

Under the

FAST-TRACK APPROVALS ACT 2024

In the matter of

an application for resource consents, concessions, wildlife approvals, an archaeological authority, and approvals relating to complex freshwater fisheries activities in relation to the Southland Wind Farm project

By

CONTACT ENERGY LIMITED

Applicant

**STATEMENT OF EVIDENCE OF MICHAEL HARDING
TERRESTRIAL ECOLOGY**

17 December 2025

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List of Abbreviations

BBOP	Business and Biodiversity Offsets Programme
BOAM	Biodiversity Offsetting Accounting Model
CFTA	Covid-19 Recovery (Fast-track Consenting) Act 2020
DOC	Department of Conservation
EcIA	Ecological Impact Assessment Guidelines
FTAA	Fast-Track Approvals Act 2024
HREP	Habitat Restoration and Enhancement Management Plan
JSEEA	Jedburgh Station Ecological Enhancement Area
NPS-IB	National Policy Statement for Indigenous Biodiversity 2023
RMA	Resource Management Act 1991
SNA	Significant Natural Area
SRPS	Southland Regional Policy Statement
SWF	Contact Energy's Southland Wind Farm proposal

Introduction

1. My full name is Michael Arthur Coupland Harding.
2. I have been asked by the Environmental Defence Society to provide expert evidence on the potential terrestrial ecology effects of Contact Energy's proposed Southland Wind Farm (**SWF**), in particular effects on the Jedburgh Plateau.

Qualifications and Experience

3. 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.
4. 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 eastern South Island. Consultancy work relevant to this consent application includes:
 - a) Preparation and presentation of evidence on terrestrial ecology at the Environment Court Hearing for a proposed wind farm at Mt Cass, Canterbury.
 - b) Preparation of a Southland Land Protection Strategy,¹ which describes the indigenous ecosystems of each ecological district in the Southland Region, assesses the extent to which each ecosystem is depleted, and identifies priorities for protection.
 - c) Provision of ecological advice to the Biodiversity Collaborative Group for preparation of the National Policy Statement for Indigenous Biodiversity 2023 (**NPS-IB**).

¹ Harding, M.A. 1999. Southland Land Protection Strategy. Nature Heritage Fund. Wellington.

- d) Preparation of independent terrestrial ecology advice to assist the Covid-19 Recovery (Fast-track Consenting) Act 2020 (**CFTA**) Expert Consenting Panel in their consideration of Contact Energy's earlier application for the SWF.
- e) Mapping of developed (cultivated) land from analysis of aerial images and ground truthing of that mapping throughout the eastern South Island (2020-2025).

Code of Conduct

- 5. I have read the code of conduct for expert witnesses contained in the Environment Court's Practice Note 2023 (**the Code**). I have complied with the Code when preparing this 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.

Scope

- 6. The scope of this evidence is the effects of the SWF on the Jedburgh Plateau. Principal issues addressed in this evidence are:
 - a) Vegetation mapping.
 - b) Delineation of wetlands.
 - c) Assessments of ecological significance and ecological value.
 - d) Fragmentation of the Jedburgh Plateau ecosystem.
 - e) Offsetting.
 - f) Compensation.
 - g) Conditions.

Material Considered

7. In preparing this evidence the principal documents I have reviewed are:
 - a) Wildlands, 2023. Assessment of terrestrial and wetland ecological effects for the proposed Southland Wind Farm, Slopedown Range, Southland. Wildlands Contract Report 6656.
 - b) Evidence of Nick Goldwater and Kelvin Lloyd, 18 August 2025, for the SWF Fast-Track Approvals Act 2024 (**FTAA**) substantive application. Southland Wind Farm Technical Assessment #5: Terrestrial and Wetland Ecology (including Appendices).
 - c) Evidence of Roger MacGibbon, 18 August 2025, for the SWF FTAA substantive application. Southland Wind Farm Technical Assessment #7: Review of Terrestrial and Wetland Ecology and Ecology Offsetting and Compensation.
 - d) Goldwater N, 10 November 2025. Wetlands at Southland Wind Farm. Wildlands Memorandum 6656s.
 - e) Contact Energy Southland Wind Farm, Part A Overarching Substantive Application Document.
 - f) Contact Energy Southland Wind Farm, Part B Approvals Relating to the Resource Management Act 1991 (**RMA**).
 - g) Proposed Southland Wind Farm Consent Conditions (101.-Part-I-Proposed Resource Consent Approvals Conditions).

Summary

8. I provided independent terrestrial ecology advice to the CFTA Expert Consenting Panel. Therefore, I am familiar with the SWF project and its actual and potential effects on terrestrial ecology, including wetlands. The present FTAA application is very similar to that submitted as the CFTA application.
9. Mapping of ecosystems as 'vegetation types' is inherently difficult, especially those with complex hydrology and mosaics of wetland and terrestrial vegetation. I found that the maps submitted for the CFTA application were inaccurate. Further vegetation surveys have been undertaken to support this FTAA application. I have not had an opportunity

to ground truth that mapping. The vegetation mapping should be reviewed by an independent expert.

10. Mapping of wetland vegetation on the Jedburgh Plateau creates an ecologically artificial boundary between wetland vegetation, as defined by standard protocols, and other vegetation, which contains wetland species.
11. The Applicant assesses the ecological values of vegetation/habitat against an 1840 baseline. That is a reductionist approach that undervalues seral vegetation and gives insufficient regard to ecological processes. The best-practice approach is to assess areas (of contiguous indigenous vegetation) for their present-day indigenous biodiversity values.
12. At expert conferencing for the CFTA application “All experts agree that the indigenous vegetation on the Jedburgh Plateau is ecologically significant”. The Applicant concurs that the Jedburgh Plateau supports significant indigenous vegetation and habitat – that it is a Significant Natural Area (**SNA**).
13. Construction of roads and turbine platforms will fragment the Jedburgh Plateau SNA. The effects of fragmentation include creation of barriers to movement/dispersal of ground-based fauna, altered hydrology such as through diversion and discharge of stormwater from impermeable surfaces, increased vulnerability to plant and animal pest invasion, and exposure of vegetation to edge/offsite effects such as wind, light and temperature.
14. The Applicant’s claim that the Jedburgh Plateau vegetation/habitat is already fragmented by the effects of grazing and pests is misleading. Fragmentation means to break or cause to break into fragments, such as by constructing a road through an area of indigenous vegetation. In any case, the effects of wind farm construction are of a much greater magnitude and permanence than the effects of grazing and pests.
15. Despite the substantial surveys undertaken by the Applicant, the data on the indigenous species, vegetation/habitat and Jedburgh Plateau ecosystem are limited. Those data limitations mean that there remains considerable uncertainty about the effects of the activity (notably fragmentation).

16. I disagree with the Applicant's assessment of irreplaceability and vulnerability. Nevertheless, I agree that management of residual adverse effects on the Jedburgh Plateau requires compensation, not offsetting.
17. Most adverse effects of the activity could be avoided if the Jedburgh Plateau was excluded from the SWF footprint, meaning the loss of 14 turbines (and associated roads). If the application is approved in its present form, the Jedburgh Plateau should be legally protected in perpetuity for nature conservation.

Background

18. I was engaged by the CFTA Expert Consenting Panel to provide expert independent advice on the actual and potential effects of the SWF on terrestrial ecology. That advice included three statements of evidence, participation in expert conferencing and contribution to Joint Witness Statements on terrestrial and wetland ecology and offsetting and compensation. Therefore, I am familiar with the project and its actual and potential effects on terrestrial ecology, including wetlands.
19. The present FTAA application is very similar to that submitted as the CFTA application. Further ecological survey work has been undertaken by Wildlands (the Applicant's consultants) to determine the potential effects of the activity² and to further assess wetland extent and character.³ Otherwise, the FTAA material (insofar as relevant to my area of expertise) remains substantially the same. Accordingly, I understand that the Joint Witness Statements on terrestrial and wetland ecology and offsetting and compensation remain relevant to this application. They are enclosed as **Attachments A** and **B** respectively, and form part of my evidence.
20. Outstanding terrestrial ecology limitations of the FTAA application are summarised below. Most of the potential terrestrial ecology effects (excluding bats and avifauna) relate to the indigenous biodiversity of the Jedburgh Plateau, which is my focus. Other parts of the SWF area largely comprise developed farmland (pasture) or exotic plantation forest.

² Evidence of Nick Goldwater and Kelvin Lloyd, 18 August 2025.

³ Wildlands Memorandum 10 November 2025 (ref.6656s).

