A **JOBS FOR NATURE** PROJECT

BIODIVERSITY ACTION ON THE GROUND

Ecological Survey
Pukerau Red Tussock Scientific Reserve

JOBS FOR NATURE | MAHI MŌ TE TAIAO

environment SOUTHLAND REGIONAL COUNCIL
Te Taiao Tonga

Ecological Survey
Pukerau Red Tussock Scientific Reserve

GORE22 PCL

February 2024

Prepared by Wildlands Consultants Ltd for:

Environment Southland

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Contract Report No. 6003iu

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CONTENTS

1. Introduction 1

2. Site Overview 1
   2.1 General site description 1

3. Landscape Context and Ecological Setting 1
   3.1 Catchments 1
   3.2 Ecological district 3

4. Existing Ecological Information 3

5. Methods 3
   5.1 Site visit and field assessment 3
   5.2 Assessment of abundance of notable flora 3
   5.3 Condition and character assessment 4

6. Vegetation and Habitats 5
   6.1 Overview 5
   6.2 Vegetation and habitat type descriptions 5
      6.2.1 Terrestrial 5
      6.2.2 Wetland 5

7. Flora 8
   7.1 Overview 8
   7.2 Threatened, At Risk, and notable species 8
   7.3 Ecological weeds 8

8. Fauna 8
   8.1 Avifauna 8
   8.2 Other indigenous fauna (lizards, bats, invertebrates, aquatic) 9
   8.3 Pest animal presence 9

9. Condition Assessment 9

10. Threatened Habitat Types 9

11. Key Ecological Values 9

12. Key Management Issues and Threats 10

13. Conclusion/Summary 10

14. Further Information 10

15. References 10

Appendix 1: List of vascular plant species found on the property 12
Appendix 2: Site photographs 13

Reviewed and approved for release by:

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Principal Ecologist
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1. Introduction

Environment Southland is undertaking ecological surveys of representative biodiversity areas as part of their 'Work Programme for South Biodiversity Action on the Ground'. This programme has been funded as a 'Jobs for Nature' project by the Public Waterways and Ecosystem Restoration Fund administered by the Ministry for the Environment. The project includes identifying biodiversity values of up to 300,000 hectares of private and public land. The aim of the surveys is to provide landholders with factual information about the presence, condition, and relative ecological value of indigenous vegetation and habitats on their land, to help inform management decisions.

Land managed by the Department of Conservation (DOC) comprises a significant proportion of the land area in Southland, and surveys on DOC-managed land are therefore an important part of Environment Southland's work programme. Areas identified for survey on DOC-managed land have been selected to encompass ecosystems that are of a higher priority for biodiversity information for both DOC and Environment Southland.

This report describes an assessment of indigenous vegetation, located at Pukerau Red Tussock Scientific Reserve, and has been identified by the Department of Conservation as a priority for survey.

2. Site Overview

2.1 General site description

Pukerau Red Tussock Scientific Reserve comprises of two sites (about 600 metres apart) of conservation land off State Highway 1. These sites are one kilometre west of the settlement of Pukerau and 10 kilometres east of Gore and are at an elevation of ~100 metres above sea level. The surrounding land use is predominantly farmland.

The site is a raised peatland bog (domed) dominated by copper tussock/red tussock (*Chionochloa rubra* subsp. *cuprea)* and wire rush (*Empodisma minus*), and has been protected as a reserve (Agnew *et al.* 1993) . It is considered an area with outstanding ecological values (Wildland Consultants Ltd 2011).

3. Landscape Context and Ecological Setting

3.1 Catchments

Pukerau Red Tussock Scientific Reserve is in the Mataura River catchment.

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Figure 1. Location of the sites surveyed at Pukerau Red Tussock Scientific Reserve

0 250 500 Meters

Legend

Site area Property Protected Area

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Location

3.2 Ecological district

The Gore Ecological District (*c.*297,183 hectares) covers plains and low rolling country of inland Southland, extending from Mataura in the southwest almost to Raes Junction in the northeast, and from Mossburn in the northwest almost to Balclutha in the southeast. The climate is humid-subhumid with dry summers and cold winters. Rainfall ranges from 650-950 millimetres per year (McEwen 1987). On higher terraces and rolling land, soils have compact, pale coloured mottled subsoils and generally poor winter drainage. On river flats, there are fertile alluvial soils, some with poor drainage. The Gore Ecological District has undergone significant modification and is currently largely covered with pasture.

