GREAT SOUTH

Southland Regional Development Agency

Southland Murihiku Energy Strategy Implementation

Energy in the Landscape

ASSESSMENT OF WIND RESOURCES – SOUTHLAND

GREAT SOUTH - OCTOBER 2025

Transitioning to a low-emissions and climate-resilient future

Assessment of renewable power generation opportunities to meet the future energy needs of Southland, New Zealand

REPORT TITLE

Assessment of wind resources - Southland

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4

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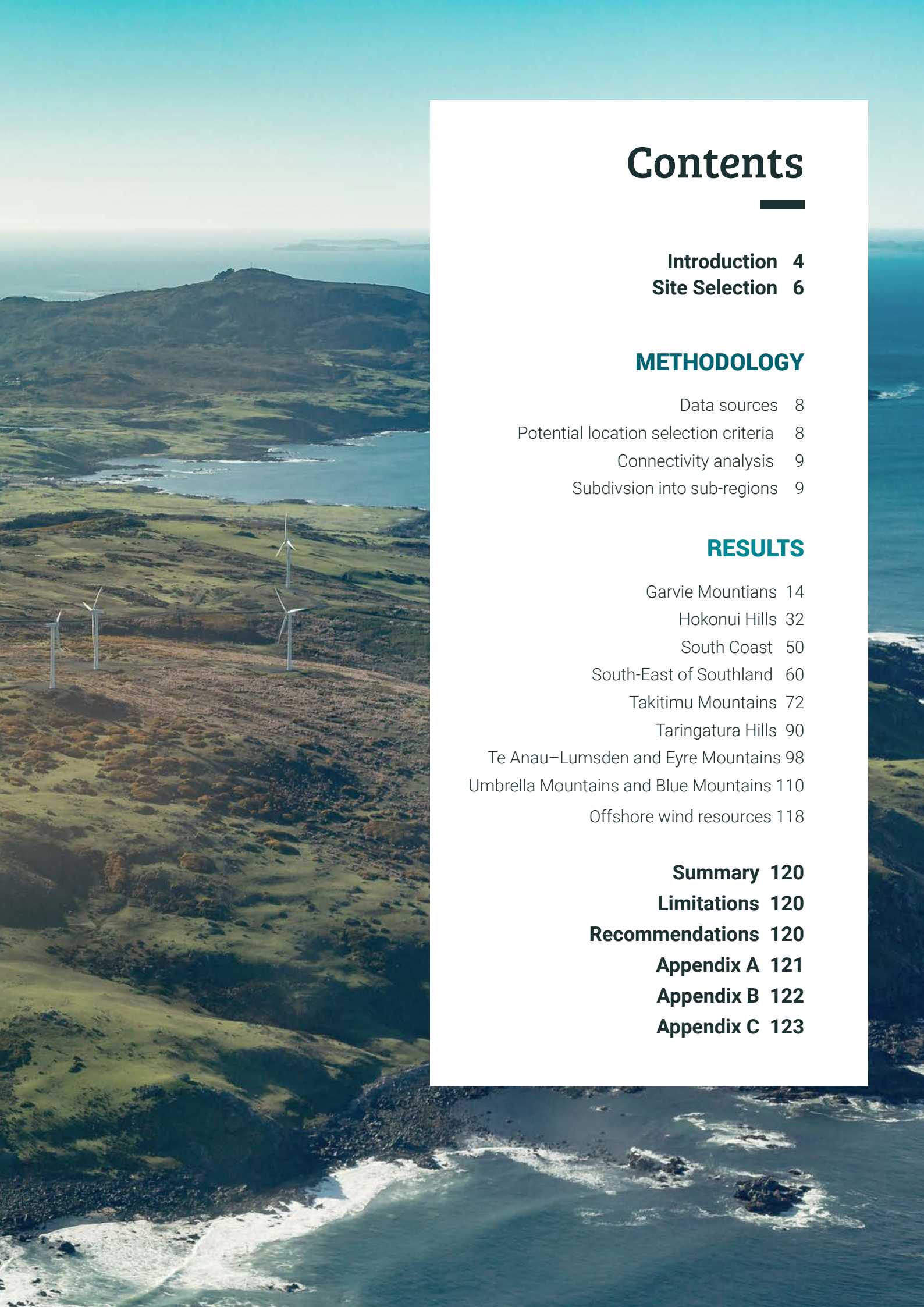


Contents

Abbreviations

Term	Definition
DEM	Digital Elevation Model
GIS	Geograhic Information Systems
GWA	Global Wind Atlas
LiDAR	Light Detection and Ranging
LINZ	Land Information New Zealand
WASP	Winning and Score Predictor

Glossary

Term	Definition
Air Density	Mass of air per unit volume, typically expressed in kilograms per cubic meter (kg/m^3). It is influenced by temperature, pressure, and humidity, and plays a crucial role in wind energy calculations, as it affects the amount of energy that can be extracted from the wind.
DEM – Digital Elevation Model	3D representation of a terrain's surface created from elevation data.
GIS – Geographic Information Systems	Tools used to capture, store, analyse, and visualize spatial and geographic data. In wind energy, GIS helps integrate various datasets such as wind speed, land use, and topography, to support site selection and resource evaluation.
Mean Power Density	Average amount of wind power available per unit area, typically measured in watts per square meter (W/m^2). It reflects the potential energy output from wind at a given location.

Introduction

Southland region has a desire to significantly reduce emissions by effective use of renewable energy. The demand for energy requires a fresh approach to identifying new electricity generation opportunities.

The 'Energy in the Landscape' report identifies locations within Southland with sufficient natural energy potential to stimulate new energy generation investment in wind power, solar power and hydroelectric.

This report is the first of three volumes for the Energy in the Landscape programme. The report has not assessed national parks and conservation areas, however some of the locations may include conservation estate and this is outlined within the individual description of each location. Reserves were not considered as a limitation and some of them are included in the report, however their potential limitations must be contemplated.

Southland's evolving energy landscape is shaped by a rapidly growing demand for electricity and a strong regional commitment to renewable energy. As industries, communities, and infrastructure transition toward low-carbon solutions, there is an urgent need to illustrate both the range of renewable energy options available and the scale of current and future demand.

The Southland Murihiku Energy Strategy 2024 highlights wind energy as a key contributor to the region's renewable future. Using global wind modelling tools and Geographic Information Systems (GIS), this report maps areas with commercial wind potential for both hilltop and flatland sites. It is important to note, however, that these maps indicate wind resource potential, not investment bankability

Site selection

Identification of potential sites is a preliminary phase in the wind planning process and does not imply cultural, environmental, or commercial viability.

At a high level there are typically, ten principal factors that guide the selection of suitable wind farm sites:

- **Electricity Demand and price**

Wind farm viability depends on securing energy off-take agreements. Demand is driven by industrial decarbonisation, climate disclosures, and the need for reliable, low-carbon energy at competitive prices.

- **The location of the demand**

Locating generation close to demand reduces transmission losses and infrastructure costs, improving overall efficiency and reliability

- **Land**

Access to suitable land with long-term tenure is essential for development, construction, and operation of wind farms.

- **Consents**

Projects must be able to obtain necessary environmental, planning, and regulatory consents to proceed.

- **Transmission Infrastructure Availability**

Proximity to existing grid infrastructure lowers capital costs and simplifies grid connection, making projects more feasible.

- **Technical Requirements**

Sites must meet wind speed and reliability thresholds, have suitable terrain, and allow for component transport and grid access.

- **Cultural, Visual and other Environmental Considerations**

Projects should respect local cultural values, visual landscapes, and ecological integrity to gain community support.

- **Consultation**

Early and meaningful engagement with iwi, councils, utilities, and communities is vital for project acceptance and success.

- **Financial Viability and project bankability.**

Projects must demonstrate strong financial returns and attract investment through sound economics and risk management.

- **Other factors**

Scale, ongoing operational costs, and access to capital also influence site selection and long-term project success.

The ability to secure resource consents for new projects is a challenge however the mapping work contained in this report has formed the basis of an energy resources layer which is expected to be incorporated into Southland's future spatial planning process which in turn is expected to make the consent processes easier. The commitment by owners of the Tiwai Point Aluminium Smelter to continue operations for the next 20 years has greatly enhanced the potential for new investment in renewable energy.

Southland's renewable energy options are increasingly being leveraged to support exporters in decarbonising the value-added processing of primary sector products. Companies such as Fonterra, Danone, Open Country Dairy, Mataura Valley Milk, and Alliance Meats are leading this transition, with most processors aiming for substantial decarbonisation by 2030. Electricity availability will be a critical enabler of these large-scale projects.

Farmers are also playing a growing role in the renewable energy transition. Negotiations with generators typically involve site access and lease agreements, but in some cases may extend to royalties or direct investment. These arrangements offer opportunities to diversify and augment farm revenues while contributing to Southland's energy resilience.

This report aims to support stakeholders—including councils, developers, Iwi, and landowners—in making informed decisions about wind energy development. By providing a regional overview of wind resource potential, it lays the groundwork for further investigation, planning, and collaboration toward a sustainable energy future.

The report describes existing locations within the region with potentially commercial wind resources however it does not classify them. Therefore, this report should be used as background information for the preliminary selection of potential locations with feasibility and expected generation of potential wind farms to be the responsibility of the interested parties. Consequently, any future wind farm (if any) may vary in size than the following locations.

Existing, proposed or consented wind farms that satisfy the selection criteria (see section 1 - Methodology) are included as potential locations and can be considered as having potential for further expansion.

1. Methodology

The following section describes the methodology used to identify the locations with high wind resources.

1.1 DATA SOURCES

Wind data

The main source of wind data is retrieved from the free access web-based application The Global Wind Atlas (GWA)1. GWA compiles large scale climate data from atmospheric reanalysis data and models the information to determine mesoscale and microscale wind climate data. GWA's purpose is to help to identify high wind areas for wind power generation.

GWA allows the retrieval and download of the Mean Wind Speed and the Mean Power Density at different altitudes, including wind roses and temporal data. The application also calculates the average wind data for user-defined areas, which was used to determine the wind attributes summarised for each location. This report considered wind data at 100 m above ground.

Digital Elevation Model

A Digital Elevation Model (DEM) is a representation of the bare ground topographic surface of the Earth, which is necessary to model the form and features of the land surface. The DEM is used to identify relatively high-altitude areas where the wind resources are typically greater.

The DEM used is an amalgamation of a number of different datasets compiled by Great South in November 2021 with a spatial resolution of 1x1 metre. The layer is derived from available regional LiDAR, groundwater bore collar heights, geodetic vertical marks, and protected survey marks.

Substations and transmission lines

The location of transmission lines, power stations and substations are acquired from two sources:

- Transpower open data website[2]
- Geographic Information Systems (GIS) data supplied directly by PowerNet

Substations and transmission lines are used to identify the distance from the selected locations with high wind resources to existing power structures.

Protected areas.

The protected areas were acquired from the Land Information New Zealand (LINZ) data service[3]. This data was used to exclude the areas of National Parks and conservation estate.

1.2 POTENTIAL LOCATION SELECTION CRITERIA

To define a location with high wind resources the following elements were considered.

Wind speed and power density

These data were acquired from GWA and is the best representation of wind resources in the region. Wind speed and power density are linked to each other: the higher the wind speed the higher the power density. However, it is the power density which delivers a better indication of wind resources because it also considers air density.

For this report only locations with power density over 1000W/m^2 and wind speed over 8 m/s were considered as locations with high wind resources. In a zone where the power density is relatively high, the lowest limit of power density was increased to 1500W/m^2. (see Table 1).

Topography

It is acquired from DEM. Topography plays an important role in wind resources: relatively high locations have usually higher wind resources. The GWA also considers the topography in their methodology, and the wind speed and power density indirectly reflect it.

There is not an absolute altitude limit to define the locations, instead relatively high-altitude areas such as ridges and hills were considered as potential locations. Relatively high-altitude areas were compared with high wind resource areas and, if both matched, that area was selected as a **potential location of wind resources.**

Protected areas

The protected areas include national parks and conservation estate and were excluded as not eligible potential locations of wind resources. Note that some

conservation state may be included in the following locations, however those protected areas are displayed and must not be overlooked.

Other protected areas such as reserves were not excluded and may be included within the potential locations. This is because this report does not intend to define how the land should be used but rather to physically describe the locations with high wind resources.

1.3 CONNECTIVITY ANALYSIS

To complement the physical description of the potential locations a short connectivity analysis was carried out. This analysis consists in measuring the distance from the centroid of each potential location to the closest power station/substation. This provides an initial idea of the minimum required distance to connect a potential wind farm to the existing electric power transmission system. This analysis was executed using the Geographic Information Systems (GIS) data provided by Transpower and PowerNet companies.

In some potential locations, the closest station/ substation was not the best option because the existing transmission lines allow to connect to a further station with a shorter connection. These locations are established with the 'closest connection' attribute and area outlined in the individual potential location descriptions.

1.4 SUBDIVISION INTO SUB-REGIONS

Due to the large number of selected potential locations, a subdivision into sub-regions was carried out to simplify the report and description of the results. The definition of sub-regions did not follow any existing criteria and grouped potential locations that share similar geographic characteristics. In total, eight sub-regions were defined

Table 1: Subdivision into regions

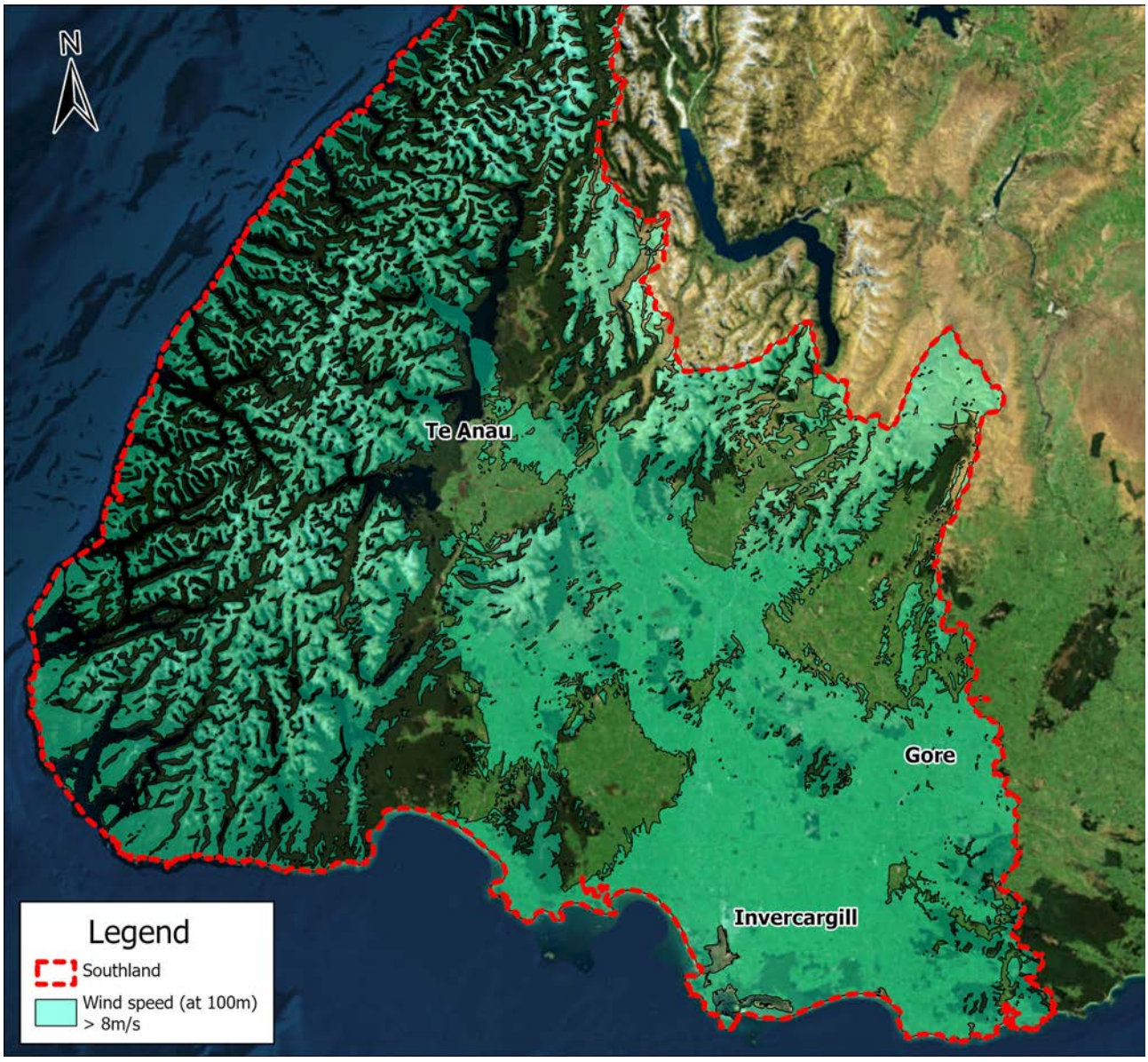
Sub-region name	Total of potential locations	Power density lowest limit criteria
Garvie Mountains	20	1500 W/m^2
Hokonui Hills	20	1000 W/m^2
South Coast	12	1000 W/m^2
South-East of Southland	11	1000 W/m^2
Takitimu Mountains	20	1000 W/m^2
Taringatura Hills	9	1000 W/m^2
Te Anau – Lumsden and Eyre Mountains	13	1000 W/m^2
Umbrella Mountains and Blue Mountains	7	1000 W/m^2

2. Results

Average wind speeds over 8 m/s were considered good enough for commercial wind generation

As it is shown in Figure 1, a great portion of Southland has high-speed winds at 100m above ground, demonstrating the excellent wind resources within the region. It is important to underline that wind speeds increase at higher altitudes. Appendices A and B show the average wind speed and wind power density across region, respectively.

Figure 1: Areas with wind speed over 8 m/s at 100m above ground in Southland



Following the criteria established in the methodology section, a total of 112 potential locations were selected. This section compiles the individual description of each potential location. Table 2 summarises the potential locations with high-wind resources, grouped by sub-regions and sorted from largest to smallest wind power density.

Table 2: All locations with high wind resources – Wind power density.

Sub-region/Potential location name	Power density (W/m²)
Garvie Mountains	
Garvie Mountains 4	2938
Garvie Mountains 3	2914
Garvie Mountains 2	2507
Conical Hill	2441
Garvie Mountains 1	2407
Garvie Mountains 5	2404
Flat Rock	2364
Mataura Range	2249
Flat Hill GM	2225
Craigie Hill	2179
Roaring Lion Trail	1932
Mid Dome	1898
S Mataura	1879
Lowther Peak	1870
Tennants Peak	1788
Round Hill	1708
Elbow Head	1592
Lintley Hill	1576
N Ardlussa	1573
Slate Range	1537

Sub-region/Potential location name	Power density (W/m²)
Hokonui Hills	
S Retreat Rd	1720
Kelvin Peak	1685
Ben Bolt	1609
East Shoulder	1582
Pukemaire	1570
Bare Hill 2	1552
Hedgehope Hill	1523
North Peak	1507
The Bastion	1506
Bare Hill 1	1498
East Peak A1AO	1475
Hall Road	1471
Ben More	1443
W Retreat Rd	1439
Waimea Hill	1419
Heale Ridge	1411
Mt Peel	1399
N Retreat Rd	1303
Forest Hill 1	1067
Forest Hill 2	1025

Sub-region/Potential location name	Power density (W/m²)
South Coast	
Pahia Hill	1879
Longwood Range 2	1819
Longwood Range 1	1818
Ruahine Hill 1	1630
Bald Hill	1563
Bluff	1549
Kawakaputa	1441
Ruahine Hill 2	1398
Omaui	1351
Flat Hill 1	1347
Flat Hill 2	1240
Riverton	1156

South-East of Southland	
Mokoreta	1773
SW Mokoreta	1694
Rocky Dome	1450
Kuriwao	1429
Brown Dome	1364
Hurst	1357
Wisp Range	1349
Kaihiku Range	1306
Kaiwera Downs	1296
Hillary	1286
Waikaka Hill	1053

Sub-region/Potential location name	Power density (W/m²)
Takitimu Mountains	
Cessnock	2532
Loudon Hill	2430
S Grassy Creek	2388
Gibraltar Hill	2385
N Grassy Creek	2206
W The Knob	2148
Barcoo Bush	2043
North Braxton	2016
Mt Linton	1999
Morely Hill	1985
NW The Knob	1975
Bell Mount	1966
South Braxton	1956
Montevue	1836
McIvors Hill	1816
Letham Hill	1795
Nugget Hill	1757
Beaumont Hill	1699
Etal Hill	1679
NW Bell Mount	1421

Sub-region/Potential location name	Power density (W/m^2)
Taringatura Hills	
White Hill	1685
Wether Hill	1647
Raggedy Hill	1541
Taringatura Forest 3	1526
Taringatura Hill	1511
West Taringatura	1465
Taringatura Forest 2	1446
Taringatura Forest 1	1438
North Range	1424

Te Anau – Lumsden and Eyre Mountains	
Eyre Mountains 3	2393
Centre Hill	2286
Eyre Mountains 2	2088
Gyzeh	1863
Eyre Mountains 1	1820
Eyre Mountains 4	1786
Mossburn	1738
Eyre Mountains 6	1708
Fairlight Station	1507
Mt Prospect	1474
Thomas Burn	1381
Danby Hill	1379
Eyre Mountains 5	1240

Sub-region/Potential location name	Power density (W/m^2)
Umbrella Mountains and Blue Mountains	
Umbrella Mountains	1998
Blue Mountains	1704
Mocking Bird Hill Road	1544
Dusk Hill	1524
Mt Wendon	1493
Leithen Hill	1451
Waikaia	1432

2.1 GARVIE MOUNTAINS

This sub-region corresponds to the area between Kingston, Lumsden and Waikaia. It covers geographical areas such as the Garvie Mountains, Slate Range, Lintley Range and Mataura Range. It borders Otago to the North.

Figure 2: Potential locations of wind resources – Garvie Mountains.
Panel (A): Southland map.
Panel (B): Zoom in on the yellow square in panel A.

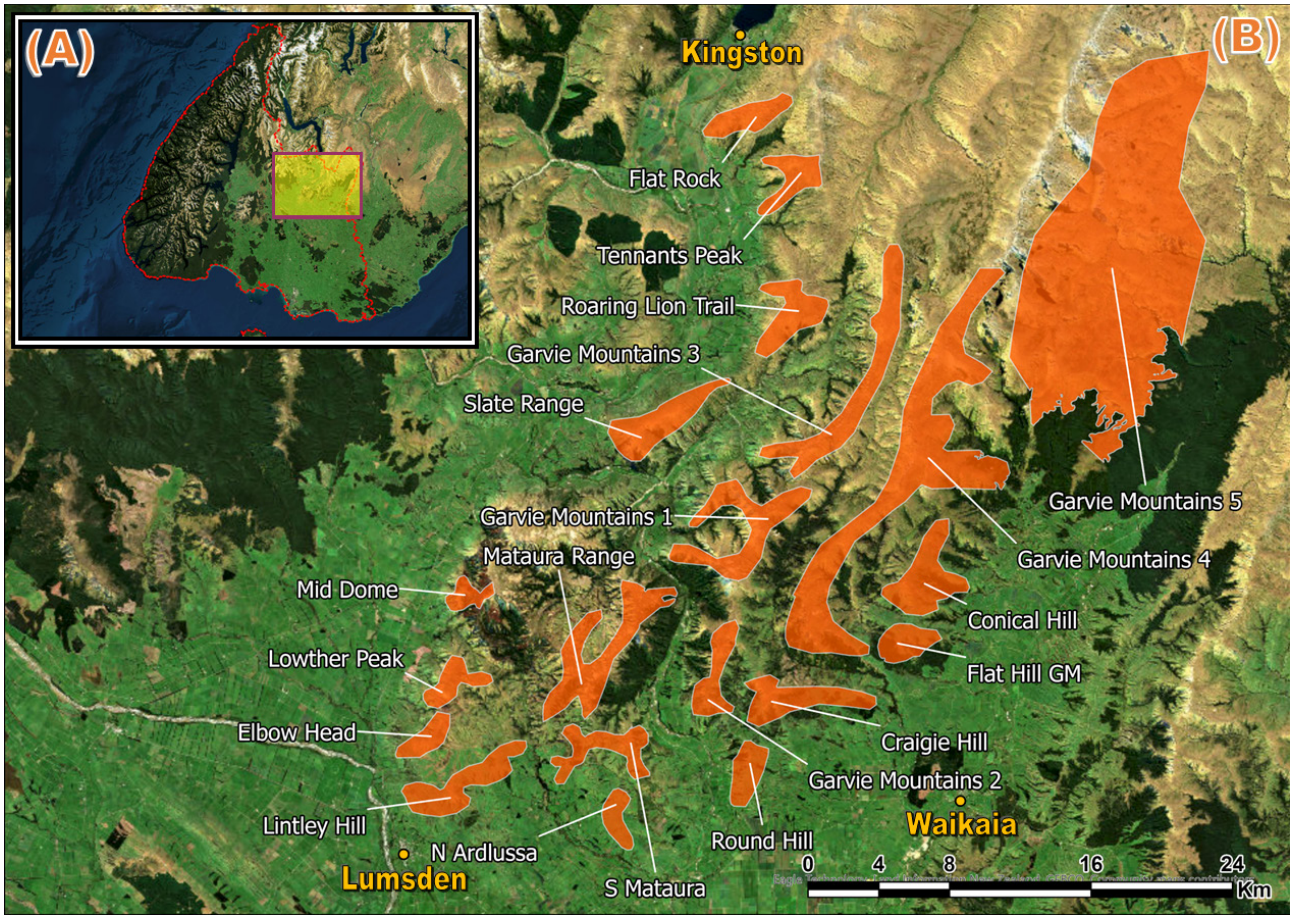


Table 3: Potential locations within the Garvie Mountains sub-region.

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Garvie Mountains		
Conical Hill	10.3	2441
Craigie Hill	10.32	2179
Elbow Head	9.75	1592
Flat Hill GM	9.72	2225
Flat Rock	11.45	2364
Garvie Mountains 1	11.01	2407
Garvie Mountains 2	11.42	2507
Garvie Mountains 3	12.11	2914
Garvie Mountains 4	11.96	2938
Garvie Mountains 5	11.66	2404

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Lintley Hill	9.75	1576
Lowther Peak	10.29	1870
Mataura Range	11.05	2249
S Mataura	10.28	1879
Mid Dome	10.35	1898
N Ardlussa	9.54	1573
Roaring Lion Trail	10.25	1932
Round Hill	9.64	1708
Slate Range	9.16	1537
Tennants Peak	10.56	1788

2.1.1 Conical Hill

Figure 1: Conical Hill - Protected areas (Left): Wind power density (Right).

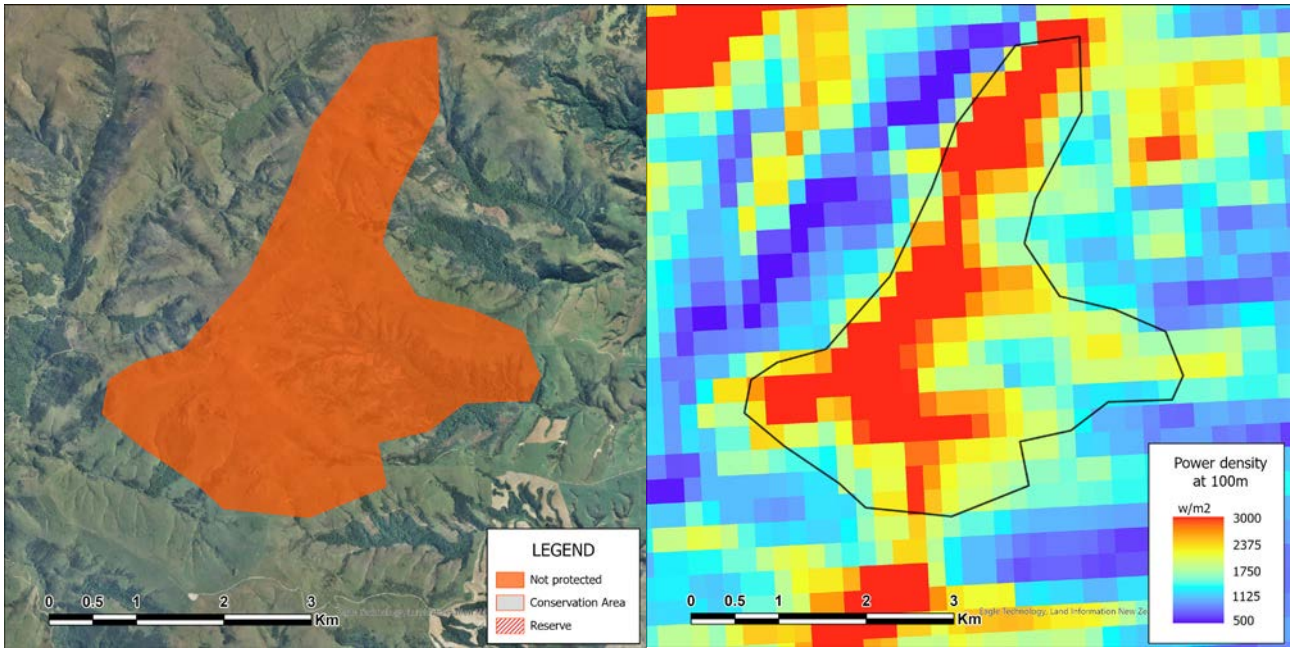


Table 4: Conical Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1275017
Centroid Y-Coordinate (NZTM2000)	4940255
Unprotected area (km^2)	11.98
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	2441
Mean wind speed (m/s) *	10.3

Transmission attributes	
Closest substation	Athol
Distance to the closest substation (km)	23.85
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.2 Craigie Hill

Figure 4: Craigie Hill - Protected areas (Left); Wind power density (Right).

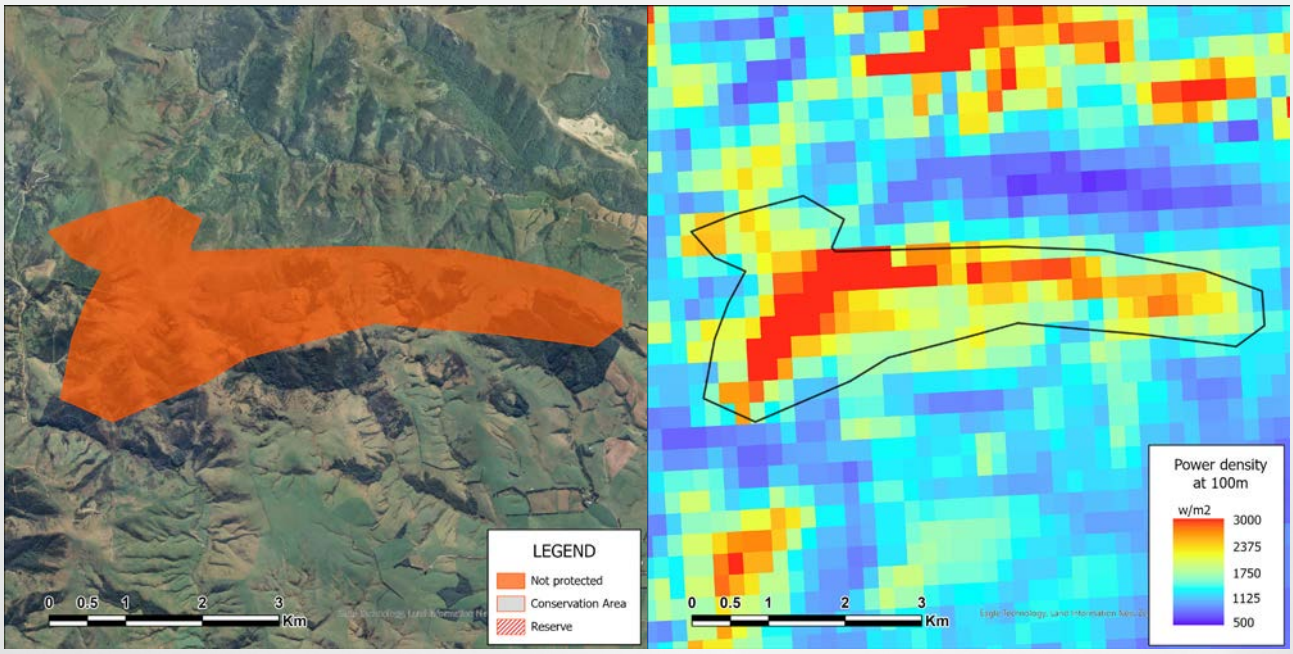


Table 5: Craigie Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1267776
Centroid Y-Coordinate (NZTM2000)	4933361
Unprotected area (km^2)	10.26
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	2179
Mean wind speed (m/s) *	10.32

Transmission attributes	
Closest substation	Lumsden
Distance to the closest substation (km)	23.13
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.3 Elbow Head

Figure 5: Elbow Head - Protected areas (Left); Wind power density (Right).

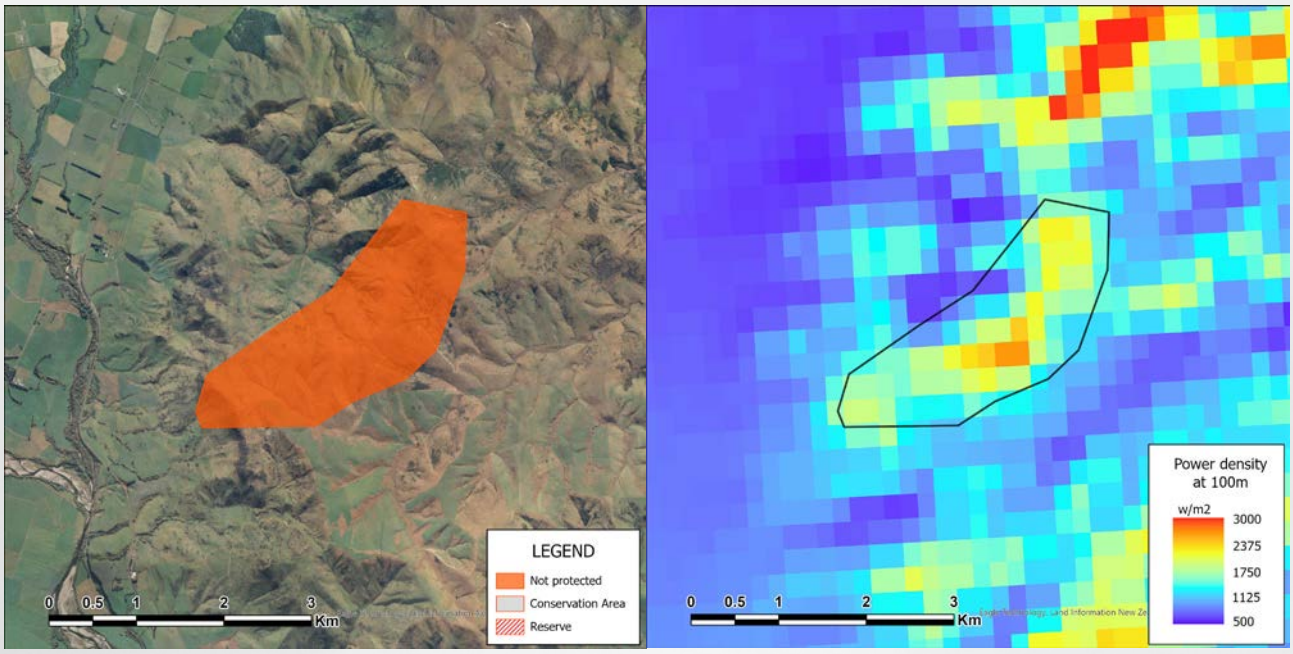


Table 6: Elbow Head attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1246759
Centroid Y-Coordinate (NZTM2000)	4931174
Unprotected area (km^2)	4.09
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1592
Mean wind speed (m/s) *	9.75

Transmission attributes	
Closest substation	Lumsden
Distance to the closest substation (km)	6.70
Closest connection **	Athol

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.4 Flat Hill (GM)

Figure 6: Flat Hill (GM) - Protected areas (Left); Wind power density (Right).

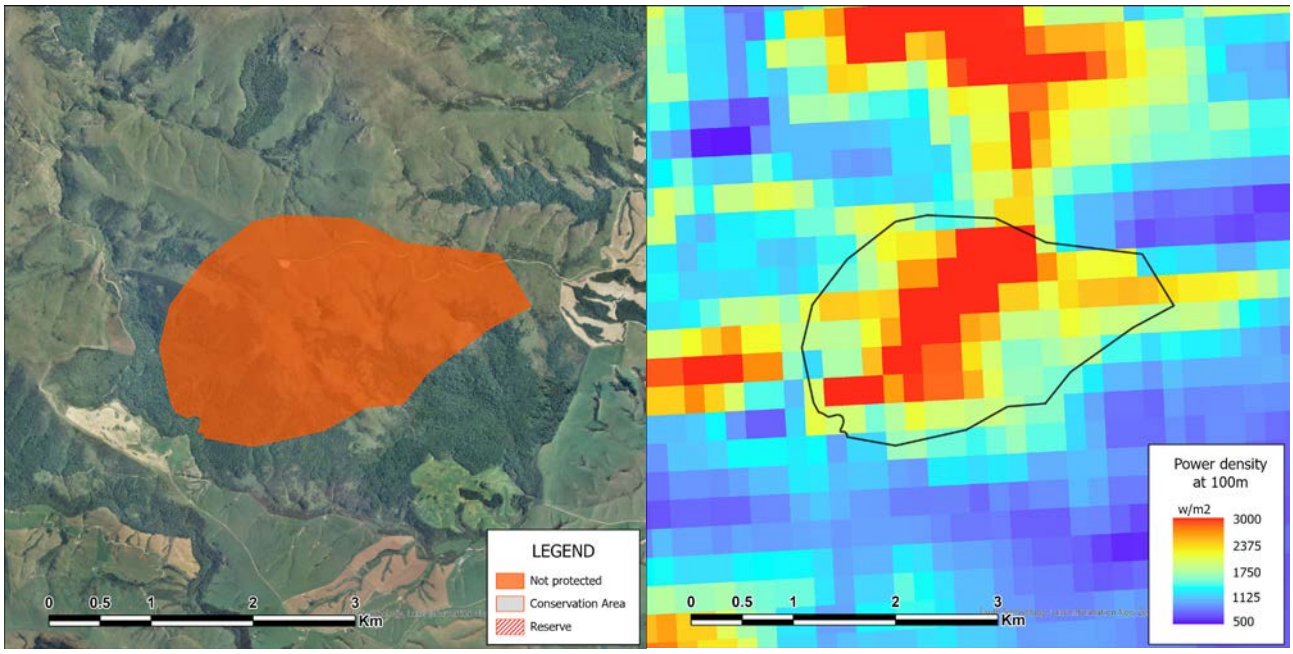


Table 7: Flat Hill (GM) attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1273864
Centroid Y-Coordinate (NZTM2000)	4936573
Unprotected area (km^2)	5.45
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	2225
Mean wind speed (m/s) *	9.72

Transmission attributes	
Closest substation	Athol
Distance to the closest substation (km)	24.26
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.5 Flat Rock

Figure 7: Flat Rock - Protected areas (Left); Wind power density (Right).

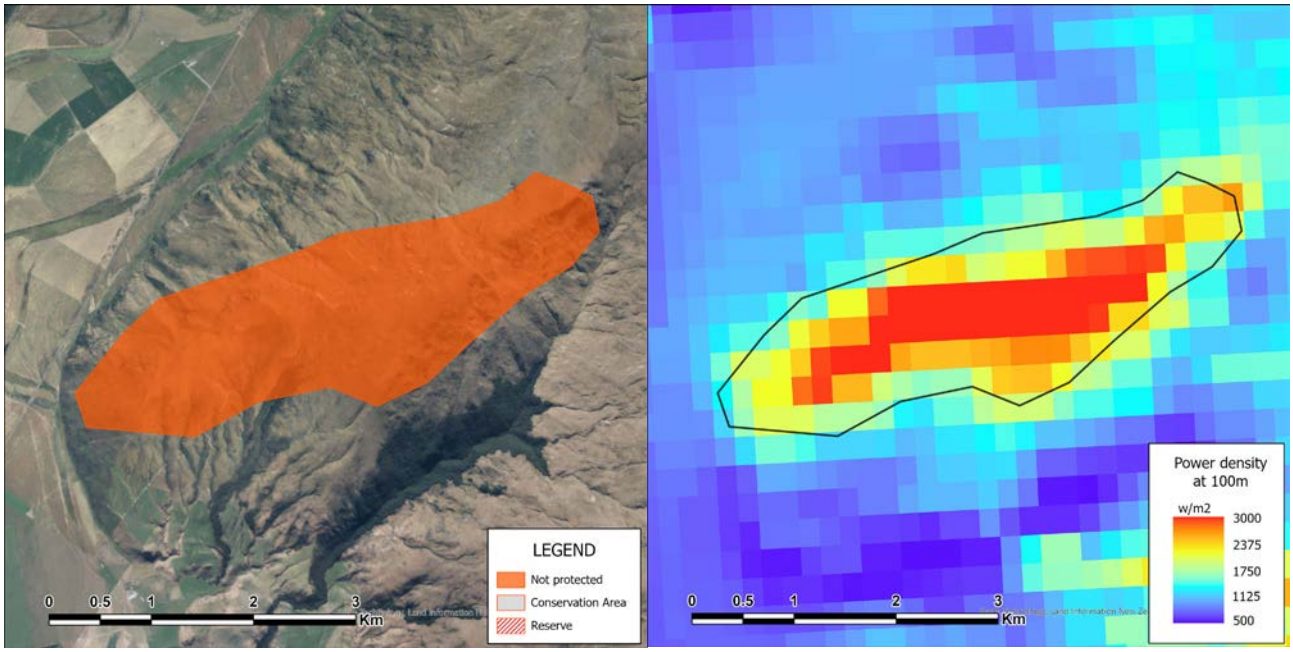


Table 8: Flat Rock attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1264933
Centroid Y-Coordinate (NZTM2000)	4966243
Unprotected area (km^2)	6.39
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	2364
Mean wind speed (m/s) *	11.45

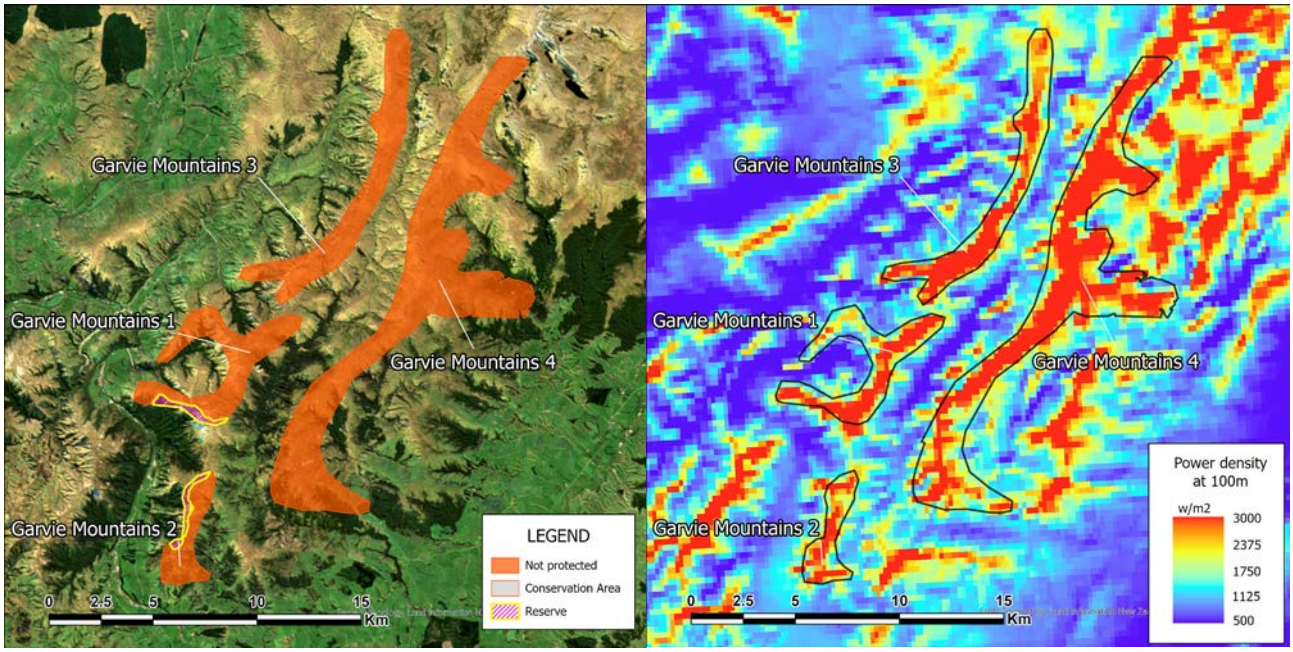
Transmission attributes	
Closest substation	Athol
Distance to the closest substation (km)	22.11
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.6 Garvie Mountains

Figure 8: Garvie Mountains 1,2,3 & 4 - Protected areas (Left); Wind power density (Right).



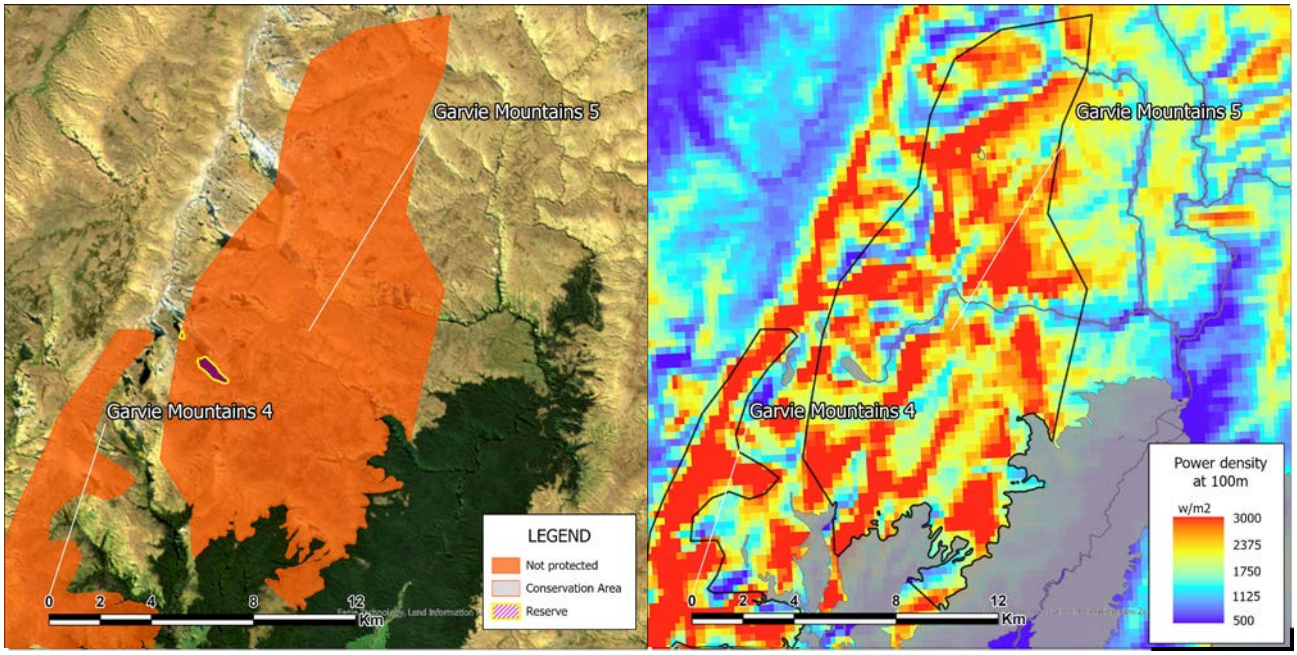
Reserve within 'Garvie Mountains 1':

East Dome Scenic Reserve

Reserve within 'Garvie Mountains 2'

Historic Reserve – Muddy Gully

Figure 9: Garvie Mountains 4 & 5 - Protected areas (Left); Wind power density (Right).



Reserve within 'Garvie Mountains 5':

Scenic Reserve – Lake Gow, Lake Scott and Blue Lake

Conservation area to the South-East of 'Garvie Mountains 5'

Waikaia Forest

Table 9: Garvie Mountains 1,2 & 3 attributes

Location Attributes	Garvie Mountains 1	Garvie Mountains 2	Garvie Mountains 3
Centroid X-Coordinate (NZTM2000)	1264531	1263116	1271005
Centroid Y-Coordinate (NZTM2000)	4943035	4934780	4951626
Unprotected area (km^2)	14.36	5.83	18.69
Protected area (km^2)	1.19	1.05	0.00
Protection type	Reserve	Reserve	-

Wind attributes	Garvie Mountains 1	Garvie Mountains 2	Garvie Mountains 3
Mean power density (W/m^2) *	2407	2507	2914
Mean wind speed (m/s) *	11.01	11.42	12.11

Transmission attributes	Garvie Mountains 1	Garvie Mountains 2	Garvie Mountains 3
Closest substation	Athol	Lumsden	Athol
Distance to the closest substation (km)	13.05	19.09	18.90
Closest connection **	-	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

Table 10: Garvie Mountains 4 & 5 attributes

Location Attributes	Garvie Mountains 4	Garvie Mountains 4
Centroid X-Coordinate (NZTM2000)	1273773	1285751
Centroid Y-Coordinate (NZTM2000)	4946077	4958365
Unprotected area (km^2)	55.84	150.28
Protected area (km^2)	0.00	1.09
Protection type	-	Reserve & Marginal Strip

Wind attributes	Garvie Mountains 4	Garvie Mountains 5
Mean power density (W/m^2) *	2938	2404
Mean wind speed (m/s) *	11.96	11.66

Transmission attributes	Garvie Mountains 4	Garvie Mountains 5
Closest substation	Athol	Athol
Distance to the closest substation (km)	21.40	34.87
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.7 Lintley Hill

Figure 10: Lintley Hill - Protected areas (Left); Wind power density (Right).

