



## Current and historic wetlands of Southland Region: Stage 2



**Landcare Research**  
Manaaki Whenua



## **Current and historic wetlands of Southland Region: Stage 2**

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## Summary

### Project and Client

Environment Southland contracted Landcare Research to classify and digitally map current and historic wetlands in Southland, excluding the Department of Conservation (DOC)-administered wetlands of Fiordland National Park and Stewart Island. The project incorporates the recently completed detailed vegetation data of the DOC-administered Awarua-Waituna wetland complex on the Southland Plains.

The Wetlands of National Importance (WONI; Ausseil et al. 2008) project mapped the extent of current and historic wetlands in New Zealand, but some aspects require refining to increase accuracy and usefulness. The first stage of work to refine the WONI predictions identified large knowledge gaps in wetland extent, wetland class and vegetation class of the Southland region (Fitzgerald et al. 2010). This second report presents the results of a mainly desk-top exercise to fill many of the information gaps outlined in Stage 1.

### Objectives

- To refine the Stage 1 map showing broad classes of wetland vegetation reconstructed as at 1840 at a scale of 1:250 000.
- To refine the Stage 1 map showing broad classes of current wetland vegetation at a scale of 1:50 000.
- To incorporate Awarua-Waituna wetland vegetation data supplied by DOC.
- To identify wetlands requiring field checking to fill remaining knowledge gaps.

### Methods

- Polygons  $\geq 5$  ha in the WONI map of current Southland wetlands that were identified as having information gaps were checked using expert local knowledge and occasional field survey.
- Polygons for wetland areas  $\geq 100$  ha in the WONI map of historic Southland wetland vegetation which were identified in Stage 1 as having information gaps were checked against topography and extant wetlands.
- The detailed Awarua-Waituna data were assigned to the broader Southland region wetland classes and vegetation classes, and then mapped.

### Results

- Some 272 284 ha of current wetlands were classed and mapped, representing 10% of the original extent.
- Bogs are well represented with 64% remaining, whereas fens (13%), marshes (4%) and swamps (1%) are poorly represented.

## **Conclusions**

- The large extent of the loss of wetlands (90%) in the Southland region study area indicates that virtually all remaining wetlands could be considered significant.
- Some wetland classes could be considered more important than others based on the extent of loss, with the order of significance being swamp>marsh>fen>bog.

## **Recommendations**

- Wetland areas that could not be confidently assigned to wetland class, vegetation class, or species composition should be investigated further, possibly requiring field checking, and soils information.



## 1 Introduction

This report summarises the second stage of work to refine the WONI predictions of the extent of current and historical wetlands in Southland. It focuses on filling the knowledge gaps identified in Stage 1 (Fitzgerald et al. 2010), and also incorporates recently-completed vegetation data from the Awarua-Waituna wetland complex (Boffa Miskell and Urtica Inc. 2010).

## 2 Background

The Wetlands of National Importance (WONI; Ausseil et al. 2008) project used a variety of data sources to calculate extent and characteristics of wetlands in New Zealand, but some aspects require refining to increase accuracy and usefulness. More accurate data for current and historical wetlands are required to provide a regional framework for assessing representativeness and significance of wetlands (Environment Southland Wetland Evaluation Protocol; Clarkson 2009) to inform resource consents.

## 3 Objectives

- To refine the Stage 1 map showing broad classes of wetland vegetation reconstructed as at 1840 at a scale of 1:250 000.
- To refine the Stage 1 map showing broad classes of current wetland vegetation at a scale of 1:50 000.
- To incorporate detailed Awarua-Waituna wetland vegetation data supplied by DOC.
- To identify wetlands requiring field checking to fill remaining knowledge gaps.

## 4 Methods

Mapping was done in ArcMap (versions 9.2 and 9.3) using the New Zealand Transverse Mercator projection and NZ Geodetic datum 2000. The area of interest was the Southland Region excluding the Department of Conservation (DOC)-administered wetlands in Fiordland National Park and Stewart Island. They were excluded because the focus was on wetlands on freehold land. The DOC-administered Waituna-Awarua wetlands on the Southland Plains were included, with current wetland vegetation data being supplied by DOC.

### 4.1 Current wetland extent

Polygons  $\geq 5$  ha in the WONI map of current Southland vegetation and listed in Appendix 1 of the Stage 1 report (Fitzgerald et al. 2010) were checked using local knowledge (mainly BDR), available information, and interpretation of coloured aerial photographs (0.75 m per pixel, supplied by Environment Southland).

Areas identified were classified by wetland class, vegetation structure (Johnson & Gerbeaux 2004), and dominant species composition. Four major freshwater classes were recognised: bog, fen, swamp and marsh. Ephemeral wetlands were included in the marsh class, and other

minor classes, e.g., pakihi, seepage, and shallow water, were assigned to the four main classes according to water and nutrient regimes and substrate characteristics (Johnson & Gerbeaux 2004). Where there was contradictory information on wetland class, or where there were complex mosaics of wetland classes within relatively small areas, the whole polygon was assigned to the dominant class.

Vegetation in the Awarua-Waituna wetland was mapped at a more detailed scale, with minimum polygon size of only a few square metres. Polygons were grouped into the broader Southland region classification system of Fitzgerald et al. (2010) based on information provided in Boffa Miskell and Urtica Inc. (2010).

## 4.2 Historic wetland extent

Polygons  $\geq 100$  ha in the WONI map of historic Southland wetland vegetation and listed in Appendix 2 of Fitzgerald et al (2010) were checked using interpretation of coloured aerial photographs, local knowledge (mainly BDR), information on extant wetlands, and Topoclimate South 1:50 000 soil map series (1999–2001) supplied by Environment Southland. All current wetlands (<100 ha) that occurred outside the historical wetland polygons were incorporated in the historic map as wetland classes are unlikely to have changed since 1840.

## 5 Results

### 5.1 Wetland classification

The main wetland classes, types, vegetation structural classes and their typical species composition for both historic and current (circa 2010) wetlands in the Southland region are summarised in Table 1.

**Table 1** 1840 and current wetlands by wetland class, type, structural class and species composition

Wetland Class	Wetland Type	Structural Class		Species composition
		1840	Current	
Bog	B1	Wire rushland	Wire rushland	<i>Empodisma minus</i> , <i>Dracophyllum oliveri</i> , <i>Gleichenia dicarpa</i> , <i>Leptospermum scoparium</i> , <i>Sphagnum cristatum</i> and locally <i>Halocarpus bidwillii</i> , <i>Chionochloa rubra</i>
Bog	B2	Mossfield	Mossfield	<i>Sphagnum cristatum</i> , <i>S. falcatulum</i> , <i>E. minus</i> and locally <i>Dracophyllum prostratum</i> , <i>Leptospermum scoparium</i> , <i>Oreobolus pectinatus</i> , <i>Hierochloa redolens</i>
Bog	B3	Cushionfield	Cushionfield	<i>Oreobolus pectinatus</i> , <i>Donatia novae-zelandiae</i> , <i>Centrolepis ciliata</i> , <i>Carpha alpina</i> , <i>Isolepis aucklandicus</i> , <i>Pentachondra pumila</i> , <i>Lepidothamnus laxifolius</i> , <i>Dracophyllum prostratum</i> ,

				<i>Celmisia</i> spp., <i>Drosera</i> spp. and locally <i>O. strictus</i>
Bog	B4	Shrubland	Shrubland	<i>Leptospermum scoparium</i> , <i>Dracophyllum oliveri</i> , <i>S. cristatum</i> , <i>E. minus</i> and locally <i>Halocarpus bidwillii</i> , <i>Gleichenia dicarpa</i>
Bog	B5	Open water	Open water	Locally <i>Sphagnum cristatum</i> , <i>Carex gaudichaudiana</i> , <i>C. lachenalii</i>
Bog	B6	NOT PRESENT	Exotic shrubland/ treeland/ grassland	<i>Ulex europaeus</i>
Fen	F1	Sedgeland	Sedgeland	<i>Carex coriacea</i> , <i>C. sinclairii</i> , <i>C. secta</i> , <i>C. diandra</i> , <i>C. gaudichaudiana</i> , <i>Oreobolus pectinatus</i> , <i>Baumea rubiginosa</i> , <i>B. tenax</i> and locally <i>C. virgata</i> , <i>C. appressa</i> , <i>Lepidosperma australe</i> , <i>Juncus edgariae</i> , <i>Coprosma elaterioides</i> , <i>C. tayloriae</i> , <i>C. propinqua</i> , <i>Leptospermum scoparium</i> <i>Eleocharis acuta</i>
Fen	F2	Tussockland	Tussockland	<i>Chionochloa rubra</i> , <i>Empodisma minus</i> , <i>Carex coriacea</i> , and locally <i>Chionochloa teretifolia</i> , <i>Sphagnum cristatum</i> , <i>Schoenus pauciflorus</i> , <i>Carpha alpina</i> , <i>Gleichenia dicarpa</i> , and scattered shrubs
Fen	F3	Wire rushland	Wire rushland	<i>Empodisma minus</i> , <i>Dracophyllum oliveri</i> , <i>Leptospermum scoparium</i> , <i>Chionochloa rubra</i> on shallower peats
Fen	F4	Fernland	Fernland	<i>Gleichenia dicarpa</i> , <i>Pteridium esculentum</i> , <i>Dracophyllum oliveri</i> , <i>Leptospermum scoparium</i> ,
Fen	F5	Herbfield-mossfield-sedgeland	Herbfield-mossfield-sedgeland	<i>Hydrocotyle</i> spp., <i>Ranunculus</i> spp., <i>Epilobium</i> spp., <i>Nertera</i> spp., <i>Celmisia</i> spp., <i>Viola cunninghamii</i> , mosses, <i>Carex gaudichaudiana</i> , <i>Schoenus pauciflorus</i> , <i>Carpha alpina</i> , <i>Isolepis aucklandicus</i> and locally <i>Sphagnum cristatum</i> , <i>Hebe pauciramosa</i> , <i>Montia fontana</i>
Fen	F6	Shrubland & scrub	Shrubland & scrub	<i>Leptospermum scoparium</i> , <i>Coprosma tayloriae</i> , <i>C. decurva</i> , <i>C. propinqua</i> , <i>Carex coriacea</i> , and locally <i>Dracophyllum aff oliveri</i> , <i>Halocarpus bidwillii</i> , <i>Olearia bullata</i> , <i>O. laxiflora</i> , <i>Ozothamnus vauvilliersii</i> , <i>Chionochloa rubra</i>
Fen	F7	Forest	Forest	<i>Dacrydium cupressinum</i> , <i>Dacrydium dacrydioides</i> , <i>Podocarpus hallii</i> , <i>Phyllocladus alpinus</i> , <i>Griselinia littoralis</i> , <i>Elaeocarpus hookerianus</i> , <i>Weinmannia racemosa</i> ,
Fen	F8	NOT PRESENT	Exotic grass- / herb-/rush- /shrubland / scrub/ forest	Mixtures of exotic pasture grasses, herbs, rushes and shrubs, e.g. <i>Ulex europaeus</i> , <i>Carex coriacea</i>
Swamp	S1	Reedland	Reedland	<i>Eleocharis sphacelata</i> , <i>Baumea arthropphylla</i> , <i>E. acuta</i>

Swamp	S2	Sedgeland	Sedgeland	<i>Carex secta</i> , <i>C. sinclairii</i> , <i>C. gaudichaudiana</i> , <i>Phormium tenax</i> , <i>Blechnum minus</i> , <i>Eleocharis acuta</i> and locally <i>C. diandra</i>
Swamp	S3	Flaxland	Flaxland	<i>Phormium tenax</i> , <i>Coprosma propinqua</i> , <i>Carex secta</i> , <i>Eleocharis acuta</i> and locally <i>Cordyline australis</i> , <i>Blechnum minus</i> .
Swamp	S4	Shrubland & scrub	Shrubland & scrub	<i>Coprosma propinqua</i> , <i>Cordyline australis</i> , <i>Phormium tenax</i> , <i>Blechnum minus</i> , <i>Leptospermum scoparium</i> and locally <i>Olearia lineata</i> , <i>Coprosma wallii</i> , <i>Pittosporum obcordatum</i>
Swamp	S5	Treeland	Treeland	<i>Cordyline australis</i> , <i>Dacrydium dacrydioides</i> , <i>Plagianthus regius</i> , <i>Coprosma propinqua</i> , <i>Myrsine divaricata</i> and locally <i>Elaeocarpus hookerianus</i> , <i>Pseudopanax crassifolius</i> , <i>Sophora microphylla</i> , <i>Coprosma pedicellata</i> , <i>Phormium tenax</i>
Swamp	S6	Forest	Forest	<i>Dacrydium dacrydioides</i> , <i>Prumnopitys taxifolia</i> , <i>Plagianthus regius</i> , <i>Myrsine divaricata</i> , <i>Neomyrtus pedunculatus</i> <i>Elaeocarpus hookerianus</i> ,
Swamp	S7	NOT PRESENT	Exotic grass- / herb- /shrub- / treeland/ forest	<i>Salix fragilis</i> , <i>Ulex europaeus</i> , <i>Cytisus scoparius</i> , mixed pasture grasses and herbs.
Swamp	S8	Open water	Open water	
Marsh	M1	Herbfield	Herbfield	Turf of <i>Leptinella</i> spp., <i>Lobelia</i> spp., <i>Hydrocotyle</i> spp., <i>Plantago</i> spp., <i>Glossostigma</i> spp., <i>Carex</i> spp., <i>Eleocharis</i> spp., <i>Isolepis</i> spp., and locally <i>Selliera radicans</i> , <i>Deschampsia caespitosa</i> ., <i>Limosella lineata</i> <i>Gratiola</i> spp., <i>Myriophyllum</i> spp. <i>Lilaeopsis</i> spp.
Marsh	M2	Rushland /sedgeland / shrubland / grassland	Rushland /sedgeland / shrubland/ grassland	<i>Apodasmia similis</i> , <i>Juncus edgariae</i> , <i>Carex</i> spp., <i>Eleocharis</i> spp., <i>Cortaderia richardii</i> , <i>Coprosma propinqua</i> , <i>Leptospermum scoparium</i>
Marsh	M3	NOT PRESENT	Exotic grass- / herb- / shrub- land	Mixtures of exotic pasture grasses, rushes, herbs, and shrubs

### Recent wetland classification systems

The Department of Conservation has recently developed a national wetland classification system within its Ecosystem Prioritisation project (N. Singers, unpubl. data). The concordance of the Southland wetland classes and vegetation classes (Table 1) with the national DOC classification system is summarised in Table 2. The relationships with the Awarua-Waituna classification system (Boffa Miskell and Urtica Inc. 2010) are also included.

**Table 2** Concordance of current wetland class, type and structural class with recent classification systems. NA = not applicable

Wetland Class	Wetland Type	Structural Class	Ecosystem prioritisation class	Awarua-Waituna wetlands
Bog	B1	Wire rushland	WL6	Wire rush WR
Bog	B2	Mossfield	WL13	Sphagnum SP
Bog	B3	Cushionfield	WL9	
Bog	B4	Shrubland	WL12	Dense manuka DM Semi-open manuka SM Bog pine BP
Bog	B5	Open water	?	Shallow water (lakes)
Bog	B6	Exotic shrubland/ treeland/ grassland	NA - exotic	
Fen	F1	Sedgeland	WL22, WL11	Carex CA (WL22) Baumea BA (WL11)
Fen	F2	Tussockland	WL16, WL7	Red tussock CH (WL16)
Fen	F3	Wire rushland	WL6	
Fen	F4	Fernland	Unassigned	Bracken PT
Fen	F5	Herbfield-mossfield- sedgeland	WL8/ WL17	
Fen	F6	Shrubland & scrub	WL20	Grey scrub GS
Fen	F7	Forest	NA – forest type	Tall podocarp forest TP Regenerating mixed forest RM
Fen	F8	Exotic grass- / herb- / rush- /shrubland / scrub/ forest	NA – exotic NA – exotic NA – exotic NA – exotic	Orse UL Exotic forest EX Pasture PA Juncus JU (part)
Swamp	S1	Reedland	WL19	
Swamp	S2	Sedgeland	WL22	
Swamp	S3	Flaxland	WL18	Flax PH
Swamp	S4	Shrubland & scrub	WL20	
Swamp	S5	Treeland	NA - forest type	Cabbage Tree CO
Swamp	S6	Forest	NA – forest type	
Swamp	S7	Exotic grass- / herb- /shrub- / treeland/ forest	NA – exotic	
Swamp	S8	Open water	?	Shallow water (swamp)
Marsh	M1	Herbfield	WL14, WL15	
Marsh	M2	Rushland /sedgeland / shrubland/ grassland	WL10 Unassigned	Juncus JU (part) Toetoe CR
Marsh	M3	Exotic grass- / herb- / shrub- land	NA – exotic	Juncus JU (part)

## 5.2 Current wetlands

### 5.2.1 Overall Trends

Extant wetland areas were classified into four wetland classes: bog, fen, swamp, and marsh (Table 3). Where there was some doubt about the classification, this is indicated by a question mark; these queries require further information or field checking (see Appendix 2). Of the 149 undetermined wetlands, 141 polygons are from Awarua-Waituna, and eight are from the remaining Southland region. Many of the 141 Awarua-Waituna polygons of questionable wetland status may end up being rejected as wetlands.

