday – on Friday,
17 which is a – so yes, there are a lot of residual effects on all the species, but I contend
18 that it’s actually really big and he’s saying “yeah, yeah, but we’re saying they’re
19 big”. And so I think we’re not disagreeing, it’s just a nuance on it. So that table
20 would help me perhaps understand the quantum or depth of the residual effects that
21 have been left on the table.

22 **Mr Muir:** Mr Leckie, did you have any questions arising out of that?

23 **CROSS-EXAMINATION BY MR LECKIE:**

24 **Mr Leckie:** Just one very short question thank you sir. It’s just a clarification
25 Dr Tocher. The lizard joint witness statement at paragraph 59 and 60 – I’ll just get
26 you to go there.

27 **Dr Tocher:** There now.

28 **Mr Leckie:** When you talk about the impact area of the BOGP, am I correct that that’s
29 the total project area so including the broader residual effects areas – the total area,
30 not just the direct disturbance footprint, is that correct?

31 **Dr Tocher:** Yes, and I have a spiel prepared under significance of impact to that. But
32 I can answer that now if it’s helpful, or should we just - - -

33 **Mr Leckie:** I’m in the hands of the Panel but I think we could probably wait for that.
34 I just want to clarify that I’m right that that number there is the total project area, not
35 just the direct disturbance footprint.

36 **Dr Tocher:** It’s basically the sum – and some of it’s guesswork that I need to explain
37 today because I didn’t have the numbers. The sum of those areas that the experts in
38 paragraph 9 of the joint witness statement – and 10 – agree that that’s the area where

1 if you're a lizard, you're going to be impacted in some way. And I need to explain
2 that today quite clearly I think because when I listened to the hearing I could see that
3 that wasn't clear to people what I meant and why. So yes.

4 **Mr Leckie:** Thank you. So that's right. So that area is all the areas at paragraph 9
5 added together so it includes the restoration areas for example?

6 **Dr Tocher:** Yes.

7 **Mr Leckie:** So it includes areas that won't be directly disturbed, doesn't it?

8 **Dr Tocher:** That's right. And – but the lizards will be affected. And we all agree with
9 that.

10 **Mr Leckie:** Yes, you do. And this isn't a trick question at all. And paragraph 60,
11 Mr Ussher and Mr Baber are talking about the DDF in their conclusions at
12 paragraph 60 – the next paragraph down from your paragraph 59.

13 **Dr Tocher:** That's right. It was very difficult to understand exactly but I believe that's
14 right that they are – they are just talking and they have it even more nuanced that it's
15 not the 610, it's 480. But I – that was – that methodology I implored them to perhaps
16 frame it in plain English. I mean, I'm an ecologist. My PhD was doing multi-variant
17 ordinations. I'm not a complete numbskull when it comes to this but I did think that
18 no one else understood what they'd done. So I think that's right.

19 **Mr Leckie:** So you're not – between those two paragraphs and between you and
20 Mr Ussher and Mr Baber, you're not comparing apples with apples. They're
21 different - - -

22 **Dr Tocher:** That's right, and that's what I want to – yeah, I think you're right, it's not
23 they're right, I'm wrong – it's different frames and I want the opportunity to explain
24 that.

25 **Mr Muir:** Thank you. And that will logically fall under what – topic 2?

26 **Dr Tocher:** I believe so.

27 **Mr Leckie:** No further questions on that topic sir.

28 **Mr Muir:** Thank you. Can we then move on topic 2 Dr Tocher?

29 **TOPIC 2: SIGNIFICANCE OF THE IMPACT**

30 **Dr Tocher:** Right, I think I have some explaining to do. I thought I'd closed it off and
31 I didn't think that the seven per cent – can we talk about that first. I didn't think it
32 was as provocative as it turned out to be. To me it was simple maths, but listening
33 to the hearing commentary, I need to explain how I got to 700 for a start. So can I
34 start there?

35 So, I should have put in paragraph 42 of the joint witness statement that the DDF
36 seems to be underestimated throughout the applicant's documents and that's based
37 on a shape file that DoC was given. I have an image of it here with the size being

1 630 hectares. So that's the first thing. Now, I was informed during conferencing –
2 not conferencing sorry, the workshopping and the field visit that the pre-works under
3 CODC consents was about 30 hectares, so that's 660. I've estimated the predator
4 exclusion fences footprints will be around 10 hectares. Now I did that based on
5 research online. That's not my field of expertise, exactly what the footprint of those
6 fences will be, and note that differs from my response and attached to the 51
7 comments because I didn't know but I did a more detailed analysis now. So we're
8 at – sorry we have to go through this - we're at 670 hectares. The ancillary works
9 plan for the covenant uplift area I've estimated at 20 and works over concession areas
10 at 10. So that gets to about 700 without really trying that hard. So I think
11 seven per cent is still a conservative estimate. But the numbers – I've put the extra
12 numbers in the joint witness statement – but if you assume that Kawarau gecko
13 occupies 10,000 to 100,000 hectares, that equates to .7 to seven per cent of their
14 national global regional population. Does anyone – do you have questions on that?

15 **Mr Muir:** I just wonder whether – would there be any value in just getting those
16 numbers up on the white board?

17 **Dr Tocher:** Yes.

18 **Mr Muir:** How we build to that. Because I suspect that we might be coming back to
19 this, aren't we Mr Leckie.

20 **Mr Leckie:** Yes, I suspect I will.

21 **Mr Muir:** Yes, digesting them. Right, could you put them on the whiteboard behind
22 you?

23 **Dr Tocher:** Sure, sure.

24 **Mr MacGibbon:** You're aware of what they are too just so we can - - -

25 **Ms Sweetman:** I'm just wondering if there's a pen. [Discussion about pen.]

26 **Dr Tocher:** This isn't my expertise – writing on boards. And yes, I'm left-handed. So
27 that's the shape file. So as I said when I put that number up, I didn't realise it would
28 be so provocative.

29 **Mr MacGibbon:** That's the shape file for DDF though?

30 **Dr Tocher:** Yeah. Yep. Sorry, DDF, thank you. 30 hectares pre-worked. That was
31 verbally given to me by the applicant's ecologists.

32 **Mr Muir:** And the category is?

33 **Dr Tocher:** I do apologise – pre-works.

34 **Mr Muir:** Pre-works.

35 **Dr Tocher:** And looking at the ODT yesterday, it looks like the pre-works look bigger
36 than the shape file. Bigger than 30 hectares but I can't verify that.

37 **Mr MacGibbon:** Can you just explain what the pre-works are?

