BEFORE THE OTAGO REGIONAL COUNCIL

AND

BEFORE THE WAITAKI DISTRICT COUNCIL

AND

BEFORE THE DUNEDIN CITY COUNCIL

ORC File No: RM16.138

IN THE MATTER	**Of the Resource Management Act 1991**
AND	
IN THE MATTER	**Of Applications by Oceana Gold (New Zealand) Limited for various resource consents for the Coronation North Mine Project, Macraes Flat**

Expert Evidence of Brian David RANCE on Behalf of the Director-General of Conservation Dated 21 October 2016

Department of Conservation

Planning Shared Services

Private Bag 4715,

Christchurch Mail Centre, CHRISTCHURCH 8053

Solicitor: P D Williams

DOC-2890278

STATEMENT OF EVIDENCE

QUALIFICATIONS AND EXPERIENCE

1 My full name is Brian David Rance. I am one of the ecological witnesses presenting evidence on behalf of the Director-General of Conservation.

2 I am employed by the Department of Conservation (the Department) as a Technical Advisor – Ecology based in its Invercargill District Office. I have been employed by the Department in various roles since its inception in April 1987. Before this I was employed by Lands and Survey Department and the University of Otago.

3 In my current role I have responsibilities for terrestrial ecosystems and species. I have a national role, although I have a focus on the Department's Southern South Island Region which includes much of Otago including the area of the Coronation North mine proposal. I am responsible for contributing to the assessment, management, conservation and restoration of ecosystems, flora and threatened species (particularly vascular plants) nationally and regionally.

4 I have extensive knowledge of the ecosystems, habitats, vegetation, flora and threatened plants, geography, landforms, and biogeography of Southern New Zealand. I have built up this knowledge from field work throughout Southern New Zealand over many years from both professional and recreational involvement. I have worked within a wide range of ecosystems within Otago and Southland. I have extensive experience with assessing ecological values and have undertaken many botanical/ecological assessments for a wide range of activities on Public Conservation Land (PCL), Crown pastoral lease lands and private land throughout Otago and Southland.

5 I have a sound knowledge of threatened plant species, including their ecology, distribution and threats within Otago and Southland. I was on the national threat assessment panel for Vascular Plants resulting in the 2004 threat classification revision. I contributed to threat classification revisions for the 2008, 2012 and 2016 revisions. I am a member of the New Zealand Plant Conservation Network and the Otago Botanical Society.

6 I have a Bachelor of Science (Hons) botany from the University of Otago in 1984.

7 Together with my wife, Chris, I have been awarded the Loder Cup (which is awarded annually to individuals and groups who have made significant contributions to plant conservation work in New Zealand) for outstanding achievements in plant conservation in establishing a community garden and nursery for threatened Southland plants, and a Queens Service Medal (QSM) for services to conservation.

8 I have visited the site in inspections undertaken on 12th July and 14th September 2016. These inspections were to overview the application area and investigate potential mitigation sites/options proposed by the company.

9 The literature or other material which I have used or relied upon in support of my opinions in this evidence are as follows:

a) The section 42A Recommending report and recommended consents (including attachments).

b) The evidence of Debbie Clark and Dr Michael Thorsen on behalf of Oceania Gold Ltd.

c) The evidence of Laurence Barea, Lynn Adams, and Herb Familton on behalf of the Director-General of Conservation.

d) The references listed in the references section.

CODE OF CONDUCT

10. I confirm that I have read the code of conduct for expert witnesses as contained in the Environment Court's Practice Note 2014. I have complied with the practice note when preparing my written statement of evidence, and will do so when I give oral evidence before the Hearing Panel.

11. The data, information, facts, and assumptions I have considered in forming my opinions are set out in my evidence to follow. The reasons for the opinions expressed are also set out in the evidence to follow.

12. Unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

SCOPE OF EVIDENCE

13. My evidence will cover the following areas:

    (a) Ecological Context (overview of the ecology and biodiversity values of the Project Impact Area and Macraes Ecological District).

    (b) Assessment of the vegetation of the Project Impact Area and its significance.

    (c) Assessment of the flora and Threatened, At Risk, Data Deficient and notable plants of the Project Impact Area and their significance.

    (d) Measures to address effects on ecosystems, habitats, flora and threatened plants.

    (e) Section 42A report relating to ecosystems, habitats, flora and threatened plants.

    (f) Comments on applicant's evidence.

    (g) Conclusions.

ECOLOGICAL CONTEXT

14. The Coronation North Oceania Gold Ltd application area ('the application area") lies within the Macraes Ecological District (Macraes ED). The Macraes ED is one of 268 ecological districts that comprise the 85 ecological regions in New Zealand (McEwen 1988). These ecological districts and regions have been identified based on topography, geology, soils, climate, vegetation, and other biological features. The Macraes ED is one of four ecological districts that comprise the Lammerlaw Ecological Region (ER). The Macraes ED is a large land area to the east of the Central Otago ER, being approximately 95,000 ha in extent (Bibby, 1997).

15. The Protected Natural Areas Programme (PNAP) was an ecological survey programme initiated by the New Zealand government in 1983 with the goal to identify and protect representative examples of a full range of ecosystems of New Zealand. PNAP surveys were carried out based on ecological districts and regions framework.

16. The Macraes ED was surveyed under the PNAP during the summer of 1994-95. The results from this ecological survey were published in a PNAP report in 1997 (Bibby, 1997). It represents the first and to date, most comprehensive survey of the ecological values of the Macraes ED. Therefore, it provides a useful context for discussion on the ecological values of the application area and the entire ecological district.

17. Macraes ED includes the Taieri Ridge and has a complex dendritic drainage pattern. The district extends from c. 80 m asl to 820 m asl at Highlay Hill. The geology is predominantly schist, although there are patches of volcanic rock (principally basalt). Gold resource is found in areas of the schist geology.

