

BEFORE THE HEARINGS PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of submissions on the Proposed Otago Regional
Policy Statement 2021 (non-freshwater parts)

SUMMARY STATEMENT OF EVIDENCE OF MICHAEL THORSEN

FOR OCEANA GOLD NEW ZEALAND LIMITED

CHAPTER 10 – ECO AND APP 3 AND 4

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Introduction

1. My qualifications and experience are set out in my statement of evidence dated 23 November 2022. I note that I am familiar with the terrestrial ecological values of the Otago region and the Macraes Ecological District in particular. I have provided ecological advice to OceanaGold in relation to the company's Macraes Mine since 2013, and prior to that I was active as an ecologist in the general Macraes area having undertaken a number of vegetation and reptile studies for the Department of Conservation and others. I have been active as an ecologist since 2005.
2. I have considerable experience in assessing the significance of ecological values using criteria established in plans, policy statements and elsewhere.
3. I confirm the contents of my evidence dated 23 November 2022, and also the contents of an earlier statement of evidence that was included as part of OceanaGold's written submission on the pORPS.
4. Since the pORPS was notified the exposure draft of the NPS-IB has been released. The pORPS takes a different approach to the assessment of ecological significance and the management of effects on ecological values from the exposure draft of the NPS-IB. In relation to the management of effects I note that this is addressed in the evidence of other experts called by OceanaGold (Mark Christensen, Scott Hooson and Claire Hunter) and I do not comment on the detailed wording of the proposed provisions other than to say I agree with the suggestions they have made.
5. I believe that Topic ECO of the pORPS is well intentioned, but that the policies do not align with the current causes of biodiversity loss in the region (the proliferation of weeds and pests, and land use changes, particularly those brought about by winter cropping, new carbon pine forest planting, and irrigation) and do not adequately consider positive contributions that have been made in conserving biodiversity, and that can be made in the future if the policies allow this.

6. The policies relating to the application of the effects management hierarchy and the important role that offsetting and compensation play in addressing residual project effects and in delivering overall biodiversity benefits have not been properly considered in the ORC's version and are at odds with both the ECO-01 and ECO-02 objectives, and also with the offsetting and compensation approach in the draft National Policy Statement on Indigenous Biodiversity (exposure draft NPS-IB) (especially Policies 6 and 8), and in the NPSFM, as Mark Christensen discusses in his evidence.

Significance Criteria

7. I participated in expert witness caucusing on significance criteria on 31 March 2023 and am a signatory to the JWS that resulted from that process. In my view the "General matters" statements at pages 2 and 3 of the JWS are particularly important to bear in mind.
8. I am particularly concerned that the significance criteria are to apply to terrestrial, freshwater and marine environments. All the ecologists participating in the JWS agreed that while the majority of the significance criteria were tested and well understood in the terrestrial environment, this is not the case in the freshwater and marine environments. Based on the experience I have had in the freshwater and marine environments, I have serious concerns about their applicability in those environments.
9. I note that the effectiveness and implications of implementing the significance criteria were not assessed as part of the section 32 or section 42A reports. I strongly disagree with the idea that such an assessment is irrelevant. In my evidence I endeavour to outline how much of Otago might qualify as significant depending on what criteria are used and how they are applied. I consider that this

information is needed to inform both the significance criteria that should be used in Otago and the way areas that are significant should be managed.

10. I consider that the significance 'bar' is set too low in the pORPS as notified, resulting in more areas likely to qualify as significant than is appropriate. This in turn seems likely to lead to areas that actually are significant being undervalued (because they are not differentiated from many other areas that also 'qualify' because the bar is set too low) and also to unnecessary constraints on activities in the region. Further, there is a risk of conservation resources being misaligned to low priority areas and lost opportunities to leverage meaningful biodiversity enhancement activities arising from commercial activities that will not take place because they involve areas assessed as significant and are consequently (and needlessly) caught by an 'avoid' policy.
11. All ecologists participating in the JWS, including the ORC's own consultant ecologist Dr Lloyd, agreed that a guidance document to aid interpretation of the significance criteria is essential. It is a concern to me that the Council has not produced such a document. Until it has, and the ecological community has had the opportunity to comment on it, I am concerned that whatever criteria are finally approved in the pORPS will be inconsistently applied, resulting in potentially poor outcomes for both biodiversity and activities that interact with it.
12. I am aware that the JWS indicates that on almost every aspect of the significance criteria there are different views amongst the ecologists as to what is appropriate. That is unfortunate in my view and reflects the need for consistent national guidance and much better process by councils (in this case Otago Regional Council) in ensuring their plans are developed with appropriate input from ecologists at an early stage.
13. In my evidence I undertook an analysis of the potential spatial extent of significant natural areas in Otago using the assessment criteria as proposed in the notified