Compared with the WONI maps, this project identified 71% of the WONI area of total wetlands, 99% of bogs, 42% of fens and 30% of each of swamps and marshes. A much greater number of wetlands were identified in this project because of the more detailed mapping data of Awarua-Waituna. This provided large numbers of small polygons (>3000), several of which were only a few square metres in area, whereas the minimum size for wetland areas other than Awarua-Waituna was 5 ha. Current wetland areas for the wider Southland region (excluding Awarua-Waituna) are listed in Appendix 1, and information for the Awarua-Waituna wetlands is provided in the shape file.

**Table 3** Current Southland wetlands identified in this project and from existing WONI data by wetland class. Question marks indicate uncertainty in assigning the wetland to a wetland class

Wetland class	Total Area (ha)			Number of wetlands identified	
	This project	WONI	% WONI	This project	WONI
?	1605.1			149	
Bog	19 590.1	19 846.1	98.7	2630	100
Fen	5855.1	13, 978.9	41.9	580	274
Fen?	72.0			5	
Marsh	284.2	944.5	30.1	50	52
Marsh?	116.7			3	
Swamp	2084.9	6891.0	30.3	168	290
Swamp?	22.4			3	
Total	29 630.5	41 660.50	71.12	3588	716

Current wetlands were classified into 44 different structural classes (Table 4). There was some uncertainty about the correct class for 157 of the wetlands, and these require further advice or field checking. Many of these may be rejected as wetlands (as above), and it is also likely that some of the structural classes could be simplified and merged.

**Table 4** Current Southland wetlands by vegetation structural class. Question marks indicate uncertainty in assigning to class

Structural Class	Wetland Count	Wetland Class	Total Area (ha)
?	157	?	1899.2245
Exotic forest	2	Swamp	18.5000

Exotic grass-/herb-/shrub-/treeland/forest	1	Fen	0.4358
Exotic grass-/herb-/shrubland/scrub/forest	51	Fen	171.5925
Exotic grassland	6	Bog	47.8000
Exotic grassland, shrubland	2	Fen	26.0000
Exotic grassland, shrubland, rushland	1	Fen	23.2000
Exotic rushland, exotic grassland, herbfield, shrubland	1	Fen	77.9000
Exotic scrub?	2	Fen	35.5000
Exotic shrubland	20	Bog	573.1000
Exotic shrubland, flaxland	1	Swamp	23.4000
Exotic treeland	5	Swamp	64.6000
Fernland	63	Fen	128.9168
Fernland, wire rushland	1	Bog	23.4000
Fernland?	1	Fen	4.8000
Flaxland	72	Swamp	222.1926
Flaxland, sedgeland	3	Swamp	257.3000
Flaxland, sedgeland, shrubland	1	Swamp	11.8000
Flaxland, shrubland	1	Marsh	7.1000
Flaxland?	2	Fen	17.0000
Forest	25	Fen	483.4529
Grassland	1	Fen	11.0000
Herbfield	1	Marsh	9.8000
Herbfield, mossfield, sedgeland	57	Fen	660.1000
Herbfield, wire rushland, sedgeland	1	Fen	9.0000
Mossfield	230	Bog	1434.3111
Mossfield, wire rushland	1	Bog	27.1000
Open water	909	Bog	174.9666
Rushland	6	Fen	178.5000
Rushland, sedgeland	1	Marsh	5.2000
Rushland/sedgeland/shrubland/grassland	7	Marsh	11.5317
Rushland/sedgeland/shrubland/grassland/ Exotic grass-/herb-/shrubland	27	Marsh	40.5075
Scrub	7	Fen	194.5000
Sedgeland	135	Fen	1401.9957
Sedgeland, mossfield, herbfield, cushionfield	2	Bog	81.4000
Sedgeland, rushland, shrubland	1	Marsh	11.0000
Sedgeland?	5	?	59.6000
Shrubland	1193	?	12524.6316
Shrubland & scrub	37	Fen	114.4375
Shrubland, flaxland	1	Swamp	6.2000

Treeland	6	Swamp	61.3113
Treeland, shrubland	1	Swamp	20.5000
Tussock, sedgeland	1	Fen	84.2000
Tussockland	184	Fen	2128.5086
Tussockland?	2	Fen	49.5000
Wire rushland	350	Bog	5992.7275
Wire rushland, fernland	1	Fen	12.2000
Wire rushland, mossfield	1	Bog	77.3000
Wire rushland, shrubland, fernland	2	Bog	131.4000

Current wetlands were classified into 68 categories of dominant species composition (Table 5). As with the other classifications, question marks indicate uncertainties that require further advice and/or field checking.

**Table 5** Dominant species composition of current Southland wetlands . Question marks indicate uncertainty in identifying species. (AW) = Awarua-Waituna polygons

Species Composition	Wetland Count	Total Area (ha)	Wetland Class	Structural Class
	146	999.8	?	?
<i>(Dracophyllum oliveri)-(Halocarpus bidwilli)-Chionochloa rubra/Empodisma minus</i>	1	28.2	Fen	Wire rushland
<i>(Phormium tenax)/Carex gaudichaudiana-Carex diandra</i>	1	17.4	Swamp	Sedgeland
?	38	1286.8	?	?
<i>Apodasma similis-Juncus-exotic herbs</i>	1	27.9	Marsh	Rushland
<i>Apodasmia similis</i>	1	5.8	Marsh	Rushland
<i>Apodasmia similis-(Juncus edgariae)</i>	1	35.2	Marsh	Rushland
<i>Baumea (AW)</i>	15	47.2	Fen	Sedgeland
<i>Carex</i>	4	151.6	Swamp	Sedgeland
<i>Carex (AW)</i>	69	140.2	Fen	Sedgeland
<i>Carex coriacea -C.secta/exotic grasses</i>	1	11.5	Fen	Sedgeland
<i>Carex coriacea-Empodisma minus</i>	1	31.5	Fen	Sedgeland
<i>Carex gaudichaudiana/Sphagnum cristatum-Oreobolus pectinatus-mixed herbs</i>	2	81.4	Bog	Sedgeland,mossfield, herbfield, cushionfield
<i>Carex ovalis-C. diandra</i>	1	87.4	Swamp	Flaxland,sedgeland
<i>Carex ovalis-Carex spp</i>	1	20.3	Swamp	Sedgeland
<i>Carex secta</i>	1	7.0	Swamp	Sedgeland
<i>Carex secta-?</i>	1	24.9	Swamp	Sedgeland
<i>Carex secta-C.coriacea-Juncus edgariae-Phormium tenax-Coprosma propinqua</i>	1	11.0	Marsh	Sedgeland,rushland,s hrubland
<i>Carex secta-C.spp-Eleocharis acuta-Phormium</i>	1	7.7	Swamp	Sedgeland



*tenax*

<i>Carex secta-Coprosma propinqua</i>	1	5.2	Swamp	Sedgeland
<i>Carex secta?</i>	1	10.3	Swamp	Sedgeland
<i>Carex sinclairii-C. diandra</i>	1	17.4	Swamp	Sedgeland
<i>Carex</i> sp	2	45.9	Fen	Sedgeland
<i>Carex</i> sp/grass	2	80.1	Fen	Sedgeland
<i>Carex</i> sp/moss	2	16.5	Fen	Mossfield
<i>Carex</i> spp	3	177.5	Swamp	Sedgeland
<i>Carex</i> spp- <i>Chionochloa rubra</i>	1	15.2	Fen	Sedgeland
<i>Carex</i> spp- <i>Coprosma</i> spp- <i>Olearia laxiflora</i> - exotic grasses	1	52.1	Swamp	Sedgeland
<i>Carex</i> spp/ <i>Chionochloa rubra</i>	1	5.9	Fen	Sedgeland
<i>Carex</i> spp/ <i>Eleocharis acuta-Coprosma</i> spp	1	9.5	Swamp	Sedgeland
<i>Carex</i> -?	3	163.8	Swamp	Sedgeland
<i>Carex</i> -exotic grasses	5	39.8	Fen	Sedgeland
<i>Carex/Sphagnum cristatum</i>	1	10.1	Fen	Mossfield
<i>Carex/Sphagnum?</i>	1	11.5	Fen	Sedgeland
<i>Carex</i> /moss	5	27.3	Fen	Mossfield
<i>Carex?</i>	4	70.4	Fen	Sedgeland
<i>Chionochloa rubra</i>	24	985.7	Fen	Tussockland
<i>Chionochloa rubra</i> (AW)	123	315.7	Fen	Tussockland
<i>Chionochloa rubra</i> -?	1	8.4	Fen	Tussockland
<i>Chionochloa rubra-Carex</i>	1	84.2	Fen	Tussock,sedgeland
<i>Chionochloa rubra-Carex coriacea</i>	1	11.9	Fen	Tussockland
<i>Chionochloa rubra-Carex coriacea?</i>	1	23.1	Fen	Tussockland
<i>Chionochloa rubra-Carex-(Empodisma minus)-</i> ( <i>Juncus edgariae</i> )	1	22.5	Fen	Tussockland
<i>Chionochloa rubra-Coprosma propinqua?</i> - exotic grasses	1	18.0	Fen	Tussockland
<i>Chionochloa rubra-Empodisma minus</i>	9	127.9	Fen	Tussockland
<i>Chionochloa rubra-Empodisma minus</i> -exotic grasses	1	59.6	Fen	Tussockland
<i>Chionochloa rubra-Leptospermum scoparium</i> - exotic grasses	1	9.1	Fen	Tussockland
<i>Chionochloa rubra</i> -exotic grasses	4	37.8	Fen	Tussockland
<i>Chionochloa rubra/ Empodisma minus</i>	1	6.1	Fen	Tussockland
<i>Chionochloa rubra/Carex</i> spp	1	22.9	Fen	Tussockland
<i>Chionochloa rubra/Empodisma minus</i>	12	282.1	Bog	Tussockland
<i>Chionochloa rubra/Empodisma minus-Carex</i>	1	15.8	Fen	Wire rushland
<i>Chionochloa rubra/Sphagnum cristatum</i>	2	73.0	Fen	Tussockland
<i>Chionochloa rubra/exotic grasses/Empodisma</i> <i>minus</i>	1	76.1	Fen	Tussockland

Current and historic wetlands of Southland Region: Stage 2

<i>Coprosma</i> sp	1	16.1	Swamp	Scrub
<i>Coprosma propinqua</i>	2	20.1	Fen	Scrub
<i>Coprosma propinqua-Phormium tenax</i>	2	17.8	Swamp	Shrubland
<i>Coprosma propinqua-Phormium tenax-Carex</i> spp	1	21.6	Fen	Shrubland
<i>Coprosma propinqua-sedge?</i>	1	6.5	Swamp	Shrubland
<i>Coprosma propinqua/Baumea rubiginosa- Empodisma minus</i>	1	24.6	Fen	Sedgeland
<i>Coprosma propinqua/Carex secta-Phormium tenax</i>	1	9.8	Swamp	Shrubland
<i>Coprosma propinqua?</i>	2	9.3	Swamp	Scrub
<i>Coprosma</i> spp-( <i>Meliccytus flexuosus</i> )	1	68.8	Fen	Shrubland
<i>Coprosma</i> spp-( <i>Olearia lineata-O.laxiflora- Sophora microphylla-Dacrycarpus dacrydioides</i> )	1	9.6	Swamp	Scrub
<i>Coprosma tayloriae</i>	1	10.4	Fen	Shrubland
<i>Coprosma?</i>	1	4.9	Swamp?	Shrubland
<i>Cordyline australis/Coprosma</i> spp	1	20.5	Swamp	Treeland,shrubland
<i>Cortaderia richardii</i> (AW)	7	11.5	Marsh	Rushland/sedgeland/ shrubland/grassland
<i>Cytisus scoparius</i>	1	72.7	Fen	Exotic shrubland
<i>Cytisus scoparius-Empodisma minus</i>	1	26.0	Fen	Exotic shrubland
<i>Cytisus scoparius-Phormium tenax</i>	1	23.4	Swamp	Exotic shrubland,flaxland
<i>Dacrycarpus dacrydioides</i>	4	77.9	Swamp	Forest
<i>Dacrycarpus dacrydioides-Prumnopitys taxifolia</i>	3	39.5	Swamp	Forest
<i>Dacrycarpus dacrydioides-Prumnopitys taxifolia-Dacrydium cupressinum</i>	1	24.2	Fen	Forest
<i>Dacrycarpus dacrydioides-Prumnopitys taxifolia-Elaeocarpus hookerianus</i>	1	34.9	Swamp	Forest
<i>Dacrydium cupressinum</i>	2	27.8	Fen	Forest
<i>Dacrydium cupressinum-?</i>	1	24.0	Swamp	Forest
<i>Dacrydium cupressinum-Elaeocarpus hookerianus/Coprosma pedicellata</i>	1	28.5	Swamp	Forest
<i>Dacrydium cupressinum/Weinmannia racemosa</i>	1	38.5	Fen	Forest
<i>Dracophyllum oliveri/Empodisma minus</i>	2	22.8	Bog	Shrubland
<i>Dracophyllum oliveri/Empodisma minus/Sphagnum cristatum</i>	5	458.7	Bog	Mossfield
<i>Dracophyllum oliveri/Sphagnum cristatum</i>	1	47.8	Fen	Shrubland
<i>Empodisma minus</i>	73	3763.4	Bog	Wire rushland
<i>Empodisma minus</i> (AW)	227	801.2	Bog	Wire rushland
<i>Empodisma minus-(Gleichenia dicarpa)</i>	1	19.9	Bog	Wire rushland

<i>Empodisma minus-Carex</i>	1	20.3	Fen	Wire rushland
<i>Empodisma minus-Chionochloa rubra</i>	6	112.9	Bog	Wire rushland
<i>Empodisma minus-Dracophyllum oliveri</i>	2	177.8	Bog	Wire rushland
<i>Empodisma minus-Gleichenia dicarpa/Sphagnum cristatum</i>	1	12.0	Bog	Wire rushland
<i>Empodisma minus-Leptospermum scoparium</i>	2	90.1	Fen	Wire rushland
<i>Empodisma minus-Leptospermum scoparium-Gleichenia dicarpa</i>	2	131.4	Bog	Wire rushland,shrubland, fernland
<i>Empodisma minus-Leptospermum scoparium-Ulex europaeus</i>	1	16.9	Bog	Wire rushland
<i>Empodisma minus-Pteridium esculentum</i>	1	12.2	Fen	Wire rushland,fernland
<i>Empodisma minus-Sphagnum cristatum</i>	1	77.3	Bog	Wire rushland,mossfield
<i>Empodisma minus-Ulex europaeus</i>	1	5.8	Bog	Wire rushland
<i>Empodisma minus/Halocarpus bidwillii/Coprosma</i>	1	8.8	Fen	Wire rushland
<i>Empodisma minus/Sphagnum cristatum</i>	52	1415.7	Bog	Mossfield
Exotic forest (AW)	5	20.3	Fen	Exotic grass-/herb-/shrubland/scrub/forest
Exotic grass/ <i>Ulex europaeus</i>	1	19.2	Fen	Exotic grassland,shrubland
Exotic grasses	1	5.2	Swamp?	Exotic grassland
Exotic grasses-?	1	11.0	Fen	Grassland
Exotic grasses- <i>Carex coriacea-Coprosma propinqua-Juncus edgariae</i>	1	23.2	Fen	Exotic grassland,shrubland, rushland
Exotic grasses- <i>Carex</i> spp	1	9.4	Fen	Exotic grassland
Exotic grasses- <i>Empodisma minus</i>	3	27.7	Bog	Exotic grassland
Exotic grasses- <i>Juncus-Carex coriacea-Sphagnum cristatum</i>	1	5.5	Bog	Exotic grassland
Exotic grasses/shrubs	1	6.8	Fen	Exotic grassland,shrubland
Exotic trees	2	18.5	Swamp	Exotic forest
<i>Gleichenia dicarpa-Empodisma minus</i>	1	23.4	Bog	Fernland,wire rushland
<i>Halocarpus bidwillii</i> (AW)	3	1.5	Bog	Shrubland
<i>Juncus</i> (AW)	27	40.5	Marsh	Rushland/sedgeland/shrubland/grassland/Exotic grass-/herbfield
<i>Juncus edgariae</i>	1	22.9	Marsh	Rushland