18. Past vegetation of the Macraes ED comprised a range of ecosystems including montane short tussocklands grading into subalpine tall snow tussockland, with some areas of coprosma-flax scrub, kanuka forest and some hardwood forest with minor podocarp element at higher altitudes (McEwen, 1988). Vegetation sampling and analysis undertaken as part of the PNAP survey identified thirteen vegetation communities in the Macraes ED (Bibby, 1997).

19. Removal of the dominant original forest cover is considered to have begun through natural fires 2500 years ago (McGlone, 1989). Deforestation was exacerbated by Polynesian fires, and by the time the time of European settlement (around 1840) about half of the original extent of forest had been destroyed and replaced by tussock grassland and shrubland (Bibby, 1997). European settlement and pastoral activity including grazing, burning, cultivation, top dressing and over-sowing, has heavily reduced remaining native vegetation. Much of the remaining vegetation has a varying level of modification. In the PNAP survey report it is stated that at the time of the PNAP survey approximately 50% of the district had been cultivated or modified to the extent that it could be considered exotic pasture (Bibby, 1997).

20. A combination land cultivation, intensification of land use, forestry, and mining all contribute to the ongoing loss and modification of indigenous vegetation and habitats within the Macraes ED. This modification is exacerbated by the impacts of pest and other exotic plants and animals. I consider that cumulatively these activities threaten the survival of some ecosystems within Macraes ED.

21. There are relatively few natural areas with protection present within Macraes ED, and I consider the extent of protected natural areas to be limited, being only c. 2065

ha or < 2.2% of the Macraes ED. This includes some areas previously covenanted by OGL which are the only protected areas located in the north of the Macraes ED, where the site is located.

22. The Macraes ED PNAP survey recorded a flora of 427 vascular plant species, including 356 indigenous species. This flora has subsequently been increased through additional survey. I consider this flora to be relatively diverse for an ecological district of its size, given the limited altitude range and the extend of modification. The flora also contains many Threatened and At Risk species. (Note: I append information on the Threat classification system in Appendix 1 and discuss threatened plants related issues in greater detail later at paragraphs 35 - 39 below).

23. The Macraes ED PNAP report identified a total of twenty Recommended Areas for Protection (RAP), see Appendix 2. One of the RAP's is Macraes RAP 4 – Trimbells Gully, which is in the headwaters of Trimbells Creek (see Appendix 2 for description of the Timbell's Gully RAP). This RAP overlaps with the PIA, a map showing this overlap is presented as Appendix 3.

24. The Macraes mine was first commissioned in 1990. The mine is the largest goldmine operating currently in New Zealand. Mining operations continue using open pit methods combined with an underground mine. Several pits have been established and mined, the Coronation project being the most recent. Each pit contributes to the cumulative destruction and permanent loss of additional pre-existing vegetation and associated biodiversity including threatened species.

25. The current project involves several elements that will result in the loss of indigenous vegetation, ecosystems, and the habitat for threatened flora and fauna including threatened species. These are:

- An extension of the existing consented Coronation Pit, being an increase in area from 62 ha to 85 ha (an increase of 23 ha).
- Establishment of a new open pit (Coronation North Pit), which will cover an involve an estimated maximum potential of 63 ha.
- A new waste rock stack (Coronation North Waste Rock Stack) a maximum potential area of 230 ha.
- A freshwater dam that may be constructed in the Coal Creek catchment.

- Road realignment and establishment of new haul roads and other sundry disturbance.

I acknowledge the existing Coronation Waste Rock Stack will be reduced from its consented size. The size is estimated to reduce from 105 ha to 41 ha, being a reduction in area of 64 ha. In addition, there are some more recent amendments.

ASSESSMENT OF THE VEGETATION OF THE PROJECT IMPACT AREA AND ITS SIGNIFICANCE

26. The ERA Coronation North Ecological Impact Assessment report – vegetation, avifauna and herpetofauna report (Thorsen, 2016b report) discusses the vegetation, its significance, and the ecological effects from the proposal. I consider this report to adequately assess the ecological impacts upon these values associated with the PIA (including the Coal Creek dam and associated reservoir footprint).

27. The Thorsen, 2016b report identified and mapped ten vegetation communities as being present in the mine and associated waste rock stack PIA, eight of these vegetation communities are predominantly indigenous vegetation: riparian herbfield & sedgeland, basalt contact seepage wetlands, ephemeral wetlands, seepage and flush wetlands, short tussock grassland, narrow-leaved snow tussock grassland, shrubland, and bluff vegetation. The other two communities present are exotic pasture and disused *Pinus radiata* plantation. The most extensive vegetation community present is narrow-leaved snow tussock grassland which covers c. 230 ha of the PIA.

28. In relation to the Coal Creek dam, the ERA Coronation North Ecological Impact Assessment report (Thorsen, 2016a) identified five vegetation communities associated with the dam and associated reservoir footprint that are present: riparian herb along stream and stream flat sedges and grasses; *Carex coriacea* sedgeland (2.5 ha together); bluff herb and shrub vegetation on schist bluffs (0.2 ha); gully slope shrublands; and mixed vegetation (10.9 ha together, 3 ha of which is shrubland). These vegetation communities have ecological importance (see photos in Appendix 5).

29. In total, ERA Coronation North Ecological Impact Assessment reports (Thorsen, 2016 a & b) identified 11 indigenous vegetation communities. These communities represent 6 of the 13 vegetation types recognised in the Macraes ED PNAP survey

report (Bibby, 1997), that are present in the PIA. Therefore, I consider the vegetation of the PIA to be relatively diverse and highly representative of the Macraes ED. However, both the Thorsen 2016 report vegetation descriptions are at a finer scale reflecting local site factors and better reflect the rich diversity of vegetation that is present in the PIA.

