BEFORE AN EXPERT PANEL
SOUTHLAND WIND FARM PROJECT

Under the	**FAST-TRACK APPROVALS ACT 2024**
In the matter of	an application for resource consents, a concession, 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

SOUTHLAND WIND FARM TECHNICAL ASSESSMENT #7: REVIEW OF TERRESTRIAL AND WETLAND ECOLOGY AND ECOLOGY OFFSETTING AND COMPENSATION

ROGER MACGIBBON

18 August 2025

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EXECUTIVE SUMMARY

1. Contact Energy Limited is seeking various approvals necessary under the Fast-track Approvals Act 2024 for the construction, operation and maintenance of the Southland Wind Farm in Slopedown, Southland.

2. I have been contracted by Contact Energy to provide an independent review of the terrestrial and wetland ecology matters associated with the Southland Wind Farm Project, and all elements of the ecological offset and compensation, including those for bats and freshwater ecology, proposed to address the actual and potential residual effects of the Project.

3. The most notable ecological features on the Wind Farm Site are located on the Jedburgh Plateau where a mosaic of bog and fen wetland habitat is interwoven amongst extensive and regenerating areas of mānuka, tauhinu, *Veronica odora*, and inaka shrublands. Extensive areas of southern rātā-kāmahi forest are present around the margins of the Jedburgh Plateau but these will be largely unaffected by the Project.

4. The Wind Farm site supports a moderate diversity of indigenous fauna with several Threatened or At Risk species including long-tailed bats, kārearea, South Island fernbird, pipit, tussock skink, tautuku gecko, seven freshwater species and two insect species identified in surveys.

5. Historically, the Jedburgh Plateau has been cleared of indigenous pāhautea forest for farming and since then has been grazed extensively by sheep and cattle.

6. The modifying impact of cattle, feral deer and pigs on the vegetation of the Jedburgh Plateau has been considerable, greatly reducing the diversity of palatable indigenous plant species and diminishing habitat quality for indigenous fauna.

7. The watercourses on the Project Site have high ecological values while the water quality is indicative of a livestock farming land use with elevated phosphorus and faecal bacteria levels.

8. The ecological assessments have determined that the Project may have the following actual/potential adverse effects on wetland and terrestrial ecological features and values:

(a) Loss of terrestrial and wetland vegetation / habitats, fragmentation, degradation, and general disturbance due to vegetation clearance and earthworks.

(b) Alterations to wetland hydrology through earthworks.

(c) Direct mortality or injury to species that may be harmed during vegetation clearance or earthworks activities.

(d) Direct harm to forest or wetland birds through potential blade strike, and noise and lighting disturbance associated with wind farm operations.

(e) Risk of electrocution and collision for birds interacting with transmission line infrastructure.

(f) Increased risk of predation of indigenous fauna following construction of wind farm roads, and

(g) For long-tailed bats:

(i) fragmentation of roosting, commuting and foraging habitat;

(ii) displacement of individuals or populations; and

(iii) direct collision mortality or injury, barotrauma and other injuries.

(h) Effects of construction-induced sedimentation, runoff and loss of habitat on freshwater ecological values.

9. Of these potential adverse effects, I have considered and addressed the effects and key issues for which there was disagreement between ecologists during the previous Covid Fast-track application process for the Project, and those that have been more thoroughly investigated since the end of 2024.

10. Extra survey work has been undertaken in the period January to April 2025 and this has improved the robustness of the data and provided a sound foundation on which to determine ecological effects and set appropriate mitigation, offset and compensation responses.

11. In particular, additional wetland mapping has been undertaken to the point that any errors that may still exist are of such a small scale to be of little or no consequence in terms of assessing the effects of the Project on wetland ecology, or setting appropriate offset and compensation measures.

12. A range of measures have been proposed, and included in draft consent conditions, to avoid, minimise and mitigate potential adverse ecological effects of construction and operation of the Wind Farm. These include bird nest surveys, acoustic bat monitoring, and salvage and relocation programmes for lizards and invertebrates. I have focused my consideration on the measures that relate to effects that were identified as unresolved during the Covid Fast-track application process.

13. A substantial ecological effects management package to address residual ecological effects has been proposed which includes:

    (a) Extensive pest control including:

        (i) aerial control of introduced mammalian pests over 1,400 ha within the Jedburgh Station Pest Control Area,

        (ii) eradication of pigs and deer within the 245 ha deer fenced Jedburgh Station Ecological Enhancement Area,

        (iii) eradication of pigs and feral deer and ground-based control of rats and mice at the 8 ha Copper Tussock Enhancement and Skink Protection Area,

        (iv) targeted deer control across the Jedburgh plateau,

        (v) intensive ground-based predator control across the 55 hectare Jedburgh Plateau Fauna Enhancement Area, and

        (vi) ground-based predator control along wind farm roads throughout the Jedburgh Plateau.

    (b) Enhancement of habitat for indigenous lizards and invertebrates by transferring woody debris, and logs, and rock stacks into proposed relocation sites together with ungulate exclusion fencing and targeted predator control.

    (c) Assisted regeneration and enrichment planting of 8.7 hectares of existing tracks and firebreaks within the proposed 245 hectare Jedburgh Station Ecological Enhancement Area.

    (d) Planting approximately of 1.6 hectares of indigenous species on the Jedburgh Plateau to enhance habitats and provide connectivity for ground-based invertebrates.

(e) Wetland compensation at a Contact Energy owned Davidson Road East property (Davidson Road Wetland Restoration Site) through exclusion of livestock and 12.86 ha of restoration and enrichment planting.

(f) Provision of funding for intensive predator control for a known population of long-tailed bats within a 10,000-hectare treatment area in the Beresford Range, Catlins Forest Park which will also benefit many other indigenous fauna and flora species.

14. Several Threatened or At Risk indigenous species and high value vegetation types exist at the Southland Wind Farm Site, and several will be subject to measurable adverse effects as a result of the construction and operation of the wind farm. However, it is my professional opinion that the offset and compensation measures proposed will fully and appropriately address the ecological effects and can be expected to result in an overall net benefit to biodiversity.

INTRODUCTION

15. My full name is Roger John MacGibbon. I am a Principal Ecologist at Tonkin & Taylor.

16. This technical assessment addresses the offset and compensation proposed for the Southland Wind Farm Project and provides an independent review of the terrestrial ecological aspects of the Project.

Qualifications and experience

17. I have the following qualifications and experience relevant to this assessment:

(a) I hold a Bachelor of Science Degree with Honours in Zoology and Ecology from the University of Canterbury (1981).

(b) I have over 40 years' experience working as an ecologist and environmental consultant and have worked in all regions of New Zealand and in Hawaii, Vanuatu and Australia.

(c) Since January 2018 I have been employed at Tonkin & Taylor. Prior to that:

(i) I worked for seven and a half years for Opus International Consultants, also as a Principal Ecologist;

(ii) I owned and managed my own environmental consultancy, Natural Logic Limited (between 1995 and 2010), which provided ecological, restoration and sustainable land and water management services to central and local government, and private landowner clients throughout New Zealand;

(iii) For seven years from 2002 to 2009, I also managed the Xcluder Pest Proof Fencing Company, a business that designed and built 130 km of pest proof fences around biodiversity sanctuaries in New Zealand, Hawaii, Mauritius and Australia; and

(iv) I worked for the Department of Conservation (**DOC**) in the early years of my career in Taupo and the Environmental Division of the NZ Forest Service in Wellington before the creation of DOC. During my time with DOC I managed the Taupo Native Plant Nursery, then the largest revegetation nursery in New Zealand.

(d) I specialise in ecological restoration and have provided design, technical support and project management services for a wide range of restoration projects across terrestrial, freshwater and coastal environments. This work has included:

(i) the rehabilitation of damaged landscapes such as mines and quarries;

(ii) the restoration of predominantly natural habitat including native forest, wetlands, sub-alpine shrublands, stream margins and coastal dunes;

(iii) the enhancement of water quality and biodiversity in natural waterways and wetlands;

(iv) the design and creation of natural features, such as wetlands and riparian areas, to treat runoff and wastewater;

(v) the control and eradication of weeds and animal pests; and

(vi) the management and reintroduction of animals (invertebrates and vertebrates) to restored environments.

(e) I have provided evidence at more than 20 council and Environment Court hearings under the Resource Management Act 1991.

18. I have worked on environmental projects in the Southland region over many years, most recently investigating constructed wetland opportunities for water quality enhancement in the Waituna catchment and flood mitigation potential in the Mataura catchment.