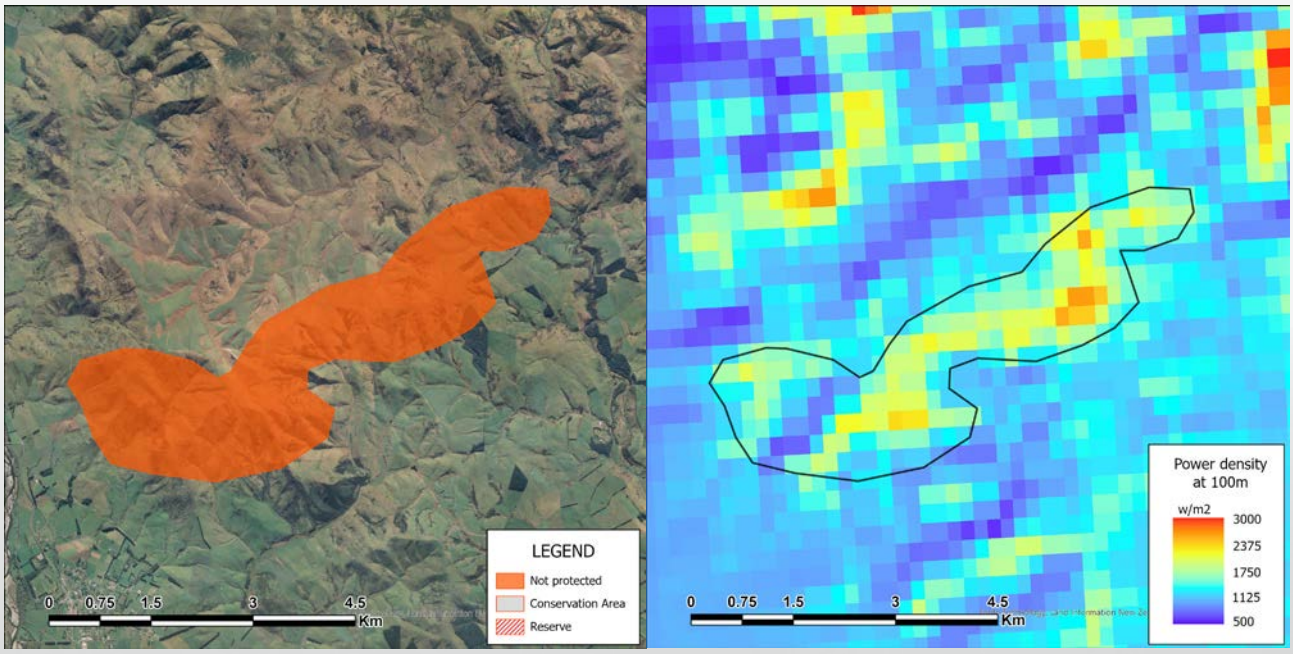


Table 11: Lintley Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1248768
Centroid Y-Coordinate (NZTM2000)	4928608
Unprotected area (km^2)	10.95
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1576
Mean wind speed (m/s) *	9.75

Transmission attributes	
Closest substation	Lumsden
Distance to the closest substation (km)	4.74
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.8 Lowther Peak

Figure 11: Lowther Peak - Protected areas (Left); Wind power density (Right).

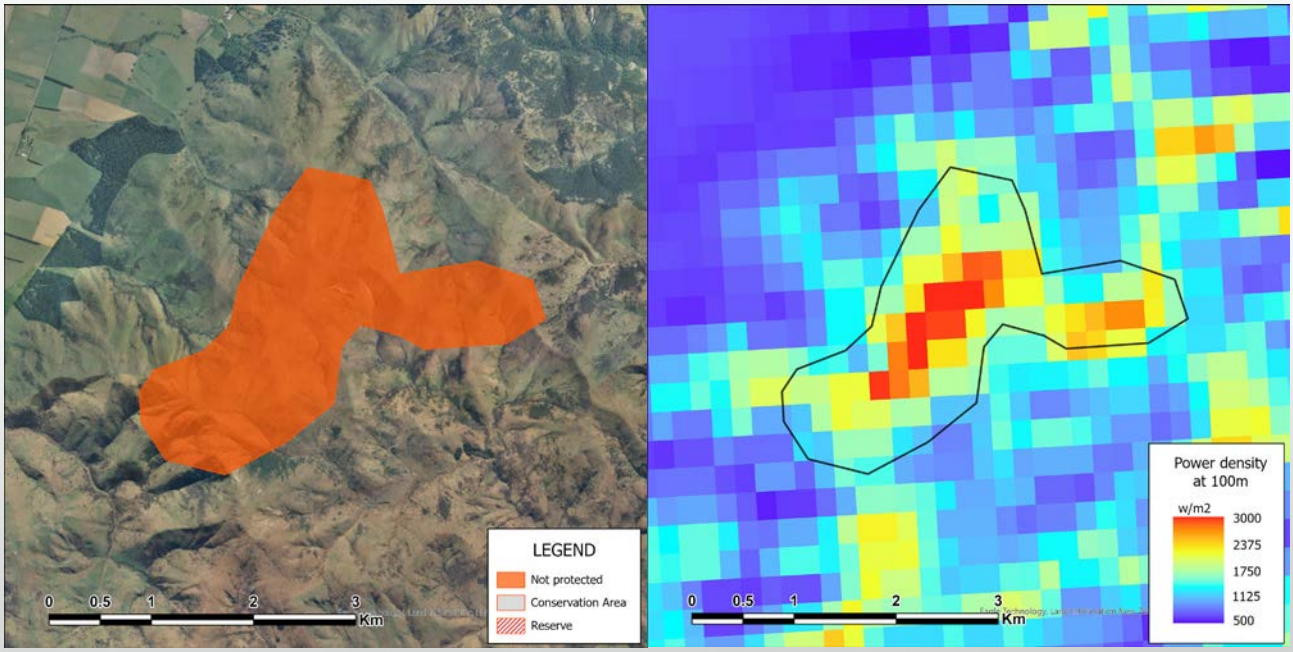


Table 12: Lowther Peak attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1248306
Centroid Y-Coordinate (NZTM2000)	4934303
Unprotected area (km^2)	4.99
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1870
Mean wind speed (m/s) *	10.29

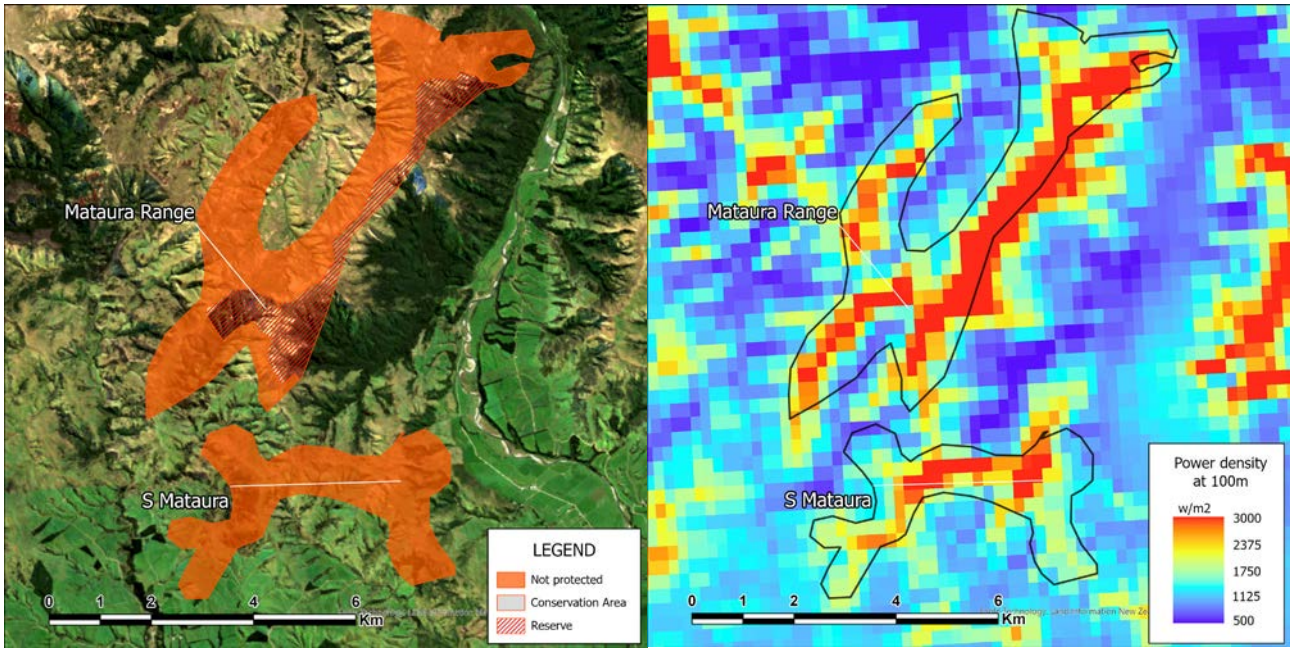
Transmission attributes	
Closest substation	Lumsden
Distance to the closest substation (km)	10.00
Closest connection **	Athol

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.9 Mataura Range and S Mataura

Figure 12: Mataura Range - Protected areas (Left); Wind power density (Right).



Reserve within 'Mataura Range':

Mataura Range Scenic Reserve

Table 13: Mataura attributes

Location Attributes	Garvie Mountains 4	Garvie Mountains 4
Centroid X-Coordinate (NZTM2000)	1256630	1256748
Centroid Y-Coordinate (NZTM2000)	4936143	4930494
Unprotected area (km^2)	13.68	8.42
Protected area (km^2)	4.43	0.00
Protection type	Reserve	-

Wind attributes	Garvie Mountains 4	Garvie Mountains 5
Mean power density (W/m^2) *	2249	1879
Mean wind speed (m/s) *	11.05	10.28

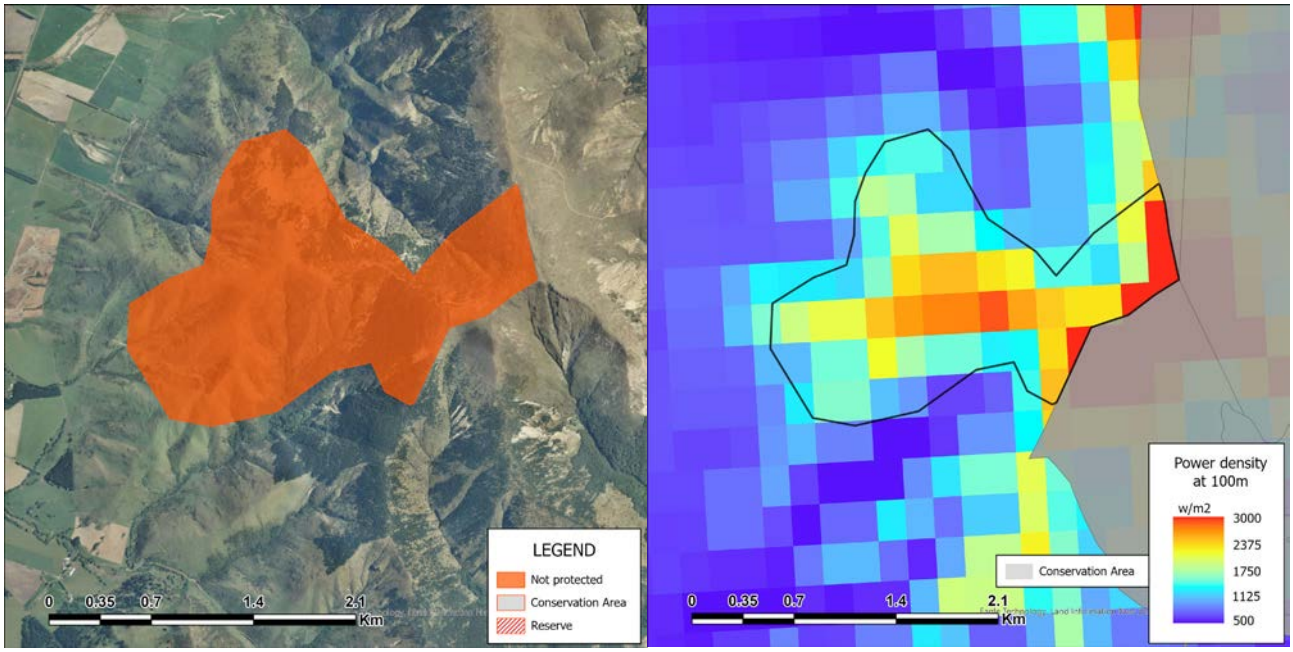
Transmission attributes	Garvie Mountains 4	Garvie Mountains 5
Closest substation	Athol	Lumsden
Distance to the closest substation (km)	12.89	11.95
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.8 Mid Dome

Figure 13: Mid Dome - Protected areas (Left); Wind power density (Right).



Conservation area to the East of Mid Dome:

Cupola

Table 14: Mid Dome attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1249083
Centroid Y-Coordinate (NZTM2000)	4939229
Unprotected area (km^2)	3.03
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1898
Mean wind speed (m/s) *	10.35

Transmission attributes	
Closest substation	Athol
Distance to the closest substation (km)	9.39
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.11 N Ardlussa

Figure 14: N Ardlussa - Protected areas (Left); Wind power density (Right).

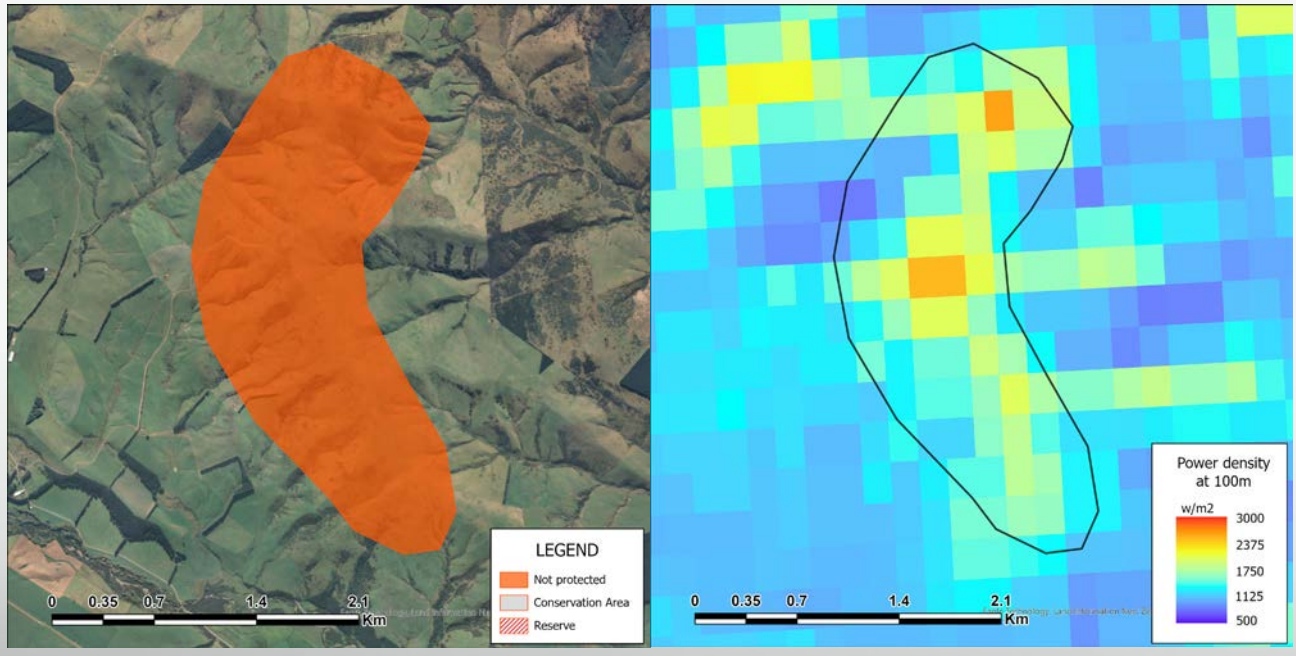


Table 15: N Ardlussa attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1257562
Centroid Y-Coordinate (NZTM2000)	4926642
Unprotected area (km^2)	3.76
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1573
Mean wind speed (m/s) *	9.54

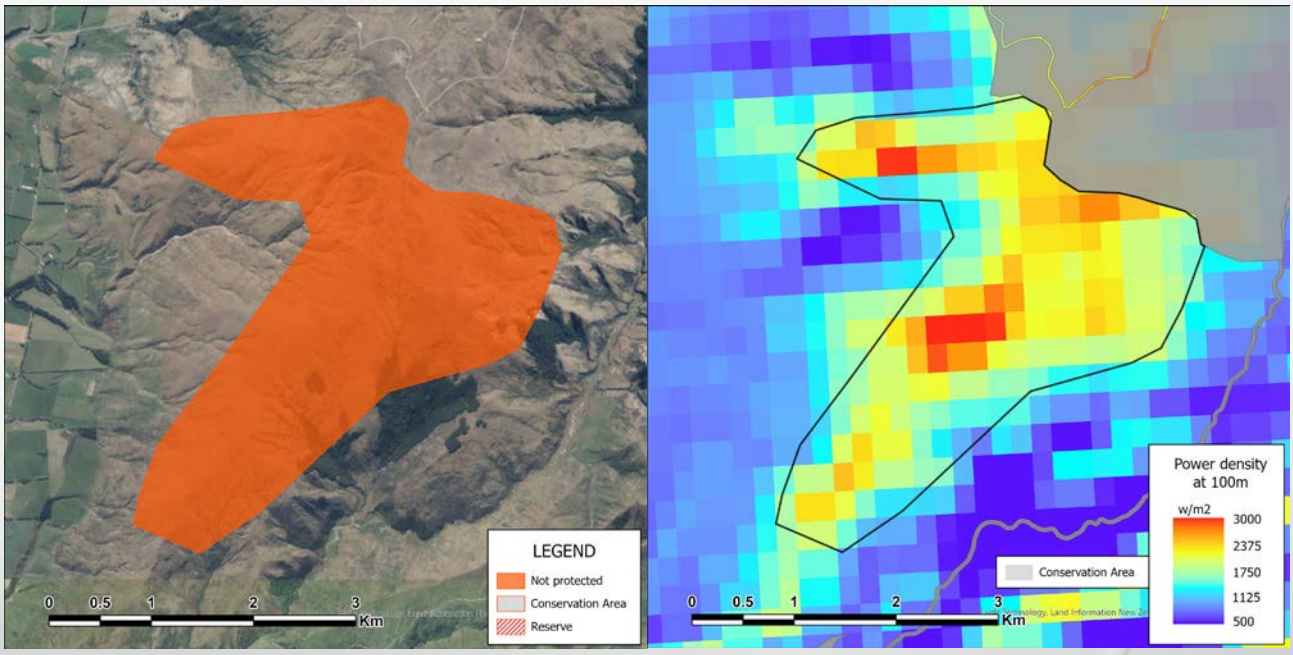
Transmission attributes	
Closest substation	Lumsden
Distance to the closest substation (km)	11.35
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.12 Roaring Lion Trail

Figure 15: Roaring Lion Trail - Protected areas (Left); Wind power density (Right).



Conservation area to the North-East of Roaring Lion Trail:

Hector Mountain

Table 16: Roaring Lion Trail attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1267329
Centroid Y-Coordinate (NZTM2000)	4955084
Unprotected area (km^2)	8.95
Protected area (km^2)	0.00
Protection type	-

Transmission attributes	
Closest substation	Athol
Distance to the closest substation (km)	16.47
Closest connection **	-

Wind attributes	
Mean power density (W/m^2) *	1932
Mean wind speed (m/s) *	10.25

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.13 Round Hill

Figure 16: Round Hill - Protected areas (Left); Wind power density (Right).

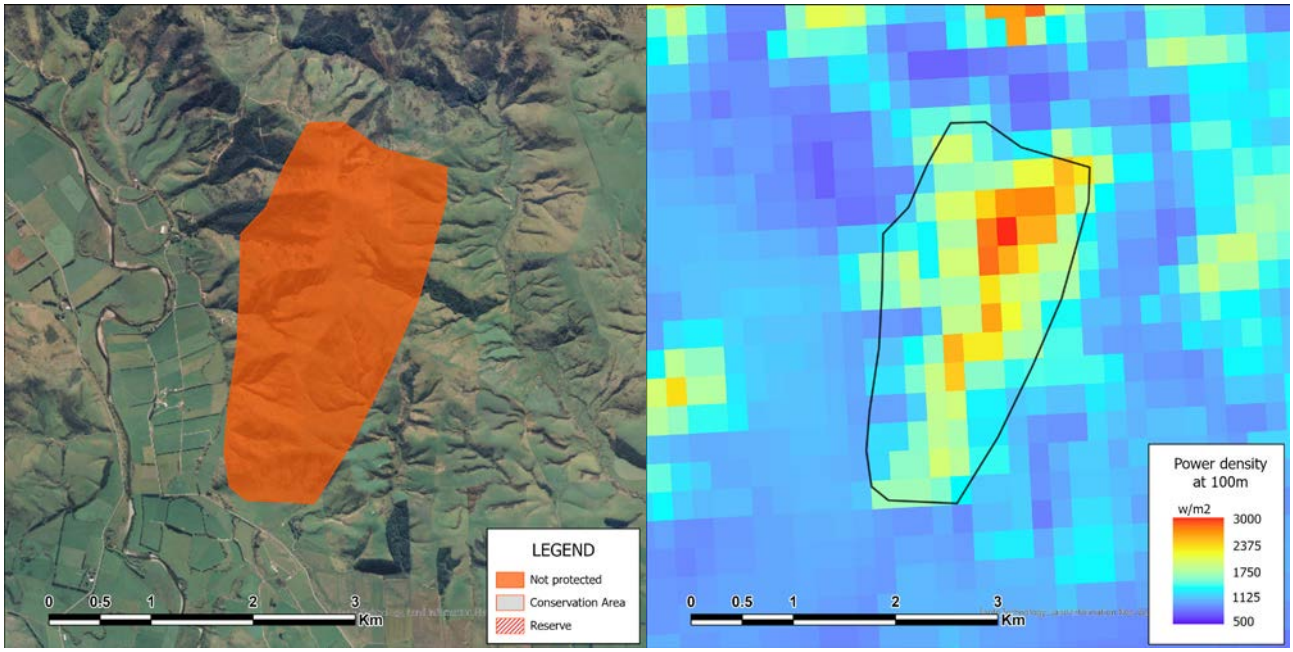


Table 17: Round Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1264904
Centroid Y-Coordinate (NZTM2000)	4929224
Unprotected area (Km^2)	5.40
Protected area (Km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1708
Mean wind speed (m/s) *	9.64

Transmission attributes	
Closest substation	Lumsden
Distance to the closest substation (Km)	19.62
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.14 Slate Range

Figure 17: Slate Range - Protected areas (Left); Wind power density (Right).

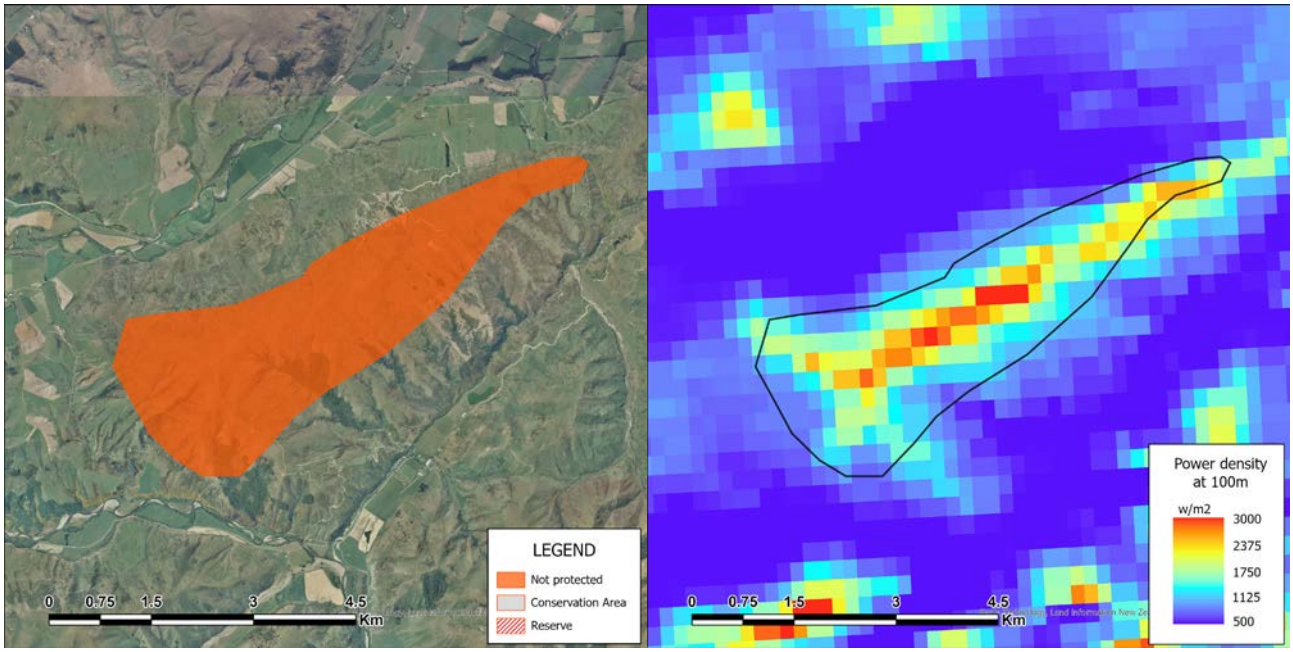


Table 18: Slate Range attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1259902
Centroid Y-Coordinate (NZTM2000)	4949023
Unprotected area (km^2)	11.11
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1537
Mean wind speed (m/s) *	9.16

Transmission attributes	
Closest substation	Athol
Distance to the closest substation (km)	7.51
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.1.15 Tennants Peak

Figure 18: Tennants Peak - Protected areas (Left); Wind power density (Right).

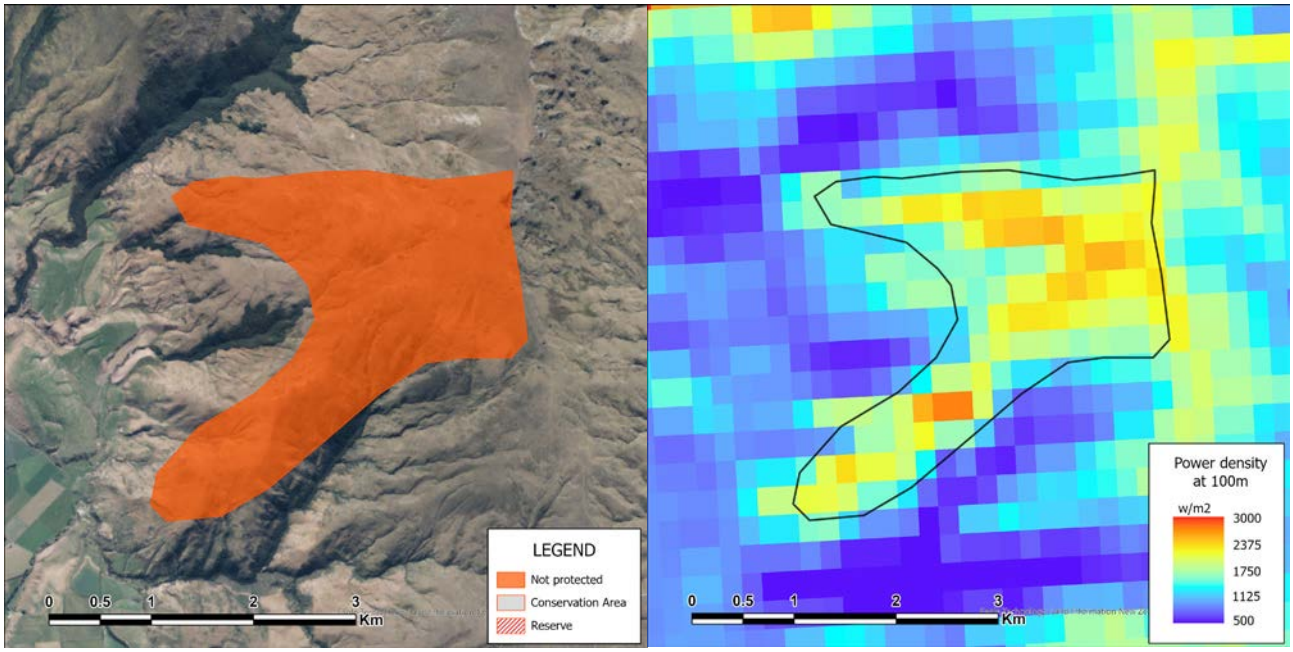


Table 19: Tennants Peak attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1267408
Centroid Y-Coordinate (NZTM2000)	4962741
Unprotected area (km^2)	6.39
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1788
Mean wind speed (m/s) *	10.56

Transmission attributes	
Closest substation	Athol
Distance to the closest substation (km)	21.00
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2 HOKONUI HILLS

This sub-region is located to the North-West of Gore, corresponding to the area between Gore, Winton, Mataura, and Lumsden. It covers geographical areas such as the Hokonui Hills, Hokonui Forest, Overton Forest, and Forest Hill.

Figure 19: Potential locations of wind resources – Hokonui Hills.
Panel (A): Southland map.
Panel (B): Zoom in on the yellow square in panel A.

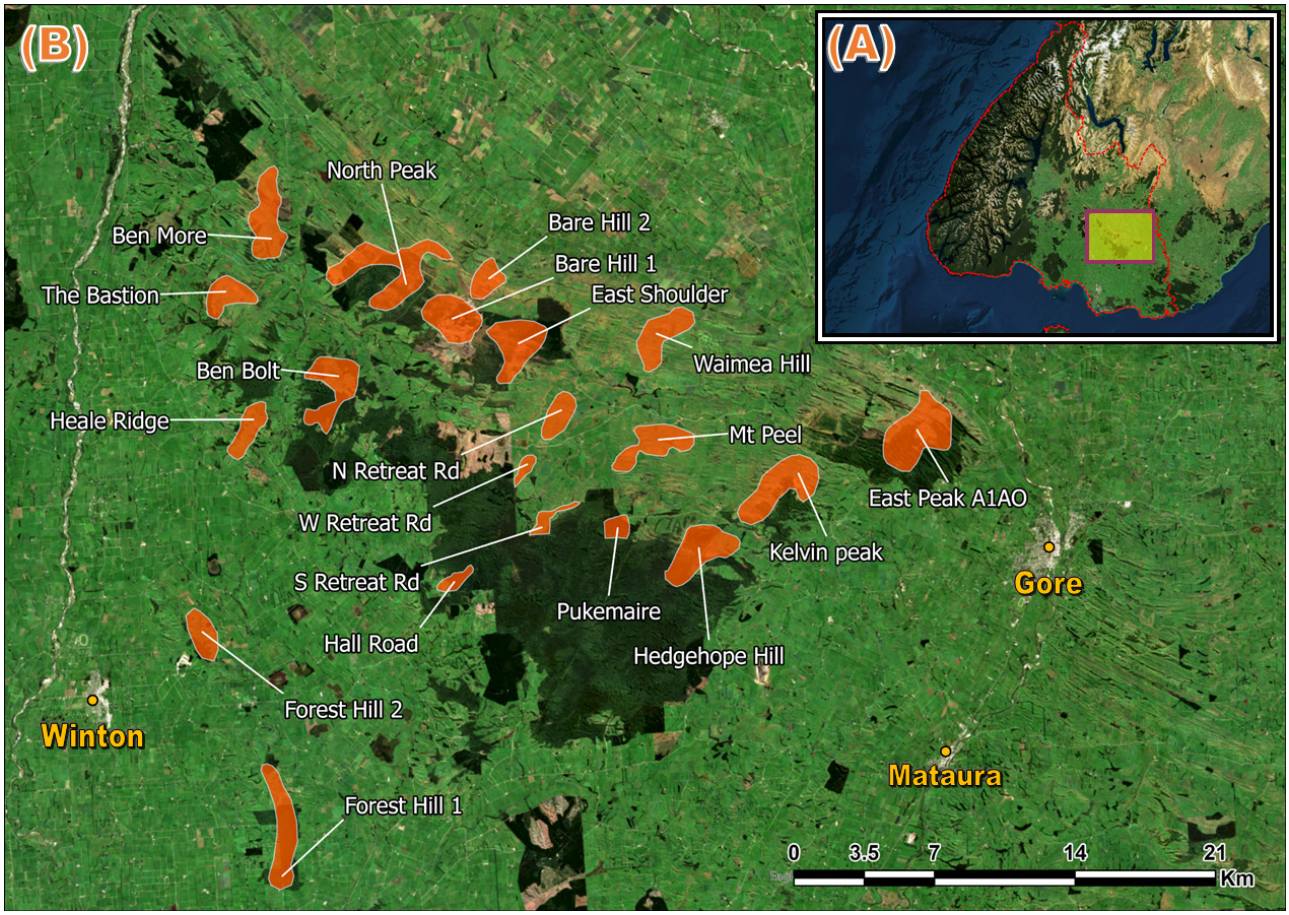


Table 20: Potential locations within the Hokonui Hills sub-region.

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Hokonui Hills		
Bare Hill 1	10.96	1498
Bare Hill 2	10.78	1552
Ben Bolt	10.65	1609
Ben More	10.69	1443
East Peak A1AO	10.45	1475
East Shoulder	10.95	1582
Forest Hill 1	9.41	1067
Forest Hill 2	9.05	1025
Hall Road	10.25	1471
Heale Ridge	9.99	1411

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Hedgehope Hill	10.43	1523
Kelvin Peak	10.72	1685
Mt Peel	10.15	1399
North Peak	10.75	1507
Pukemaire	10.8	1570
N Retreat Rd	10.1	1303
S Retreat Rd	11.05	1720
W Retreat Rd	10.65	1439
The Bastion	10.48	1506
Waimea Hill	10.22	1419

2.2.1 Bare Hill

Figure 20: Bare Hill - Protected areas (Left); Wind power density (Right).

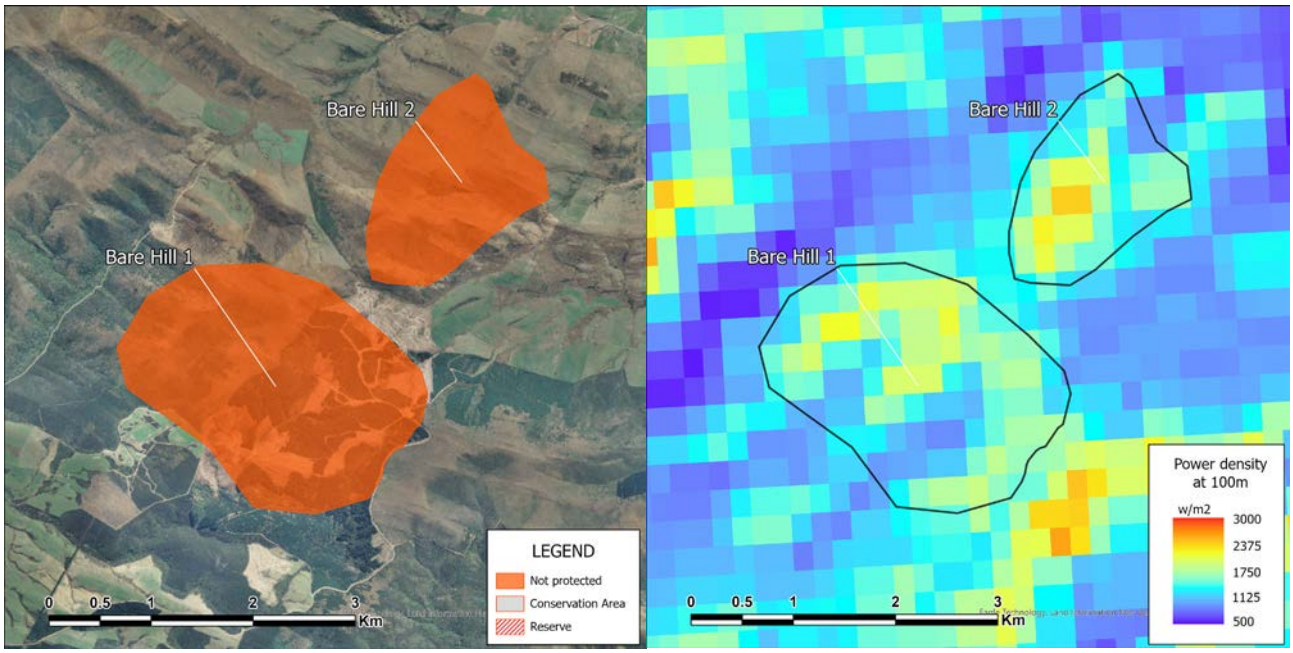


Table 21: Bare Hill attributes

Location Attributes	Bare Hill 1	Bare Hill 2
Centroid X-Coordinate (NZTM2000)	1256572	1258274
Centroid Y-Coordinate (NZTM2000)	4898246	4900153
Unprotected area (km^2)	5.01	2.24
Protected area (km^2)	0.00	0.00
Protection type	-	-

Wind attributes	Bare Hill 1	Bare Hill 2
Mean power density (W/m^2) *	1498	1552
Mean wind speed (m/s) *	10.96	10.78

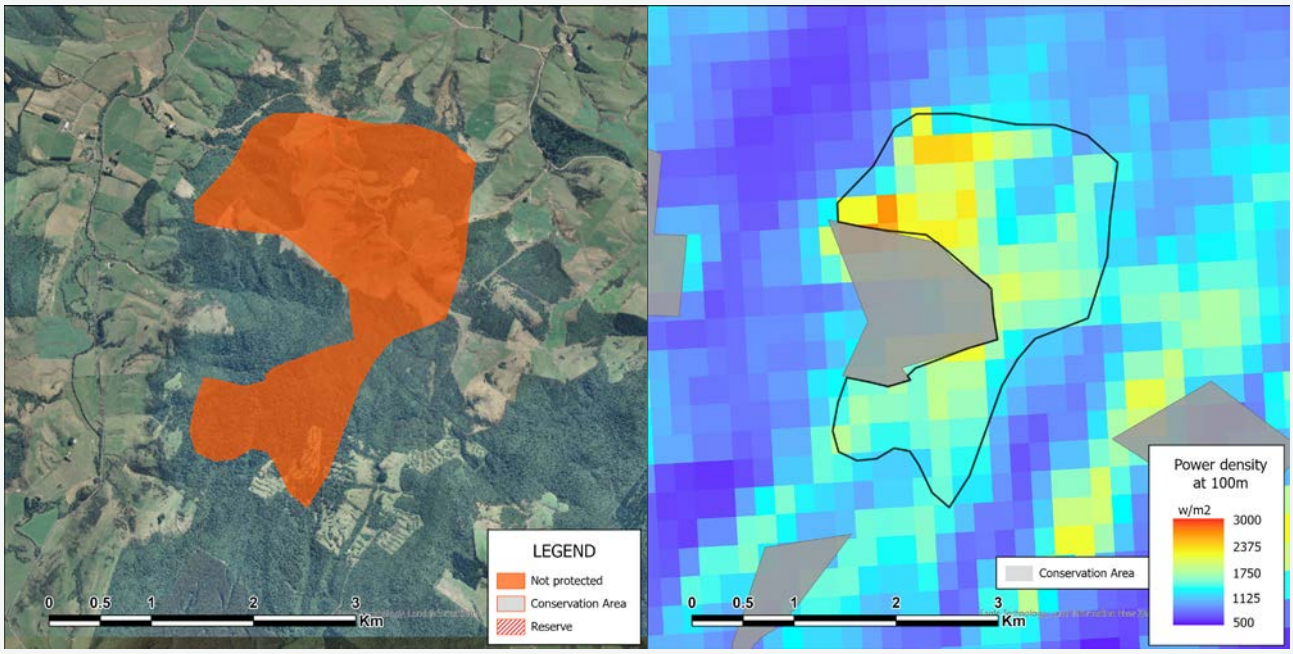
Transmission attributes	Bare Hill 1	Bare Hill 2
Closest substation	Riversdale	Riversdale
Distance to the closest substation (km)	15.87	13.37
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.2 Ben Bolt

Figure 21: Ben Bolt - Protected areas (Left); Wind power density (Right).



Conservation area to the West of Ben Bolt:

The Cone Forest

Table 22: Ben Bolt attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1250591
Centroid Y-Coordinate (NZTM2000)	4894785
Unprotected area (km^2)	5.35
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1609
Mean wind speed (m/s) *	10.65

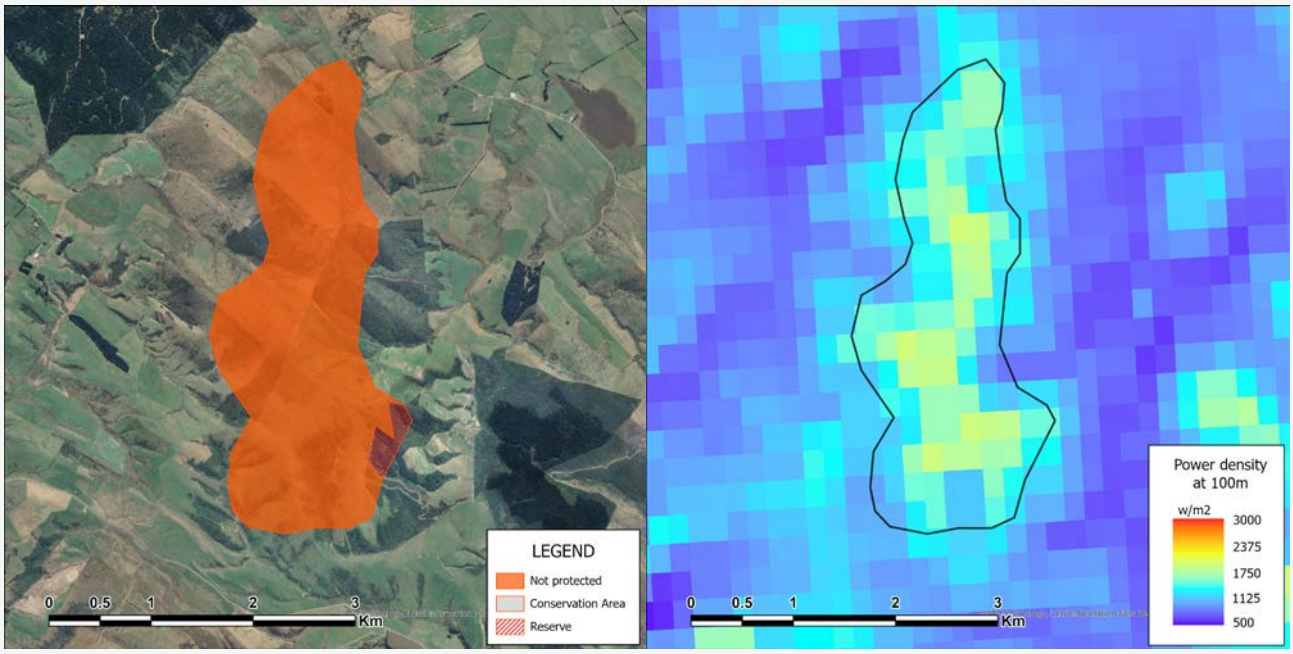
Transmission attributes	
Closest substation	Centre Bush
Distance to the closest substation (km)	15.38
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.3 Ben More

Figure 22: Ben More - Protected areas (Left); Wind power density (Right).



Reserve within Ben More:

Wadworth Scenic Reserve

Table 23: Ben More attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1247351
Centroid Y-Coordinate (NZTM2000)	4903208
Unprotected area (km^2)	5.38
Protected area (km^2)	0.15
Protection type	Reserve

Wind attributes	
Mean power density (W/m^2) *	1443
Mean wind speed (m/s) *	10.69

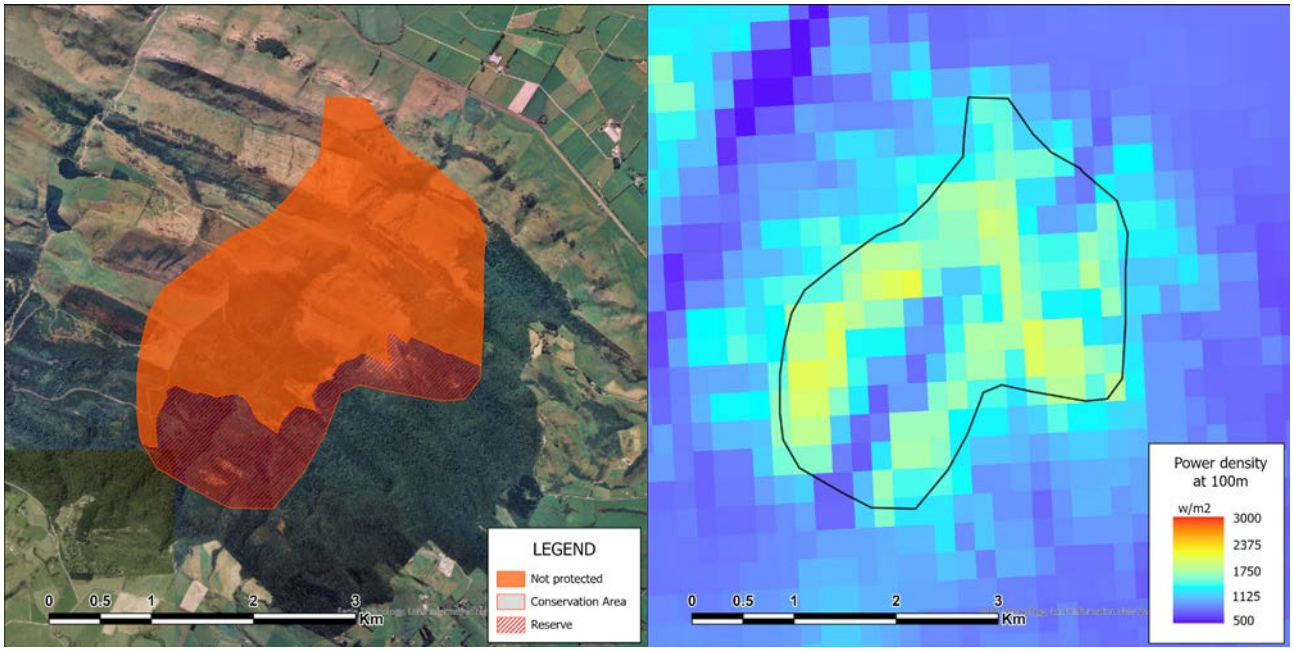
Transmission attributes	
Closest substation	Dipton
Distance to the closest substation (km)	9.37
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.4 East Peak A1AO

Figure 23: East Peak A1AO - Protected areas (Left); Wind power density (Right).



Reserve within 'East Peak A1AO':

Croydon Bush Scenic Reserve

Table 24: East Peak A1AO attributes

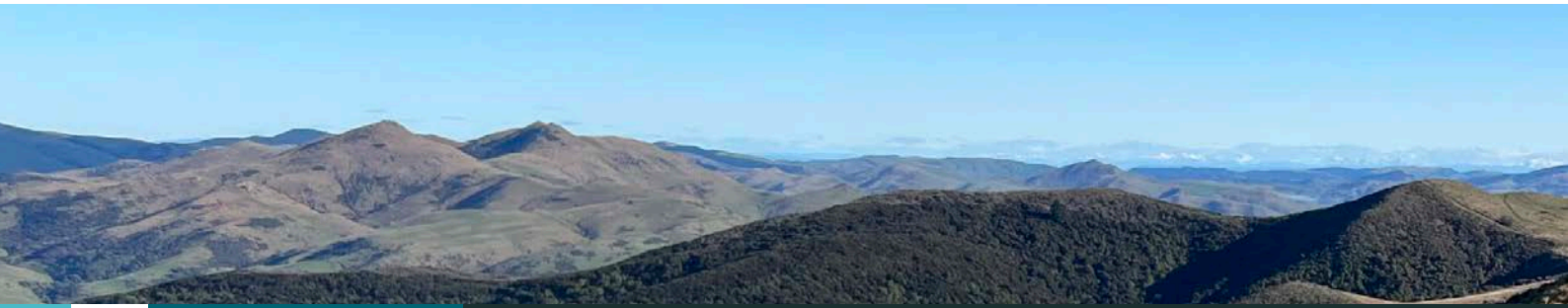
Location Attributes	
Centroid X-Coordinate (NZTM2000)	1279761
Centroid Y-Coordinate (NZTM2000)	4892503
Unprotected area (km^2)	6.17
Protected area (km^2)	2.05
Protection type	Reserve

Wind attributes	
Mean power density (W/m^2) *	1475
Mean wind speed (m/s) *	10.45

Transmission attributes	
Closest substation	North Gore
Distance to the closest substation (km)	7.07
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*



2.2.5 East Shoulder

Figure 24: East Shoulder - Protected areas (Left); Wind power density (Right).

