

**Application by TKO Properties Limited for a residential development and
subdivision at Rocky Point, Bendigo (RC230179)**

Supplementary Statement

**Mike Harding
Terrestrial Ecology**

20 November 2024

Code of Conduct

1. I have read the code of conduct for expert witnesses as contained in the Environment Court's Practice Note 2023 (the Code). I have complied with the Code when preparing my written statement of evidence. The data, information, facts, and assumptions I have considered in forming my opinions are set out in my evidence. 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.

Introduction

2. This statement should be read on conjunction with my earlier advice to CODC dated 25th March 2024 and 22nd September 2024. It provides a summary response to evidence provided by the applicant and submitters just prior to the planning hearing, and to the issues arising from that evidence as discussed at the hearing on 18th and 19th November 2024.
3. This statement is necessarily brief. It was prepared at the request of the Hearing Commissioners following the close of the hearing on the 19th November. Its purpose is to assist the Commissioners with consideration of the key ecological issues.

Information Requirements

4. The evidence of Richard Ewans confirms my earlier concern that the plant species data provided as part of the application are inadequate. It is concerning that a relatively brief survey of only parts of the application area revealed the presence of so many additional species. I have worked with Richard Ewans on ecological surveys in dryland environments. I have confidence in his competence and professionalism.
5. I am familiar with the rigour that is required to adequately survey dryland vegetation. I recently surveyed areas in Central Otago, Waitaki valley, and Mackenzie Basin for plants of

one of the more cryptic genera (dryland cresses: *Lepidium* species).¹ Many of the notable plant species in dryland habitats are small, cryptic and/or ephemeral.

6. The applicant's plant species' data do not give me confidence that the applicant has adequately surveyed vegetation and flora at the proposed development area. The applicant's response to this lack of data is that the proposed offset remains adequate in part because such species are abundant elsewhere in the Bendigo Hills area.² I disagree. It is not possible to adequately assess or manage the potential adverse effects of an activity without comprehensive and robust data. There may be other notable plant species – or additional populations of known species – at the site.
7. In earlier advice, I expressed concern at the lack of invertebrate data. The applicant concedes that a field survey should have been undertaken³ but appears to have made no further effort to provide those data. The applicant's response to this limitation is that the proposed effects management will improve habitat quality for invertebrates.⁴ No evidence is presented to support this assumption.
8. The applicant's invertebrate ecologist advised that At Risk invertebrate species are likely to be present and that the effects of the proposed activity will have permanent effects on invertebrate fauna.⁵ It cannot be assumed that the proposed activity will not have significant adverse effects on invertebrate fauna – or to adequately manage those effects – when it is not known what species are present at the site.

Significant Natural Area (SNA)

9. The application area supports significant indigenous vegetation and significant habitats of indigenous fauna. It is an SNA, though not scheduled as such in the Central Otago District Plan. I am unaware of any contrary view presented in evidence.
10. SNAs are areas, not just species, or vegetation types. The assessment of effects of an activity on an SNA should be of the effects on the area, not just on individual components (such as

¹ Walker, S.; Harding, M.A.C.; Loh, G. 2023. The pattern of declines and local extinctions of endemic inland *Lepidium* species in the eastern South Island. NZ Journal of Ecology 47(1): 3547. <https://doi.org/10.20417/nzjecol.47.3547>.

² Summary Statement of Simon Beale, para 11.

³ Evidence of Simon Beale, para. 58 (pg. 25-26).