<i>Juncus edgariae</i> - <i>J. procerus</i>	1	5.2	Marsh	Rushland, sedgeland
<i>Juncus</i> spp- <i>Carex</i> spp-exotic grasses and herbs	1	7.8	Marsh	Rushland
<i>Juncus</i> -exotic grasses	1	78.9	Fen	Rushland
<i>Juncus effusus</i> -exotic grasses	1	77.9	Fen	Exotic rushland, exotic grassland, herbfield, shrubland
<i>Leptospermum scoparium</i>	28	950.8	Bog	Scrub
<i>Leptospermum scoparium</i> (AW)	1142	11053.4	Bog	Shrubland
<i>Leptospermum scoparium</i> - <i>Coprosma propinqua</i>	1	11.9	Fen	Shrubland
<i>Leptospermum scoparium</i> - <i>Coprosma propinqua</i> - <i>C. tayloriae</i> - <i>Pittosporum tenuifolium</i> - <i>Griselinia littoralis</i>	1	21.3	Fen	Shrubland
<i>Leptospermum scoparium</i> - <i>Empodisma minus</i> - <i>Ulex europaeus</i>	1	40.1	Fen	Exotic shrubland
<i>Leptospermum scoparium</i> - <i>Phormium tenax</i> / <i>Empodisma minus</i>	1	13.4	Fen	Shrubland
<i>Leptospermum scoparium</i> / <i>Coprosma</i> spp	1	182.1	Fen	Shrubland
<i>Leptospermum scoparium</i> / <i>Dacrydium cupressinum</i>	1	89.9	Fen	Scrub
<i>Leptospermum scoparium</i> / <i>Empodisma minus</i>	1	25.2	Bog	Shrubland
<i>Leptospermum scoparium</i> ?	1	8.6	Fen	Shrubland
<i>Leptospermum scoparium</i> ?/ <i>Sphagnum cristatum</i>	1	30.0	Fen	Mossfield
Mixed herb/moss/sedge	56	647.9	Fen	Herbfield, mossfield, sedgeland
Open water	909	175.0	Bog	Open water
<i>Oreobolus pectinatus</i> /mixed herb/moss/sedge	2	21.2	Fen	Herbfield, mossfield, sedgeland
Pasture grasses (AW)	21	56.4	Fen	Exotic grass-/herb-/shrubland/scrub/forest
<i>Phormium tenax</i>	1	19.1	Swamp	Flaxland
<i>Phormium tenax</i> (AW)	67	104.9	Swamp	Flaxland
<i>Phormium tenax</i> - <i>Carex</i>	1	33.5	Swamp	Flaxland, sedgeland
<i>Phormium tenax</i> - <i>Carex coriacea</i> - <i>Coprosma propinqua</i>	1	11.0	Swamp	Flaxland
<i>Phormium tenax</i> - <i>Carex</i> sp	1	30.5	Swamp	Sedgeland
<i>Phormium tenax</i> - <i>Coprosma propinqua</i>	1	7.1	Marsh	Flaxland, shrubland
<i>Phormium tenax</i> - <i>Ulex europaeus</i>	1	24.2	Swamp	Flaxland
<i>Phormium tenax</i> / <i>Carex</i>	1	56.7	Swamp	Flaxland
<i>Phormium tenax</i> / <i>Carex gaudichaudiana</i>	1	9.8	Marsh	Sedgeland
<i>Phormium tenax</i> / <i>Carex secta</i>	1	136.4	Swamp	Flaxland, sedgeland

<i>Phormium tenax/Carex</i> spp	1	61.4	Swamp	Sedgeland
<i>Phormium tenax/Carex</i> spp/ <i>Leptospermum scoparium</i> /exotic grasses	1	11.8	Swamp	Flaxland, sedgeland, shrubland
<i>Phormium tenax/Carex</i> spp?	1	4.7	Fen	Flaxland?
<i>Phormium tenax/Carex/Baumea rubiginosa</i>	1	13.7	Fen	Sedgeland
<i>Phormium tenax/Ulex europaeus</i> /exotic grasses	1	6.3	Swamp	Flaxland
<i>Phormium tenax</i> ?	1	12.3	Swamp?	Flaxland?
<i>Pittosporum tenuifolium-Cordyline australis-Leptospermum scoparium</i>	1	39.4	Swamp	Scrub
<i>Prumnopitys taxifolia</i>	2	33.9	Swamp	Forest
<i>Prumnopitys taxifolia -Dacrydium dacrydioides</i>	1	30.6	Swamp	Forest
<i>Pteridium esculentum</i>	1	12.1	Fen	Fernland
<i>Pteridium esculentum</i> (AW)	62	116.8	Fen	Fernland
<i>Pteridium esculentum</i> ?	1	4.8	Fen	Fernland?
<i>Salix fragilis</i>	3	19.2	Swamp	Exotic treeland
<i>Salix fragilis/Ulex europaeus</i> ?	2	45.4	Swamp	Exotic treeland
<i>Samolus repens</i>	1	9.8	Marsh	Herbfield
Scrub (AW)	37	114.4	Fen	Shrubland & scrub
<i>Sophora microphylla</i>	1	30.9	Swamp	Forest
<i>Sophora microphylla-Plagianthus regius</i>	1	21.9	Swamp	Treeland
<i>Sphagnum</i> (AW)	187	273.0	Bog	Mossfield
<i>Sphagnum cristatum</i>	10	148.3	Bog	Mossfield
<i>Sphagnum cristatum-Empodisma minus</i>	1	27.1	Bog	Mossfield, wire rushland
<i>Sphagnum cristatum-S. falcatulum-Empodisma minus</i>	1	5.6	Bog	Mossfield
<i>Sphagnum cristatum/Empodisma minus</i>	1	6.3	Bog	Mossfield
<i>Ulex europaeus</i>	7	152.7	Bog	Exotic shrubland
<i>Ulex europaeus</i> (AW)	25	94.9	Fen	Exotic grass-/herb-/shrubland/scrub/forest
<i>Ulex europaeus-Amelanchier</i>	1	13.1	Bog	Exotic shrubland
<i>Ulex europaeus-Amelanchier-Betula</i>	1	21.5	Bog	Exotic shrubland
<i>Ulex europaeus</i> -exotic grasses	1	11.4	Fen	Exotic shrubland
<i>Ulex europaeus/Chionochloa rubra</i> /grass	1	25.7	Fen	Tussockland
<i>Ulex europaeus/Cytisus scoparius</i>	2	103.6	Fen	Exotic shrubland
<i>Ulex europaeus/Empodisma minus</i>	2	18.2	Bog	Exotic shrubland
<i>Ulex europaeus/Leptospermum scoparium/Empodisma minus</i>	1	61.4	Fen	Exotic shrubland
<i>Ulex europaeus</i> /exotic grasses- <i>Juncus</i>	2	52.4	Marsh?	Exotic shrubland
<i>Ulex europaeus</i> ?	2	35.5	Fen	Exotic scrub?

### 5.2.2 Awarua-Waituna current wetlands

Analysis of the current Awarua-Waituna palustrine wetlands reveal they are mainly bog (12 143 ha; 91%), with smaller areas of fen (909 ha; 7%), swamp (122 ha; 1%) and marsh (52 ha; <1%) (Table 6). There was doubt about the classification of 20 polygons dominated by oioi (*Apodasmia similis*) and one by silver tussock (*Poa cita*) with regard to hydrosystem and/or wetland class at the broader mapping scale. In addition, 120 polygons were categorised by Boffa Miskell and Urtica Inc. (2010) as having N/A vegetation, and may not qualify as palustrine wetlands. Uncertainties are indicated by a question mark. However, as these represent only a minor proportion of the area that was mapped, they should not markedly affect overall proportions and patterns.

**Table 6** Current Awarua/Waituna wetlands by vegetation structural class

Wetland Class	Wetland Type	Structural Class	Vegetation	Area (ha)	Wetland count	Total Area (ha)
Bog	B1	Wire rushland	Wire rush	801.2	227	801.2
Bog	B2	Mossfield	Sphagnum	275.3	189	275.3
Bog	B4	Shrubland	Bog pine	1.5	3	
Bog	B4	Shrubland	Dense manuka	5921.6	543	
Bog	B4	Shrubland	Semi-open manuka	4983.2	596	10906.4
Bog	B5	Open water	NA	160.5	887	160.5
Fen	F1	Sedgeland	Baumea	47.2	15	
Fen	F1	Sedgeland	Carex	140.2	69	187.4
Fen	F2	Tussockland	Red tussock	315.7	123	315.7
Fen	F4	Fernland	Bracken	116.8	62	116.8
Fen	F6	Shrubland & scrub	Grey scrub	114.4	37	114.4
Fen	F7	Forest	Tall podocarp	2.6	1	2.6
Fen	F8	Exotic grass-/herb-/shrubland/scrub/forest	Exotic forest	20.3	5	
Fen	F8	Exotic grass-/herb-/shrubland/scrub/forest	Gorse	94.9	25	
Fen	F8	Exotic grass-/herb-/shrubland/scrub/forest	Pasture	56.9	22	172
Marsh	M2	Rushland/sedgeland/shrubland/grassland	Toetoe	11.5	7	11.5
Marsh	M2/3	Rushland/sedgeland/shrubland/grassland/Exotic grass-/herb-	Juncus	40.5	27	40.5
Swamp	S3	Flaxland	Flax	105.8	68	105.8
Swamp	S5	Treeland	Cabbage tree	1.7	3	1.7
Swamp	S8	Open water	NA	14.5	22	14.5
?	?		Silver tussock	4.0	1	4.0

?	?	Oioi	44.7	20	44.7
?	?	N/A	946.5	120	946.5

### 5.3 Historic wetlands

Historic wetlands that passed the filtering process of Fitzgerald et al. (2010) were assigned to one of four wetland classes: bog, fen, swamp, and marsh (Table 7). There was some uncertainty about the correct wetland class of 57 wetland areas which require further advice or field checking (see Appendix 3, Excel spreadsheet). In addition, several polygons comprised a mosaic of wetland classes, e.g., swamp, fen and bog, or only a proportion of the polygon was considered to be wetland, e.g., small valley floor ‘fingers’ at the base of hill slopes. It is recommended that these be refined based on extant wetland information including the current vegetation map from this project, and the Topoclimate South 1:50 000 soil map series (1999–2001), as soils provide an indication of original vegetation and hence wetland class.

For Awarua-Waituna historic wetlands, the relevant WONI polygon area (ranging from a few square metres to >500 ha in area) was divided into 85% bog, 15% fen, 5% swamp on the basis of expert knowledge and current vegetation. This is similar to current wetland class proportions of 91% bog, 7% fen and 1% swamp (see section 5.2.2), which reflects the fact that greater portions of swamps and fens are more likely to have been developed as they are more fertile and easier to drain than peat bogs. Current wetland maps and soils information, e.g., from Topoclimate South soil map series, would be useful in further refinement and delineation of the wetland classes.

**Table 7** Historic (circa 1840) Southland wetlands identified in this project by wetland class. Question marks indicate uncertainty in assigning the wetland to class

Wetland Class	Wetland Count	Total Area (ha)
?	57	2446.1
Bog	223	30,741.5
Fen	329	46 111.1
Fen?	7	1044.4
Marsh	19	6819.0
Marsh?	2	0.8
Swamp	127	188 612.1
Swamp?	11	2759.1
Total	775	278 534.2

### 5.4 Representativeness of current wetlands

The representativeness of current wetland extent and class compared to former baselines can be estimated (see Tables 3 and 7). Where wetland extent or wetland class could not be confidently assigned, these data have been excluded. These ‘question mark’ data represent only a small proportion of the total areas, and therefore should not markedly affect overall

trends. Approximately 10% of wetlands remain in the Southland region study area (Table 8). Of these, bogs are well represented with 64% remaining. The remaining wetland classes are poorly represented, with 13% for fens, 4% for marshes and 1% for swamps.

These results indicate bogs would score lower than swamps in the Representativeness criterion of the Environment Southland Wetland Evaluation Protocol (Clarkson 2009). At the Ecological Unit (EU) level (vegetation and landform), *Empodisma minus* wire rushland on blanket bog near Awarua-Waituna would probably score ‘low’ as it is well protected in the Awarua-Waituna system; however, a *Halocarpus bidwillii* shrubland on raised bog would score ‘high’ or ‘very high’ as there are very few remaining. A second aspect for assessing the Representativeness score is Representative Quality where the EU is assessed as being a poor, typical, one of the better, or exemplary example of its type. For the resource consent process, each wetland should be taken on a case by case basis and adequate ecological information supplied to be able to assess its relative significance using all seven criteria in the evaluation protocol. The high overall loss of wetlands in the study area (90%) indicates that all wetlands could be considered significant, and protection of more bogs may be the only way to redress the imbalance.

**Table 8** Proportions of current wetlands compared with historical baselines

Wetland Class	Current Area (ha)	Historic Area (ha)	% Remaining
Bog	19590.1	30741.5	64
Fen	5855.1	46111.1	13
Marsh	284.2	6819.0	4
Swamp	2084.9	188612.1	1
Total	27814.4	272283.7	10

## 6 Conclusions

The current and historical wetland data provide a regional framework for assessing representativeness and significance of wetlands (Environment Southland Wetland Evaluation Protocol; Clarkson 2009) to inform resource consents. The data show that 90% of wetlands have been lost from the study area and that the extent of the loss varies according to wetland class. Bogs are relatively well represented; however, the other three wetland classes – fens, marshes, swamps – are not. The order of significance, based on representativeness according to wetland class, is swamp>marsh>fen>bog. However, because of the large extent of loss of wetlands overall, virtually all remaining wetlands could be considered significant.

## 7 Recommendations

Wetland areas that could not be confidently assigned to wetland class, structural class, or species composition should be investigated further, possibly requiring field checking, and soils information. Wetlands requiring further checking are summarised in Appendix 2 (current) and Appendix 3 (historic). Extra information on decisions, rules, etc., is stored in the shape file and in an Excel spreadsheet provided with this report.



## 8 Acknowledgements

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## Appendix 1 – Current wetlands of Southland excluding Awarua-Waituna

ID	Wetland class	Structural class	Species composition	Area (ha)
1001	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	26.1
1002	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	7.6
1003	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	11.4
1004	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.6
1005	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.0
1006	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	6.5
1007	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.0
1008	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	6.0
1009	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	10.4
1010	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	16.6
1011	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	15.5
1012	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	13.0
1013	Fen	Sedgeland	Carex/moss	5.8
1014	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	12.6
1015	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	12.7
1016	Fen	Sedgeland	Carex/moss	5.6
1017	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	9.6
1018	Fen	Sedgeland	Carex/moss	5.5
1019	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	7.5
1020	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	9.0
1021	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	51.8
1022	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	17.4
1023	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	6.6
1024	Fen	Herbfield,mossfield,sedgeland	Oreobolus pectinatus/mixed herb/moss/sedge	10.9
1025	Fen	Herbfield,mossfield,sedgeland	Oreobolus pectinatus/mixed herb/moss/sedge	10.3
1026	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	6.2
1027	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	12.0
1028	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	7.6
1029	Fen	Herbfield,wire rushland,sedgeland	Mixed herb/moss/sedge	9.0
1030	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	7.3
1031	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.3
1032	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	10.4
1033	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.6
1034	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	6.3
1035	Fen	Mossfield	Carex/moss	5.0
1036	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	9.8
1037	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.9
1038	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	9.5
1039	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.0
1040	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	30.8
1041	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	12.9
1042	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	6.4
1043	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	11.0
1044	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	7.4
1045	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	9.5
1046	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	12.7
1047	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	7.5
1048	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	8.1
1049	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	8.6