Vegetation Mapping

21. Mapping of complex ecosystems, especially delineation of ‘vegetation types’ is inherently difficult. Vegetation type boundaries at sites with complex drainage, and especially disturbed sites, are usually not distinct; they grade from one type to another. I have considerable experience at vegetation mapping from aerial images and am aware of the challenges. An outcome of the ecology conferencing for the CFTA application was that “All experts agree that it is a challenging site to map vegetation types accurately, particularly on the Jedburgh Plateau” and “All experts agree that accurately mapping vegetation types on the Jedburgh Plateau is challenging”.⁴
22. During a randomly selected foot traverse of part of the Jedburgh Plateau in July 2024 I found that the Applicant’s vegetation mapping by Wildlands was incorrect.⁵ For example, ‘fen wetland’ was mapped as ‘scrub/shrubland’ (at a proposed road location) and ‘shrubland’ was mapped as ‘exotic unmanaged grassland’. The vegetation mapping was – at that time – clearly inaccurate.
23. Subsequently, Wildlands has stated that “vegetation mapping for the Project has combined extensive on-site ground surveys by an experienced team; formal vegetation plots, and the use of recently commissioned, high-definition aerial imagery” with particular importance “placed on identifying and mapping vegetation close to and within the proposed wind farm footprint and significant vegetation across the site”.⁶
24. I have not had the opportunity to field check (ground truth) the revised mapping and there does not appear to have been an independent review of that mapping. Therefore, I cannot provide advice on the accuracy of the updated mapping.
25. I remain concerned about its accuracy. That is because when I previously identified mapping errors they were dismissed by Wildlands as minor when in fact they appeared ubiquitous. Further, when I sought an explanation for the remapping of fen wetland as shrubland at a proposed road location, Wildlands advised “It appears that a very small segment of fen wetland (c.640m²) was inadvertently removed during the GIS mapping

⁴ Joint Witness Statement of Experts in the field of Ecology, 13 September 2024, para 14 & para 24.

⁵ Harding, M. 30 August 2024. Southland Wind Farm Ecology Review, Advice to CFTA Consent Panel, Appendix 1.

⁶ Appendices to Technical Assessment #5: Terrestrial and Wetland Ecology (Appendix 1), page 3.

process, probably when the road alignment was overlaid”.⁷ That was not reassuring. An independent review of the mapping of the Jedburgh Plateau would enable a more robust analysis of the efficacy of the Applicant’s offsetting and compensation package.

Delineation of Wetlands

26. The Applicant’s experts have expended considerable effort to define and describe wetlands in the vicinity of the SWF footprint. That is useful for determining whether those areas meet the definition of a ‘natural inland wetland’, but it gives insufficient regard to ecological (and hydrological) processes and assessing ecological integrity on Jedburgh Plateau. The elevated plateau receives high annual rainfall and has poorly drained soils. Consequently, it supports a mosaic of vegetation types within which plant species tolerant of wet habitats are widely distributed.
27. An outcome of ecology conferencing for the CFTA application was that “All experts agree that mapping wetlands is more difficult because many wetlands are induced and, in addition, facultative wetland species can occur in terrestrial habitat”.⁸
28. Mapping of wetland vegetation on the Jedburgh Plateau creates an ecologically artificial boundary between wetland vegetation, as defined by standard protocols, and other vegetation, which contains wetland species.
29. The important consideration is the effects of the activity (notably fragmentation) on a contiguous area of ecologically significant indigenous vegetation which includes extensive wetlands.

Assessments of Ecological Significance and Ecological Value

30. The Applicant relies on the Environmental Institute of Australia and New Zealand (**EIANZ**) Ecological Impact Assessment (**EciA**) Guidelines for the assessment of ecological value and ecological effects. These guidelines are non-statutory and not universally accepted as best practice by ecologists or consent authorities.⁹

⁷ Response to Ecology Peer Review, Wildlands Contract Report 6656q, page 26.

⁸ Joint Witness Statement of Experts in the field of Ecology, 13 September 2024, para 26.

⁹ Report and Decision of the Hearing Commissioners, Bathurst Coal Limited v Canterbury Regional Council and Selwyn District Council, 17 June 2022; & Joint Report and Decision of Hearing Commissioners, AW & AK Simpson v Mackenzie District Council and Canterbury Regional Council, 8 November 2023.

31. The EcIA Guidelines have important limitations for the assessment of value and ecological effects:
- a. First, they assess representativeness against an 1840 baseline. The effect of such assessments is to undervalue seral (regenerating) indigenous vegetation. The 1840 baseline originates from the Reserves Act 1977, a purpose of which was to “identify the best representative examples of natural ecosystems which originally gave New Zealand its own recognisable character”.¹⁰ The RMA (s.31(b)) requires maintenance of the indigenous biological diversity that is present today, not just that which may have been present in 1840.
 - b. Secondly, the EcIA Guidelines assess values of, and effects on, species and habitats, rather than areas or ecosystems. This encourages practitioners to subdivide the assessment area into small components based on species or vegetation types. This method divides areas/ecosystems into somewhat arbitrary units and has little regard for ecological integrity or the contribution the area makes to the wider ecosystem.
32. Assessing the ecological significance of vegetation types, rather than that of a wider site, is a reductionist approach which is inconsistent with the conclusions of ecological conferencing for the CFTA application, that “All experts agree that the indigenous vegetation on the Jedburgh Plateau is ecologically significant” and “All experts agree that all contiguous areas of indigenous vegetation at the Southland wind farm area are ecologically significant”.¹¹
33. Despite wrongly assessing significance based on divided up vegetation types (instead of the contiguous area of indigenous vegetation) and wrongly assessing representativeness against a historic baseline (instead of whether vegetation/habitat is typical or characteristic of present day natural diversity of the ecological district), the Applicant’s evidence accepts that the Jedburgh Plateau is ecologically significant.¹²
34. Therefore, the ecologically appropriate approach is to assess the Jedburgh Plateau as a complex and interconnected mosaic of indigenous vegetation that is ecologically

¹⁰ Reserves Act 1977, Section 3(1)(b).

¹¹ Joint Witness Statement of Experts in the field of Ecology for CFTA application, 13 September 2024, para 20 & para 40.

¹² Evidence of Nick Goldwater and Kelvin Lloyd, 18 August 2025, para 136.

significant as one contiguous area of vegetation/habitat. Instead, the Applicant has assessed vegetation types so that the “Project footprint has been reconfigured to the greatest extent practicable to avoid ‘Very high’ and ‘High’ value vegetation and habitat types”.¹³

Fragmentation of the Jedburgh Plateau Ecosystem

35. The SWF will construct roads and turbine platforms on the Jedburgh Plateau. The proposed roads are “8m wide with localised widening on corners to accommodate the tracking of the wind turbine components.”¹⁴ The proposed turbine platforms “could be up to approximately 125m long by a varying width of approximately 30-65m, with an additional extension of approximately 70m by 13m for crane assembly”.¹⁵ There will be 14 turbine platforms on the elevated part of the plateau. An important adverse effect on terrestrial ecology will be fragmentation of the ecologically significant plateau ecosystem.
36. The Southland Regional Policy Statement Policy (SRPS) BIO.2 seeks “prevention of further loss and fragmentation of areas of significant indigenous vegetation and habitats of indigenous fauna”.¹⁶ It requires, when giving effect to the policy, regard to the following potential adverse effects:
- i. fragmentation of, or reduction in the extent of, significant indigenous vegetation or significant habitats of indigenous fauna; and
 - ii. fragmentation or disruption of connections and linkages between significant ecosystems or significant habitats of indigenous fauna.
37. The Jedburgh Plateau supports a large contiguous area of indigenous vegetation which is an SNA when assessed against the SRPS criteria.¹⁷ The plateau supports a modified example of a ‘cloud forest’ ecosystem; an ecosystem type that is listed as a ‘rare forest habitat type’ in the SRPS.¹⁸
38. Fragmentation effects include creation of barriers to movement/dispersal of ground-based fauna (invertebrates and lizards), altered hydrology such as through diversion and discharge of stormwater from impermeable surfaces (roads and turbine platforms),

¹³ Evidence of Nick Goldwater and Kelvin Lloyd, 18 August 2025, para 8.

¹⁴ Contact Energy Southland Wind Farm. Part A Overarching Substantive Application for FTAA application, page 39.

¹⁵ Ibid, page 29.

¹⁶ SRPS, page 81.

¹⁷ SRPS, Appendix 3, page 286.

¹⁸ SRPS, Appendix 2, p284 (Slopedown Hill).

increased vulnerability to plant and animal pest invasion, and exposure of vegetation (including the eventual predicted forest) to edge/offsite effects such as wind, light and temperature.

39. An ecological principle for protection of natural areas (such as SNAs) is to minimise edge effects.¹⁹ Recent research shows that land-use intensification can facilitate plant invasions into adjacent indigenous shrublands.²⁰ A recent study showed the loss of vulnerable indigenous species (albeit in dryland ecosystems) following land use change at adjacent sites.²¹
40. An outcome of the invertebrate conferencing for the CFTA application was that “All experts agree that fragmentation will have different levels of adverse effects on different invertebrate species. Some of those effects are permanent effects (e.g. roads and turbine platforms)”.²² The Applicant’s FTA evidence concurs: “Habitat fragmentation may further isolate populations, limiting gene flow and increasing vulnerability to stochastic events. Less mobile species such as Helms’ stag beetle, ngaokeoke/peripatus.....are more vulnerable to fragmentation”.²³
41. The Applicant’s ecology evidence regards the effects of grazing, browsing and predation as fragmentation and, therefore, concludes that “new fragmentation is unlikely to significantly worsen conditions” and that “fragmentation effects are expected to be minor in the context of a landscape already dominated by extensive indigenous vegetation”.²⁴ That view is also articulated in the Applicant’s offsetting evidence, which states that “The entire Jedburgh Plateau site is already a fragmented landscape, both naturally and as a result of farming and ungulate modification”.²⁵
42. Farming (occasional extensive grazing), ungulate browsing and predation affect the condition of an ecosystem, notably its vulnerable components (such as palatable plant

¹⁹ O’Connor, K.F.; Overmars, F.B.; Ralston, M.M 1990. Land Evaluation for Nature Conservation. *Conservation Sciences Publication No.3*. Department of Conservation, Wellington.