1 **Dr Tocher:** So there's a lot of works being carried out there now.

2 **Mr MacGibbon:** Exploratory drilling and that sort of thing that's gone before.

3 **Dr Tocher:** Dredging, roading, they're establishing quarries. Well, this could be a –
 4 yeah, it's a shame the applicant's ecologists aren't here. They're establishing
 5 quarries and the base buildings as I understand it.

6 **Mr MacGibbon:** Right, they're all outside the DDF though?

7 **Dr Tocher:** Yes. And exploratory drilling and tracking outside the DDF and maybe
 8 some inside. So I've assumed 10 hectares of the fence footprints but I don't know.
 9 Covenant uplift area. So as I understand it that's 850 hectares so I've assumed
 10 20 hectares given the tracking and exploratory drilling size over the pre-works. So
 11 what am I calling that – 20 hectares covenant uplift area. And then there's the
 12 concession areas where I've estimated 10 hectares – goodness me, I've got this
 13 wrong. So 10, 30, 40, 50, 60, 70 plus that is 700. But it's about – and I've called it
 14 up to seven per cent. I haven't said it's seven per cent.

15 **Mr MacGibbon:** The concession areas are what?

16 **Dr Tocher:** So I said five or seven concession areas. I think I've – I might have missed
 17 some. I've appended them to my response – access to the Come in Time Battery,
 18 Ardgour Rise access track upgrade, Ardgour Road intersection upgrade, willow
 19 clearance, and I think one of them is in the DDF from memory. But perhaps that's a
 20 question for – is there five or seven?

21 **Ms Williams:** So there's a total of seven concessions but I think there's two areas which
 22 have two concessions relevant to each area.

23 **Dr Tocher:** So I think it's still a reasonable estimate. It's – I've said up to, I haven't
 24 tried to overplay my hand on that one. I just – it was just as I saw it at the time and
 25 with the documentation that I had. I would welcome a review of those numbers with
 26 some accurate maps and plans. In fact, I think the applicant's ecologists – yes, that's
 27 right, in the joint witness statement – do say they're going to provide that or they're
 28 going to provide – paragraph 10 I believe of the joint witness statement. They will
 29 provide an all-encompassing map showing all potential areas in which lizard impacts
 30 are possible. It would be good if that map also differentiated between direct
 31 disturbance areas versus the other areas where effects of lizards will be possible but
 32 not direct, or maybe direct but maybe not.

33 **Mr MacGibbon:** I would venture to say that that map would be helpful for us too, so
 34 thank you.

35 **Mr Muir:** Probably the best course is now just to go straight to Mr Leckie just so we
 36 can try and just refine numbers a little.

37 **CROSS-EXAMINATION BY MR LECKIE:**

38 **Mr Leckie:** Thank you sir.

1 **Dr Tocher:** We could put the actual numbers with red pen maybe?

2 **Mr Leckie:** Yeah, well I'll ask some questions and then we could – and they're really
3 just to explore the numbers, nothing more than that. And it may be you probably
4 can't answer some of these but would you agree – I think in terms of the 30 hectares
5 if we start there. Those quarry activities are within the DDF? Is that your
6 understanding?

7 **Dr Tocher:** I didn't think they were all within the DDF and perhaps that was a
8 communication – because that was given to me verbally, perhaps I misunderstood
9 the applicant's ecologists when they said the pre-works were 30 hectares. Perhaps
10 they didn't differentiate between which were in and which were out the DDF.

11 **Mr Leckie:** If they were within the DDF, that would reduce that total number of 700?

12 **Dr Tocher:** Absolutely. And I welcome updates on these numbers.

13 **Mr Leckie:** I won't take that one any further and I understand that you really need an
14 updated plan.

15 **Dr Tocher:** Yeah, definitely.

16 **Mr Leckie:** The covenant uplift area – again, you'd agree that there are limited
17 activities enabled through this consent within that broader covenant uplift area?

18 **Dr Tocher:** I think that's more of a planning issue. All I've heard through
19 workshopping was ancillary activities, roading, tracking, exploratory drilling, so I
20 haven't been given a number. I thought, as I said, 20 hectares seemed reasonable
21 over approximately 850 covenant uplift area given what I've seen.

22 **Mr Leckie:** For your calculations, what have you assumed is taking place within the
23 covenant uplift area 20 hectares?

24 **Dr Tocher:** Ancillary activities of roading, tracking and exploratory drilling.

25 **Mr Leckie:** Over that entire 20 hectares?

26 **Dr Tocher:** Yes. Noting that I just don't know.

27 **Mr Muir:** [Inaudible 00:37:10] clear indication yesterday that that area was
28 somewhat less than that – that the exploration would be confined to three hectares.
29 Is that correct Mr Leckie?

30 **Mr Leckie:** Yes that's correct sir.

31 **Mr Muir:** And that that three hectares would include access established to any
32 exploratory drilling site such that you could very rapidly erode your three kilometre
33 – three hectare - - -?

34 **Dr Tocher:** Yes, I'm happy to change that to three if that's what it is. Is there maps
35 etc to support that? Shall I - - -

36 **Mr Muir:** Well, that's part of the consent application isn't it?

1 **Mr Leckie:** I could clarify if I could speak to the Panel. That's a point that's to be
2 clarified in the conditions coming on Monday so to be fair to Dr Tocher, I won't put
3 more questions to her on that because that's an addition since she's reviewed the
4 application [inaudible 00:38:17 - overtalking] - - -

5 **Dr Tocher:** [inaudible 00:38:17 - overtalking] so I couldn't find that three hectares
6 anywhere.

7 **Mr Leckie:** It's not in the application at the moment, that three hectare control. But
8 it's been agreed to through this – through this hearing process so to be fair to
9 Dr Tocher, she won't know about that yet. And then the last one I just wanted to
10 touch on was the concessions – again, just to clarify your methodology. So you've
11 assumed full disturbance of that 10 hectare of the concession area, or have you –
12 sorry – one question at a time. Have you assumed full disturbance of that
13 10 hectares?

14 **Dr Tocher:** No. Now if you think of the timeline, this seven per cent was in my
15 response and at that time I didn't have that information of what disturbance was going
16 to happen in the consent areas – I mean in the concession areas. In the next number
17 that's contentious – the 32 per cent – I take a different approach because I had more
18 information. Well, actually, no I don't. So to answer your question, no, I don't know
19 the extent of direct effects in the concession areas and I'd be very keen to know what
20 that total is.