Code of conduct

19. I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. This assessment has been prepared in compliance with that Code, as if it were evidence being given in Environment Court proceedings. In particular, unless I state otherwise, this assessment is within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Purpose and scope of assessment

20. The purpose of this assessment is to provide an independent review of and comment on:

    (a) terrestrial and wetland ecology matters in respect of the Southland Wind Farm Project, with a particular focus on effects and effects management measures related to the 'Jedburgh Plateau'; and

    (b) all elements of the ecological offset and compensation, including those for bats and freshwater ecology, proposed to address the actual and potential residual effects of the Project to inform the applications under the Fast-track Approvals Act 2024.

21. In doing so, I address criticisms made by the expert-consenting panel in its decision under the previous COVID-19 Recovery (Fast-track Consenting) Act 2020 (**Covid Fast-track**) process for the Project.

Assumptions and exclusions in this assessment

22. I have not provided technical review of the freshwater methodology and freshwater effects assessment as I do not have specific expertise in this area. I do, however, have expertise in the area of riparian restoration and offset and have reviewed the offset recommendations accordingly.

THE SOUTHLAND WIND FARM PROJECT

23. Contact Energy Limited (**Contact**) is seeking various approvals necessary for the construction, operation and maintenance of the Southland Wind Farm in Slopedown, Southland (the **Project**). The Project includes up to 55 wind turbines and associated infrastructure.

24. The full description for the Project is provided in Part A of the Southland Wind Farm Fast-track Approvals Substantive Application document. I do not repeat it in my assessment.

METHODOLOGY

Introduction

25. My approach has been to review all relevant Project reports necessary to:

    (a) develop an understanding of the likely environmental effects of the Project (construction and operation);

    (b) consider whether the extent and nature of the effects have been correctly and fully assessed, documented and addressed; and

    (c) determine whether the offset/compensation measures proposed (including pest control, fencing, enhancement and restoration planting) appropriately address the impacts of the construction and operation of the wind farm.

26. The reports I have reviewed include:

    (a) Part A (overarching application document) and Part B (RMA approvals) of the overall application.

    (b) The proposed resource consent conditions.

    (c) All ecological assessment reports (included in Part H of the application):

        (i) Terrestrial and Wetland Ecology (Report 5), prepared by Mr Goldwater and Dr Lloyd of Wildland Consultants;

        (ii) Long-tailed Bats (Report 6), prepared by Mr Kessels and Dr Davidson-Watts; and

(iii) Freshwater Ecology (Report 8), prepared by Dr Ryder and Dr Goldsmith, both independent Environmental Scientists.

(d) All the draft ecology management plans (in Part J of the application): the Vegetation Management Plan, Avifauna Management Plan, Lizard Management Plan, Terrestrial Invertebrate Management Plan including Stag Beetle Management Plan, Habitat Restoration & Enhancement Management Plan, Biosecurity Management Plan, Bat Management Plan, and Riparian Offsetting Management Plan.

(e) Other expert reports and draft management plans that provide information of consequence to the ecology of the area, including in particular:

(i) Conceptual Hydrological Design report (Report10), prepared by Williamson Water & Land Advisory;

(ii) Construction Effects report (Report 9), prepared by Riley Consultants Ltd;

(iii) Transport report, prepared by Mr Rossiter (Report 12);

(iv) Draft Construction Environmental Management Plan; and

(v) Draft Earthworks Management Plan (including the Erosion and Sediment Management Plan).

27. I note that I was engaged by Contact to conduct an independent review of terrestrial elements of the previous application for consents for the Project made under the Covid Fast-track Act. I prepared that review in January 2025, towards the end of the previous Covid Fast-Track Act consenting process.

28. In preparing my previous review, I reviewed the key relevant documents in the previous application for consents for the Project made under the Covid Fast-track Act,[1] including in particular the Terrestrial and Wetland Ecology Report and Addendum Report prepared by Wildland Consultants (**Wildlands**). I also reviewed all written reports and submissions provided by expert ecologists during the Covid Fast-track consenting process, including in particular:

[1] Noting that my review did not address effect on bats or on freshwater ecology.

(a) Comments made on behalf of DOC and the councils;

(b) Reports prepared by the ecology peer reviewers appointed by the panel;

(c) The responses to those comments and reports that were prepared by Wildlands; and

(d) The joint witness statements produced to document the outcomes of expert conferencing.

29. I undertook a full day site visit on Wednesday 15 January 2025. I was guided by Kenn Wood (Contact Energy) and Nick Goldwater (Wildlands). During the visit we traversed a large part of Jedburgh Station in a side-by-side vehicle (in excess of 15 km travelled within the proposed turbine area) and also walked to a range of wetland (bog and fen), terrestrial vegetation sites, proposed turbine platforms and access road locations. Our GPS route across the site can be seen in **Figure 1** below. The proposed wetland compensation sites on Davidson Road were also visited and the offset sites for pest control and pest exclusion were viewed.

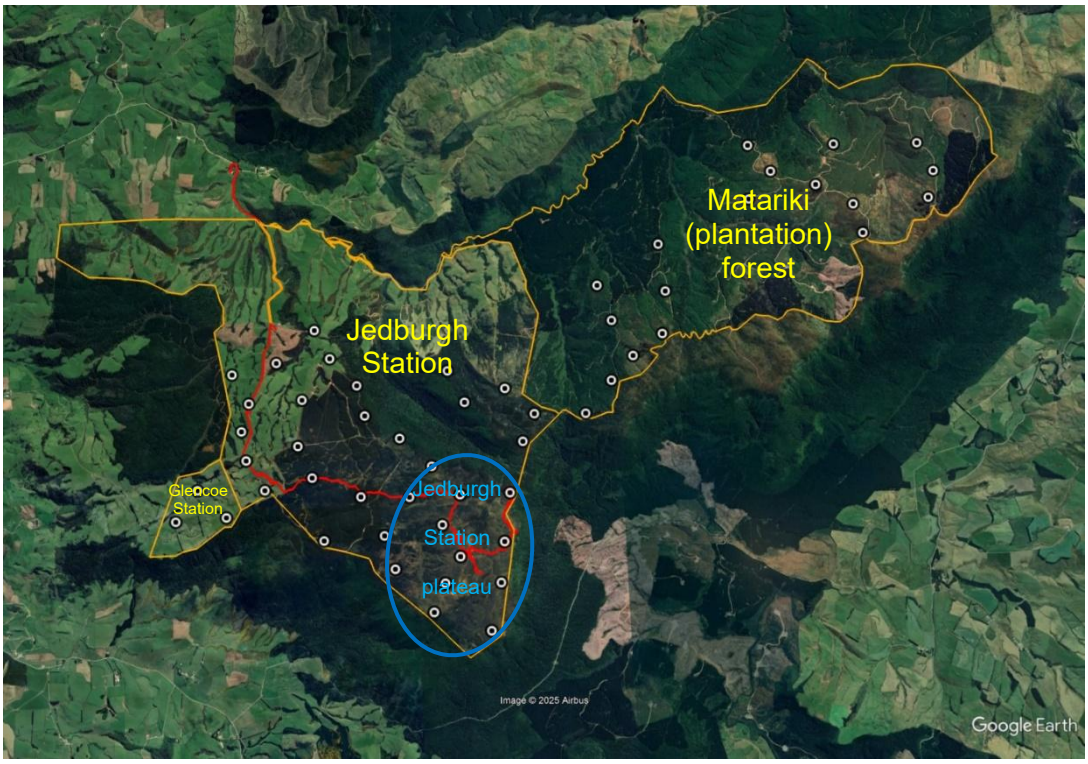

Figure 1: View of the Southland wind farm site, identifying the proposed wind turbine locations (white dots), the different properties, the Jedburgh Plateau (discussed below) and the route taken (red line) during the site visit assessment on 15 January 2025.

EXISTING ENVIRONMENT

Current environment

30. The physical and ecological features of the Wind Farm Site and wider Project Site are described in detail in the application documents, and in the ecological assessment reports. The comments that follow represent my own site observations and the features and history of the site that I consider most relevant to the assessment of potential effects of the Project.

31. There has been a particular focus, through the Covid Fast-track consenting process and now this new consenting process, on the ecological values of the part of the Wind Farm Site referred to as the 'Jedburgh Plateau', and the potential effects of the Project on those values.

32. Much of the indigenous vegetation and habitat on the Wind Farm Site is located on the Jedburgh Plateau which is a 530 ha elevated area (between 520 and 630 metres above sea level) in the southern part of the Wind Farm Site. A detailed description of the ecology of Jedburgh Plateau can be found in the Terrestrial and Wetland Ecology report.

33. The most noteworthy ecological features observed during my site visit were the large extent of southern rātā-kāmahi (*Metrosideros umbellata – Weinmannia racemosa*) forest present, especially around the margins of the Wind Farm Site (with the rātā in full and vibrant flower at the time of my visit) and the mosaic of bog and fen wetland habitat interwoven amongst the extensive and regenerating mānuka (*Leptospermum scoparium*), tauhinu (*Ozothamnus vauvilliersii*), *Veronica odora*, and inaka (*Dracophyllum longifolium*) shrublands across the Jedburgh Plateau. The small remnant area of rare pāhautea (*Libocedrus bidwillii*) forest was not viewed close up.