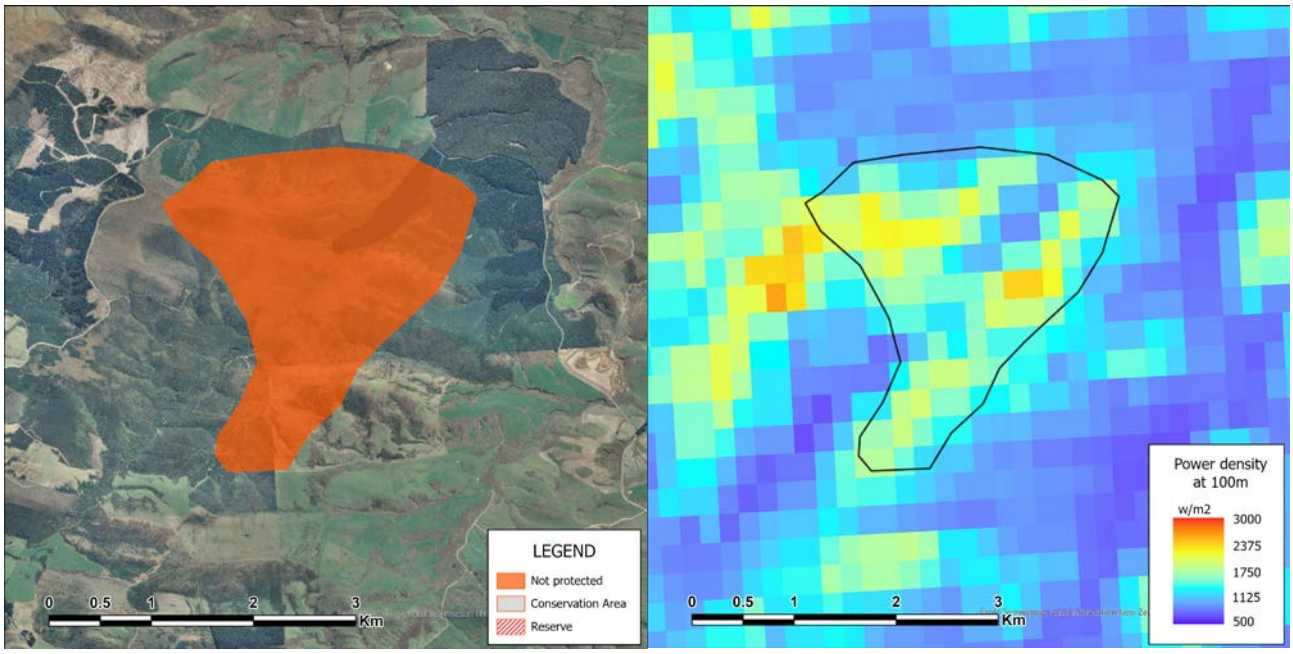


Table 25: East Shoulder attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1259771
Centroid Y-Coordinate (NZTM2000)	4896917
Unprotected area (km^2)	5.43
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1582
Mean wind speed (m/s) *	10.95

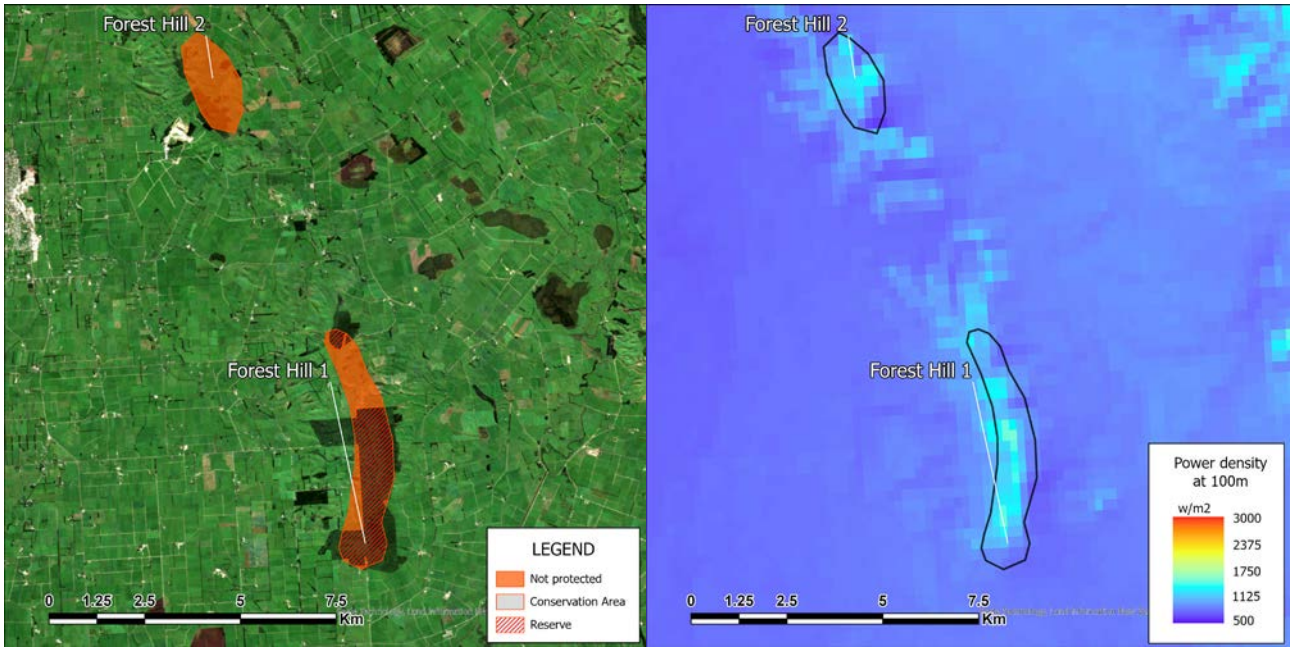
Transmission attributes	
Closest substation	Riversdale
Distance to the closest substation (km)	14.39
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.6 Forest Hill

Figure 25: Forest Hill - Protected areas (Left); Wind power density (Right).



Reserve within 'Forest Hill 1':

Forest Hill Scenic Reserve

Table 26: Forest Hill attributes

Location Attributes	Forest Hill 1	Forest Hill 2
Centroid X-Coordinate (NZTM2000)	1248073	1244134
Centroid Y-Coordinate (NZTM2000)	4872739	4882486
Unprotected area (km^2)	2.02	2.71
Protected area (km^2)	3.77	0.00
Protection type	Reserve	-

Wind attributes	Forest Hill 1	Forest Hill 2
Mean power density (W/m^2) *	1067	1025
Mean wind speed (m/s) *	9.41	9.05

Transmission attributes	Forest Hill 1	Forest Hill 2
Closest substation	Hedgehope	Winton
Distance to the closest substation (km)	6.01	7.50
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.7 Hall Road

Figure 26: Hall Road - Protected areas (Left); Wind power density (Right).

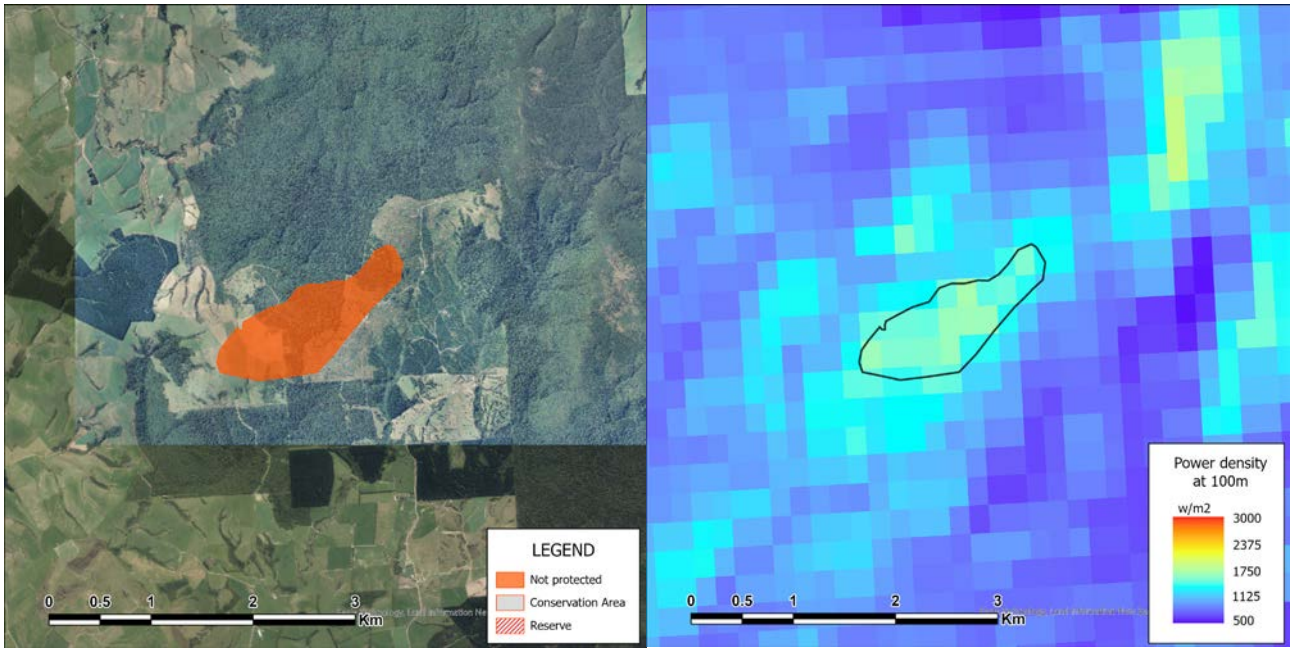


Table 27: Hall Road attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1256691
Centroid Y-Coordinate (NZTM2000)	4885176
Unprotected area (km^2)	1.08
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1471
Mean wind speed (m/s) *	10.25

Transmission attributes	
Closest substation	Hedgehope
Distance to the closest substation (km)	12.20
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.8 Heale Ridge

Figure 27: Heale Ridge - Wind power density.

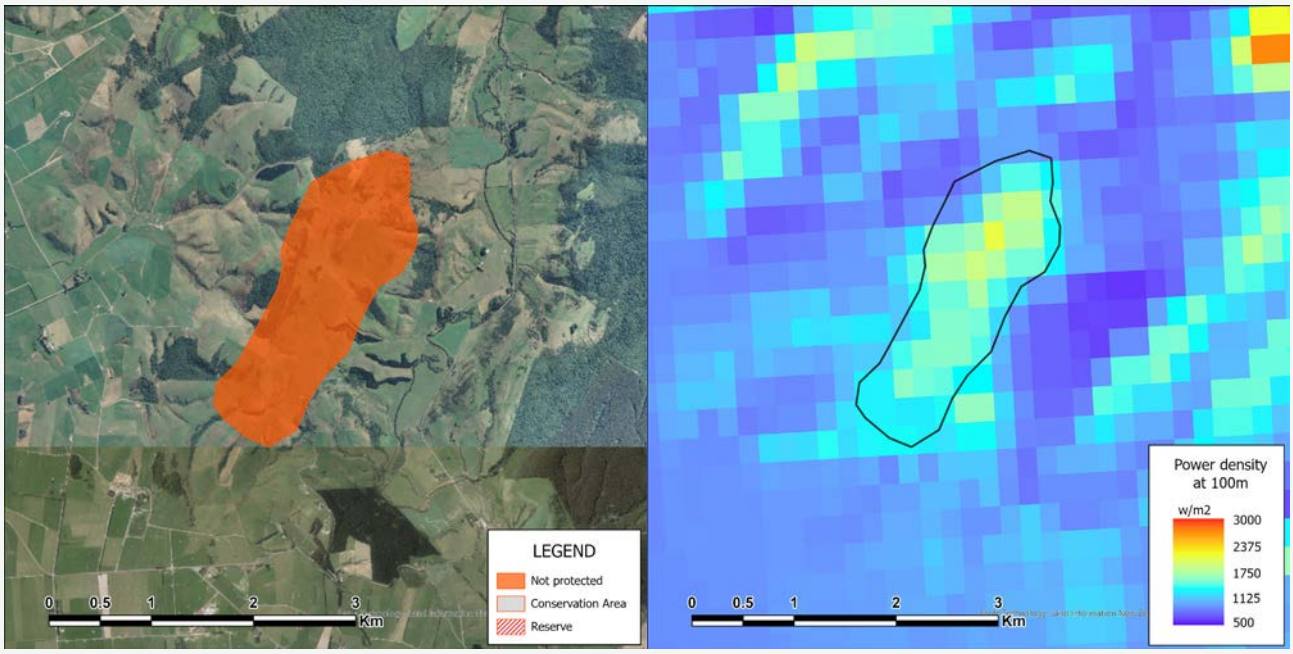


Table 28: Heale Ridge attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1246406
Centroid Y-Coordinate (NZTM2000)	4892703
Unprotected area (km^2)	2.75
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1411
Mean wind speed (m/s) *	9.99

Transmission attributes	
Closest substation	Centre Bush
Distance to the closest substation (km)	10.72
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.9 Hedgehope Hill

Figure 28: Hedgehope Hill - Protected areas (Left); Wind power density (Right).

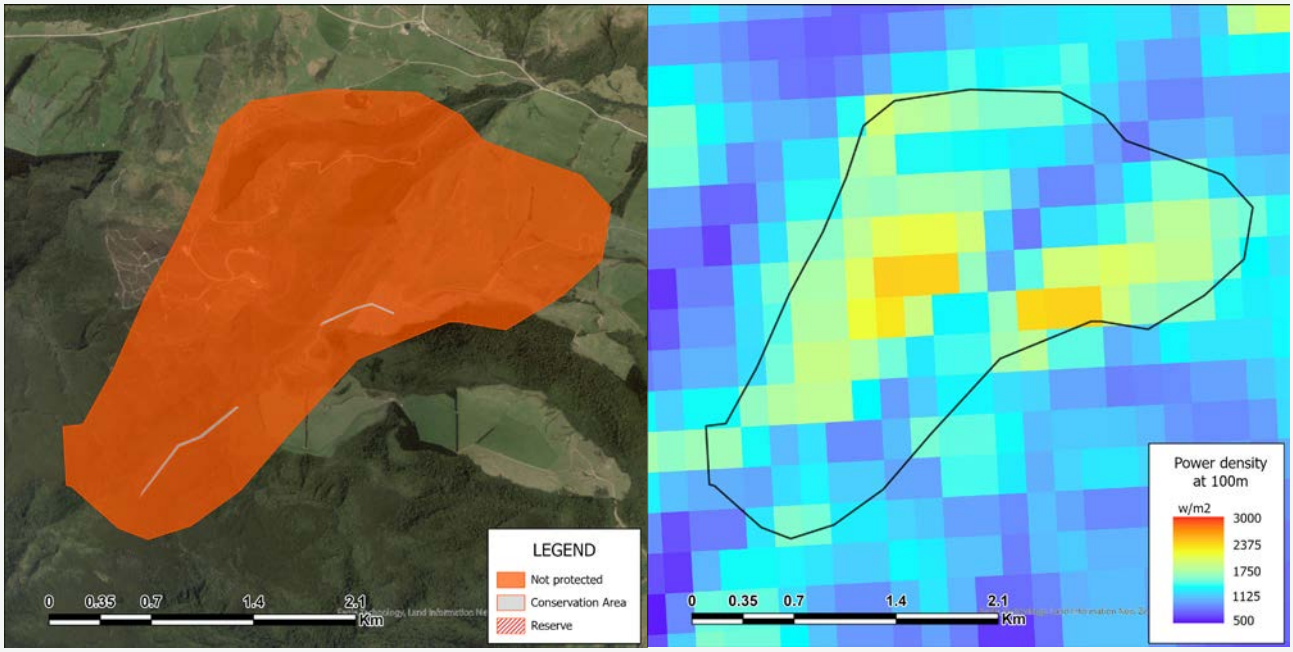


Table 29: Hedgehope Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1268894
Centroid Y-Coordinate (NZTM2000)	4886612
Unprotected area (km^2)	5.89
Protected area (km^2)	0.03
Protection type	Conservation Area

Wind attributes	
Mean power density (W/m^2) *	1523
Mean wind speed (m/s) *	10.43

Transmission attributes	
Closest substation	North Gore
Distance to the closest substation (km)	16.33
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.10 Kelvin Peak

Figure 29: Kelvin Peak - Protected areas (Left); Wind power density (Right).

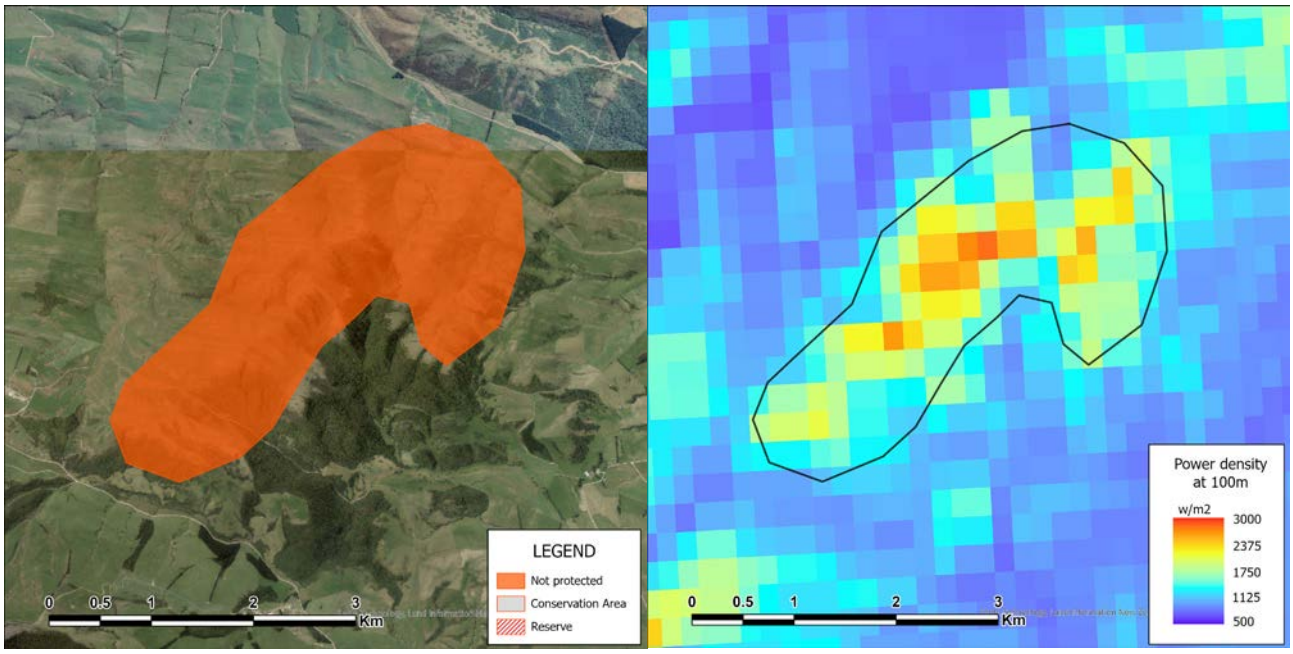


Table 30: Kelvin Peak attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1272913
Centroid Y-Coordinate (NZTM2000)	4889824
Unprotected area (km^2)	6.84
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1685
Mean wind speed (m/s) *	10.72

Transmission attributes	
Closest substation	North Gore
Distance to the closest substation (km)	12.40
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.11 Mt Peel

Figure 30: Mt Peel - Protected areas (Left); Wind power density (Right).

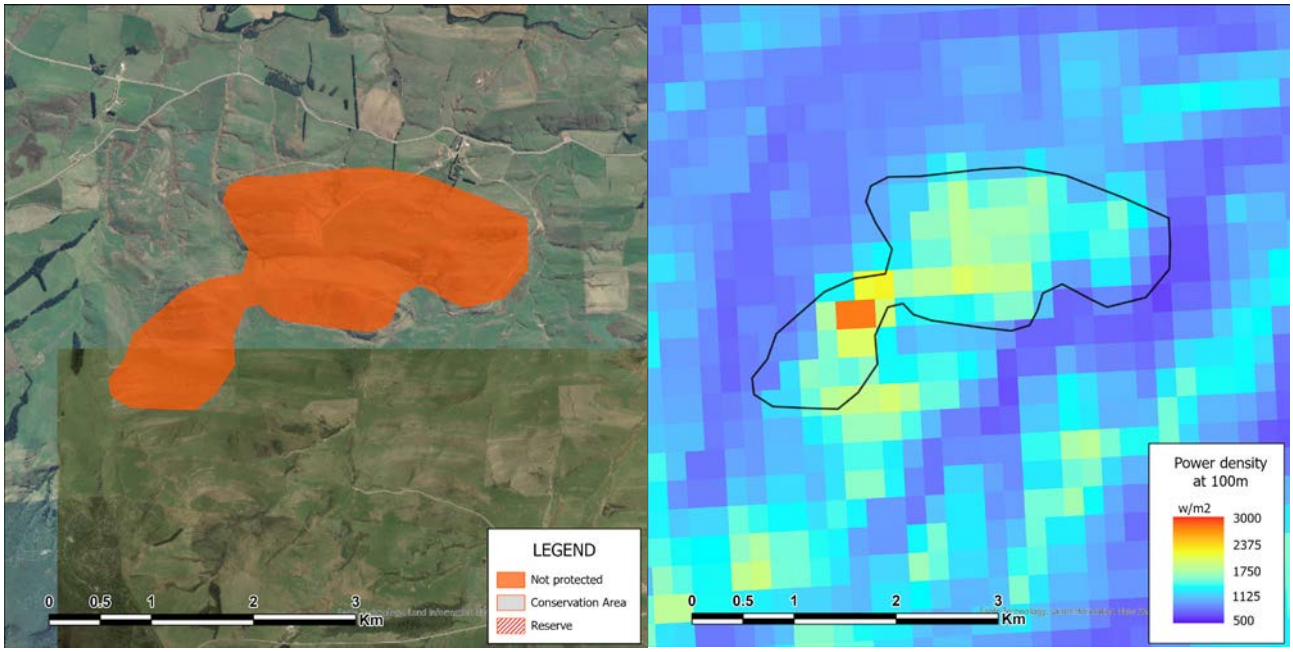


Table 31: Mt Peel attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1266617
Centroid Y-Coordinate (NZTM2000)	4891966
Unprotected area (km^2)	4.69
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1399
Mean wind speed (m/s) *	10.15

Transmission attributes	
Closest substation	Riversdale
Distance to the closest substation (km)	15.94
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.12 North Peak

Figure 31: North Peak - Protected areas (Left); Wind power density (Right).

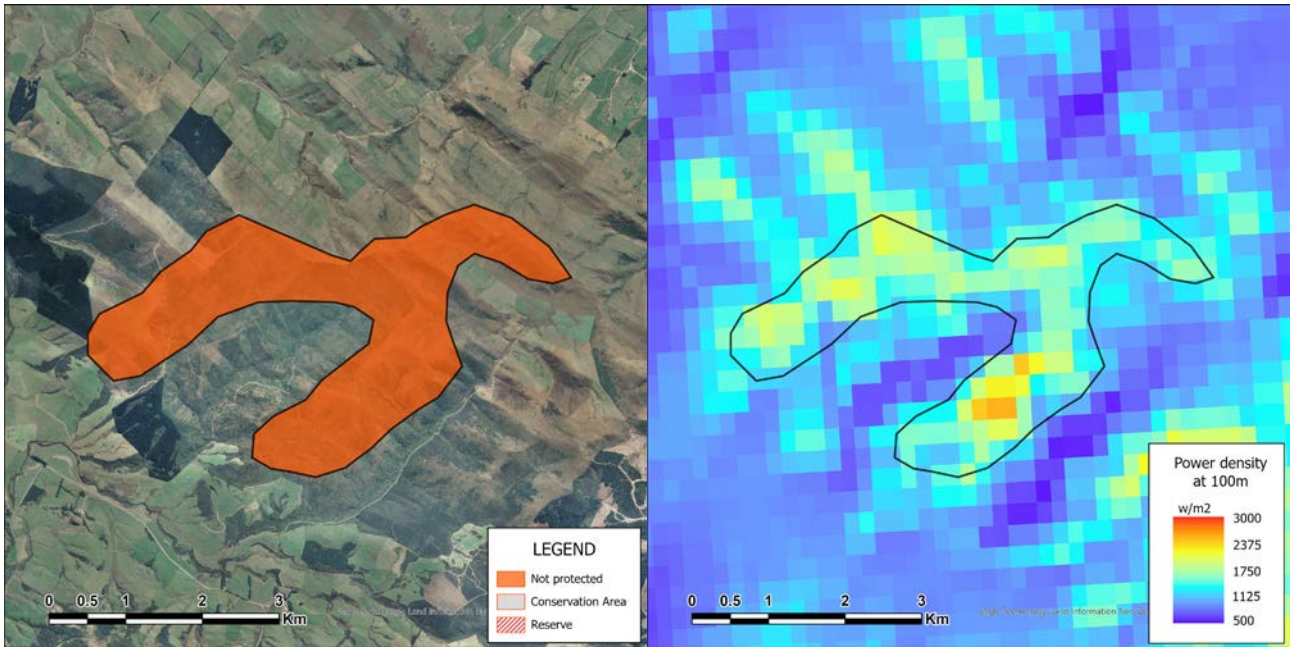


Table 32: North Peak attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1253391
Centroid Y-Coordinate (NZTM2000)	4900649
Unprotected area (km^2)	8.56
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1507
Mean wind speed (m/s) *	10.75

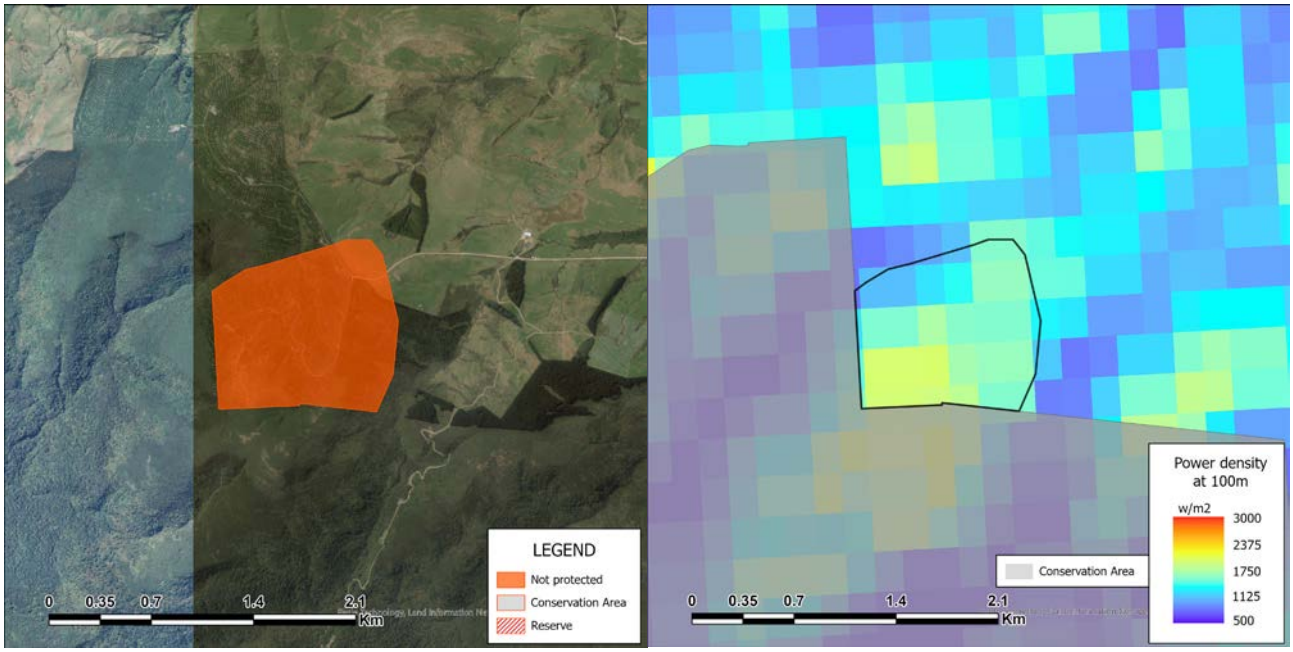
Transmission attributes	
Closest substation	Dipton
Distance to the closest substation (km)	15.88
Closest connection **	Riversdale

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.13 Pukemaire

Figure 32: Pukemaire - Protected areas (Left); Wind power density (Right).



Conservation area to the South-West of Pukemaire:

Hokonui Forest

Table 33: Pukemaire attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1264783
Centroid Y-Coordinate (NZTM2000)	4887822
Unprotected area (km^2)	1.24
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1570
Mean wind speed (m/s) *	10.8

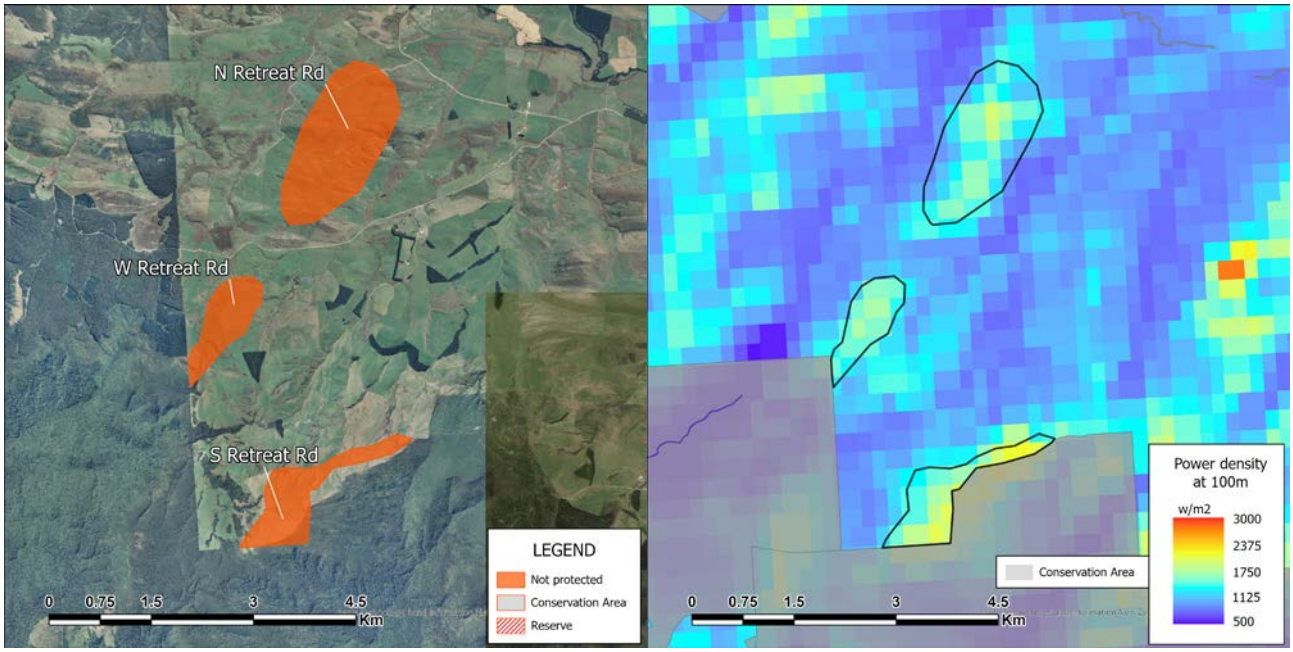
Transmission attributes	
Closest substation	Riversdale
Distance to the closest substation (km)	20.36
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.14 Retreat Road

Figure 33: Retreat Road - Protected areas (Left); Wind power density (Right).



Conservation area to the South of 'W Retreat Road' and 'S Retreat Road':

Hokonui Forest

Table 34: Retreat Road attributes

Location Attributes	N Retreat Road	S Retreat Road	W Retreat Road
Centroid X-Coordinate (NZTM2000)	1261863	1261354	1260182
Centroid Y-Coordinate (NZTM2000)	4893396	4888219	4890773
Unprotected area (km^2)	2.55	1.15	0.81
Protected area (km^2)	0.00	0.00	0.00
Protection type	-	-	-

Wind attributes	N Retreat Road	S Retreat Road	W Retreat Road
Mean power density (W/m^2) *	1303	1720	1439
Mean wind speed (m/s) *	10.1	11.05	10.65

Transmission attributes	N Retreat Road	S Retreat Road	W Retreat Road
Closest substation	Riversdale	Riversdale	Riversdale
Distance to the closest substation (km)	16.11	21.02	19.22
Closest connection **	-	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.15 The Bastion

Figure 34: The Bastion - Protected areas (Left); Wind power density (Right).

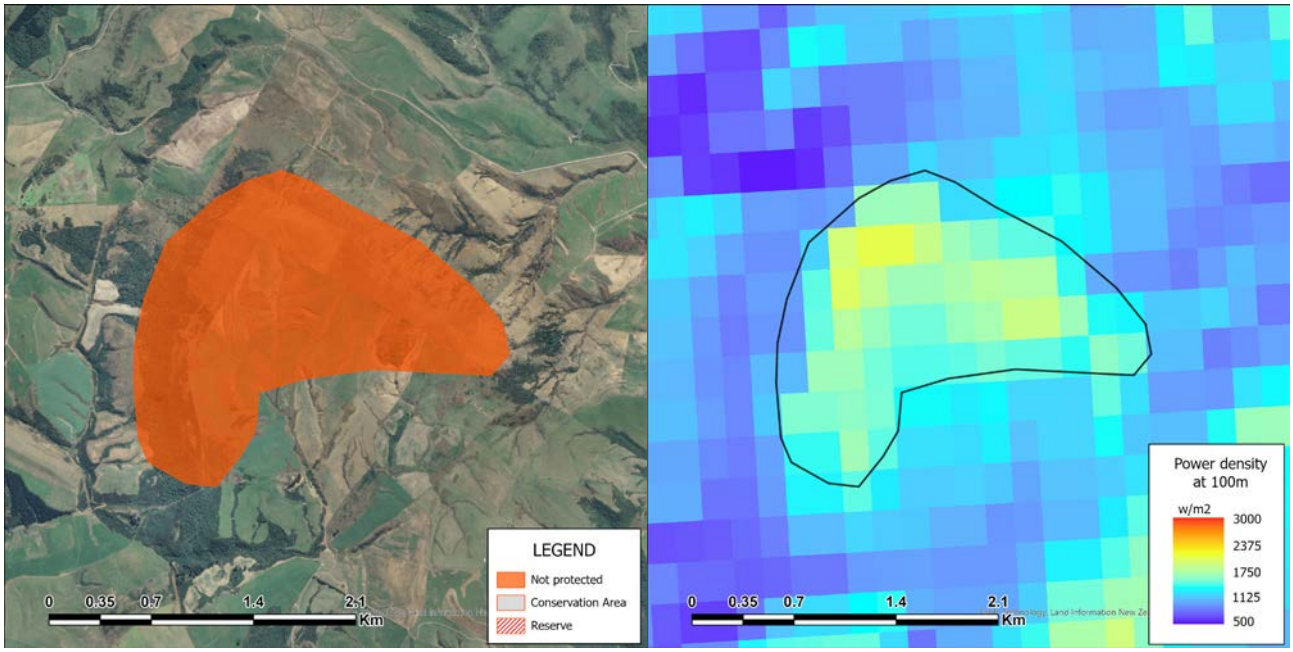


Table 35: The Bastion attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1245374
Centroid Y-Coordinate (NZTM2000)	4899365
Unprotected area (km^2)	3.11
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1506
Mean wind speed (m/s) *	10.48

Transmission attributes	
Closest substation	Dipton
Distance to the closest substation (km)	10.65
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.2.16 Waimea Hill

Figure 35: Waimea Hill - Protected areas (Left); Wind power density (Right).

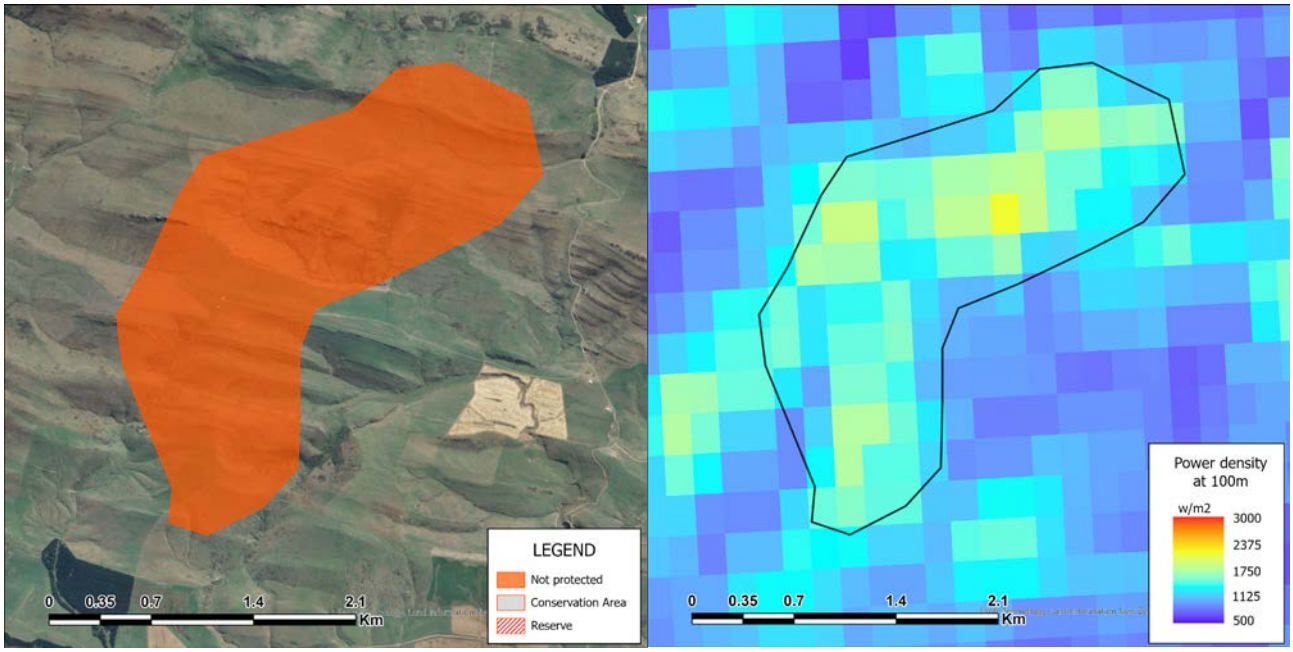


Table 36: Waimea Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1267008
Centroid Y-Coordinate (NZTM2000)	4897392
Unprotected area (km^2)	4.49
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1419
Mean wind speed (m/s) *	10.22

Transmission attributes	
Closest substation	Riversdale
Distance to the closest substation (km)	10.54
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3 SOUTH COAST

This sub-region corresponds to the area between Bluff, Invercargill, Riverton, and the South-East of Fiorland. It covers geographical areas such as Longwood range and the coastline from the delta of Waiau River to Tiwai Peninsula. One of the existing wind farms in Southland is located in this region: Flat Hill.

Figure 36: Potential locations of wind resources – South Coast
Panel (A): Southland map.
Panel (B): Zoom in on the yellow square in panel A.

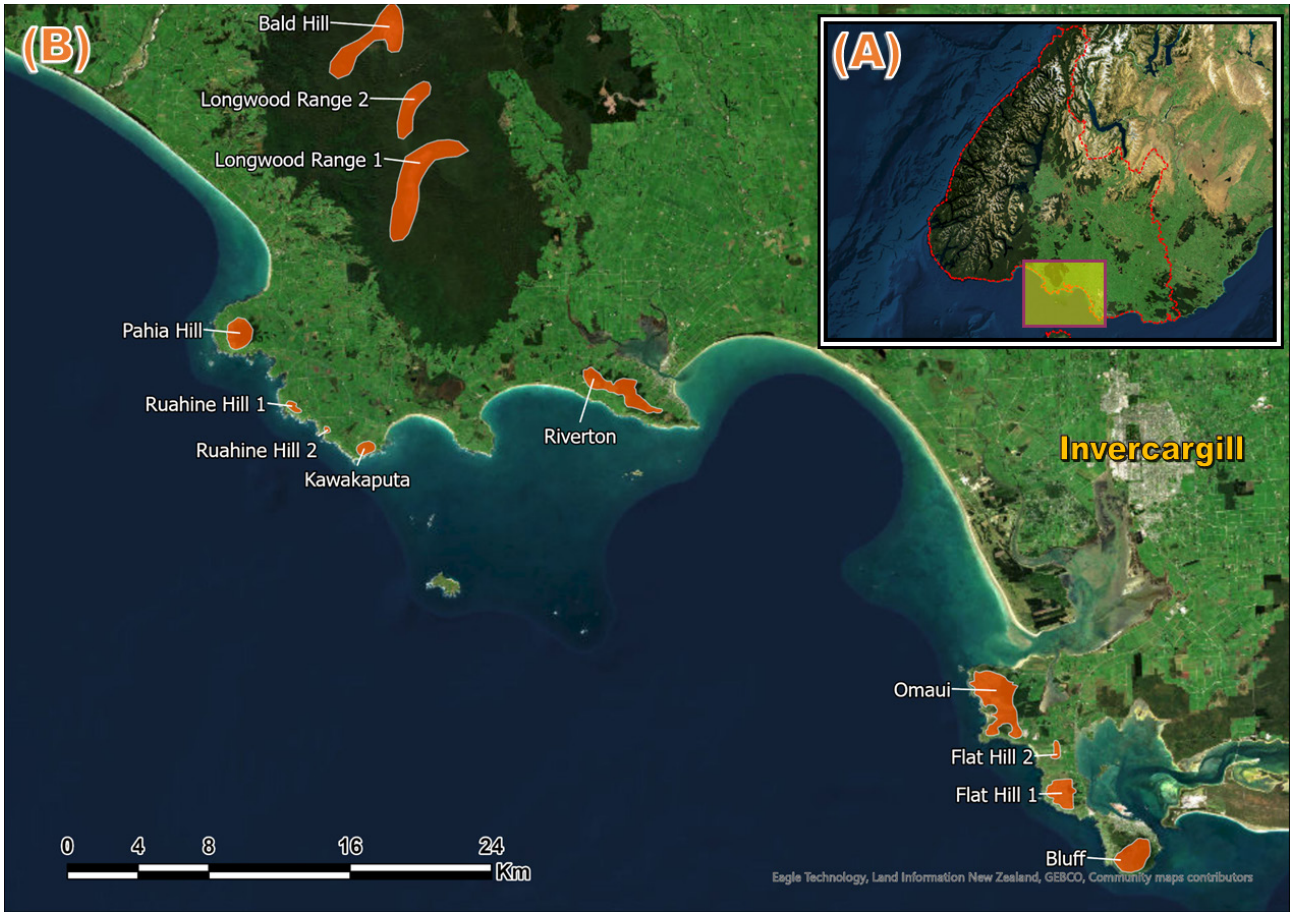
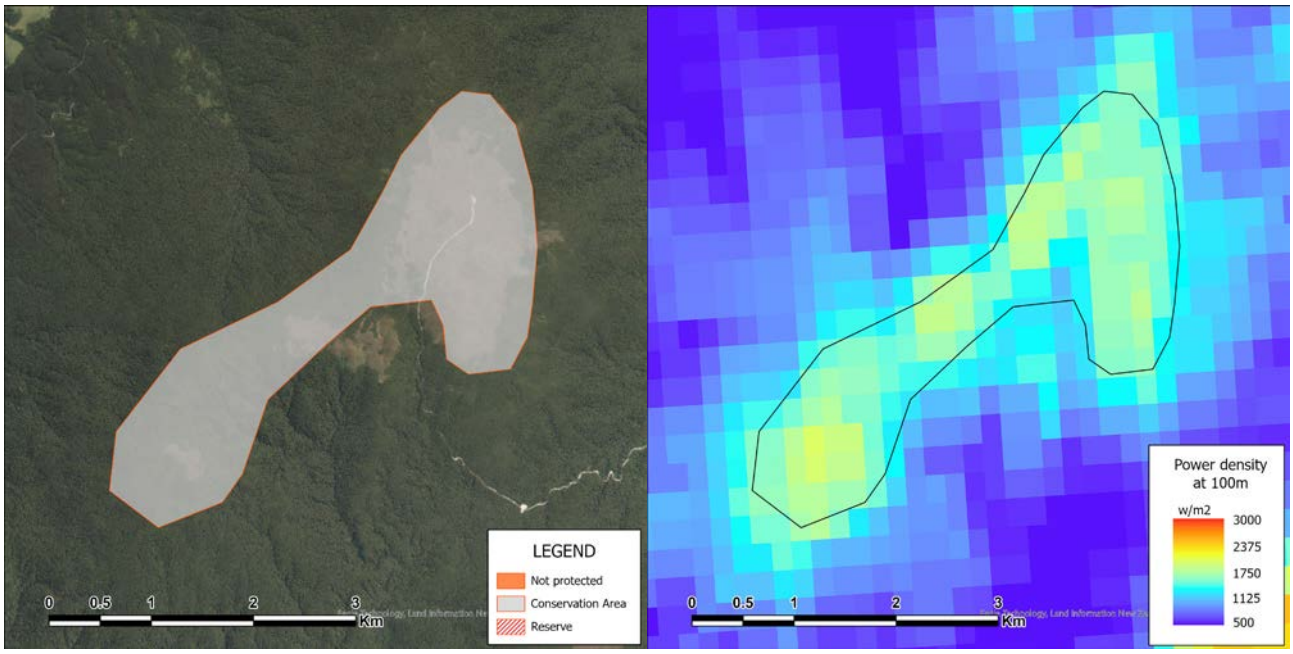


Table 37: Potential locations within the South Coast sub-region.

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
South Coast		
Bald Hill	11.07	1563
Bluff	11.13	1549
Flat Hill 1	10.58	1347
Flat Hill 2	10.33	1240
Kawakaputa	10.73	1441
Longwood Range 1	11.57	1818
Longwood Range 2	11.66	1819
Omaui	10.55	1351
Pahia Hill	11.49	1879
Riverton	9.76	1156
Ruahine Hill 1	11.21	1630
Ruahine Hill 2	10.66	1398

2.3.1 Bald Hill

Figure 37: Bald Hill - Protected areas (Left); Wind power density (Right).



Conservation area within 'Bald Hill':

Longwood Forest

Table 38: Bald Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1199951
Centroid Y-Coordinate (NZTM2000)	4873157
Unprotected area (km^2)	0.00
Protected area (km^2)	6.15
Protection type	Conservation Area

Wind attributes	
Mean power density (W/m^2) *	1563
Mean wind speed (m/s) *	11.07

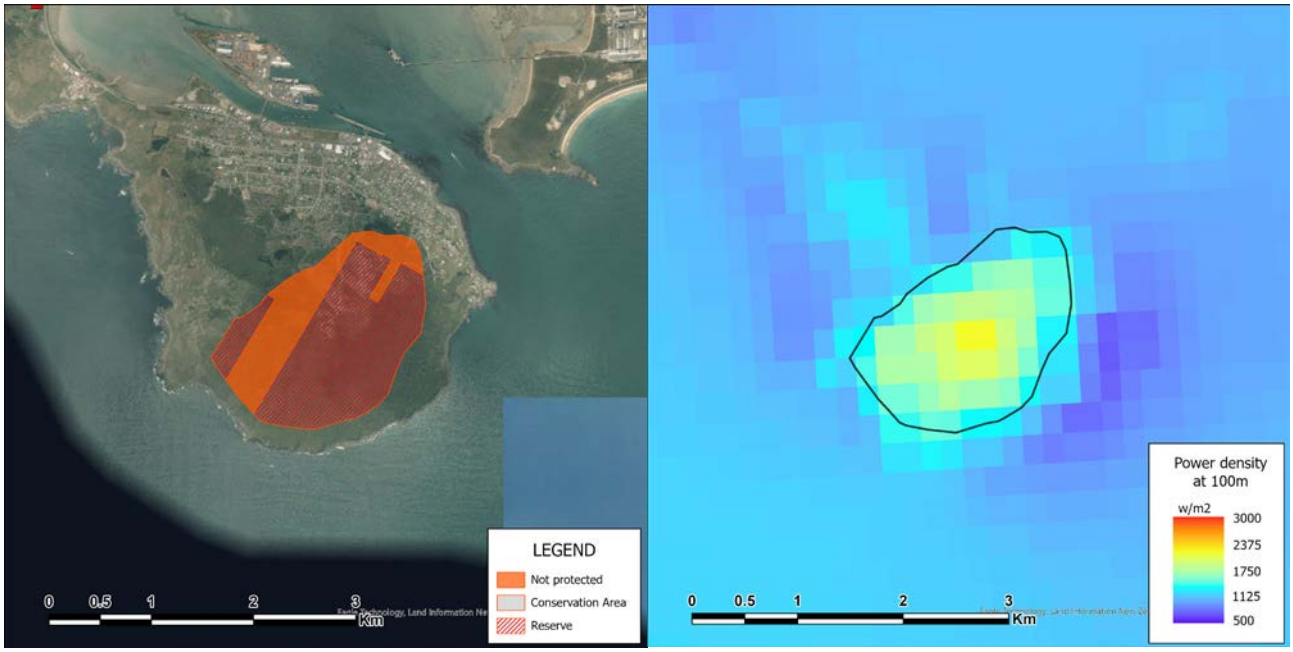
Transmission attributes	
Closest substation	Orawia
Distance to the closest substation (km)	12.11
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3.2 Bluff

Figure 38: Bluff - Protected areas (Left); Wind power density (Right).