21 **Mr Leckie:** Okay, I think I've worked through each of the numbers here. No further
22 questions, thank you.

23 **Dr Tocher:** Sir, can I just finish on that and just say I'm not set on that number. I want
24 the numbers – I want the actual numbers. Happy to change that number downwards
25 if that's the case.

26 **Mr Muir:** Is there any other issue that we wish to address under that heading
27 Dr Tocher?

28 **Dr Tocher:** Well, there's the other number that was brought up in the joint witness
29 statement that I need to explain.

30 **Mr Muir:** Yes.

31 **Dr Tocher:** So – and this is where as Mr Leckie's pointed out, it's not a case of who's
32 right or wrong. It's using two different frames of reference. I, you know, DoC is my
33 – I've got a background working on the New Zealand Threat Classification Panels,
34 two or three or four of them. The assessment criteria follows IUCN
35 recommendations. I actually went onto the site last night and produced – found this
36 graphic which shows it very clearly that what I think Dr Ussher and Dr Baber have
37 done is look at area of occupancy – I'm sorry, extent of occurrence. So they've got
38 the dots for Kowari gecko and put a polygon round them and summed the area,
39 notwithstanding the analysis they've done in that paragraph that I don't understand.
40 What IUCN does to measure the 10,000 to 100,000 and what the New Zealand

1 Threats Classification system is looks at area of occupancy versus extent of
2 occurrence. So they've done extent of occurrence, which can overestimate the
3 amount, and I looked at area of occupancy – well, I didn't – I just got the numbers
4 from the published literature. So I'm not explaining this very well but I think that's
5 why there's a big difference. So I've just used the 10,000 to 100,000 in the published
6 literature. They have drawn the polygon around the dots and got a much bigger area
7 so that potentially underestimates the effects of this proposal on Kowarau gecko. So
8 that's one big difference and we've already covered where I got this 3,283 hectares
9 from – it was simply summing the areas in paragraph 9 of the joint witness statement.

10 And I feel like I need to explain a little bit – take a bit of time to explain why I think
11 the impact area for the lizards is, you know, up to 3,000 hectares. And it relates to
12 the ideas that you don't have to go very deep into the literature to find a lot of papers
13 talking about perverse outcomes if you try to manage grazing in Otago. There's a
14 lot of literature in Otago – mainly led by Grant Norbury – talking about taking
15 grazing off and perverse outcomes for indigenous fauna. In fact, there is a paper
16 titled that. I actually put it in my notes so I could read the title. So this was Grant
17 Norbury, Landcare Research and his colleagues. Invasive mammals and habitat
18 modification interact to generate unforeseen outcomes for indigenous fauna. So it
19 was a mixed bag of perverse outcomes. So that area – every area impacted by the
20 project, although we hear from the applicant's ecologists that they'll probably be
21 positive effects, it's just not supported by the literature. And that's not to say it won't
22 happen. And in fact at the workshopping, I was saying that to them – just substantiate
23 your claims. You know, you're claiming you're going to be able to put everything
24 back together again and in 20 years the lizard populations will be the same as before
25 the mine. Substantiate it. And if they'd started to reference some of these papers,
26 they would see that mice are the elephant in the room. You – there's a lot of literature
27 showing – especially where you have quite a bit of rank grass – I hope I'm not – I'm
28 sure you've already heard of all this literature. But basically you take grazing off,
29 the grasses seed intermittently, usually in autumn, produce a massive seed source,
30 the mice erupt, they bring in their predators, they prey on the lizards, the mice prey
31 on the lizards, everyone preys on the lizards and the numbers plummet. There was a
32 study that showed this really well for a skink – Whitaker's skink – Hoare et al 2007,
33 and the numbers plummeted of the targeted animals. And the same thing happened
34 on Mana Island. Like, these concepts have been around for decades. I think
35 Don Newman who was my manager when I worked for DoC years ago – Mana Island
36 – you know, let's take grazing off to help the McGregor's skink. Well, the mice just
37 went nuts and killed everything.

38 And I just want to share an anecdote. I did – I worked for six years on Stewart Island
39 above the treeline on Harlequin geckos and there are no mice in that site, but the
40 intermittent [inaudible 00:46:08] seeding in the forests drove the ship rats up into my
41 site so that the Harlequin geckos are a ground dwelling creature and the Norway rats
42 seem to just leave them alone. I don't know how – they must use their words, talk

1 politely to each other. For some reason, they don't seem to hammer them. But the
2 ship rats just strip them to skeletons. And I was doing a study down near Bluff a
3 couple of weeks ago and I was using G minnow traps – so that's a typical trap we
4 use for lizards. And it was disturbing what I was finding my traps. I was finding
5 dead mice, half dead mice, mice that had died earlier and were eaten by the other
6 mice that had got there later, the odd lizard in there with its tail missing. Mice are
7 just mean and it's the elephant in the room here and it's likely to be – unless the
8 applicant can commit to managing mice, the literature says that there's not going to
9 be any uplift in the rehab sites.

10 But the problem is almost insoluble. I know you've heard about uncertainty and you
11 don't like that word – I don't blame you – but I've got something to say about that
12 as well. But there is no landscape scale mouse control method in New Zealand.
13 There isn't. You can't do it. Even the biggest pest exclusion fences have trouble.
14 But that's not the end of the world. We know – and Graham – I'm sure Dr Ussher
15 would agree – you don't need to get mice at zero to get a response in lizards. I've
16 got a number of examples myself where I've had to move lizards into mousy places
17 and do my best to control mice, and that means bait stations every two or three
18 metres. It's a ridiculous amount of bait stations to control the mice. But at one site
19 with southern grass skink, I've had a 380 per cent increase in lizards by doing my
20 best to control mice. So how would they do it? I don't know.

21 **Ms Sweetman:** We did have some discussion on last Friday about mice and rat control,
22 which was more under the avifauna topic rather than lizards. So the issue of control
23 of mice has been raised with us already.

24 **Dr Tocher:** I did hear that discussion.

25 **Ms Sweetman:** And so Dr Baber there acknowledged that the pest control programme
26 doesn't do that as proposed now.

27 **Mr MacGibbon:** Perhaps just picking up and going on this subject a little bit further, so
28 mouse eradication certainly is a challenge and even keeping them to very low levels.
29 But would you see benefit in some control of mice, or at least even targets being set?
30 In the absence of rats, for example, in the pest control area, mice may increase. I'm
31 not sure whether you agree or not but I would suggest perhaps keeping mice to below
32 a certain percentage level is possible and would you expect there to be benefits to
33 lizards if that was undertaken?