4. Existing Ecological Information

Agnew, A. D. Q., Rapson, G. L., Sykes, M. T., & Bastow Wilson, J. (1993). The functional ecology of *Empodisma minus* (Hook, f.) Johnson & Cutler in New Zealand ombrotrophic mires. *New Phytologist 124*(4): 703-710.

Wildland Consultants 2011: Assessment of potentially significant indigenous vegetation and habitats in Gore District. Wildland Consultants Ltd Contract Report No. 2716. Prepared for Gore District Council. 49 pp.

5. Methods

5.1 Site visit and field assessment

A walk-through site visit was conducted on 16 January 2024. All vascular plants observed during the site visit were recorded (Appendix 2), as were any incidental observations of indigenous fauna. Vegetation types were classified using the Atkinson system (Atkinson 1985), ecosystem types were determined using the classification proposed by Singers and Rogers (2014), and wetlands were classified using the system of Johnson and Gerbeaux (2004). The abundance of any notable species observed, including species that are classed as Threatened or At Risk by de Lange *et al.* (2018), and plant species that are recognised as ecological weeds or pest plants in Southland, was assessed using the classes in Table 1.

5.2 Assessment of abundance of notable flora

The abundance of any notable species observed, including species that are classed as Threatened or At Risk by de Lange *et al.* (2018), and plant species that are recognised as ecological weeds or pest plants in Southland, was assessed using the classes in Table 1.

Table 1: Abundance definitions used in this report for notable flora, and ecological weeds and pest plants.

Abundance Class	Definition
Abundant	Dominates a vegetation tier across most of the site
Frequent	Occurring widely across the site, but not dominant
Locally common	Common in particular habitats, but uncommon elsewhere
Occasional	Scattered occurrence across the site
Rare	Few individuals, not common anywhere within the site
Very rare	Only one individual found within the site

5.3 Condition and character assessment

The condition and character of each vegetation type were assigned a category based on the criteria in Table 2. Condition scoring is based on canopy composition, expected recruitment, and invasion by exotic plant species, while character is assessed by the proportion of indigenous plant species in the canopy.

Table 2: Condition and character definitions used in this report.

Category	Definition
Condition	
Intact	Indigenous canopy, expected recruitment of palatable indigenous plant species, no exotic plant species present, e.g. remote areas of conservation land with pest control programmes, highly intact bog wetlands.
Highly Functioning	Indigenous canopy, limited recruitment of palatable indigenous plant species and/or exotic plant species present at low abundance, e.g. conservation land with no control of ungulate browsing animals, slightly modified bog wetlands, fenced forest on private land with a low abundance of exotic plant species.
Functioning	Mostly indigenous canopy, mainly recruitment of unpalatable indigenous plant species and/or exotic plant species frequent, e.g. grazed forest on private land, swamp wetland with frequent exotic plant species.
At Risk	Mixed indigenous-exotic canopy and/or exotic plant species locally abundant, e.g. grazed forest on private land with hawthorn and elder in canopy.
Declining	Mostly exotic canopy, and/or exotic plant species abundant over most of the site, e.g. sparsely regenerating forest trees in gorse and/or broom scrub, swamp wetland dominated by willows, treeland of indigenous trees above pasture.
Character	
Indigenous	Indigenous species >50% canopy cover.
Mixed	Indigenous species 10-50% canopy cover.
Exotic	Indigenous species <10% canopy cover.
N/A	Non-vegetated areas, e.g. open water, bare soil.

6. Vegetation and Habitats

6.1 Overview

Vegetation and habitat types present at Pukerau Red Tussock Scientific Reserve are summarised in Table 3, and mapped in Figure 2. Descriptions of vegetation and habitat types follow in Section 6.2.

Table 3: Vegetation and habitat types at Pukerau Red Tussock Scientific Reserve.

Vegetation and Habitat Type Name	Ecosystem Type	Area (ha)	
		Site 1	Site 2
1. Harakeke/copper tussock/wire rush rushland bog	WL6 Lesser wire rush, tangle fern restiad rushland/fernland	8.1	
2. (Copper tussock)-wire rush rushland bog	WL6 Lesser wire rush, tangle fern restiad rushland/fernland		4.8

6.2 Vegetation and habitat type descriptions

6.2.1 Terrestrial

There are no terrestrial habitats present.