Reserves within Bluff:

Motopōhue Scenic Reserve & Quarry Site

Table 39: Bluff attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1243094
Centroid Y-Coordinate (NZTM2000)	4827008
Unprotected area (km^2)	0.82
Protected area (km^2)	1.87
Protection type	Reserve

Wind attributes	
Mean power density (W/m^2) *	1549
Mean wind speed (m/s) *	11.13

Transmission attributes	
Closest substation	Bluff
Distance to the closest substation (km)	4.32
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3.3 Flat Hill

Figure 39: Flat Hill - Protected areas (Left); Wind power density (Right).

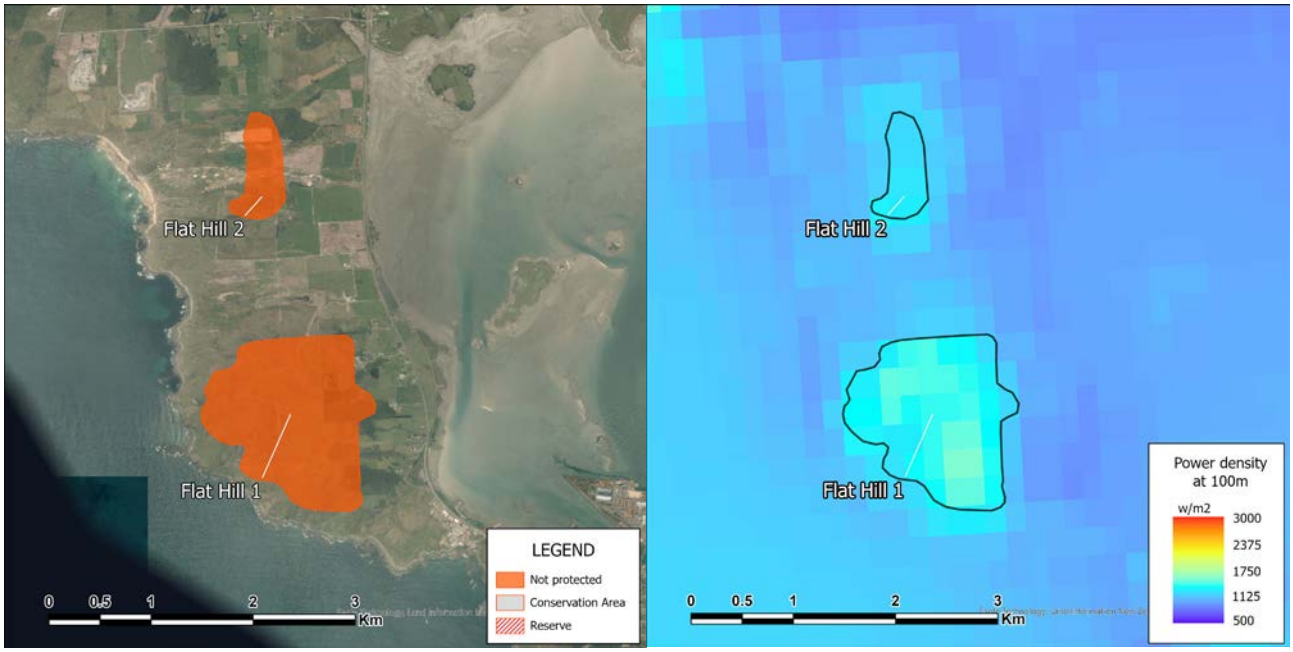


Table 40: Flat Hill attributes

Location Attributes	Flat Hill 1	Flat Hill 2
Centroid X-Coordinate (NZTM2000)	1239045	1238722
Centroid Y-Coordinate (NZTM2000)	4830577	4832989
Unprotected area (km^2)	2.06	0.37
Protected area (km^2)	0.00	0.00
Protection type	-	-

Wind attributes	Flat Hill 1	Flat Hill 2
Mean power density (W/m^2) *	1347	1240
Mean wind speed (m/s) *	10.58	10.33

Transmission attributes	Flat Hill 1	Flat Hill 2
Closest substation	Bluff	Bluff
Distance to the closest substation (km)	1.24	3.13
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3.4 Kawakaputa

Figure 40: Kawakaputa - Protected areas (Left); Wind power density (Right).

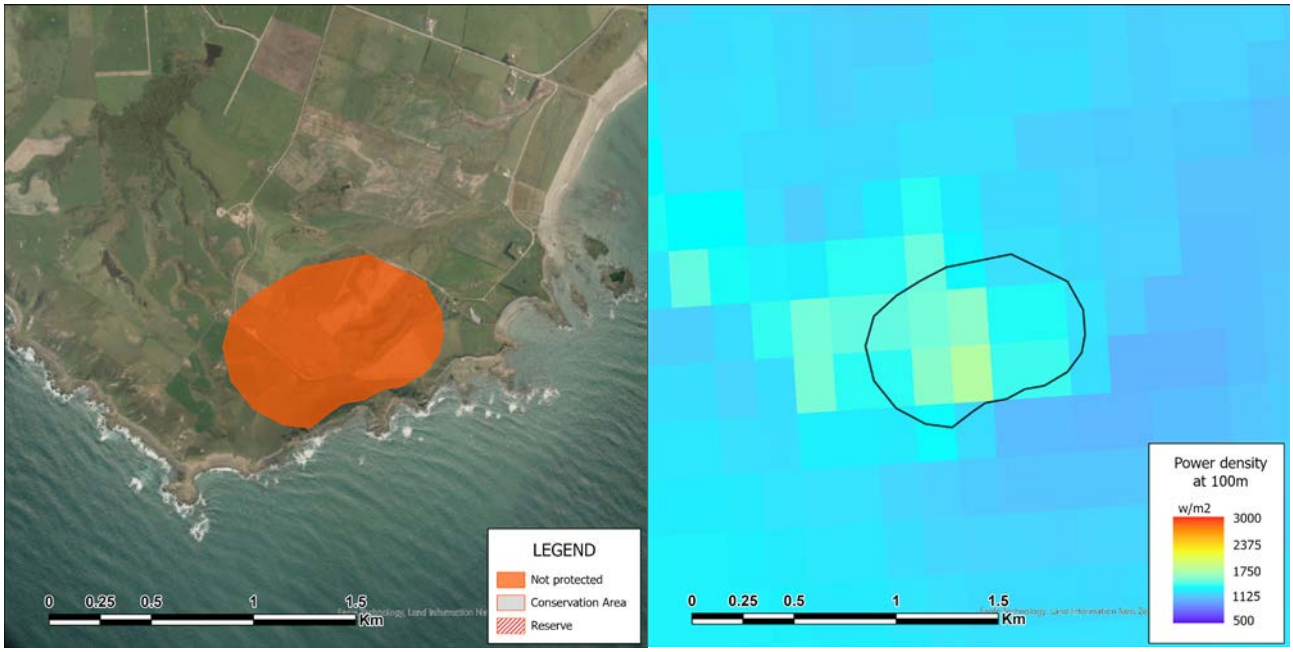


Table 41: Kawkaputa attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1199643
Centroid Y-Coordinate (NZTM2000)	4850105
Unprotected area (km^2)	0.64
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1441
Mean wind speed (m/s) *	10.73

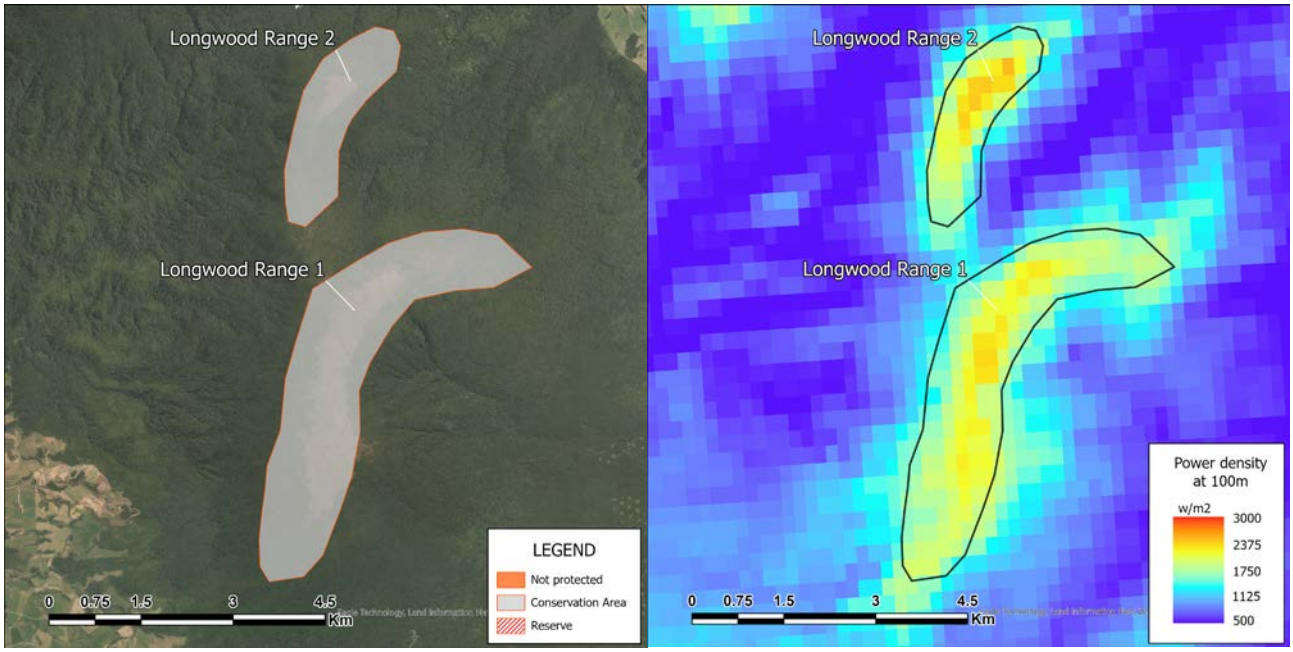
Transmission attributes	
Closest substation	Riverton
Distance to the closest substation (km)	18.53
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3.5 Longwood Range

Figure 41: Longwood Range - Protected areas (Left); Wind power density (Right).



Conservation area within 'Longwood Range 1' and 'longwood Range 2':

Longwood Forest

Table 42: Longwood Range attributes

Location Attributes	Longwood Range 1	Longwood Range 2
Centroid X-Coordinate (NZTM2000)	1202537	1202217
Centroid Y-Coordinate (NZTM2000)	4865121	4869366
Unprotected area (Km^2)	0.00	0.00
Protected area (Km^2)	8.55	2.92
Protection type	Conservation Area	Conservation Area

Wind attributes	Longwood Range 1	Longwood Range 2
Mean power density (W/m^2) *	1818	1819
Mean wind speed (m/s) *	11.57	11.66

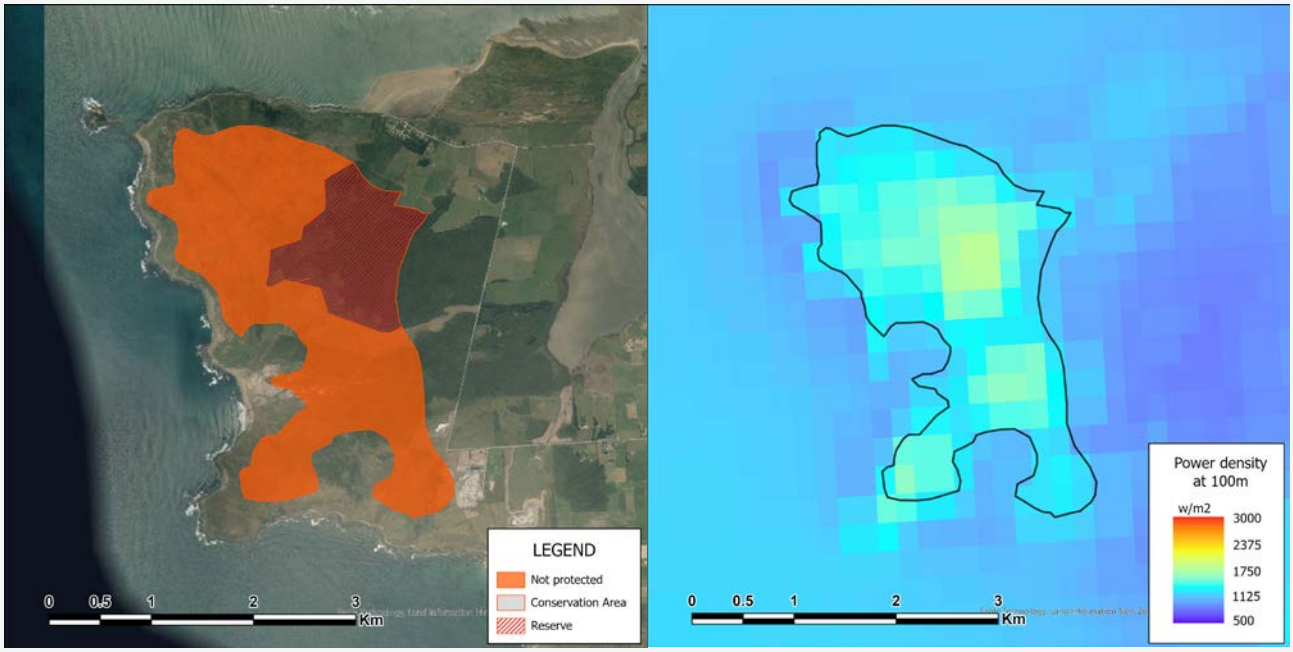
Transmission attributes	Longwood Range 1	Longwood Range 2
Closest substation	Riverton	Otautau
Distance to the closest substation (Km)	17.25	14.75
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3.5 Omaui

Figure 42: Omaui - Protected areas (Left); Wind power density (Right).



Reserve within Omaui:

Omaui Scenic Reserve

Table 43: Omaui attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1235409
Centroid Y-Coordinate (NZTM2000)	4835813
Unprotected area (km^2)	4.50
Protected area (km^2)	1.39
Protection type	Reserve

Wind attributes	
Mean power density (W/m^2) *	1351
Mean wind speed (m/s) *	10.55

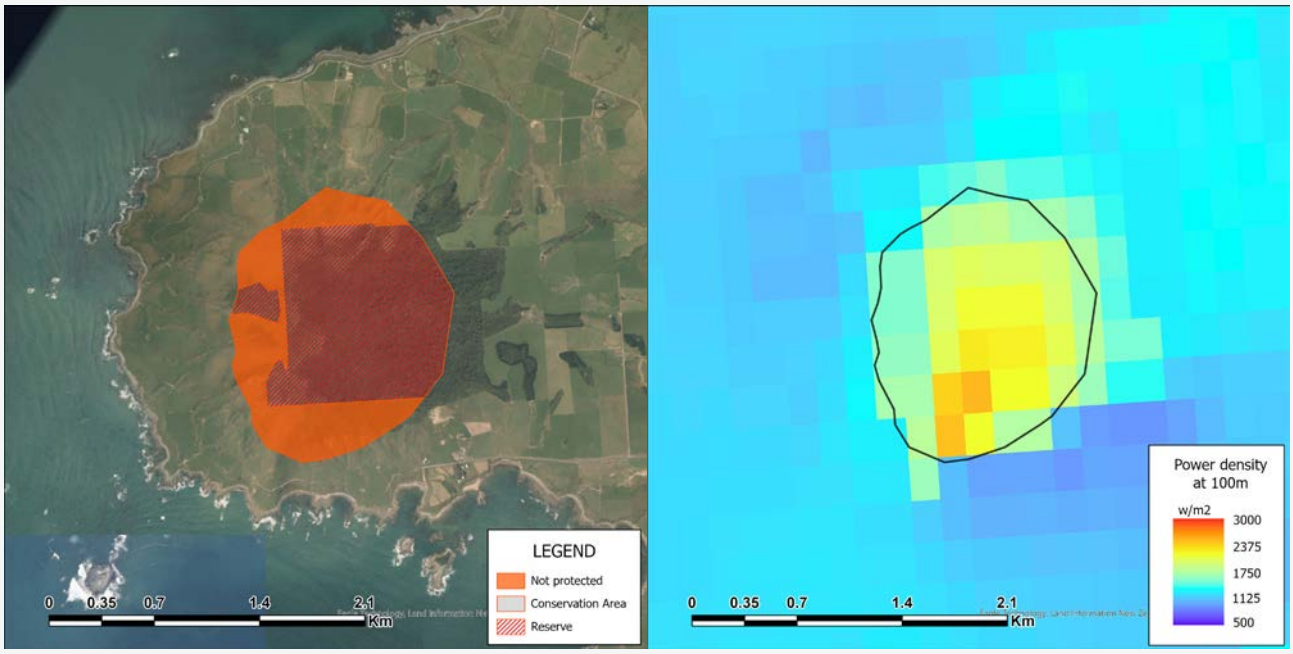
Transmission attributes	
Closest substation	Bluff
Distance to the closest substation (km)	7.37
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3.6 Pahia Hill

Figure 43: Pahia Hill - Protected areas (Left); Wind power density (Right).



Reserve within Pahia Hill:

Pahia Hill Scenic Reserve

Table 44: Pahia Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1192481
Centroid Y-Coordinate (NZTM2000)	4856591
Unprotected area (km^2)	0.72
Protected area (km^2)	1.31
Protection type	Reserve

Wind attributes	
Mean power density (W/m^2) *	1879
Mean wind speed (m/s) *	11.49

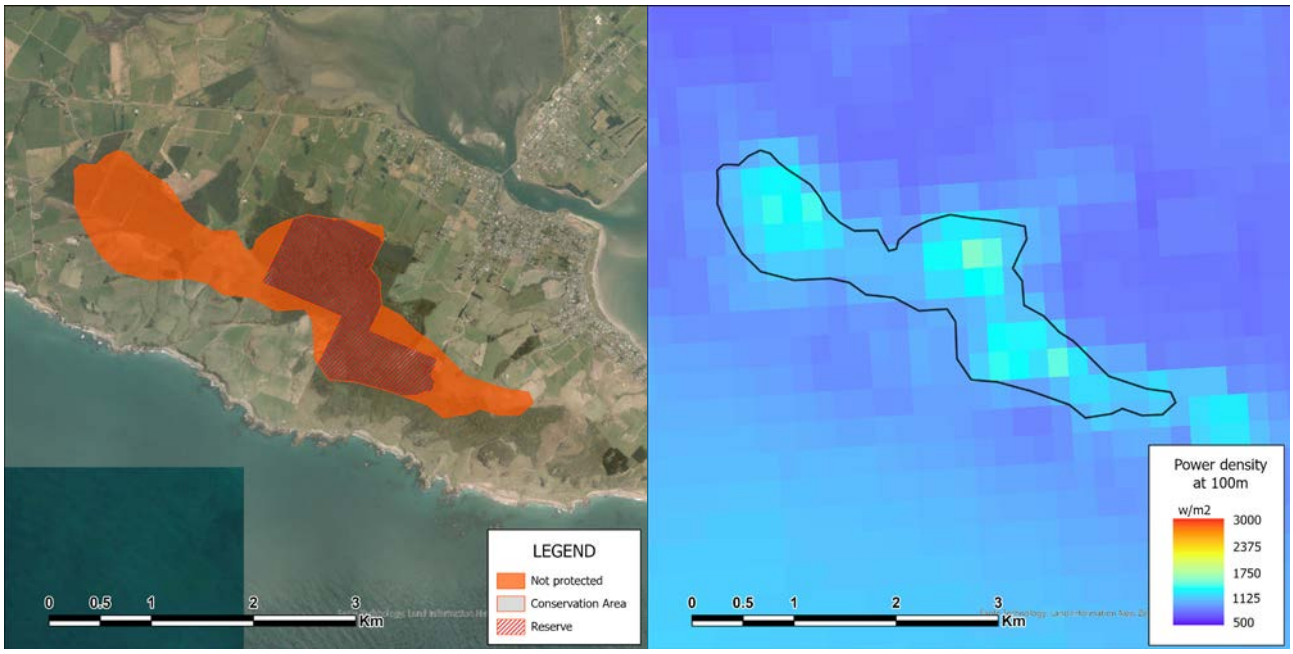
Transmission attributes	
Closest substation	Riverton
Distance to the closest substation (km)	24.72
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3.7 Riverton

Figure 44: Riverton - Protected areas (Left); Wind power density (Right).



Reserve within Riverton:

Mores Scenic Reserve

Table 45: Riverton attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1213989
Centroid Y-Coordinate (NZTM2000)	4853390
Unprotected area (km^2)	2.20
Protected area (km^2)	1.41
Protection type	Reserve

Wind attributes	
Mean power density (W/m^2) *	1156
Mean wind speed (m/s) *	9.76

Transmission attributes	
Closest substation	Riverton
Distance to the closest substation (km)	4.16
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.3.3 Ruahine Hill

Figure 45: Ruahine Hill - Protected areas (Left); Wind power density (Right).

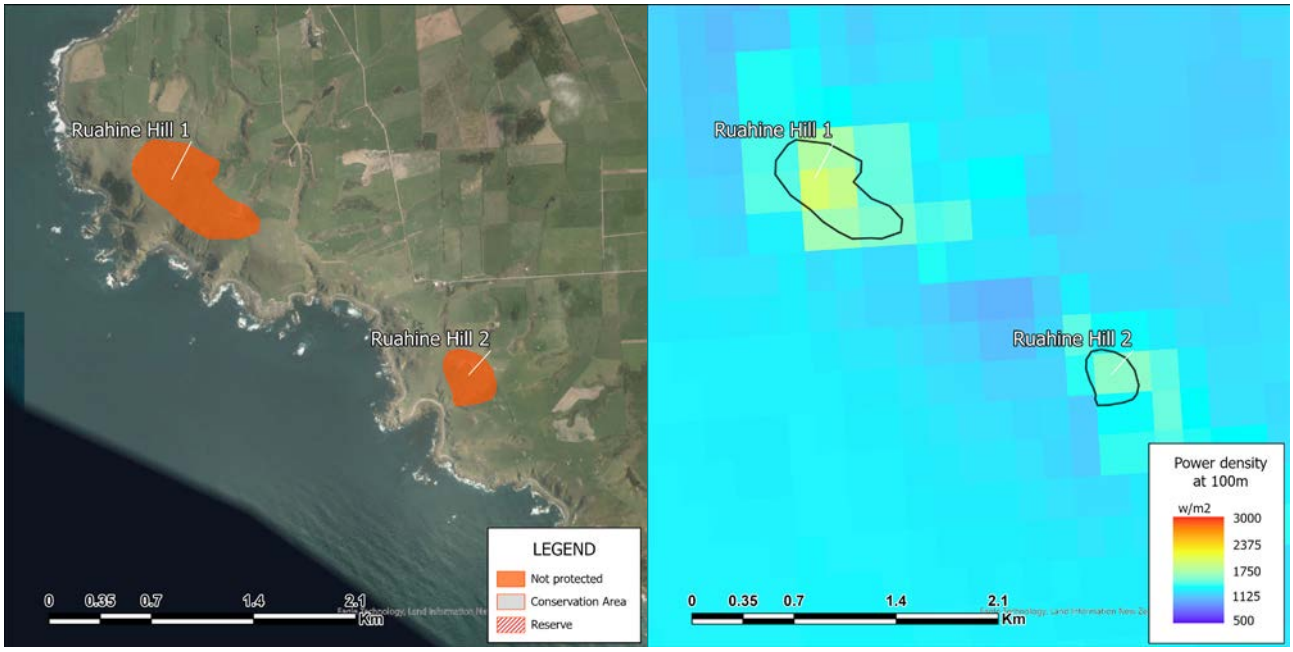


Table 46: Ruahine Hill attributes

Location Attributes	Ruahine Hill 1	Ruahine Hill 2
Centroid X-Coordinate (NZTM2000)	1195545	1197446
Centroid Y-Coordinate (NZTM2000)	4852436	4851152
Unprotected area (km^2)	0.33	0.10
Protected area (km^2)	0.00	0.00
Protection type	-	-

Wind attributes	Ruahine Hill 1	Ruahine Hill 2
Mean power density (W/m^2) *	1630	1398
Mean wind speed (m/s) *	11.21	10.66

Transmission attributes	Ruahine Hill 1	Ruahine Hill 2
Closest substation	Riverton	Riverton
Distance to the closest substation (km)	21.25	20.35
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4 SOUTH-EAST OF SOUTHLAND

This sub-region corresponds to the area between Gore, Mataura, and Clinton. It covers geographical areas such as Waikaka, Mokoreta, Wisp Range and Kaihiku Range. This sub-region extends beyond Southland and covers a small portion of South-West Otago. Kaiwera Downs location is currently a consented wind farm.

Figure 46: Potential locations of wind resources – South-East of Southland
Panel (A): Southland map.
Panel (B): Zoom in on the yellow square in panel A.

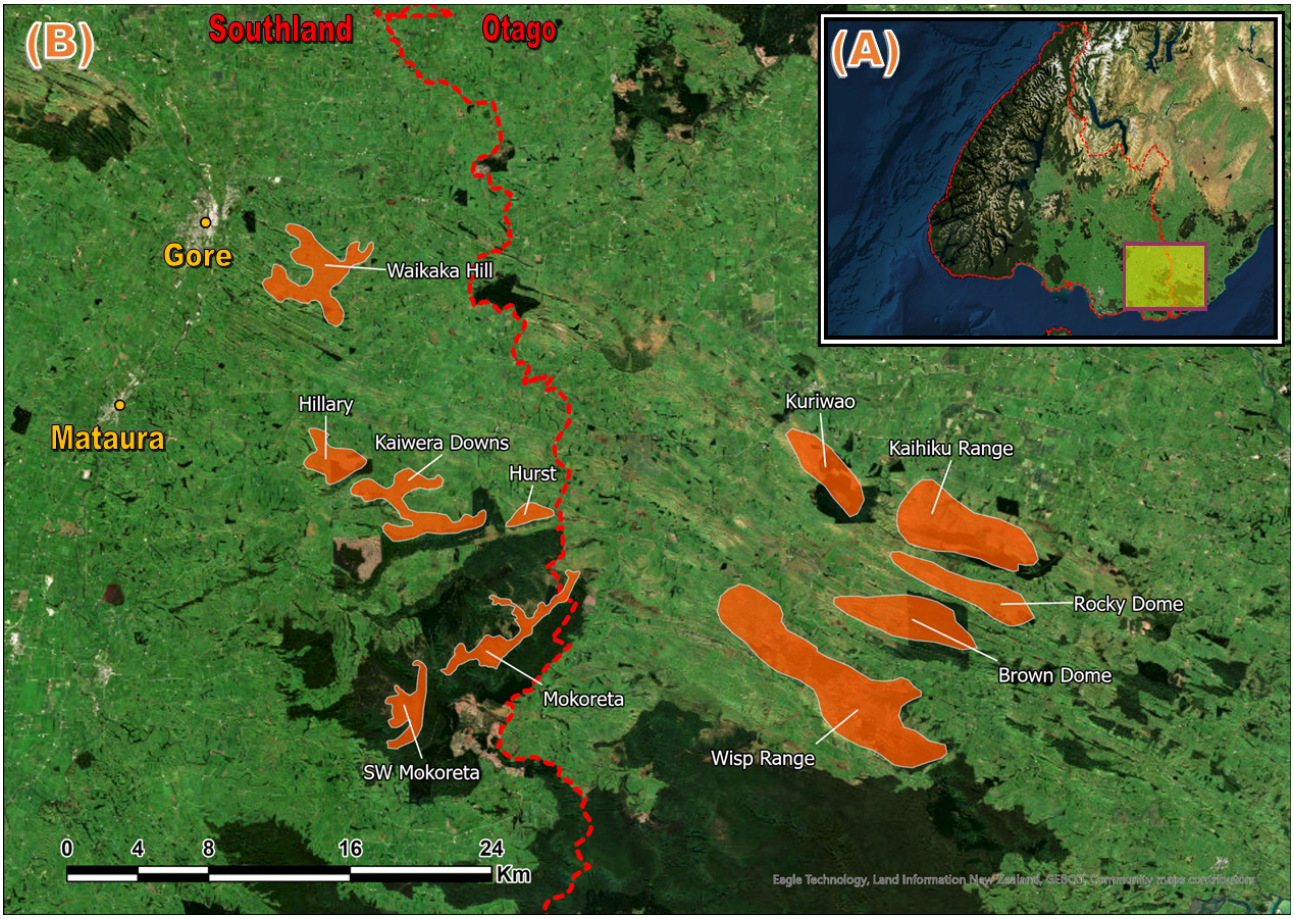


Table 47: Potential locations within the South-East of Southland sub-region.

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
South-East of Southland		
Brown Dome	10.49	1364
Hillary	10.46	1286
Hurst	10.29	1357
Kaihiku Range	10.19	1306
Kaiwera Downs	10.51	1296
Kuriwao	10.42	1429

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Mokoreta	11.46	1773
SW Mokoreta	11.5	1694
Rocky Dome	10.83	1450
Waikaka Hill	9.51	1053
Wisp Range	10.31	1349

2.4.1 Brown Dome

Figure 47: Brown Dome - Protected areas (Left); Wind power density (Right).

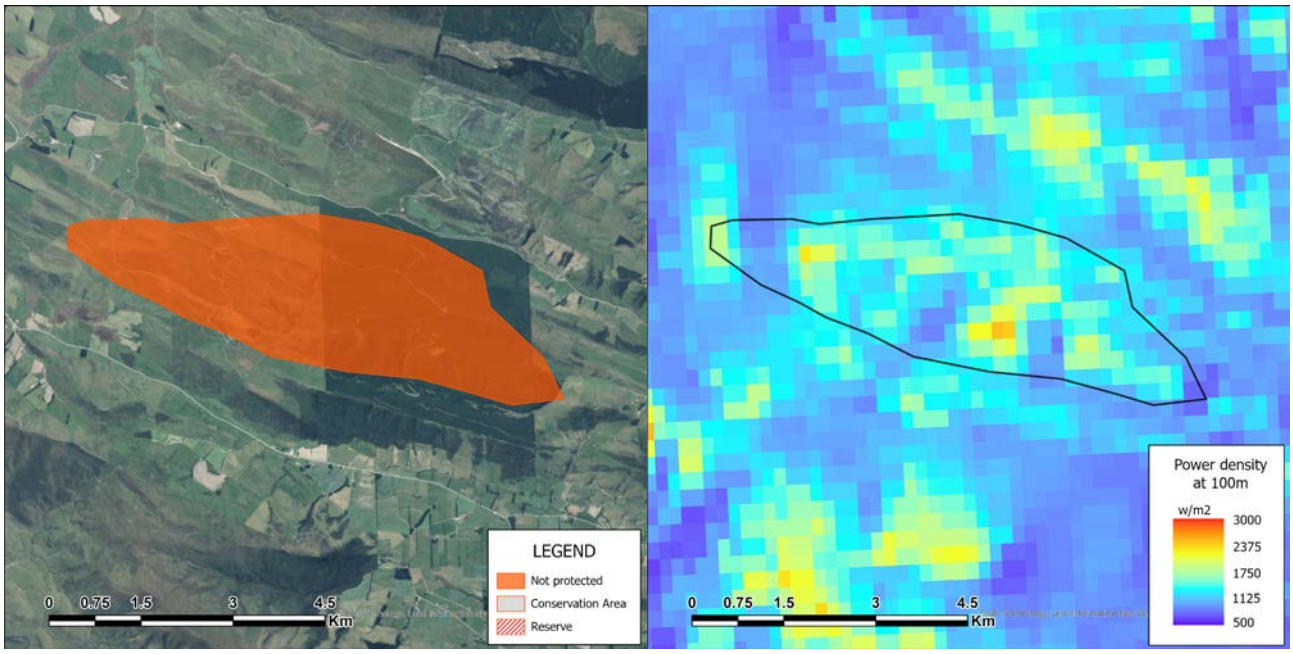


Table 48: Brown Dome attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1325911
Centroid Y-Coordinate (NZTM2000)	4864189
Unprotected area (km^2)	14.13
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1364
Mean wind speed (m/s) *	10.49

Transmission attributes	
Closest substation	Clinton
Distance to the closest substation (km)	13.47
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.2 Hillary

Figure 48: Hillary - Protected areas (Left); Wind power density (Right).

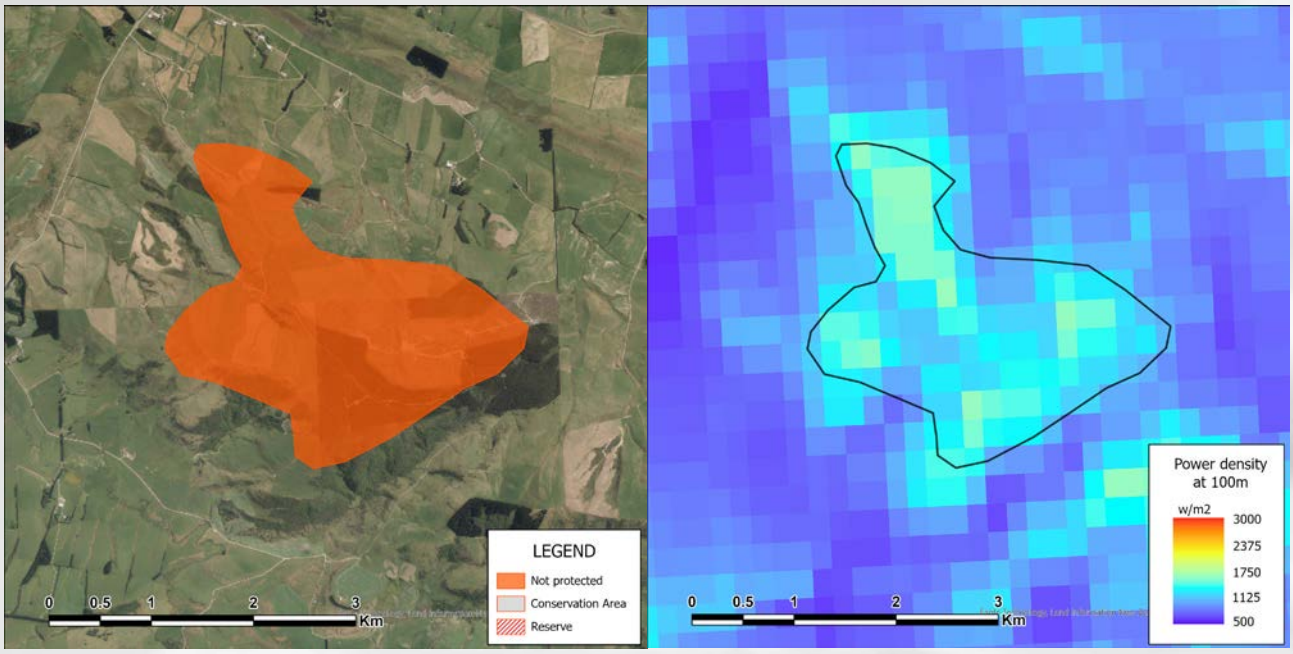


Table 49: Hillary attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1293357
Centroid Y-Coordinate (NZTM2000)	4873201
Unprotected area (km^2)	5.54
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1286
Mean wind speed (m/s) *	10.46

Transmission attributes	
Closest substation	Mataura
Distance to the closest substation (km)	11.45
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.3 Hurst

Figure 49: Hurst - Protected areas (Left); Wind power density (Right).

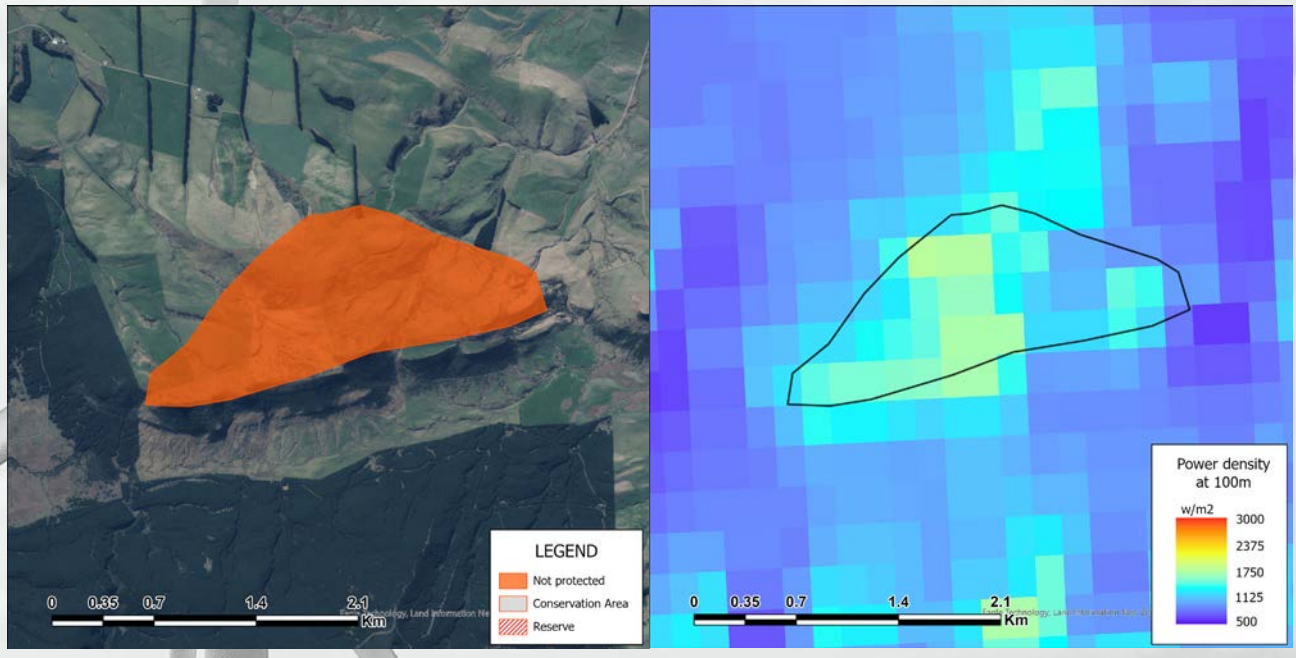


Table 50: Hurst attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1304498
Centroid Y-Coordinate (NZTM2000)	4870071
Unprotected area (km^2)	2.00
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1357
Mean wind speed (m/s) *	10.29

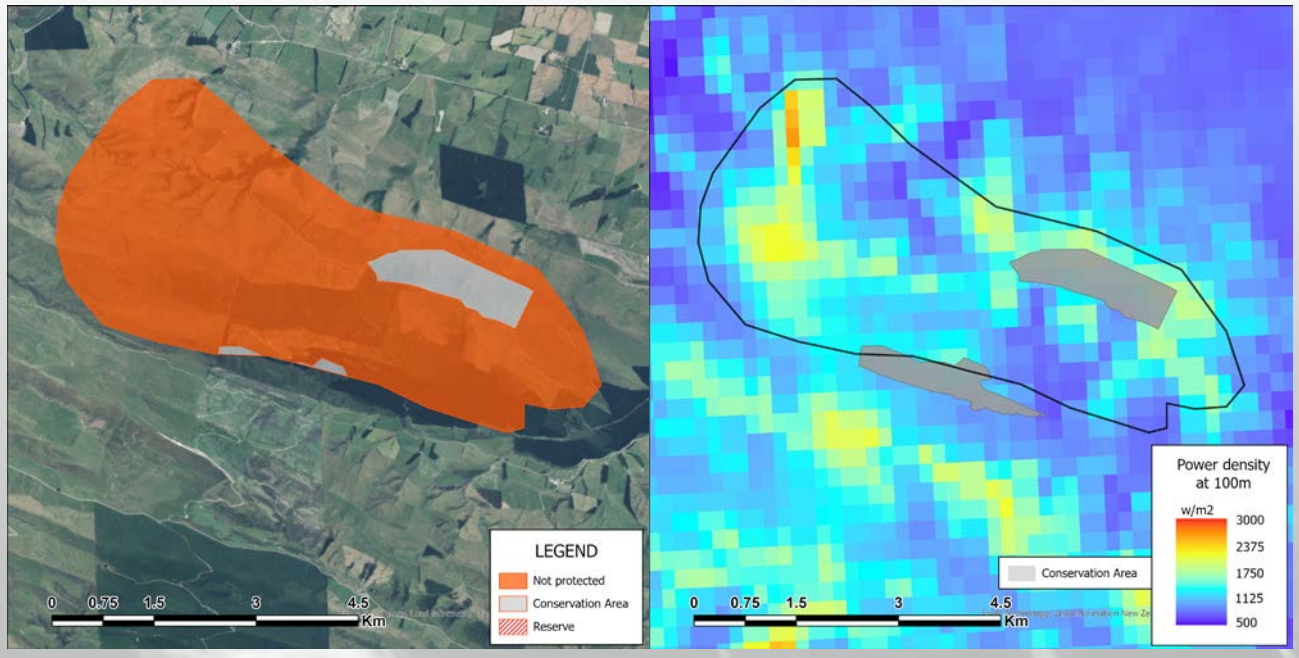
Transmission attributes	
Closest substation	Mataura
Distance to the closest substation (km)	16.75
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.4 Kaihiku Range

Figure 50: Kaihiku Range - Protected areas (Left); Wind power density (Right).



Conservation area within Kaihiku Range:

Catlins Conservation Park

Table 51: Kaihiku Range attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1328867
Centroid Y-Coordinate (NZTM2000)	4869243
Unprotected area (km^2)	20.24
Protected area (km^2)	1.49
Protection type	Conservation Area

Wind attributes	
Mean power density (W/m^2) *	1306
Mean wind speed (m/s) *	10.19

Transmission attributes	
Closest substation	Clinton
Distance to the closest substation (km)	10.62
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.5 Kaiwera Downs

Figure 51: Kaiwera Downs - Protected areas (Left); Wind power density (Right).

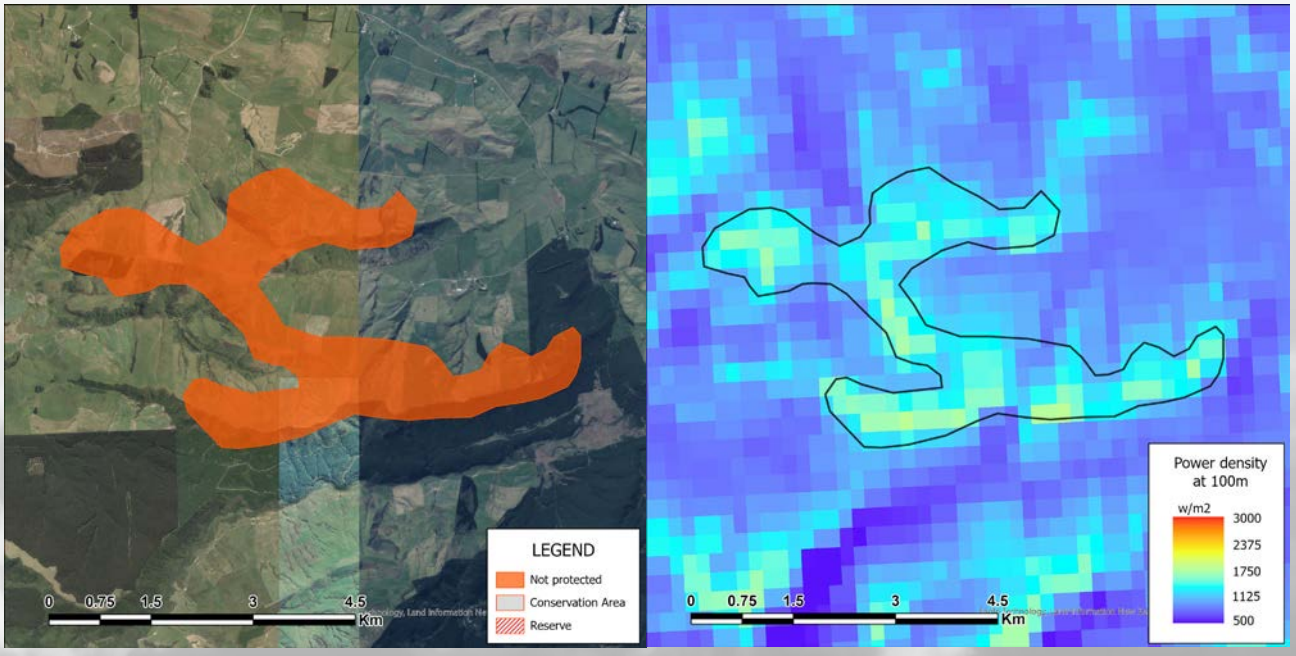


Table 52: Kaiwera Downs attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1297961
Centroid Y-Coordinate (NZTM2000)	4870491
Unprotected area (km^2)	10.92
Protected area (km^2)	0.00
Protection type	-

Transmission attributes	
Closest substation	Clinton
Distance to the closest substation (km)	19.01
Closest connection **	-

Wind attributes	
Mean power density (W/m^2) *	1296
Mean wind speed (m/s) *	10.51

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.6 Kuriwao

Figure 52: Kuriwao - Protected areas (Left); Wind power density (Right).

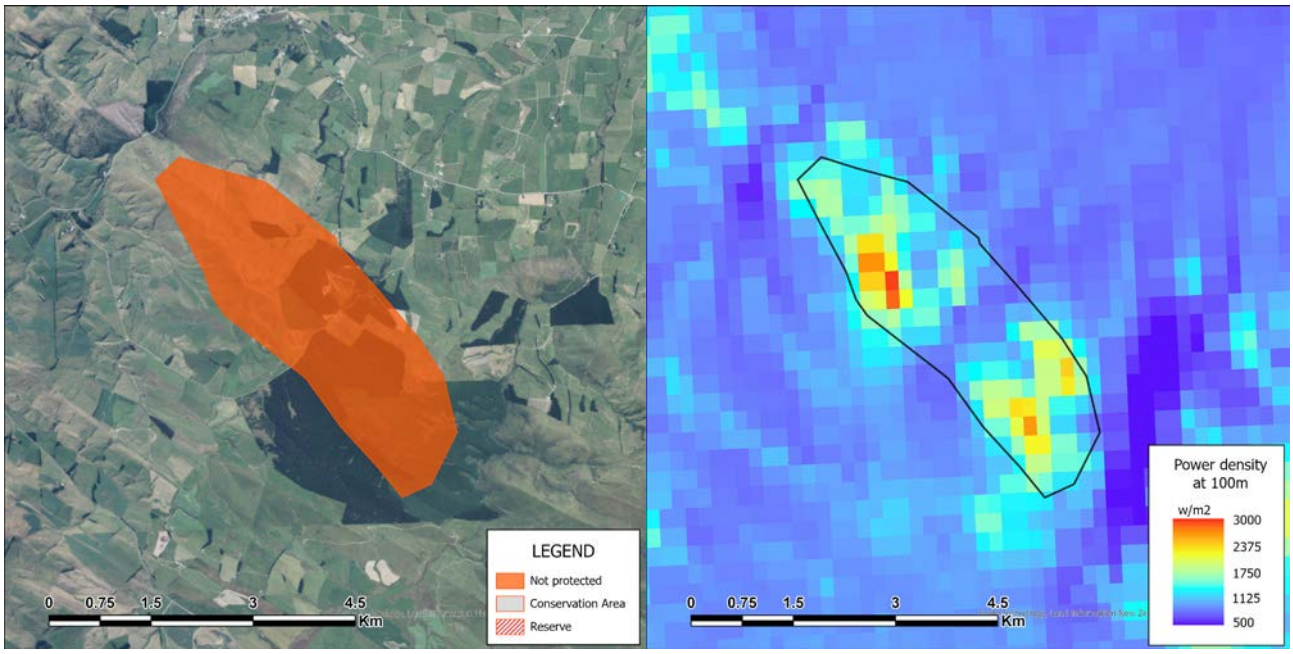


Table 53: Kuriwao attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1321341
Centroid Y-Coordinate (NZTM2000)	4872575
Unprotected area (km^2)	9.07
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1429
Mean wind speed (m/s) *	10.42

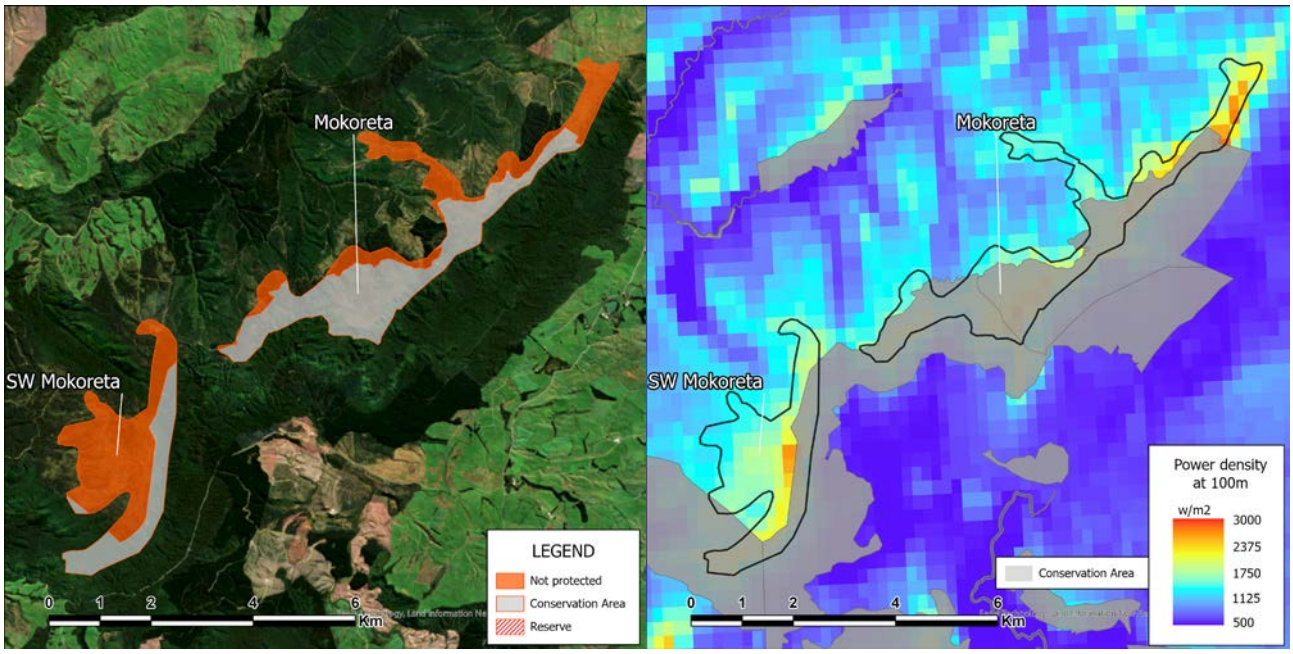
Transmission attributes	
Closest substation	Clinton
Distance to the closest substation (km)	4.85
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.7 Mokoreta

Figure 53: Mokoreta - Protected areas (Left); Wind power density (Right).