30. Both Thorsen 2016 reports assess the standard ecological assessment criteria and the National Biodiversity Priorities (MfE, 2007). Overall the vegetation communities present with the PIA are assessed as being of very high ecological importance. I agree with this assessment.

31. Features of the vegetation within the PIA include:

- Extensive narrow-leaved snow tussocklands. This community is highly representative of the Macraes ED and has suffered extensive loss and or modification which is ongoing.

- A variety of wetlands are present in the PIA. Wetlands are a feature of National Importance (MfE, 2007). Two of the wetland types present are ephemeral wetlands and seepages and flushes which have been classified as Naturally uncommon ecosystem types (Williams et. al, 2007). Naturally uncommon ecosystems are also a feature of National Importance (MfE, 2007).

- Ephemeral wetlands which have been classified as Critically Endangered (Holdaway et. al, 2012), while seepages and flushes which have been classified as Critically Endangered (Holdaway et. al, 2012).

- Further the loss of wetlands resulting from this project will contribute to the ongoing loss of wetlands, which are an ecosystem class that have suffered severe reductions at local, regional and national levels.

- Rock outcrops and bluffs. These have a characteristic flora which includes several threatened species (I will discuss these later in my evidence). They also form a distinctive landform feature.

- Approximately 353 ha of the PIA has been classified as an Acutely Threatened LENZ unit (i.e. less than 10% of the area remaining in

indigenous vegetation remaining), and a further 0.6 ha as Chronically Threatened LENZ unit (i.e. between 10 and 20 % % of the area remaining in indigenous vegetation remaining) (Thorsen, 2016b). The protection of threatened LENZ units (both Acutely and Chronically threatened) is a national biodiversity priority (MfE, 2007).

32. The eastern half of the waste rock stack area will cover c. 108 ha of the Trimbells Gully RAP (564 ha) identified in 1994/95 and has regional significance (this figure is less than the proposed 144 ha as a consequence of recent amendments to the waste rock stack area made by OGL – see map in Appendix 3). Since its designation as an RAP it has continued to be grazed and has been burnt resulting in some modification. Particularly, a reduction of tussock size (stature) and a loss of inter tussock native plant cover. Despite this the tussock cover remains high and I consider that the tussockland has a good ability for recovery with appropriate management. Therefore, I still consider it to be one of the best stands remaining in the Macraes ED and to continue to have high ecological importance (see photos in Appendix 5).

33. The Thorsen, 2106b report states that the project impact upon vegetation communities "*is assessed as having an adverse, direct, permanent, irreversible, local impact on vegetation communities, with a national impact or the rarer vegetation communities*." Also the report states "*T[t]he magnitude of the projects impacts on the areas vegetation communities at a local scale is assessed as high, and at a national level is high*." Further the report states "*T[t]he overall degree of the project's effect on these communities is very high*." I agree with these assessments.

ASSESSMENT OF THE FLORA AND THREATENED, AT RISK, DATA DEFICIENT AND NOTABLE PLANTS OF THE PROJECT IMPACT AREA AND THEIR SIGNIFICANCE

34. The Thorsen 2106b report states that a flora of 163 indigenous species has been recorded in the PIA. This represents 39% of the indigenous flora of the Macraes ED. The report assessed the botanical diversity importance as high. I agree with this assessment as the flora is both very diverse and highly representative of the Macraes ED.

35. The list of threatened, uncommon and notable plants known from Macraes ED totals 84 taxa (Thorsen, 2008), including 36 Nationally Threatened or Uncommon

species and Data Deficient taxa. These are comprised of 6 Threatened, 3 Serious Decline, 6 Gradual Decline, 15 Sparse and 6 Data Deficient taxa (de Lange et. al, 2004). Based on this very high diversity of threatened plants Thorsen proposed that this may be the highest concentration of Threatened plants in New Zealand.

36. Since the Thorsen 2008 paper, additional Threatened and At Risk species have been recorded, including as part of assessments for the Coronation North mine proposal. Therefore, I have updated this list and reviewed it using the most recent vascular plant threat classification listing (de Lange et. al, 2013). The list now includes 49 nationally Threatened, At Risk or Data Deficient taxa. Of these 20 are known from the PIA (including the Coal Creek dam impact area). Therefore, the PIA is considered very important for plant conservation nationally, regionally, and locally.

37. The Thorsen reports record and discuss the 28 Nationally threatened, At Risk, Data Deficient or otherwise notable species within the PIA. These include seven Threatened species (being one Nationally Critical species (*Simplicia laxa*) and six Nationally Vulnerable species), six Declining status species, five Naturally Uncommon species, two Data Deficient status species and eight other notable species.

38. Figure 5 of both Thorsen 2016 reports show the distribution of where he recorded rare and notable species within the PIA. From the distribution shown on this map I consider that it is highly likely that there will be additional sites for these species. In addition, it is possible that additional rare and notable species could be present.

39. The Thorsen 2016 reports assess the ecological importance for the populations of the rare and notable species within the PIA. The seven threatened species are assessed to have very high ecological importance. The six Declining status species are assessed to have high ecological importance. The five Naturally Uncommon species are assessed to have moderate-high ecological importance. While the two Data Deficient species are assessed to have moderate ecological importance. I am in general agreement with and support this assessment, in particular, I support the very high importance given. I also support the additional detail and comments made by Dr Kelvin Lloyd in the section 42A report.

MEASURES TO ADDRESS EFFECTS ON ECOSYSTEMS, HABITATS, FLORA AND THREATENED PLANTS

40. OGL has proposed an ecological mitigation package. I have reviewed this and I consider the proposed package to have some deficiencies.