34. Notable across the open areas of the Wind Farm Site (including the bog and fen areas) was the abundance of woody remnants of the pāhautea forest that is likely to have predominated on the upland portions of the Jedburgh Plateau before clearance for farming.

35. Jedburgh Station is a sheep and beef farm. The pasture areas are the more intensely farmed areas, however, the mānuka forest and scrub, and the Jedburgh Plateau are also used for farming – although much less intensively. Approximately 300 cattle have been run in the Jedburgh Plateau through winter and sheep in summer (Kenn Wood, pers. com).

36. While my site visit was in mid-summer and no farm livestock were present on the Jedburgh Plateau, there was abundant evidence of the impact of cattle and feral ungulates (especially deer). Ground surface pugging was evident through the wetland areas, across the shrubland, within the tall mānuka stands and also beneath the margins of the regenerating rātā forest.

37. Deer sign (hoof prints) was abundant across the whole site, suggesting that deer numbers are high. Evidence of browsing damage to a variety of indigenous species was also apparent and widespread. This is likely to have been caused by both cattle and feral deer. Palatable species were largely absent across all vegetation types and browsing was evident of less palatable species such as inaka and rautahi (*Carex coriacea*) across the wetland and shrubland areas. Recent and older ungulate tracking was common beneath the taller mānuka stands and regenerating rātā-kāmahi forest. Native seedling regeneration, especially of palatable species, was sparse, very likely because of deer, pigs and cattle browsing and trampling.

38. The modifying impact of cattle and feral ungulates on the vegetation of the Jedburgh Plateau is and has been considerable and appears to have been considerably understated in many of the reports and submissions presented during the Covid Fast-track process.

Historical land use changes

39. There is clear evidence on site and from past aerial photography that the Jedburgh Plateau was largely cleared of forest and indigenous vegetation, probably in the mid-decades of the 20th century. Clearance would have been to establish pasture for farming.

40. Since clearance, there has been a gradual but noticeable reversion across the site from pasture back to shrubland. The Retrolens and Land Information NZ (LINZ) sourced photos in **Figure 2** and **Appendix One** show a visually obvious reduction in pasture-dominant land and an increase in indigenous shrubland between 1984 and 2023. The rate of reversion, especially of palatable native plants species, is very likely to have been slowed by the impacts of cattle and deer.

Current and future vegetation successional trajectory

41. Despite the impact of cattle, deer and pigs, there is clear evidence on site that the vegetation cover is following a gradual successional path via shrubland back to a forested canopy. Rātā, kāmahi and Hall's tōtara

(*Podocarpus laetus*) are regenerating through the mānuka on the more fertile Jedburgh Plateau flanks and is it likely in time that pāhautea will begin to regenerate in the upper plateau areas. The removal of ungulates, or reduction through pest control, would increase the pace of this regeneration.

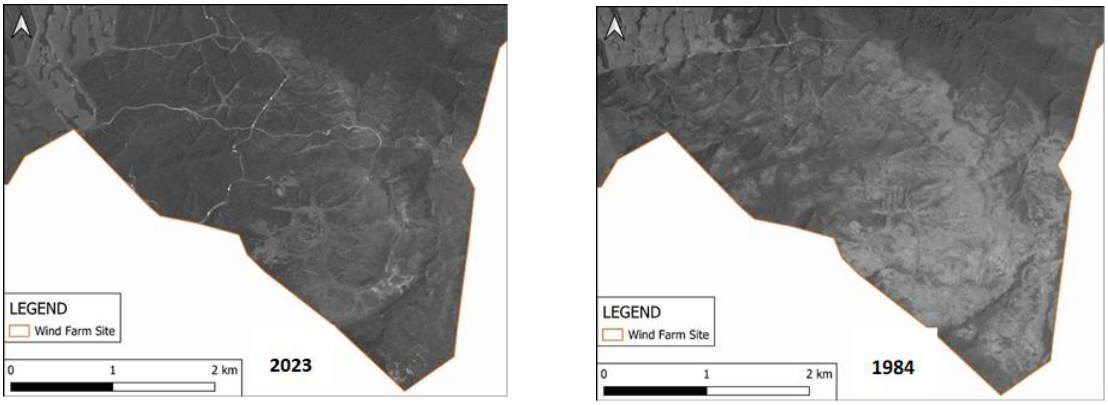

Figure 2: Comparison of vegetation cover between 2023 (left) and 1984 (right). The lighter shaded areas are areas dominated by pasture, the dark areas are forest covered, and the medium shaded areas have a shrub/sedge cover. (Source: Land Information NZ (LINZ) and Retrolens). Enlarged closeups of the 2023 and 1984 comparison can be viewed in Error! Reference source not found.**.**

42. Through the sequence of land clearance and reversion, the types of wetland present on site and the extent of each wetland type are likely to have changed. The significance of this is discussed later in my statement.

Bog and fen wetlands

43. The bog and fen wetlands present across the Wind Farm Site, including the Jedburgh Plateau, are of high ecological value and significance because of their botanical diversity, the habitat they provide for indigenous fauna, their rarity on a national scale and the size of the wetland extent across the site.

44. However, the bog and fen wetlands on the Jedburgh Plateau have been modified by decades of winter grazing by cattle and browsing by deer. There are physical signs of past trampling (pugging) across much of the site and browsing of several species growing in the wetlands including rautahi and inaka. There is also an absence of palatable species regeneration across all vegetation types, the product of cattle grazing and deer browsing.

45. Bogs, by their nature, derive their water supply entirely from rainwater whereas the fens on site are mostly located on the slopes and obtain water from a combination of trapped rainwater and runoff/overflow from the bogs. Hydrogeologist, Jon Williamson, has provided a helpful diagram in his 17

October 2023 memo[2] to explain how and where bogs have formed on the Jedburgh site plateau. This is copied in **Figure 3** below.

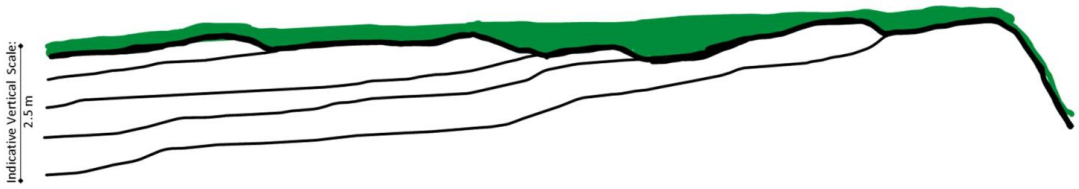

Figure 3: Diagram showing how bogs form on relatively flat ground in the hollows of shallow impervious sub-strata (source: Williamson, J. 2023. Southland Wind Farm – Wetland Soils & Hydrology Site Visit).

46. The bogs exist on the Jedburgh Plateau where the ground is generally flat and where there is shallow, low permeability strata beneath the ground surface. Minimal drainage, high annual rainfall and low evapotranspiration conditions means that water stays trapped in these depressions through all or much of the year. The bog areas generally retain water all year round although both Kenn Wood and Nick Goldwater noted during the site visit that the amount of water in many (and therefore their size) was reduced in summer compared to winter.

47. The bog and fen wetlands occur as a mosaic of variable sized patches in amongst the extensive regenerating shrubland across the Jedburgh Plateau. Their size, shape and water-holding capacity are largely determined by the topography of the impervious sub-strata layer below. In many locations, the boundary between wetland and non-wetland vegetation is less than clear with the wetlands and wetland margins often interspersed with species such as mānuka and *Veronica odora* that are more common on the Plateau in shrubland areas that are not wetlands.

48. This no doubt has made physical wetland field delineation a challenging task, as has been noted in the Wildlands reports. That said, my assessment of the wetland mapping undertaken by Wildlands is that the appropriate assessment criteria for delineating bog and fen wetlands have been used and from what I observed the criteria have been applied conservatively.

[2] Williamson, J. 2023. Southland Wind Farm – Wetland Soils & Hydrology Site Visit. Memo to Brigid Buckley, 17 October 2023. Available on the Covid Fast-track webpage for the Project: WWLA Letter

49. As the Plateau follows the successional path of reversion to shrubland and then back to forest, which is apparent on site and in aerial photography, the type and extent of wetlands can be expected to change. Woody species such as mānuka and pāhautea will grow on the wetland margins and raised areas within the wetlands (mānuka is occupying wetland space now). As these species dominate and form a canopy the nature of the vegetation growing in the wetland areas will change the wetland type and extent. Some of the bogs with deeper and more reliable water storage may retain bog vegetation and not revert to forest but many of the bog and some of the fen wetlands will be replaced by indigenous forest.