Conservation area within Mokoreta and SW Mokoreta:

Catlins Conservation Park

Conservation area within SW Mokoreta:

Slopedown

Table 54: Mokoreta attributes

Location Attributes	Mokoreta	SW Mokoreta
Centroid X-Coordinate (NZTM2000)	1303263	1297668
Centroid Y-Coordinate (NZTM2000)	4863421	4859045
Unprotected area (km^2)	2.82	3.72
Protected area (km^2)	5.08	1.86
Protection type	Conservation Area	Conservation Area

Wind attributes	Mokoreta	SW Mokoreta
Mean power density (W/m^2) *	1773	1694
Mean wind speed (m/s) *	11.46	11.5

Transmission attributes	Mokoreta	SW Mokoreta
Closest substation	Glenham	Glenham
Distance to the closest substation (km)	24.50	17.67
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.8 Rocky Dome

Figure 54: Rocky Dome - Protected areas (Left); Wind power density (Right).

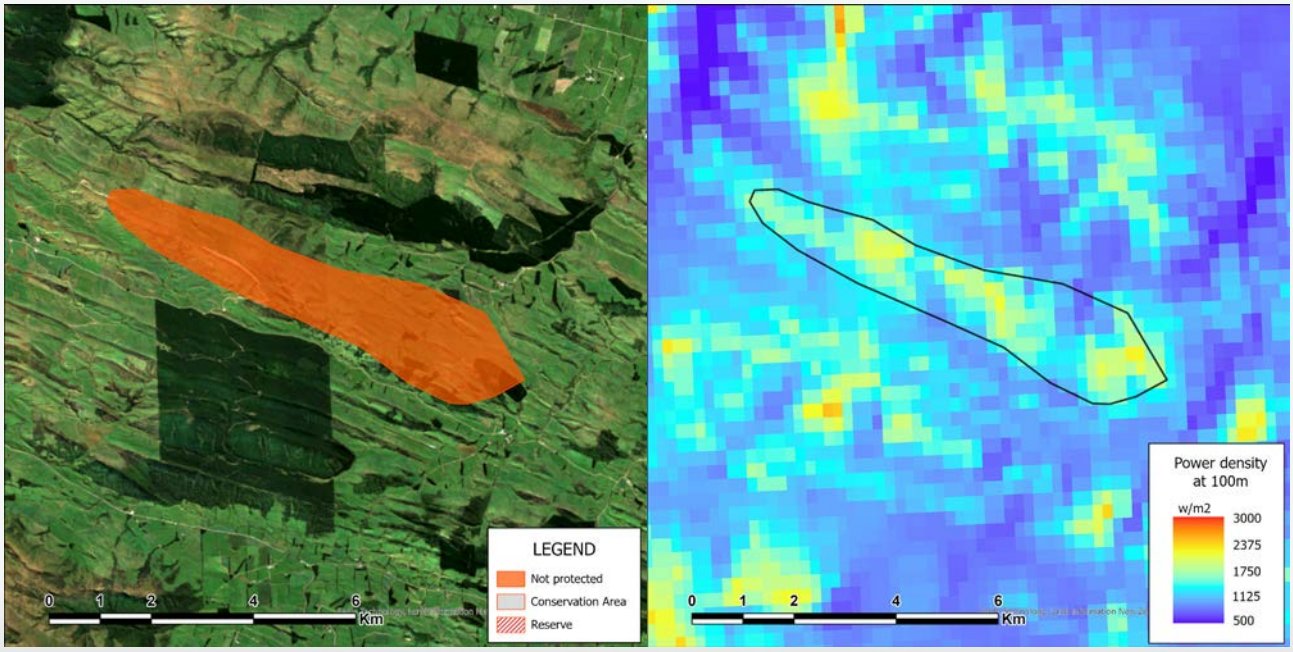


Table 55: Rocky Dome attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1329321
Centroid Y-Coordinate (NZTM2000)	4865802
Unprotected area (km^2)	11.07
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1450
Mean wind speed (m/s) *	10.83

Transmission attributes	
Closest substation	Clinton
Distance to the closest substation (km)	13.67
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.9 Waikaka Hill

Figure 55: Waikaka Hill - Wind power density.

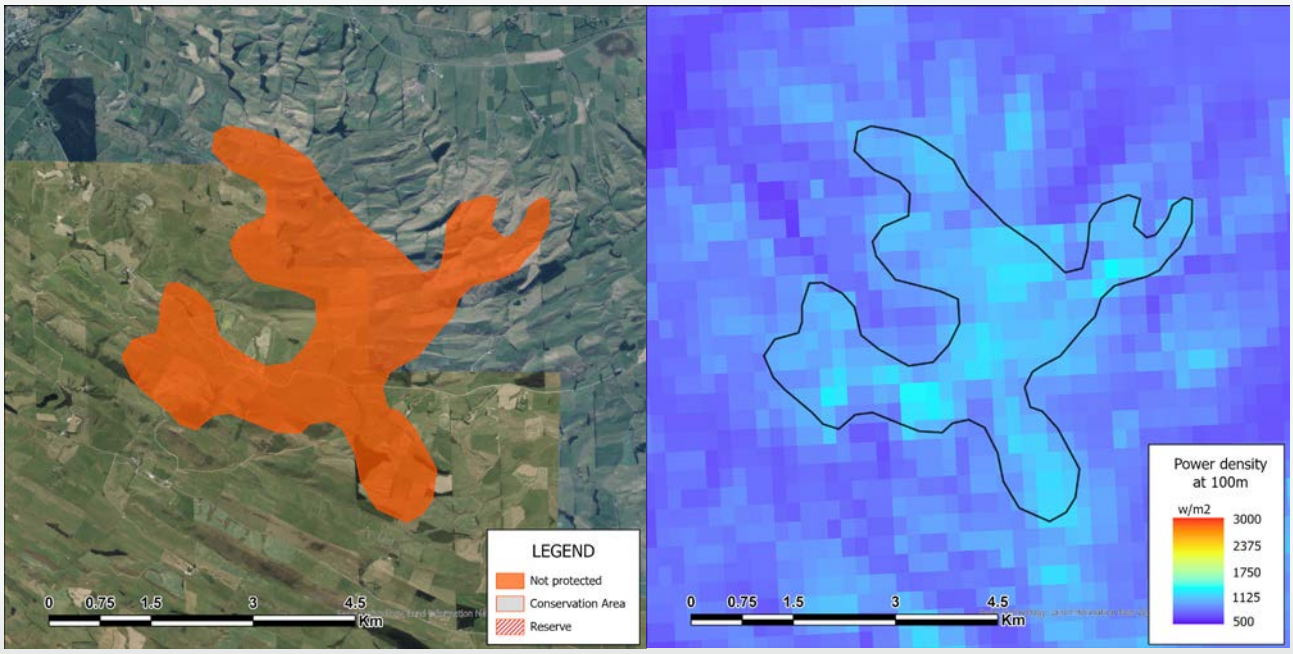


Table 56: Waikaka Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1292396
Centroid Y-Coordinate (NZTM2000)	4883669
Unprotected area (km^2)	13.10
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1053
Mean wind speed (m/s) *	9.51

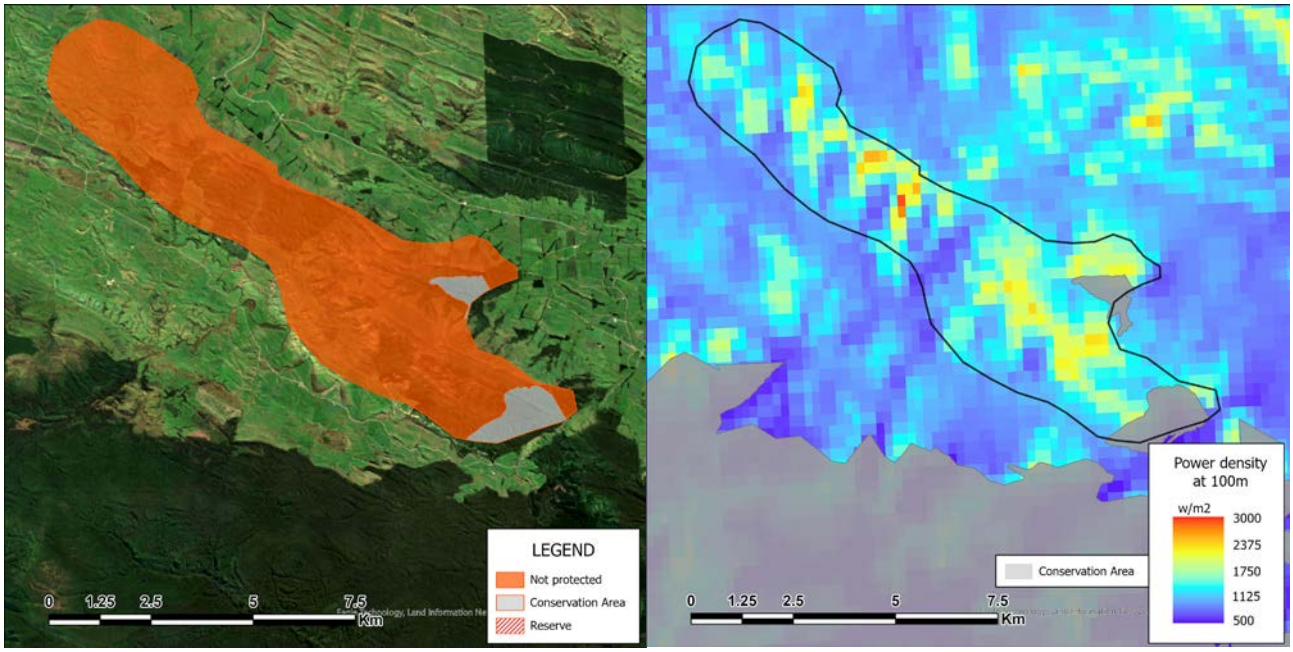
Transmission attributes	
Closest substation	McNab
Distance to the closest substation (km)	5.70
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.4.10 Wisp Range

Figure 56: Wisp Range - Protected areas (Left); Wind power density (Right).



Conservation area within Wisp Range:

Catlins Conservation Park

Table 57: Wisp Range attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1321509
Centroid Y-Coordinate (NZTM2000)	4860628
Unprotected area (km^2)	38.33
Protected area (km^2)	2.43
Protection type	Conservation Area

Wind attributes	
Mean power density (W/m^2) *	1349
Mean wind speed (m/s) *	10.31

Transmission attributes	
Closest substation	Clinton
Distance to the closest substation (km)	16.76
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5 TAKITIMU MOUNTAINS

This sub-region corresponds to the area between Ohai, Nightcaps, Mossburn, and Manapouri. It covers the geographical area of the Takitimu Mountains and its environs to the South between the Aparima River and Waiau River.

Figure 57: Potential locations of wind resources – Takitimu Mountains.
Panel (A): Southland map.
Panel (B): Zoom in on the yellow square in panel A.

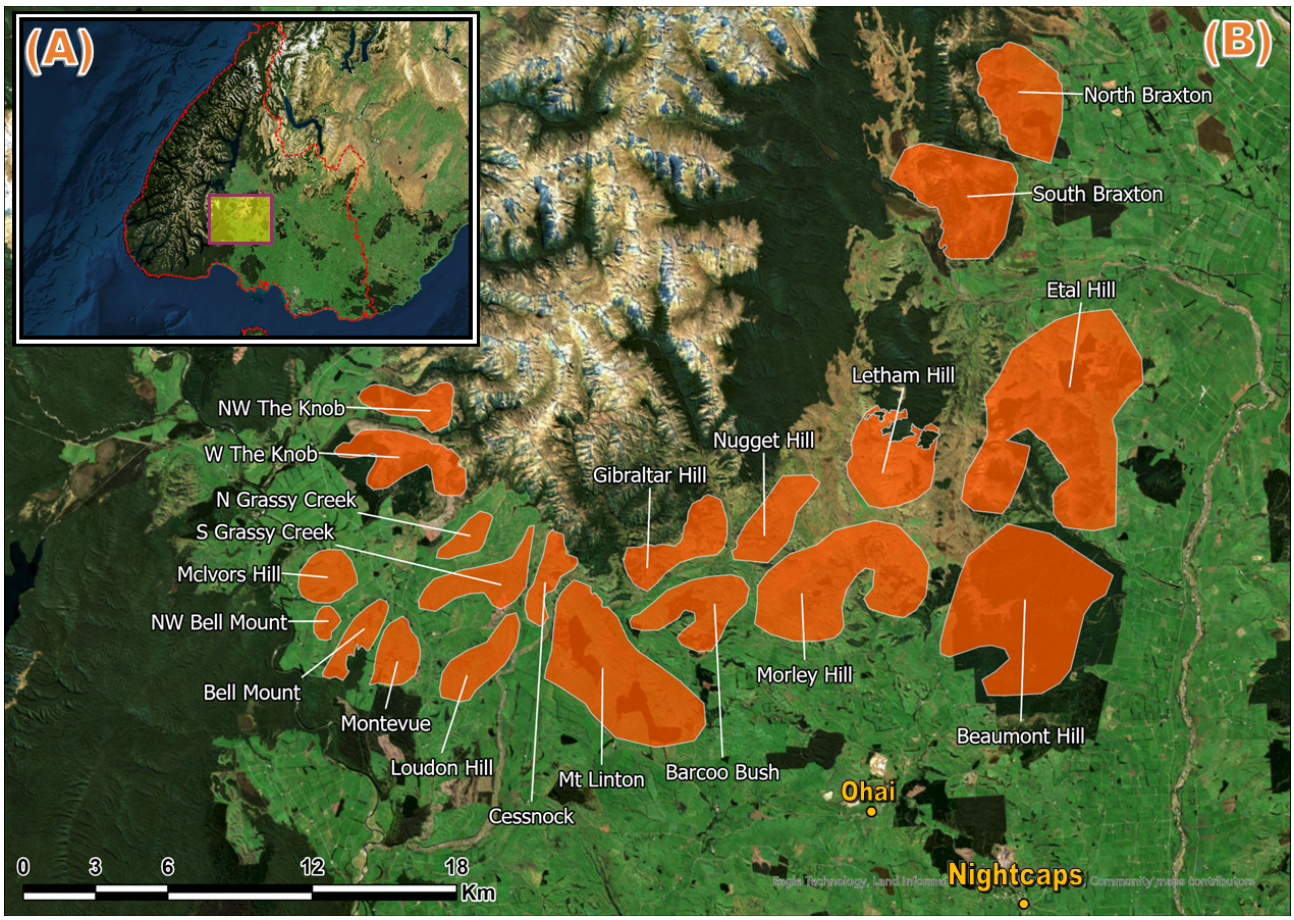


Table 58: Potential locations within the Takitimu Mountains sub-region.

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Takitimu Mountains		
Barcoo Bush	10.03	2043
Beaumont Hill	9.71	1699
Bell Mount	10.23	1966
NW Bell Mount	9.36	1421
Cessnock	11.03	2532
Etal Hill	9.8	1679
Gibraltar Hill	10.79	2385
N Grassy Creek	11	2206
S Grassy Creek	10.97	2388
Letham Hill	10.07	1795

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Loudon Hill	10.79	2430
McIvors Hill	10.25	1816
Montevue	9.99	1836
Morley Hill	10.03	1985
Mt Linton	9.87	1999
North Braxton	10.38	2016
Nugget Hill	9.88	1757
South Braxton	10.12	1956
NW The Knob	11.02	1975
W The Knob	11.11	2148

2.5.1 Barcoo Bush

Figure 58: Barcoo Bush - Protected areas (Left); Wind power density (Right).

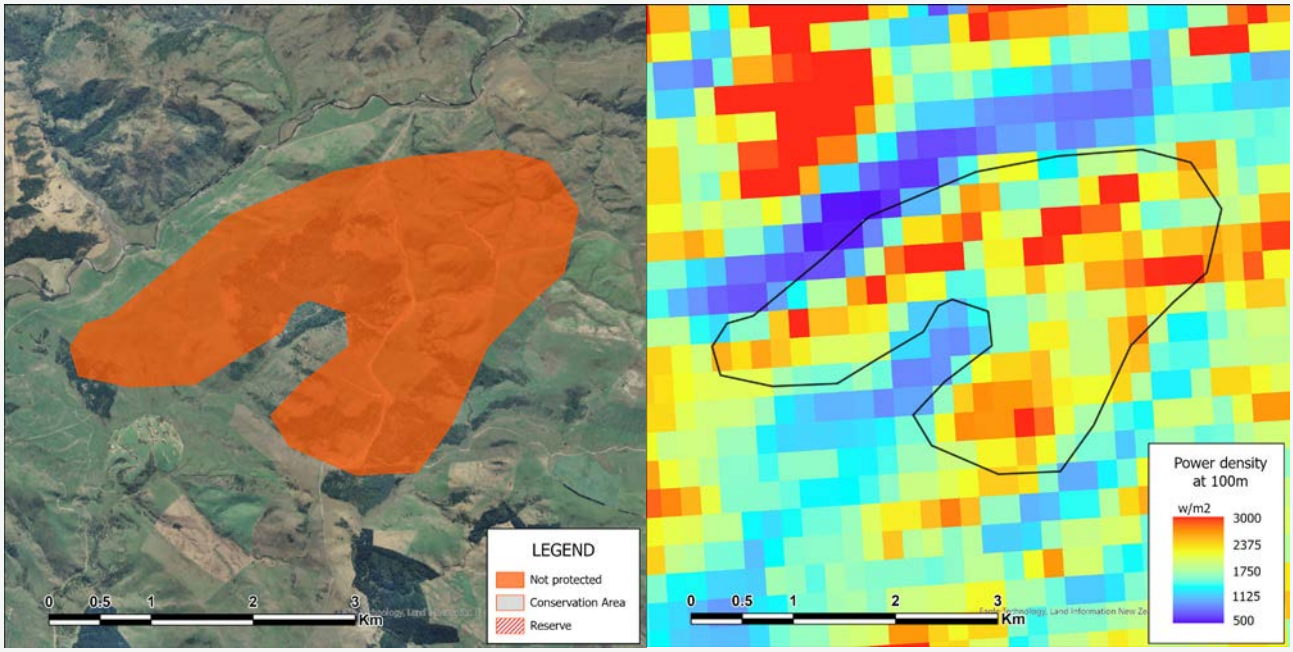


Table 59: Barcoo Bush attributes

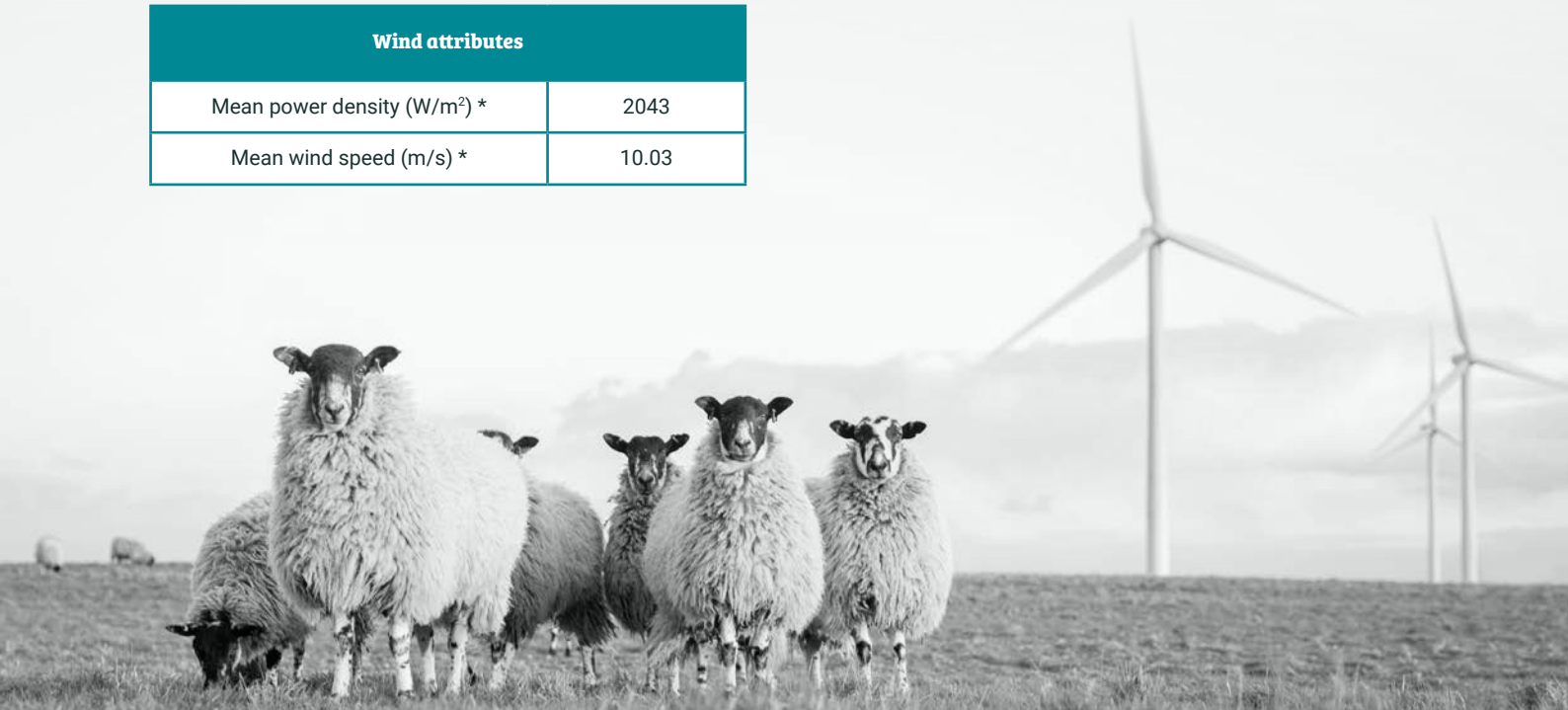
Location Attributes	
Centroid X-Coordinate (NZTM2000)	1201604
Centroid Y-Coordinate (NZTM2000)	4909323
Unprotected area (km^2)	8.57
Protected area (km^2)	0.00
Protection type	-

Transmission attributes	
Closest substation	Monowai
Distance to the closest substation (km)	14.61
Closest connection **	-

Wind attributes	
Mean power density (W/m^2) *	2043
Mean wind speed (m/s) *	10.03

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*



2.5.2 Beaumont Hill

Figure 59: Beaumont Hill - Protected areas (Left); Wind power density (Right).

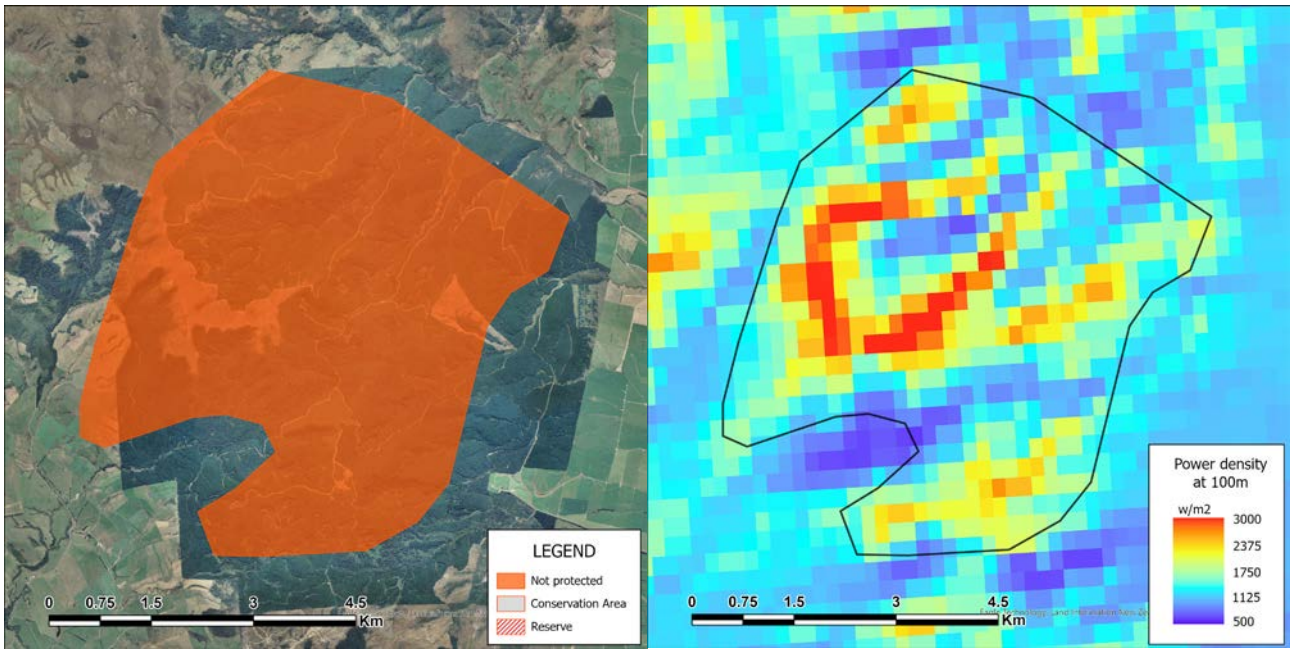


Table 60: Beaumont Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1215164
Centroid Y-Coordinate (NZTM2000)	4909400
Unprotected area (km^2)	31.96
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1699
Mean wind speed (m/s) *	9.71

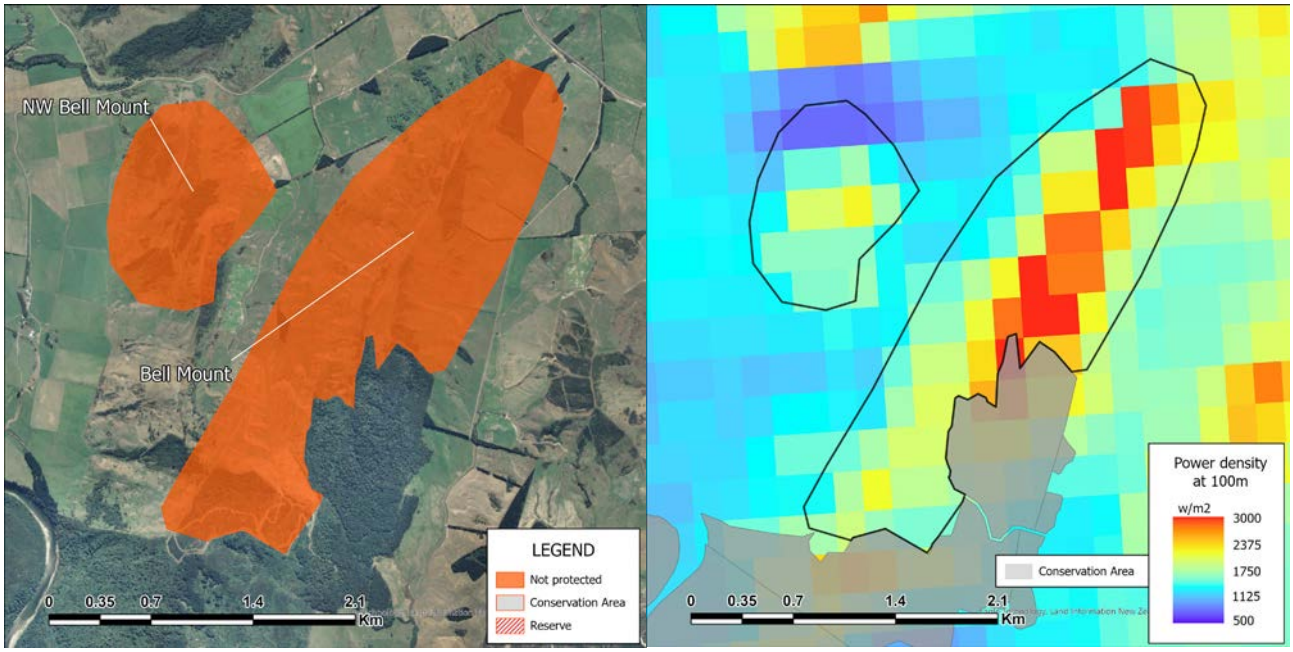
Transmission attributes	
Closest substation	Ohai
Distance to the closest substation (km)	11.34
Closest connection **	White Hill Generation

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.3 Bell Mount

Figure 60: Bell Mount - Protected areas (Left); Wind power density (Right).



Conservation areas to the South of 'Bell Mount':

Mangapiri Forest & Ericson Forest Heritage

Table 61: Bell Mount attributes

Location Attributes	Bell Mount	NW Bell Mount
Centroid X-Coordinate (NZTM2000)	1187496	1186190
Centroid Y-Coordinate (NZTM2000)	4908141	4908767
Unprotected area (km^2)	3.45	1.12
Protected area (km^2)	0.00	0.00
Protection type	-	-

Wind attributes	Bell Mount	NW Bell Mount
Mean power density (W/m^2) *	1966	1421
Mean wind speed (m/s) *	10.23	9.36

Transmission attributes	Bell Mount	NW Bell Mount
Closest substation	Monowai	Monowai
Distance to the closest substation (km)	10.42	9.18
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.4 Cessnock

Figure 61: Cessnock - Protected areas (Left); Wind power density (Right).

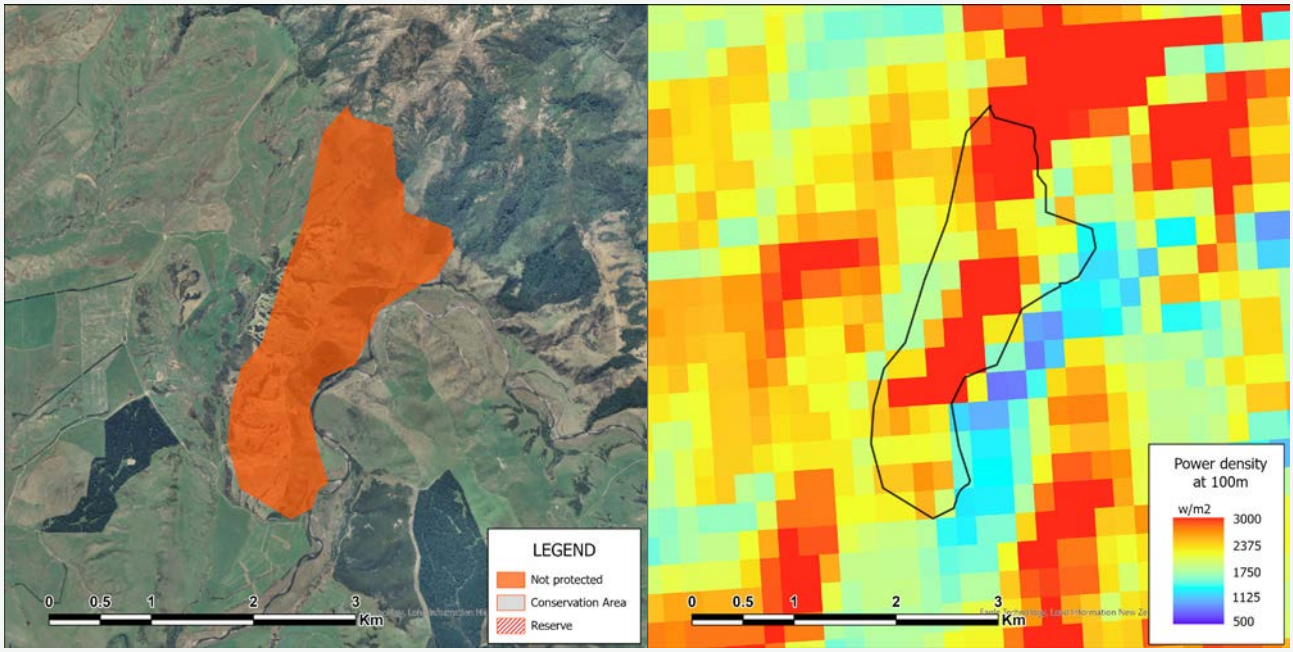


Table 62: Cessnock attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1195428
Centroid Y-Coordinate (NZTM2000)	4910686
Unprotected area (km^2)	3.71
Protected area (km^2)	0.00
Protection type	-

Transmission attributes	
Closest substation	Ohai
Distance to the closest substation (km)	13.96
Closest connection **	-

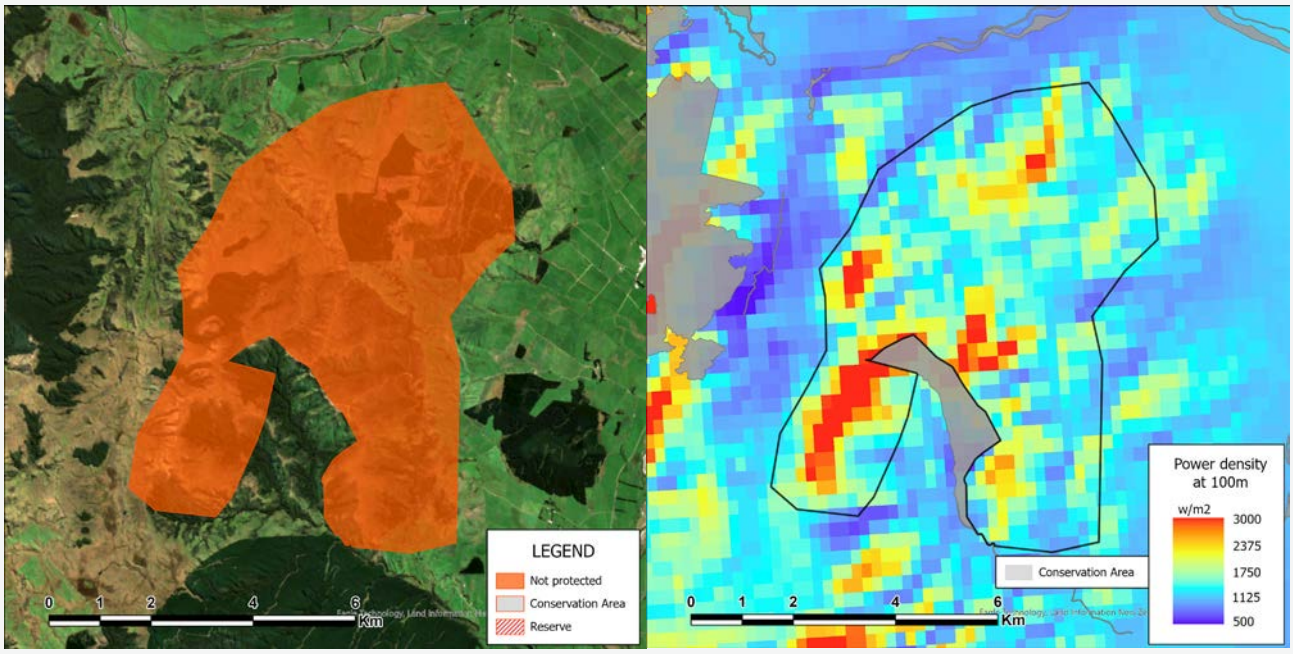
Wind attributes	
Mean power density (W/m^2) *	2532
Mean wind speed (m/s) *	11.03

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.5 Etal Hill

Figure 62: Etal Hill - Protected areas (Left); Wind power density (Right).



Conservation area to the South of Etal Hill:

Etal Hill

Table 63: Etal Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1216686
Centroid Y-Coordinate (NZTM2000)	4917291
Unprotected area (km^2)	41.63
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1679
Mean wind speed (m/s) *	9.8

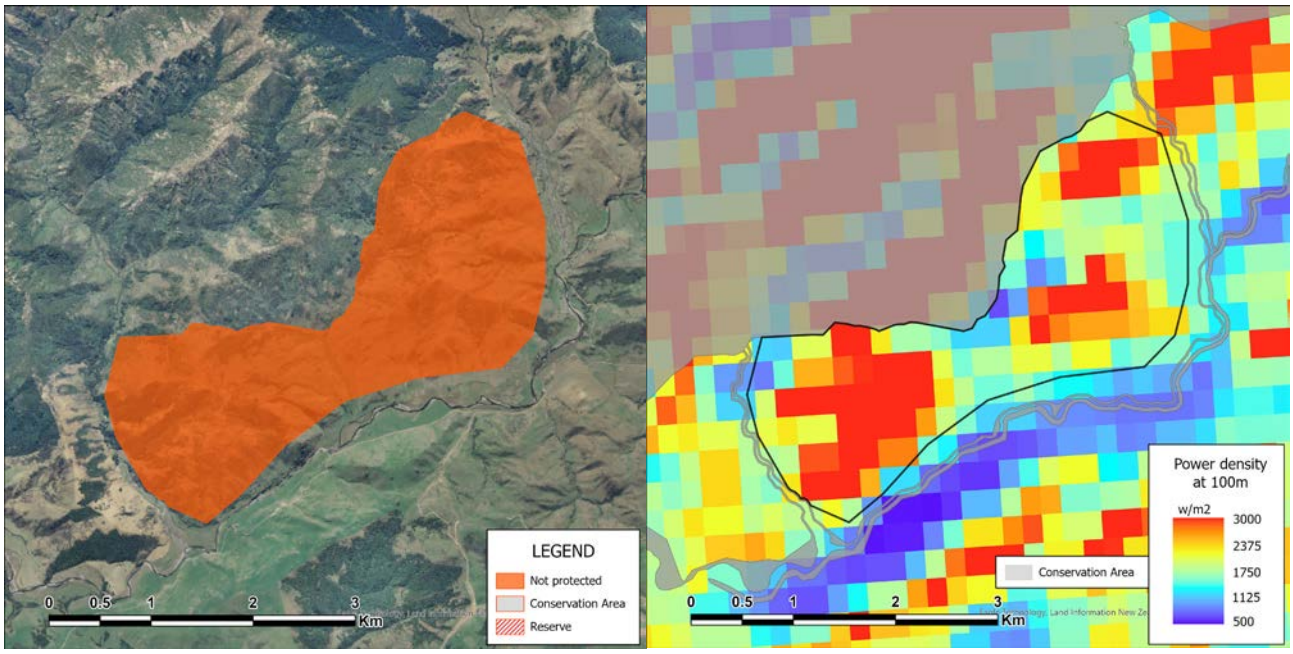
Transmission attributes	
Closest substation	Mossburn
Distance to the closest substation (km)	16.63
Closest connection **	White Hill Generation

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.6 Gibraltar Hill

Figure 63: Gibraltar Hill - Protected areas (Left); Wind power density (Right).



Conservation area to the North of Gibraltar Hill:

Takitimu Conservation Area

Table 64: Gibraltar Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1200917
Centroid Y-Coordinate (NZTM2000)	4912017
Unprotected area (km^2)	7.22
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	2385
Mean wind speed (m/s) *	10.79

Transmission attributes	
Closest substation	Ohai
Distance to the closest substation (km)	11.94
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.7 Grassy Creek

Figure 64: Grassy Creek - Protected areas (Left); Wind power density (Right).

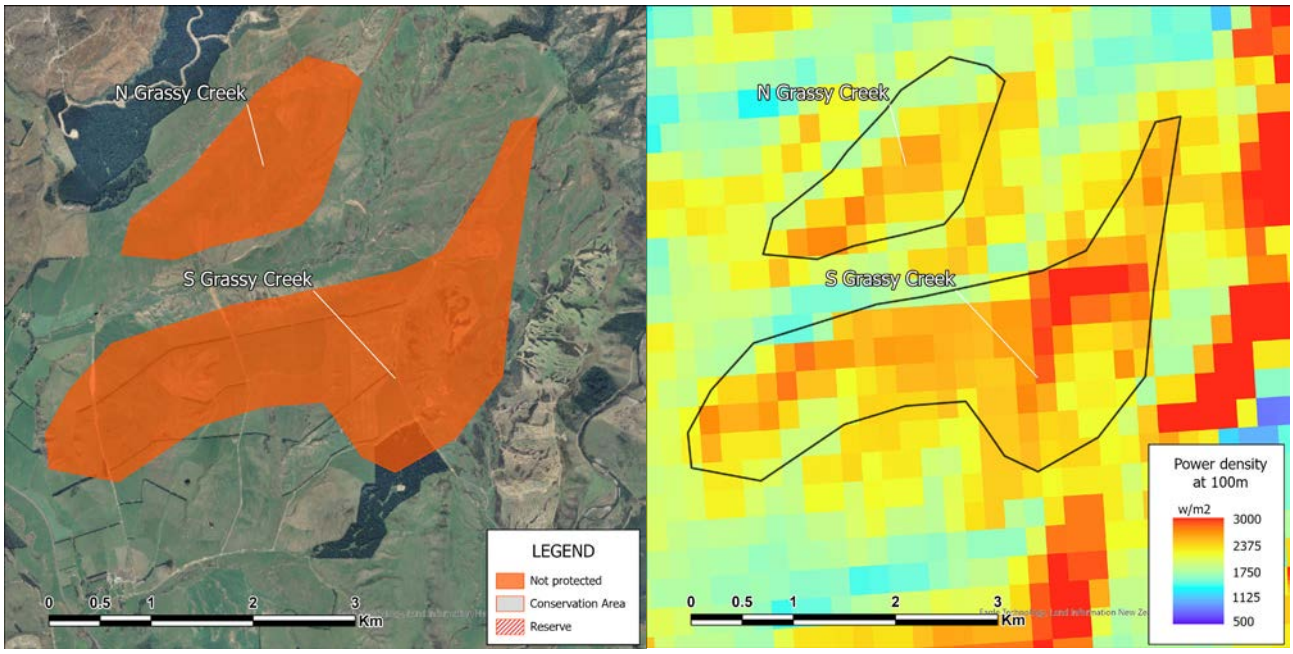


Table 65: Grassy Creek attributes

Location Attributes	N Grassy Creek	S Grassy Creek
Centroid X-Coordinate (NZTM2000)	1192080	1192727
Centroid Y-Coordinate (NZTM2000)	4912315	4910507
Unprotected area (km^2)	2.33	6.56
Protected area (km^2)	0.00	0.00
Protection type	-	-

Wind attributes	N Grassy Creek	S Grassy Creek
Mean power density (W/m^2) *	2206	2388
Mean wind speed (m/s) *	11	10.97

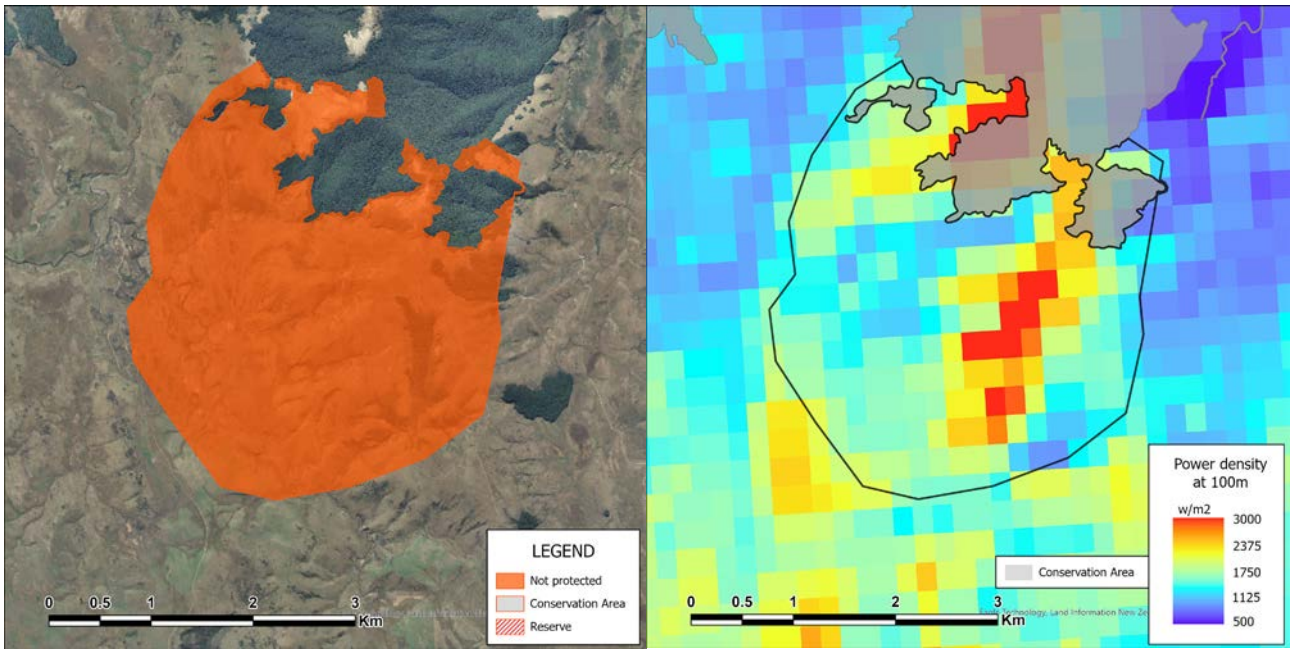
Transmission attributes	N Grassy Creek	S Grassy Creek
Closest substation	Monowai	Monowai
Distance to the closest substation (km)	11.43	12.79
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.8 Letham Hill

Figure 65: Letham Hill - Protected areas (Left); Wind power density (Right).



Conservation area to the North of Letham Hill:

Takitimu Conservation Area

Table 66: Letham Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1209613
Centroid Y-Coordinate (NZTM2000)	4915428
Unprotected area (km^2)	10.52
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1795
Mean wind speed (m/s) *	10.07

Transmission attributes	
Closest substation	Ohai
Distance to the closest substation (km)	15.21
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.9 Loudon Hill

Figure 66: Loudon Hill - Protected areas (Left); Wind power density (Right).