²⁰ Brownstein, G.; Monks, A. 2024. Adjacent land-use intensification facilitates plant invasions into indigenous shrubland fragments. *NZ Journal of Ecology* 48(1): 1-12.

²¹ 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.

²² Joint Witness Statement of Experts in the field of ecology-invertebrates for CFTA application, 1 October 2024, para 22.

²³ Evidence of Nick Goldwater and Kelvin Lloyd, 18 August 2025, para 181.

²⁴ Evidence of Nick Goldwater and Kelvin Lloyd, 18 August 2025, para 169-170.

²⁵ Evidence of Roger MacGibbon, 18 August 2025, para 102(a).

species). To describe those effects as fragmentation is inconsistent with the common meaning of the word²⁶ and the ecological interpretation of the concept. It is also inconsistent with the Applicant's vegetation mapping which shows an unbroken expanse of indigenous vegetation across the plateau.²⁷

43. Construction of the SWF will permanently replace existing naturally occurring vegetation with linear strips of elevated hard surfaces (roads) which will fragment the ecologically significant vegetation/habitat of the Jedburgh Plateau. These roads are substantially longer, wider and more numerous than the few roughly formed unsealed farm tracks on the plateau. Even if the effects of grazing, browsing and predation are regarded as fragmentation, the magnitude of those effects is incomparable with the effects of wide hard-surface roads and turbine platforms.
44. It may be possible to minimise or avoid fragmentation effects on individual components of the Jedburgh Plateau ecosystem (though that is uncertain). However, it is not possible to minimise or avoid fragmentation effects on the Jedburgh Plateau ecosystem. Similarly, it is not possible to avoid fragmentation effects on the SNA, which all ecologists agreed to be the "contiguous areas of indigenous vegetation" of the SWF, including that on the plateau.²⁸

Offsetting

45. The Applicant uses the NPS-IB definitions for 'irreplaceability' and 'vulnerability' to assess the limits to offsetting and compensation at the SWF, notably the Jedburgh Plateau.²⁹ The provisions of the NPS-IB explicitly exclude the "development, operation, maintenance or upgrade of renewable electricity generation assets".³⁰ Therefore, the appropriate guidance principles for offsetting are those in the Business and Biodiversity Offsets Programme (BBOP). (Compensation is discussed later in this evidence).
46. The BBOP guidance states that "Irreplaceability is a term used to reflect the extent to which the loss of an area and its biodiversity will compromise regional conservation

²⁶ Cambridge Dictionary: "the action or process of breaking something into small parts"; or Collins English Dictionary "to break or cause to break into fragments".

²⁷ Wildlands, 2023. Assessment of terrestrial and wetland ecological effects for the proposed Southland Wind Farm, Slopedown Range, Southland (Appendix D). Wildlands Contract Report 6656, page 25.

²⁸ Joint Witness Statement of Experts in the field of Ecology for CFTA application, 13 September 2024, para 20 & para 40.

²⁹ Evidence of Nick Goldwater and Kelvin Lloyd, 18 August 2025, para 283-290.

³⁰ NPS-IB, section 1.3(3).

targets”.³¹ The proposed SWF activity will compromise regional conservation targets by removing vegetation/habitat from – and fragmenting – an area of significant indigenous vegetation and habitat, the protection of which is required by the SRPS and RMA (Section 6(c)).

47. The BBOP guidance states that “vulnerability indicates the likelihood or imminence of biodiversity loss (e.g., of a particular species or ecosystem, or of a specific site) due to current or impending threats.”³² The Applicant’s evidence and my observations suggest that vegetation on the Jedburgh Plateau is regenerating/recovering naturally following earlier disturbance. That recovery is influenced – but not prevented – by grazing and feral animals. The SWF activity will lead to the direct loss of biodiversity on the Jedburgh Plateau and will make the remaining biodiversity vulnerable to further loss through interruption of ecological processes (fragmentation of the area).
48. The Applicant’s evidence is that wetlands on the Jedburgh Plateau do not have high irreplaceability or high vulnerability, because the bog wetlands have resulted from land clearance.³³ Again, that analysis is too narrow. An analysis should consider “loss of an area and its biodiversity” (irreplaceability) and “particular species or ecosystem, or of a specific site” (vulnerability). The appropriate scale for analysis is the SNA or ecosystem, both of which comprise the Jedburgh Plateau, not just a subset of vegetation types.
49. The method employed by the Applicant to calculate offsets is the Biodiversity Offsetting Accounting Model (**BOAM**). The Applicant’s evidence states “The BOAMs focus on the residual loss of significant vegetation. The models do not account for exotic-dominant nor for indigenous fauna”.³⁴
50. Like any model, the adequacy of the BOAM is influenced by the data available. It is difficult, despite best efforts and intentions, to gather complete, or even adequate, data on ecosystem values. An outcome of offsetting/compensation conferencing for the

³¹ Business and Biodiversity Offsets Programme (BBOP). 2012. Guidance Notes to the Standard on Biodiversity Offsets, BBOP, Washington DC. p10.

³² Business and Biodiversity Offsets Programme (BBOP). 2012. Guidance Notes to the Standard on Biodiversity Offsets, BBOP, Washington DC. p11.

³³ Wildlands Memorandum 10 November 2025 (ref.6656s), page 9.

³⁴ Evidence of Nick Goldwater and Kelvin Lloyd, 18 August 2025, para 335.

CFTA application was that “All experts consider that uncertainties about the accuracy and adequacy of the data create uncertainties in the BOAM outputs”.³⁵

51. An outcome of invertebrate conferencing for the CFTA application was that “All experts agree that complete invertebrate inventories at the Southland Wind Farm site (Site) are not possible and for that reason invertebrate data will always be incomplete”.³⁶ An outcome of lizard conferencing was “The experts acknowledge the practical difficulties of undertaking comprehensive lizard surveys at the Southland Wind Farm site (Site)”.³⁷
52. A further outcome of lizard conferencing for the CFTA application was that “All experts agree offsetting calculations could not be done for lizards due to the uncertainty as to the presence of populations and ability to measure populations or changes to populations following management interventions”.³⁸
53. An outcome of offsetting/compensation conferencing for the CFTA application was that “All experts except NG and RB [who considered other experts were better qualified to comment] consider that the BOAM does not and is not designed to account for all ecosystem-wide effects such as fragmentation, or population-wide effects for mobile fauna”.³⁹

Compensation

54. The Applicant states that it has addressed these uncertainties by proffering compensation which exceeds that required for the anticipated losses caused by construction and operation of the SWF. However, those losses are difficult to quantify (fragmentation effects) and, again, only consider components of the ecosystem. It is even more difficult, if not impossible, to assess the potential effects on ecosystem processes, such as the migration and dispersal of ground-dwelling species, and the movement of water (hydrological effects), propagules and energy.

³⁵ Joint Witness Statement of Experts on the topic of offsetting/compensation for CFTA application, 5 November 2024, para 11(a).

³⁶ Joint Witness Statement of Experts in the field of ecology-invertebrates for CFTA application, 1 October 2024, para 13.

³⁷ Joint Witness Statement of Experts in the field of ecology-lizards for CFTA application, 30 September 2024, para 13.

³⁸ *Ibid*, para 29.

³⁹ Joint Witness Statement of Experts on the topic of offsetting/compensation for CFTA application, 5 November 2024, para 15.

55. The proposed compensation appears generous but uncertainty about the effects of the activity (notably fragmentation of the ecologically significant Jedburgh Plateau ecosystem) means it is difficult to determine whether that compensation is adequate.
56. This issue was addressed by the CFTA Expert Consenting Panel who concluded, based on the available evidence, that the adverse ecological effects of the proposed activity could be adequately addressed at all other parts of the SWF area but not at the Jedburgh Plateau.⁴⁰

Conditions

57. The Applicant has proffered a package of actions to mitigate or manage the effects of “loss of indigenous vegetation/habitat”, “impacts of habitat fragmentation for lizards and terrestrial invertebrates” and “loss of wetland extent”, among other things.⁴¹ These actions are outlined in a Habitat Restoration and Enhancement Management Plan (**HREP**)⁴² which will form part of a set of conditions if consent for the activity is granted. This section of my evidence reviews the proposed consent conditions for Ecological Management (EC1 to EC59A).⁴³
58. EC11B: The proposed wetland monitoring should include control plots (that is, plots located away from the wind farm footprint), otherwise it will not be possible to isolate any effects of construction from effects occurring naturally in the wider environment. Monitoring should continue for no less than ten years following wind farm construction. The conditions should specify the action that will be taken if monitoring reveals adverse effects of the wind farm on those wetlands.
59. EC40: The Biosecurity Management Plan should include the requirement that any naturalised plant species that colonise (invade) any area disturbed by wind farm construction on the Jedburgh Plateau (and are not already present in the undisturbed environment) be completely removed (eradicated) and that all infestation sites be monitored for reinvasion.