version of the pORPS. Dr Lloyd in his written answers to questions from the Panel criticises aspects of my approach. I do not accept his criticisms. Regardless, any reasonable analysis would conclude that a very large part of Otago's indigenous vegetation-dominated land area at a multitude of sites would qualify as significant, together with many areas dominated by exotic vegetation that provide habitat for important indigenous species. Such an outcome would be of uncertain ecological merit. Further, and while it is beyond my expertise, I would think many submitters and residents in Otago would be surprised at the number, size, and location of significant areas and adoption of this framework would likely be socially and economically unacceptable.

14. My concerns in this regard would be greatly reduced if the criteria I support in the JWS are adopted instead. For the Commissioners' assistance I have attached a clean version of the significance criteria I support as per the JWS. I set out below the key aspects of the criteria I support that I would draw to the Commissioners' attention.
15. As notified the pORPS requires an area to meet only one criterion to be considered significant by using the wording "An area is considered to be a significant natural area if it meets any one or more of the criteria below" (my changes highlighted in green). Even if the criteria are revised in line with some of the expert suggestions in the JWS to make them more explicit, I feel this remains a low bar to significance. My main concern is with respect to seral and secondary plant communities assuming the revised Representativeness criterion is adopted as per the JWS (if the Representativeness criteria is adopted as currently worded then I have a much greater concern). Seral or secondary communities would have been a typical part of the pre-human natural diversity in Otago and because of this are significant (at least in part). Examples of these communities in Otago include shrublands and short tussock grasslands that would have played a colonising and regenerating role

following disturbance events such as landslides and following fire. However, the same ecological capacities of the species that comprise these communities can mean that some such as matagouri-dominated shrubland and silver tussock grassland are now probably much more common than in pre-human times. Shrublands too are in a state of flux as a result of changing farm practices (especially the reduction in deliberate burning) and are now becoming increasingly common. In the case of kanuka in Central Otago the expansion in the last decade is very rapid in places. Considering these common, often expanding and youthful vegetation communities as significant is not appropriate in my view unless they have other values such as those described in the other criteria, hence my view that an area needs to meet two criteria before being classified as significant, at least when considering seral plant communities that may not now be in their original pre-human location.

16. At point 4 of the General Matters at page 3 of the JWS there is disagreement on whether the cost and benefit implications of adopting criteria should have more detailed analysis. The concern I have is that without such an analysis of the location, range and size of sites likely to meet the significance criteria using best available data it is very difficult to evaluate whether the criteria are fulfilling their purpose of accurately identifying significant areas where biodiversity conservation is of higher importance. It is also difficult to ensure they are aligned to Policy that seeks to maintain and enhance biodiversity. Ideally this analysis should also include comprehensiveness of the existing protected area network in Otago, the likely effectiveness for conservation of biodiversity if significant areas are considered part of this network, and of the resources available and required to manage the sites to maintain their biodiversity. On the other side of the coin, given the default policy setting is to require adverse effects on the values of significant areas to simply be avoided, there needs to be some accounting for the costs that will impose on people

and communities where desirable activities are unable to be undertaken. Related to this, and as discussed above, some of our most important conservation actions are undertaken by businesses (like OceanaGold) that responsibly address the unavoidable effects their activities have on significant areas. If opportunities to undertake those economic activities are denied because areas are unnecessarily called significant, we will lose the benefits of related compensation and biodiversity enhancement.