41. The RMA provides for sustainable management while avoiding, remedying, or mitigating any adverse effects of activities on the environment. My colleague Dr Laurence Barea discusses the mitigation hierarchy in greater detail.

42. I am very pleased that OGL have made some amendments to the design and extent of the waste rock stack in their evidence. I accept that this will reduce the impact upon threatened plants and important vegetation. However, a substantial area of the Trimbells Gully RAP (c.108 ha) and many threatened plant sites are still to be covered by the waste rock stack.

43. The eastern portion of the waste rock stack encroaches on the Trimbell's Gully RAP. The location of the waste rock stack serves to fragment the RAP and so impact upon the integrity of the RAP. The area to the west of waste rock stack has lesser ecological values and should be considered as an ecologically more acceptable alternative.

44. I support the establishment of protective covenants over areas of indigenous vegetation identified to have ecological importance. These will add to the existing limited extent of legally protected natural areas. Further I consider these covenants to be a primary compensation mechanism. However, there are some areas that could be added or additional actions which should be taken to improve the ecological gains achieved by these protective covenants.

45. The Highlay Hill proposed protection area (covenant) is dominated by narrow-leaved snow tussockland, with areas of wetlands (seepages) and boulderfield. I consider this to be highly appropriate as compensation, as it is broadly "like for like". That is, the dominant vegetation present has similarities with that being lost. It is also near to the PIA. However, it is centred on Highlay Hill, which is at the highest point in the Macraes ED. I consider this area to have limited use in terms of grazing, mining, or other development opportunity, meaning it is not threatened by intensive land use practices in the near future. Therefore, placing a covenant on the site offers limited additional gains to compensate for the loss of values in the Trimbells Gully RAP.

This aspect is also discussed by my colleague Dr Barea and I agree with his assessment.

46. I consider the Highlay Hill proposed protection area to have inadequacies, particularly in its extent (as it is estimated to be only 83 ha), compared to the 108 ha of the Trimbell's Gully RAP that is to be lost. I also have concerns about its boundaries and its composition. However, these deficiencies could be resolved with the following amendments:

- Expanding the area to be protected – Currently it includes only c.19 (3.4%) ha of the Trimbells Gully RAP (total area of 564 ha) compared to the 108 ha (19.1%) that that is proposed to be lost in the PIA.
- Expanding to include additional wetland areas to compensate for the almost 6 ha proposed to be lost (Thorsen, 2016b).
- Addressing the bias in geology type – Currently it includes mainly basalt geology, whereas the project impact area is mainly schist geology. The rock type is a major factor in determining soil characteristics. Both basalt and schist geology weathers to produce a reasonably fertile soil. However, the soils of each have some different properties which result in some differences expressed in the vegetation occurring on them. Schist derived soils tend to have limited macro porosity and therefore a greater water holding capacity. Therefore, schist soils tend to be summer dry and winter saturated. This difference can result in a greater propensity for wetland formation on gentle surfaces where water logging is more likely to occur. In addition, schist weathers to create a greater diversity of habitat than basalt. Schist geology supports some species that do not occur on basalt geology, including the threatened species *Simplicia laxa, Annogramma leptophylla* and *Carex inopinata*.
- An expansion in topographical diversity – The identified protection area is primarily on moderately steep hill slopes, the inclusion of some of the gentler summit plateau area would add ecological diversity and to be more representative of the area that is proposed to be lost in the project impact area.
- Additional diversity of aspect – The identified protection area is primarily on the south-eastern slopes/aspect, the inclusion of a greater area on other aspects would add ecological diversity and to be more representative of the area that is proposed to be lost in the PIA.

47. Therefore, I recommend the inclusion of some additional areas. These are:

- Addition of an area to the west, being c. 19.3 ha. and/or
- Addition of an area to the west, being c. 15.9 ha.

I attach a map showing potential boundary changes in Appendix 4.

48. The Island Block (Deepdell Gorge) proposed protected area primarily contains steep slopes with abundant rock outcropping and rubble and gorge. The principal vegetation present is indigenous shrubland and regenerating forest with areas of exotic broom shrubland. Therefore, I consider it to be "like for unlike", that is, the vegetation present is not like that being lost. Other considerations include:
    - It is a moderate distance from the PIA.
    - The area is actively regenerating despite the current light grazing levels; therefore, a destocked covenant offers limited additionality. However, I accept that there are several palatable native species present (i.e. species attractive to browsing animals).
    - The area is likely to require management to control weed species of broom, wilding pines and possible additional species.
    - There is limited commitment to ongoing conservation management.

49. I also seek to confirm the inclusion of some areas/values within the Island Block protected area. In particular that a small totara (*Podocarpus laetus*) stand near to southern boundary of the covenant is included. Totara is rare within the Macraes ED and is considered to have formed part of the original forest composition of the area. Therefore, its protection is important to protect the seed source for future forest regeneration.

50. Despite these matters I consider the proposed area to be relatively large (288 ha), to contain important ecological values worthy of protection and to be complementary to the Highlay Hill area.

51. The proposed ecological mitigation package includes reference to planting tussock species on rehabilitated land. However, there is no detail provided as to the extent of this work, ecological or other targets, monitoring, review or success. This results in uncertainty of ecological outcomes.

52. There has been no survey or assessment of invertebrates, non-vascular plant species (i.e. mosses and liverworts) or some other taxonomic groups (e.g. lichens). In

addition, the significance of these taxonomic groups has not been assessed. There will certainly be a range of a range of invertebrate species and other species present reflecting the diversity of vegetation and ecosystems present. Some of these species will be important in contributing to ecosystem function (e.g. pollination, decomposition and nutrient cycling processes). Therefore, it is appropriate to mitigate for the loss of these species from the PIA. The protection of a range of habitat is considered appropriate to compensate for the loss of these species of these taxonomic groups, particularly if it is "like for like".