⁴⁰ Record of Decision of the Expert Consenting Panel, Southland Wind Farm Project, 18 March 2025, para 199.

⁴¹ Contact Energy Southland Wind Farm, Part B Approvals Relating to Resource Management Act 1991 for FTAA application, page 27 & 131.

⁴² Ibid, page 146.

⁴³ Proposed Southland Wind Farm Consent Conditions (101.-Part-I-Proposed Resource Consent Approvals Conditions).

60. EC49: The HREP should address, as a residual adverse effect, the fragmentation of ecologically significant indigenous vegetation on Jedburgh Plateau, in addition to those effects listed in (a) to (f).
61. EC51: Farmed animals (stock) should be excluded from the entire Jedburgh Plateau, not just the Jedburgh Station Ecological Enhancement Area (**JSEEA**).
62. EC54: I support the plant and animal pest control outlined in this condition, except that pest plant control (g) should be undertaken for the duration of the operation of the SWF.
63. An additional condition should require legal protection of the Jedburgh Plateau in perpetuity for nature conservation. The boundaries of the protected area should be the same as those delineated for the Jedburgh Station Pest Control Area (Appendix D Ecological Enhancement Areas).

Conclusion

64. The evidence submitted by the Applicant, while comprehensive, does not adequately address the adverse effects of the activity on the ecological integrity of the Jedburgh Plateau ecosystem. There remains considerable uncertainty about the fragmentation effects of roads and turbine platforms on this ecologically significant area of contiguous indigenous vegetation and habitat.
65. Conditions of consent are proposed to compensate for the loss of vegetation and habitat. Those conditions do not adequately compensate for the net loss of an intact (that is, unfragmented) ecologically significant site (Jedburgh Plateau).
66. These adverse effects could be largely avoided if the Jedburgh Plateau was excluded from the wind farm footprint. Adverse effects on terrestrial ecology at other parts of the SWF (that is, excluding the Jedburgh Plateau) can more likely be mitigated, offset or compensated.



Mike Harding
17 December 2025

Attachment A

BEFORE THE EXPERT CONSENTING PANEL (“ECP”)

IN THE MATTER of the COVID-19 Recovery (Fast-track Consenting)
Act 2020

AND

IN THE MATTER of an application by Contact Energy Limited for
resource consents to construct and operate a wind
farm on land in Oware, Southland

JOINT STATEMENT OF EXPERTS IN THE FIELD OF

ECOLOGY

Dated 13 September 2024

INTRODUCTION

1. Expert conferencing on the topic of ecology effects took place in person in Ōtepoti / Dunedin and online via Microsoft Teams on 13 September 2024.
2. The conference was attended by the following experts:¹
 - a) Nick Goldwater (“NG”) (for applicant),
 - b) Kelvin Lloyd (“KL”) (for applicant),
 - c) Lydia Metcalfe (“LM”) (for applicant),
 - d) Mike Harding (“MH”) (peer review advisor to the Expert Consenting Panel),
 - e) Darin Sutherland (“DS”) (for Environment Southland),
 - f) Catriona Gower (“CG”) (for Environment Southland), and
 - g) Rhys Burns (“RB”) (for Department of Conservation).
3. Chris Simmons (ChanceryGreen) acted as facilitator.
4. Megan Hankey (Mitchell Daysh) assisted the experts to draft the JWS.

CODE OF CONDUCT

5. The experts confirm that we have read the Environment Court Code of Conduct 2023 and agree to comply with it. The experts confirm that the issues addressed in this Joint Statement are within our area of expertise, unless stated otherwise.

SCOPE OF STATEMENT

6. In accordance with the ECP Minute 5 (5 September 2024), the ECP has directed the experts to confer on ecology matters. It is acknowledged that this conferencing session excludes:
 - a) avifauna,
 - b) bats,
 - c) lizards,
 - d) invertebrates, and
 - e) freshwater ecology.
7. Based on the ECP’s direction, an agenda for conferencing has been agreed. That agenda forms the basis for conferencing, as recorded in this Joint Statement below.
8. In this Joint Statement we report the outcome of our discussions in relation to each issue (below) by reference to points of agreement and disagreement relating to facts, assumptions, uncertainties, and expert opinions. We have noted where each of us is relying on the opinion or advice of other experts.

¹ Noting that LM was required to leave the conferencing and so were not present for the discussion on Topic 5.

Where we are not agreed in relation to any issue, we have set out the nature and basis of that disagreement.

9. The issues posed in the conferencing agenda are set out in **bold** below.
10. Unless otherwise stated, the experts agree with the statements in the following paragraphs.

TOPIC 1: ECOLOGICAL CONTEXT

The accuracy and adequacy of the description of the ecological context in the Wildlands reporting.

11. MH, RB and CG say that it is necessary to have further information about the indigenous biodiversity of other areas (including within the two ecological districts) and the interaction between the biodiversity of those areas and the SWF area, for example mobile fauna, and in a climatic and hydrological context.
12. NG says that it will be useful to have further information but does not think it is necessary for the assessment. NG thinks the work that has been done on site is enough to inform the assessment but can provide further information on the wider context of the ecological districts.
13. KL says that further information could be provided, but the current information is sufficient for an assessment of significance and effects.

TOPIC 2 VEGETATION MAPPING AND WETLAND DELINEATION

The approach / methodology applied by Wildlands to the mapping / identification of vegetation and wetlands.

14. All experts agree that it is a challenging site to map vegetation types accurately, particularly on the Jedburgh Plateau.
15. MH has expressed concern with the lack of information on mapping method, in particular:
 - a) The date of the aerial imagery
 - b) The extent and location of ground truthing
 - c) The mapping scale
 - d) The method by which changes were made to the mapped vegetation types
16. NG agrees to revisit the methodology and supply additional information if necessary, with regard to paragraph 15 a-d.
17. NG and KL say that wetland mapping approach has been well described in Section 2.4.3 of the EclA. Wetland delineation plots were not undertaken in

vegetation that was clearly terrestrial.

18. NG says that all terrestrial vegetation and wetland mapping will be refined at detailed design stage as a condition of consent.
19. DS says that given the nature of the vegetation he has concerns about the amount of wetland plots that have been used and given the size and extent of the proposed wind farm though there could have been more effort done in that regard especially since the vegetation is difficult to ascertain (including for facultative species) particularly with regard to the requirements of the NPSFM 2020. DS considers that the applicant's approach should focus on the areas of the wind farm footprint to provide certainty. DS considers that a clear description of the methodology utilized is not apparent, and that the rapid assessment approach that has been utilized in some areas is not necessarily appropriate given the vegetation types.

Whether that approach / methodology was appropriate / sufficient to inform the consenting process for the Project.

20. All experts agree that the indigenous vegetation on the Jedburgh Plateau is ecologically significant.
21. MH considers that the assessment of significance should be of areas of vegetation and habitat not of vegetation types.
22. MH considers that the applicant's assessment of significance is inappropriate because it is based on vegetation types.
23. NG and KL say that it would be inappropriate to assess the site as one overall vegetation type. NG and KL believe the method used to assess effects is a standard approach for resource consent applications. NG and KL believe that characterizing vegetation types at the Jedburgh Plateau provides a high level of information to make a fulsome assessment of significance and effects. Vegetation types were not treated in isolation. Rather, they were assessed in the context of contiguous vegetation and ecosystems.

The accuracy of the vegetation and wetland mapping / identification, and the implications of any inaccuracies.

24. All experts agree that accurately mapping vegetation types on the Jedburgh Plateau is challenging.
25. KL, NG and LM consider mapping some vegetation types (e.g. forest vegetation) in and around the Jedburgh Plateau is relatively straightforward.
26. All experts agree that mapping wetlands is more difficult because many

wetlands are induced and, in addition, facultative wetland species can occur in terrestrial habitat.

27. MH considers that the vegetation type mapping gives an incorrect impression of accuracy and that the consequent uncertainty should be acknowledged in the assessment of effects.
28. DS, CG, RB and MH have some reservations about the accuracy of vegetation mapping and how that was used to inform the biodiversity offset modelling.
29. NG, LM and KL consider that there is a sufficient level of accuracy to assess the effects. Even if there are minor errors, they would not affect the outcome of the effects assessment, particularly for terrestrial habitat types.