17. The discussion around the Rarity criteria is around the scale at which it should be considered. My main concern is that national evaluations are often of low local accuracy due to the difficulties of remotely delineating plant communities, especially of non-forest examples and where the boundary between communities is blurred. I believe it is possible to spatially map the indigenous vegetation at an Otago scale (as the Otago Regional Council has already done). This provides a more accurate picture than can be achieved using the Land Environments of NZ data where inaccuracies in extrapolating environments has been compounded by inaccuracies of mapping vegetation at a national scale in the Land Cover Database. I do not understand why the Otago Regional Council is not using its own mapping information instead of the poorer resolution LENZ information.
18. With regards to the Diversity criterion the issue is how does one assess a relative metric (diversity) without regard to a comparison state. For example, Otago's inland saline areas have naturally low diversity, but some saline sites harbour species that are not present in other examples. Inserting the words "in the context of similar areas and similar ecosystem types" to the existing text gives much needed guidance on how to apply this criterion.
19. The discussion around gradients is problematic. There are many examples of ecological gradients such as the gradient from rock bluff community to steepland community, or the gradient from dryland hillslope to riparian and then instream

macrophyte community. The existence of a gradient is not of itself a significant feature and in my opinion should not be included. The role that gradients may play in the context of significance is appropriately captured within the buffering function in Ecological Context.

20. With regards to the Distinctiveness criteria the significance of a species at its distributional limit in Otago could largely reflect little more than the southern position of Otago within the South Island. Distributional limits are often represented by a single individual or small stand of individuals that are of dubious ecological merit (though of some biogeographic importance). In my opinion consideration of distributional limits is better reflected in considering whether the species is endemic to the region as this has the effect of reflecting the distribution limits of terrestrial and freshwater species to those that occur only within the boundary of the Otago region. A population (as opposed to the presence of individuals) should also be added to the endemism criterion as there are a number of species endemic to Otago where the presence of a single individual would not be considered ecologically important.

21. With regards to the Ecological Context Criteria the connectivity of a terrestrial site is an important consideration, especially in a world with a changing climate. However, connectivity has a different meaning and value in the freshwater and marine environments as species migrate up and down waterways to spawning areas and marine larvae are often free floating until they settle. In my opinion separate terrestrial, freshwater and marine connectivity criteria are appropriate, representing the differences of meaning that concept has in each of those environments.

22. I am not convinced there is a sound ecological justification for why wetlands have been singled out as many ecosystems besides wetlands have effects in surrounding areas such as forests being seed sources, reservoirs of biodiversity,

slowing the movement of water and creating shelter from wind. I feel that this concern for wetlands is adequately captured in criteria (i), (ii), (iii), but could accept the wording if it explained what the intrinsic or provisioning features of wetlands are which makes it important to single them out. One possibility would be to use the words “A wetland which plays an important hydrological role in the natural functioning of a downstream waterway or coastal ecosystem.” This would make clear exactly what the wetland value was that gave rise to significance. Without this there is a risk that wetlands which provide low value to surrounding areas (such as many of the small and highly degraded wetlands in the Macraes ED) are inappropriately ascribed value they do not possess.

Consistent interpretation and application of criteria

23. Regardless of the criteria that are finally adopted there is a need to ensure the revised criteria will lead to accurate and consistent identification of areas deserving of being classified as significant and will not lead to the misidentification of areas that should not be classed as significant. The expert witness caucusing did not have sufficient time to undertake such an analysis. This work is important because no full analysis has been done on the extent and representativeness of biodiversity in Otago, the threats it faces, and the positive contributions to biodiversity maintenance and enhancement that are currently being made by a multitude of individuals and groups. In short, if the criteria are not appropriately worded and the bar is set too low, then there is a risk that areas that are classified as an SNA or as significant are not considered as being of actual ecological importance by the ecologists. Accurately identifying significant areas is also important when activities are constrained to avoid areas which are unreasonably classified as significant areas. If the area is not actually significant then property rights and legal activities are being unduly constrained.