34 **Dr Tocher:** Yes. And there is a paper that says exactly that. If you can manage to
35 keep mice below five per cent, that's the magic threshold, you'll get a response. The
36 work I've done – so just anecdotally – a war story I suppose. You can do your best
37 to keep them at five per cent and get a response. And of course - - -

38 **Mr Muir:** Sorry, for the non-ecologist in the room – the five per cent of what?

39 **Dr Tocher:** My apologies. There's a standard method for monitoring mice using black
40 tracker funnels at 50 metre spacings. It's a national protocol so you can compare it

1 across sites of five per cent tracking. So there's, you know, that's the short story.
2 There's a longer story.

3 **Mr Muir:** That's fine for me for present purposes.

4 **Dr Tocher:** So that is certainly something they could look at doing. As I understand
5 it, mouse monitoring isn't even happening and I'm pretty sure they're using wax tags
6 to monitor possums and rats and incidentally maybe mice. So I don't even know if
7 at this point the monitoring is proposed to use the standard method. But in the joint
8 witness statement, Chief Baber – Dr Baber – Mr Baber did agree that the national
9 standard would be appropriate to monitor mice.

10 So we're getting into an adaptive management discussion. If I can continue along
11 this path, is that -? So I saw you getting hit with the word "uncertainty" so many
12 times on Friday – I only said it twice by the way. Adaptive management is designed
13 for uncertainty – that's what it's for. So you'll see throughout the joint witness
14 statement and my appendix to the section 51, it appears like I'm criticising them for
15 doing that. But I wanted it put in front of the Panel that that's what they're relying
16 on, even though they're not using those words. And listening to Friday, because I'm
17 going to just explain what I mean by not using those words, then I'm going to go into
18 what I think could help. Why I think they're not using the words "adaptive
19 management" freely is because that implies a suck it and see approach. Whereas the
20 applicant's ecologists will contend "no, no, we're not sucking and seeing, we know
21 what we're doing". But in the next breath it sounds very much like adaptive
22 management to me. So I think it would be better just to say it's adaptive management
23 because then we can move forward. So adaptive management is designed for
24 uncertainty but as I think it was Matt Dale pointed out to the Panel, there's rules
25 around adaptive management. You have to have really good continuous monitoring
26 – robust monitoring continuously and pre-set triggers and I made some notes on it –
27 pre-set triggers before it happens, a toolbox to respond – so again mice, let's not go
28 there again. Of course, to start with, clear measurable objectives – that's obvious.
29 But the other thing that Matt Dale didn't mention was stakeholder buy-in. Now I
30 worked for Oceana Gold on a number of research projects out at Macraes Flat and
31 that stakeholder buy-in, my lord it matters in the end. It may not seem important to
32 start with but if, in this case, the applicant, their contractors, the environment team,
33 if there's not buy-in to be flexible to change to allocate resources in a timely manner,
34 adaptive management's not going to work. So – but I think adaptive management is
35 the answer to uncertainty. There's heaps of literature on that. It needs to be
36 [inaudible 00:53:24].

37 **Mr Muir:** You may not be aware, Dr Tocher, of the ultimate proposed ownership
38 structure in relation to the – not only the DDF but the wider area – is that it will pass
39 at some point yet to be established – but will pass into a trust and that trust will have
40 significant direct or indirect community engagement which must put it into a slightly

1 different category in terms of stakeholder buy-in and that effectively stakeholders
2 will be running the show.

3 **Dr Tocher:** That is an interesting way of approaching it. Good luck writing conditions
4 on that. That sounds – my mind can't really take that in to be fair.

5 **Mr Muir:** It's – that is the nature of the proposal now and then of course, you may
6 have heard also, supported by a capitalised trust of an enduring nature, one of the
7 principal responsibilities will be to ensure in perpetuity in relation to this trust-owned
8 and publicly accessible land that these environmental objectives – these outcomes
9 are maintained in perpetuity and appropriate funding stream to ensure it. Now
10 whether the sum that's on the table at the moment is sufficient for that and all of these
11 other issues that we must necessarily consider, what are the assumptions about annual
12 returns on the principal sum and all of these issues – that's the basic framework. So
13 it's quite unusual in that context, the application. And again, I just raise the point
14 with you now because, as you quite rightly pointed out, there is no point having in –
15 well no point – it would be inappropriate to have adaptive management that did not
16 have – that did not reference, for example, the cultural considerations that are very
17 important here, as well as what we call the hard ecological considerations. And that
18 is why it is proposed that there be – that there be mana whenua – strong mana whenua
19 representation in relation to that. A board of trustees.

20 **Dr Tocher:** Interesting. I guess obviously not my field, my only comment would be
21 to reiterate the need to have engagement in a timely way because best laid plans –
22 some of these effects could be irreversible quite quickly. So, yeah.

23 **Mr Muir:** Right. Thank you. Does that now conclude topic two? I've got to go to
24 Mr Leckie obviously, but is that what – all that you wished to address us on?

25 **Dr Tocher:** I believe so. I can leave a copy of that IUCN figure – I didn't articulate it
26 very well but just showing the difference if it's interesting to anyone. Not as an
27 official exhibit but just I printed it out if someone looks at it.

28 **Mr Muir:** At the conclusion of this, we'll round back to make sure we haven't missed
29 anything. So don't fret.

30 **FURTHER CROSS-EXAMINATION BY MR LECKIE:**

31 **Mr Leckie:** Thank you sir. Just a couple of questions on this topic Dr Tocher. Just in
32 relation to this extent of lizards, did I hear you right in your comments that Dr Baber
33 and Dr Ussher conducted a field study and they mapped the outcome of that with
34 polygons? Correct? That's your understanding?

35 **Dr Tocher:** No. My understanding is they used readily available data points from the
36 herpetofauna database and from iNaturalist and plotted them on a map and then did
37 some higgery jiggery pokery and came up with that number. I'm not trying to be
38 funny – I simply don't understand what they did. But I'm not arguing that it's correct.

1 It's just a different way of doing it and I stuck to the gold standard that's been around
2 for decades and did it my way.

3 **Mr Leckie:** And your way was the desktop mapping, literature review approach? Is
4 that what you're - - -

5 **Dr Tocher:** No desktop mapping. Just using the published threat classification system
6 that quotes both the regional and the national one. In fact I think the regional one
7 quotes the area used by Kowarau gecko as 10,000 hectares. The national one is
8 10,000 to 100,000. I just used those figures. They weren't mine and I've referenced
9 them.