⁴ *ibid.*

⁵ Terrestrial invertebrate desktop assessment of a proposed subdivision at Rocky Point, Central Otago. Vikki Smith, Wildlands (Ref. 7080c), pg. 2-3. (EIA Appendix 4)

cushionfield or kanuka forest). Adverse effects on an SNA of any new subdivision, use of development that must be avoided include:⁶

- loss of ecosystem representation and extent
- disruption to sequences, mosaics, or ecosystem function
- fragmentation
- reduction in the population size or occupancy of Threatened or At Risk (declining) species

11. The area is not a listed SNA. Nevertheless, the adverse effects which must be avoided are in my view relevant to application of the effects management hierarchy, as required for indigenous biodiversity outside SNAs.⁷

12. The applicant's assessment of ecological effects does not adequately consider the effects listed above. The EIANZ Guidelines are inadequate for such an assessment. The applicant's response⁸ to my earlier advice does not alter my view that effects such as ecosystem loss, fragmentation, and reduction of Threatened and At Risk species have not been adequately assessed (let alone avoided).

Threatened and At Risk Species

13. The application area and the wider ecosystem within which the area is located support populations of Threatened and At Risk plant and animal species. Evidence has been presented that the notable species (and vegetation) within the application area are widespread and relatively common elsewhere in the Bendigo area and/or within the Dunstan Ecological District. The applicant implies therefore that the loss of such notable species from the application area is insignificant or minor because these species are a widespread component of vegetation across the district.⁹

14. Threatened and At Risk species are assessed and listed through a national classification system.¹⁰ Those species that meet the assessment criteria are nationally Threatened or nationally At Risk. The abundance of those species at a locality or within a region does not reduce or minimise their threat status. It is typical that some Threatened or At Risk species

⁶ NPSIB Clause 3.10 (2).

⁷ NPSIB Clause 3.16 (1).

⁸ Evidence of Simon Beale, para. 58 (pg. 30).

⁹ Summary Statement of Andrew Wells, para 21-22.

¹⁰ Townsend, A.J.; de Lange P.J.; Duffy, C.A.J.; Miskelly, C.M.; Molloy, J.; Norton, D.A. 2008. *New Zealand Threat Classification System Manual*. Department of Conservation, Wellington.

are common at certain locations, as they are often confined to specific habitats or ecosystems.

15. The notable species present at the application area are no exception. They are typical of dryland (and saline/sodic) ecosystems, such as those present at the application area. These dryland ecosystems are a feature of the Dunstan Ecological District, which is a national stronghold for some of these dryland species, notably spring annual species.
16. The loss of populations of these notable dryland species from the application area will have adverse effects on the national populations of those species listed as threatened with or at risk of extinction. It is not appropriate to assess these adverse effects in just the regional or local context.

The Biodiversity Offset

17. The applicant's offsetting proposal is based on a presumption that recreation of a "climax" plant community is appropriate to offset the loss of naturally occurring indigenous vegetation at the application area. This proposal raises several issues.
18. First, there is considerable uncertainty about what a 'climax' plant community would comprise at this location. The applicant's assessment makes several assumptions – albeit well-informed – about the character of a climax plant community at this location. However, they remain assumptions, based on incomplete data, and on the presumption that a climax community would persist in today's environment. It is highly likely that risks associated with a rapidly warming climate (increased intensity and frequency of fire and storm events), and increased human settlement in the wider area, mean that the 'climax' community that may have once been present is no longer likely to occur.
19. Second, establishing and maintaining species' plantings at this drought-prone location will be very challenging. In addition to the landscape-scale threats identified above, it will be a challenge to maintain watering systems, protect plants from herbivores, and release plants from competition. Successful establishment of plants will likely take a long time, considerable effort, and substantial expense. There is no certainty that it will be successful.
20. Third, establishment of a pre-determined 'climax' plant community will not replicate the species and plant communities that will be lost at the application area. The offset plantings

will not be 'like for like', as is required as a principle of biodiversity offsetting.¹¹ That is, it will not comprise the "same ecosystems, vegetation, habitats and species"¹² as those that will be lost at the application area.

