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ECOLOGICAL EVALUATION OF SEVEN
WETLANDS IN RELATION TO PROPOSED
PLAN CHANGE 2, REGIONAL PLAN:
WATER FOR OTAGO



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Ecological Evaluation of Seven Wetlands in Relation to Proposed Plan Change 2, Regional Plan: Water for Otago

Contract Report No. 2842

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December 2011

Cover photograph (top left): Wetland on the Begg property, Stirling Marsh Complex.

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1. INTRODUCTION

Otago Regional Council has released a consultation draft for Proposed Plan Change 2 (Regionally Significant Wetlands) to the Regional Plan: Water for Otago. This plan change would add wetlands currently listed in Schedule 10 (Additional Wetlands) of the Plan to Schedule 9 (Significant Wetlands). Some wetlands currently in Schedule 10 require further evaluation as to their regional significance. This report describes the evaluation of wetlands at seven sites in Otago:

- Te Hua Taki Wetland (NZTM 1438600E 5024200N)¹;
- Trig Q Ephemeral Pool (NZTM 1392900E 4981700N²);
- Stirling Marsh Complex (NZTM 1353200E 4873900N);
- Lower Manorburn Dam Margins (NZTM 1321700E 4983900N);
- Shotover River Confluence Swamp (NZTM 1266900E 5007100N);
- Diamond Lake Wetland (NZTM 1234800E 5035400N);
- Lake Reid Wetland (NZTM 1235100E 5033400N).

2. METHODS

The wetlands were assessed during field inspections undertaken on 6-7 December and 9 December 2011. In several cases, these visits included discussions with landholders, who described their farming practices on land within and adjacent to the wetlands.

The initial step during each visit was to determine whether a wetland was still present, using the wetland definition in the Resource Management Act 1991:

Wetland includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.

If a wetland was present, the wetland class (as per Johnson and Gerbeaux 2004) and condition were assessed, and each wetland was evaluated using the following ecological significance criteria in the Regional Plan: Water for Otago.

- A1: Habitat for nationally or internationally rare or threatened species or communities.
- A2: Critical habitat for the life cycles of indigenous fauna which are dependent on wetlands.
- A3: High diversity of habitat types.
- A4: Wetland with a high degree of naturalness.
- A5: Wetland scarce in Otago in terms of its ecological or physical character.
- A6: Wetland which is highly valued by Kai Tahu for mahika kai or other waahi taoka.
- A7: Wetland with a high diversity of indigenous flora and fauna.

¹ GPS coordinates for wetland centre.

² See note in Section 3.2.

- A8: Wetland which is regionally significant habitat for waterfowl.
- A9: Performing a significant hydrological function including maintaining water quality or low flows, or reducing flood flows.

Wetlands were not assessed against Criterion A6, which does not have an ecological basis.

3. WETLAND ASSESSMENTS

3.1 Te Hua Taki Wetland

Vegetation

This lowland swamp is spring-fed, but has drains along its north-eastern and south-western boundaries. Drains and open water contain musk (*Mimulus guttatus*), watercress (*Nasturtium microphyllum*), *Azolla filiculoides*, and water speedwell (*Veronica anagallis-aquatica*). The wetland contains tall crack willow (*Salix fragilis*) and grey willow (*S. cinerea*) forest, ponds, raupo (*Typha orientalis*) reedland, bracken (*Pteridium esculentum*) fernland, and harakeke (*Phormium tenax*) flaxland. Under the willow forest are blackberry (*Rubus fruticosus* agg.), cocksfoot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), cleavers (*Galium aparine*), *Hypolepis ambigua*, scattered rautahi (*Carex coriacea*), swamp kiokio (*Blechnum minus*), and purei (*Carex secta*), and standing water with duckweed (*Lemnor minor*). Ponds are surrounded by raupo, purei, and rushes (*Juncus edgariae*). The harakeke flaxland and bracken fernland form a matrix that is partly smothered in pohuehue (*Muehlenbeckia australis*) and also contains scattered cabbage tree (*Cordyline australis*), elder (*Sambucus nigra*), exotic fuchsia (*Fuchsia* sp.), bittersweet (*Solanum dulcamara*), crack willow, a single radiata pine (*Pinus radiata*), and a few *Coprosma propinqua*. There are a few Lombardy poplar (*Populus nigra*) on wetland margins. The north-eastern side of the wetland is fenced, but the south-western side is grazed by cattle to keep the weeds down.



Plate 1: Flaxland and bracken fernland (left) and pond with raupo (right), Te Hua Taki wetland.

Birds

Six bird species (four native) have been recorded in the wetland. New Zealand pied oystercatcher (*Haematopus finschi*) (At Risk-Declining in Miskelly *et al.* 2008) was observed in pasture near the wetland.

Species	Common Name	Threat Classification
<i>Anas platyrhynchos</i>	Mallard	Introduced and Naturalised
<i>Emberiza citrinella</i>	Yellowhammer	Introduced and Naturalised
<i>Gymnorhina tibicen</i>	Australian magpie	Introduced and Naturalised
<i>Haematopus finschi</i>	New Zealand pied oystercatcher	At Risk-Declining
<i>Hirundo tahitica neoxena</i>	Welcome swallow	Not Threatened
<i>Porphyrio melanotus</i>	Pukeko	Not Threatened
<i>Rhipidura fuliginosa fuliginosa</i>	South Island fantail	Not Threatened

ORC Regional Significance Criteria

Te Hua Taki Wetland meets criterion A5 (Wetland scarce in Otago in terms of its ecological or physical character) as it is located in Glenavy Ecological District where less than 1% of land cover comprises flaxland, lakes and ponds, or freshwater wetlands (Landcover Database v2).