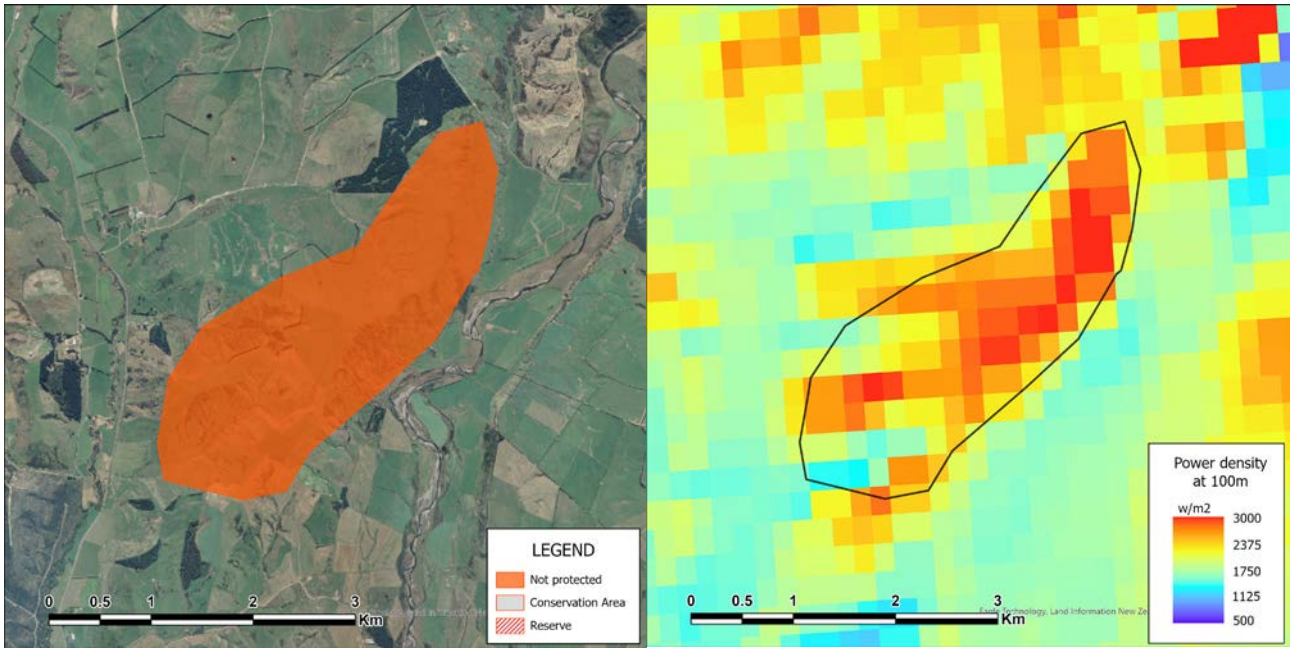


Table 67: Loudon Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1192586
Centroid Y-Coordinate (NZTM2000)	4907136
Unprotected area (km^2)	5.57
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	2430
Mean wind speed (m/s) *	10.79

Transmission attributes	
Closest substation	Monowai
Distance to the closest substation (km)	15.14
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.10 McIvors Hill

Figure 67: McIvors Hill - Protected areas (Left); Wind power density (Right).

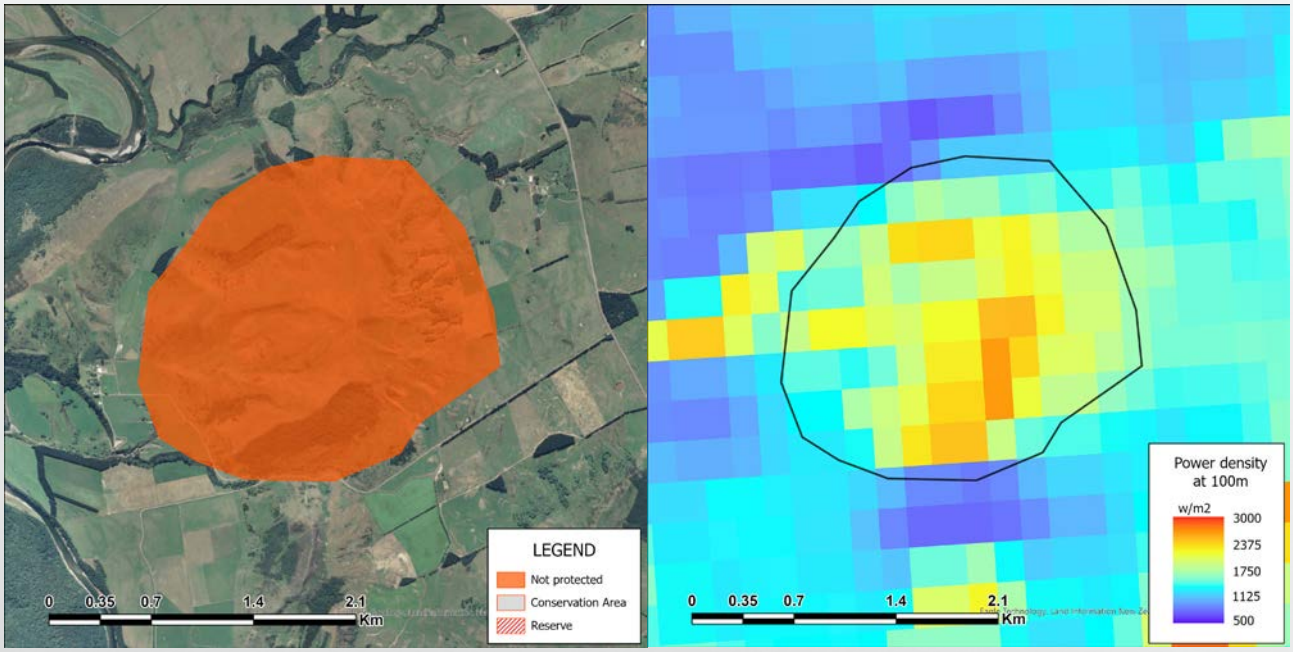


Table 68: McIvors Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1186234
Centroid Y-Coordinate (NZTM2000)	4910682
Unprotected area (km^2)	4.16
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1816
Mean wind speed (m/s) *	10.25

Transmission attributes	
Closest substation	Monowai
Distance to the closest substation (km)	7.63
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.11 Montevue

Figure 68: Montevue - Protected areas (Left); Wind power density (Right).

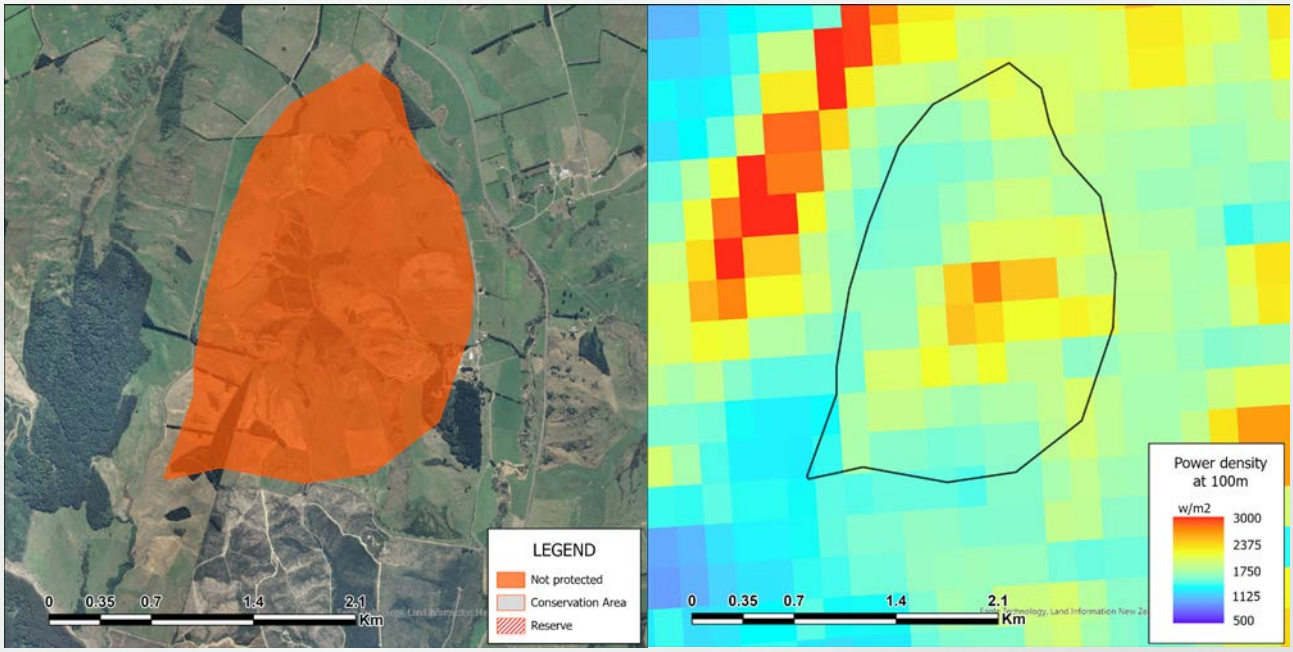


Table 69: Montevue attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1189126
Centroid Y-Coordinate (NZTM2000)	4907441
Unprotected area (Km^2)	4.12
Protected area (Km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1836
Mean wind speed (m/s) *	9.99

Transmission attributes	
Closest substation	Monowai
Distance to the closest substation (Km)	11.96
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.12 Morley Hill

Figure 69: Morley Hill - Protected areas (Left); Wind power density (Right).

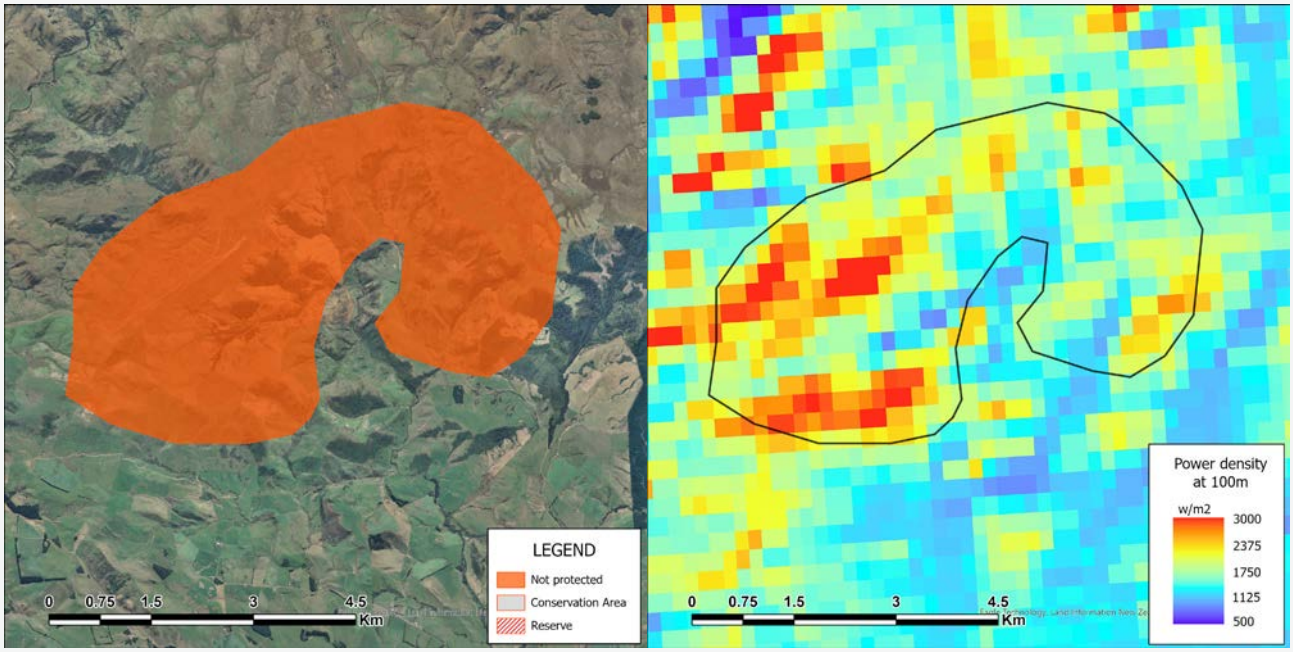


Table 70: Morley Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1207601
Centroid Y-Coordinate (NZTM2000)	4910481
Unprotected area (km^2)	23.02
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1985
Mean wind speed (m/s) *	10.03

Transmission attributes	
Closest substation	Ohai
Distance to the closest substation (km)	10.25
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.13 Mt Linton

Figure 70: Mt Linton - Protected areas (Left); Wind power density (Right).

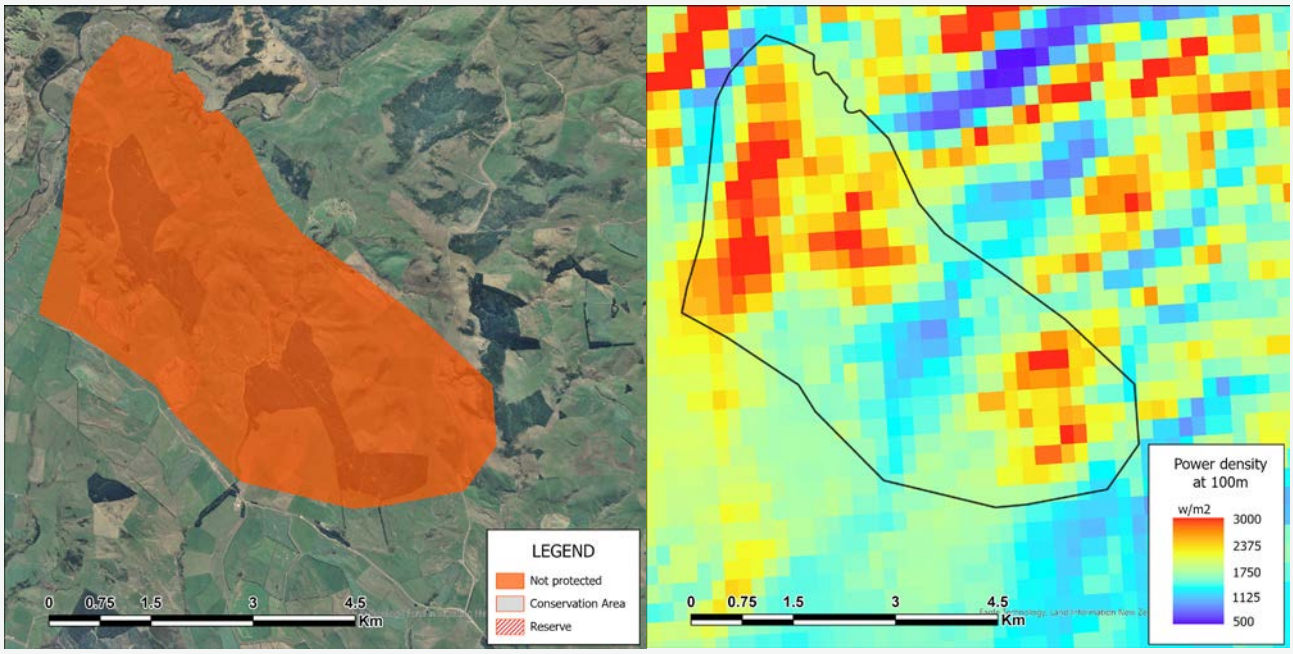


Table 71: Mt Linton attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1198319
Centroid Y-Coordinate (NZTM2000)	4906580
Unprotected area (km^2)	24.25
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1999
Mean wind speed (m/s) *	9.87

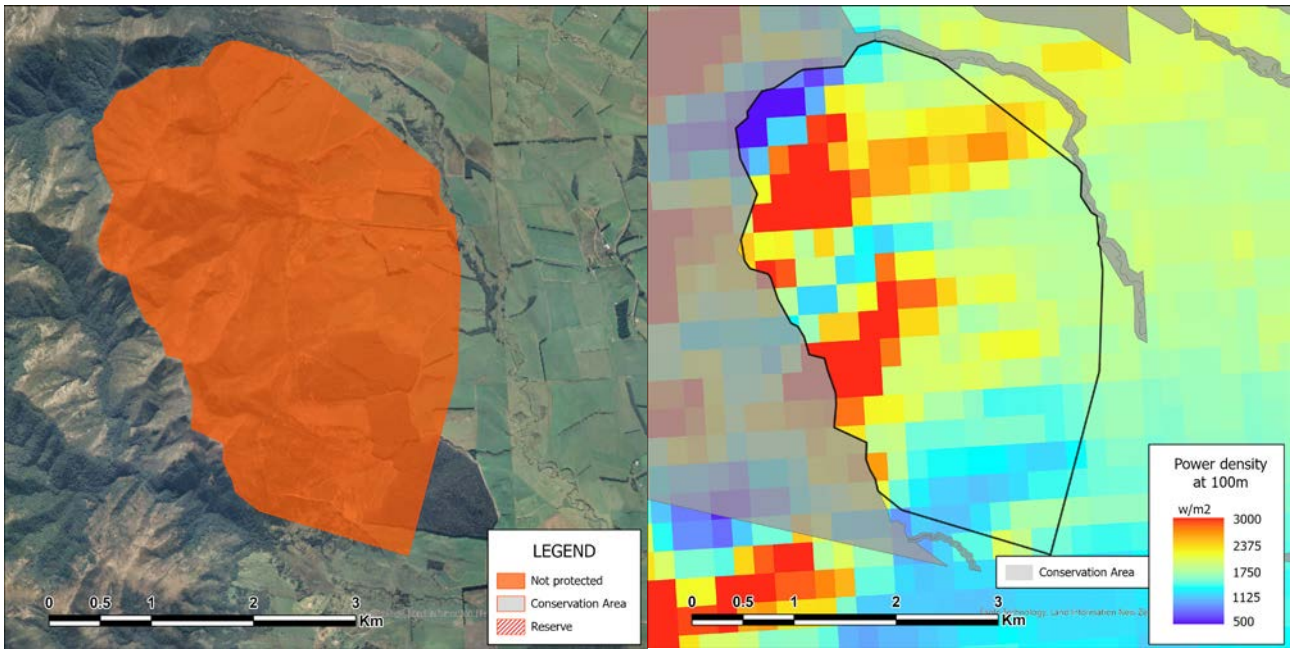
Transmission attributes	
Closest substation	Ohai
Distance to the closest substation (km)	11.35
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.14 North Braxton

Figure 71: North Braxton - Protected areas (Left); Wind power density (Right).



Conservation area to the West of North Braxton:

Takitimu Conservation Area

Table 72: North Braxton attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1215141
Centroid Y-Coordinate (NZTM2000)	4930496
Unprotected area (km^2)	12.36
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	2016
Mean wind speed (m/s) *	10.38

Transmission attributes	
Closest substation	Mossburn
Distance to the closest substation (km)	12.55
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.15 Nugget Hill

Figure 72: Nugget Hill - Protected areas (Left); Wind power density (Right).

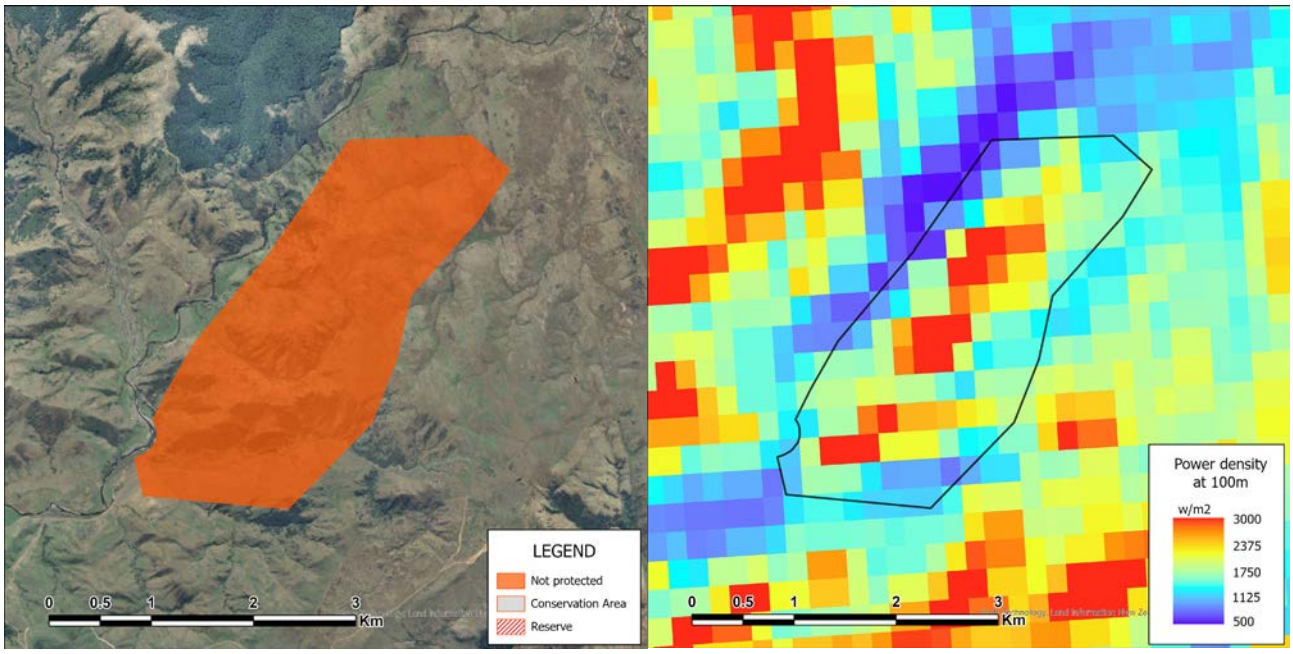


Table 73: Nugget Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1204825
Centroid Y-Coordinate (NZTM2000)	4913055
Unprotected area (km^2)	6.58
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1757
Mean wind speed (m/s) *	9.88

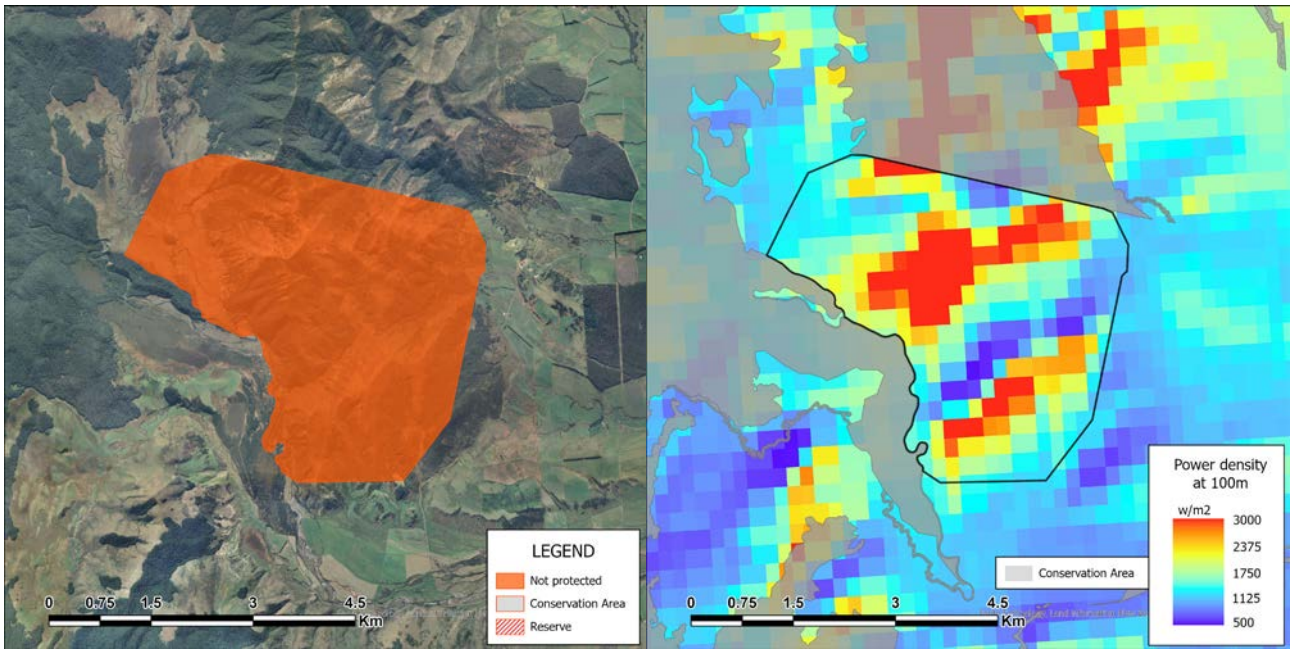
Transmission attributes	
Closest substation	Ohai
Distance to the closest substation (km)	13.29
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.16 South Braxton

Figure 73: South Braxton - Protected areas (Left); Wind power density (Right).



Conservation area to the West of South Braxton:

Takitimu Conservation Area

Table 74: South Braxton attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1212585
Centroid Y-Coordinate (NZTM2000)	4926474
Unprotected area (Km^2)	15.98
Protected area (Km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1956
Mean wind speed (m/s) *	10.12

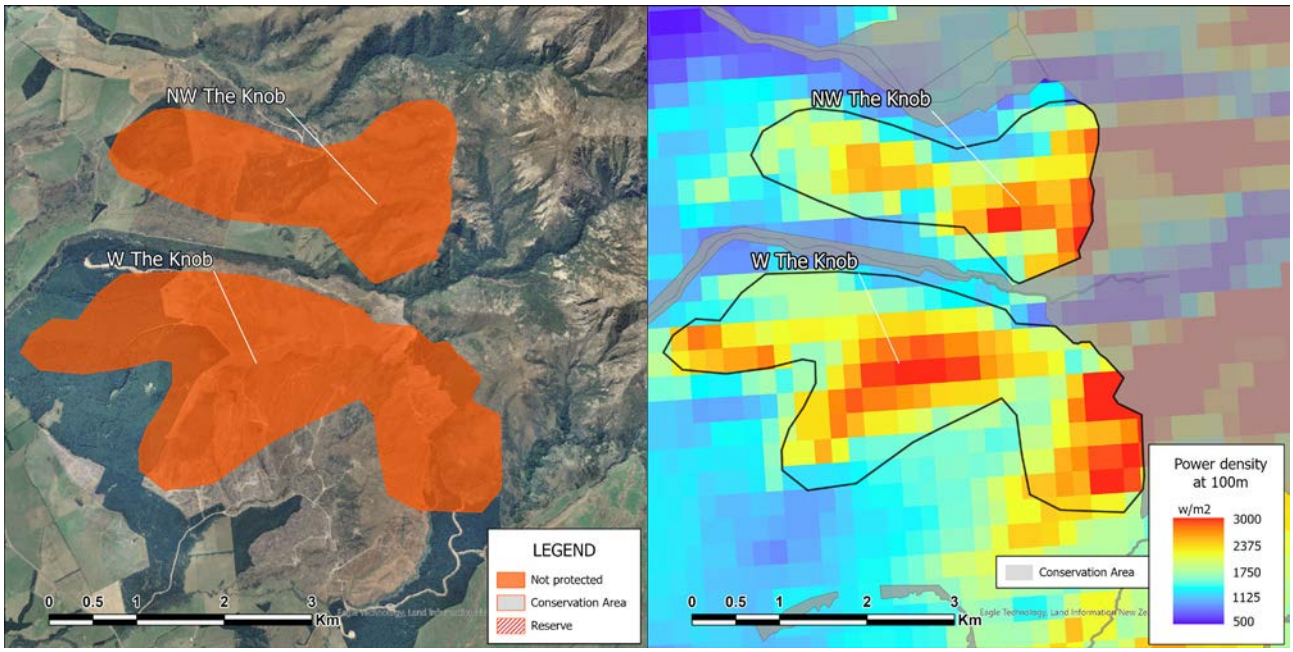
Transmission attributes	
Closest substation	Mossburn
Distance to the closest substation (Km)	15.44
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.5.17 The Knob

Figure 74: The Knob - Protected areas (Left); Wind power density (Right).



Conservation area to the East of 'NW The Knob' and 'W The Knob':

Takitimu Conservation Area

Table 75: The Knob attributes

Location Attributes	NW The Knob	W The Knob
Centroid X-Coordinate (NZTM2000)	1189813	1189515
Centroid Y-Coordinate (NZTM2000)	4917853	4915539
Unprotected area (km^2)	4.72	8.29
Protected area (km^2)	0.00	0.00
Protection type	-	-

Wind attributes	NW The Knob	W The Knob
Mean power density (W/m^2) *	1975	2148
Mean wind speed (m/s) *	11.02	11.11

Transmission attributes	NW The Knob	W The Knob
Closest substation	Monowai	Monowai
Distance to the closest substation (km)	8.38	8.08
Closest connection **	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.6 TARINGATURA HILLS

This sub-region corresponds to the area between Nightcaps, Mossburn, Lumsden, Dipton and Winton. It covers the geographical areas of the Taringatura Hills and North Range. One of the existing wind farms in Southland is located in this sub-region: White Hills.

Figure 75: Potential locations of wind resources – Taringatura Hills
Panel (A): Southland map.
Panel (B): Zoom in on the yellow square in panel A.

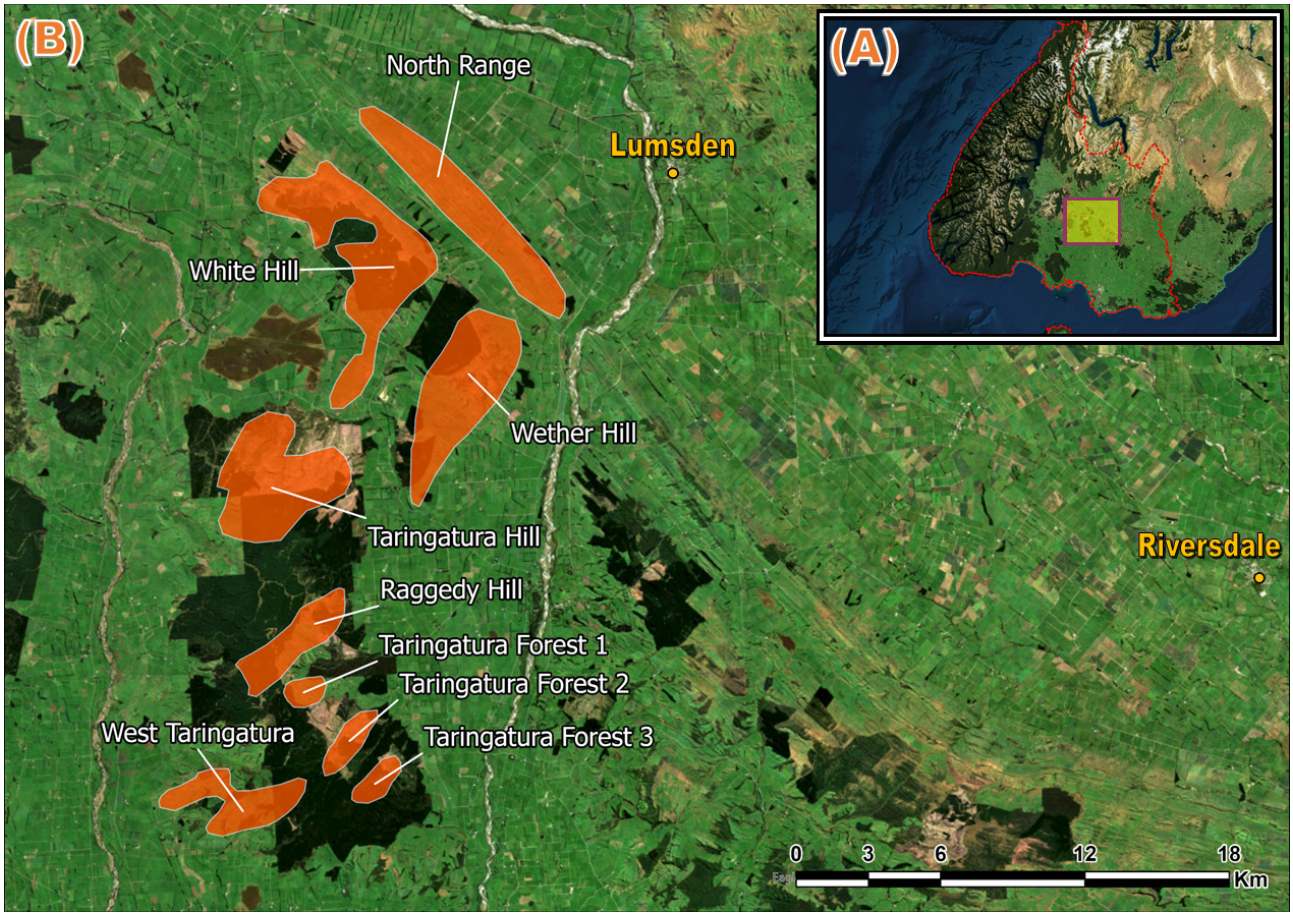


Table 76: Potential locations within the Taringatura Hills sub-region.

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Taringatura Hills		
North Range	9.76	1424
Raggedy Hill	10.06	1541
Taringatura Forest 1	9.77	1438
Taringatura Forest 2	9.59	1446
Taringatura Forest 3	9.8	1526
Taringatura Hill	9.87	1511
West Taringatura	9.66	1465
Wether Hill	10.23	1647
White Hill	10.34	1685

2.6.1 North Range

Figure 76: North Range - Protected areas (Left); Wind power density (Right).

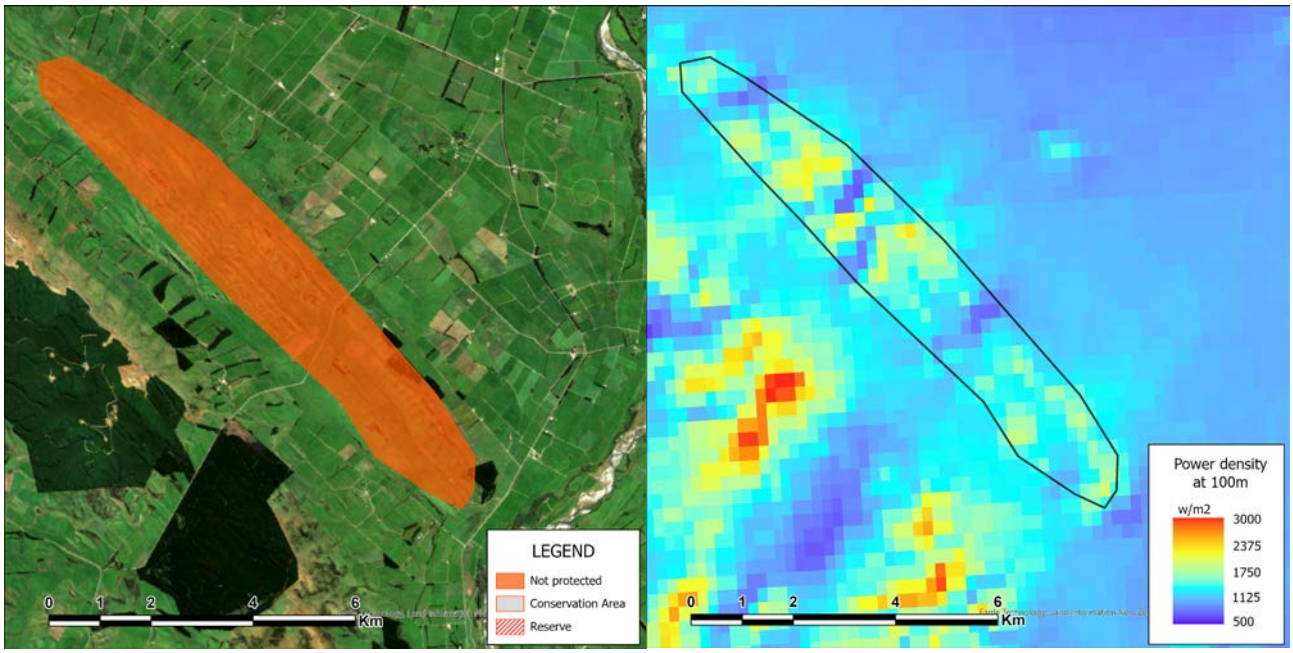


Table 77: North Range attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1236942
Centroid Y-Coordinate (NZTM2000)	4923282
Unprotected area (km^2)	17.64
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1424
Mean wind speed (m/s) *	9.76

Transmission attributes	
Closest substation	White Hill Generation
Distance to the closest substation (km)	5.05
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.6.2 Raggedy Hill

Figure 77: Raggedy Hill - Protected areas (Left); Wind power density (Right).

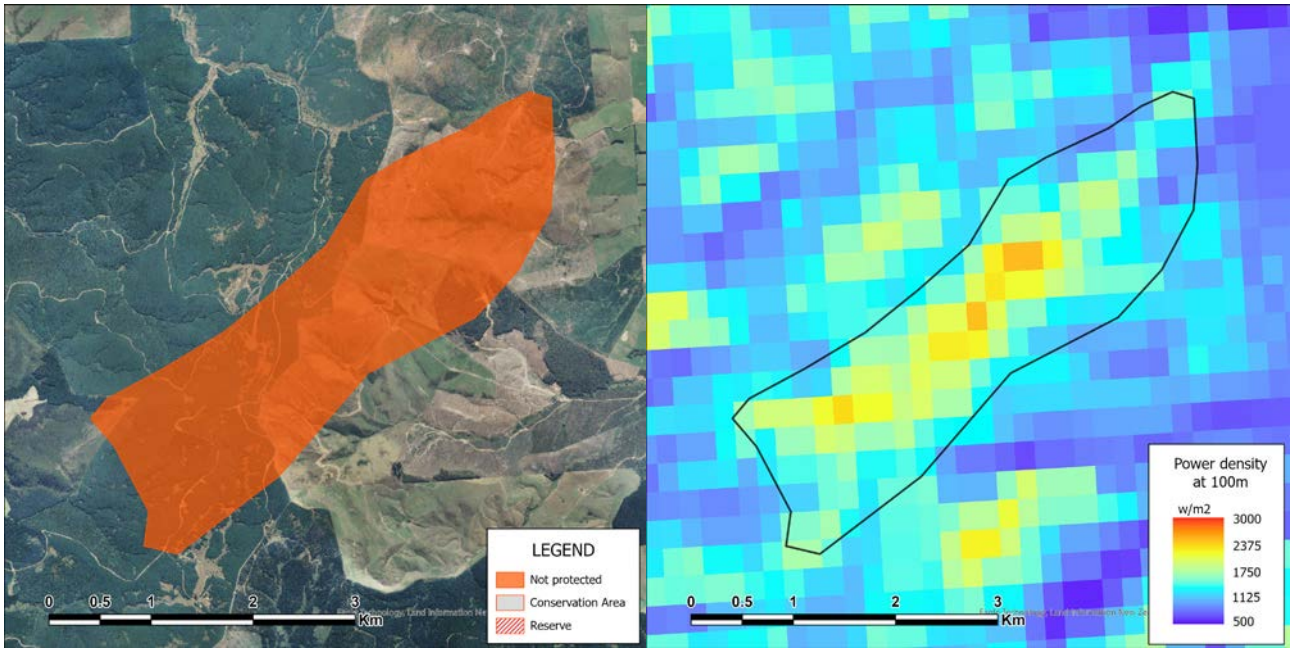


Table 78: Raggedy Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1229694
Centroid Y-Coordinate (NZTM2000)	4905309
Unprotected area (km^2)	7.55
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1541
Mean wind speed (m/s) *	10.06

Transmission attributes	
Closest substation	Dipton
Distance to the closest substation (km)	10.14
Closest connection **	White Hill Generation

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.6.3 Taringatura Forest

Figure 78: Taringatura Forest - Protected areas (Left); Wind power density (Right).

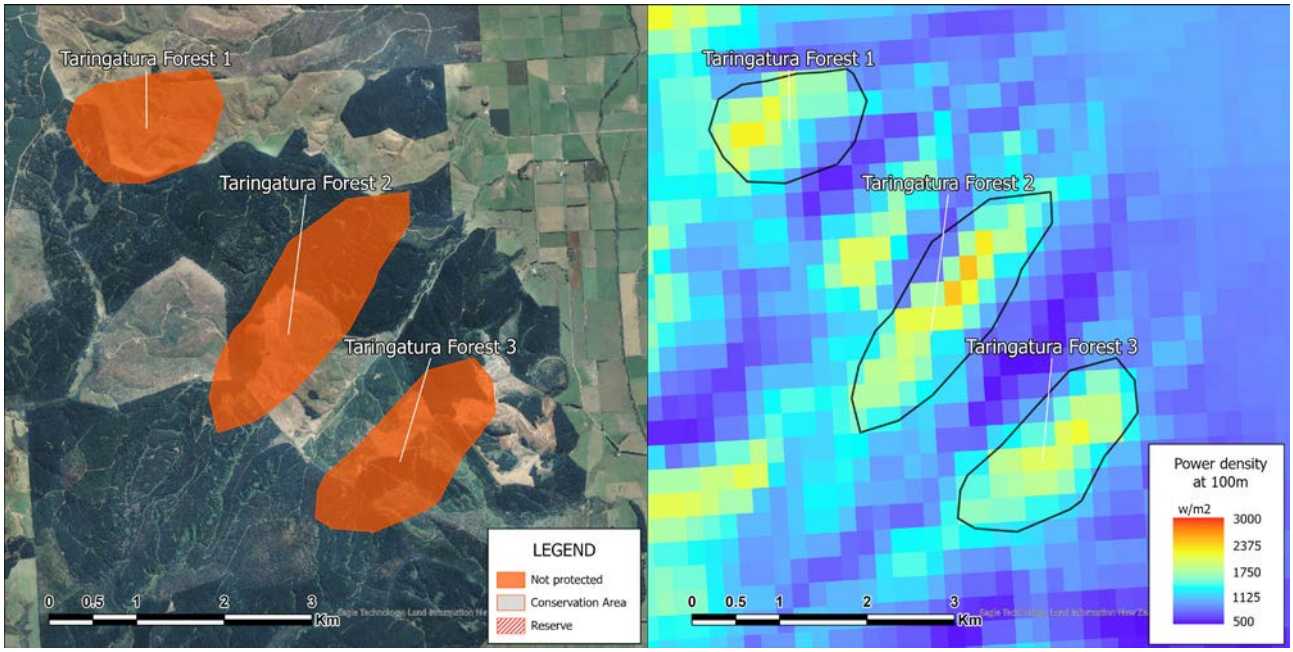


Table 79: Taringatura Forest attributes

Location Attributes	Taringatura Forest 1	Taringatura Forest 2	Taringatura Forest 3
Centroid X-Coordinate (NZTM2000)	1230176	1231997	1233183
Centroid Y-Coordinate (NZTM2000)	4903239	4901167	4899515
Unprotected area (Km^2)	1.74	2.85	2.22
Protected area (Km^2)	0.00	0.00	0.00
Protection type	-	-	-

Wind attributes	Taringatura Forest 1	Taringatura Forest 2	Taringatura Forest 3
Mean power density (W/m^2) *	1438	1446	1526
Mean wind speed (m/s) *	9.77	9.59	9.8

Transmission attributes	Taringatura Forest 1	Taringatura Forest 2	Taringatura Forest 3
Closest substation	Dipton	Dipton	Dipton
Distance to the closest substation (Km)	10.48	10.22	10.68
Closest connection **	White Hill Generation	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.6.4 Taringatura Hill

Figure 79: Taringatura Hill - Protected areas (Left); Wind power density (Right).

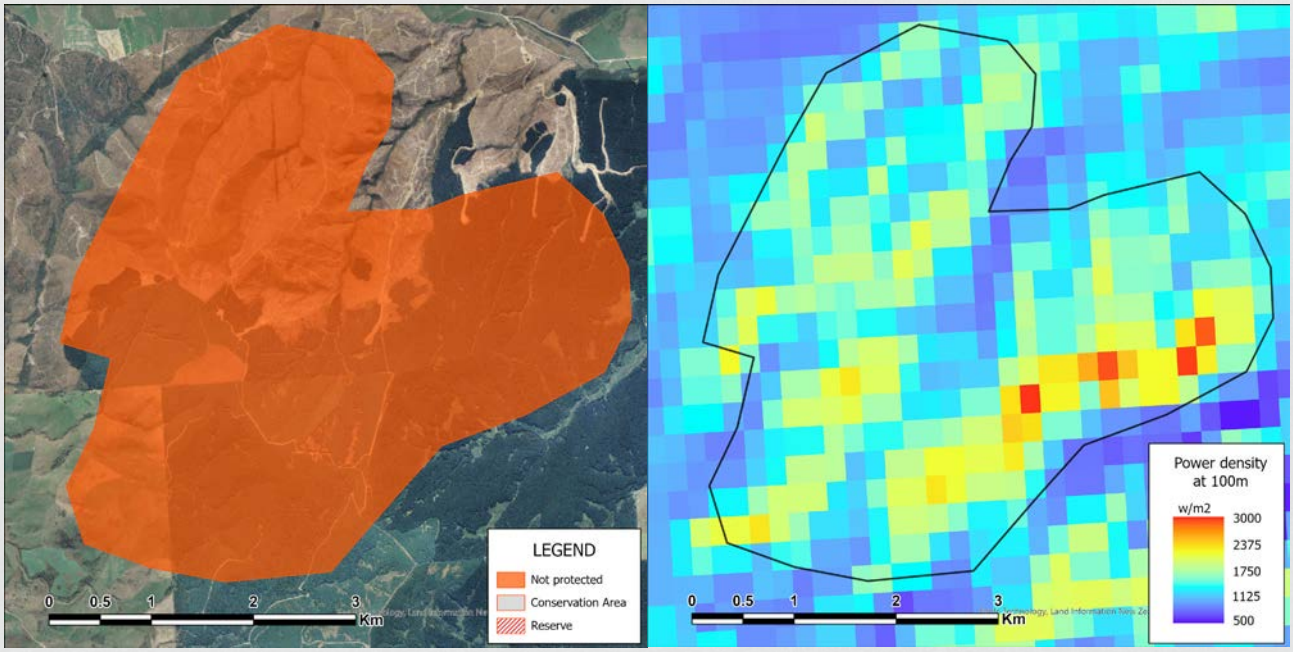


Table 80: Taringatura Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1228953
Centroid Y-Coordinate (NZTM2000)	4912006
Unprotected area (km^2)	19.03
Protected area (km^2)	0.00
Protection type	-

Transmission attributes	
Closest substation	Dipton
Distance to the closest substation (km)	11.14
Closest connection **	White Hill Generation

Wind attributes	
Mean power density (W/m^2) *	1511
Mean wind speed (m/s) *	9.87

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.6.5 West Taringatura

Figure 80: West Taringatura - Protected areas (Left); Wind power density (Right).

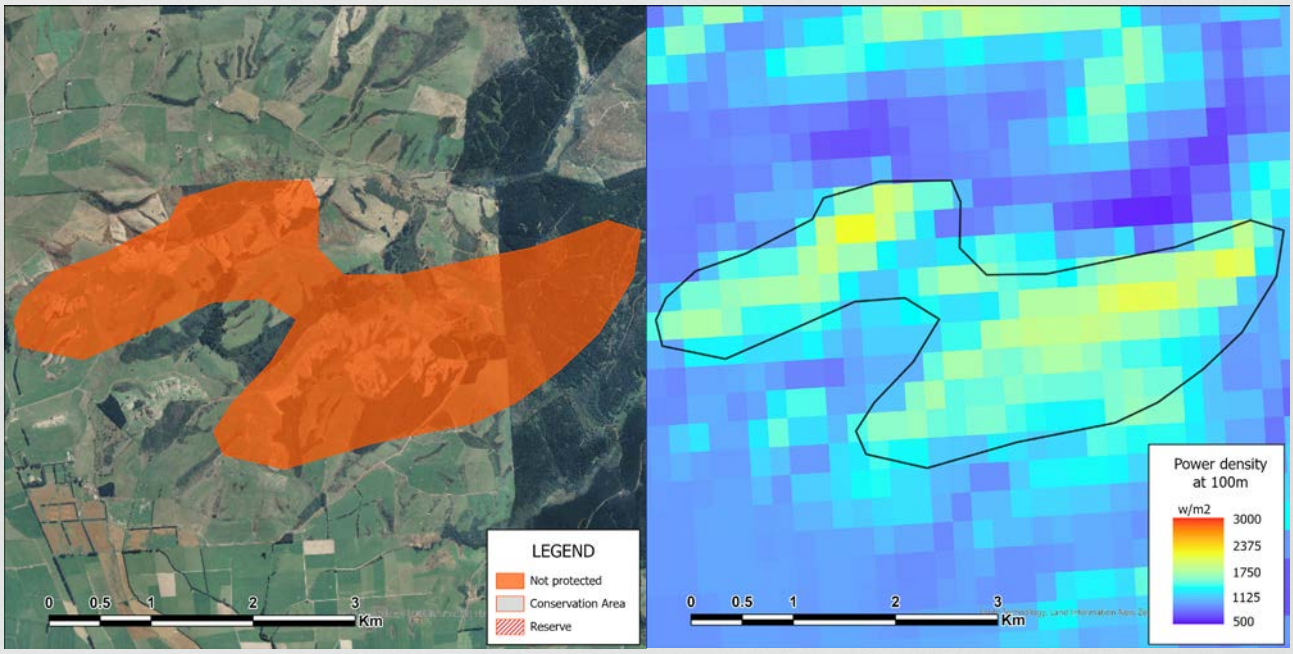


Table 81: West Taringatura attributes

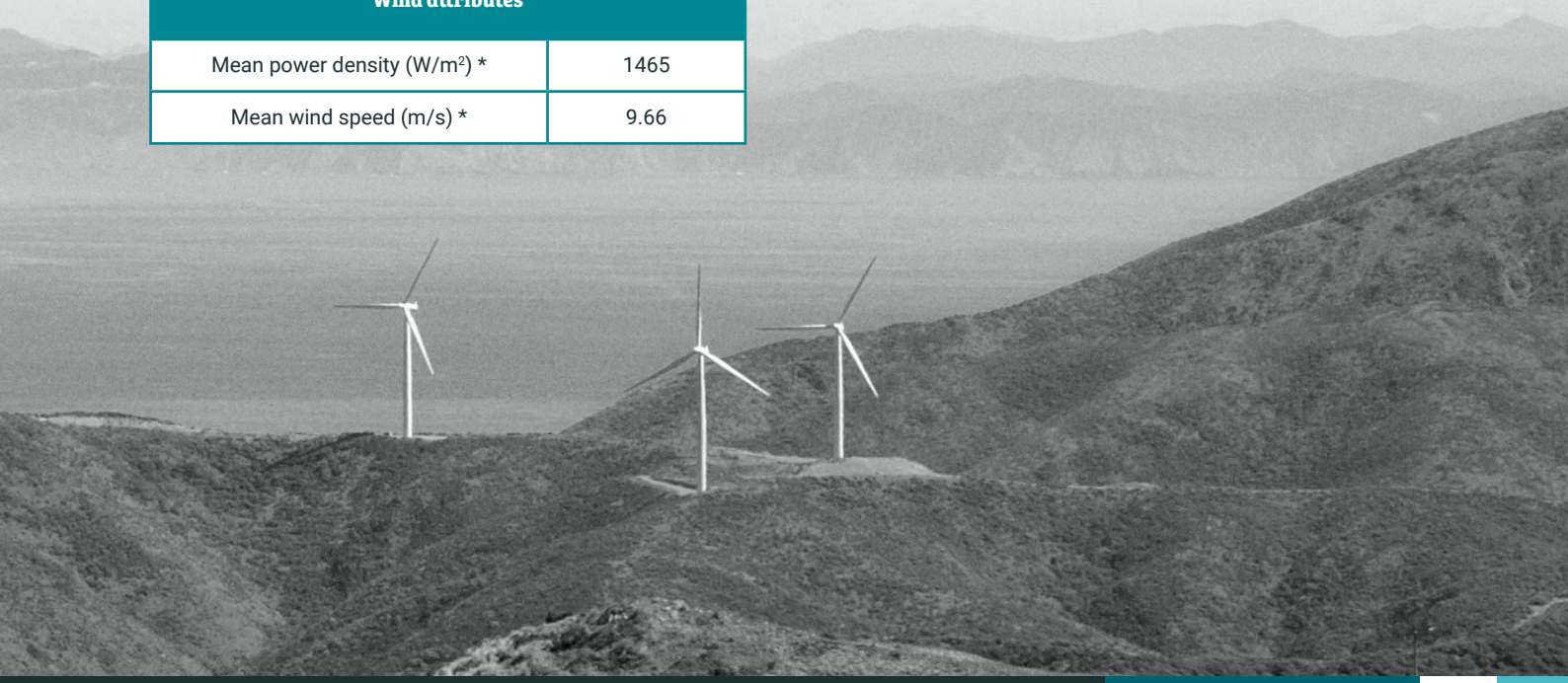
Location Attributes	
Centroid X-Coordinate (NZTM2000)	1227288
Centroid Y-Coordinate (NZTM2000)	4898679
Unprotected area (km^2)	8.47
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1465
Mean wind speed (m/s) *	9.66

Transmission attributes	
Closest substation	Heddon Bush
Distance to the closest substation (km)	11.53
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*



2.6.6 Wether Hill

Figure 81: Wether Hill - Protected areas (Left); Wind power density (Right).