53. I consider there to be inadequate compensation proposed by the applicant for the Coal Creek dam and associated irrigation dam (if it proceeds). Currently the only mitigation proposed is for native fish species. Other mitigation that should be required includes:

- That the dam, associated adjacent rock outcrop systems and wetlands should be fenced to exclude stock (see photos in Appendix 5).
- That areas of valley floor wetland similar to those that are to be lost should be identified and then legally and physically protected.

54. Some mitigation for Threatened, At Risk and other notable species is proposed by the applicant. The translocation of plant species is a complex issue with many aspects to be assessed. I consider there to be several deficiencies with the mitigation proposed. In particular:

- 15 of the 28 Threatened, At Risk, Data Deficient and other notable species recorded from the site are proposed to have conservation management undertaken. It is pleasing that that OGL have increased the number of threatened and At Risk species to have management undertaken.
- The proposed management is to cultivate and plant out 20 plants of each of the listed species.
- Monitoring is proposed for only three years.
- There is a lack of clear management, monitoring and review targets.
- There is no requirement for a management plan to provide clarity around the work to be undertaken.

An example of my concern is that under the proposed management the 20 plants could be planted out and even if none survived for three years this would achieve the proposed condition target as worded.

55. I consider the conservation management actions and targets suggested by OGL are not appropriate or sufficient. Actions which could address these deficiencies include:

- The target number of plants to be established or translocated and the number of sites required for each species should be tailored to each individual species. This would be dependent upon the plant's ecology, threats to the species, likelihood of success and other factors.
- The method of propagation and translocation would vary for the individual species. Some species would be best grown from seed, others from cuttings or division, and some from both. Some species could rely on direct seeding rather than propagation and planting out (e.g. *Pachycladon cheesemanii*, *Senecio dunedinensis* and *Cardamine bilobata*). I note that *Coprosma intertexta* is dioecius (that is have separate male and female plants) therefore cultivating from a single plant would result in a single sex population being grown. For this species it is important that both sexes are evenly represented in the translocated population.
- Some species could utilise direct transfer to salvage and use the plants that will otherwise be destroyed. However other species could be salvaged and taken into cultivation for later planting or for seed harvest.
- Some species may require additional management. In particular, highly palatable species may need to be caged or otherwise protected from browsing animals e.g. *Pachycladon cheesemanii*, *Carmichaelia corrigata* and coral broom (*Carmichaelia crassicaule* ssp. *crassicaule*).
- There should be appropriate monitoring allowing for review of methods to be utilised (i.e. adaptive management) to ensure the best results or outcomes for each species.
- It is important that the project involves appropriately skilled personnel, requiring both plant propagation and threatened plant ecological skills.
- There must be an assessment of suitable sites to undertake the translocation to. These sites should ideally be protected both legally and physically (i.e. fenced to exclude stock). Also they should be free of weeds or other imminent threat.

The additional clarity and detail sought above could be included within the proposed Coronation North Ecological Management Plan or a separate Coronation North Threatened Plant Restoration Plan.

SECTION 42A REPORT

56. The section 42A Recommending report summarises the application. It does include some additional information and I will comment on the some of this additional information.

57. The response to the Request for further information - letter from Jackie St John/John Bywater of OGL (dated 29 June 2016), addresses a few matters and I wish to comment on two of these. The first matter relates to considering alternatives to the Coronation North Waste Rock Stack. The letter discusses a higher stack design which is rejected based on engineering and aesthetic criteria. The letter also states that "that there is real potential for waste to be opportunistically backfilled into pits, thereby reducing the footprint and the area of ecological impact." However, while this may occur there is no certainty of outcome. The most obvious solution is to adjust the location the Waste Rock Stack by moving it further to the west into areas of lower ecological importance vegetation (see photos in Appendix 5).

58. The second matter considers alternatives to the Coal Creek dam. There appears to be no alternatives offered, the primary reason provided is the need to locate the dam on land owned by the company with sufficient volume of water. However the response goes on to state " …*if we (OGL) were to acquire more land in the proximity to the Coronation North waste rock stack in the future we could consider re-locating the dam to a site with lesser effects on ecology*". This suggests that there could be alternatives.

59. The response to request for further information - letter from Mike Thorsen (ERA Ecology NZ Ltd.) (dated 8 July 2016), addresses several matters.

60. Additional information is provided on the assessment of representativeness. The summary is that the PIA remains assessed as having high representativeness. I agree with this assessment.

61. Additional information is provided on the evaluation of significance. Considering 1998 ORC Regional Policy Statement guidelines (d) Vegetation that contains a substantially intact, uninterrupted ecological sequence of indigenous species which are rare or representative regionally or nationally. The Thorsen response states that

there are no ecological sequences meeting this criteria. I disagree, as there are ecological sequences of moisture (from "wetland" to "dryland") and altitude which are present which could meet this criteria. However, the summary concludes the PIA remains assessed as significant against 1998 ORC Regional Plan, WDC District Plan, current DCC District Plan criteria and draft DCC 2GP District Plan criteria or guidelines. I agree that the site is significant and I believe it to be of high significance.

62. Regarding invertebrates, the Thorsen response states "…*the Coronation North PIA is likely to contain a diversity of invertebrate species probably commensurate with the number, naturalness and complexity of the plant habitats that it contains*…". I agree with this statement, and consider it is possible that some threatened or notable species are present.

63. Regarding cumulative effects, the Thorsen response states "*It is likely given current land management practices in the area that loss of indigenous vegetation cover is real and ongoing, but the extent of change is unknown*". I agree with this statement, however, I believe there is some knowledge on the extent of change. Dr Kelvin Lloyd provides some information of the vegetation loss that has occurred. Therefore, I consider cumulative effects from the ongoing loss of indigenous vegetation to be a concern that needs to be taken into account.