10 **Mr Leckie:** Thank you. And I just want to test you on your comments that adaptive
11 management is "suck it and see". Is that what you put to the Panel?

12 **Dr Tocher:** I did and I used that term – I think it was Dr Baber used it at the hearing.

13 **Mr Leckie:** Would you agree that adaptive management done well with the necessary
14 requirements like objectives, measurable limits, monitoring, reporting back, is the
15 opposite? It's not suck it and see?

16 **Dr Tocher:** I think we're just dancing on the head of a pin. To me it is. It's – we don't
17 know what's going to happen, let's start, monitor, if something happens let's fix it if
18 we have the toolbox to do so hence my comment about mice. Maybe – it sounds like
19 suck it and see to me sorry Mr Leckie.

20 **Mr Leckie:** That's fine. Thank you sir.

21 **Mr Muir:** Any questions from the Panel arising out of that? No. Moving to topic
22 number three – the temporary as opposed to permanent nature of effects.

23 **TOPIC 3: TEMPORARY AS OPPOSED TO PERMANENT NATURE OF EFFECTS**

24 **Dr Tocher:** Yes, can I be so bold as to ask – can we go straight to questions? I heard
25 the hearing on Friday last week and I don't know where else I can add value to be
26 honest. I started writing a spiel and ended up with four bullets and no spiel. But if
27 you like, I can go through the bullets – whatever you prefer. But I'd prefer perhaps
28 to know where your gaps are?

29 **Ms Sweetman:** Did we even cover this?

30 **Mr MacGibbon:** No, I'm not even sure whether we actually dealt with that during the
31 session in the end. It was put on the board and I can't recall why we didn't, but I
32 don't think we addressed – well, it wasn't a priority and we probably ran short of
33 time.

34 **Mr Muir:** Let's go to salvage.

35 **Mr MacGibbon:** Yeah.

1 **TOPIC 4: SALVAGE**

2 **Dr Tocher:** Okay, so salvage. It's a tricky one, right. And as I said during the
3 workshop, I was asked "what would you do, how many should we salvage,
4 where should we salvage". And I said to the applicant's ecologists that if I was
5 running the show, it would be more about "well, where am I going to put them and
6 that would determine how many I could take". You know, there's no point going
7 into a lolly shop and grabbing all the lollies and not being able to eat them all. You
8 want to be able to put them in a safe place where they have a chance of surviving,
9 otherwise it's not worth it.

10 Now, as I understand it, I'm going to stray – this is not my field – but I work in this
11 field so I'm aware that under the normal Wildlife Act process, there's a test that came
12 out of case law that a lizard management plan needs to achieve an overall protective
13 benefit for the lizards affected, and that's the test DoC used. This is the fast track so
14 that's not relevant, but why this is relevant is you don't necessarily have to salvage.
15 And I said that at the workshop. I'm not saying don't salvage. I'm saying don't
16 salvage at the moment because we've no idea where they're going to go and that's
17 where that larger area of impact comes in. Grant Norbury did a study at the
18 Mokomoko sanctuary – he had an established population of skinks, he brought in a
19 new population, so a second cohort, and at the same time there was a 160-day mouse
20 incursion. So he was able to track the survival of the existing residents versus the
21 newcomers and found that the newcomers were seriously disadvantaged.

22 **Mr Muir:** Was that back in the days when there wasn't such a negative approach to
23 toe clipping. Because, I mean, I was left after the discussion and in the context of
24 advice from one of the applicant's ecologists that the cost of this salvaging exercise
25 would be in the "tens of millions of dollars", simultaneously told that there was no
26 reliable basis upon which to track the survival of the displaced lizards into the new
27 environment such that – please don't get me wrong but it had the air of a – could I
28 call it – the opponents or others might call it a virtue-signalling exercise. I'm not
29 suggesting that that's my own view but just putting that label on it.

30 **Dr Tocher:** I understand what you're saying.

31 **Mr Muir:** Yes.

32 **Dr Tocher:** I – can I answer? First of all, the study done by Grant Norbury was Otago
33 skinks and you can tell them generally apart by their markings.

34 **Mr Muir:** By their markings, yes. Thus my somewhat facetious suggestion that a
35 spot of paint be put on the head of each relocated lizard.

36 **Dr Tocher:** I've been known to paint the odd lizard. The issue – so we've strayed –
37 this is a topic under salvage. The idea of, first, is it worth it and I'm saying yes, if
38 you can put them in a safe place where you make room for them and we've heard
39 from the experts for the applicants and counsel that the way you make room for
40 lizards is you do a good predator control or you add habitat. You can't just put them

1 into the environ. Now in the case of Grant Norbury's work, it was inside a fenced
2 sanctuary. So the predators were already controlled – he just happened to have a
3 mouse incursion at the time. And he concluded that this – the cohort that was
4 released on top of residents if you like would have probably done better if the mice
5 weren't there. In fact, do you know the size of an Otago skink? They're like two
6 hands and they bite and they hurt. They're big animals. A mouse was observed in
7 daylight attacking one – an adult. So when I say mice are vicious and in my opinion
8 worse than rats, except ship rats when they're hungry, I'm not kidding – mice are
9 mean. Anyway, I digress.

10 So your question sir was around monitoring. I routinely have to do post-release
11 monitoring of salvaged animals and it's science – I'm sure Mr MacGibbon
12 understands this and Ms Sweetman too I believe as a scientific bent – that if you can't
13 do the gold standard, which is individually mark animals and do fancy mark
14 recapture statistics to get your trends – you do indices instead over a longer period
15 of time. And that's how I've done it. For example, I was involved in the Beaumont
16 Bridge project. We released – actually I've got the exact numbers – I think it was
17 146 grass skinks into a grass verge where I'd put out cover for them and I'd put out
18 the mice bait stations. So we did a baseline – we put out a hundred of those funnel
19 traps I was telling you about that also catch mice that eat each other – and so every
20 year for three years controlling the weather as much as I can, I put out the same
21 number of traps and that's how I was able to say that the salvage was successful –
22 the lizards persisted. There was no sign over three years – that was an NZTA project
23 – they're not – they usually like to stop the work when the project's finished. So
24 three years the lizards persisted. They didn't go up. They didn't go down. So there
25 are other ways of doing it. So toe clipping isn't the only way. You just have to use
26 an index which takes a bit more effort and a bit longer to get the robust trends and
27 you'll see in the witness statement I suggested a power analysis because they tell me
28 they were already doing some monitoring using artificial cover objects. I'm not sure
29 if that was put before the Panel. Right now, they're doing monitoring. So artificial
30 cover objects are those, you know, corrugated roofing material things stacked up
31 which mice like so there's issues with using them to monitor mice. I've got a study
32 going on the Otago peninsula looking at that – it's flat, it's hot, it's black – of course
33 mice are going to live under them as well.