Whether further mapping / identification work should be carried out:

- **now, to inform the consenting process; and / or**
- **following the consenting process but before the start of construction, to reflect the detailed design of the Project (to 'ground truth' the work carried out to date)**

30. NG and KL consider that the level of mapping within the consent footprint is appropriate to determine the level of effects. We acknowledge that minor tweaks to the final design may be made and also adjustments to the vegetation mapping. Any unders or overs will be accounted for in the effects management approach, noting that additional ground truthing will be undertaken at detailed design stage.
31. MH, RB, DS and CG consider that there should be a full ecological survey, including utilization of existing data, of the footprint of the proposed wind farm layout and adjacent areas prior to grant of consent to ensure appropriate application of the effects management hierarchy. For example, this enables avoidance of ecologically valuable areas either by adjustment or removal of turbines or infrastructure. This assumes that the application is for a wind farm footprint and not an envelope approach.

TOPIC 3: ECOLOGICAL VALUE

The approach / methodology applied by Wildlands to the assessment of ecological value, and in particular the use of the EclA guidelines.

32. All experts agree that an ecological assessment necessarily contains a level of subjectivity.
33. NG and KL say the approach used here utilizes the EclA guidelines in a

conservative manner which is appropriate for the assessment of ecological values. Rather than using broad ecosystem classifications we have used more detailed vegetation types in our assessment of ecological values. This allows the significance and effects on each vegetation type to be assessed.

34. KL and NG say that they have seen the EclA guidelines used inappropriately, and that this is commonly where experts assign values and level of effect that are inappropriate. They are confident that this has not occurred in this application.

35. MH considers that the EclA approach is not appropriate because it uses vegetation types as units for assessment and averages values and effects.

36. NG and KL say that Wildlands has been very conservative in assigning the ecological values.

Whether the EclA guidelines have limitations meaning they are not an appropriate basis or are inadequate for the assessment of ecological effects in RMA consenting processes.

37. Refer to section above.

The influence of the assessed historical disturbance and current threats at the Project site on Wildlands' assessment of ecological value.

38. All experts agree that indigenous vegetation at the site is affected by domestic stock and feral herbivores.

39. KL and NG say the effects of feral herbivores and domestic stock are clear. They are inhibiting palatable species recruitment right across the site. The manuka forest is in a state of arrested succession, and would succeed to rata-kamahi forest if ungulates were excluded. Another effect is trampling and pugging disturbance when ungulates are crossing wetlands.

TOPIC 4: ECOLOGICAL SIGNIFICANCE

The approach / methodology applied by Wildlands to the assessment of ecological significance, and how that influenced Wildlands' assessment of ecological values and effects.

40. All experts agree that all contiguous areas of indigenous vegetation at the Southland wind farm area are ecologically significant.

41. MH considers the correct approach when assessing ecological significance is to assess contiguous areas of indigenous vegetation, instead of the individual vegetation types.

42. KL and NG confirm that the vegetation types have been appropriately assessed for ecological significance, including against Appendix 3 of the RPS.

Whether that approach / methodology is appropriate and consistent with the RMA and relevant planning instruments, in the context of an application for resource consents.

43. MH and DS consider that the appropriate approach under the RPS is to assess contiguous areas of indigenous vegetation and habitat, not vegetation types. This ensures that ecological attributes such as diversity, pattern and ecological context are appropriately considered and enables a more meaningful assessment of the effects of fragmentation.

44. NG says that Wildlands took a highly conservative approach when assessing significance against the RPS, for example, if a vegetation type could potentially support a threatened species (e.g. tussock skink) it was deemed to meet the 'Rarity/distinctiveness' criterion based on professional judgement. It is important to note that some vegetation types were not assessed as significant solely based on the quality or representativeness of the vegetation.

45. NG and KL say that Wildlands assessed discrete areas of significant indigenous vegetation rather than one overall area. We did this to inform our effects assessment, and it is a standard approach we have used in previous effects assessments.

Whether Wildlands has appropriately assessed:

- **fragmentation effects; and**
- **connections / buffers / corridors significance and effects.**

46. MH considers Wildlands method does not allow for adequate assessment of fragmentation effects because it assesses vegetation types, not areas. The data on indigenous fauna are limited and consequently the effects of fragmentation on fauna habitat are uncertain.

47. NG notes that potential effects of fragmentation on indigenous fauna have been described in Section 11.4.2 of the EclA. Wildlands fauna experts have responded to the issues raised by MH in relation to fragmentation.

48. NG and KL say that the principal effect of fragmentation on vegetation is that it creates new edges that are vulnerable to weed invasion. NG notes that pest plant control will be undertaken within close proximity of the wind farm

footprint during the wind farm operation.

49. NG and KL say that fragmentation will not separate different ecosystem types (e.g. forest, shrubland, wetlands). There is enough habitat onsite to retain connectivity between different ecosystem types.

50. DS, CG and MH acknowledge that there will be effects on hydrology associated with roads/corridors/fragmentation, with consequential effects on biodiversity. These effects have not been adequately assessed.

TOPIC 5: ECOLOGICAL IMPACT ASSESSMENT

Limitations of the data

Whether the vegetation mapping can be relied upon for a robust assessment of effects, to inform the consenting process.

51. MH and DS consider that the vegetation mapping (including delineation of wetlands) is not accurate enough for a robust assessment of ecological effects and that further survey of the wind farm footprint is required prior to grant of consent (refer to paragraph 31 above).

52. NG and KL have confidence in the vegetation mapping and the assessment of effects based on it is robust. NG notes that further ground truthing will be undertaken as per the consent conditions proposed by the applicant (as discussed in paragraph 30 above).

Whether fauna have been adequately surveyed; and whether further data are required to enable a robust assessment of effects.

53. The experts agree this is best addressed in a separate conferencing session, with fauna experts.

Ecosystem effects

Whether the assessment of effects includes an appropriate level of focus on loss or fragmentation of indigenous ecosystems, the effects on ecological processes such as species' movement, and the effects on other ecosystem-wide processes such as hydrological systems.

54. Effects associated with fragmentation have been dealt with above.

55. All experts agree that hydrological effects on vegetation, fauna and wetlands should be assessed.

56. KL and CG consider that gully wetlands will be resilient to hydrological change, unless there is infill disposal involved.

57. KL, CG, DS and RB consider that natural bogs on ridges should be carefully treated to avoid drainage.

58. CG and DS consider that wider process effects on hydrological systems are not clear in the application. This includes drying and wetting processes affecting wetland areas.

Avoiding adverse effects

Whether appropriate avoidance measures are proposed, in light of the value / significance of the vegetation and habitats present.

59. MH, RB, CG and DS consider that vegetation that has been mapped as high value (wetland vegetation) has not been avoided in the wind farm layout, for example, at turbines JED-07 and JED-23. Significant indigenous vegetation has not been avoided by the wind farm layout.

60. KL and NG state that the Pahautea forest has high irreplaceability value and was therefore avoided. Effects on wetlands were minimised, noting that fen and bog wetlands have lower irreplaceability value in the context of the wider Catlins area.

61. RB and DS have uncertainty about the wider prevalence, and therefore the irreplaceability, of these wetland types (fen and bog wetlands at high altitude) in the wider Catlins area.

62. KL and NG acknowledge that avoidance of all high value habitats has not been achieved. Overall impacts on wetlands have been minimised through iterative design changes.

Whether the effects assessment has appropriately considered and addressed fragmentation and edge effects.

63. Fragmentation effects have been addressed above.

The efficacy of the iterative design process to avoid high value habitat, noting, in particular turbine JED07.

64. Refer to paragraph 60 above.

Magnitude of residual effects

The approach taken to identifying the magnitude of residual effects, and whether that approach was appropriate.

65. NG considers that the approach to assessing the magnitude of residual

effects is highly conservative when assessing requirements for offsetting and compensation. NG says that regardless of the extent of loss, the magnitude of effect was considered at least moderate for high and very high value vegetation types. NG says that magnitude and level of effect is not particularly relevant for wetland loss because wetland loss has to be addressed under the NPSFM.

66. MH considers that both the approach (EIANZ guidelines) to identify the magnitude of residual effects and the units (vegetation types) used for that assessment are inappropriate.