50. The significance of these observations is that the extent of the bog and fen wetlands are likely to decline naturally as reversion to woody vegetation progresses. The indigenous fauna they support will also change. The pace of reversion is likely to have been relatively slow because of the impact of grazing cattle and feral ungulates but is likely to accelerate if the number of these animals on the land is reduced.

Terrestrial vegetation

51. There is visible evidence of successional change throughout the Jedburgh Plateau with distinct zones of equal age regeneration. Large areas of the plateau between the bog and fen wetlands consist of dense metre high stands of shrub species, notably tauhinu, inaka and *Veronica odora*. Mānuka is establishing around the margins of these areas. These shrub species now occupy large areas of land that was pasture 40 years ago (see **Figure 1** and Error! Reference source not found.). Elsewhere, tall stands of mānuka have formed an intact woody canopy.

52. A small area of emergent pāhautea above a canopy of southern rātā and kāmahi exists on the southern edge of the Wind Farm Site but this will not be affected by the Project. The Wind Farm Site's central gully contains a stand of southern rātā – kāmahi forest, and an advanced successional stage of manuka - haumakaroa (*Raukaua simplex*) – mountain holly *(Olearia ilicifolia*) low forest occupies the forest margins and escarpment faces.

53. To date, Wildlands (Report 5) has identified 225 indigenous and 23 exotic plant taxa at the Wind Farm site, with one listed 'At Risk' species found - desert broom (*Carmichaelia petriei*) (At Risk – Declining).

54. Four vegetation/habitat types present in the general Project area are listed in the Southland Regional Policy Statement (**SRPS**) as Threatened, At-Risk or Rare ecosystems: pāhautea/southern rātā-kāmahi forest (Cloud forest - Rare forest type); southern rātā-kāmahi forest (Threatened forest habitat type); mānuka-haumakaroa–mountain holly forest (At Risk habitat type); copper tussock/rautahi marsh (Threatened wetland habitat type).

Freshwater habitat

55. Most watercourses within the Wind Farm Site drain northwards, to the Mimihau Stream South Branch. The very southern part of the Wind Farm Site drains towards the west and into Redan Stream, which is a tributary of the Mokoreta River that flows into the Mataura River south of Wyndham township.

56. Drs Ryder and Goldsmith provide detailed coverage of the current state of the water courses on and adjacent to the Project Site in their technical report (Report 8). In general, they describe the existing freshwater ecology values within the Project Site as high, with benthic macroinvertebrate communities containing a large percentage of sensitive taxa.

57. Water quality in the site watercourses is indicative of a livestock farming land use with elevated phosphorus and faecal bacteria levels.

Indigenous fauna

58. The indigenous fauna recorded at and adjacent to the Wind Farm Site are detailed in the three ecology technical assessments. A total of 85 terrestrial indigenous fauna species have been recorded at the Wind Farm Site.

59. Of particular note, the following Threatened or At Risk indigenous fauna species have been identified on the Project Site:

    (a) Indigenous mammals: long-tailed bat (*Chalinolobus tuberculatus*) (Conservation Status: Threatened – Nationally Critical).

    (b) Indigenous birds: kārearea/eastern falcon (*Falco novaeseelandiae novaeseelandiae*) (conservation status: Threatened - Nationally Vulnerable); koekoeā/long-tailed cuckoo (*Eudynamys taitensis*) (Threatened - Nationally Vulnerable); pīhoihoi/New Zealand pipit (*Anthus novaeseelandiae)* (At Risk – Declining); mātātā/South Island fernbird (*Poodytes punctatus*) (At Risk - Declining); tōrea/South Island

pied oystercatcher (*Haematopus finschi*) (At Risk - Declining), and kawau/black shag (*Phalacrocorax carbo novaehollandiae)* (At Risk - Relict).

(c) Indigenous lizards: tussock skink (*Oligosoma chionochloescens*) (At Risk – Declining); tautuku gecko (*Mokopirirakau* "southern forest") (At Risk – Declining).

(d) Indigenous invertebrates: Helms' stag beetle (*Geodorcus helmsi*) and short-horned grasshopper (*Sigaus campestris*), both *(*At Risk – Declining).

(e) Aquatic fauna: longfin eel (*Anguilla dieffenbachii*) (At Risk – Declining); giant kokopu (*Galaxias argenteus*) (At risk – Declining); Gollum galaxias (*Galaxias gollumoides*) (Threatened – Nationally Vulnerable); Clutha flathead galaxias (*Galaxias* species D) (Threatened – Nationally Critical); southern flathead galaxias (*Galaxias* species S) (Threatened – Nationally Vulnerable); lamprey (*Geotria australis*) (Threatened – Nationally Vulnerable); freshwater crayfish (*Paranephrops zealandicus*) (At Risk – Declining).

60. Note that no matuku-hūrepo/Australasian bittern (*Botaurus poiciloptilus*) (Threatened – Nationally Critical) were detected in surveys undertaken on site but the precautionary stance that they may be present has been adopted.

61. Green skink (*Oligosoma chloronoton*) (Threatened – Nationally Critical) have not been detected in the surveys undertaken on site but may be present; there are conditions of consent proposed that prescribe the response if they are encountered.

COMMENT ON THE METHODOLOGY USED TO ASSESS ECOLOGICAL VALUES

Wetland extent and mapping and delineation of Jedburgh Plateau habitats

62. There was considerable commentary in the Covid Fast-track application process about the comprehensiveness and accuracy of the survey methods and effort applied by Wildlands in undertaking the ecological assessments, especially in relation to locating and delineating areas of wetland, and more generally the habitats across the Jedburgh Plateau. Most of the commentary

that was critical of the surveying was provided by one of the ecology peer reviewers appointed by the expert consenting panel.

63. In response to this, I have given particular consideration to the appropriateness and accuracy of the surveys undertaken to describe the vegetative cover, delineate the location, type and extent of wetlands across the Wind Farm Site (and in particular at the Jedburgh Plateau), and assess the nature and extent of effects.

64. I was able to view a reasonable amount of Jedburgh Plateau and the broader Wind Farm Site during my eight-hour site visit and was able to physically locate and assess the accuracy of the vegetation type delineation at several locations. All of the specific locations I viewed were accurately described and delineated although I am aware of some errors detected by the peer review ecologist who advised the Covid Fast-track panel.

65. Accurate mapping of the vegetation cover across the Jedburgh Plateau is particularly challenging because of the complexity of the vegetation cover and the graded boundaries between bog and fen wetlands and non-wetland areas. The upper areas of the Jedburgh Plateau where the wetland areas occur is a maze of variable hydrological conditions often changing over very short distances. Mapping these areas is further complicated by the appearance of predominantly non wetland or wetland margin species in areas of bog and fen.

66. As is required by the National Policy Statement for Freshwater Management (**NPS-FM**), Wildlands appears to have applied the NPS-FM wetland delineation protocols appropriately. Precise delineation of wetland from non-wetland areas is challenging at a site of this nature where the margins of bogs and fens are not abrupt.

67. Increased survey intensity – both in terms of the amount of survey effort across the site during each visit and the number of site surveys undertaken – will reduce the likelihood of error or omissions. Wildlands has returned to the site in April 2025 and completed a fourth wetland vegetation survey. Thirty-eight additional wetland plots were installed and documented and all areas within and adjacent to the proposed wind farm footprint were physically ground-truthed for accuracy.

68. In addition, high resolution drone photography was taken in mid-January 2025 to assist in more precise determination of areas of potential bog and fen wetlands.

69. With this additional survey effort, I am comfortable that the extent, type and location of the vegetation types recorded in the ecological assessments are representative of what is present and that any errors that may still exist are of such a small scale to be of little or no consequence in terms of assessing the effects of the Project on wetland ecology, or setting appropriate offset and compensation measures.

70. I note that the conditions that were proposed by Contact during the Covid Fast-track process requiring re-mapping of the final Project footprint (and adjacent areas) prior to construction, and subsequent consideration of modifications to minimise adverse effects on key habitat types, have also been retained for this new consenting process. Those conditions provide an additional 'safety net' in terms of the accuracy of the mapping that has been carried out and the level of anticipated effects.

Long-tailed bats

71. I have reviewed the technical report prepared by Mr Kessels Dr Davidson-Watts on long-tailed bats (report 6) and believe the methodology used to assess long-tailed bat activity at and adjacent to the wind farm site, the assessment of potential effects of the Project on bats and the recommendations made to address those effects are appropriate. I provide additional commentary later in this report on the value of the offset and compensation measures proposed for bats.

72. It is my understanding that, as part of the Covid Fast-track Consenting application process, agreement had been reached between the ecologists for the Applicant, DOC and its ecologists, and the specialist peer reviewer appointed by the Panel (Ms Cummings) on the effects on long tailed bats, appropriate conditions, and the offset and compensation measures proposed to address those effects.