OceanaGold activities in the Macraes area

24. As noted earlier I have been providing ecological advice to OceanaGold at their Macraes Mine for 7 years, including in relation to managing the effects of proposed mining developments to achieve positive biodiversity outcomes. I have no doubt that with appropriate access to the full effects management hierarchy, including sensible flexibility in applying the mitigation hierarchy good environmental outcomes are likely to be achieved in projects such as those undertaken by Oceana Gold. In past projects such as the recent Deepdell North project, a practical approach focussed on achieving good outcomes has resulted in meaningful biodiversity conservation in the Macraes E.D. As our knowledge on how to effectively manage biodiversity increases, and technological advances are made, I believe that even more meaningful biodiversity conservation is certain to result.
25. It is probable that all future development projects at Macraes (including 'brownfield' developments) will unavoidably affect significant areas, regardless of the way the significance criteria are finally framed in the pORPS (or as they will be framed when overtaken by the NPS-IB). Therefore it is important that important locationally-constrained activities such as mining at Macraes are able to use the full mitigation hierarchy to fully address unavoidable effects on significant biodiversity.

Response to Dr Lloyd's written answers dated 12 April 2023

26. I offer the following comments in response to Dr Lloyd's answers to the written questions posed to him by the Panel:
- a. In his answer to Commissioner Cubitt's Question 1 he states that there has been significant recent loss of indigenous vegetation in the Macraes ED caused by pastoral farming and mining.

Pastoral farming's ecological footprint in the Macraes ED is much greater than that of mining, and indigenous vegetation losses are unlikely to be equally shared across the two activities. Dr Lloyd also does not mention the various extensive biodiversity enhancements that have offset or compensated for losses of terrestrial biodiversity values resulting from OceanaGold's mining at Macraes. It is not fair to look at just one side of the coin and omitting the investments OceanaGold has made to produce enduring benefits. I also note that Dr Lloyd does not mention the rapid growth in areas under exotic pine forest in the Macraes E.D.. These areas support very low indigenous biodiversity value.

- b. In his answer to Commissioner Cubitt's Question 10 he refers to ephemeral wetlands in the Macraes ED. I agree that most ephemeral wetlands are small. I also agree they are of variable ecological value, and the location of many of them on relatively flat land makes them vulnerable to cultivation and farming development. I agree that many are dominated by exotic pasture grasses, but not always species that are on the National List of Exotic Pasture Species which is a requirement for an area to be excluded from the definition of a 'natural inland wetland'. I agree that some ephemeral wetlands provide habitat for Threatened and At Risk species. In my opinion it is important not to assume that all ephemeral wetlands are important or of equal value. The ecological value of an ephemeral wetland needs to be considered on a case by case basis. For example, OceanaGold's Deepdell North development involved the loss of several small ephemeral wetlands. These wetlands had little ecological value, and their loss is being offset and compensated for by major enhancement of another large ephemeral wetland (in fact the largest ephemeral wetland in the Macraes ED).

- c. In answer to Commissioner Sullivan's Question 1 he says that the areas I list in Table 3 of my evidence as likely qualifying as significant are not accurate. I have addressed this matter above, and while I do not accept Dr Lloyd's criticisms the more important consideration is to ensure the representativeness criterion is expressed correctly. What I would emphasise though is that the Council should have (but didn't) undertake any assessment at all of what the application of the criteria they were proposing would mean in practice. To the extent that another ecologist (Dr Lloyd) would make different assumptions on the information I presented only serves to emphasise the importance of expert judgement, and the importance of having a guide to interpreting the criteria available for all ecologists to consult. Without it – and as is currently the case – ecologists will continue to have to use their own judgement on a range of matters. That means we will continue to differ in our significance conclusions, and much energy and money will be wasted arguing about details that really should be settled.