1050	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.4
1051	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	9.8
1052	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.3
1053	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	6.6
1054	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	6.3
1055	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	15.1
1056	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	29.7
1057	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	58.5
1058	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	9.1
1059	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	7.7
1060	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	5.8
1061	Bog	Sedgeland,mossfield,herbfield, cushionfield	<i>Carex gaudichaudiana/Sphagnum cristatum-Oreobolus pectinatus</i> -mixed herbs	63.2
1062	Bog	Sedgeland, mossfield,herbfield, cushionfield	<i>Carex gaudichaudiana/Sphagnum cristatum-Oreobolus pectinatus</i> -mixed herbs	18.2
1063	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	7.4
1064	Fen	Herbfield,mossfield,sedgeland	Mixed herb/moss/sedge	10.5
1065	Marsh	Sedgeland	<i>Phormium tenax/Carex gaudichaudiana</i>	9.8
1065a	Swamp	Exotic treeland	<i>Salix fragilis</i>	6.5
1066	Swamp	Sedgeland	( <i>Phormium tenax</i> )/ <i>Carex gaudichaudiana</i> - <i>Carex diandra</i>	17.4
1067	Fen	Wire rushland	<i>Chionochloa rubra/Empodisma minus</i> - <i>Carex</i>	15.8
1068	Fen	Wire rushland	<i>Empodisma minus-Carex</i>	20.3
1069	Fen	Tussockland	<i>Chionochloa rubra</i>	7.0
1070	Fen	Sedgeland	<i>Carex</i> spp- <i>Chionochloa rubra</i>	15.2
1071	Fen	Sedgeland	<i>Carex</i> spp/ <i>Chionochloa rubra</i>	5.9
1072	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	140.2
1073	Fen	Wire rushland	( <i>Dracophyllum oliveri</i> )-(Halocarpus <i>bidwilli</i> )- <i>Chionochloa rubra</i> / <i>Empodisma minus</i>	28.2
1074	Fen	Sedgeland	<i>Carex coriacea-Empodisma minus</i>	31.5
1075	Fen	Tussockland	<i>Chionochloa rubra/Carex</i> spp	22.9
1076	Bog	Wire rushland	<i>Empodisma minus</i>	96.4
1077	Bog	Mossfield	<i>Dracophyllum oliveri/Empodisma minus/Sphagnum cristatum</i>	360.1
1078	Swamp	Sedgeland	<i>Carex</i> /moss	5.4
1079	Bog	Wire rushland	<i>Empodisma minus-Dracophyllum oliveri</i>	86.0
1080	Swamp	Flaxland,sedgeland	<i>Carex ovalis-C. diandra</i>	87.4
1080a	Fen	Exotic shrubland	<i>Cytisus scoparius</i>	72.7
1080b	Fen	Shrubland	<i>Leptospermum scoparium</i>	12.9
1081	Fen	Shrubland	?	46.3
1082	Fen	Wire rushland	<i>Empodisma minus</i>	7.7
1083	Fen	Shrubland	<i>Dracophyllum oliveri/Sphagnum cristatum</i>	47.8
1084	Bog	Wire rushland	<i>Chionochloa rubra/Empodisma minus</i>	19.3
1084a	Fen	Tussockland	<i>Chionochloa rubra</i>	9.3
1085	Bog	Wire rushland	<i>Empodisma minus-Chionochloa rubra</i>	8.9
1086	Swamp	Exotic treeland	<i>Salix fragilis</i>	6.3
1087	Swamp	Exotic treeland	<i>Salix fragilis</i>	6.4
1088	Fen	Tussockland	<i>Chionochloa rubra</i> -exotic grasses	5.0
1089	Fen	Tussockland	<i>Chionochloa rubra</i> -exotic grasses	12.6
1090	Fen	Tussockland	<i>Chionochloa rubra</i> -exotic grasses	8.5
1091	Fen	Tussockland?	?	14.9
1092	Fen	Tussockland	<i>Chionochloa rubra</i>	8.5

1093	Fen	Tussockland	<i>Chionochloa rubra</i> -?	8.4
1094	Fen	Tussockland	<i>Chionochloa rubra</i>	8.0
1095	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	8.9
1096	Fen	Tussockland	<i>Chionochloa rubra</i>	7.3
1097	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	13.0
1098	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	7.8
1099	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	12.2
1100	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	5.0
1101	Fen	Wire rushland	<i>Empodisma minus</i> - <i>Chionochloa rubra</i>	5.6
1102	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	20.6
1102a	Fen	Wire rushland	<i>Empodisma minus</i> - <i>Chionochloa rubra</i>	70.5
1103	Bog	Wire rushland	<i>Empodisma minus</i>	61.3
1103a	Fen	Tussockland	<i>Chionochloa rubra</i> / <i>Empodisma minus</i>	6.1
1103b	Swamp	Treeland	<i>Prumnopitys taxifolia</i>	9.2
1103c	Swamp	Forest	<i>Prumnopitys taxifolia</i>	24.7
1104	Bog	Exotic shrubland	<i>Ulex europaeus</i>	14.1
1105	Swamp	Sedgeland	<i>Carex secta</i> - <i>C.spp</i> - <i>Eleocharis acuta</i> - <i>Phormium tenax</i>	7.7
1106	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Carex</i> -( <i>Empodisma minus</i> )-( <i>Juncus edgariae</i> )	22.5
1107	Swamp	Shrubland	<i>Coprosma propinqua</i> - <i>Phormium tenax</i>	11.6
1108	Bog	Wire rushland	<i>Empodisma minus</i>	9.3
1109	Fen	Tussockland	<i>Ulex europaeus</i> / <i>Chionochloa rubra</i> /grass	25.7
1110	Fen	Tussockland	<i>Chionochloa rubra</i>	13.5
1111	Fen	Tussockland	<i>Chionochloa rubra</i>	6.5
1112	Fen	Tussockland	<i>Chionochloa rubra</i>	6.0
1113	Fen	Tussockland	<i>Chionochloa rubra</i>	9.3
1114	Fen	Wire rushland	<i>Empodisma minus</i> - <i>Chionochloa rubra</i>	12.0
1115	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Carex coriacea</i>	11.9
1115a	Fen	Tussockland	<i>Chionochloa rubra</i>	70.8
1115b	Fen	Wire rushland	<i>Empodisma minus</i> - <i>Chionochloa rubra</i>	8.8
1115c	Fen	Wire rushland	<i>Empodisma minus</i> - <i>Chionochloa rubra</i>	7.1
1115d	Fen	Tussockland	<i>Chionochloa rubra</i> -exotic grasses	11.7
1116	Bog	Wire rushland	<i>Empodisma minus</i>	9.3
1117	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	18.3
1118	Bog	Wire rushland	<i>Empodisma minus</i>	10.4
1119	Fen	Exotic shrubland	<i>Cytisus scoparius</i> - <i>Empodisma minus</i>	26.0
1119a	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Coprosma propinqua</i> ?-exotic grasses	18.0
1120	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	36.5
1121	Bog	Wire rushland	<i>Empodisma minus</i>	57.7
1122	Bog	Wire rushland	<i>Empodisma minus</i>	10.0
1122a	Fen	Tussockland	<i>Chionochloa rubra</i> - <i>Leptospermum scoparium</i> -exotic grasses	9.1
1123	Fen	Wire rushland	<i>Chionochloa rubra</i> - <i>Empodisma minus</i>	5.6
1124	Bog	Wire rushland	<i>Empodisma minus</i>	53.2
1124a	Fen	Exotic shrubland	<i>Ulex europaeus</i> -exotic grasses	11.4
1124b	Fen	Grassland	Exotic grasses-?	11.0
1125	Bog	Exotic shrubland	<i>Ulex europaeus</i> / <i>Empodisma minus</i>	12.1
1126	Bog	Wire rushland	<i>Empodisma minus</i>	5.8
1127	Bog	Wire rushland	<i>Empodisma minus</i>	12.4
1128	Bog	Wire rushland	<i>Empodisma minus</i>	5.3
1129	Fen	Exotic grassland,shrubland	Exotic grass/ <i>Ulex europaeus</i>	19.2
1129a	Bog	Wire rushland	<i>Empodisma minus</i> - <i>Leptospermum scoparium</i> - <i>Ulex europaeus</i>	16.9
1129b	Fen	Forest	?	9.9

1129c	Fen	Forest	?	21.4
1130	Swamp	Flaxland,sedgeland,shrubland	<i>Phormium tenax/Carex spp/Leptospermum scoparium/exotic grasses</i>	11.8
1130a	Fen	Exotic shrubland	<i>Leptospermum scoparium-Empodisma minus-Ulex europaeus</i>	40.1
1131	Swamp	Flaxland	<i>Phormium tenax/Ulex europaeus/exotic grasses</i>	6.3
1131a	Fen	Shrubland	<i>Leptospermum scoparium-Coprosma propinqua</i>	11.9
1132	Fen	Scrub	<i>Leptospermum scoparium/Dacrydium cupressinum</i>	89.9
1132a	Marsh?	Exotic shrubland	<i>Ulex europaeus/exotic grasses-Juncus</i>	28.0
1132b	Marsh?	Exotic shrubland	<i>Ulex europaeus/exotic grasses-Juncus</i>	24.4
1133	Marsh	Rushland	<i>Apodasmia similis-(Juncus edgariae)</i>	35.2
1134	Fen	Scrub	<i>Leptospermum scoparium</i>	20.4
1135	Fen	Exotic shrubland	<i>Ulex europaeus/Cytisus scoparius</i>	6.7
1136	Fen	Exotic shrubland	<i>Ulex europaeus/Cytisus scoparius</i>	96.9
1137	Swamp	Shrubland	<i>Leptospermum scoparium</i>	31.8
1138	Fen	Shrubland	?	8.8
1139	Swamp	Sedgeland	<i>Carex-?</i>	119.1
1140	Fen	Exotic shrubland	<i>Ulex europaeus/Leptospermum scoparium/Empodisma minus</i>	61.4
1140a	Fen	Forest	<i>Dacrydium cupressinum/Weinmannia racemosa</i>	38.5
1140b	?	?	?	230.2
1140c	?	?	?	179.4
1141	Swamp	Exotic treeland	<i>Salix fragilis/Ulex europaeus?</i>	25.8
1142	Swamp	Exotic treeland	<i>Salix fragilis/Ulex europaeus?</i>	19.6
1142a	Fen	Forest	?	13.6
1142b	Fen	Forest	?	27.9
1142c	Fen	Forest	?	19.7
1142d	Fen	Forest	?	9.5
1142e	Fen	Forest	?	13.8
1143	Fen	?	?	6.1
1144	?	Shrubland	?	9.5
1145	Bog	Shrubland	<i>Leptospermum scoparium/Empodisma minus</i>	25.2
1146	Swamp	Sedgeland	<i>Carex spp/Eleocharis acuta-Coprosma spp</i>	9.5
1146a	Swamp	Forest	<i>Dacrydium cupressinum-Elaeocarpus hookerianus/Coprosma pedicellata</i>	28.5
1147	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	57.2
1148	Swamp	Scrub	<i>Coprosma propinqua</i>	15.7
1149	Marsh	Rushland	<i>Juncus spp-Carex spp-exotic grasses and herbs</i>	7.8
1149a	Fen	Shrubland	<i>Coprosma propinqua-Phormium tenax-Carex spp</i>	21.6
1150	Swamp	Scrub	<i>Coprosma</i>	16.1
1151	Fen	Sedgeland	?	24.2
1152	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	44.6
1152a	Fen	Shrubland	<i>Leptospermum scoparium/Coprosma spp</i>	182.1
1152b	Swamp	Forest	<i>Sophora microphylla</i>	30.9
1152c	Swamp	Treeland	<i>Dacrycarpus dacrydioides</i>	28.5
1152d	Swamp	Sedgeland	<i>Carex?</i>	8.1
1152e	Swamp?	Shrubland	<i>Coprosma?</i>	4.9
1153	Bog	Wire rushland	<i>Empodisma minus</i>	7.8
1153a	Fen	Tussockland	<i>Chionochloa rubra-Carex coriacea?</i>	23.1
1154	Bog	Wire rushland	<i>Empodisma minus</i>	17.3

1155	Fen	Tussockland	<i>Chionochloa rubra</i> / <i>Empodisma minus</i>	74.5
1155a	Fen	Shrubland	<i>Coprosma</i> spp-( <i>Melicytus flexuosus</i> )	68.8
1156	Bog	Wire rushland	<i>Empodisma minus</i>	10.3
1157	Bog	Wire rushland	<i>Empodisma minus</i>	32.1
1158	Bog	Wire rushland	<i>Empodisma minus</i>	12.4
1158a	Bog	Wire rushland	<i>Empodisma minus</i>	12.9
1159	Fen	Sedgeland	<i>Carex coriacea</i> - <i>C.secta</i> /exotic grasses	11.5
1160	Bog	Wire rushland	<i>Empodisma minus</i>	5.8
1161	Bog	Wire rushland	<i>Empodisma minus</i>	35.1
1162	Bog	Wire rushland	<i>Empodisma minus</i>	25.7
1163	Bog	Wire rushland	<i>Empodisma minus</i>	13.7
1164	Bog	Exotic grassland	Exotic grasses- <i>Empodisma minus</i>	7.2
1165	Bog	Exotic grassland	Exotic grasses- <i>Empodisma minus</i>	10.1
1166	Bog	Exotic grassland	Exotic grasses- <i>Empodisma minus</i>	10.4
1167	Fen	Exotic grassland	Exotic grasses- <i>Carex</i> spp	9.4
1168	Fen	Sedgeland	<i>Coprosma propinqua</i> / <i>Baumea rubiginosa</i> - <i>Empodisma minus</i>	24.6
1169	Swamp	?	?	122.3
1171	Bog	Wire rushland	<i>Empodisma minus</i>	11.0
1172	Bog	Wire rushland	<i>Empodisma minus</i>	528.5
1173	Bog	Wire rushland	<i>Empodisma minus</i>	143.2
1174	Bog	Wire rushland	<i>Empodisma minus</i>	7.4
1175	Bog	Wire rushland	<i>Empodisma minus</i>	249.5
1176	Bog	Wire rushland	<i>Empodisma minus</i>	24.3
1177	Bog	Wire rushland	<i>Empodisma minus</i>	30.2
1177a	Bog	Exotic shrubland	<i>Ulex europaeus</i>	29.6
1178	Bog	Wire rushland	<i>Empodisma minus</i>	68.5
1179	Marsh	Sedgeland,rushland,shrubland	<i>Carex secta</i> - <i>C.coriacea</i> - <i>Juncus edgariae</i> - <i>Phormium tenax</i> - <i>Coprosma propinqua</i>	11.0
1180	Fen	Exotic grassland,shrubland,rushland	Exotic grasses- <i>Carex coriacea</i> - <i>Coprosma</i> <i>propinqua</i> - <i>Juncus edgariae</i>	23.2
1180a	Fen	Shrubland	<i>Coprosma propinqua</i>	4.4
1180b	Marsh	Rushland,sedgeland	<i>Juncus edgariae</i> - <i>J. procerus</i>	5.2
1181	Marsh	Herbfield	<i>Samolus repens</i>	9.8
1182	Fen	Forest	<i>Dacrycarpus dacrydioides</i> - <i>Prumnopitys</i> <i>taxifolia</i> - <i>Dacrydium cupressinum</i>	24.2
1182a	Fen	Shrubland	<i>Coprosma tayloriae</i>	10.4
1183	Fen	Exotic grassland,shrubland	Exotic grasses/shrubs	6.8
1184	Bog	Fernland,wire rushland	<i>Gleichenia dicarpa</i> - <i>Empodisma minus</i>	23.4
1185	Fen	Fernland?	<i>Pteridium esculentum</i> ?	4.8
1186	Bog	Wire rushland	<i>Empodisma minus</i>	9.4
1187	Fen	Exotic rushland,exotic grassland,herbfield,shrubland	<i>Junus effusus</i> -exoticgrasses	77.9
1188	Marsh	Rushland	<i>Juncus edgariae</i>	22.9
1189a	Marsh	Flaxland,shrubland	<i>Phormium tenax</i> - <i>Coprosma propinqua</i>	7.1
1190	Fen	Shrubland	<i>Leptospermum scoparium</i> - <i>Coprosma</i> <i>propinqua</i> - <i>C. tayloriae</i> - <i>Pittosporum</i> <i>tenuifolium</i> - <i>Griselinia littoralis</i>	21.3
1191	Swamp	Shrubland,flaxland	<i>Coprosma propinqua</i> - <i>Phormium tenax</i>	6.2
1191a	Swamp	Forest	<i>Dacrycarpus dacrydioides</i>	27.9
1191b	Swamp	Forest	<i>Dacrycarpus dacrydioides</i>	19.2
1191c	Swamp	Forest	<i>Dacrycarpus dacrydioides</i> - <i>Prumnopitys</i> <i>taxifolia</i> - <i>Elaeocarpus hookerianus</i>	34.9
1191d	Swamp	Forest	<i>Dacrycarpus dacrydioides</i>	2.3
1191e	Swamp	Scrub	<i>Pittosporum tenuifolium</i> - <i>Cordyline</i> <i>australis</i> - <i>Leptospermum scoparium</i>	39.4
1192	Swamp	Forest	<i>Dacrycarpus dacrydioides</i> - <i>Prumnopitys</i>	13.2