TOPIC 6: BIODIVERSITY OFFSETS AND COMPENSATION [excludes consideration of the modelling]

67. The experts did not have time to address this topic.

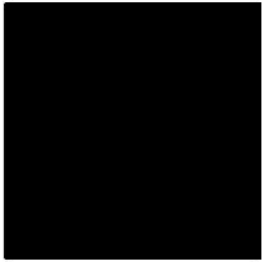
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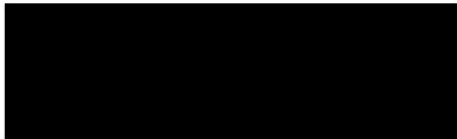
Nick Goldwater



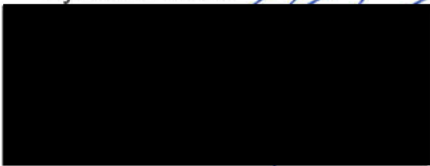
Kelvin Lloyd



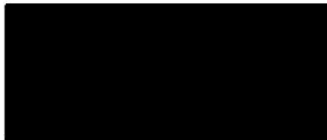
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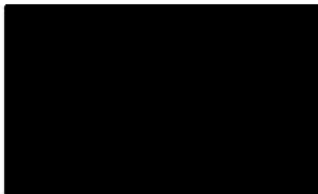
Mike Harding



Darin Sutherland



Catriona Gower



Rhys Burns

Attachment B

BEFORE THE EXPERT CONSENTING PANEL (“ECP”)

IN THE MATTER of the COVID-19 Recovery (Fast-track Consenting)
Act 2020

AND

IN THE MATTER of an application by Contact Energy Limited for
resource consents to construct and operate a wind
farm on land in Oware, Southland

JOINT STATEMENT OF EXPERTS ON THE TOPIC OF

OFFSETTING / COMPENSATION

Dated 5 NOVEMBER 2024

INTRODUCTION

1. Expert conferencing on the topic of offsetting / compensation in the context of ecology matters took place online via Microsoft Teams on 29 October and 1 November 2024.
2. The conference was attended by the following experts:
 - a) Nick Goldwater (“NG”) (for applicant);
 - b) Dr Kelvin Lloyd (“KL”) (for applicant);
 - c) Dr Greg Ryder (“GR”) (for applicant) who participated in discussions on topic 4 (freshwater) only;
 - d) Dr Justyna Giejsztowt (“JG”) (for applicant);
 - e) Dr Graham Ussher (“GU”) (peer review advisor to the Expert Consenting Panel);
 - f) Mike Harding (“MH”) (peer review advisor to the Expert Consenting Panel) who participated in discussions on topic 1, issues 1A to 1C only;
 - g) Catriona Gower (“CG”) (for Environment Southland);
 - h) Dr Darin Sutherland (“DS”) (for Environment Southland);
 - i) Cassie Mealey (“CM”) (for Department of Conservation); and
 - j) Dr Rhys Burns (“RB”) (for Department of Conservation).
3. Chris Simmons (ChanceryGreen) acted as facilitator.
4. Islay Fowler (ChanceryGreen) assisted the experts to draft the Joint Witness Statement (“JWS”).

CODE OF CONDUCT

5. The experts confirm that we have read the Environment Court Code of Conduct 2023 and agree to comply with it. The experts confirm that the issues addressed in this JWS are within our area of expertise, unless stated otherwise.

SCOPE OF STATEMENT

6. The scope of this JWS is limited to offsetting / compensation in the context of ecology matters, and conditions. Specifically, the applicant's approach to offsetting and compensation (wetlands, freshwater and terrestrial ecology (excluding bats)), including the inputs and outputs of the offset model and proposed compensation package, and the SEV method.
7. An agenda for conferencing has been agreed. That agenda forms the basis for conferencing, as recorded in this JWS below.
8. In this JWS we report the outcome of our discussions in relation to each issue (below) by reference to points of agreement and disagreement relating to facts, assumptions, uncertainties, and expert opinions. We have noted where each of us is relying on the opinion or advice of other experts. Where we are not agreed in relation to any issue, we have set out the nature and basis of that disagreement.
9. The issues posed in the conferencing agenda are set out in **bold** below.
10. Unless otherwise stated, the experts agree with the statements in the following paragraphs.

TOPICS 1 – 3: TERRESTRIAL AND WETLAND OFFSET AND COMPENSATION

TOPIC 1: TERRESTRIAL AND WETLAND OFFSET AND COMPENSATION

Issue 1A: Information basis (GU Peer Review at [3], [5], [7]–[10] and [19]–[20])

- ***The completeness of the assessments by Wildlands and its responses to ecology peer reviews.***

- ***Consider potential uncertainties referenced by GU and whether those are addressed in the application reports, conditions and management plans, and responses to comments and peer reviews.***
11. On this issue, the experts say:
 - (a) All experts consider that uncertainties about the accuracy and adequacy of the data create uncertainties in the BOAM outputs.
 - (b) Further to the above, KL, NG, JG, GU, CM, RB, CG, and DS consider that uncertainties about the accuracy and adequacy of the data create uncertainties in typical BOAM outputs, wherever they are used.
 12. NG, JG and KL consider that the approach to input data collection for the BOAMs including field counts and measures (including additional measures from this season), use of literature values, and an overall conservative approach indicates that the data used in the models is sufficiently accurate.
 13. CM and GU support the approach to data collection as per [12] above, however are not sufficiently familiar with the data to comment further. Both consider the input data is sufficient to demonstrate proof of concept for managing adverse effects / predicting net gain.
 14. JG and KL consider that uncertainties in the input values are not likely to be affecting the net gain predictions of the BOAM models.
 15. All experts except NG and RB consider that the BOAM does not and is not designed to account for all ecosystem-wide effects such as fragmentation, or population-wide effects for mobile fauna.
 16. JG and KL consider that these effects referred to at [15] above are partially accounted for through the use of metrics of ecological integrity within the BOAM.
 17. NG and RB consider other experts are better qualified to make express comment on the effect of the BOAM.
- ***Reliance by GU on other ecology peer reviews and statements in joint witness statements.***

18. GU is primarily reliant upon the opinions expressed in the ecology peer reviews and statements and joint witness statements, although his opinion is also informed by the applicant's technical reports and his site visit dated 25 October 2024.
 - ***Whether residual uncertainties / potential uncertainties are addressed in Wildlands reporting, conditions / management plans, and the proposed approach to offsetting and compensation.***
19. GU, MH CG and DS consider that further detail/clarification is required from the applicant in order to address these residual uncertainties.
20. GU, CG and DS consider that this should include a draft riparian offset management plan, and updated conditions detailing the proposed approach to offsetting and compensation, and that this further information/clarity is provided to inform the consenting process. CM and MH agree with the second part of the preceding statement only and are not prepared to comment on riparian matters.

Issue 1B: Use of the BOAM model with the current information basis (GU Peer Review at [2] and [8])

- ***Whether the Biodiversity Offset Accounting Model (BOAM) can be used with the existing information (noting the conservatism in the approach adopted to date).***
21. GU, JG, CM and KL consider that uncertainties are inherent in offset modelling, and the uncertainties present in the offset modelling for this project for the biodiversity components that are modelled, can be managed through precautionary approaches in modelling and conditions of consent.
 22. GU, JG and CM consider that precautionary approaches should prescribe avoidance of impacts on species classified as threatened and also include limits on the maximum extent of indigenous vegetation clearance.
 - ***Whether the BOAM can adequately address potential adverse effects of fragmentation of significant indigenous vegetation/habitat at the SWF and surrounding areas.***
 23. Refer to comments at [15]-[17] above.

- ***If not, what further information on the type, condition/ status, magnitude, and extent of potential effects on ecological values is required to use the BOAM (including any time frames for obtaining such information).***

24. MH, NG and RB consider that the issue of potential fragmentation effects has been discussed at earlier conferencing (refer to ecology JWS at [46]-[50], lizard JWS at [29] and invertebrate JWS at [22]-[24]).

Issue 1C: The use of the BOAM model to identify offsets (GU Peer Review at [22]–[23])

- ***The BOAM approach used by Wildlands (including its appropriateness).***

25. CM, JG, GU and KL consider that the benchmarks used in the BOAMs are an appropriate framework for offsetting and compensation.

- ***Matters raised by GU and any other commenters to be addressed:***

- ***If attributes in the BOAM are required specifically to address effects on recovery on native birds, lizards or invertebrates (considering the practicality / utility of doing so).***

26. GU and KL's response to the above statement is "no". These matters are/can be addressed through conditions of consent that prescribe limits or further survey requirements.

27. CM considers that an offset is possible for forest birds and fernbirds. JG agrees with this statement however further says that avifauna models would provide the basis for an argument that mitigation is sufficient but should not be considered conclusive without challenging attributes such as breeding success and recruitment.

28. CM and RB consider that in this instance where pest control is proposed over the long term, less intensive techniques such as five-minute bird counts (including mean calls per five minutes and species diversity in each season) could effectively demonstrate a net gain in avifauna. Fernbirds could be measured using territory mapping or site occupancy. The offset would demonstrate that residual adverse effects on birds have been managed whereby a positive trend for forest birds and fernbirds (such as a percentage increase over the lifetime of the consent) is achieved over the life of the pest control.

TOPIC 2: PROPOSED PACKAGE OF OFFSETS AND COMPENSATION

Issue 2A: Offsetting and compensation (GU Peer Review at [7]–[8], [21] and [27]); DOC comments at [113]–[114])

- *The proposed on-site offsetting and compensation by Wildlands, and the ecological benefits it will provide.*

29. NG summarised the proposed offset and compensation actions as follows.

Summary of offset and compensation actions

- Aerial control of introduced mammalian pests across indigenous vegetation and habitats on Jedburgh Station (across 1,400ha) no less than every three (3) years from the commencement of the commissioning of the wind turbines;
- Deer fence around an approximately 250-hectare block at Jedburgh Station. Stock exclusion within the deer fence area. Enrichment planting at rate of 20 plants per hectare, totalling approximately 5,000 plants.
- Targeted deer control across the Jedburgh Station plateau every six (6) months for two (2) years following the commencement of the commissioning of the wind turbines, and no less than every three (3) years for the life of the consent (35 years) following that;
- Targeted ground-based predator control on a 150-metre grid within a designated ‘fernbird protection area’ on the Jedburgh Station plateau and along the access roads to the Southland Wind Farm to protect the local fernbird population for the duration of this consent;
- Targeted ground-based pest control at the Davidson Road East wetlands, if considered necessary to protect plantings and restoration of this site;
- Targeted ground-based predator control at the Dunvegan Fen Complex, targeting mustelids and feral cats to protect the local population of Australasian bittern, if the transmission line and GIP are located in the Clutha District (undertaken bi-monthly for a period of five years);
- Enhance habitat for indigenous lizards and invertebrates by transferring woody

debris and logs into proposed relocation sites.