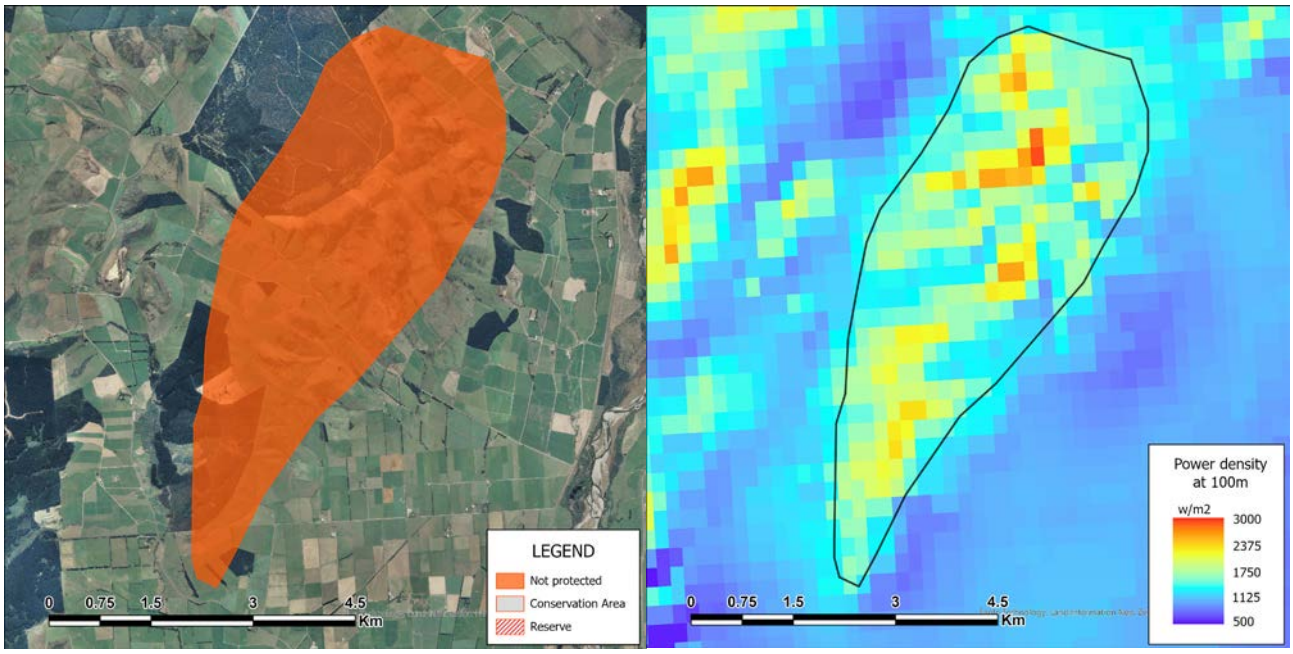


Table 82: Wether Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1236658
Centroid Y-Coordinate (NZTM2000)	4915747
Unprotected area (km^2)	18.76
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1647
Mean wind speed (m/s) *	10.23

Transmission attributes	
Closest substation	Dipton
Distance to the closest substation (km)	8.04
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.6.7 White Hill

Figure 82: White Hill - Protected areas (Left); Wind power density (Right).

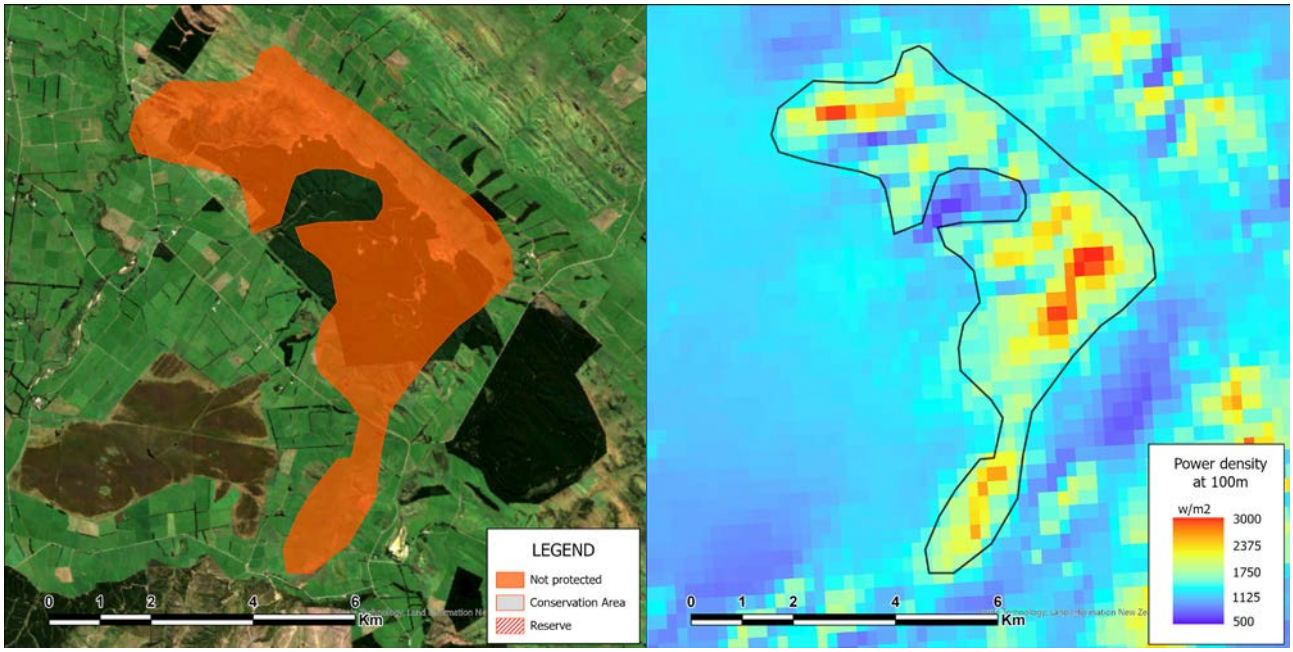


Table 83: White Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1232333
Centroid Y-Coordinate (NZTM2000)	4921312
Unprotected area (km^2)	24.46
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1685
Mean wind speed (m/s) *	10.34

Transmission attributes	
Closest substation	White Hill Generation
Distance to the closest substation (km)	0.00
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.7 TE ANAU–LUMSDEN AND EYRE MOUNTAINS

This sub-region corresponds to the area between Te Anau, Lumsden, and Kingston. It covers geographical areas such as Eyre Mountains, Dunton Range, and the relative flatter area between Te Anau and Lumsden. It limits with Otago to the North.

Figure 83: Potential locations of wind resources – Te Anau–Lumsden and Eyre Mountains.
Panel (A): Southland map.
Panel (B): Zoom in on the yellow square in panel A.

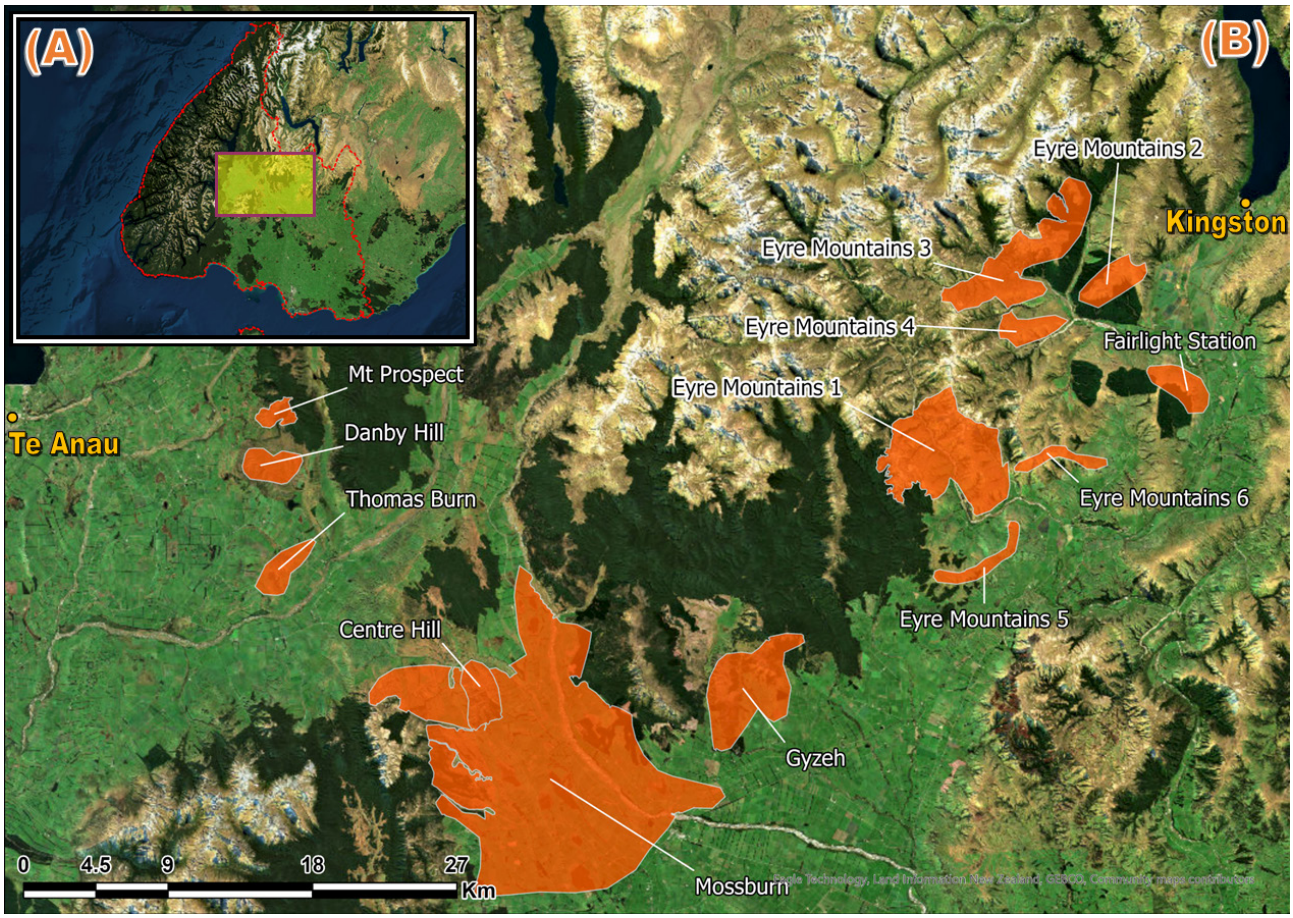


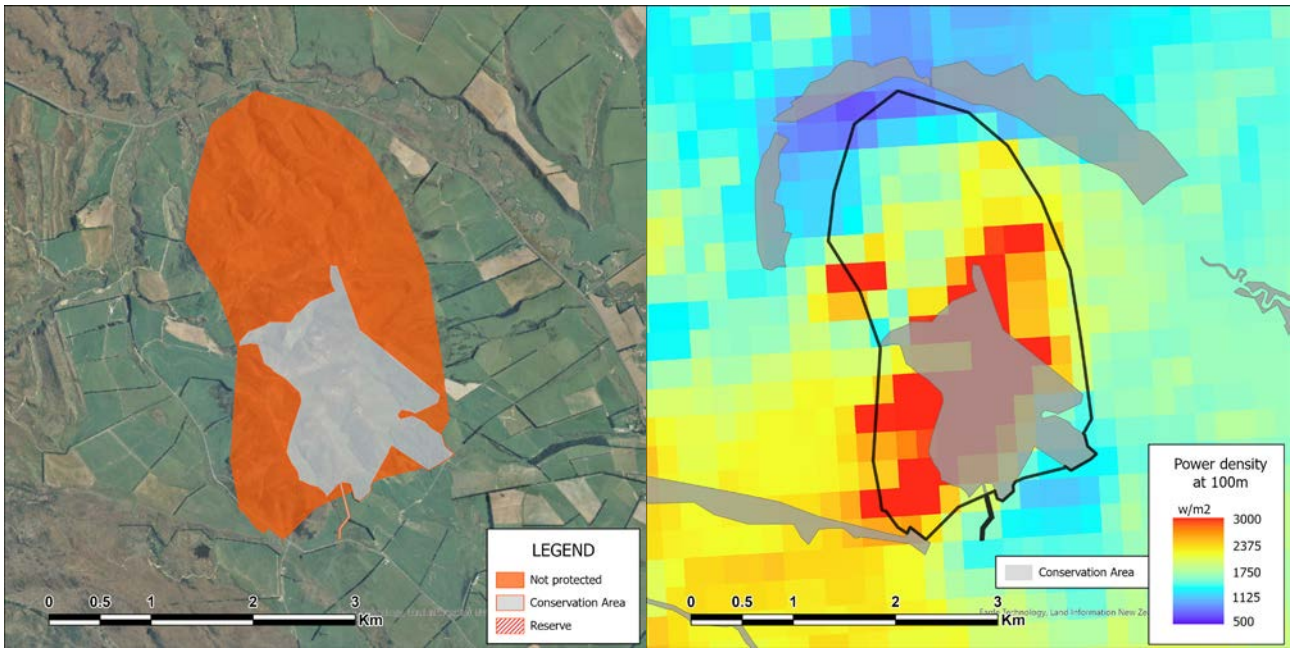
Table 84: Potential locations within the Te Anau–Lumsden and Eyre Mountains sub-region.

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Te Anau – Lumsden and Eyre Mountains		
Centre Hill	11.81	2286
Danby Hill	10.39	1379
E Eyre Mountains 1	9	1820
E Eyre Mountains 2	9.13	2088
E Eyre Mountains 3	9.9	2393
E Eyre Mountains 4	8.14	1786

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
E Eyre Mountains 5	7.77	1240
E Eyre Mountains 6	9.4	1708
Fairlight Station	9.6	1507
Gyzeh	9.66	1863
Mossburn	10.22	1738
Mt Prospect	10.57	1474
Thomas Burn	9.57	1381

2.7.1 Centre Hill

Figure 84: Centre Hill - Protected areas (Left); Wind power density (Right).



Conservation area within Centre Hill:

Centre Hill

Conservation area to the North of Centre Hill:

Chewings Road & Weydon Burn

Table 85: Centre Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1216807
Centroid Y-Coordinate (NZTM2000)	4940416
Unprotected area (Km^2)	5.41
Protected area (Km^2)	2.19
Protection type	Conservation Area

Wind attributes	
Mean power density (W/m^2) *	2286
Mean wind speed (m/s) *	11.81

Transmission attributes	
Closest substation	Mossburn
Distance to the closest substation (Km)	15.20
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.7.2 Danby Hill

Figure 85: Danby Hill - Protected areas (Left); Wind power density (Right).

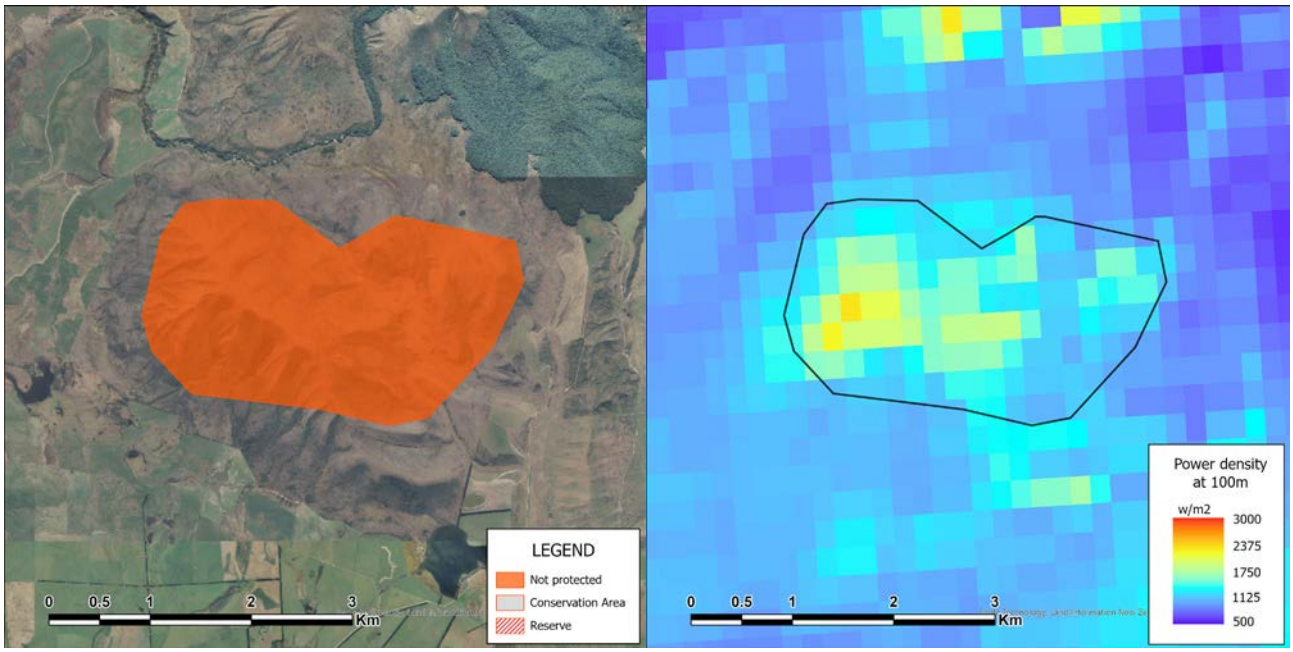


Table 86: Danby Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1203749
Centroid Y-Coordinate (NZTM2000)	4954685
Unprotected area (km^2)	6.24
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1379
Mean wind speed (m/s) *	10.39

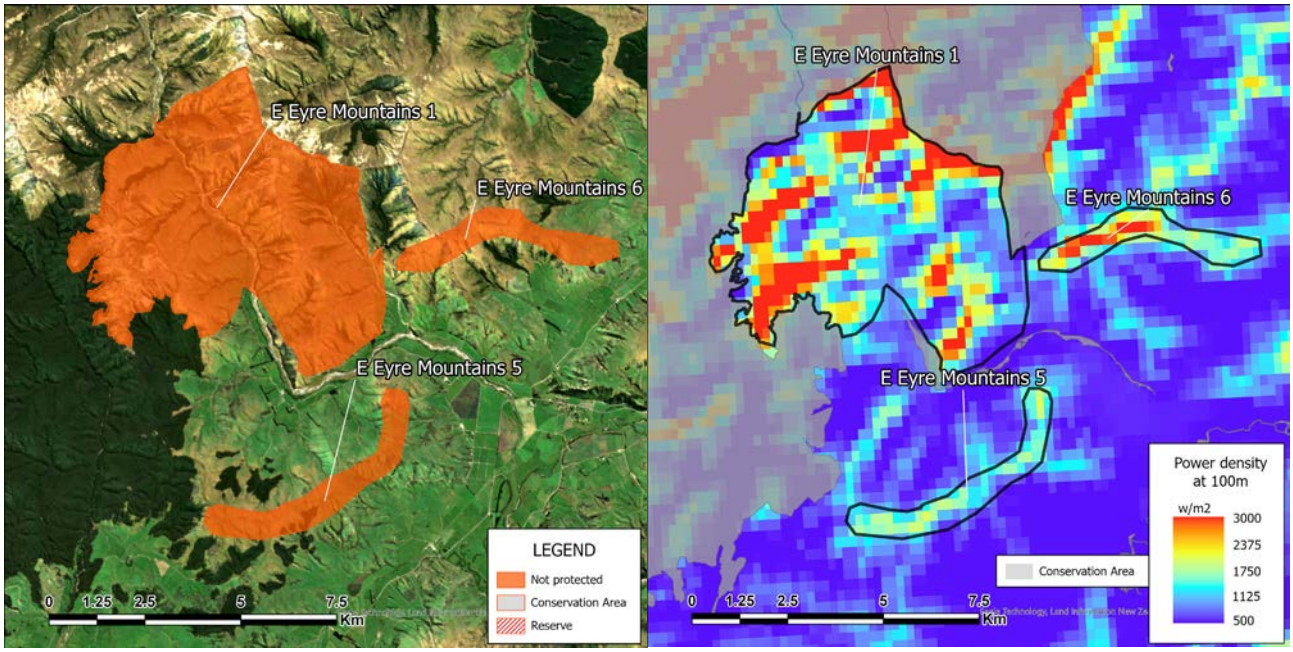
Transmission attributes	
Closest substation	Hillside
Distance to the closest substation (km)	13.50
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.7.3 Eyre Mountains

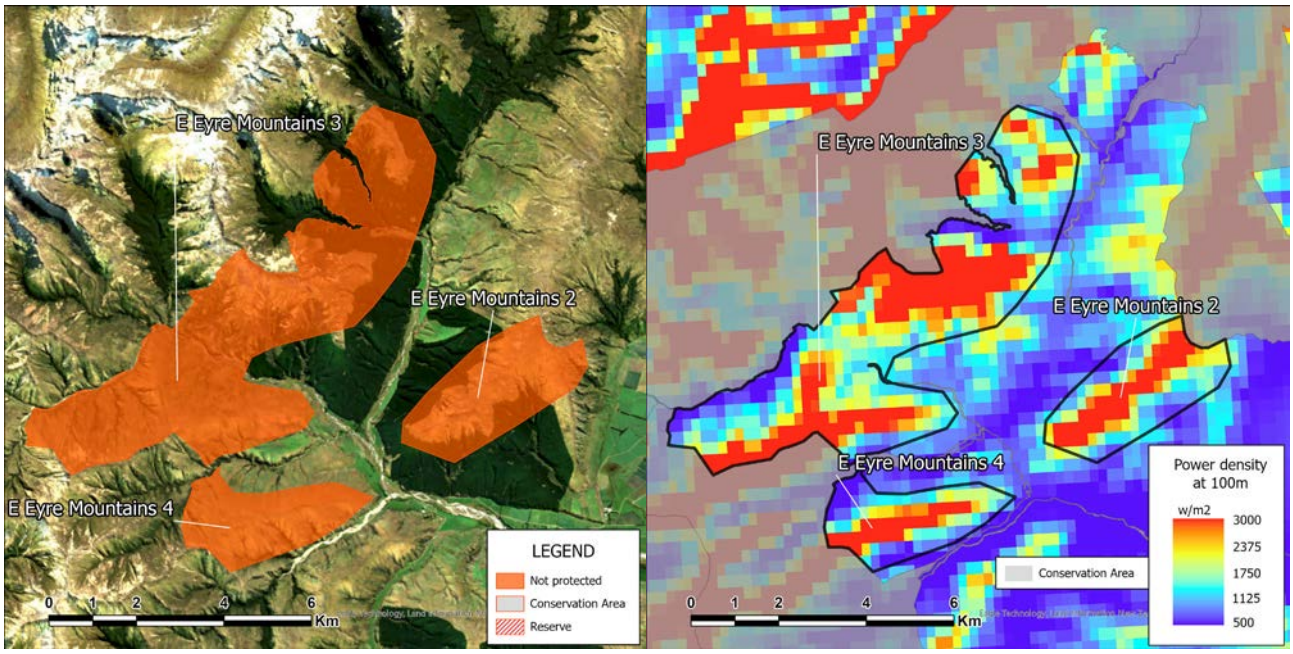
Figure 86: Eyre Mountains 1,5 & 6 - Protected areas (Left); Wind power density (Right).



Conservation area to the North-West of 'Eyre Mountains 1':

Eyre Mountains/Taka Ra Haka Conservation Park

Figure 87: Eyre Mountains 2,3 & 4 - Wind power density



Conservation area to the North-West of 'Eyre Mountains 3' and 'Eyre Mountains 4':

Eyre Mountains/Taka Ra Haka Conservation Park

Conservation area to the North-East of 'Eyre Mountains 2':

Taka Ra Haka Conservation Park

Table 87: Eyre Mountains 1,2 & 3 attributes

Location Attributes	Eyre Mountains 1	Eyre Mountains 2	Eyre Mountains 3
Centroid X-Coordinate (NZTM2000)	1245813	1256173	1250811
Centroid Y-Coordinate (NZTM2000)	4955356	4966148	4967848
Unprotected area (km^2)	38.62	7.31	26.77
Protected area (km^2)	0.00	0.00	0.00
Protection type	-	-	-

Wind attributes	Eyre Mountains 1	Eyre Mountains 2	Eyre Mountains 3
Mean power density (W/m^2) *	1820	2088	2393
Mean wind speed (m/s) *	9	9.13	9.9

Transmission attributes	Eyre Mountains 1	Garvie Mountains 2	Garvie Mountains 3
Closest substation	Athol	Athol	Athol
Distance to the closest substation (km)	9.92	18.53	19.93
Closest connection **	-	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

Table 88: Eyre Mountains 4,5 & 6 attributes

Location Attributes	Eyre Mountains 4	Eyre Mountains 5	Eyre Mountains 6
Centroid X-Coordinate (NZTM2000)	1250912	1248071	1252895
Centroid Y-Coordinate (NZTM2000)	4963237	4948692	4955080
Unprotected area (km^2)	5.65	4.94	4.07
Protected area (km^2)	0.00	0.00	0.00
Protection type	-	-	-

Wind attributes	Eyre Mountains 4	Eyre Mountains 5	Eyre Mountains 6
Mean power density (W/m^2) *	1786	1240	1708
Mean wind speed (m/s) *	8.14	7.77	9.4

Transmission attributes	Eyre Mountains 4	Garvie Mountains 5	Garvie Mountains 6
Closest substation	Athol	Athol	Athol
Distance to the closest substation (km)	15.32	4.45	7.10
Closest connection **	-	-	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.7.4 Fairlight Station

Figure 88: Fairlight Station - Protected areas (Left); Wind power density (Right).

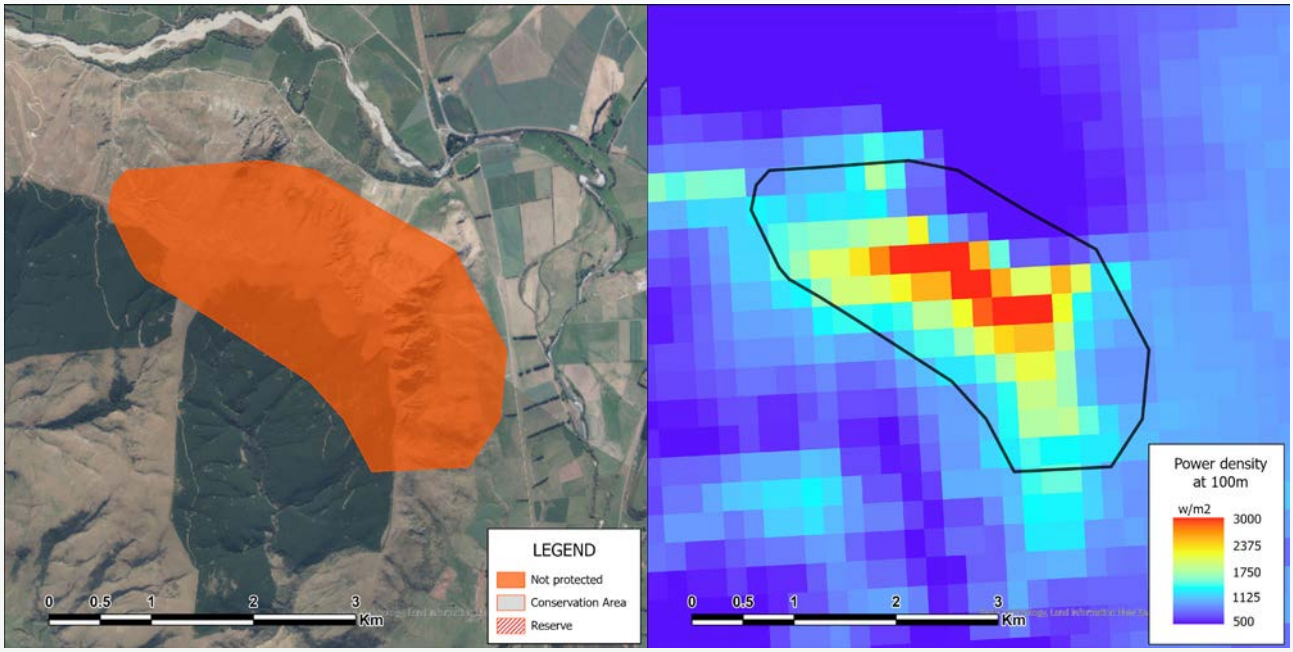


Table 89: Fairlight Station attributes

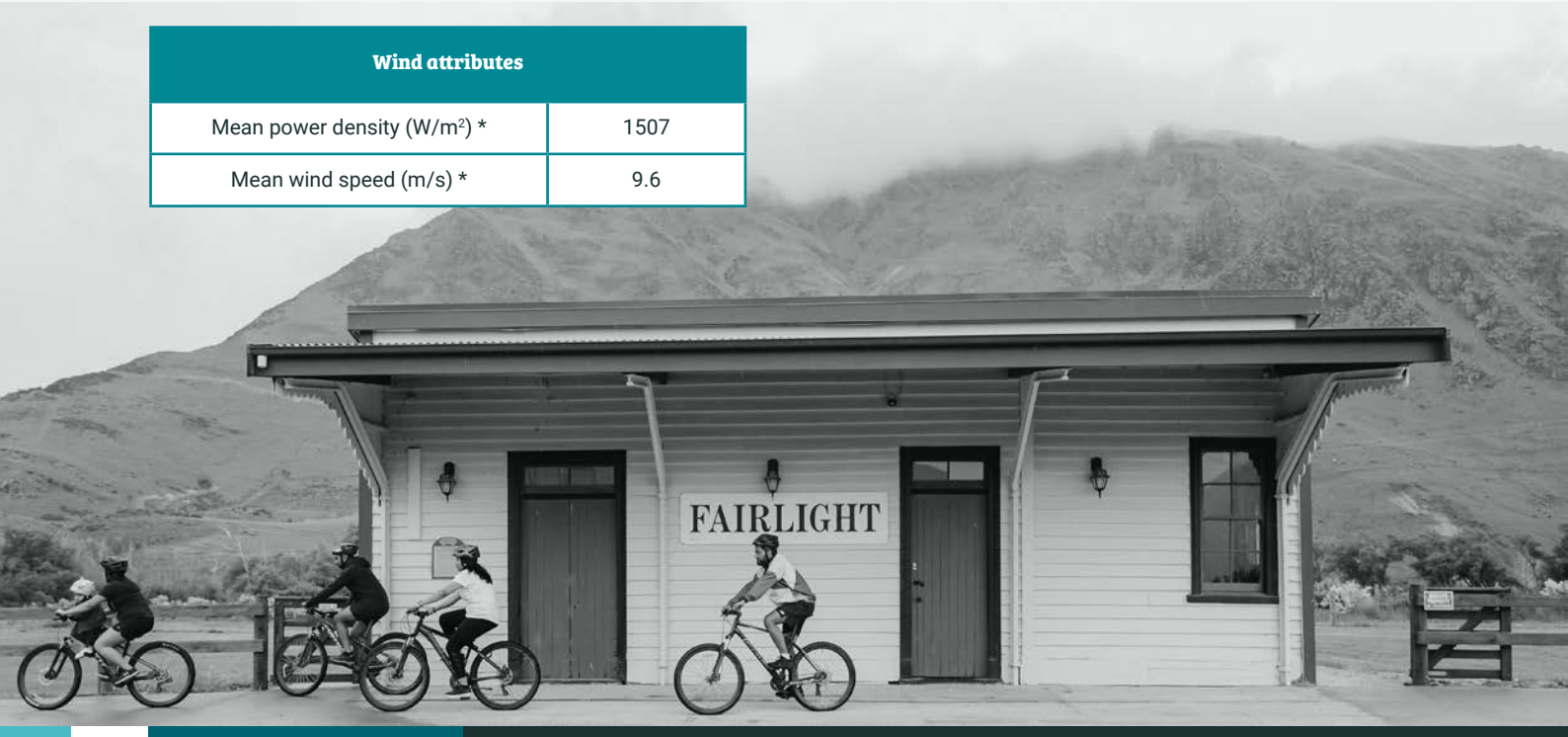
Location Attributes	
Centroid X-Coordinate (NZTM2000)	1260453
Centroid Y-Coordinate (NZTM2000)	4959627
Unprotected area (km^2)	6.86
Protected area (km^2)	0.00
Protection type	-

Transmission attributes	
Closest substation	Athol
Distance to the closest substation (km)	14.12
Closest connection **	-

Wind attributes	
Mean power density (W/m^2) *	1507
Mean wind speed (m/s) *	9.6

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*



2.7.5 Gyzeh

Figure 89: Gyzeh - Protected areas (Left); Wind power density (Right).

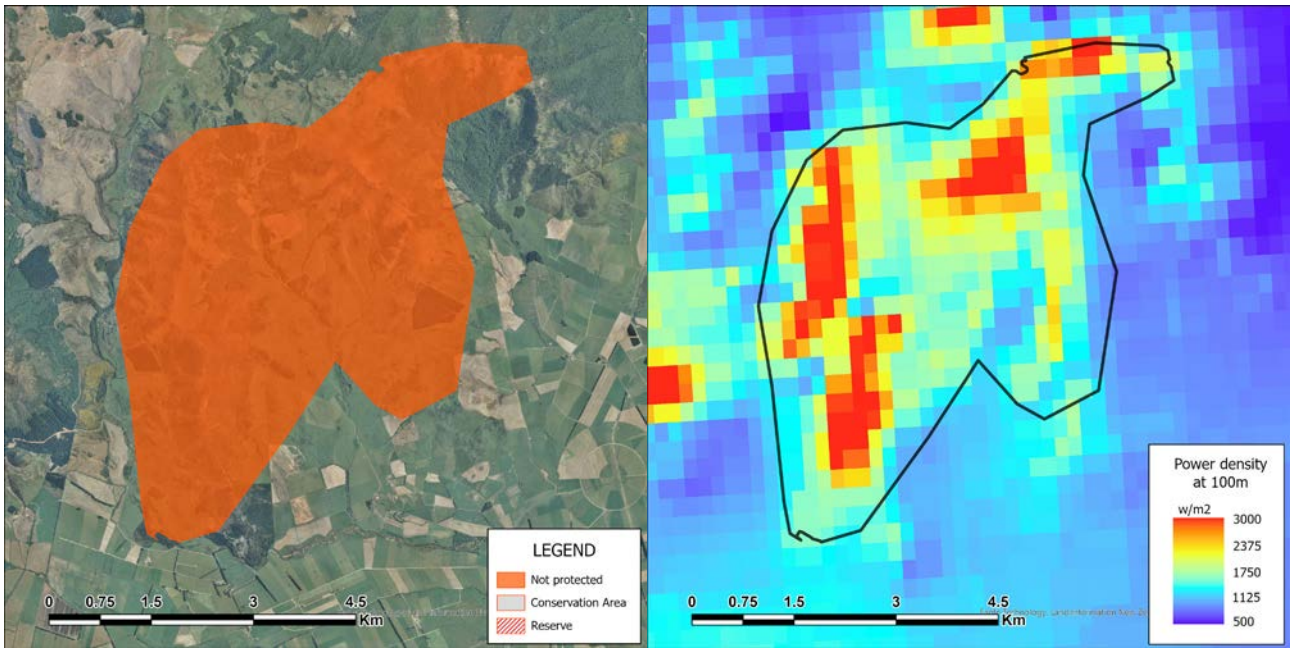


Table 90: Gyzeh attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1233534
Centroid Y-Coordinate (NZTM2000)	4940793
Unprotected area (km^2)	25.11
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1863
Mean wind speed (m/s) *	9.66

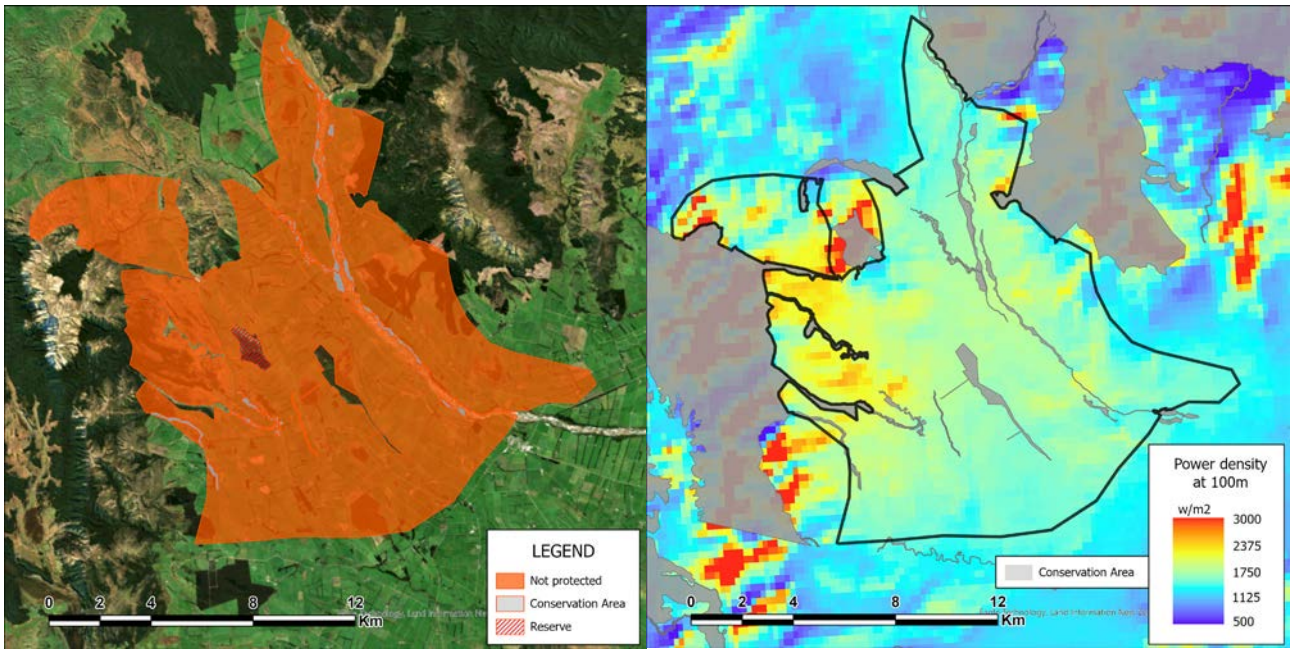
Transmission attributes	
Closest substation	Mossburn
Distance to the closest substation (km)	12.47
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.7.6 Mossburn

Figure 90: Mossburn - Protected areas (Left); Wind power density (Right).



Mossburn is the only exception to the topography selection criteria. This exception was made because of the high wind power density widely distributed along the area. Although this location is not a relative high-altitude area, it is located between two important mountain ranges (Eyre Mountains and Takitimu Mountains) that function as natural barriers generating high speed wind conduction.

Conservation area to the North-East of Mossburn:

Eyre Mountains/Taka Ra Haka Conservation Park

Conservation area to the East of Mossburn:

Takitimu Conservation Area

Table 91: Mossburn attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1220799
Centroid Y-Coordinate (NZTM2000)	4935984
Unprotected area (km^2)	182.10
Protected area (km^2)	4.88
Protection type	Reserve & Marginal Strip

Transmission attributes	
Closest substation	Mossburn
Distance to the closest substation (km)	9.25
Closest connection **	-

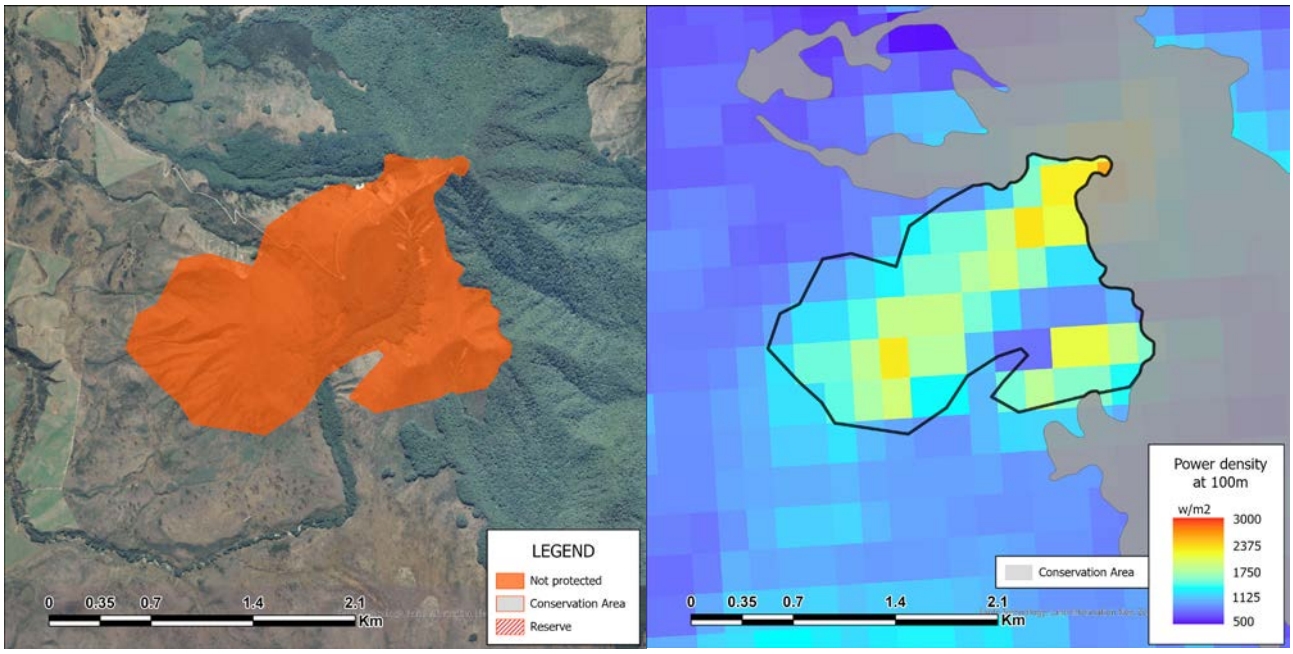
Wind attributes	
Mean power density (W/m^2) *	1738
Mean wind speed (m/s) *	10.22

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.7.7 Mt Prospect

Figure 91: Mt Prospect - Protected areas (Left); Wind power density (Right).



Conservation area to the East of Mt Prospect:

Mount Prospect

Table 92: Mt Prospect attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1204093
Centroid Y-Coordinate (NZTM2000)	4957893
Unprotected area (km^2)	2.96
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1474
Mean wind speed (m/s) *	10.57

Transmission attributes	
Closest substation	Te Anau
Distance to the closest substation (km)	15.50
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.7.8 Thomas Burn

Figure 92: Thomas Burn - Protected areas (Left); Wind power density (Right).

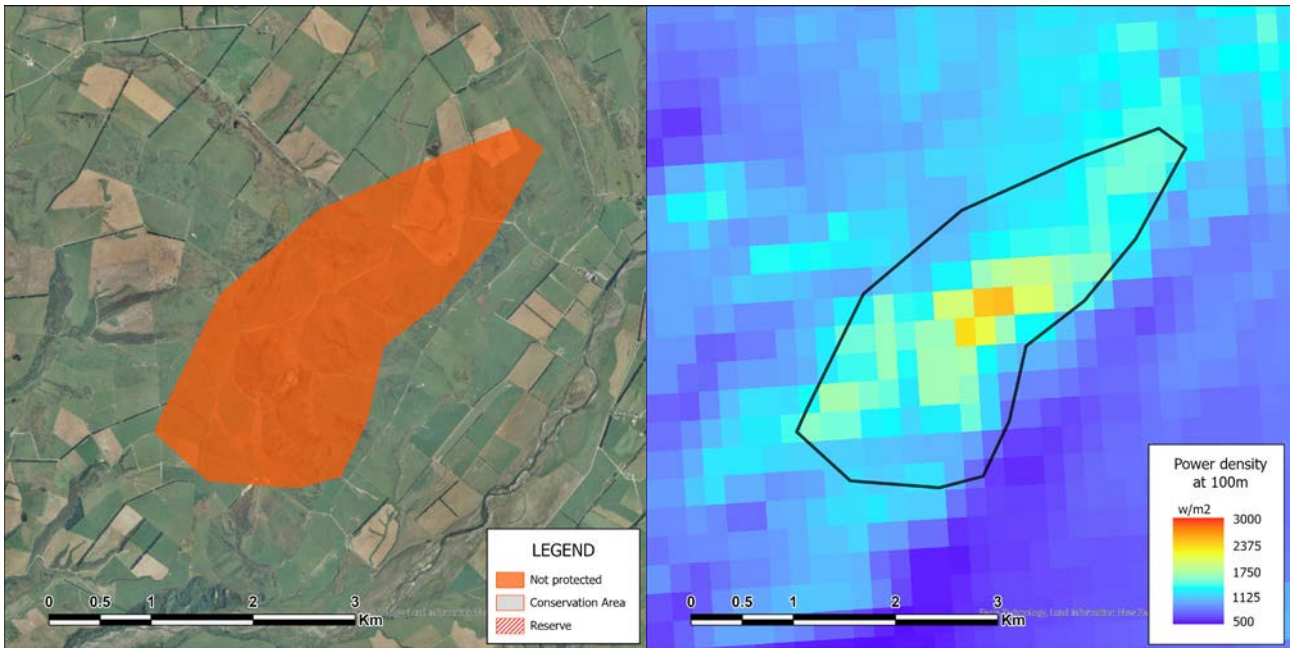


Table 93: Thomas Burn attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1204487
Centroid Y-Coordinate (NZTM2000)	4948266
Unprotected area (km^2)	6.09
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1381
Mean wind speed (m/s) *	9.57

Transmission attributes	
Closest substation	Hillside
Distance to the closest substation (km)	11.18
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.8 UMBRELLA MOUNTAINS AND BLUE MOUNTAINS

This sub-region corresponds to the area between Waikaia, Riversdale, and Tapanui. It covers geographical areas such as Umbrella Mountains, Black Umbrella Range, Dusky Forest, and Blue Mountains. This sub-region extends beyond Southland and covers a small portion of South-West Otago.