21. Fourth, the contention that the establishment of an area of 'climax' vegetation will provide a benefit or net gain for indigenous biodiversity is misplaced. The ecological value of the application area, and surrounding ecosystem, is the mosaic of dryland plant communities (principally cushionfield and kanuka) and the notable plant and animal species they support. The proposed climax vegetation is not representative, typical or characteristic of the present-day indigenous biodiversity of the ecological district.
22. Fifth, there is a high risk that the offset plantings will displace (remove) indigenous vegetation that is ecologically significant (an SNA), thereby creating further adverse effects for which no effects management is proposed. Any assurance that ecologically significant vegetation (and Threatened or At Risk species) will be avoided is not credible given the applicant's failure to adequately survey and identify ecological values at the application area.
23. The offset proposal is based on inadequate data, a misplaced objective of creating 'climax' vegetation, and a misinterpretation of the ecological character and functioning of dryland ecosystems at this location.
24. Disturbance, notably by wildfire, is a natural phenomenon at this location. Inland parts of the South Island east of the main divide experienced occasional wildfire prior to human settlement.¹³ The frequency and extent of burning increased following human settlement. It is likely that dryland ecosystems in Central Otago never – or only rarely – achieved a 'climax' state. They were more usually dynamic (constantly changing), with successional mosaics maintained by repeated disturbance, such as they are today in Dunstan Ecological District.
25. The mosaic of plant communities at the location is typical and characteristic of the ecological district. They are representative of the naturally occurring indigenous vegetation at this location. A key assessment principle of the NPSIB is that "significant indigenous vegetation

¹¹ NPSIB, Appendix 3 (3).

¹² NPSIB, Appendix 6.

¹³ McGlone, M.S. 2001. The origin of the indigenous grasslands of southeastern South Island in relation to pre-human woody ecosystems. *NZ Journal of Ecology* 25: 1-15.

has ecological integrity typical of the indigenous vegetation of the ecological district in the present-day environment”¹⁴

26. The support of other ecologists for restoring original vegetation at disturbed/induced sites cited by Andrew Wells in his Summary Statement is misleading.¹⁵ The Southland Wind Farm expert conferencing he cites was for offsetting and compensation. Further, the site referred to by the experts in the quoted paragraph is very different ecologically from the Rocky Point site. It is tall ‘cloud’ forest on a poorly drained plateau in a high-rainfall climate.¹⁶ Natural disturbances such as drought and fire are not important at the Southland site.

Protection of the wider area

27. The applicant’s proposal includes protection and management of indigenous biodiversity values on other parts of the property.¹⁷ Evidence presented at the hearing is that those other parts of the property are already protected by a conservation covenant¹⁸ and that indigenous biodiversity values are already adequately protected within the covenanted area.¹⁹
28. It is unclear whether the applicant’s proposal can be considered part of a biodiversity offset, as it is inconsistent with the Additionality Principle for offsetting.²⁰

Incremental Loss

29. Evidence has been presented about the extent of recent loss of dryland ecosystems in Central Otago, particularly cushionfield-kanuka ecosystems.²¹ I recently investigated the extent of loss of indigenous vegetation in Otago Region at the request of Otago Regional Council. Analysis of the Land Cover Database (LCDB) revealed that there has been a loss of 40,000ha of indigenous vegetation in Otago Region between 1996 and 2018.²²
30. Evidence has also been presented that kanuka has increased in extent in the Rocky Point-Bendigo area in recent years.²³ However, the LCDB analysis cited above shows that there has

¹⁴ NPSIB, Appendix 1 A (2).

¹⁵ Summary Statement of Andrew Wells, para. 13.

¹⁶ I was a participant in that expert conferencing, though was not present when that statement was mediated.

¹⁷ Summary Statement of Simon Beale, para 2.

¹⁸ Legal Submissions on behalf of the Director-General of Conservation, Ceri Warnock, para 144-168.

¹⁹ Richard Ewans, verbal presentation.

²⁰ NPSIB, Appendix 3 (4).

²¹ Evidence of Richard Ewans, para. 60-64; Matt Sole verbal presentation.