34 So in terms of adaptive management, they really need to get on to that. They need to
35 understand is the monitoring they're doing enough to trigger or to have the robustness
36 required to get the triggers in a timely manner. That's a big deal. Have I said that
37 clearly enough? I don't know if I've – yeah, it's a statistical thing. You go out, you
38 do a pilot study, you take it to a statistician and the statistician will tell you it's not
39 enough, you need to double your effort or triple your effort and you need to do it in
40 more places. So that informs. Then you go out and you do it properly after your
41 pilot study.

1 **Mr Muir:** So fundamentally provided the adequate habitats can be identified, your
2 professional evidence is that there is still utility in undertaking this salvage and
3 relocation exercise to the extent of 100,000 lizards.

4 **Dr Tocher:** I didn't say that. I [inaudible 01:09:28] talk numbers. I've talked release
5 site. That's what they have to get right. And you'll see in the joint witness statement,
6 we all agreed they need to go into fences. That's the best place for them.

7 **Mr Muir:** Fenced areas, yes.

8 **Dr Tocher:** And you'll see the fenced areas as proposed. One of them – the Ardgour
9 one – I personally would write off. The Bendigo one has really good lizard habitat
10 already occupied. The fences need to be much larger to close those – the depth or to
11 bridge the gap between where they are now and the quantum of residual effects.

12 **QUESTIONS FROM THE PANEL:**

13 **Mr MacGibbon:** So perhaps just picking up and running with that one a wee bit, I think
14 the joint witness statement at 101 – was it at 101 – you talk – or you suggest that
15 modelling might be the way – population modelling – might be the way to determine
16 how big these pest exclusion fences should be to enable them to be used as release
17 sites for salvaged animals. Do you want to expand on that a little bit more and what
18 that would involve?

19 **Dr Tocher:** Yeah. I've done that myself to inform conservation and published on that.
20 So it's something I am familiar with. It's a case of species by species. So let's start
21 with Kowarau gecko. Getting a list of its life history traits – so longevity. They may
22 live up to 56 years. That's the oldest gecko known in New Zealand. They give
23 offspring – give birth to two offspring a year – that would be conservative and
24 perhaps make that one. You find out their age to first reproduction, the sex ratio, etc,
25 etc, and you put it in a very simple model to work out how long would it take to grow
26 – if we're saying 750,000 animals – how long would it take to grow that many and
27 what would your founder population need to be to get it done in a timely way. So
28 maybe 35 years, you want to completely offset all your effects for Kowarau gecko,
29 you need a founder population of 1,000 animals say, and then you do the good
30 science – the good survey work to say “well, an area of 30 hectares we think's enough
31 for that species” and then that's one module. And then you add on southern grass
32 skinks and McCann skinks to work out “well, this is the area we think we need to
33 offset all effects and these are the habitats we need and therefore that place is the best
34 place”.

35 Now somewhat controversially on – during the workshopping we asked naturally –
36 or I did – is this the only place you've considered and the experts said “no” and
37 indicated there were better options. But when I pushed that quite rightly was told
38 it's commercially sensitive, back off. So I do understand that there were other
39 options considered that were perhaps bigger and in a different place but I have no
40 visibility on that. And just knowing the site, you know, I've done surveys up there

1 myself further along towards Cromwell. I'm sure there are better sites than what
2 they've proposed.

3 **Mr MacGibbon:** Do you have any thoughts as to how many animals – lizards – should
4 be salvaged – thinking of Kowarau gecko specifically – and relocated to create that
5 sort of founder population? We've heard the applicant's aiming for – to try and
6 salvage and move 100,000 lizards. I suspect that was derived more from the
7 maximum amount that was perhaps able to be captured and moved rather than any
8 sort of population modelling basis. Do you have any thoughts on that?

9 **Dr Tocher:** I do. It pains me to say it, sometimes salvage isn't worth it if you've got a
10 better option. And we know from Mokomoko sanctuary, 14 hectares, lovely schist
11 rock, which is present in the Bendigo predator exclusion proposed fence, that's – the
12 gecko there, the schist gecko, I think it tripled – doubled anyway from baseline. They
13 had monitoring gear outside the fence and inside the fence and intensive effort. The
14 schist gecko doubled in three years within the fence. So the population modelling
15 might tell you that instead of moving these things around and basically extending
16 your effects, can you see what I mean? Like if the DDF is whatever it is – I'm
17 reluctant to say 700 hectares – but the areas directly affected is in the order of 700
18 hectares yet your effects are extended if you start moving lizards and messing around
19 with the ones outside. You might be better off - - -

20 **Mr Muir:** Spending your tens of millions there?

21 **Dr Tocher:** Putting the fence somewhere else that gets much closer to offsetting all
22 your effects. And I don't know – as I said, I don't know how much work's been
23 done on that. I know in the witness statement they all agreed – Dr Baber and Ussher
24 as well – that the population monitoring – sorry, modelling – would be helpful but I
25 heard Dr Ussher say here to the Panel that he wasn't that supportive, so I don't know
26 where he stands on that. But at least in the joint witness statement, he did think it
27 would be useful.

28 And I can give an example where I've done it myself – but it's on frogs. I don't
29 know if it's that useful. I just like talking about it.

30 **Mr MacGibbon:** Just for clarity, so what you're suggesting is that a more productive
31 approach for the sake of the lizards would be to invest in good habitat and promote
32 – and make it pest-free and promote the expansion of those existing populations
33 rather than trying to move animals and have them survive and create the disruption
34 that happens when you release salvaged animals?

35 **Ms Sweetman:** And of a sufficient size area as well.

36 **Dr Tocher:** And location. And as you all know, then the problem – I'm allowed to say
37 problem, just not uncertainty – then the problem is around governance and you will
38 have more visibility on what's proposed there than I do but I'm – that is a problem.
39 Locking in the gains, there's no point, you know, doing anything unless the gains are
40 locked in forever.

1 **Mr Muir:** It would appear to be good sense that if you don't lock in the gains, the
2 gains will evaporate very quickly.

3 **Dr Tocher:** Yep.

4 **Mr MacGibbon:** Just to keep developing that a little bit, so I think you mentioned – was
5 it schist skink was it that you were talking about before?