Avifauna

73. The assessment of the avifauna values at and adjacent to the Wind Farm Site, the potential effects of the Project on avifauna and the proposed measures to address residual effects are presented in the technical report prepared by Mr Goldwater and Dr Lloyd (Report 5). I endorse the avifauna

assessments undertaken and the offset and compensation measures offered and note that, as for long-tailed bats, the ecologists representing the Applicant, DOC and the specialist peer reviewer appointed by the Covid Fast-track Panel (Dr Mueller) reached agreement as to the effects on avifauna, appropriate conditions and the offset and compensation measures proposed.

74. Following the Covid Fast-track decision, additional five-minute bird counts and bird flight height and path surveys were undertaken in February and May 2025.

Freshwater Ecology

75. I do not have specific expertise in the assessment of freshwater ecological values and effects and so do not provide a review of the methods used or the conclusions offered in the report prepared by Dr Ryder and Dr Goldsmith.

76. I do, however, have expertise in freshwater offset and restoration and note that it is estimated that 1-2 km of stream length will be required to provide offset for the effects on streams. It is my understanding that the Stream Ecological Valuation (**SEV**) calculations to confirm the offset requirements are yet to be completed.

77. Suitable stream length for fencing and planting would appear to be available on Jedburgh Station although the approval of the property owners to do this work has yet to be confirmed. In my experience this is not unusual, and I note that the proposed conditions of consent require Contact to secure the necessary rights to enable it to carry out and maintain the riparian planting before it begins construction of the Project.

Wind farm footprint extent and fill disposal

78. There has been some question as to whether the areas that will be affected by the construction of the wind farm are accurately described and therefore whether the assessment of effects can be relied upon. Contact has made it clear that, by necessity, detailed design of the exact location of turbine platforms and access roads will not be undertaken until after the decision to grant consent has been made. It is likely that some changes to platform locations and road alignment may be required (by consent conditions or design), though I understand that the proposed conditions of consent provide that turbine platforms will only be able to move to a limited degree from their indicative locations.

79. Consequently, accurate re-assessment of the areas affected will need to occur following detailed design and this will enable the actual extent of effects to be confirmed. As noted above, the proposed conditions specifically require a remapping exercise to be carried out once the Project footprint is confirmed.

80. A substantial amount of surplus fill material (in excess of 1.2 million m^3) will be generated by the formation of the turbine platforms and access roading network. The intention is to dispose of the fill on the wider Wind Farm Site and by necessity this will require that some of the fill disposal will need to be on areas currently covered in indigenous vegetation.

81. Likely surplus fill disposal (**SFD**) locations have been modelled and mapped (see the Construction Effects report (Report 9)) to show where the required fill volume can be disposed of and to enable the likely ecological effects to be assessed. With input from ecologists, this exercise has allowed fill disposal sites to be located and sized to avoid areas of high ecological value and minimise overall ecological effects.

82. Three types of SFD are proposed – blanket, shoulder and gully – and these are described and their locations mapped in the Construction Effects report (Report 9).[3] Each SFD type is designed to reflect the existing landform and allow each site to be restored to a landform and vegetation type similar to its pre-fill state.

[3] See also Figure Project Description – 7 in Part G of the application.

83. The area of indigenous-dominant vegetation that will be affected by the indicative SFDs is as follows:

All SFD's (gully, shoulder, blanket)	Area (ha)
[Mānuka]/gorse-tauhinu scrub*	0.57
[Mānuka]/tauhinu-inaka-Veronica odora scrub and shrubland	8.40
[Mānuka-gorse]/copper tussock grassland	0.08
[Wilding conifers]/copper tussock grassland	0.22
[Wilding conifers]/copper tussock shrubland	1.32
[Wilding conifers]/mānuka-copper tussock shrubland*	1.01
Inaka scrub	0.08
Mānuka forest and scrub	7.15
Mānuka scrub/shrubland	0.88
Mānuka-gorse/copper tussock shrubland	1.10
Mānuka-inaka-mountain holly-(gorse) scrub and shrubland	2.57
Mixed indigenous-conifer forest and scrub	0.30
Total significant / moderate value indigenous veg affected	**23.68**

** vegetation type not assessed as significant; however, it does have Moderate ecological value and needs to be accounted for.*

84. The SFD sites selected avoid wetlands and other high value vegetation types, as per the criteria for the final location of SFD sites that are set out in the proposed conditions.[4] The final location of SFDs will be confirmed through the detailed design process, but the exercise of more clearly identifying indicative SFDs gives confidence as to the level of effects that will arise, and the appropriate approach to addressing effects.

85. The exception is that SFDs on the Jedburgh Plateau will be limited to only those modelled and mapped (i.e., there will be no flexibility to expand those SFDs or to identify additional SFDs on the Jedburgh Plateau). That is an appropriate approach given the particular focus on certainty of effects on the Jedburgh Plateau.

86. The area of indigenous vegetation affected by the SFDs is additional to the effects determined for the main wind farm infrastructure. The mitigation strategy to address the ecological effects of the SFDs is discussed in a later section of this report.

[4] Noting that 'significant' vegetation (identified based on CRPS criteria) is not the same as 'high value' vegetation (identified based on a specific assessment of value, as set out in the Terrestrial and Wetland Ecology Report).

COMMENT ON TERRESTRIAL AND WETLAND ECOLOGY EFFECTS AND EFFECTS MANAGEMENT MEASURES

87. A detailed description of the expected and potential effects of Project construction and operation is contained in the Terrestrial and Wetland Ecology report, the Bat report and the Freshwater Ecology report.

88. The main actual/potential adverse wetland and terrestrial (including long-tailed bats) ecological effects identified are:

    (a) Loss of indigenous terrestrial and wetland vegetation / habitat (approximately 87.42 ha[5]), fragmentation, degradation, and general disturbance due to vegetation clearance and earthworks.

    (b) Alterations to wetland hydrology through earthworks.

    (c) Direct mortality or injury to species that may be harmed during vegetation clearance or earthworks activities.

    (d) For long-tailed bats, there is potential risk of direct collision with turbines, barotrauma[6], fragmentation of roosting, commuting and foraging habitat, and displacement of individuals or populations.

    (e) Direct harm to forest or wetland birds through potential blade strike, and noise and lighting disturbance associated with wind farm operations.

    (f) Risk of electrocution and collision for birds interacting with transmission line infrastructure.

    (g) Increased risk of predation of indigenous fauna following construction of wind farm roads.

    (h) Any biophysical effects of the proposal may also affect mana whenua values.

89. Of these potential adverse effects, I provide comments below on those effects and key issues for which there was disagreement between ecologists

[5] 63.74 ha of indigenous dominant vegetation due to construction of the wind farm infrastructure and an additional 23.68 ha indigenous dominant vegetation due to the disposal of surplus fill.
[6] Barotrauma, or lung damage from pressure changes, is a significant cause of bat fatalities at wind turbines in New Zealand. This occurs when bats fly near the rotating blades and experience rapid pressure drops, causing their lungs to rupture. While direct collisions also occur, barotrauma is a major factor in bat deaths at wind farms (Source: Bats and windfarms in New Zealand, New Zealand Bat Recovery Group Information Sheet Version 5.0, October 2023).

during the Covid Fast-track application process, and those that have been more thoroughly investigated since the end of 2024.

90. The issues of disagreement between ecologists, all of which relate primarily to the Jedburgh Plateau, were:

    (a) The significance of the loss of bog and fen wetlands and whether they are irreplaceable and vulnerable.

    (b) Habitat fragmentation and edge effects and the extent to which the Project will increase the impact of both on flora and fauna.

    (c) Potential impact of roads, turbine platforms and fill disposal sites on surface and shallow sub-surface water movement across the site.

    (d) The appropriateness of the on-site management proposed to address residual effects particularly with regard to issues (a) and (b) above.

Loss of bog and fen wetlands

91. One of the principles of biodiversity offsetting (also stated in the SRPS) is to give consideration to the limits to offsetting. Biodiversity offsetting should not be applied to justify or address impacts on vulnerable or irreplaceable biodiversity. The panel appointed peer review ecologist during the Covid Fast-track application process argued that the bog and fen wetlands at the Project site were both irreplaceable and vulnerable.

92. Many of the bog wetlands present on the Jedburgh Plateau exist because the pāhautea forest that once covered the higher altitude ridges and flats has been cleared for farming, and the wetlands are likely to have been sustained because of the grazing of cattle and browsing of feral ungulates. In other words, they have been induced by human activity and exist where favourable hydrological conditions exist.

93. The fact that they have been induced does not diminish their current ecological value but they represent an early seral stage of vegetative succession across the plateau. In time, the wetlands will be replaced by woody shrub species and then forest species. Consequently, they are not a permanent vegetation type at this site and are not irreplaceable. Natural processes will replace them. It is likely that the presence of cattle and feral ungulates has prolonged their existence.