Michael Thorsen

17 April 2023

pORPS text	My proposal	Reasoning
<p>An area is considered to be a significant natural area if it meets any one or more of the criteria below:</p>	<p>An area is considered to be a significant natural area if it meets any one the threshold for the rarity criterion or two or more of the other criteria below:</p>	<p>Meeting only one criteria is a low bar when considering common seral vegetation communities</p>
<p>Representativeness (a) An area that is an example of an indigenous vegetation type or habitat that is typical or characteristic of the original natural diversity of the relevant ecological district¹ or coastal marine biogeographic region. This may include degraded degraded² examples of their type or represent all that remains of indigenous vegetation and habitats examples of their type or represent all that remains of indigenous vegetation and habitats of indigenous fauna in some areas.</p> <p>(b) An indigenous marine ecosystem (including both intertidal and subtidal habitats, and including both faunal and floral assemblages) that makes up part of at least 10% of the natural extent of each of Otago's original marine ecosystem types the environmental of indigenous fauna in some areas and reflecting the environmental gradients of the region.³</p> <p>(c) An indigenous marine ecosystem, or</p>	<p>(a) An area that is an example of an indigenous vegetation type or habitat that is typical or characteristic of the original pre-human natural diversity of the relevant ecological district or coastal marine biogeographic region. This may include degraded degraded degraded examples of their type or represent all that remains of indigenous vegetation and habitats of indigenous fauna in some areas. This can include degraded examples where they are some of the best remaining examples of their type. All agree</p> <p>(b) An indigenous marine ecosystem (including both intertidal and sub-tidal habitats, and including both faunal and floral assemblages) that makes up part of at least 10% of the natural extent of each of Otago's original marine ecosystem types and reflecting the environmental gradients of the region.</p> <p>(c) An indigenous marine ecosystem, or habitat of indigenous marine fauna (including both intertidal and sub-tidal habitats, and including both faunal and floral components), that is characteristic</p>	<p>(a) "Pre-human" is more specific than "original" which could apply to many historic timeframes, this sets a clear baseline for assessment. As worded referring generally to degraded examples would have captured too much. The wording "all that remains" is a consideration under the rarity criterion.</p> <p>Note my concern about application of this criteria to common seral vegetation communities if significance is met by meeting one criterion only.</p> <p>(b) Deleted because impractical and immeasurable – not formulated in a way that could be evaluated sensibly.</p> <p>(c) Delete. This would have the effect of making any and all marine ecosystems significant (including</p>

<p>habitat of indigenous marine fauna (including both intertidal and sub-tidal habitats, and including both faunal and floral components), that is characteristic or typical of the natural marine ecosystem diversity of Otago.</p>	<p>or typical of the natural marine ecosystem diversity of Otago.</p>	<p>intertidal habitats). NEW POSITION</p>
<p>Rarity (d) An area that supports: (i) An indigenous species that is threatened, or uncommon, or an important population of species that is⁴ at risk risk,⁵ or uncommon, nationally or within an ecological district⁶ or coastal marine biogeographic region, or (ii) Indigenous vegetation or habitat of indigenous fauna that has been reduced to less than 20% of its former extent nationally, regionally or within a relevant <i>land environment</i>, ecological district,⁷ coastal marine biogeographic region or <i>freshwater environment</i> including <i>wetlands</i>, or (iii) Indigenous vegetation and habitats within originally rare ecosystems,⁸ or (iv) The site contains indigenous</p>	<p>(d) An area that supports: (i) An indigenous species that is Threatened*, or uncommon, or an important population of species that is At risk Risk, or uncommon, nationally or within an ecological district or coastal marine biogeographic region, or (ii) - Indigenous vegetation type or habitat of indigenous fauna that has been reduced to less than 20% of its pre-human extent nationally, regionally or within a relevant <i>land environment</i>, ecological district, coastal marine biogeographic region or <i>freshwater environment</i> including <i>wetlands</i> – VK, BM, MT (iii) Indigenous vegetation and habitats within originally rare ecosystems** - all agree,⁹ or (iv) The site contains indigenous vegetation or an indigenous species that is endemic to Otago or that are at distributional limits within Otago.⁹—all agree</p> <p>*add footnote – as defined in the NZTCS **as defined in Williams et al 2007.</p>	<p>(i) Wording amended to give consistency to guiding documents</p> <p>(ii) This should have a regional focus not a national one as this can use more accurate information.</p> <p>(iii) Removed as a duplicate of other criteria.</p>

<p>vegetation or an indigenous species that is endemic to Otago or that are at distributional limits within Otago.⁸</p>		
<p>Diversity</p> <p>(e) An area that supports a high diversity of indigenous ecosystem types, indigenous <i>taxa</i> or has changes in species composition reflecting the existence of diverse natural features or gradients.</p>	<p>(d) An area that supports a high diversity of indigenous ecosystem types, <u>or indigenous taxa in the context of similar areas and similar ecosystem types</u> or has changes in species composition reflecting the existence of diverse natural features <u>or gradients</u>. KL, HS, MR, MT, BM</p>	<p>(e) “gradients” was redundant. The text “in the context of similar areas and similar ecosystem types” was added to give a benchmark for assessing “diversity”.</p>