6.2.2 Wetland

1. Harakeke/copper tussock/wire rush rushland bog

This bog is dominated by wire rush but harakeke/flax (*Phormium tenax*) and *Dracophyllum* species are common as canopy species (Plate 1). *Coprosma dumosa* is an occasional canopy species. Copper tussock is scattered throughout but particularly dense in the centre and southern parts of the site. Rārahu/bracken (*Pteridium esculentum*) is locally common, especially on the margins of the bog. Common ground cover species amongst the wire rush include swamp sun orchid (*Theymitra cyanea*), *Gaultheria macrostigma*, *Gleichenia alpina* and little hard fern (*Blechnum penna-marina*). However, in drier areas, catsear (*Hypochaeris radicata*) is locally common.

Weedy species such as blackberry (*Rubus fruticosus*) and gorse (*Ulex europaeus*) are common closer to the road edge. One silver birch (*Betula pendula*) sapling was observed at this site. Hydrological functioning is affected by surrounding farmland and road. There were no ditches running through this wetland, but there were drainage ditches in surrounding farmland.

Figure 2. Vegetation and habitat types at Pukerau Red Tussock Scientific Reserve

Plate 1: Harakeke is a common canopy species over the wire rush.

2. (Copper tussock)/wire rush rushland bog

Wire rush is the dominant species in this bog, copper tussock is occasional. Harakeke, *Dracophyllum* species, and *C. dumosa* are also occasional canopy species (Plate 2). Hydrological functioning is good, there are deep channels formed by the wire rush. Catsear, *Gaultheria macrostigma*, *Gleichenia alpina.* little hard fern and rārahu are occasional ground cover species scattered throughout. Silver birch is occasional and spreading at this site, probably from seeds dispersed from reproductive trees in the surrounding farmland.

Plate 2: Wire rush is the most abundant species at Site 2.

7. Flora

7.1 Overview

Seventeen indigenous and 12 exotic plant species were recorded at the sites (listed in Appendix 1).

7.2 Threatened, At Risk, and notable species

No Threatened, At Risk or notable species were observed.

7.3 Ecological weeds

Four ecological weed species were observed at the sites (Table 4), two of which are classified as pest plants in the Southland Regional Pest Management Plan (RPMP, Environment Southland 2019). Environment Southland have also identified some ecological weeds as 'Organisms of interest'. Two ecological weeds present are classified as 'Organisms of interest'.

Table 4: Ecological weed species and their abundance recorded at Pukerau Red Tussock Scientific Reserve.

Common Name (Species)	Abundance		Southland RPMS Status
	Site 1	Site 2	
Blackberry (*Rubus fruticosus*)	Occasional	Occasional	Organism of interest
Broom (*Cytisus scoparius*)	Rare	-	Pest - Sustained control
Gorse (*Ulex europaeus*)	Occasional	Occasional	Pest - Sustained control
Silver birch (*Betula pendula*)	Rare	Occasional	Organism of interest

8. Fauna

8.1 Avifauna

One indigenous and two exotic bird species were recorded on the sites (Table 5). Threat rankings for indigenous avifauna follow Robertson *et al.* (2021). While beyond the scope of the present survey, a targeted bird survey could identify more species at the sites.

Table 5: Bird species recorded at Pukerau Red Tussock Scientific Reserve.

Species	Common Name	Status
Alauda arvensis	Eurasian skylark	Introduced and naturalised
Circus approximans	Kāhu, harrier hawk	Not Threatened
Turdus merula	Eurasian blackbird	Introduced and naturalised

8.2 Other indigenous fauna (lizards, bats, invertebrates, aquatic)

No incidental observations of other indigenous fauna were made during the field survey. Targeted fauna surveys, beyond the scope of this survey, would be required to fully assess lizards, bats, invertebrates, and aquatic fauna values at the sites, and their potential presence and abundance at the site.

8.3 Pest animal presence

The usual suite of mammalian pest animals will be present on site, including rodents, possum, mustelids, cats, and lagomorphs. Rabbit sign was seen on site during the site visit (Table 6).

Table 6: Pest animal species recorded at Pukerau Red Tussock Scientific Reserve.