64. I have read the Section 42A Audit of Terrestrial Ecology information for the Coronation North mine consent application. I am in general agreement with vegetation and flora component prepared by Dr Kelvin Lloyd. In particular, there are several concerns with the Thorsen reports that have been raised and discussed. I am in broad agreement with these discussions.

COMMENTS ON APPLICANT'S EVIDENCE

65. I have read the evidence of Dr Michael Thorsen and am in general agreement with this evidence. There are a few points that I would like to make relating to this evidence.

66. At paragraph 14 I accept that there is a level of modification to the narrow-leaved snow tussocklands within the Trimbell's Gully RAP, however the site retains the key values that formed the basis of its inclusion as an RAP. Further it has a high potential for recovery with appropriate management. Appendix 2 contains the Tribell's Gully RAP portion of the Macraes ED PNAP survey report (Bibby, 1997, pages 66 - 70).

67. At paragrpah 22 Dr Thorsen has omitted that the basalt contact flush wetlands and long inundation ephemeral wetlands, as well as the seepage (all listed in table 1 of his evidence) are naturally rare ecosystems (Williams et. al, 2007). Further that ephemeral wetlands have been classified as Critically Endangered and seepages and flushes have been classified as Endangered ecosystems (Holdaway e. al, 2012).

68. At 25(a) *Carex inopinata* was listed as present in the EIA because it was mentioned in the ERA report (Thorsen, 2016b, page 39).

69. Within the Significant values in the PIA section Dr Thorsen has omitted that values present within the PIA trigger (at least in part) all four of the National Biodiversity Priorities (MfE, 2007).

70. In respect of paragraphs 43 and 44, I will address these further under my comments on the evidence of Debbie Clarke.

71. With paragraph 45, while I am in general agreement with the comments of Dr Thorsen, I would like to reinforce the point that there is a lack of clarity and detail with elements of the compensation package offered by OGL. This will hopefully be rectified in the Coronation North Ecological Management Plan (EMP). The department is to have input to this (EMP) however this is not produced until the consent is approved. This leaves some doubt regarding the final wording of the EMP.

72. I have read the evidence of Debbie Clarke, in particular paragraph 15 dealing with Nature Conservation and Landscape values (being conditions offered by OGL). I have some comments on these proposed conditions.

73. I support the preparation of a Coronation North Environmental Management Plan (EMP). I also support that this should be prepared in consultation with the Department.

74. That paragraph 15.4 be amended to include an additional point (e) to allow for additional management that is required to be undertaken in agreement by OGL (covenanter) and the covenanting authority (DOC).

75. That paragraph 15.5 be amended. This currently states "…. *The obligations of the covenanter shall be limited to maintaining fencing and ensuring the covenanted land is not used for farming or mining purposes*." This is not acceptable as it would be different from "normal" covenanter responsibility. Covenanters "normally" have responsibility for weed and pest control.

76. That paragraph 15.6 (b) be amended to allow for the numbers of plants, number of translocation sites, additional management, and other additional detail to be established through an EMP.

CONCLUSIONS.

77. The Coronation North Project involves the disturbance and loss of potentially at least 316 ha of land and an additional area associated with a possible dam and reservoir in Coal Creek. Most of the area to be disturbed is clothed in indigenous vegetation, which has ecological importance. Therefore, a significant loss in indigenous vegetation will eventuate. This loss adds to other loss and ongoing loss and so has cumulative loss impacts within the Macraes Ecological District.

78. There is a diversity of indigenous vegetation communities present, including some of the Project Impact Area (PIA) that has previously been identified as a recommended area for protection within the Macraes ED (Macraes RAP 4 – Trimbell's Gully). The vegetation has been assessed to being of very high ecological importance. Some features of the vegetation meet each of the four criteria of National Importance from the Statement of National Priorities for Protecting Rare and Threatened Biodiversity on Private Land (Ministry for the Environment, 2007).

79. Under the New Zealand Threat Classification system the PIA has been recorded as having seven Nationally Threatened, eleven At Risk, two Data Deficient and eight other notable species have been recorded from within it. Therefore, I consider the site to have high importance for threatened plants and in particular for these species.

80. I have considered the applicant's proposed compensation package and consider that it has several inadequacies regarding compensation for indigenous vegetation communities and for Threatened, At Risk, Data Deficient and other notable plant species. In particular:

- There should be greater efforts to avoid impacts upon the indigenous vegetation and rare/notable species of importance.
- The Highlay Hill covenant should be increased in size.
- There should be amended targets and additional detail with threatened plant species conservation compensation package.

- There should be additional compensation considered for the loss of indigenous vegetation associated with the proposed Coal Creek dam and reservoir.

Brian David Rance

21 October 2016

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Appendix 1 The New Zealand threat classification system

The New Zealand Threat Classification System is a national system led by the Department of Conservation (DOC). It is a robust tool that uses objective criteria and information drawn from a wide range of experts to rigorously assess the risk of extinction faced by New Zealand plants, animals, and fungi. Each taxon is placed in a category that reflects the level of risk it faces. The system is specifically designed to be relevant to New Zealand's unusual ecological and geographic conditions.