<p>Distinctiveness</p> <p>(f) An area that supports or provides habitat for:</p> <ul style="list-style-type: none"> (i) Indigenous species at their distributional limit within Otago or nationally, or (ii) Indigenous species that are endemic to the Otago region, or (iii) Indigenous vegetation or an association of indigenous species that is distinctive, of restricted occurrence, or has developed as a result of an unusual environmental factor or combinations of factors. 	<p>(f) An area that supports or provides habitat for:</p> <ul style="list-style-type: none"> (i) Indigenous species at their distributional limit within Otago or nationally, or – VK, MT (ii) A population of Indigenous species that are endemic to the Otago region, or VK, BM, MT, KL, MR, SH, ZL, HR, GP, (iii) Indigenous vegetation or an association of indigenous species that is distinctive, of restricted occurrence, or has developed as a result of an unusual environmental factor or combinations of factors. – all agree. <p>Reasons: “distinctive” is a tautology</p>	<ul style="list-style-type: none"> (i) Distribution limits not a reasonable ecological consideration. Also better expressed in the endemicity criterion. (ii) An individual of an endemic species is not considered ecological important
<p>Ecological context</p> <p>(g) The relationship of the area with its surroundings (both within Otago and between Otago and the adjoining regions), including:</p> <ul style="list-style-type: none"> (i) An area that has important connectivity value allowing dispersal of indigenous flora and fauna between different 	<p>(g) The relationship of the area with its surroundings (both within Otago and between Otago and the adjoining regions), including:</p> <p>- all agree because already requires consideration of an areas surroundings.</p> <ul style="list-style-type: none"> (i) An area that has important connectivity value allowing dispersal of indigenous flora and fauna between different areas, or – all agree – with notes 	<ul style="list-style-type: none"> (i) Agree with (i) in context of terrestrial situations but not freshwater or marine as “connectivity” is different in those situations

<p>areas, or</p> <p>(ii) An area that has an important buffering function that helps to protect the values of an adjacent area or feature, or</p> <p>(iii) An area that is important for indigenous fauna during some part of their life cycle, either regularly or on an irregular basis, e.g. for feeding, resting, nesting, breeding, spawning or refuges from predation, or</p> <p>(iv) A wetland which plays an important hydrological, biological or ecological role in the natural functioning of a river or coastal ecosystem.</p>	<p>(ii) An area that has an important buffering function that helps to protect the values of an adjacent area or feature <u>of significant indigenous vegetation or significant habitat of indigenous fauna</u>, or</p> <p>– all agree</p> <p>(iii) An area that is important for <u>a population of indigenous fauna during some a critical part of their life cycle, either seasonally or permanently regularly or on an irregular basis</u>, e.g. for feeding, resting, nesting, breeding, spawning or refuges from predation, or</p> <p>– all agree</p> <p>(iv) <u>A wetland which plays an important hydrological role in the natural functioning of a downstream waterway or coastal ecosystem.</u></p>	<p>(v) <u>Delete (iv) as it is redundant and captured by multiple criteria, or reword to “A wetland which plays an important hydrological role in the natural functioning of a downstream waterway or coastal ecosystem.”</u></p>
<p><u>Vulnerable and sensitive species</u></p> <p><u>(h) An area that contains sensitive habitats or species that are fragile to anthropogenic effects or have slow recovery from anthropogenic effects.</u></p>	<p><u>Vulnerable and sensitive species</u></p> <p><u>(h) An area that contains sensitive habitats or species that are fragile to anthropogenic effects or have slow recovery from anthropogenic effects.</u></p>	<p>Delete because the clause (in particular references to ‘fragile and slow recovery to anthropogenic effects’) relates to managing effects instead of identification of significance; effects should be managed by the policy framework. – VK, SH, MT, HG, BM, GP, ZL, MR, KL</p>