Common Name	Species	Comment/Evidence
European rabbit	*Oryctolagus cuniculus cuniculus*	Scat

9. Condition Assessment

The condition and character of indigenous vegetation at the site (based on the classes in Table 2) are presented in Table 7.

Table 7: Condition and character assessment of each vegetation type.

Vegetation Type	Condition	Character
1. Harakeke/copper tussock/wire rush rushland bog	Highly Functioning	Indigenous
2. (Copper tussock) wire rush rushland bog	Highly Functioning	Indigenous

10. Threatened Habitat Types

Regionally-threatened habitat types are listed in Schedule 2 of the Southland Regional Policy Statement (Environment Southland 2017). The sites contains one threatened habitat type, 'raised peatland bogs'.

11. Key Ecological Values

Pukerau Red Tussock Scientific Reserve is a remnant of red tussock peat ecosystem, an ecosystem that was formerly more widespread in Southland. It has been deemed as an area of high conservation values by the Gore District Council (Wildland Consultants Ltd 2011). It is also an example of a raised peatland bog, which is a threatened ecosystem type. There is evidence of the site being monitored - marked vegetation plots were found throughout Site 1. Additionally, there has been some restoration planting at Site 1.

12. Key Management Issues and Threats

Pest plants spreading at the sites and drainage of surrounding farmland are the main ecological issues for these sites. Currently, pest plants are at relatively low numbers especially at Site 1. Gorse and blackberry are the main weeds at Site 1. Silver birch is the main issue at Site 2, as trees are spreading there. There are large silver birch trees in the surrounding farmland, so control of these at the sites will need to be ongoing.

The sites have already been altered, there is evidence of drainage around the edges. Historically there was more copper tussock. Copper tussock is now only a small component of Site 2. Both sites are fenced, but animals can easily get through the fence. There are a couple of game trails through Site 1.

13. Conclusion/Summary

Pukerau Red Tussock Scientific Reserve comprises of two sites of raised peatland bog. It is an important reserve regionally, as this ecosystem type was more widespread in the past. Both bogs are dominated by wire rush, which forms deep channels. Control of pest plants is a priority as they will alter the function of the wetlands if not managed.

14. Further Information

Site information has been collected directly into ArcGIS and is available in this format, or can be exported into Excel or similar for viewing. Site maps, photos and descriptions are available. Access to the database for this survey area can be obtained from Environment Southland; use the DOC property number to search the database for detailed site information collected during the field survey.

15. References

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Appendix 1: List of vascular plant species found on the property

Key: * = exotic species

Species	Common Name	Plant Type
*Anthoxanthum odoratum**	Sweet vernal	Graminoid
Astelia nervosa	Mountain astelia	Graminoid
*Betula pendula**	Silver birch	Tree
Blechnum penna-marina	Little hard fern	Fern
Carex coriacea	Rautahi	Graminoid
Celmisia gracilenta	Pekapeka, slender mountain daisy	Forb
*Cerastium fontanum**	Mouse-ear chickweed	Forb
Chionochloa rubra subsp. *cuprea*	Copper tussock, red tussock	Graminoid
Coprosma dumosa		Tree
*Cytisus scoparius**	Broom	Shrub
*Dactylis glomerata**	Cocksfoot	Graminoid
Dracophyllum longifolium	Inaka, īnanga	Tree
Dracophyllum oliveri		Shrub
Empodisma minus	Wire rush	Graminoid
Gaultheria macrostigma	Prostrate snowberry	Shrub
Gleichenia alpina		Fern
Histiopteris incisa	Mātātā, water fern	Fern
*Holcus lanatus**	Yorkshire fog	Graminoid
*Hypochaeris radicata**	Catsear	Forb
*Juncus effusus**	Soft rush	Graminoid
Nertera balfouriana		SubShrub
Phormium tenax	Harakeke, flax	Graminoid
Pteridium esculentum	Rārahu, bracken	Fern
*Rubus fruticosus**	Blackberry	SubShrub
*Rumex acetosella**	Sheep's sorrel	Forb
Senecio minimus	Native fireweed	Forb
*Senecio sylvaticus**	Wood groundsel	Forb
Thelymitra cyanea	Swamp sun orchid	Forb
*Ulex europaeus**	Gorse	Shrub

Appendix 2: Site photographs

Plate A3-1: Copper tussock in the centre of the harakeke/copper tussock wire rush rushland bog.

Plate A3-2: Catsear is common in drier areas of the sites.

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