6 **Dr Tocher:** Yes, in the Mekomoko sanctuary.

7 **Mr MacGibbon:** Did you say that they got a 300 per cent increase in population from
8 that work?

9 **Dr Tocher:** I've got – so it was again Grant Norbury and his student, Sam Turner.
10 They – I wrote the numbers down. I'm pretty sure it was a doubling. Yeah, so yeah,
11 Sam Turner and Grant Norbury, 2023, baseline populations doubled within three
12 years. So they actually, I think, got a tripling inside the fence but they discounted
13 the baseline from outside the fence. So that's something to keep in mind with this as
14 well. You know, don't assume the fences are going to – there still needs monitoring
15 of outcomes, even within the fence, and I'm stating the obvious, but obviously the
16 vigilance for incursions and keeping those mice numbers down. I think Dr Ussher,
17 if he was here, he would agree with me that the ideal is to get the mice numbers at
18 zero but it's not necessary – below five per cent will probably be okay. Talking to
19 other colleagues about this more generally, because obviously this is something
20 herpetologists talk about a lot, we all agree you put the fence where there's hardly
21 any mice. That's the best way to manage mice.

22 **Ms Sweetman:** And where you know there's lizards.

23 **Dr Tocher:** Of course, yeah, and habitats for the lizards.

24 **Ms Sweetman:** Thank you, that's really helpful.

25 **Mr MacGibbon:** So I guess on that basis, and I am aware of a few other studies that have
26 been done with lizard recovery and pest-free areas, you could even rather than going
27 through sophisticated modelling, you could work on the basis that if you can
28 eliminate mice and all other pests, that you could expect a doubling of populations
29 generally. Do you agree with that?

30 **Dr Tocher:** I would and I've used that argument myself.

31 **Mr MacGibbon:** Thank you.

32 **Mr Muir:** Does that cover off that topic, Dr Tocher?

33 **Dr Tocher:** Just give me one moment. It's certainly wide-ranging. Can I just give –
34 just seeing I've gone to the trouble of printing it out, one of my research projects at
35 Oceana Gold, I was actually given permission to toe clip. So I toe clipped 500 geckos
36 – that's more than 500 toes – and a similar number of grass skinks and released them
37 into habitats – it was an experimental treatment. Just for the record, I've recovered

1 only 2.2 per cent of those toe-clipped geckos. But I think that – I think I’ve covered
2 off that topic, thank you.

3 **Mr MacGibbon:** One last question sorry, and probably a slightly controversial one in a
4 way. The concept of allowing works to go ahead and killing 500,000 lizards is
5 obviously one that, in the perception of the public in particular, is a serious one. I’m
6 just interested from a DoC perspective whether that would be tolerated?

7 **Dr Tocher:** Do you think perhaps that’s a legal question? Ms Williams [inaudible
8 01:20:14].

9 **Mr MacGibbon:** Well, there’s a legal element to it. There’s also a - - -

10 **Mr Muir:** That’s code for “I’d like to duck this question Commissioner”.

11 **Ms Williams:** And I don’t think I can express the position for DoC on that.

12 **Mr MacGibbon:** Right, okay, thanks anyway.

13 **Dr Tocher:** But I definitely – I didn’t want to say it because, you know, they’re pretty
14 cool animals – when you have one in your hand and you think “well, perhaps this
15 thing’s 56 years old”, you can just see the mana. Yeah.

16 **Mr MacGibbon:** Thanks.

17 **Mr Muir:** Mr Leckie?

18 **Mr Leckie:** No.

19 **Mr Muir:** Right. Overall effects.

20 **TOPIC 5: OVERALL EFFECTS**

21 **Dr Tocher:** Right. So I think I’ve – I mean you can see from my – what I’ve said to
22 date that I do think the effects have been undercooked. And a big part of that is
23 because the area of impact is much larger. The focus on 610 hectares just seems not
24 quite right to me. But what matters now, I suppose, is the quantum of residual effects
25 – that’s where the big gap is. So even after avoidance – and just a comment – I don’t
26 want to sound too critical – but what I, you know, best practice lizard management
27 is you detail lizard-specific avoidance. We were going to put the spoil disposal pile
28 here, we did a lizard survey, there were lots of lizards so we put it here on the green
29 grass. I don’t see that yet there is, they claim, avoidance actions but I haven’t seen
30 it documented. That just sounds a bit picky at this point.

31 So I’ve talked about the geographic area. Some areas weren’t surveyed. The
32 concession areas, for example, in the covenant which of course is of interest to DoC.
33 And the use of those – we heard a lot yesterday – last Friday from Mike Harding and
34 Nick Head about the guidelines that are being used and it obscures effects. Especially
35 cumulative little effects – like you’ll hear Dr Baber and Dr Ussher saying “well, yes,
36 okay, we didn’t survey that but it doesn’t have much effect” and they’re referring to
37 their subjective allocation of, say, significance of effect or magnitude of effect. But

1 all those little things that are disregarded – so I just wanted to make that comment
2 that I'm one of the ones that don't – don't agree or use those guidelines. I think they
3 do biodiversity a disservice overall.

4 So there does remain that gap between myself and the applicant's herpetologists, just
5 that I think the depth of residual effects are greater. But they will say we've already
6 said they're significant. So it's a nuance that I don't know if it's worth delving too
7 much into at this point. Happy to be questioned on it of course.

8 And I came up with this summary statement after pondering on this last night. I think
9 for the Kawarau geckos which seems to be the biggest concern in the herpetological
10 sense because of its low fecundity basically. Can you imagine two offspring a year
11 – maybe even every second year – some geckos actually only give birth every second
12 year – that the substantial residual effects on the species and pests are less about a
13 disagreement between the experts and more about whether the mitigation package
14 sanctioned by the applicant is sufficient. That's where I've landed on that. I don't
15 think the experts are necessarily disagreeing. We're all saying there's shared residual
16 effects. I say really huge, they say huge. But we all say what's on the table isn't
17 enough. Does that make sense? So that's all I've got for that topic.

18 **Mr Muir:** And because you come always back to fenced enclosures as being, you
19 know, not just a gold standard. You say it's necessary really?

20 **Dr Tocher:** It's the only way to deal with mice and it's proven in Otago.

21 **Mr Muir:** Yes.

22 **Mr MacGibbon:** Would that apply to southern grass skink though too, that they'd get
23 benefit from fenced areas, but I assume picking the right fenced areas would matter?
24 Does that habitat overlap greatly with Kawarau gecko?