The first version of the NZ Threat Classification System was published in 2002, with updates in 2008 and 2012. Following rigorous review, a revised manual was published in 2008. This revision introduced a range of improvements and better reflects the type of management action required for taxa in the different categories. The current structure of the classification system is as follows:

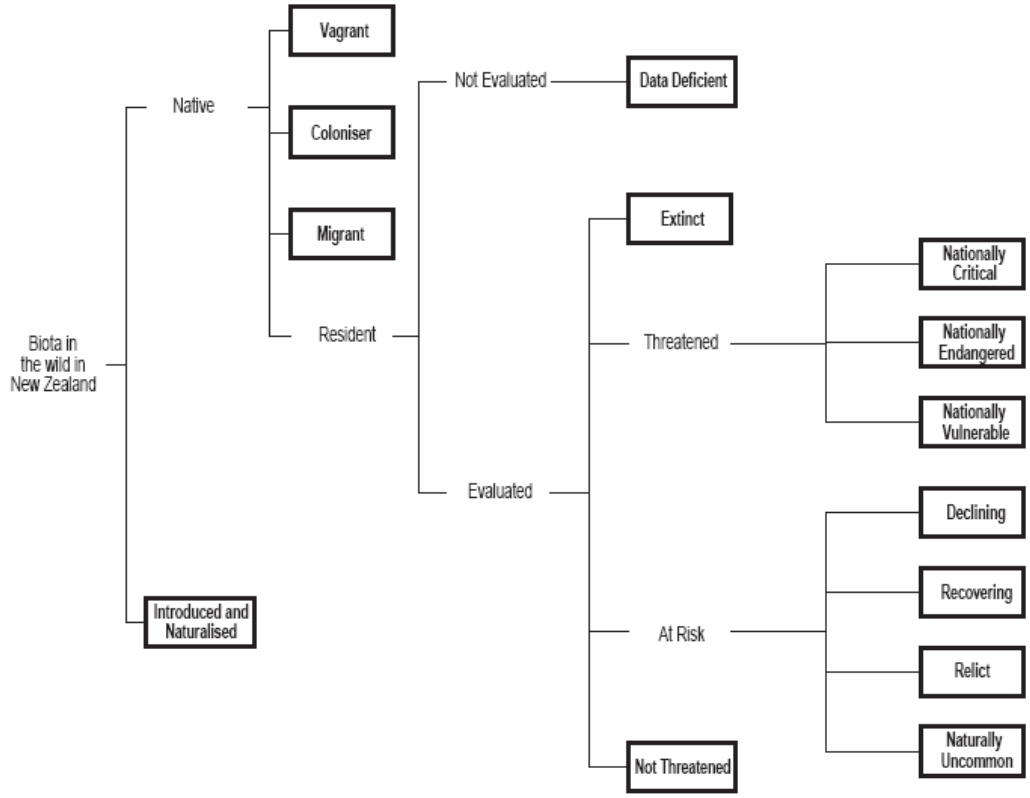


Fig. 1 New Zealand Threat Classification System (after Townsend et al. 2008).

Species listed in the super category 'Threatened" are grouped into three categories: 'Nationally Critical', Nationally Endangered', and 'Nationally Vulnerable'. Taxa in these three categories are facing a very high risk of extinction in the wild.

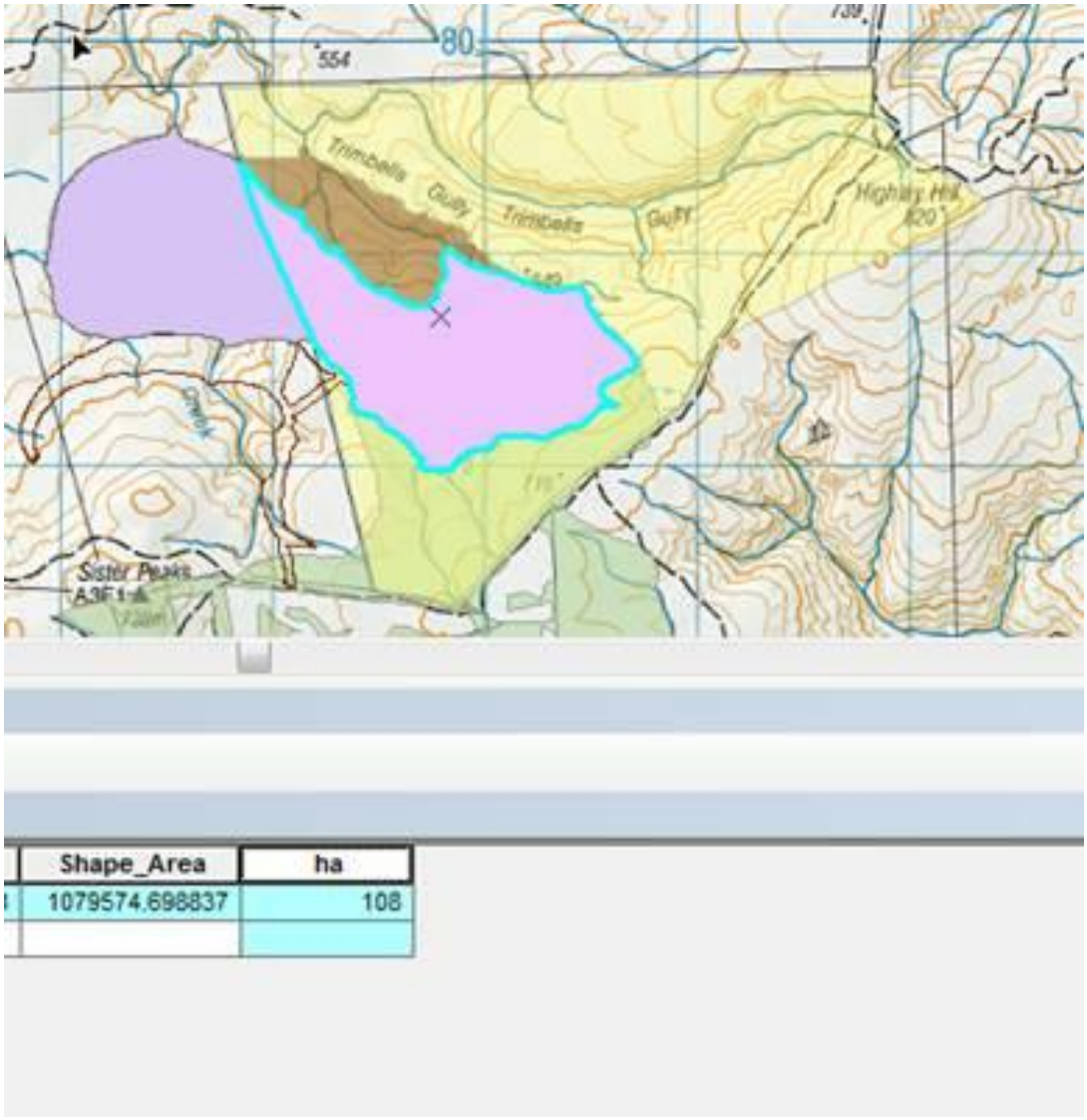
Species listed in the super category 'At Risk' are grouped into four categories: 'Declining', 'Naturally Uncommon', 'Recovering' and 'Relict'. Declining taxa do not qualify as 'Threatened' because a large total population size and/or slower decline rate buffer them. However, if the declining trends continue, these taxa may be listed as 'Threatened' in the future. The category 'Naturally Uncommon' is adopted to distinguish between biologically scarce and threatened taxa. 'Recovering' allows for threatened taxa whose status is improving through management action and 'Relict' is used to encompass taxa that have experienced very large historic range reductions and now exist as remnant populations that are not considered unduly threatened.