- Intensive predator control for a known population of long-tailed bats within a 10,000-hectare treatment area in the Beresford Range, Catlins (noting there will be additional benefits for other indigenous fauna and flora species).
- Assisted regeneration and enrichment planting of 8.7-hectare of existing tracks and firebreaks within the proposed 250-hectare enhancement area to address concerns around fragmentation. [NG notes that this measure is not currently provided in the conditions being advanced by the applicant].

Wetland compensation at Davidson Road East property

- Revegetation of exotic wetland (up to 5.6 hectares).
 - Enrichment wetland planting (c.4.5 hectares).
 - Riparian enrichment planting (minimum planting area of 2,500m²).
- ***The appropriateness of that offsetting and compensation, including:***
 - ***the locations selected; and***
 - ***the management actions proposed.***

30. GU considers that strict limits to the areas of indigenous vegetation that may be cleared across the project footprint should be set in the conditions of consent. Those limits should incorporate good practice avoidance protocols as part of detailed design, especially turbine micro-siting.

31. NG advises that the proposed upper clearance limit is 3.5 hectares for all wetlands.

32. NG and KL advise that the proposed upper limits on clearance for each vegetation type are set out in the draft table **annexed** and marked 'A'.

33. CG and DS raised some issues with the offsetting proposed:

- (a) They prefer a "like for like" approach to offsetting for the wetland areas, but acknowledge the practical constraints.

- (b) They note that the irregular shape to the fenced wetland area increases the adverse edge effects. In comparison, a shorter, straighter-edged fenced area encloses a larger area and minimises edge effects.
- (c) They note that the proposed fencing will not keep pigs out of upland areas and hares out of wetland areas. DS and CG also note that it is an existing requirement to exclude stock from natural wetland areas under the proposed Southland Water and Land Plan.
- (d) Note that unfenced areas will remain subject to grazing pressure.
- (e) Insufficient detail of level of pest animal species control (other than deer) and monitoring of its effectiveness, such as monitoring of fence repairs.

34. In response to [33] above, NG advises:

- (a) That Wildlands has already addressed the issue of using not “like for like” compensation for wetlands, noting that it would be impossible to recreate fen and bog habitats at the site.
- (b) That the existing wetland is essentially edge habitat due to the impacts of stock and exotic plant species. The proposed revegetation planting adjacent to the existing wetland vegetation, together with the proposed enhancement planting within the wetland (amongst existing wetland plants), will make the site more resilient against edge effects. NG notes that edge effects are less of an issue for these types of wetlands than they are for woody terrestrial habitats. NG considers that there may be merits in reviewing the fence line and construction type as there may be benefits associated with straighter lines. NG advises that, regardless, there will be a setback of up to 4m between the wetland margin and fence line. This will help to reduce the effects of stock on the wetlands.
- (c) That electric hotwires will be installed around the perimeter of the deerproof fence to minimise damage caused by deer and pigs interacting with the fence. The fence will be inspected regularly as per the Habitat Restoration and Enhancement Plan (“HREP”). NG agrees that the HREP should specify that necessary repairs are undertaken as soon as practical and all deer incursions removed.
- (d) That he acknowledges that stock will continue to graze some of the plateau for

three months of the year. However, the landowner will shortly require consent to graze animals in wetlands and it is unlikely that consent will be granted.

(e) NG notes that target outcomes for key pest animal species are outlined in condition EC57. NG is supportive of all predator control being extended to continue for the lifetime of the consent. In particular, mouse control within the lizard release areas being extended from 10 years to the life of the windfarm, or as otherwise agreed with DOC.

- ***Matters raised by GU and DOC and any other commenters to be addressed:***

- ***The appropriateness of restoring and protecting biodiverse communities similar to the original vegetation – rather than concentrating on retaining transitional or mosaic communities that have resulted from human-induced modification.***

35. GU, NG, KL, CM, JG, RB, CG and DS agree that it is appropriate to restore and protect biodiverse communities to support the transition to original vegetation types, such as the benchmarks used in the offsetting models.

- ***The benefit (and practicality) of "like for like" approach instead of compensation (as proposed) for wetlands.***

36. This issue is addressed at [33(a)] and [34(a)] above.

37. GU, CM, KL, NG, JG, RB, DS and CG opine that a "like for unlike" approach is contrary to the preferred ecological outcomes, however, the restoration of extent and values for copper tussock marsh wetland habitat is an achievable option in this instance but does not offset the permanent loss of bog and fen wetland. Achieving a "like for like" approach to bog and fen offset would be technically difficult and experimental and could not be relied on as an offset or compensation.

38. NG and KL advise that the focus for addressing effects on wetlands has been on increasing overall indigenous extent of natural wetlands by retiring grazed areas with hydric soils at Davidson Road East, together with enhancement planting and weed control within existing areas of marsh.

39. KL considers that marshes have been greatly reduced in extent within the Southland region for the purposes of agriculture and flood protection. It therefore makes sense

from an ecological perspective to prioritise restoration of marsh habitats.

40. DS considers that areas of marsh have been induced in Southland and therefore its overall rarity versus its original extent is uncertain. Further, marsh habitat is easier to create than bog and fen.
41. NG and KL advise that approximately 21 hectares of fen wetland and bog will be legally protected in perpetuity within the 250-hectare enhancement area, as per condition EC59 (version dated 13 September 2024). These areas of wetland have not been factored into the offsetting or compensation calculations.

Issue 2B: Pest control (GU Peer Review at [8])

- ***The nature and extent of the proposed pest control (including fencing / other associated actions).***
42. CG queries the process of rodent control at the lizard release area. CG has concern with lizards being directly or secondarily affected by poison, and over the use of brodifacoum for many years in one place.
 43. RB notes that the concerns at [42] above were not addressed in the JWS for lizards, and some management action to address these concerns should form part of the HREP.
 44. All experts agree that a suitable condition should be included requiring prior approval from DOC as to proposed pest control at the lizard release area, noting that a Lizard Management Plan has been submitted to DOC as part of the Wildlife Act process.
 45. NG advises that condition EC57 (version 13 September 2024) stipulates management targets for rats and mice at the windfarm site.
 - ***Address the duration of actions / benefits.***
 - ***The benefits that the proposed pest control scheme will bring.***
 46. GU notes that the proposed benefits arising from the offsetting and compensation package are derived from planting and pest control and queries whether no net loss or a net gain will be achieved in perpetuity once pest control is ceased.

47. NG, KL and JG consider that in perpetuity pest control is not needed to meet the offsetting targets within the 25-30 year timeframe stipulated in the BOAM. NG and KL consider that the consented life of the wind farm will be long enough for palatable indigenous tree species to regenerate and grow tall enough to be beyond reach of feral ungulates. Many of these tree species will remain in the forest canopy long after the wind farm has been decommissioned.
48. CG, DS and RB disagree regarding tree height and ungulates. RB notes that feral ungulates can affect trees with foliage above deer browse height by stripping and rubbing bark and can cause tree mortality, even of mature palatable tree species.
49. KL considers that deer can strip and rub on bark, but stripping is mainly on young trees of broadleaf and three finger. He has not seen deer stripping bark in forests near the wind farm site. He has seen mature trees rubbed around deer wallows, but this has not caused tree mortality.
50. GU notes decommissioning condition DT2 and identifies that there may be a time gap between the end of pest animal control requirements and decommissioning (or re-consenting) of the wind farm. GU, KL, JG, CM, CG, DS, RB and NG consider that pest animal control requirements should be continued for the life of the wind farm and until decommissioning has resulted in the rehabilitation and re-establishment of pre-development indigenous vegetation.
51. All experts consider that condition:
 - (a) DT2 should include a requirement for the Decommissioning Management Plan to be subject to council certification; and
 - (b) DT2(b) should be amended to require revegetation and rehabilitation of all roads created or developed within indigenous vegetation areas to service the wind farm area.

Issue 2D: Outcomes (GU Peer Review at [8] and [24]–[27])

- ***Level of confidence that benefits sufficient to address the residual effects of the Project will be achieved.***
52. GU and CM have reviewed the offset models and confirm that the offset and

compensation program as proposed by the applicant is precautionary and includes contingency buffers. They further note that the discussions recorded in this caucusing session do not supersede any conclusions reached from other caucusing of experts.