94. It is also important to note that the bogs on the Jedburgh Plateau do not have the floristic diversity that would be the case if the site was protected from animal pests and cattle. Very few palatable species remain. For this reason, their current ecological value is diminished.

95. Wildlands has referenced the wetland complex at Ajax Hill in the Catlins as an example of a wetland mosaic similar to that on the Jedburgh plateau. My understanding is that the Ajax Hill wetland area is largely unmodified and a more appropriate example of irreplaceability.

96. It is worth noting that neither bog or fen wetlands have been allocated the status of threatened habitat type in Appendix 2 of the SRPS.

97. The wetlands have also been described by some as vulnerable. The bog and fen wetlands in the form that they are now have withstood the impact of cattle and feral ungulates for several decades. In that regard they have exhibited a tolerance of modifying influences and cannot be described as vulnerable.

98. In the context of the impact of bog and fen removal on the functionality of the wider plateau ecosystem, I do not believe that the anticipated removal of 0.94 ha of bog, 1.08 ha of fen, and 0.01 ha of copper tussock/rautahi marsh[7] will have other than minor effects.

99. The area of induced bog wetland habitat is likely to be diminishing over time as natural succession transforms the plateau to woody shrubland and then back to forest. The loss of approximately 3.3 % of bog (0.94 ha out of 28.70 ha) and approximately 1.1% of fen (1.08 ha out of 102.26 ha) on the Jedburgh Plateau, and approximately 1.9% of copper tussock/rautahi marsh (0.01 ha our of 0.73 ha) at Matariki, due to the construction and operation of the wind farm is small and may not be more than what natural succession would otherwise replace over the next few years.

100. I support the proposed consent condition that limits the area of indigenous wetland that can be cleared to a maximum of 2.5 ha (Condition EC8, Table 4). This will ensure that the offset and compensation measures offered are sufficient to address wetland loss.

[7] Source: Table 4A in the Terrestrial and Wetland Ecology report (Report 5).

Habitat fragmentation and edge effects

101. Habitat fragmentation and increased edge effects are potential adverse ecological effects resulting from the addition of access roads and turbine platforms.

102. Fragmentation is only of significance to flora and fauna where structures/barriers/obstacles are put in place that the species present are not adapted to move past. For two reasons, it is my opinion that the Project will not greatly reduce the ability of fauna to move around the site and therefore not result in anything other than minor additional adverse fragmentation:

    (a) The entire Jedburgh Plateau site is already a fragmented landscape, both naturally and as a result of farming and ungulate modification. For smaller organisms, especially invertebrates and lizards, the site is a mosaic of small to medium sized areas of preferred habitat interspersed by less favourable habitat. The species occupying these patches, especially those occupying wetlands, are well adapted to finding and moving to new patches.

    (b) Many of the roads that will be constructed for the Wind Farm will be built on existing farm tracks and are unlikely to form barriers to movement. In addition, the frequency of use of those roads will be very low (less than 20 vehicle movements per day over the entire Wind Farm Site once the Wind Farm is in full operation)[8] compared to public road networks so the risk of animal mortality due to vehicle strike is also low.

103. The combined footprint of wider metalled road surfaces and the proposed additional roads and turbine platforms will be small in what is already a fragmented landscape, therefore it is my view that the effects will be minor.

104. Because of the generally early to mid-successional state of the vegetation that will be removed to build the wind farm and the fragmented mosaic nature of the vegetation distribution, the impact of an increase in exposed edges is considerably less than where forest is cleared. The plant and animal species present on the plateau are adapted to a degree of habitat variability and as a consequence the additional habitat edge created by the construction of the roads and platforms is unlikely to have other than minor adverse effects.

[8] Transport report (Report 12).

Impacts on hydrology and sediment loss

105. Sediment loss to streams and wetlands, especially during construction of the wind farm infrastructure, and the alteration of surface and shallow sub-surface water movement resulting from the formation of new roads and platforms both have the potential to adversely affect ecology on the plateau if not carefully managed.

106. The new and metalled roads will generate sediment and this must be prevented from leaving the road margins in concentrated flow that could then enter wetlands or streams. There is some existing evidence on site where farm track cut outs are feeding elevated sediment loads into fen wetlands. The production and implementation of a comprehensive site Erosion and Sediment Control Plan (**ESCP**) will be necessary to ensure the sediment is managed in an appropriate manner and water courses are protected. A draft ESCP has been prepared as part of the substantive Fast-track Act application.

107. The surface and subsurface hydrology of the site, which provides the constant supply of water to the bog and fen wetlands, is very hard to interpret from the surface. Inadvertent redirection or blockage of surface and shallow sub-surface water movement could occur if care is not taken and this could result in an increased loss of bog or fen wetlands due to severed or restricted water flow. In addition, where access roads or turbine platforms sever existing wetlands the sections of wetland remaining on the downstream side of the road or platform could lose all water supply.

108. To address this issue, a comprehensive concept design study of the hydrology of the Jedburgh plateau has been undertaken by Williamson Water & Land Advisory (**WWLA**)[9]. WWLA have developed a hydrological model for the plateau which has enabled the likely impact of wind farm infrastructure on water flow to and from bog and fen wetlands to be determined and for design engineering mitigation options to be developed to minimise hydrological impact on the wetlands.

109. The WWLA report has mapped all sites where wind farm infrastructure could intercept and/or affect surface and shallow sub-surface water flow to bog and fen wetlands and has proposed design recommendations to minimise any effects on wetland hydrology. The report suggests that, if the recommended

[9] Conceptual Hydrological Design Southland Wind Farm at Jedburgh Station Plateau (Report 10).

mitigation works are undertaken, an estimated 0.09 ha of fen and no bog will be impaired by wind farm infrastructure. This, when added to the anticipated direct loss of 2.03 ha of wetland, sits well below the maximum loss of 2.5 ha of wetland proposed as a consent condition.

110. I consider the WWLA report to be thorough and comprehensive and I have confidence that the hydrological mitigation measures recommended will successfully minimise any risk of additional wetland loss occurring.

111. The mitigation measures proposed consist of a combination of culverts and perimeter drains. To ensure wetland water continues to be captured and redistributed as intended, a culvert and drain maintenance plan and programme will need to be developed and implemented. The perimeter drains, in particular, will need to be cleared of debris on a regular basis to remain functional. Contact has agreed with this recommendation and a condition of consent is proposed to that end (CM12).

Potential effects on long-tailed bats

112. The Long-tailed Bat report (Report 6) has identified three potential effects of the Wind Farm on long-tailed bats:

    (a) fragmentation of roosting, commuting and foraging habitat, (wind farms may form barriers to commuting or seasonal movements, and can result in severance of foraging habitat);

    (b) displacement of individuals or populations (due to wind farm construction or because bats avoid the wind farm area); and

    (c) direct collision mortality or injury, barotrauma and other injuries.

113. Of these effects, only the unmitigated risk of turbine strike and/or barotrauma injury is considered to be greater than low at some locations on the Wind Farm Site.

114. The Bat report recommends several measures to address effects on bats including the implementation of vegetation clearance protocols, live turbine curtailment trials on nine turbines in the Bat Risk Area, and a 10,000 ha intensive pest control programme in the Beresford Range to compensate for residual effects. These are discussed later in this report.

Avifauna collision with turbines and transmission lines

115. Agreement was reached between ecologists during the Covid Fast-track application process as to the likely nature and magnitude of effects of turbines and transmission lines and pylons on indigenous bird species. However, I would like to highlight and endorse the additional work undertaken since that application to reinforce the conclusions as to potential effects and therefore the appropriateness of the measures proposed to offset and compensate any effects.

116. Additional avifauna surveys were undertaken including bioacoustics monitoring designed to detect migratory and nocturnal bird species. This information was used to inform a bird collision model developed by Blue Wattle Ecology in May 2025. The results of the modelling are presented in the Terrestrial and Wetland Ecology report.

117. The modelling has verified the earlier conclusions made by Project ecologists that the level of effects on indigenous birds due to turbine collision is mostly low or very low with the possible exception of bellbird and kahu.

118. Most importantly, the model suggests that there is a low probability that the compensation triggers proposed in Condition EC37B will be hit.

119. In the event that one or more of the bird collision compensation triggers is equalled or exceeded a process for the determination of whether additional compensation is required and the nature and extent of that compensation has been clearly defined. This process is described in Conditions EC37C - EC37E.

SURPLUS FILL DISPOSAL (SFD) SITE MITIGATION

120. As highlighted earlier, in addition to the 63.74 ha of indigenous dominant vegetation / habitat that will be cleared in constructing the wind farm infrastructure, an additional area of indigenous dominant vegetation of 23.68 ha will be cleared to allow for the disposal of surplus fill.