Figure 93: Potential locations of wind resources – Umbrella Mountains and Blue Mountains
Panel (A): Southland map.
Panel (B): Zoom in on the yellow square in panel A.

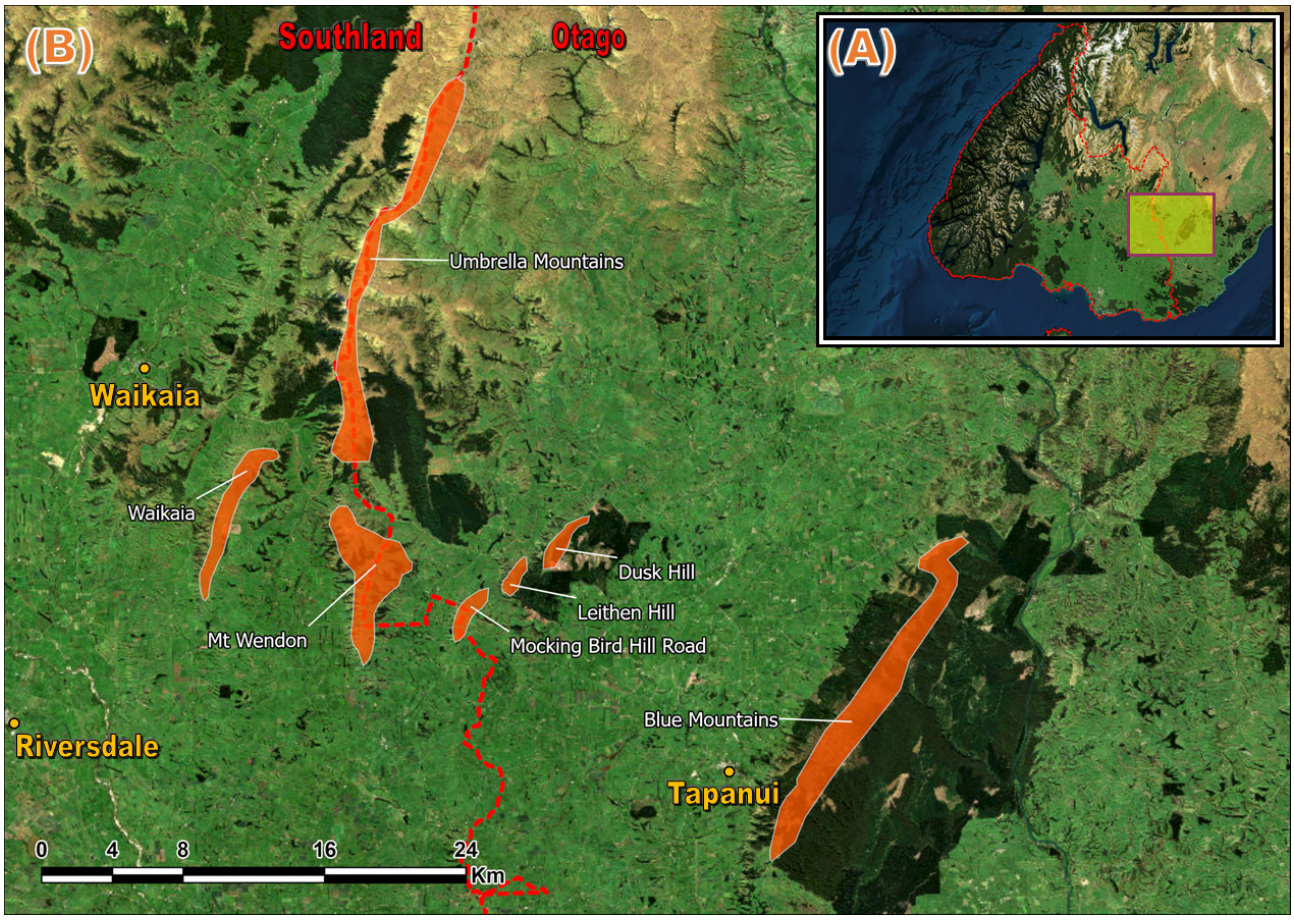


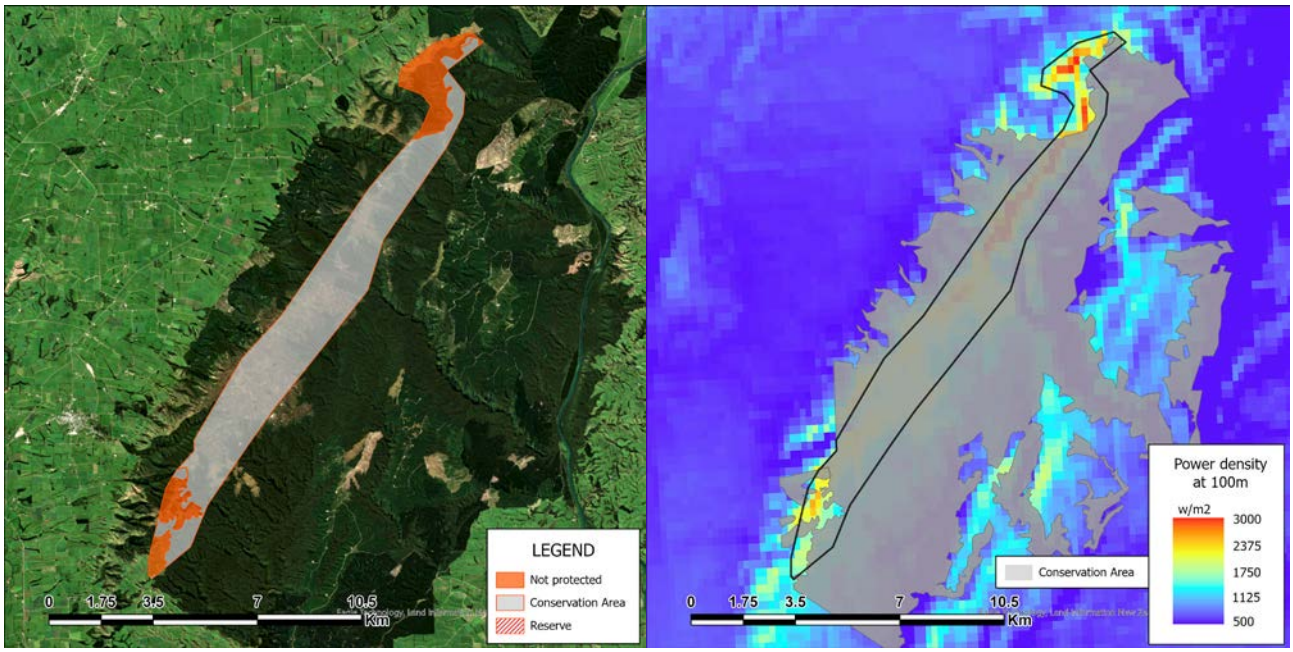
Table 94: Potential locations within the Umbrella Mountains and Blue Mountains sub-region

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Umbrella Mountains and Blue Mountains		
Blue Mountains	10.9	1704
Dusk Hill	9.57	1524
Leithen Hill	9.26	1451
Mocking Bird Hill Road	9.68	1544

Sub-region/Potential location name	Wind Speed (m/s)	Power density (W/m²)
Mt Wendon	9.78	1493
Umbrella Mountains	10.88	1998
Waikaia	9.49	1432

2.8.1 Blue Mountains

Figure 94: Blue Mountains - Protected areas (Left); Wind power density (Right).



Conservation area within Blue Mountains:

Blue Mountains Forest

Table 95: Blue Mountains attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1318309
Centroid Y-Coordinate (NZTM2000)	4909152
Unprotected area (km^2)	5.61
Protected area (km^2)	26.12
Protection type	Conservation Area

Wind attributes	
Mean power density (W/m^2) *	1704
Mean wind speed (m/s) *	10.9

Transmission attributes	
Closest substation	Conical Hill
Distance to the closest substation (km)	17.17
Closest connection **	Kelso

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.8.2 Dusk Hill

Figure 95: Dusk Hill - Protected areas (Left); Wind power density (Right).

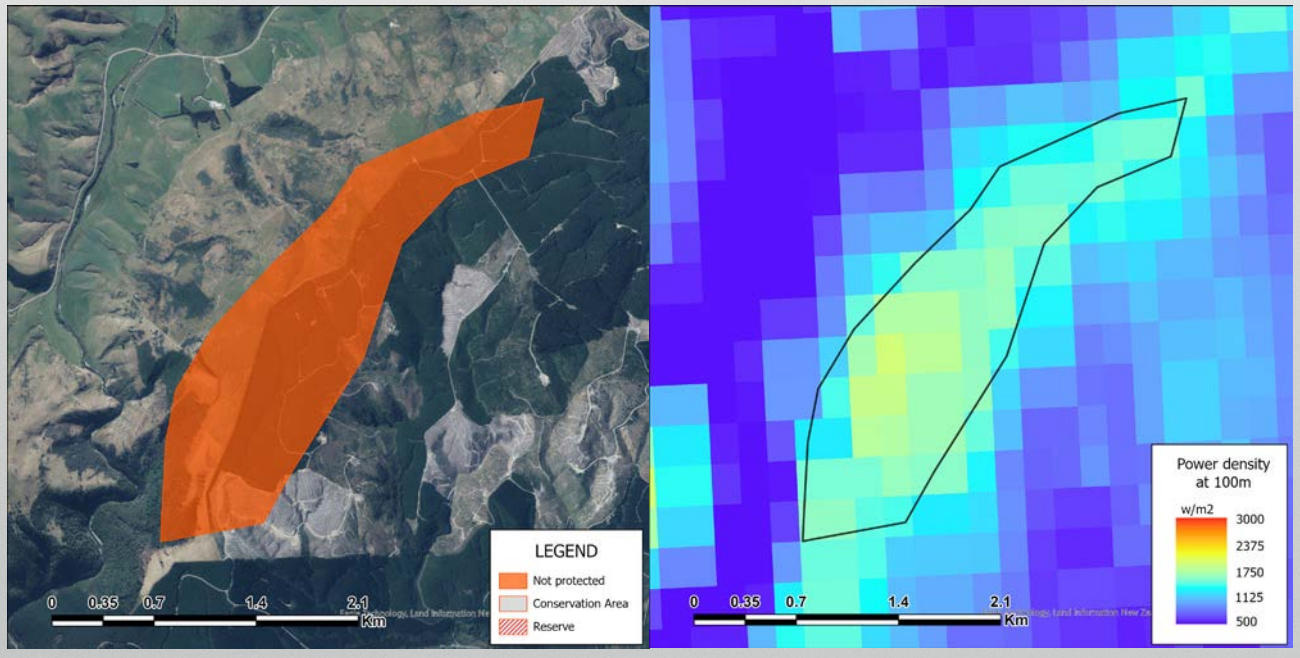


Table 96: Dusk Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1301036
Centroid Y-Coordinate (NZTM2000)	4918022
Unprotected area (km^2)	2.63
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1524
Mean wind speed (m/s) *	9.57

Transmission attributes	
Closest substation	Kelso
Distance to the closest substation (km)	11.63
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.8.3 Leithen Hill

Figure 96: Leithen Hill - Wind power density.

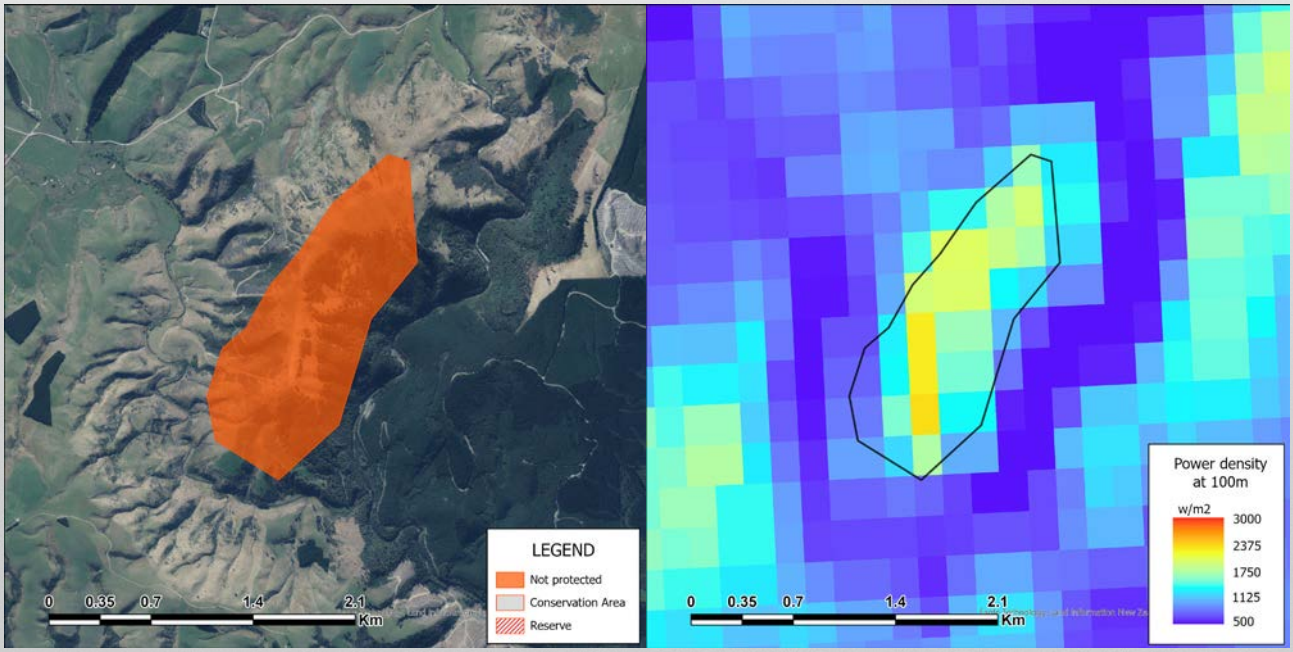


Table 97: Leithen Hill attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1298412
Centroid Y-Coordinate (NZTM2000)	4916099
Unprotected area (km^2)	1.59
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1451
Mean wind speed (m/s) *	9.26

Transmission attributes	
Closest substation	Kelso
Distance to the closest substation (km)	10.98
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.8.4 Mocking Bird Hill Road

Figure 97: Mocking Bird Hill Road - Protected areas (Left); Wind power density (Right).

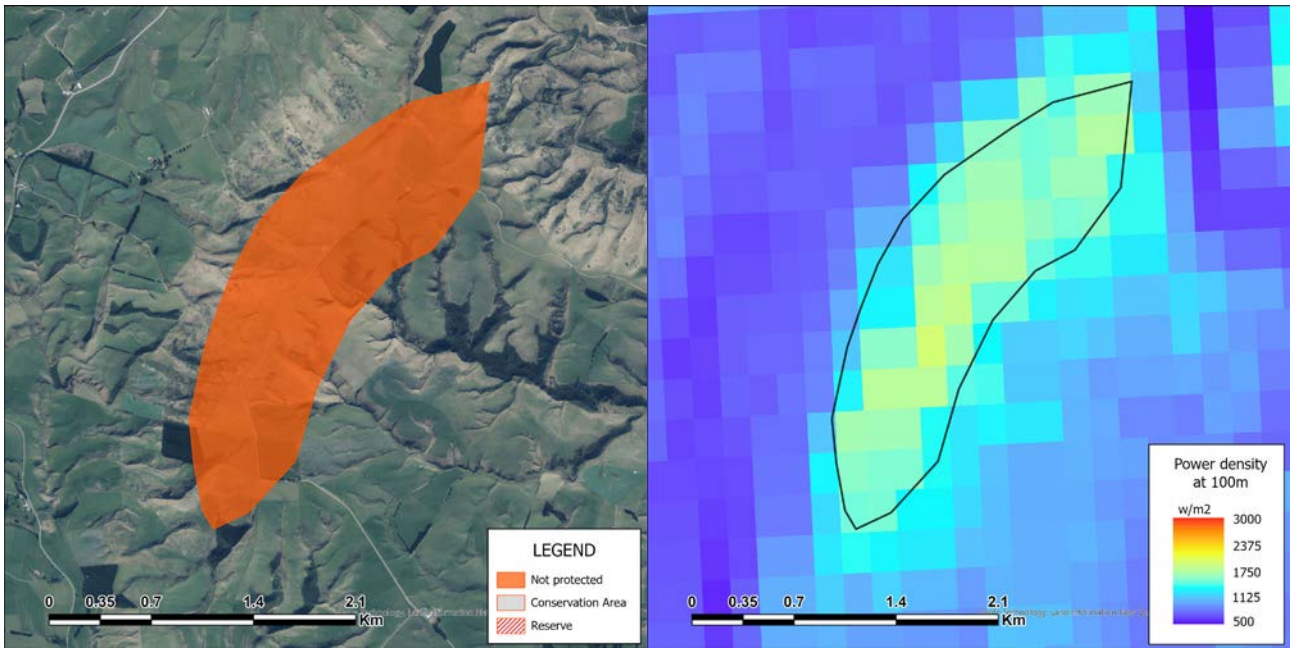


Table 98: Mocking Bird Hill Road attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1295781
Centroid Y-Coordinate (NZTM2000)	4914103
Unprotected area (km^2)	2.67
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1544
Mean wind speed (m/s) *	9.68

Transmission attributes	
Closest substation	Waikaka
Distance to the closest substation (km)	8.30
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.8.5 Mt Wendon

Figure 98: Mt Wendon - Protected areas (Left); Wind power density (Right).

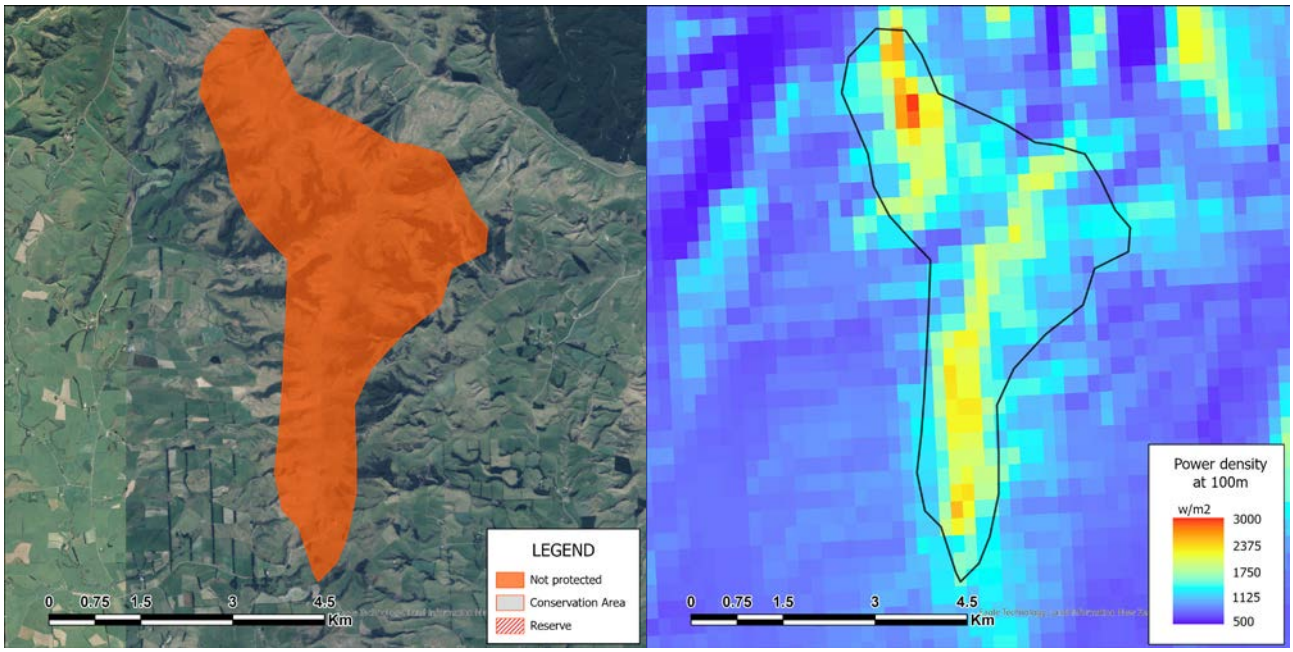


Table 99: Mt Wendon attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1290088
Centroid Y-Coordinate (NZTM2000)	4916346
Unprotected area (km^2)	17.50
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1493
Mean wind speed (m/s) *	9.78

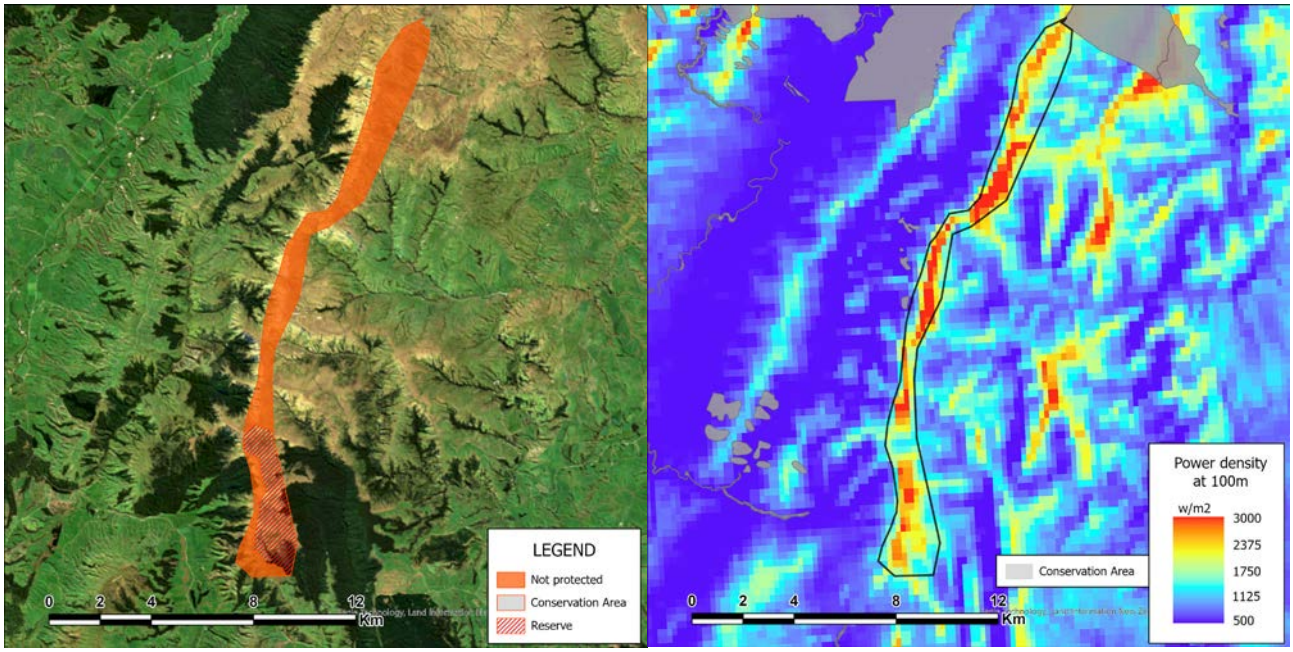
Transmission attributes	
Closest substation	Waikaka
Distance to the closest substation (km)	9.06
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.8.6 Umbrella Mountains

Figure 99: Umbrella Mountains - Protected areas (Left); Wind power density (Right).



Conservation area to the North of Umbrella Mountains:

Pomohaka Conservation Area

Reserve within Umbrella Mountains:

Leithen Bush Scenic Reserve

Table 100: Umbrella Mountains attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1291170
Centroid Y-Coordinate (NZTM2000)	4933320
Unprotected area (km^2)	20.02
Protected area (km^2)	6.41
Protection type	Reserve

Wind attributes	
Mean power density (W/m^2) *	1998
Mean wind speed (m/s) *	10.88

Transmission attributes	
Closest substation	Waikaka
Distance to the closest substation (km)	25.99
Closest connection **	-

** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.8.7 Waikaia

Figure 100: Waikaia - Protected areas (Left); Wind power density (Right).

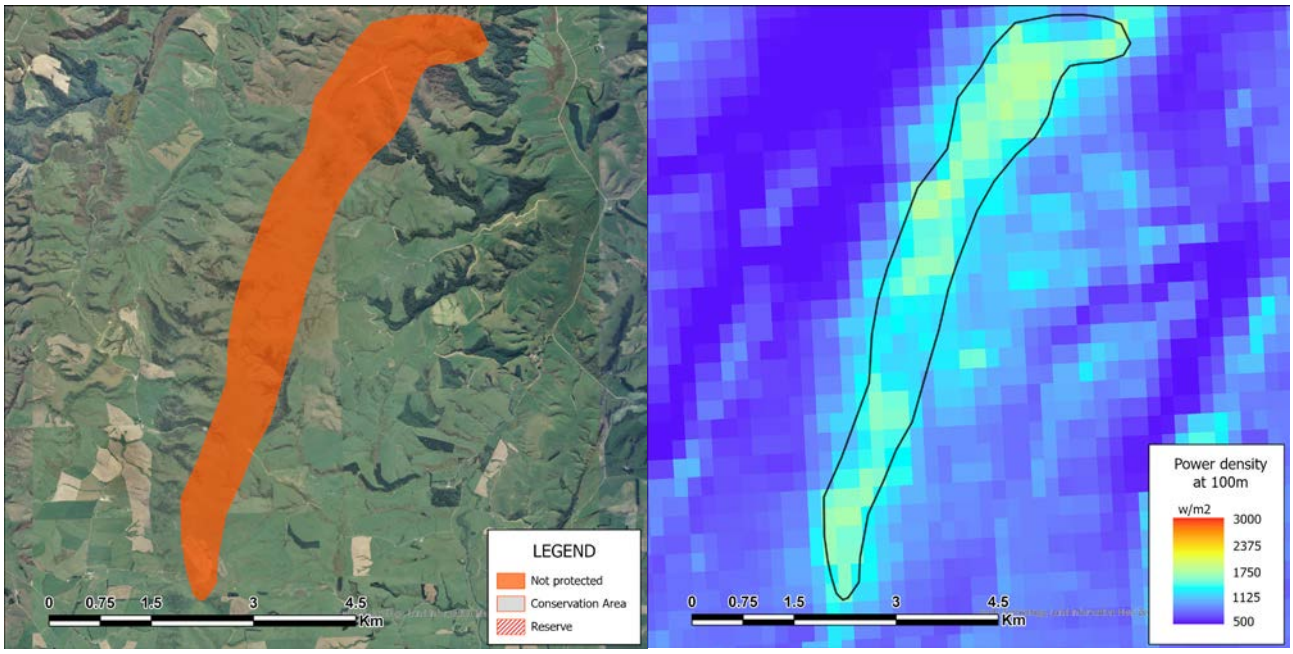


Table 101: Mt Wendon attributes

Location Attributes	
Centroid X-Coordinate (NZTM2000)	1282392
Centroid Y-Coordinate (NZTM2000)	4919903
Unprotected area (km^2)	8.36
Protected area (km^2)	0.00
Protection type	-

Wind attributes	
Mean power density (W/m^2) *	1432
Mean wind speed (m/s) *	9.49

Transmission attributes	
Closest substation	Waikaka
Distance to the closest substation (km)	15.23
Closest connection **	-

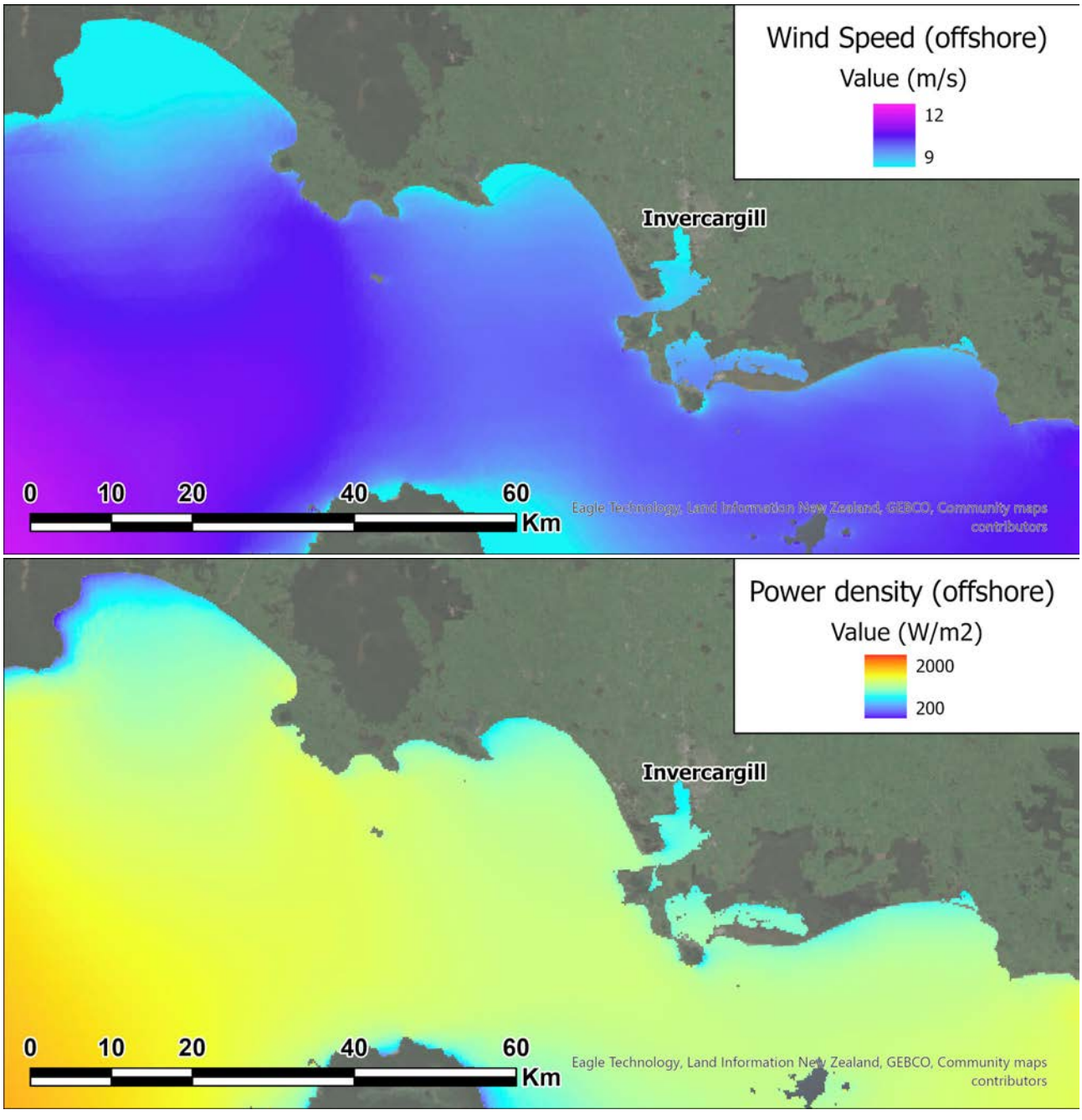
** At 100m altitude from the ground*

*** Only if existing transmission lines allow a shorter connection to a further substation.*

2.9 OFFSHORE WIND RESOURCES

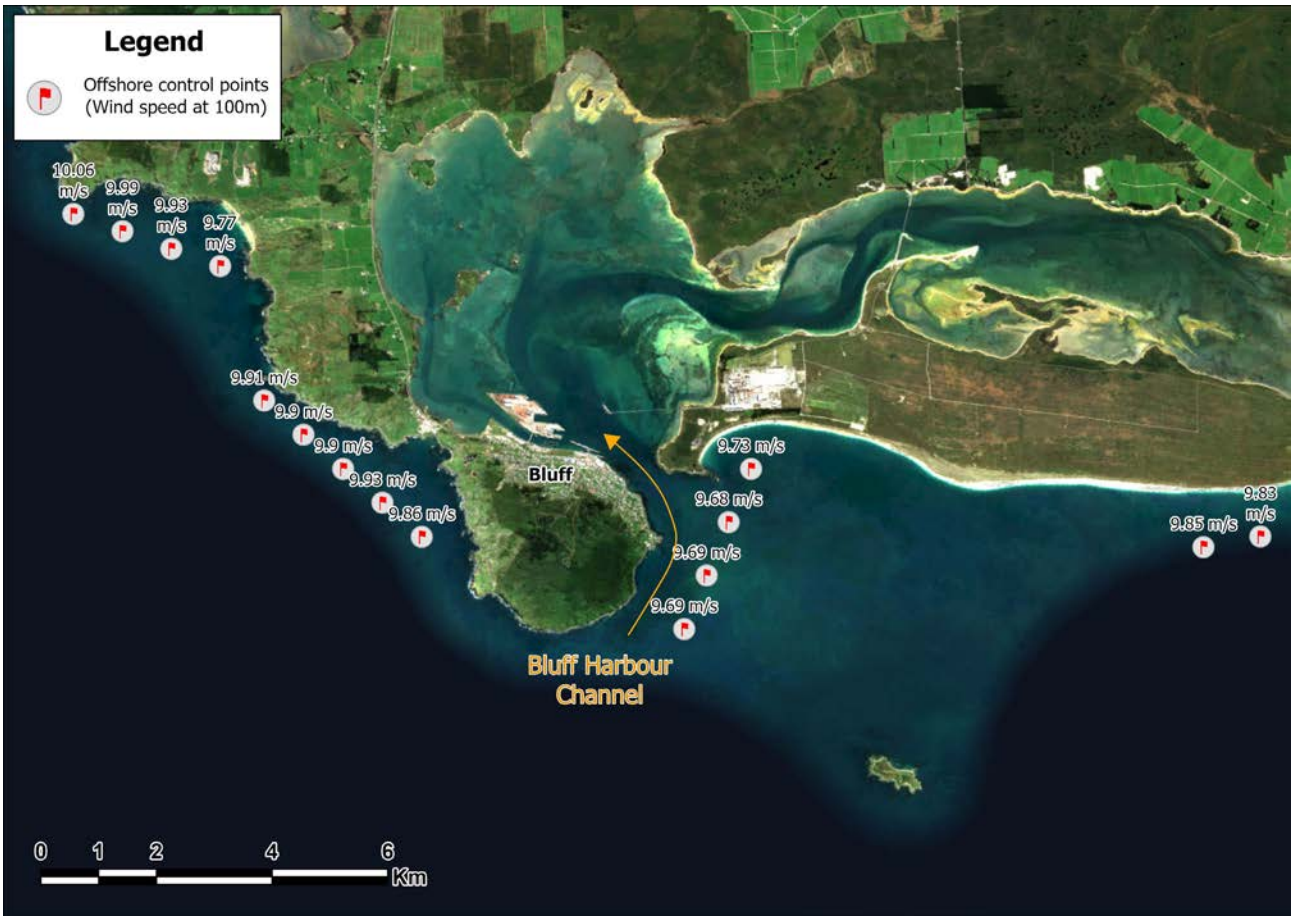
The Foveaux Strait presents high wind resources. To the South of Bluff and Tiwai Peninsula, there is an average wind speed of 10.14 m/s and wind power density of 1153 W/m2. To the West of Sandy Point and Greenhills, there is an average wind speed of 9.97 m/s and wind power density of 1186 W/m2. Offshore wind resources in Foveaux Strait increase with distance from the coast in a westerly direction (Figure 101).

Figure 101. (Top): Offshorewind speed at 100m; (Bottom): Offshore wind power density at 100m.



A number of control points were established to the South of Tiwai Peninsula and to the West of Greenhills, where energy is more probable to be needed for the development of the region. The control points represent potential offshore wind turbines displaying the wind speed at 100m from the average sea level surface (GSA); these points show a high wind potential with speeds over 9m/s, up to 10.06 m/s.

Figure 102. Offshore wind resources – control points



The gaps between the control points to the West of Greenhills and to the South of Tiwai Peninsula are kept on purpose due to the potential Single Point Mooring locations.

Summary

- Open access wind data from The Global Wind Atlas (GWA) was used to identify areas with high-speed winds and high-power density within Southland and South-West Otago.
- Other criteria were considered such as areas of high relative altitude (topography),and excluding national parks and most conservation areas were excluded.
- A total of 112 potential locations with high wind resources were identified. A number of lowland sites also show potentially commercial wind velocities.
- Great wind potential in Foveaux Strait is recognised. Offshore control points to the west of Greenhills and to the south of Tiwai Peninsula show high wind resources at 100m altitude (wind speeds over 9m/s)

Limitations

- The wind climate data provided by GWA consists of datasets and tools for analysing statistics based on a 250m grid. This grid is the result of a generalisation and Winning and Score Predictor (WASP) calculation of a dataset acquired from the atmospheric re-analysis data with a grid spacing of approximately 30km. Therefore, the wind speed and power density values shown in this report are based on a low-resolution model and may be imprecise.
- The Global Wind Data can provide wind roses to indicate wind direction trends. However, the wind direction was not considered during the assessment of this report. The wind direction may influence which side of the mountain/hill has the greatest wind resources, or whether the wind turbines need to rotate frequently.
- Most locations with high wind resources are part of New Zealand's protected areas. This limits the amount of wind resources that can be used in the region. Consequently, many of the potential locations selected include protected areas whose restrictions must be considered before any further analysis.

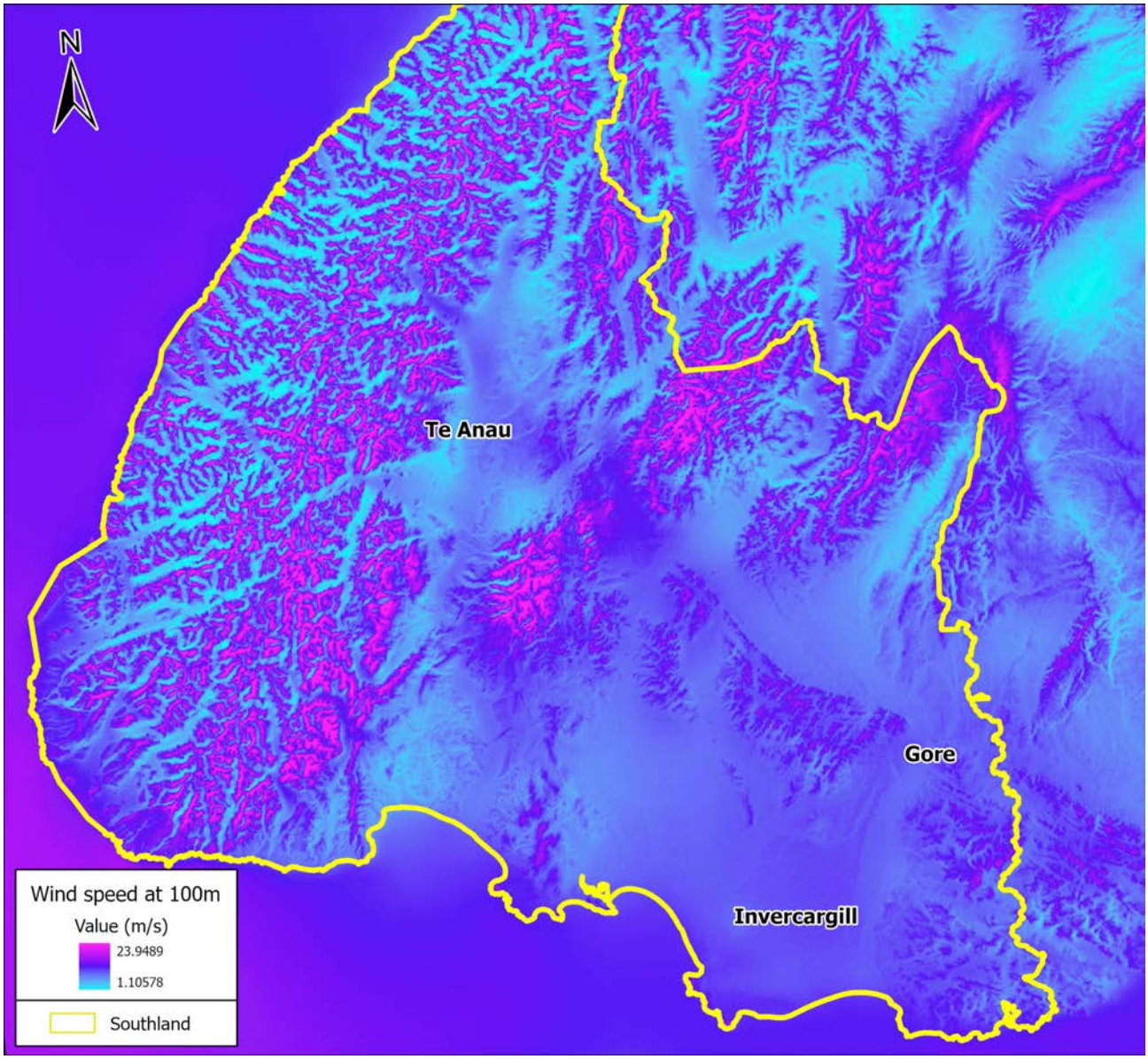
Recommendations

The potential locations shown in this report are a preliminary selection of areas with high wind resources. It is necessary to collect site-specific data to increase the granularity and accuracy of wind resource predictions. Therefore, at any potential location of interest, it is recommended a higher-level study considering wind speed, wind direction, air density and topography is undertaken to better define the site-specific wind resources. This should include a further analysis considering the numbers, size, and separation of wind turbines to define the potential generation of any possible wind farm.

For further information please contact info@greatsouth.nz subject line "Wind Resources Inquiry".

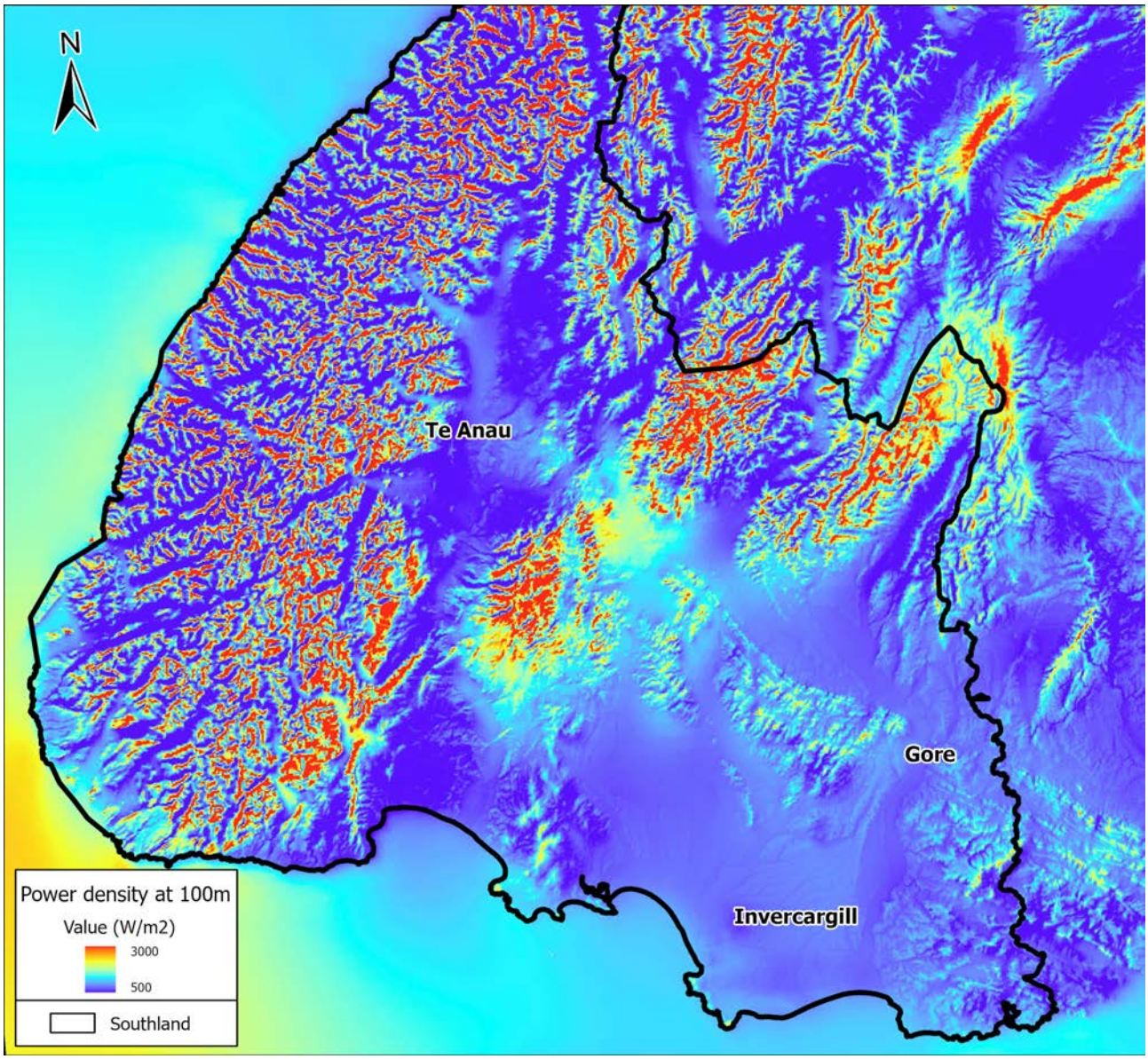
Appendix A

Figure 103. Average wind speed at 100m above ground - Southland



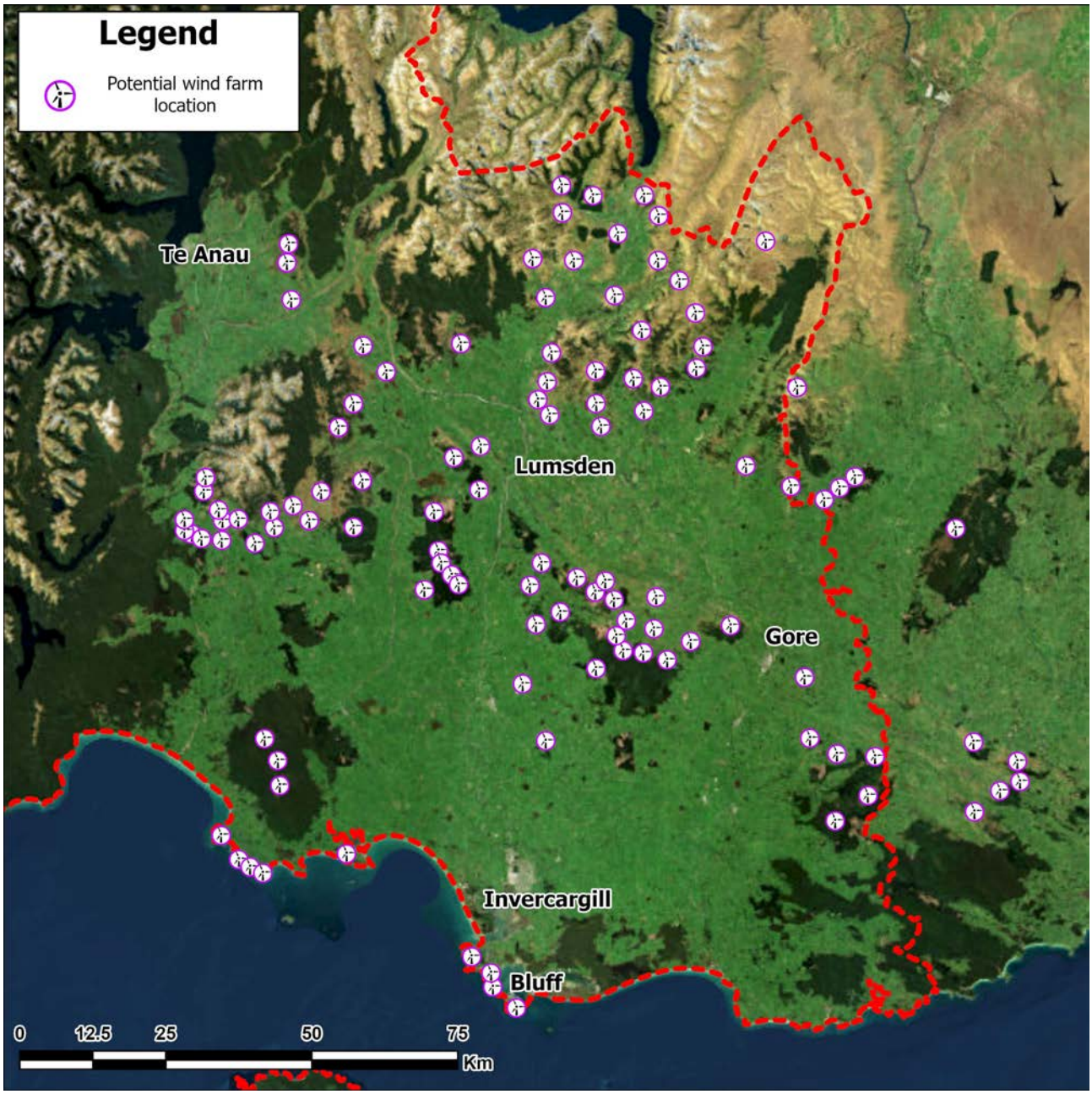
Appendix B

Figure 104. Average wind power density at 100m above ground - Southland



Appendix C

Figure 105. All potential wind farm location (Excluding offshore control points) - General view



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