1193	Swamp	Forest	<i>taxifolia</i> <i>Dacrycarpus dacrydioides-Prumnopitys</i>	7.1
1194	Bog	Wire rushland,shrubland,fernland	<i>taxifolia</i> <i>Empodisma minus-Leptospermum</i> <i>scoparium-Gleichenia dicarpa</i>	74.9
1195	Bog	Wire rushland,shrubland,fernland	<i>Empodisma minus-Leptospermum</i> <i>scoparium-Gleichenia dicarpa</i>	56.5
1195a	Bog	Wire rushland	<i>Empodisma minus</i>	8.1
1196	Swamp	Forest	<i>Prumnopitys taxifolia -Dacrycarpus</i> <i>dacrydioides</i>	30.6
1197	Swamp	Exotic shrubland	<i>Ulex europaeus/Empodisma minus</i>	6.1
1198	Swamp	Forest	<i>Dacrycarpus dacrydioides-Prumnopitys</i> <i>taxifolia</i>	19.2
1199	Bog	Exotic shrubland	<i>Ulex europaeus</i>	10.2
1200	Bog	?	?	60.1
1200a	Bog	Wire rushland	?	34.0
1201	Bog	Exotic shrubland	<i>Ulex europaeus-Amelanchier</i>	13.1
1202	Bog	Wire rushland	<i>Empodisma minus</i>	13.7
1203	Bog	Exotic shrubland	<i>Ulex europaeus</i>	33.8
1204	Bog	Wire rushland	<i>Empodisma minus</i>	29.2
1205	Bog	Wire rushland	<i>Empodisma minus</i>	14.4
1206	Bog	Wire rushland	<i>Empodisma minus</i>	34.1
1207	Bog	Exotic shrubland	<i>Ulex europaeus</i>	13.4
1208	Bog	Exotic shrubland	<i>Ulex europaeus</i>	20.2
1209	Bog	Wire rushland	<i>Empodisma minus</i>	19.0
1210	Bog	Wire rushland	<i>Empodisma minus</i>	8.3
1211	Bog	Exotic shrubland	<i>Ulex europaeus-Amelanchier-Betula</i>	21.5
1212	Bog	Wire rushland	<i>Empodisma minus</i>	11.2
1213	Swamp	Treeland	<i>Sophora microphylla-Plagianthus regius</i>	21.9
1214	Fen?	Exotic scrub?	<i>Ulex europaeus?</i>	23.1
1214a	Bog	Wire rushland	<i>Empodisma minus-Ulex europaeus</i>	5.8
1214b	Swamp	Scrub	<i>Coprosma spp-(Olearia lineata-</i> <i>O.laxiflora-Sophora microphylla-</i> <i>Dacrycarpus dacrydioides)</i>	9.6
1215	Bog	Exotic shrubland	<i>Ulex europaeus</i>	31.4
1215a	Swamp	Shrubland	<i>Coprosma propinqua?</i>	5.9
1215b	Swamp	Scrub	<i>Coprosma propinqua?</i>	3.4
1215c	Swamp	Shrubland	<i>Coprosma propinqua/Carex secta-</i> <i>Phormium tenax</i>	9.8
1215d	Swamp	Forest	<i>Dacrydium cupressinum-?</i>	24.0
1215e	Swamp	Forest	<i>Dacrydium cupressinum</i>	8.3
1215f	Swamp	Sedgeland	<i>Carex spp-Coprosma spp-Olearia</i> <i>laxiflora-exotic grasses</i>	52.1
1215g	Swamp	Shrubland	<i>Coprosma propinqua-sedge?</i>	6.5
1215h	Swamp	Sedgeland	<i>Carex secta-Coprosma propinqua</i>	5.2
1216	Swamp?	Flaxland?	<i>Phormium tenax?</i>	12.3
1217	Fen	Exotic scrub?	<i>Ulex europaeus?</i>	12.4
1219	Swamp	Flaxland	<i>Phormium tenax-Ulex europaeus</i>	24.2
1220	Swamp	Flaxland	<i>Phormium tenax-Carex coriacea-</i> <i>Coprosma propinqua</i>	11.0
1221	Marsh	Rushland	<i>Apodasma similis-Juncus-exotic herbs</i>	27.9
1223	Fen	Shrubland	<i>Leptospermum scoparium</i>	25.3
1223a	Fen	Forest	?	12.1
1223b	Fen	Shrubland	<i>Leptospermum scoparium?</i>	8.6
1224	Bog	?	?	10.0
1225	Fen	Fernland	<i>Pteridium esculentum</i>	12.1
1225a	Fen	Shrubland	<i>Leptospermum scoparium</i>	4.3

1226	Fen	Shrubland	<i>Leptospermum scoparium</i>	6.6
1227	Bog	Shrubland	<i>Leptospermum scoparium</i>	42.9
1227a	Bog	Shrubland	<i>Leptospermum scoparium</i>	15.9
1228	Fen	Shrubland	<i>Leptospermum scoparium</i>	17.4
1229	Fen	Shrubland	<i>Leptospermum scoparium</i>	16.5
1231	Fen	Wire rushland	<i>Empodisma minus-Leptospermum scoparium</i>	84.9
1234	Bog	Shrubland	<i>Leptospermum scoparium</i>	46.0
1235	Marsh	Rushland	<i>Apodasmia similis</i>	5.8
1236	Bog	Shrubland	<i>Leptospermum scoparium</i>	11.7
1237	Bog	Shrubland	<i>Leptospermum scoparium</i>	23.1
1238	Bog	Exotic grassland	<i>Exotic grasses-Juncus-Carex coriacea-Sphagnum cristatum</i>	5.5
1239	Bog	Wire rushland	<i>Empodisma minus-Gleichenia dicarpa/Sphagnum cristatum</i>	12.0
1240	Fen	Rushland	<i>Juncus-exotic grasses</i>	78.9
1241	Fen	Forest	<i>Dacrydium cupressinum</i>	19.5
1243	Fen	Shrubland	?	14.9
1245	Bog	Shrubland	<i>Leptospermum scoparium</i>	6.2
1248	Bog	Shrubland	<i>Leptospermum scoparium</i>	7.8
1249	Bog	Shrubland	<i>Leptospermum scoparium</i>	43.6
1250	Bog	Shrubland	<i>Leptospermum scoparium</i>	148.9
1251	Bog	Shrubland	<i>Leptospermum scoparium</i>	15.1
1252	Bog	Shrubland	<i>Leptospermum scoparium</i>	16.3
1253	Bog	Shrubland	<i>Leptospermum scoparium</i>	33.6
1254	Bog	Shrubland	<i>Leptospermum scoparium</i>	64.6
1255	Bog	Shrubland	<i>Leptospermum scoparium</i>	211.6
1256	Bog	Shrubland	<i>Leptospermum scoparium</i>	6.8
1258	Fen	Shrubland	<i>Leptospermum scoparium-Phormium tenax/Empodisma minus</i>	13.4
1259	Fen	Tussockland	<i>Chionochloa rubra</i>	6.4
1260	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	9.1
1261	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	8.1
1261a	Fen	Tussockland	<i>Empodisma minus/Sphagnum cristatum</i>	15.4
1261b	Fen	Tussockland	<i>Empodisma minus/Sphagnum cristatum</i>	67.0
1262	Bog	Wire rushland	<i>Empodisma minus</i>	17.5
1263	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	6.2
1264	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	5.8
1264a	Fen	Tussockland	<i>Chionochloa rubra</i>	18.1
1264b	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	17.7
1265	Bog	Wire rushland	<i>Empodisma minus</i>	825.1
1266	Bog	Wire rushland	<i>Empodisma minus</i>	21.7
1267	Fen	Tussockland	<i>Chionochloa rubra</i>	141.1
1268	Bog	Wire rushland	<i>Empodisma minus</i>	11.3
1269	Bog	Wire rushland	<i>Empodisma minus</i>	10.4
1270	Bog	Wire rushland	<i>Empodisma minus</i>	16.8
1271	Bog	Wire rushland	<i>Empodisma minus</i>	113.4
1272	Bog	Wire rushland,mossfield	<i>Empodisma minus-Sphagnum cristatum</i>	77.3
1272a	Bog	Wire rushland	<i>Empodisma minus</i>	8.1
1272b	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	11.6
1272c	Bog	Wire rushland	<i>Empodisma minus</i>	4.1
1272d	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	37.4
1272e	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	36.3
1272f	Fen	Tussockland	<i>Chionochloa rubra/Empodisma minus</i>	21.5
1273	Bog	Wire rushland	<i>Empodisma minus</i>	8.0
1274	Bog	Wire rushland	<i>Empodisma minus-(Gleichenia dicarpa)</i>	19.9



1275	Bog	Wire rushland	<i>Empodisma minus</i>	21.5
1276	Bog	Wire rushland	<i>Empodisma minus</i>	172.7
1277	Bog	Wire rushland	<i>Empodisma minus-Dracophyllum oliveri</i>	91.8
1278	Fen	Tussockland	<i>Chionochloa rubra</i>	27.8
1279	Fen	Tussockland	<i>Chionochloa rubra</i>	7.9
1280	Bog	Wire rushland	<i>Empodisma minus</i>	10.8
1281	Bog	Wire rushland	<i>Empodisma minus</i>	242.2
1281a	Swamp	Sedgeland	<i>Phormium tenax-Carex sp</i>	30.5
1282	Bog	Wire rushland	<i>Empodisma minus</i>	62.4
1283	Fen	Tussockland	<i>Chionochloa rubra</i>	282.4
1284	Fen	Tussockland	<i>Chionochloa rubra</i>	115.9
1285	Fen	Tussockland	<i>Chionochloa rubra</i>	19.9
1286	Fen	Tussockland	<i>Chionochloa rubra</i>	67.3
1286a	Fen	Tussockland	<i>Chionochloa rubra/exotic grasses/Empodisma minus</i>	76.1
1286b	?	?	?	126.6
1287	Bog	Wire rushland	<i>Empodisma minus</i>	23.6
1288	Fen	Tussockland	<i>Chionochloa rubra-Empodisma minus-exotic grasses</i>	59.6
1289	Marsh	Sedgeland	<i>Carex sp</i>	42.0
1290	Marsh	Sedgeland	<i>Carex-exotic grasses</i>	6.5
1291	Marsh	Sedgeland	<i>Carex-exotic grasses</i>	18.6
1291a	Marsh	Sedgeland	<i>Carex-exotic grasses</i>	3.4
1291b	Marsh	Sedgeland	<i>Carex-exotic grasses</i>	4.8
1292	Fen	Sedgeland	<i>Carex-exotic grasses</i>	6.5
1293	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	4.0
1294	Fen	Sedgeland	<i>Carex sp</i>	3.9
1295	Fen?	Sedgeland?	?	4.0
1296	Fen?	Sedgeland?	?	23.1
1297	Fen	Tussockland	<i>Chionochloa rubra</i>	26.2
1297a	Fen	Mossfield	<i>Carex sp/moss</i>	7.5
1297b	Fen	Sedgeland	<i>Carex sp/moss</i>	9.0
1297c	Fen	Sedgeland	<i>Carex sp/grass</i>	25.1
1297d	Fen	Sedgeland	<i>Carex sp/grass</i>	55.0
1298	Fen?	Sedgeland?	?	16.6
1298a	Fen	Sedgeland	?	3.6
1299	Fen	Sedgeland	?	37.8
1299a	Fen	Sedgeland	?	5.7
1300	Swamp	Flaxland	<i>Phormium tenax/Carex</i>	56.7
1301	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	56.4
1302	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	10.7
1303	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	10.2
1304	Bog	Mossfield	<i>Sphagnum cristatum</i>	3.3
1305	Swamp	Sedgeland	<i>Carex sinclairii-C. diandra</i>	17.4
1306	Bog	Mossfield	<i>Sphagnum cristatum</i>	6.3
1307	Swamp	Sedgeland	<i>Carex</i>	45.4
1308	Swamp	Sedgeland	<i>Carex?</i>	24.7
1309	Fen	Tussockland	<i>Chionochloa rubra</i>	50.6
1310	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	6.5
1310a	Swamp	Sedgeland	<i>Carex spp</i>	43.9
1310b	Fen	Tussockland	<i>Chionochloa rubra/Sphagnum cristatum</i>	23.2
1311	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	40.8
1312	Fen	Tussockland?	<i>Chionochloa rubra/Empodisma minus</i>	34.6
1313	Bog	Wire rushland	<i>Empodisma minus</i>	20.4
1313b	Bog	Wire rushland	<i>Empodisma minus</i>	28.8
1314	Fen	Wire rushland	<i>Empodisma minus</i>	49.2

1315	Fen	Wire rushland	<i>Empodisma minus</i>	19.9
1316	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	99.6
1317	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	8.7
1318	Bog	Mossfield	<i>Sphagnum cristatum</i>	5.3
1319	Swamp	Sedgeland	<i>Carex secta</i>	7.0
1319a	Bog	Mossfield	<i>Sphagnum cristatum</i>	3.4
1320	Bog	Mossfield	<i>Sphagnum cristatum</i>	41.1
1321	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	9.3
1322	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	30.3
1323	Bog	Mossfield	<i>Sphagnum cristatum</i>	5.1
1324	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	20.0
1325	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	12.8
1326	Bog	Mossfield	<i>Dracophyllum oliveri/Empodisma minus/Sphagnum cristatum</i>	6.5
1327	Bog	Mossfield	<i>Dracophyllum oliveri/Empodisma minus/Sphagnum cristatum</i>	4.8
1328	Bog	Mossfield	<i>Sphagnum cristatum</i>	3.2
1329	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	8.3
1330	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	11.9
1331	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	7.3
1332	Bog	Mossfield	<i>Dracophyllum oliveri/Empodisma minus/Sphagnum cristatum</i>	59.5
1333	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	22.0
1334	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	6.8
1335	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	8.0
1336	Bog	Wire rushland	<i>Empodisma minus</i>	11.8
1336a	Fen	Mossfield	<i>Leptospermum scoparium?/Sphagnum cristatum</i>	30.0
1337	Bog	Wire rushland	<i>Empodisma minus</i>	10.9
1338	Bog	Wire rushland	<i>Dracophyllum oliveri/Empodisma minus/Sphagnum cristatum</i>	27.8
1339	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	4.9
1340	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	5.4
1341	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	7.5
1342	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	5.9
1343	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	6.9
1344	Bog	Wire rushland	<i>Dracophyllum oliveri/Empodisma minus</i>	17.2
1345	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	34.5
1346	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	11.7
1347	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	8.3
1347a	Fen	Flaxland?	<i>Phormium tenax/Carex spp?</i>	4.7
1348	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	8.2
1349	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	17.8
1350	Fen	?	?	11.3
1351	Bog	Shrubland	<i>Dracophyllum oliveri/Empodisma minus</i>	5.6
1352	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	17.1
1353	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	17.2
1354	Fen	Sedgeland	<i>Phormium tenax/Carex/Baumea rubiginosa</i>	13.7
1355	Fen	Shrubland	<i>Leptospermum scoparium</i>	7.7
1356	Fen	Shrubland	<i>Leptospermum scoparium</i>	30.4
1357	Bog	Wire rushland	<i>Empodisma minus</i>	5.1
1358	Fen	Shrubland	<i>Leptospermum scoparium</i>	18.9
1359	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	165.6
1360	Fen	Shrubland	<i>Leptospermum scoparium</i>	12.7
1361	Fen	Sedgeland	<i>Carex?</i>	33.1

1361a	Swamp	Sedgeland	<i>Phormium tenax/Carex</i> spp	61.4
1361b	Swamp	Flaxland	<i>Phormium tenax</i>	19.1
1362	Bog	Wire rushland	<i>Empodisma minus</i>	5.9
1363	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	7.9
1364	Swamp	Flaxland,sedgeland	<i>Phormium tenax/Carex secta</i>	136.4
1364a	Fen	Wire rushland	<i>Empodisma minus</i>	9.6
1364b	Fen	Wire rushland	<i>Empodisma minus</i>	2.6
1365	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	8.7
1366	Bog	Mossfield	<i>Sphagnum cristatum</i>	8.3
1367	Bog	Wire rushland	<i>Empodisma minus</i>	16.1
1368	Bog	Mossfield	<i>Sphagnum cristatum/Empodisma minus</i>	6.3
1369	Bog	Wire rushland	<i>Empodisma minus</i>	20.7
1370	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	7.3
1371	Bog	Wire rushland	<i>Empodisma minus</i>	18.8
1372	Swamp	Sedgeland	<i>Carex</i>	79.8
1372a	Swamp	Sedgeland	<i>Carex</i>	18.2
1372b	Swamp	Sedgeland	<i>Carex</i>	8.2
1373	Fen	Wire rushland	<i>Empodisma minus/Halocarpus bidwillii/Coprosma</i>	8.8
1374	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	17.1
1375	Swamp?	Exotic grassland	Exotic grasses	5.2
1376	Fen	Mossfield	<i>Carex/Sphagnum cristatum</i>	10.1
1376a	Fen	Tussock,sedgeland	<i>Chionochloa rubra-Carex</i>	84.2
1376b	Fen	Tussockland	<i>Chionochloa rubra/Sphagnum cristatum</i>	49.8
1376c	Fen	Sedgeland	<i>Carex/Sphagnum?</i>	11.5
1376d	Swamp	Sedgeland	<i>Carex secta-?</i>	24.9
1377	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	8.6
1378	Bog	Wire rushland	<i>Empodisma minus</i>	16.1
1379	Fen	Shrubland	<i>Leptospermum scoparium</i>	51.8
1380	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	78.9
1381	Swamp	Sedgeland	<i>Carex</i> spp	118.7
1381a	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	53.4
1382	Bog	Mossfield	<i>Sphagnum cristatum-S. falcatulum- Empodisma minus</i>	5.6
1383	Bog	Mossfield,wire rushland	<i>Sphagnum cristatum-Empodisma minus</i>	27.1
1384	Bog	Mossfield	<i>Sphagnum cristatum</i>	6.7
1385	Swamp	Flaxland,sedgeland	<i>Phormium tenax-Carex</i>	33.5
1385a	Swamp	Treeland,shrubland	<i>Cordyline australis/Coprosma</i> spp	20.5
1385b	Swamp	Sedgeland	<i>Carex ovalis-Carex</i> spp	20.3
1385c	Swamp	Exotic shrubland,flaxland	<i>Cytisus scoparius-Phormium tenax</i>	23.4
1386	Swamp	Exotic forest	Exotic trees	8.8
1387	Bog	Wire rushland	<i>Empodisma minus</i>	14.2
1388	Swamp	Exotic forest	Exotic trees	9.7
1389	Fen	Wire rushland	<i>Empodisma minus</i>	6.1
1390	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	13.6
1392	Bog	Wire rushland	<i>Empodisma minus</i>	197.5
1392a	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	75.4
1392b	Bog	Mossfield	<i>Sphagnum cristatum</i>	65.6
1393	Swamp	Sedgeland	<i>Carex-?</i>	24.7
1393a	Swamp	Sedgeland	<i>Carex secta?</i>	10.3
1393b	?	?	?	22.0
1394	Swamp	Sedgeland	<i>Carex-?</i>	20.0
1395	Fen	?	?	9.9
1403	Fen	?	?	10.4
1404	Swamp	Tussockland	<i>Chionochloa rubra</i>	18.7
1405	Swamp	Tussockland	<i>Chionochloa rubra</i>	11.4