25 **Dr Tocher:** Well it can do. If you get rid of mice out the equation, I think what's
26 happened at Mokomoko is the grass skinks and the McCann's skinks have gone nuts
27 because the grass has given the cover. What limits southern grass skinks is the
28 climate. If you give them heaps of cover and every year the grass lodges and forms
29 those mats, you've grass skink habitat. But if you don't take mice out, it's bad.

30 **Mr Muir:** So cover against avian predators for example and?

31 **Dr Tocher:** Yes, and mice and rats and cats, other skinks.

32 **Mr Muir:** Just by the by, I don't know whether it's in the correct topic – the success
33 of a creation of new rock habitats – so rock stacks and things of this nature. Do you
34 have any experience with – provided you can keep your environment predator-free,
35 do they rapidly repopulate?

36 **Dr Tocher:** I've been – because I - - -

37 **Mr Muir:** [Inaudible 01:26:13] discriminating about natural environments to created
38 environments.

1 **Dr Tocher:** You have to separate out skinks and geckos, right. Straight away. So
2 skinks – if the habitat – if the – I’m sure McCann’s skinks are going to do it and in
3 fact there’s a site I was involved in at Oceana Gold where we rehabbed 10 hectares
4 of a backfilled landform and the skinks seemed to be moving through it. McCann’s
5 mostly. The occasional grass skink. One gecko so far and we suspect somebody put
6 it there. Geckos – we just don’t know enough about them. They seem to form family
7 groups. They don’t move around. You find the same gecko in the same area. Of
8 course they move around a little bit, you know, like all animals, you know, eventually
9 there’s surplus young and the dominant male throw them out. But we just don’t
10 know enough. I’m actually saying this based on my experience, not the literature.
11 So Dr Ussher’s – I actually noted his enthusiasm that the pit will be put back together
12 and that within 20 years he states the lizard populations will be as before. When he
13 first said that to me I thought he might be joking. But he wasn’t joking because he’s
14 basing that on his experience of Southern Alps geckos at a North Canterbury site. So
15 it’s valid and that may be the outcome. We just don’t know. That’s the truth of it
16 and his work hasn’t been published so it’s hard for me to interrogate it. What we’re
17 seeing at Macraes is maybe in 100 years. And we know that because of the gold
18 tailings or the gold remains, there’s geckos in them. The geckos – it’s just a matter
19 of time. They will, but not in 20 years. I firmly believe he’s got that wrong. He’s
20 being overly optimistic. Within 100 or 150 years I would say. As long as the
21 vegetation comes up, the – what you see in parts of the Macraes ecological district is
22 the geckos are blinking out. As their habitat becomes less and less complex, so, you
23 know, the tussock with the shrublands, etc where the geckos come out of their
24 crevices and they forage in the bushes at night, they’re gone. The tussocks are gone.
25 Eventually it ends up just a green desert with the odd *Meuhlenbeckia* and *Melicytus*
26 and the geckos disappear. There’s no study that I know of that explains why but they
27 certainly need shrubland. So in terms of the rehab, that’s planned. So – in short I
28 think Dr Ussher perhaps has the timeline wrong.

29 **Mr Muir:** Mr Leckie?

30 **Mr Leckie:** No questions.

31 **Mr Muir:** Thank you. This bracketed topic, I think we probably have covered it have
32 we not Dr Tocher? Yes, in salvage and rehab?

33 **Dr Tocher:** I think so. We’ve talked about mice and just make the point, if I may, just
34 to close it off, that the literature does tend to point to releasing an area from grazing
35 seems to be context-specific and will vary across rainfall gradients, fertilities – you
36 can’t easily predict what will happen at a place. But I think that’s with other things
37 I’ve said and I know we’ve got a landscape person here – I did note during – I’ve
38 just got to be careful what I say if it’s in the witness statement – I think it’s in the –
39 yes, it is in the witness statement that discussing the issue of rehab, it came to light
40 that what’s planned is a compromise and landscape is part of that. So they’re not

1 rehabbing for lizards, they're rehabbing for a lot of things and so that additionality
2 for lizards is lost in that tangled mix. That's all I've got to say on that topic.

3 **Mr Muir:** Is there anything else that the Panel wanted to engage Dr Tocher about?

4 **Mr MacGibbon:** Just one thing. I know it's peripheral to the application but it is in the
5 joint witness statement, although I think you as experts didn't get a chance to address
6 it, but I see your name attached to a comment about it, and that is the suggestion of
7 re-introduction of Grand and Otago skink to the site. Do you have thoughts on that
8 as to whether it's something that should be considered? It's not part of the package
9 as it is but it has been presented to be considered. What are your thoughts on it?

10 **Dr Tocher:** I was really hoping you wouldn't ask me that. I've got a lot of thoughts
11 on that. I did – I mean, when I started work for DoC in '96, I worked on Grand and
12 Otago skinks for six years and they were on the brink of extinction. We dealt with
13 issues of translocation of this populations blinking out in the Lindis Pass and what
14 we were going to do about it – about whether do we do predator management or
15 fences. So I – that's why I didn't want you to ask me that because I feel it's not up
16 to us. There's so many working parts behind a decision of that nature for animals
17 that are so important that – no disrespect – but it feels like it should be outside of this
18 process. I don't see it fitting well in it. So I was annoyed to be honest when it seemed
19 confusing at the beginning when I went through all the documents whether or not it
20 was part of the proposal. It took me a while to work out. I had to follow the threads
21 through various management plans to get to the fence management plan that finally
22 said “no, we're not actually going to do it, we're just going to talk about it”. And
23 then it was put through – I think Mr Chrisp's conditions had Grand and Otago and
24 jewelled geckos in it, so it just added to the confusion. So that's my very articulate
25 way to say that's my opinion. I think it's too big and it clearly wasn't part of the
26 application to get approvals for that sort of thing. It's a minefield.

27 **Mr MacGibbon:** Thank you.

28 **Mr Muir:** Right. Nothing else that anyone else wanted to raise from the Panel,
29 nothing else Dr Tocher wanted to raise or counsel wish to raise. Well, thank you
30 very much, that concludes the hearing and again our thanks for making yourself
31 available today. It was both informative and delightful. Thank you.

32 **Dr Tocher:** All the best with your deliberations.

33 **Ms Williams:** And I will just again say thank you very much to the Panel for
34 accommodating Dr Tocher.

35 **Mr Muir:** That's our pleasure. It would have been inappropriate had we not heard
36 from her at some point and by some method. Thank you.

37

38 **Hearing concluded**