²² Harding, M.A. 2022. Otago Region: analysis of recent changes to terrestrial indigenous ecosystems. Unpublished Contract Report. Otago Regional Council. 30p.

²³

been a loss of 1200ha of kanuka/manuka in Otago Region between 1996 and 2018. This suggests that the increase in extent of kanuka in the Bendigo area is not replicated elsewhere in the region. Rocky Point-Bendigo can be regarded as a regional stronghold for this vegetation type, as suggested in the submission of Kate Wardle.²⁴

31. I have recently completed a project for Otago Regional Council mapping converted land at inland parts of Otago Region. Converted land is defined as land at which indigenous vegetation has been completely removed and replaced with pasture, crops or other development. The analysis I undertook for this project indicates that much of the recent land conversion has been small-scale loss at lower altitudes for development of rural residential subdivisions, such as that proposed in this application.
32. The proposed activity will remove low-altitude indigenous vegetation and have edge/offsite effects on the remaining indigenous vegetation at that location. It will contribute to the continued incremental loss of naturally occurring indigenous vegetation in Otago Region.

Qualifications and Experience

33. I am an independent Environmental Consultant working from offices in Nelson and Dunedin. I have papers in Botany and Geology from Otago University (1980) and a Diploma in Parks and Recreation Management (with Distinction) from Lincoln University (1986). I have seven years' experience in national park management and conservation advocacy, and a subsequent thirty years' experience as an independent ecologist.
34. My work as an independent ecologist has included field surveys of indigenous vegetation and habitat, assessments of ecological significance, assessments of priorities for protection of indigenous ecosystems, and advice on management of indigenous ecosystems, throughout New Zealand though principally in the South Island. Consultancy work relevant to this consent application includes:
 - a) Survey of vegetation and/or collation of specialists' survey reports on high country pastoral leases, including Otago properties, for the Pastoral Lease Tenure Review Programme (DOC contracts, 1994 to 2015).

²⁴ Submission of Kate Wardle, pg. 7.

- b) Preparation and presentation of evidence on terrestrial ecology at the Environment Court Hearing for Mackenzie District Plan Change 13 (Eleventh Decision-2017), and at the Commissioner Hearing for PC18 (terrestrial ecology) 2020 (independent advice to Mackenzie District Council), and at Environment Court (Plan Change 18).
- c) Provision of advice for the preparation of guidelines²⁵ for application of the Canterbury Regional Policy Statement (CRPS) Appendix 3 ecological significance criteria.
- d) Provision of ecological advice to the Biodiversity Collaborative Group for preparation of the National Policy Statement for Indigenous Biodiversity 2023 (2017-2019).
- e) Monitoring of dryland grassland plots and the effects of sheep grazing, High Plains Ecological District, 2012 to 2024 (Timaru District Council contract).
- f) Contribution to scientific research into the distribution and health of threatened dryland cress (*Lepidium*) species in the Mackenzie Basin and Central Otago (2021 to 2023).²⁶
- g) Analysis of recent changes in terrestrial indigenous ecosystems in Otago Region, 2022 (Otago Regional Council contract).²⁷
- h) Preparation of maps of land converted to pasture or crops throughout inland parts of Otago Region 2023-2024 (Otago Regional Council contract).

²⁵ Wildlands. 2013. Guidelines for the application of ecological significance criteria for indigenous vegetation and habitats of indigenous fauna in Canterbury Region. *Contract Report 2289i*. Environment Canterbury, Christchurch.

²⁶ Walker, S.; Harding, M.A.C.; Loh, G. 2023. The pattern of declines and local extinctions of endemic inland *Lepidium* species in the eastern South Island. *NZ Journal of Ecology* 47(1): 3547.
<https://doi.org/10.20417/nzj ecol.47.3547>

²⁷ Harding, M.A. 2022. Otago Region: analysis of recent changes to terrestrial indigenous ecosystems. Unpublished Contract Report. Otago Regional Council. 30p.