1406	Fen	Tussockland	<i>Chionochloa rubra</i>	45.8
1407	Marsh	?	?	14.4
1408	Swamp	Sedgeland	<i>Carex</i> spp	14.9
1409	Bog	Wire rushland	<i>Empodisma minus</i>	18.2
1410	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	13.8
1411	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	8.8
1412	Fen?	Wire rushland	<i>Empodisma minus-Leptospermum scoparium</i>	5.2
1413	Fen	Wire rushland,fernland	<i>Empodisma minus-Pteridium esculentum</i>	12.2
1414	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	25.9
1415	Bog	Wire rushland	<i>Empodisma minus/Sphagnum cristatum</i>	25.2
1416	Marsh?	?	?	64.3
1417	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	42.1
1418	Swamp	?	?	6.2
1419	?	?	?	11.7
1420	Swamp	Sedgeland?	<i>Carex?</i>	4.5
1421	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	5.0
1422	?	?	?	19.2
1423	Bog	Mossfield	<i>Empodisma minus/Sphagnum cristatum</i>	15.0
1424	?	Sedgeland?	?	11.4

## Appendix 2 – Current wetland polygons that require further checking

LCR ID Code	DOC ID Code	NOTES	Area (ha)	Structure class	Wetland Class	Vegetation	Wetland type
1143			6.1	?	Fen	?	?
1169		Not in WONI	122.3	?	Swamp	?	?
1200			60.1	?	Bog	?	?
1224		Not in WONI	10.0	?	Bog	?	?
1350			11.3	?	Fen	?	?
1395			9.9	?	Fen	?	?
1403			10.4	?	Fen	?	?
1407		Google maps	14.4	?	Marsh	?	?
1416		Google maps	64.3	?	Marsh?	?	?
1418		Google maps	6.2	?	Swamp	?	?
1419		Not in WONI. Google maps	11.7	?	?	?	?
1422		Not in WONI. Google Maps	19.2	?	?	?	?
1286b			126.6	?	?	?	?
1140b			230.2	?	?	?	?
1140c			179.4	?	?	?	?
1393b			22.0	?	?	?	?
	77	Source: Waituna Wetlands DOC	0.2	?	?	?	?
	113	Source: Waituna Wetlands DOC	14.4	?	?	?	?
	116	Source: Waituna Wetlands DOC	2.5	?	?	?	?
	119	Source: Waituna Wetlands DOC	3.5	?	?	?	?
	120	Source: Waituna Wetlands DOC	0.2	?	?	?	?
	121	Source: Waituna Wetlands DOC	1.4	?	?	Oioi	?
	122	Source: Waituna Wetlands DOC	2.0	?	?	Oioi	?
	126	Source: Waituna Wetlands DOC	2.2	?	?	?	?
	127	Source: Waituna Wetlands DOC	5.3	?	?	?	?
	128	Source: Waituna Wetlands DOC	3.9	?	?	?	?
	596	Source: Waituna Wetlands DOC	0.6	?	?	?	?

987	Source: Waituna Wetlands DOC	10.4	?	?	?	?
992	Source: Waituna Wetlands DOC	39.2	?	?	?	?
993	Source: Waituna Wetlands DOC	10.6	?	?	?	?
996	Source: Waituna Wetlands DOC	16.4	?	?	?	?
1003	Source: Waituna Wetlands DOC	6.2	?	?	?	?
1034	Source: Waituna Wetlands DOC	0.1	?	?	?	?
1036	Source: Waituna Wetlands DOC	3.4	?	?	?	?
1044	Source: Waituna Wetlands DOC	4.3	?	?	?	?
1049	Source: Waituna Wetlands DOC	14.8	?	?	?	?
1050	Source: Waituna Wetlands DOC	0.1	?	?	?	?
1051	Source: Waituna Wetlands DOC	1.1	?	?	?	?
1056	Source: Waituna Wetlands DOC	0.5	?	?	Oioi	?
1071	Source: Waituna Wetlands DOC	4.9	?	?	?	?
1072	Source: Waituna Wetlands DOC	1.3	?	?	?	?
1073	Source: Waituna Wetlands DOC	9.3	?	?	?	?
1074	Source: Waituna Wetlands DOC	36.6	?	?	?	?
1075	Source: Waituna Wetlands DOC	16.2	?	?	?	?
1077	Source: Waituna Wetlands DOC	1.4	?	?	?	?
1079	Source: Waituna Wetlands DOC	12.7	?	?	?	?
1080	Source: Waituna Wetlands DOC	4.2	?	?	?	?
1082	Source: Waituna Wetlands DOC	6.0	?	?	?	?
1083	Source: Waituna Wetlands DOC	1.5	?	?	?	?
1084	Source: Waituna Wetlands DOC	22.6	?	?	?	?
1085	Source: Waituna Wetlands DOC	3.5	?	?	?	?
1089	Source: Waituna Wetlands DOC	1.5	?	?	?	?
1091	Source: Waituna Wetlands DOC	8.5	?	?	?	?
1092	Source: Waituna Wetlands DOC	3.0	?	?	?	?
1093	Source: Waituna Wetlands DOC	8.8	?	?	?	?
1095	Source: Waituna Wetlands DOC	1.0	?	?	?	?
1096	Source: Waituna Wetlands DOC	1.0	?	?	?	?
1099	Source: Waituna Wetlands DOC	2.1	?	?	?	?
1100	Source: Waituna Wetlands DOC	2.0	?	?	?	?
1101	Source: Waituna Wetlands DOC	2.7	?	?	?	?
1103	Source: Waituna Wetlands DOC	0.9	?	?	?	?
1104	Source: Waituna Wetlands DOC	2.4	?	?	?	?
1105	Source: Waituna Wetlands DOC	5.7	?	?	?	?
1107	Source: Waituna Wetlands DOC	17.3	?	?	?	?
1108	Source: Waituna Wetlands DOC	22.4	?	?	?	?
1109	Source: Waituna Wetlands DOC	4.6	?	?	?	?
1112	Source: Waituna Wetlands DOC	13.7	?	?	?	?
1113	Source: Waituna Wetlands DOC	42.1	?	?	?	?
1115	Source: Waituna Wetlands DOC	1.3	?	?	?	?
1118	Source: Waituna Wetlands DOC	11.1	?	?	?	?
1119	Source: Waituna Wetlands DOC	0.7	?	?	?	?
1122	Source: Waituna Wetlands DOC	6.3	?	?	?	?
1123	Source: Waituna Wetlands DOC	13.4	?	?	?	?
1124	Source: Waituna Wetlands DOC	8.7	?	?	?	?
1125	Source: Waituna Wetlands DOC	5.9	?	?	?	?
1127	Source: Waituna Wetlands DOC	6.6	?	?	?	?
1128	Source: Waituna Wetlands DOC	1.7	?	?	?	?
1129	Source: Waituna Wetlands DOC	1.3	?	?	?	?
1130	Source: Waituna Wetlands DOC	13.7	?	?	?	?
1131	Source: Waituna Wetlands DOC	24.0	?	?	?	?
1132	Source: Waituna Wetlands DOC	16.0	?	?	?	?
1133	Source: Waituna Wetlands DOC	23.3	?	?	?	?

1134	Source: Waituna Wetlands DOC	19.4	?	?	?	?
1135	Source: Waituna Wetlands DOC	3.5	?	?	?	?
1137	Source: Waituna Wetlands DOC	6.0	?	?	?	?
1138	Source: Waituna Wetlands DOC	7.5	?	?	?	?
1139	Source: Waituna Wetlands DOC	0.6	?	?	?	?
1140	Source: Waituna Wetlands DOC	3.4	?	?	?	?
1141	Source: Waituna Wetlands DOC	2.5	?	?	?	?
1142	Source: Waituna Wetlands DOC	0.7	?	?	?	?
1143	Source: Waituna Wetlands DOC	0.2	?	?	?	?
1144	Source: Waituna Wetlands DOC	5.5	?	?	?	?
1146	Source: Waituna Wetlands DOC	0.8	?	?	Oioi	M2
1157	Source: Waituna Wetlands DOC	0.6	?	?	Oioi	?
1176	Source: Waituna Wetlands DOC	1.6	?	?	Oioi	?
1187	Source: Waituna Wetlands DOC	5.7	?	?	Oioi	?
1198	Source: Waituna Wetlands DOC	0.3	?	?	?	?
1203	Source: Waituna Wetlands DOC	1.0	?	?	?	?
1232	Source: Waituna Wetlands DOC	9.9	?	?	Oioi	?
1234	Source: Waituna Wetlands DOC	0.0	?	?	Oioi	?
1237	Source: Waituna Wetlands DOC	1.8	?	?	Oioi	?
1240	Source: Waituna Wetlands DOC	0.3	?	?	Oioi	?
1248	Source: Waituna Wetlands DOC	3.9	?	?	Oioi	?
1252	Source: Waituna Wetlands DOC	6.9	?	?	?	?
1253	Source: Waituna Wetlands DOC	0.9	?	?	?	?
1266	Source: Waituna Wetlands DOC	6.9	?	?	?	?
1267	Source: Waituna Wetlands DOC	0.0	?	?	?	?
1268	Source: Waituna Wetlands DOC	0.0	?	?	?	?
1269	Source: Waituna Wetlands DOC	0.0	?	?	?	?
1282	Source: Waituna Wetlands DOC	0.1	?	?	?	?
1287	Source: Waituna Wetlands DOC	0.7	?	?	?	?
1288	Source: Waituna Wetlands DOC	0.0	?	?	?	?
1289	Source: Waituna Wetlands DOC	0.8	?	?	?	?
1318	Source: Waituna Wetlands DOC	0.5	?	?	?	?
1320	Source: Waituna Wetlands DOC	3.1	?	?	?	?
1323	Source: Waituna Wetlands DOC	11.3	?	?	?	?
1324	Source: Waituna Wetlands DOC	0.7	?	?	?	?
1325	Source: Waituna Wetlands DOC	0.3	?	?	?	?
1331	Source: Waituna Wetlands DOC	0.3	?	?	?	?
1333	Source: Waituna Wetlands DOC	2.7	?	?	?	?
1353	Source: Waituna Wetlands DOC	2.2	?	?	?	?
1354	Source: Waituna Wetlands DOC	0.8	?	?	?	?
1355	Source: Waituna Wetlands DOC	8.8	?	?	?	?
1359	Source: Waituna Wetlands DOC	3.2	?	?	?	?
1362	Source: Waituna Wetlands DOC	0.5	?	?	?	?
1511	Source: Waituna Wetlands DOC	3.9	?	?	Oioi	?
1516	Source: Waituna Wetlands DOC	2.1	?	?	?	?
1689	Source: Waituna Wetlands DOC	1.5	?	?	?	?
1917	Source: Waituna Wetlands DOC	75.8	?	?	?	?
1918	Source: Waituna Wetlands DOC	9.4	?	?	?	?
1919	Source: Waituna Wetlands DOC	1.2	?	?	?	?
1920	Source: Waituna Wetlands DOC	0.3	?	?	?	?
1921	Source: Waituna Wetlands DOC	6.4	?	?	?	?
1922	Source: Waituna Wetlands DOC	158.8	?	?	?	?
1923	Source: Waituna Wetlands DOC	0.5	?	?	?	?
1924	Source: Waituna Wetlands DOC	0.0	?	?	?	?
1974	Source: Waituna Wetlands DOC	0.1	?	?	?	?

2058	Source: Waituna Wetlands DOC	4.0	?	?	Silver tussock	?
2139	Source: Waituna Wetlands DOC	0.7	?	?	?	?
2358	Source: Waituna Wetlands DOC	0.8	?	?	?	?
2571	Source: Waituna Wetlands DOC	1.8	?	?	?	?
2572	Source: Waituna Wetlands DOC	14.4	?	?	?	?
2615	Source: Waituna Wetlands DOC	1.1	?	?	?	?
2619	Source: Waituna Wetlands DOC	0.3	?	?	?	?
2653	Source: Waituna Wetlands DOC	0.0	?	?	?	?
2654	Source: Waituna Wetlands DOC	0.0	?	?	?	?
2763	Source: Waituna Wetlands DOC	1.0	?	?	Oioi	?
2820	Source: Waituna Wetlands DOC	5.7	?	?	?	?
2827	Source: Waituna Wetlands DOC	7.0	?	?	?	?
3275	Source: Waituna Wetlands DOC	22.1	?	?	?	?
3286	Source: Waituna Wetlands DOC	0.2	?	?	Oioi	?
3287	Source: Waituna Wetlands DOC	0.5	?	?	Oioi	?
3373	Source: Waituna Wetlands DOC	2.8	?	?	?	?
3608	Source: Waituna Wetlands DOC	0.4	?	?	Oioi	M2
3610	Source: Waituna Wetlands DOC	6.2	?	?	Oioi	?
3638	Source: Waituna Wetlands DOC	1.0	?	?	Oioi	?
3639	Source: Waituna Wetlands DOC	3.1	?	?	Oioi	?

### Appendix 3 – Historic wetlands

ID Code	Wetland class	Structure	Area (ha)
H1006	Fen	Tussockland?	29.2
H1007	Fen	Tussockland	36.0
H1008	Swamp	Sedgeland/mossfield	81.3
H1009	Swamp	Sedgeland/mossfield	253.8
H1011	Swamp?	Sedgeland/mossfield	50.0
H1012	Fen	Tussockland	211.7
H1013	Fen	Tussockland	107.7
H1016	Bog	Mossfield	155.4
H1017	Swamp	Sedgeland?	145.9
H1018b	Swamp?	Sedgeland?	249.3
H1019	Bog	Wire rushland	114.0
H1020	Bog	Wire rushland	110.5
H1021	Fen	?	13.6
H1023	Fen		471.3
H1024	Fen	Rushland?	183.6
H1025	Fen	?	28.5
H1026	Fen	?	16.4
H1027	Fen	?	19.2
H1028	Fen	?	313.8
H1029	Swamp, bog	?	315.7
H1030	Fen	?	160.7
H1031	Fen	?	104.5
H1032	Fen	?	106.9
H1033	Bog	Wire rushland	1271.9
H1034	Fen	?	165.2
H1035	Fen	?	100.1
H1036	Swamp?	?	71.2
H1037	Swamp?	?	86.4
H1038	Swamp?	?	96.3

Current and historic wetlands of Southland Region: Stage 2

H1039	Fen	?	133.9
H1040	Swamp	?	103.7
H1041	Fen	?	266.5
H1042	Fen	?	550.9
H1043	Fen	?	87.7
H1044	Fen	?	199.1
H1045	Fen	?	84.7
H1046	Fen	?	141.9
H1047	Fen	?	118.1
H1048	Fen	?	1204.4
H1049	Fen (40% Swamp)	?	187.9
H1050	Fen	?	487.1
H1051	Bog	?	537.6
H1052	Fen	?	2103.2
H1053	Fen	?	179.7
H1054	Swamp	?	449.4
H1055	Fen	Tussockland	296.3
H1056	Fen	?	179.4
H1057	Fen	?	127.0
H1058	Fen (not Swamp)	?	439.1
H1059	Fen	?	2078.7
H1060	Fen	Wire rushland	227.3
H1061	Fen	?	184.9
H1062	Swamp?	?	204.7
H1063	Fen	?	100.9
H1064	Fen	?	106.5
H1065	Bog	Wire rushland	228.5
H1066	Fen	?	653.1
H1067	Fen	?	90.5
H1068	Fen	?	323.5
H1069	Fen	?	325.4
H1070	Fen	?	378.9
H1071	Fen	?	409.5
H1072	Fen	?	44.5
H1073	Fen	?	212.2
H1074	Swamp	?	383.9
H1075	Swamp	?	8977.4
H1076	Fen	?	935.7
H1077	Fen?	?	470.4
H1078	Bog	Wire rushland	1275.6
H1079	Fen	?	339.2
H1080	Swamp	?	85.1
H1081	Fen	?	272.1
H1082	Fen	?	368.2
H1083	Swamp	?	5994.2
H1084	Swamp	?	326.1
H1085	Swamp	?	121.7
H1086	Fen	?	1205.6
H1087	Fen	?	122.4
H1088	Fen	Tussockland	75.5
H1089	Fen	?	124.4
H1090	Swamp	?	12244.6
H1091	Bog	Wire rushland	137.4
H1092	Swamp	?	9293.1
H1093	Swamp	?	278.9