TOPIC 3: CONDITIONS

Issue 3A: Performance targets (GU Peer Review at [28]; DOC comments at page 54)

- *Whether the performance targets proposed are appropriate.*
- *Whether additional performance targets are required.*
- *Whether the proposed timeframes for the performance targets are appropriate.*
- *Whether additional timeframes for the performance targets are required.*

53. GU and CM consider that the draft consent conditions do not provide adequate consideration of:

- (a) avoidance of effects on ecology that may be greater than described in the effects assessment;
- (b) financial guarantees that ecological works will be delivered for the duration of the programmes;
- (c) monitoring of anticipated ecological trajectories such as performance targets taken from the offset and compensation models against which the measure of success of the offsets and/or compensation can be assessed; and
- (d) how to respond where outcomes delivered are substantially less than anticipated.

54. GU, CM and KL recommend that approaches to address the issues raised in [53] above should include consent conditions relating to financial bonding, review clauses that assess progress towards achieving biodiversity outcomes, outcome monitoring for ecological deliverables and limits to indigenous vegetation clearance. JG supports this.

55. All experts suggest better specifying within the conditions the actions to be undertaken to achieve the proposed offset and compensation package. For example, the 250 hectare enhancement area to be legally protected, with stock and deer excluded, should be outlined in a condition together with the duration of stock/deer exclusion and the party responsible for maintaining the enclosure.

56. NG refers to the draft table **annexed** and marked **A** showing the proposed upper limits

of clearance per habitat type. All experts suggest that this table could, once finalised, be included as a condition of consent establishing upper limits for vegetation clearance. The draft table was the subject of some discussion amongst the experts. Feedback was provided to NG for possible modifications to the table. The table is not agreed by all experts in its current form.

Issue 3B: Reviews / adaptive management (GU Peer Review at [28]; DOC comments at page 54)

- ***Whether the proposed timeframe for reviews is appropriate.***
57. All experts agree that vegetation monitoring can appropriately occur at longer intervals (than every three years as DOC originally suggested) after 12 years, if targets set for this timeframe have been achieved. If those targets have been achieved, the experts suggest continued vegetation monitoring at years 15, 20 and 25 following the initial 12 years of monitoring, unless the applicant agrees otherwise with council.
- ***Whether the actions required if performance targets are not met are appropriate.***
58. This subissue is addressed at [53]-[54] above.
- ***Whether adaptive management is required/is appropriate (given the current level of information).***
59. JG queries the adaptive management response to the monitoring at [57] above. All experts agree that more detail is required around adaptive management conditions.
60. All experts recommend including a condition referring to the use of adaptive management for offsetting and compensation such that if monitoring indicates that the proposed outcomes are unlikely to be achieved, the applicant is to work with Council and/or DOC to identify and implement alternative actions to ensure the proposed net gains and positive outcomes are achieved within the timeframe. For example, this could include enhanced or modified pest control within the approved offset and compensation areas, or elsewhere if deemed appropriate by Council and/or DOC.
61. NG and KL refer to condition EC58 which provides for the preparation of a further enhancement programme should the monitoring results show that the expected biodiversity outcomes will not be achieved. NG considers that EC58 largely addresses

the concerns raised in [60] above, although he agrees with the recommendations to work with Council and/or DOC to implement such actions.

62. GU and CM note that adaptive management is referred to in the conditions with respect to Tautuku gecko and green skink; however, they consider that avoidance of effects on any nationally threatened fauna species should be given greater emphasis. They rely on the views of other technical experts as to actual and potential effects and their avoidance.

Issue 3D: Wetland monitoring (GU Peer Review at [28])

- ***Whether wetland monitoring should be included in the conditions.***

63. All experts consider that a condition requiring wetland monitoring for wetlands adjacent to the wind farm footprint is appropriate and should be required.

64. NG advises that the draft condition will provide for the assessment of potential effects on wetland condition and monitoring of wetlands adjacent to the windfarm footprint following the completion of construction works. This will involve monitoring plots of 2 x 2 m for groundcover, 5 m radius for scrub and saplings established within bog and fen wetlands potentially affected by the proposed wind farm as determined by the Project Ecologist.

TOPIC 4: FRESHWATER OFFSET

Issue 4A: Information basis (GU Peer Review at [13]–[15] and [18])

- ***The relevant effects that require offsetting.***
- ***The completeness of the assessments by 4Sight Consulting and Greg Ryder Consulting (including GR response to ecology peer review and other comments).***
 - ***Consider potential uncertainties referenced by GU and whether those are addressed in the application reports, conditions and management plans, and responses to comments and peer reviews.***

65. Refer to [67]-[68] below.

Issue 4B: The SEV method and the proposed offset (GU Peer Review at [15] - [18])

- ***The SEV method suggested by 4Sight Consulting and Greg Ryder Consulting (including its appropriateness as an approach for offsetting loss of stream habitat).***
66. GU and GR consider that the SEV method is appropriate to use, including a robust analysis of the potential future state of the impacted streams as per the standard SEV methodology.
- ***The appropriateness of the proposed offset, including:***
 - ***Consideration of GR's reporting and the proposed conditions re gathering further information to finalise details.***
 - ***Overall level of confidence that benefits sufficient to address the residual effects of the Project can be achieved.***
 - ***The requirements of the Riparian Offsetting Management Plan, and whether a full draft Management Plan is needed to inform the consenting process.***
67. As a comprehensive statement to the various questions around freshwater offsetting, GU is of the opinion that an outline Riparian Offsetting Management Plan should be provided to inform the consenting process. The outline Riparian Offsetting Management Plan should as a minimum include enough detail to confirm the range of potential impacts, identify and show the location of the proposed offset site(s), confirmation of landowner support and intention to protect the offset in perpetuity and a detailed description of the calculation basis that will be used to determine the length of stream to be restored. This is so that the effects on freshwater and management of those effects is clearly described for the panel.
68. GR does not oppose, in principle, the concept of preparing an outline Riparian Offsetting Management Plan for the panel's consideration. However, he considers the Applicant's proposed conditions of consent, including those addressing no net loss of stream habitat (EC34 to EC46) and those relating to the management plan certification process (MP1 to MP10), already provide a sufficient level of rigor and scrutiny for the Riparian Offsetting Management Plan to meet before construction can commence.

SIGNATURES OF EXPERTS



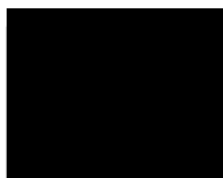
Nick Goldwater



Dr Kelvin Lloyd



Dr Greg Rider



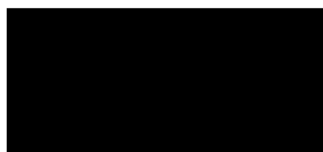
Dr Justyna Giejsztowt



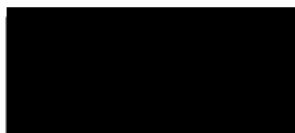
Dr Graham Ussher



Mike Harding



Catriona Gower



Dr Darin Sutherland



Cassie Mealey



Dr Rhys Burns

Annexure A

Vegetation Type	Ecological Value	Current Impact Area (ha)	% of area impacted	Proposed Upper Clearance Limit (ha)
Indigenous forest				
Pahautea forest	Very high	0	0	0
Southern rātā-kāmahi forest	Very high	0.57	0.17	0.65
Mānuka-haumakaroa-mountain holly forest	High	1.06	3.68	1.2
Mixed indigenous-conifer forest and scrub	Moderate	0.47	6.62	0.8
Indigenous scrub and shrubland	Moderate	0.61	13.12	1
Manuka and inaka-dominant forest and scrub				
Mānuka forest and scrub	Moderate	18.89	2.71	20
[Mānuka]/tauhinu-inaka- <i>Veronica odora</i> - scrub and shrubland	Moderate	20.64	8.40	30
Mānuka-inaka-mountain holly-(gorse) scrub and shrubland	Moderate	3.53	6.57	5
[Mānuka]/gorse-tauhinu scrub	Moderate	0.62	3.71	2
Mānuka scrub and shrubland	Moderate	1.68	7.48	3
Mānuka scrub	Moderate	0.59	0.71	5
Inaka scrub	Moderate	0.98	45.79	1.2
Indigenous wetland (combined maximum clearance limit of 3.5 ha)				
Fen wetland	Very high	2	1.99	2.5
Bog wetland	Very high	0.72	2.76	0.8
Copper tussock/rautahi marsh	High	0.037	5.1	0.05
Copper tussock-rautahi swamp	High	0.12	63.2	0.15
Copper tussock-dominated grassland and shrubland				
[Gorse]/copper tussock grassland	Moderate	0.19	46.61	1.2
Mānuka/copper tussock grassland	High	2.94	22.47	3.5
[Mānuka-gorse]/copper tussock grassland	Moderate	0.62	5.59	1
[Wilding conifers]/copper tussock shrubland	Moderate	1.17	19.52	2.5
[Wilding conifers]/copper tussock grassland	Moderate	0.11	44.21	0.2
Copper tussock grassland	Moderate	0.07	19.87	0.12
Exotic-dominated shrubland				
Gorse/copper tussock shrubland	Low	2.84	14.6	12
Mānuka-gorse/copper tussock shrubland	Low	3.57	2.77	15
Wilding conifers/mānuka-copper tussock shrubland	Low	0.71	3.56	10