The NZ Threat Classification System can be used to assess the status of any plant, animal or fungus that has a wild population established in NZ and for which there is sufficient information available. It uses the best available information on the population trend (rate of decline or increase) and the size of the population (or, if population size cannot be measured, the area occupied by the population) to place each taxon into a category that directly reflects the rate of extinction it faces. All listings are reviewed about every three years to detect changes in status over time.

The most recent listing of vascular plants under the NZ Threat Classification system was carried out in 2012 and published the following year (de Lange et al. 2013).

Appendix 2 Extracts from the Macraes Ecological District PNAP report (Bibby, 1997)

Appendix 3 Map showing the relationship between the Trimbell's Gully RAP and the Coronation North Waste Rock Stack



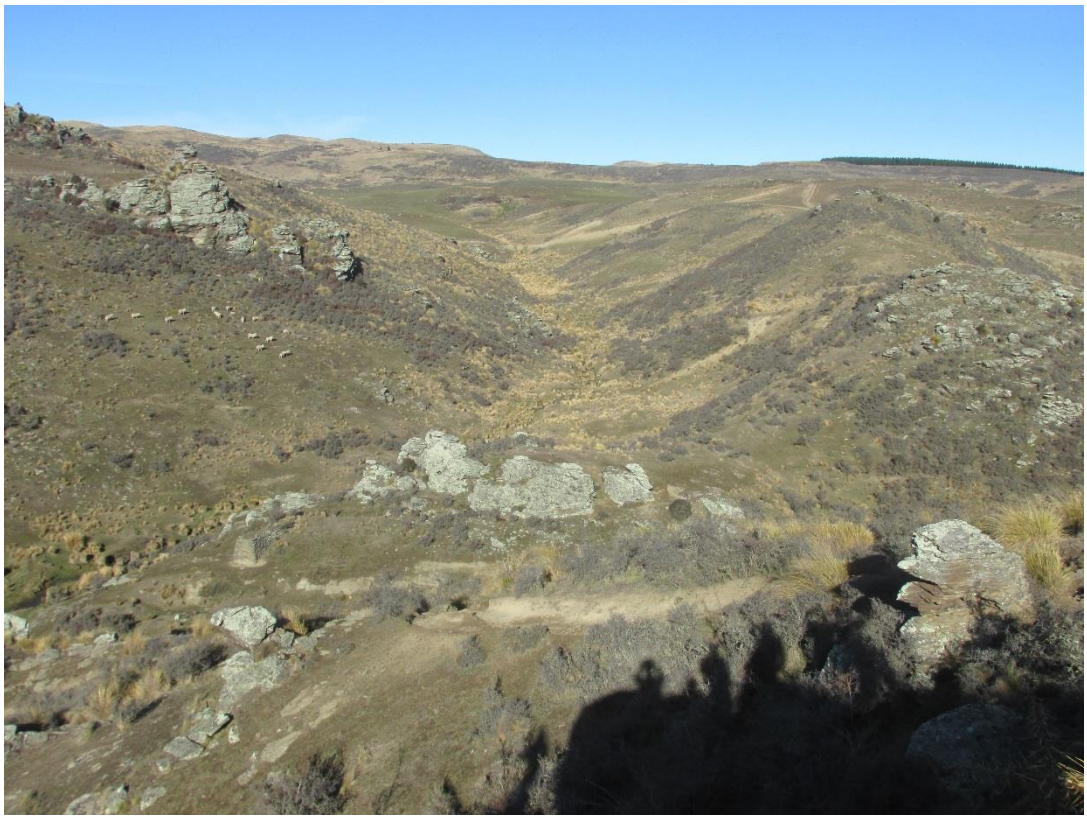
Appendix 5 Photos of the PIA

Photo from within Timbell's Gully RAP to the Coronation mine site through the PIA (above) and across the RAP to the west (below).

Photo into a tributary of Timbell's Gully within the Timbell's Gully RAP

Photo up Coal Creek to and beyond the location of the dam (shows shrublands, valley floor wetlands and rock outcrops)

Photos up Coal Creek into and beyond the reservoir area (shows shrublands, valley floor wetlands and rock outcrops)



Photos into area to west of the waste rock stack showing modified to semi-modifed indigenous vegetation. The central hill in the photo above is the same hill shown on the skyline between the pines and Coronation waste rock stack in the photo below.

Appendix 4 Map of Highlay Hill proposed covenant

This map shows proposed additions to the Highlay Hill covenant.