H1094	?	?	417.5
H1095	Swamp	?	608.8
H1096	Swamp	?	129120.4
H1097	Bog	Wire rushland	550.9
H1098	Bog	Wire rushland	1045.1
H1099	Bog	Wire rushland	162.6
H1100	Bog	Wire rushland	101.4
H1101	Bog	Wire rushland	103.0
H1102	Marsh	Wire rushland	309.3
H1103	Swamp	?	269.4
H1104	Swamp?	?	1475.6
H1105	Swamp	?	598.0
H1106	Swamp	?	145.4
H1107	?	?	178.0
H1108	Marsh	?	1646.4
H1109	Swamp	?	647.6
H1110	Swamp	Wire rushland	745.0
H1111	Fen	?	639.6
H1112	Bog	Wire rushland	228.5
H1113	Bog (also Fen)	Wire rushland	150.7
H1114	Marsh	?	3073.7
H1115	Fen	Forest	55.3
H1116	?	?	1040.1
H1117	Bog	Wire rushland	67.0
H1118a	Bog	?	390.3
H1119	?	?	197.1
H1120	?	?	67.3
H1121	Swamp	?	184.2
H1122	Bog	Wire rushland	425.1
H1123	Bog	Wire rushland	119.6
H1124	Marsh	?	714.7
H1125	Fen	?	380.8
H1126	Swamp	?	123.2
H1127	Swamp	?	383.1
H1128	Swamp	?	581.6
H1129	Fen	?	2613.0
H1130	Bog	Wire rushland	138.7
H1131	Fen	?	54.3
H1132	Swamp	?	219.2
H1133	Bog	Wire rushland	75.7
H1134	Bog	Wire rushland	133.8
H1135	Swamp (not Marsh)	forest	289.0
H1136	Swamp?	?	366.4
H1137	Swamp	?	373.5
H1138	Fen	?	395.2
H1139	Swamp	?	103.3
H1140	Swamp	?	106.9
H1141	Swamp	?	182.7
H1142	Fen	?	936.6
H1143	Swamp	?	182.9
H1144	Swamp	?	109.3
H1145	Swamp	?	136.9
H1146	Swamp	?	121.2
H1147	Marsh	?	560.3
H1148	Swamp	?	103.5

Current and historic wetlands of Southland Region: Stage 2

H1149	Swamp (not Marsh)	?	172.6
H1150	Swamp	?	276.7
H1151	Fen	?	53.8
H1152	Swamp	?	134.4
H1153	Swamp (not Marsh)	?	546.9
H1154	Fen	?	18.8
H1155	Fen	?	16.2
H1156	Fen	?	113.7
H1157	Fen	?	12.0
H1158	Fen	?	17.6
H1159	Fen	?	126.4
H1160	Swamp (not Marsh)	?	454.0
H1161	Fen	?	147.8
H1162	Fen	?	172.8
H1163	Fen	?	140.7
H1164	Fen	?	61.0
H1165	Fen?	?	348.7
H1166	Fen?	?	171.9
H1168	Swamp	?	128.5
H1172	Swamp	?	4907.2
H1173	Bog	?	172.4
H1174	Swamp	?	1306.4
H1175	Fen	?	437.9
H1176	Fen	?	257.3
H1177a	Bog	Wire rushland for bog/ Forest for fen	553.7
H1178	Fen	?	360.7
H1179	Bog	?	291.3
H1180	Fen	?	261.7
H1181	Bog (+fen swamp see notes)	Shrubland?	17981.4
H1182	fen	?	1067.1
H1183	Swamp	?	95.1
H1184	Marsh	?	76.5
H1185	Marsh	?	184.4
H1186	Fen	?	294.1
H1188	Marsh	Rushland?	30.5
H1189	Marsh	Rushland?	23.9
H1190a	Swamp	?	181.5
H1191	Fen	?	32.8
H1192	Fen	?	142.8
H1194	Marsh	?	156.4
H1195	Swamp?	?	149.2
H1196	Swamp	?	100.2
H1197	Swamp	?	131.3
H1198	Swamp	?	163.5
H1199	Swamp	?	1012.5
H1200	Fen	?	1828.9
H1201	Fen	?	902.9
H1202	Fen	?	146.2
H1205	Fen	Forest	94.5
H1206	Fen	Forest	750.3
H1207	Fen	Shrubland	439.7
H1208	Fen	Shrubland	2240.0
H1209	Fen	Forest	1701.2
H1210	Fen	Forest	686.5
H1211	Bog	Shrubland	320.4

H1212	Fen	Forest	1269.4
H1213	Fen	Forest	122.3
H1214	Fen	Wire rushland	139.5
H1215	Fen	Forest	685.8
H1216	Fen	?	185.3
H1218	Fen	Forest	108.3
H1219	Fen	Forest	153.4
H1220	Fen	?	424.0
H1221	Fen	?	354.7
H1222	Swamp	Forest	191.7
H1223	Bog	Wire rushland	138.5
H1224	Fen	?	272.3
H1225	Swamp	?	596.8
H1226	Swamp	?	38.9
H1228	Swamp	?	757.1
H1229	Fen	?	34.9
H1230	Fen	?	537.3
H1231	Bog	Wire rushland	224.2
H1233	Fen	Tussockland	181.6
H1234	Fen	?	232.1
H1236	Swamp	sedgeland	257.8
H1237	Fen	?	241.1
H1238	Bog	Wire rushland	142.2
H1239	Swamp	?	182.2
H1240	Fen	Sedgeland	186.8
H1241	Fen	?	13.8
H1242	Bog	Sedgeland	136.9
H1243	Fen	?	69.7
H1018a	Bog	Wire rushland	217.8
H1022	Bog	Wire rushland	225.8
H1118	Swamp	?	383.9
H1190	Bog	?	67.8
H1182a	bog	?	1012.0
H1177	Fen	Wire rushland for bog/ Forest for fen	277.7
H1110a	Bog	Wire rushland	140.2
H1016a	Fen	Mossfield	114.6
HC1001	Fen	Herbfield,mossfield,sedgeland	26.1
HC1002	Fen	Herbfield,mossfield,sedgeland	7.6
HC1003	Fen	Herbfield,mossfield,sedgeland	11.4
HC1004	Fen	Herbfield,mossfield,sedgeland	5.6
HC1005	Fen	Herbfield,mossfield,sedgeland	5.0
HC1006	Fen	Herbfield,mossfield,sedgeland	6.5
HC1007	Fen	Herbfield,mossfield,sedgeland	5.0
HC1008	Fen	Herbfield,mossfield,sedgeland	6.0
HC1009	Fen	Herbfield,mossfield,sedgeland	10.4
HC1010	Fen	Herbfield,mossfield,sedgeland	16.6
HC1011	Fen	Herbfield,mossfield,sedgeland	15.5
HC1012	Fen	Herbfield,mossfield,sedgeland	13.0
HC1013	Fen	Sedgeland	5.8
HC1014	Fen	Herbfield,mossfield,sedgeland	12.6
HC1015	Fen	Herbfield,mossfield,sedgeland	12.7
HC1016	Fen	Sedgeland	5.6
HC1017	Fen	Herbfield,mossfield,sedgeland	9.6
HC1018	Fen	Sedgeland	5.5
HC1019	Fen	Herbfield,mossfield,sedgeland	7.5

HC1020	Fen	Herbfield,mossfield,sedgeland	9.0
HC1021	Fen	Herbfield,mossfield,sedgeland	51.8
HC1022	Fen	Herbfield,mossfield,sedgeland	17.4
HC1023	Fen	Herbfield,mossfield,sedgeland	6.6
HC1024	Fen	Herbfield,mossfield,sedgeland	10.9
HC1025	Fen	Herbfield,mossfield,sedgeland	10.3
HC1026	Fen	Herbfield,mossfield,sedgeland	6.2
HC1027	Fen	Herbfield,mossfield,sedgeland	12.0
HC1028	Fen	Herbfield,mossfield,sedgeland	7.6
HC1029	Fen	Herbfield,wire rushland,sedgeland	9.0
HC1030	Fen	Herbfield,mossfield,sedgeland	7.3
HC1031	Fen	Herbfield,mossfield,sedgeland	5.3
HC1032	Fen	Herbfield,mossfield,sedgeland	10.4
HC1033	Fen	Herbfield,mossfield,sedgeland	5.6
HC1034	Fen	Herbfield,mossfield,sedgeland	6.3
HC1035	Fen	Mossfield	5.0
HC1036	Fen	Herbfield,mossfield,sedgeland	9.8
HC1037	Fen	Herbfield,mossfield,sedgeland	5.9
HC1038	Fen	Herbfield,mossfield,sedgeland	9.5
HC1039	Fen	Herbfield,mossfield,sedgeland	5.0
HC1040	Fen	Herbfield,mossfield,sedgeland	30.8
HC1041	Fen	Herbfield,mossfield,sedgeland	12.9
HC1042	Fen	Herbfield,mossfield,sedgeland	6.4
HC1043	Fen	Herbfield,mossfield,sedgeland	11.0
HC1044	Fen	Herbfield,mossfield,sedgeland	7.4
HC1045	Fen	Herbfield,mossfield,sedgeland	9.5
HC1046	Fen	Herbfield,mossfield,sedgeland	12.7
HC1047	Fen	Herbfield,mossfield,sedgeland	7.5
HC1048	Fen	Herbfield,mossfield,sedgeland	8.1
HC1049	Fen	Herbfield,mossfield,sedgeland	8.6
HC1050	Fen	Herbfield,mossfield,sedgeland	5.4
HC1051	Fen	Herbfield,mossfield,sedgeland	9.8
HC1052	Fen	Herbfield,mossfield,sedgeland	5.3
HC1053	Fen	Herbfield,mossfield,sedgeland	6.6
HC1054	Fen	Herbfield,mossfield,sedgeland	6.3
HC1055	Fen	Herbfield,mossfield,sedgeland	0.3
HC1056	Fen	Herbfield,mossfield,sedgeland	0.1
HC1057	Fen	Herbfield,mossfield,sedgeland	4.7
HC1058	Fen	Herbfield,mossfield,sedgeland	9.1
HC1059	Fen	Herbfield,mossfield,sedgeland	7.7
HC1060	Fen	Herbfield,mossfield,sedgeland	5.8
HC1061	Bog	Sedgeland,mossfield,herbfield,cushionfield	63.2
HC1063	Fen	Herbfield,mossfield,sedgeland	7.4
HC1064	Fen	Herbfield,mossfield,sedgeland	10.5
HC1065	Marsh	Sedgeland	9.8
HC1066	Swamp	Sedgeland	2.0
HC1074	Fen	Sedgeland	31.5
HC1075	Fen	Tussockland	22.9
HC1076	Bog	Wire rushland	5.8
HC1077	Bog	Mossfield	0.0
HC1078	Swamp	Sedgeland	5.4
HC1079	Bog	Wire rushland	0.2
HC1080	Swamp	Flaxland,sedgeland	15.5
HC1082	Fen	Wire rushland	7.7
HC1083	Fen	Shrubland	47.8

HC1084	Bog	Wire rushland	0.4
HC1086	Swamp	? (current–Exotic treeland)	6.3
HC1087	Swamp	? (current–Exotic treeland)	6.4
HC1088	Fen	Tussockland	0.1
HC1089	Fen	Tussockland	12.6
HC1090	Fen	Tussockland	8.5
HC1091	Fen	Tussockland?	2.0
HC1092	Fen	Tussockland	1.5
HC1093	Fen	Tussockland	8.4
HC1094	Fen	Tussockland	8.0
HC1095	Fen	Tussockland	8.9
HC1096	Fen	Tussockland	7.2
HC1097	Fen	Tussockland	1.4
HC1098	Fen	Tussockland	7.8
HC1099	Fen	Tussockland	12.2
HC1100	Fen	Tussockland	5.0
HC1101	Fen	Wire rushland	5.6
HC1104	Bog	? (current–Exotic shrubland)	1.0
HC1108	Bog	Wire rushland	9.3
HC1115	Fen	Tussockland	11.9
HC1116	Bog	Wire rushland	9.3
HC1117	Fen	Tussockland	18.3
HC1118	Bog	Wire rushland	10.4
HC1119	Fen	? (current–Exotic shrubland)	26.0
HC1120	Fen	Tussockland	36.5
HC1122	Bog	Wire rushland	10.0
HC1128	Bog	Wire rushland	5.3
HC1130	Swamp	Flaxland, sedgeland, shrubland	2.5
HC1131	Swamp	Flaxland	0.3
HC1133	Marsh	Rushland	0.3
HC1137	Swamp	Shrubland	6.2
HC1139	Swamp	Sedgeland	0.0
HC1141	Swamp	? (current–Exotic treeland)	25.8
HC1142	Swamp	? (current–Exotic treeland)	19.6
HC1143	Fen	?	6.1
HC1144	?	Shrubland	0.2
HC1145	Bog	Shrubland	25.2
HC1150	Swamp	Scrub	16.1
HC1153	Bog	Wire rushland	7.8
HC1156	Bog	Wire rushland	1.9
HC1159	Fen	Sedgeland	5.4
HC1163	Bog	Wire rushland	0.4
HC1164	Bog	? (current–Exotic grassland)	0.5
HC1166	Bog	? (current–Exotic grassland)	0.3
HC1167	Fen	? (current–Exotic grassland)	1.7
HC1172	Bog	Wire rushland	13.2
HC1173	Bog	Wire rushland	1.1
HC1174	Bog	Wire rushland	7.4
HC1175	Bog	Wire rushland	0.4
HC1182	Fen	Forest	0.9
HC1185	Fen	Fernland?	2.6
HC1187	Fen	? (current–Exotic rushland, exotic grassland, herffield, shrubl*)	1.4
HC1190	Fen	Shrubland	0.1
HC1192	Swamp	Forest	0.4
HC1193	Swamp	Forest	7.1

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HC1214	Fen?	? (current–Exotic scrub?)	23.1
HC1219	Swamp	Flaxland	0.1
HC1221	Marsh	Rushland	10.8
HC1223	Fen	Shrubland	0.6
HC1240	Fen	Rushland	6.1
HC1241	Fen	Forest	19.4
HC1243	Fen	Shrubland	4.7
HC1248	Bog	Shrubland	0.0
HC1255	Bog	Shrubland	3.6
HC1258	Fen	Shrubland	0.4
HC1259	Fen	Tussockland	6.4
HC1260	Fen	Tussockland	1.6
HC1262	Bog	Wire rushland	17.5
HC1263	Fen	Tussockland	6.2
HC1264	Fen	Tussockland	5.8
HC1265	Bog	Wire rushland	1.4
HC1267	Fen	Tussockland	3.0
HC1269	Bog	Wire rushland	10.4
HC1270	Bog	Wire rushland	0.4
HC1273	Bog	Wire rushland	8.0
HC1274	Bog	Wire rushland	19.9
HC1275	Bog	Wire rushland	21.5
HC1276	Bog	Wire rushland	0.2
HC1279	Fen	Tussockland	0.2
HC1280	Bog	Wire rushland	0.2
HC1281	Bog	Wire rushland	3.5
HC1283	Fen	Tussockland	61.8
HC1286	Fen	Tussockland	0.0
HC1289	Marsh	Sedgeland	0.0
HC1293	Bog	Mossfield	4.0
HC1294	Fen	Sedgeland	3.9
HC1295	Fen?	Sedgeland?	4.0
HC1296	Fen?	Sedgeland?	23.1
HC1299	Fen	Sedgeland	37.8
HC1300	Swamp	Flaxland	56.7
HC1301	Bog	Mossfield	56.4
HC1302	Bog	Wire rushland	10.7
HC1303	Bog	Wire rushland	10.2
HC1304	Bog	Mossfield	3.3
HC1305	Swamp	Sedgeland	17.4
HC1306	Bog	Mossfield	6.3
HC1307	Swamp	Sedgeland	45.4
HC1308	Swamp	Sedgeland	24.7
HC1309	Fen	Tussockland	50.6
HC1311	Bog	Wire rushland	40.8
HC1312	Fen	Tussockland?	34.6
HC1313	Bog	Wire rushland	20.4
HC1314	Fen	Wire rushland	49.2
HC1315	Fen	Wire rushland	19.9
HC1319	Swamp	Sedgeland	7.0
HC1320	Bog	Mossfield	41.1
HC1321	Bog	Wire rushland	9.3
HC1322	Bog	Wire rushland	30.3
HC1323	Bog	Mossfield	5.1
HC1324	Bog	Mossfield	20.0