121. It is intended that the impact of the loss of indigenous vegetation due to the creation of SFDs will be fully addressed by mitigation. To qualify as mitigation each SFD site will need to be filled, capped and restored within 12 to 15 months of initial disturbance. Specifically, this will require:

(a) Removing and storing on site all topsoil and organic matter (including seed) from each SFD site and using it to resurface the completed fill.

(b) Collection of seed and propagation material from the general area of the fill site in advance of land disturbance so that plantable grade seedlings are available for planting immediately the SFD site has been completed.

(c) The completed SFD site surface replicates the landform shape prior to disturbance so that drainage patterns and slope are similar.

(d) The same range of indigenous plant species are replanted as occurred before disturbance. This assumes that the finished fill surface has been re-created to be suitable for that range of species.

(e) Each SFD site is filled and replanted within 12 to 15 months of initial disturbance. The allowance of up to 15 months is to allow for a suitable planting window, e.g. planting in mid-summer would not be ideal.

(f) Stockpiled topsoil and organic matter should not be transported and re-applied other than on the SFD site from which it was salvaged. This is to prevent the spread of soil-borne weed seed (especially gorse seed which remains viable for many years).

(g) A comprehensive post-planting weed management and replenishment planting programme will need to be implemented to achieve acceptable plant coverage over each SFD site.

(h) Each restored SFD site is temporarily fenced from livestock until the planted vegetation is well established.

(i) Appropriate erosion and sediment management controls are in place to prevent sediment loss from each SFD site.

(j) Any new tracks formed to access each SFD site are remediated (i.e. replanted) once maintenance access to each restored SFD site is no longer required.

122. I have participated in and managed several successful restoration projects in New Zealand in conditions as challenging as those on the Jedburgh Plateau (including sub-alpine restoration above the treeline on Mt Ruapehu), some with the same range of species. I have confidence that the vegetative cover can be reinstated effectively (i.e. remediated) on the SFD sites provided the

revegetation is managed (from clearance to maintenance) by personnel with the appropriate restoration expertise.

COMMENT ON THE PROPOSED ECOLOGY OFFSET AND COMPENSATION MEASURES

Effects management package

123. A substantial ecological effects management package to address residual ecological effects has been prepared by Wildlands and is described in detail in the technical report of Mr Goldwater and Dr Lloyd, and in the draft Habitat Restoration and Enhancement Management Plan.

124. The principal elements of the package are described below.:

125. On-site actions:

(a) Aerial control of introduced mammalian pests within the **Jedburgh Station Pest Control Area**, which comprises 1,400 hectares of indigenous vegetation and habitats on Jedburgh Station (excluding pasture). Pest control to be undertaken every three (3) years from the commencement of the construction of the Southland Wind Farm (for the duration of the operation of the Wind Farm).

(b) Construction of a deer fence around an approximately 245-hectare block at Jedburgh Station (**Jedburgh Station Ecological Enhancement Area**) and legal protection of this area. Stock exclusion within the deer fence area and pig and deer eradication. Enrichment planting at rate of 20 plants per hectare, totalling approximately 5,000 plants.

(c) Deer fencing around approximately eight hectares of degraded copper tussock vegetation at Matariki (**Copper Tussock Enhancement and Skink Protection Area**), with enrichment planting, eradication of pigs and feral deer, ground-based control of rats and mice, and pest plant control to restore habitat.

(d) Targeted deer control across the Jedburgh 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 duration of the operation of the Wind Farm).

(e) Targeted intensive ground-based predator control (targeting rats, stoats and hedgehogs) across 55 hectares of the Jedburgh Plateau (**Plateau Fauna Enhancement Area**) to benefit the local populations of mātātā/South Island fernbird, pihoihoi/NZ pipit, and invertebrates for the life of the consents.

(f) Enhancement of habitat for indigenous lizards and invertebrates by transferring woody debris, and logs, and rock stacks into proposed relocation sites together with ungulate exclusion fencing (around the Jedburgh Station Ecological Enhancement Area and the Copper Tussock Enhancement and Skink Protection Area) and targeted predator control.

(g) To address concerns around fragmentation:

(i) Assisted regeneration and enrichment planting of 8.7 hectares of existing tracks and firebreaks within the proposed 245 hectare Jedburgh Station Ecological Enhancement Area.

(ii) Targeted ground-based predator control along wind farm roads throughout the Jedburgh Plateau (for the duration of the operation of the wind farm).

(iii) Planting approximately 1.6 hectares of indigenous species on the Jedburgh Plateau to enhance habitats and provide connectivity for ground-based invertebrates.

126. Off-site restoration actions:

(a) Wetland compensation at a Contact Energy owned Davidson Road East property (**Davidson Road Wetland Restoration Site**) through:

(i) Restoration planting of 5.11 hectares of exotic pasture back into copper tussock-rautahi marsh.

(ii) Enrichment wetland planting (c.6.67 hectares).

(iii) Terrestrial revegetation planting (c.1 hectare).

(iv) Removal and exclusion of stock by the construction of fencing.

(b) Provision of funding for intensive predator control for a known population of long-tailed bats within a 10,000-hectare treatment area in

the Beresford Range, Catlins Forest Park which will also benefit many other indigenous fauna and flora species.

Offset and compensation for wetland loss

127. The permanent loss of bog and fen wetlands as a result of the wind farm construction cannot be offset in terms of wetland extent because wetlands of this type cannot (with any confidence) be created at new sites. However, partial offset can be achieved by protecting and enhancing the condition of the bog and fen wetlands that will not be affected by the wind farm construction and operation.

128. Permanent deer fencing is proposed around the Jedburgh Station Ecological Enhancement Area, a 245 ha block of indigenous forest, scrub, shrubland and fen and bog wetlands adjacent to the Jedburgh Plateau. Feral deer and pigs will be eradicated from within this fenced area and farm livestock will be excluded. The ecological enhancement of this area through fencing, eradication of ungulates, and enrichment planting, is proposed as a partial offset for the loss of indigenous vegetation, noting it will also provide protection and enhancement for the 18 ha of fen and 1.5 ha of bog that will be enclosed by the fence. Exclusion of grazing animals can be expected to result in substantial improvement in the floristic diversity of the wetlands by removing the grazing pressure on palatable wetland species.

129. Targeted deer control across the Jedburgh Plateau will also benefit the bog and fen wetlands and indigenous shrubland, in this zone. Deer numbers and impact are currently high across the Plateau and most palatable indigenous plant species are absent from wetland and terrestrial vegetation. Reduction in deer numbers can be expected to result in improved plant diversity across all vegetation types.

130. In addition, compensation for the loss of bog and fen wetlands will be provided by the revegetation with indigenous wetland species of 5.11 ha of wetland dominated by exotic wetland plant species at the Davidson Road Wetland Restoration Site and enrichment planting of 6.67 ha of adjacent wetland that is dominated by indigenous species. Both areas will be fenced to exclude livestock and protected by covenant or equivalent legal mechanism.

131. Wetlands at the Davidson Road Wetland Restoration Site are dominated by copper tussock and, as such, are different to the bog and fen wetlands on the

Jedburgh Plateau. However, copper tussock is listed as an At Risk Tussockland Habitat Type in the Southland RPS (where it is referred to as red tussock) and for that reason restoration of the Davidson Road Wetland Restoration Site is considered to be appropriate compensation.

132. In summary, restoration and enhancement planting of up to 11.78 ha of copper tussock wetland, plus the permanent exclusion of grazing ungulates from 18.7 ha of fen and 2.3 ha of bog on the Jedburgh Plateau, is expected to result in the creation of substantially improved wetland condition over all restoration sites and is considered more than appropriate compensation for the loss of 0.94 ha of bog, 1.08 ha of fen, and 0.01 ha of copper tussock/rautahi marsh.

133. The adverse impact of grazing ungulates (livestock, deer and pigs) on the Jedburgh Plateau wetlands was, in my opinion, understated during the Covid Fast-track Consenting application, as were the benefits that will accrue to wetland habitat condition and the wetland fauna that inhabit the wetland sites when ungulates are permanently excluded from the 245 ha Jedburgh Station Ecological Enhancement Area.

Offset for the effects on fernbird and invertebrates

134. The Jedburgh Plateau provides important habitat (wetlands and shrubland areas) for South Island fernbird (mātātā) and indigenous terrestrial invertebrates. Fernbird are particularly vulnerable to predation by rats, stoats, weasels and feral cats[10] but population recovery is significant and reasonably rapid when effective predator control is applied to their habitat[11]. Invertebrates are particularly vulnerable to predation by rodents, and there is evidence that rodents are adversely affecting beetle species at the Southland Wind Farm Site (e.g. observations of beetle cadavers with legs chewed off).