HC1325	Bog	Mossfield	12.8
HC1326	Bog	Mossfield	6.5
HC1327	Bog	Mossfield	4.8
HC1328	Bog	Mossfield	3.2
HC1329	Bog	Mossfield	8.3
HC1330	Bog	Mossfield	0.5
HC1335	Bog	Mossfield	8.0
HC1336	Bog	Wire rushland	11.8
HC1337	Bog	Wire rushland	10.9
HC1338	Bog	Wire rushland	27.8
HC1339	Bog	Mossfield	0.6
HC1341	Bog	Wire rushland	7.5
HC1342	Bog	Mossfield	5.9
HC1343	Bog	Wire rushland	6.9
HC1345	Bog	Mossfield	0.4
HC1346	Bog	Wire rushland	0.0
HC1348	Bog	Wire rushland	8.2
HC1349	Bog	Wire rushland	17.8
HC1350	Fen	?	11.3
HC1351	Bog	Shrubland	5.6
HC1352	Bog	Wire rushland	17.1
HC1353	Bog	Wire rushland	17.2
HC1354	Fen	Sedgeland	13.7
HC1355	Fen	Shrubland	0.2
HC1356	Fen	Shrubland	2.9
HC1358	Fen	Shrubland	0.2
HC1359	Bog	Wire rushland	6.7
HC1360	Fen	Shrubland	4.3
HC1362	Bog	Wire rushland	5.9
HC1363	Bog	Mossfield	7.9
HC1364	Swamp	Flaxland,sedgeland	2.9
HC1365	Bog	Mossfield	8.7
HC1368	Bog	Mossfield	6.3
HC1369	Bog	Wire rushland	20.7
HC1370	Bog	Wire rushland	7.3
HC1371	Bog	Wire rushland	18.8
HC1373	Fen	Wire rushland	8.8
HC1375	Swamp?	? (current–Exotic grassland)	5.2
HC1376	Fen	Mossfield	10.1
HC1377	Bog	Mossfield	8.6
HC1378	Bog	Wire rushland	16.1
HC1379	Fen	Shrubland	15.9
HC1381	Swamp	Sedgeland	2.6
HC1382	Bog	Mossfield	5.6
HC1383	Bog	Mossfield,wire rushland	0.5
HC1384	Bog	Mossfield	6.7
HC1385	Swamp	Flaxland,sedgeland	3.5
HC1386	Swamp	? (current–Exotic forest)	8.4
HC1387	Bog	Wire rushland	14.2
HC1388	Swamp	? (current–Exotic forest)	9.7
HC1389	Fen	Wire rushland	6.1
HC1390	Bog	Wire rushland	13.6
HC1392	Bog	Wire rushland	15.2
HC1393	Swamp	Sedgeland	4.9
HC1394	Swamp	Sedgeland	0.5

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HC1395	Fen	?	9.9
HC1403	Fen	?	10.4
HC1404	Swamp	Tussockland	1.0
HC1405	Swamp	Tussockland	0.0
HC1406	Fen	Tussockland	1.5
HC1407	Marsh	?	14.4
HC1408	Swamp	Sedgeland	14.9
HC1409	Bog	Wire rushland	18.2
HC1410	Bog	Wire rushland	13.8
HC1411	Bog	Wire rushland	8.8
HC1412	Fen?	Wire rushland	3.3
HC1413	Fen	Wire rushland,fernland	0.3
HC1414	Bog	Wire rushland	3.9
HC1415	Bog	Wire rushland	0.1
HC1416	Marsh?	?	0.1
HC1417	Bog	Mossfield	42.1
HC1418	Swamp	?	6.2
HC1419	?	?	11.7
HC1420	Swamp	Sedgeland?	4.5
HC1421	Bog	Mossfield	5.0
HC1422	?	?	0.5
HC1423	Bog	Mossfield	15.0
HC1424	?	Sedgeland?	11.4
HC1261a	Fen	Tussockland	2.7
HC1261b	Fen	Tussockland	0.7
HC1264b	Fen	Tussockland	17.7
HC1264a	Fen	Tussockland	18.1
HC1272f	Fen	Tussockland	9.7
HC1272e	Fen	Tussockland	36.1
HC1272d	Fen	Tussockland	4.8
HC1272c	Bog	Wire rushland	4.1
HC1272a	Bog	Wire rushland	8.1
HC1281a	Swamp	Sedgeland	10.4
HC1286b	?	?	3.1
HC1286a	Fen	Tussockland	29.0
HC1313b	Bog	Wire rushland	0.7
HC1297c	Fen	Sedgeland	13.9
HC1297b	Fen	Sedgeland	9.0
HC1298a	Fen	Sedgeland	0.0
HC1299a	Fen	Sedgeland	5.7
HC1065a	Swamp	? (current–Exotic treeland)	6.5
HC1310b	Fen	Tussockland	23.2
HC1310a	Swamp	Sedgeland	0.1
HC1319a	Bog	Mossfield	3.4
HC1336a	Fen	Mossfield	30.0
HC1361	Fen	Sedgeland	1.7
HC1361a	Swamp	Sedgeland	3.1
HC1361b	Swamp	Flaxland	3.5
HC1372b	Swamp	Sedgeland	0.0
HC1381a	Bog	Wire rushland	3.3
HC1385a	Swamp	Treeland,shrubland	0.7
HC1393a	Swamp	Sedgeland	6.8
HC1392b	Bog	Mossfield	65.6
HC1392a	Bog	Wire rushland	75.4
HC1223a	Fen	Forest	12.1



HC1223b	Fen	Shrubland	8.6
HC1195a	Bog	Wire rushland	7.4
HC1119a	Fen	Tussockland	18.0
HC1122a	Fen	Tussockland	9.1
HC1191c	Swamp	Forest	0.5
HC1191d	Swamp	Forest	2.3
HC1191e	Swamp	Scrub	39.4
HC1189a	Marsh	Flaxland,shrubland	5.9
HC1182a	Fen	Shrubland	1.1
HC1115d	Fen	Tussockland	11.7
HC1115c	Fen	Wire rushland	7.1
HC1103b	Swamp	Treeland	9.2
HC1103a	Fen	Tussockland	6.1
HC1215h	Swamp	Sedgeland	5.2
HC1215g	Swamp	Shrubland	6.5
HC1215e	Swamp	Forest	0.0
HC1215f	Swamp	Sedgeland	16.6
HC1215c	Swamp	Shrubland	9.8
HC1215d	Swamp	Forest	24.0
HC1215a	Swamp	Shrubland	1.2
HC1215b	Swamp	Scrub	0.4
HC1214a	Bog	Wire rushland	5.8
HC1214b	Swamp	Scrub	8.8
HC1102a	Fen	Wire rushland	70.5
HC1084a	Fen	Tussockland	9.3
HC1115b	Fen	Wire rushland	8.8
HC1115a	Fen	Tussockland	70.8
HC1129b	Fen	Forest	9.9
HC1131a	Fen	Shrubland	8.7
HC1129c	Fen	Forest	21.4
HC1130a	Fen	? (current–Exotic shrubland)	15.9
HC1142c	Fen	Forest	19.7
HC1142d	Fen	Forest	9.5
HC1142e	Fen	Forest	13.8
HC1142a	Fen	Forest	13.6
HC1142b	Fen	Forest	27.9
HC1124a	Fen	? (current–Exotic shrubland)	9.8
HC1124b	Fen	Grassland	7.1
HC1153a	Fen	Tussockland	8.4
HC1140a	Fen	Forest	0.5
HC1152e	Swamp?	Shrubland	4.9
HC1152d	Swamp	Sedgeland	8.1
HC1152b	Swamp	Forest	0.0
HC1152a	Fen	Shrubland	0.7
HC1152c	Swamp	Treeland	0.3
HC1140b	?	?	230.2
HC1140c	?	?	179.4
HC1132a	Marsh?	? (current–Exotic shrubland)	0.7
HC1155a	Fen	Shrubland	2.7
HC1376d	Swamp	Sedgeland	0.0
HC1376b	Fen	Tussockland	49.8
HC1376c	Fen	Sedgeland	11.5
HC1376a	Fen	Tussock,sedgeland	1.9
HC1080a	Fen	? (current–Exotic shrubland)	21.4
HC1385c	Swamp	? (current–Exotic shrubland),flaxland	2.5

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HC1177a	Bog	? (current–Exotic shrubland)	0.0
HC1393b	?	?	22.0
HW4	Bog	Open water	0.6
HW5	Bog	Open water	0.8
HW11	Bog	Open water	0.5
HW47	Bog	Open water	0.2
HW73	Bog	Open water	0.1
HW78	Bog	Open water	0.1
HW79	Bog	Open water	0.3
HW86	Bog	Open water	0.2
HW87	Bog	Open water	0.1
HW88	Bog	Open water	0.1
HW89	Bog	Open water	0.1
HW90	Bog	Open water	0.1
HW91	Bog	Open water	0.1
HW92	Bog	Open water	0.1
HW93	Bog	Open water	0.1
HW94	Bog	Open water	0.1
HW95	Bog	Open water	0.0
HW96	Bog	Open water	0.1
HW97	Bog	Open water	0.2
HW98	Bog	Open water	0.2
HW100	Bog	Open water	0.3
HW101	Bog	Open water	0.3
HW117	Bog	Shrubland	1.7
HW118	Bog	Shrubland	1.5
HW120	?	?	0.2
HW121	?	?	1.4
HW122	?	?	2.0
HW129	Marsh	Rushld/sedgld/shrubld/grassld/Exotic grass-/herb-	0.2
HW258	Bog	Open water	0.7
HW343	Bog	Open water	0.3
HW1003	?	?	6.1
HW1008	Bog	Shrubland	0.2
HW1009	Bog	Shrubland	0.4
HW1010	Bog	Shrubland	2.5
HW1034	?	?	0.1
HW1035	Bog	Shrubland	20.8
HW1036	?	?	3.4
HW1037	Bog	Shrubland	18.6
HW1044	?	?	0.4
HW1049	?	?	0.4
HW1052	Bog	Shrubland	16.5
HW1055	Bog	Shrubland	0.1
HW1064	Bog	Open water	2.2
HW1071	?	?	4.9
HW1072	?	?	1.3
HW1073	?	?	0.2
HW1074	?	?	4.2
HW1075	?	?	0.1
HW1080	?	?	4.2
HW1082	?	?	0.2
HW1097	Fen	? (current–Exotic grass-/herb-/shrubland/scrub/forest)	1.8
HW1112	?	?	5.0
HW1118	?	?	4.4

HW1122	?	?	0.0
HW1131	?	?	8.3
HW1133	?	?	0.6
HW1137	?	?	3.1
HW1146	?	?	0.8
HW1154	Bog	Shrubland	0.2
HW1198	?	?	0.0
HW1240	?	?	0.3
HW1241	Swamp	Flaxland	0.9
HW1260	Fen	Sedgeland	0.2
HW1274	Bog	Shrubland	0.3
HW1282	?	?	0.0
HW1294	Bog	Shrubland	2.5
HW1295	Bog	Shrubland	0.1
HW1300	Fen	Sedgeland	2.1
HW1301	Bog	Shrubland	0.6
HW1302	Fen	Shrubland & scrub	0.3
HW1303	Fen	Sedgeland	0.3
HW1308	Fen	Sedgeland	2.0
HW1309	Fen	Shrubland & scrub	0.1
HW1310	Fen	Tussockland	0.2
HW1318	?	?	0.5
HW1320	?	?	2.6
HW1323	?	?	11.3
HW1324	?	?	0.7
HW1325	?	?	0.3
HW1330	Bog	Shrubland	1.0
HW1331	?	?	0.3
HW1333	?	?	2.7
HW1338	Bog	Shrubland	1.0
HW1340	Bog	Shrubland	0.7
HW1346	Bog	Shrubland	0.4
HW1347	Bog	Shrubland	3.2
HW1348	Fen	Sedgeland	2.0
HW1353	?	?	2.2
HW1354	?	?	0.8
HW1355	?	?	8.8
HW1356	Bog	Shrubland	0.6
HW1357	Bog	Shrubland	0.1
HW1358	Bog	Shrubland	0.1
HW1359	?	?	3.2
HW1360	Bog	Shrubland	1.2
HW1361	Bog	Shrubland	0.0
HW1362	?	?	0.5
HW1385	Swamp	Flaxland	0.6
HW1387	Fen	Fernland	0.3
HW1425	Bog	Shrubland	0.6
HW1428	Bog	Shrubland	0.7
HW1433	Bog	Shrubland	0.0
HW1434	Bog	Shrubland	0.1
HW1486	Bog	Shrubland	0.1
HW1492	Fen	? (current–Exotic grass-/herb-/shrubland/scrub/forest)	0.1
HW1507	Bog	Shrubland	0.2
HW1511	?	?	0.2
HW1547	Bog	Shrubland	0.0

HW1649	Bog	Shrubland	0.0
HW1800	Bog	Shrubland	1.1
HW1806	Bog	Shrubland	0.1
HW1911	Marsh	Rushld/sedgeld/shrubld/grassld/Exotic grass-/herb-	0.4
HW1929	Bog	Shrubland	4.8
HW1955	Fen	Tussockland	3.8
HW1956	Fen	Sedgeland	0.0
HW1959	Bog	Wire rushland	2.0
HW1968	Fen	Fernland	0.2
HW1976	Bog	Shrubland	7.8
HW1988	Bog	Shrubland	0.2
HW1993	Bog	Shrubland	0.5
HW2004	Bog	Shrubland	0.3
HW2009	Fen	Sedgeland	1.9
HW2020	Bog	Shrubland	12.6
HW2062	Fen	Tussockland	0.1
HW2123	Fen	? (current-Exotic grass-/herb-/shrubland/scrub/forest)	1.0
HW2126	Fen	? (current-Exotic grass-/herb-/shrubland/scrub/forest)	0.2
HW2129	Bog	Wire rushland	0.1
HW2130	Bog	Shrubland	0.2
HW2137	Bog	Shrubland	0.0
HW2459	Bog	Shrubland	0.1
HW2488	Fen	Tussockland	1.5
HW2507	Swamp	Flaxland	0.7
HW2508	Swamp	Flaxland	1.9
HW2509	Fen	Shrubland & scrub	6.4
HW2510	Marsh	Rushld/sedgeld/shrubld/grassld/Exotic grass-/herb-	1.1
HW2511	Fen	Sedgeland	0.4
HW2512	Fen	Sedgeland	1.5
HW2513	Fen	? (current-Exotic grass-/herb-/shrubland/scrub/forest)	5.6
HW2532	Bog	Wire rushland	0.6
HW2533	Fen	Tussockland	0.7
HW2534	Bog	Shrubland	2.2
HW2535	Fen	Shrubland & scrub	1.6
HW2537	Fen	Shrubland & scrub	6.8
HW2538	Swamp	Flaxland	2.3
HW2543	Fen	? (currentExotic grass-/herb-/shrubland/scrub/forest)	3.4
HW2561	Fen	Tussockland	1.3
HW2563	Fen	Sedgeland	7.0
HW2566	Fen	Shrubland & scrub	0.7
HW2567	Fen	Shrubland & scrub	2.0
HW2574	Fen	Fernland	1.0
HW2576	Bog	Shrubland	1.2
HW2625	Fen	Shrubland & scrub	0.8
HW2746	Fen	Sedgeland	0.8
HW2747	Fen	? (current-Exotic grass-/herb-/shrub-/treeland/forest)	0.4
HW2748	Fen	Fernland	8.7
HW2749	Fen	Sedgeland	0.3
HW2750	Fen	Tussockland	0.5
HW2756	Bog	Shrubland	5.4
HW2757	Bog	Shrubland	4.9
HW2758	Fen	Shrubland & scrub	0.4
HW2760	Bog	Wire rushland	0.4
HW2771	Bog	Shrubland	0.0
HW2827	?	?	0.1

HW2829	Fen	Tussockland	3.8
HW2830	Fen	Tussockland	4.8
HW2831	Fen	Tussockland	5.8
HW2833	Fen	Fernland	4.7
HW2834	Fen	Fernland	3.5
HW2991	Bog	Wire rushland	1.3
HW3025	Bog	Shrubland	2.6
HW3041	Bog	Shrubland	1.0
HW3043	Swamp	Flaxland	0.9
HW3275	?	?	0.1
HW3281	Bog	Shrubland	0.2
HW3287	?	?	0.4
HW3309	Fen	? (current–Exotic grass-/herb-/shrubland/scrub/forest)	0.5
HW3360	Fen	? (current–Exotic grass-/herb-/shrubland/scrub/forest)	0.2
HW3367	Bog	Shrubland	0.1
HW3368	Bog	Shrubland	0.1
HW3373	?	?	1.0
HW3528	Bog	Wire rushland	0.8
HW3534	Fen	Tussockland	7.8
HW3537	Swamp	Flaxland	0.2
HW3540	Fen	Tussockland	0.0
HW3541	Fen	Sedgeland	0.3
HW3608	?	?	0.4
HW85	Bog	Open water	0.1
HW1003	?	?	0.1

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