135. Targeted intensive ground-based predator control within the 55 ha Plateau Fauna Enhancement Area is a measure developed to protect existing fernbirds and terrestrial invertebrates and address any adverse effects of habitat removal. The pest control will also likely benefit local populations of pīhoihoi/NZ pipit that may breed on the plateau. A bait station grid with at least 2 devices per hectare will be effective at controlling rats, while DOC200

[10] O'Donnell, C.F.J, Clapperton, B.K. and Monks, J.M. (2015). Impacts of introduced mammalian predators on indigenous birds of freshwater wetlands in New Zealand. New Zealand Journal of Ecology 39(1): 19-33.
[11] O'Donnell, C.F.J. (2018). Responses of spotless crake and fernbird populations to experiemental predator control in Whangamarino and Awarua wetlands. Presentation to the National Wetland Symposium, Napier 26-28 September 2018.

traps will also be deployed to control stoats, and weasels, noting that this area will be bounded by a network of traps along the wind farm roads. Feral cats, if they are present on the Plateau, will need to controlled using cat-specific traps that are located on commonly used cat trails.

136. Provided the trap and bait station network is well maintained with a focus of effort at and immediately preceding bird breeding season, noticeable recovery in fernbird numbers can be expected within a few years. This can be expected to more than offset any decline in fernbird resulting from habitat loss.

Offset and compensation for the effects on long-tailed bats

137. I fully endorse the assessment of potential ecological effects of the Project on long-tailed bats documented by Mr Gerry Kessels and Dr Ian Davidson-Watts in their report (Report 6). I agree that the proposed mitigation measures to reduce the level of adverse effects to no more than minor and compensation measures proposed in the Catlins will likely result in a net gain outcome for long-tailed bats.

138. Bat detection levels at the Project Site were assessed to be very low and the risk of blade strike and/or barotrauma is very low over the majority of the wind farm site. However, the risk of blade strike and/or barotrauma was determined to be moderate at nine of the proposed turbine sites.

139. A live curtailment regime has been proposed for the nine turbines where turbines are triggered to slow down or turn off when bats are detected flying near or within the rotor-swept zone of an individual turbine. Because the live curtailment technology is new and relatively untested in New Zealand, a three-year trial operating period has been proposed, with ‘set’ curtailment to be substituted for live curtailment if necessary.

140. Residual effects on long-tailed bats will be addressed through a compensation package of pest management over 10,000 ha in the Catlins Forest and Beresford Range for the life of the Southland Wind Farm. Funding will be provided by Contact to DOC, initially to be used for track building and trap purchases, and then annually to assist the on-going predator control.

141. Research undertaken by Dr Colin O'Donnell and others[12] has shown that effective predator control is essential if long-tailed bat populations are to recover and that predator control over contiguous habitat in excess of 3,000 ha is necessary to achieve population recovery. The proposed compensation package providing funding for on-going predator control over 10,000 ha can be expected to benefit the long-tailed bat population in that area in a significant way and will more than compensate for the residual risks of the Project on bats.

142. The proposed predator control for long-tailed bats will also provide substantial additional ecological benefits. Effective control of the predators of bats – rats, stoats, weasels, possums and feral cats – will also improve the survival and recruitment of several native bird species known to be present in the Catlins Forest area. Research undertaken in Southland[13] showed significant increases in the populations of eight indigenous bird species over a period of 12 years of predator control. Many of the species in that study, including mohua (also known as yellowhead; *Mohoua ochrocephala*) with a conservation status of At-Risk – Declining, are present in the Catlins Forest.

143. The expected recovery of several forest bird species as a result of the long-tailed bat predator control programme will far exceed, in terms of ecological benefits, any adverse effects of the Southland Wind Farm Project on indigenous birds. For this reason, the effects management package proposed by Contact can be expected to generate a substantial overall net gain in biodiversity.

SUMMARY

144. I have reviewed the ecology assessment of effects reports, evaluated the methodology used to assess ecological values and likely effects, including survey intensity and accuracy, and assessed the likely outcomes of the mitigation, offset and compensation actions proposed.

145. While several Threatened or At Risk indigenous species and high value vegetation types exist at the Southland Wind Farm Site, and several will be subject to measurable adverse effects as a result of the construction and operation of the wind farm, it is my professional opinion that the offset and

[12] O'Donnell, C.F.J., Pryde, M.A., van Dam-Bates, P., and Elliot, G.P. (2017). Controlling invasive predators enhances the long-term survival of endangered New Zealand long-tailed bats (Chalinolobus tuberculatus): implications for conservation of bats on oceanic islands. Biological Conservation 214:156–167.

[13] O'Donnell, C.F.J. and Hoare, J.M. (2012). Quantifying the benefits of long-term integrated pest control for forest bird populations in a New Zealand temperate rainforest. New Zealand Journal of Ecology 36(2): 131-140.

compensation measures proposed will fully and appropriately address the ecological effects and can be expected to result in an overall net benefit to biodiversity.

Roger John MacGibbon

APPENDIX ONE: JEDBURGH PLATEAU VEGETATION COVER COMPARISON 2023 AND 1984

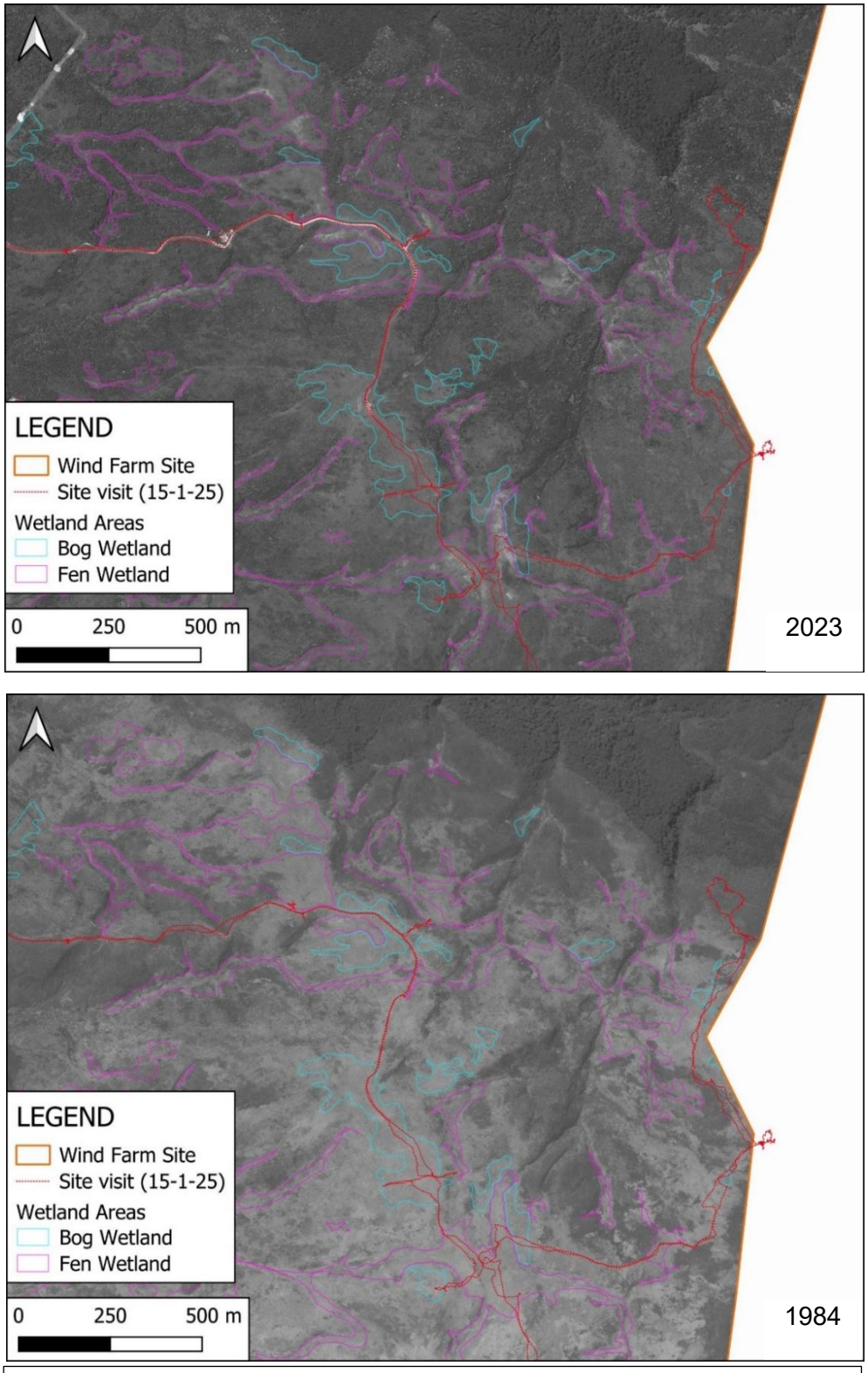

Figure 1: *Comparison of vegetation cover between 2023 (top) and 1984 (bottom) on the section of the Project area near the head of the gully. The red line shows my field site visit route.*