3.2 Trig Q Ephemeral Pool

The GPS coordinates provided did not correspond to a wetland, but to a non-wetland area just west of point 696 m, near the northern property boundary. However, the wetland described below was found nearby at NZMG E2302675 N5543213/NZTM E1392800 N4981552 which also corresponds to the area marked on the aerial photograph provided.

Vegetation

In December 2011, this site comprised a shallow pool containing dense marsh foxtail (*Alopecurus geniculatus*) surrounded by scattered rushes (*Juncus edgariae* and a few *J. effusus*) and an ephemeral wetland (dry at time of survey) containing rushes over bare ground and pasture grasses and herbs. Dry mud at the western end of the ephemeral wetland contained sheep's sorrel (*Rumex acetosella*), sand spurrey (*Spergularia rubra*), and annual poa (*Poa annua*). Other common species present at the site included creeping bent (*Agrostis stolonifera*), hawksbeard (*Crepis capillaris*), *Eleocharis acuta*, *Juncus articulatus*, white clover (*Trifolium repens*), and patchy *Carex* sedges. The site is grazed and has been fertilized and oversown.

Flora

Crassula peduncularis (Threatened-Nationally Critical in de Lange *et al.* 2009) has been previously recorded at this wetland, but was not observed during this recent site visit.



Plate 2: Shallow pond with march foxtail (left) and ephemeral wetland (right), Trig Q Ephemeral Pool.

Birds

Two common bird species were recorded at the wetland.

Species	Common Name	Threat Classification
<i>Alauda arvensis</i>	Skylark	Introduced and Naturalised
<i>Circus approximans</i>	Australasian harrier	Not Threatened

ORC Regional Significance Criteria

This wetland would meet criterion A1 if *Crassula peduncularis* is still present. Dry conditions in the ephemeral wetland did not facilitate verification of its presence or absence.

3.3 Stirling Marsh Complex

Vegetation

The Stirling Marsh Complex comprises three wetlands, two of which are located on the Begg property. The south-eastern wetland is a marsh containing sparse emergent cabbage trees (*Cordyline australis*) over a shrubland dominated by *Coprosma propinqua* with blackberry (*Rubus fruticosus* agg.), pohuehue (*Muehlenbeckia australis*), and a few gorse (*Ulex europaeus*) shrubs. The margins of the shrubland are covered in rautahi (*Carex coriacea*) sedgeland. Rautihi, along with *Blechnum minus*, *B. penna-marina*, and pasture grasses, extends under the shrubland canopy. The wetland's eastern margins contain wet pasture of sweet vernal, Yorkshire fog, white clover (*Trifolium repens*), creeping buttercup, and lotus with patchy rautahi and *Juncus* spp. Harakeke (*Phormium tenax*) flaxland is present to the east, over the property boundary. This wetland is grazed by stock.



Plate 3: *Coprosma propinqua* shrubland, eastern wetland, Begg property, Stirling Marsh Complex.

The western wetland is a modified fen. Originally level with the surrounding land, the fen subsided after the peat caught fire during a burn-off (William Begg, pers. comm., 6 December 2011). The fen contains rushland of *Juncus edgariae*, an unidentified rush, and a few *J. effusus* over rautahi, sweet vernal, Yorkshire fog, white clover, browntop (*Agrostis capillaris*), lotus (*Lotus pedunculatus*), and creeping buttercup. A few *Juncus planifolius*, *Carex secta*, *Coprosma propinqua*, and gorse are scattered throughout. There is a small shrubland where *Coprosma propinqua* is dominant. Also present is a harakeke flaxland, with *Juncus edgariae* and rautahi, and open areas containing sphagnum, sweet vernal, catsear (*Hypochaeris radicata*), browntop, *Juncus articulatus*, *Celmisia gracilentia*, *Centella uniflora*, *Gonocarpus micranthus*, *Blechnum penna-marina*, and small clumps of wire rush (*Empodisma minus*). A small patch of red tussock (*Chionochloa rubra*) grassland contains a few flax and *Coprosma propinqua* over rautahi, *Blechnum minus*, pasture grasses, lotus, and abundant spearwort (*Ranunculus flammula*). There is also a small area dominated by *Carex secta*. This wetland contains some old unmaintained drains and is mostly fenced to exclude stock.



Plate 4: Rushland and flaxland, western wetland, Begg property, Stirling Marsh Complex.

ORC Regional Significance Criteria

The Stirling Marsh Complex meets criterion A5 (Wetland scarce in Otago in terms of its ecological or physical character) because it is located in Tokomairiro Ecological District where less than 2% of land cover comprises flaxland and freshwater wetlands (Landcover Database v2).

3.4 Lower Manorburn Dam Margins

Vegetation

The margins of the Lower Manorburn Dam contain lacustrine swamp vegetation dominated by crack willow (*Salix fragilis*) over raupo (*Typha orientalis*), as well as swamp vegetation where raupo is dominant. Common associate species were *Juncus articulatus*, duckweed (*Lemna minor*), *Carex secta*, and *Azolla filiculoides*, with alder (*Alnus glutinosa*) near the main car park. Open water and mud were also present. Other species recorded were *Glyceria fluitans*, *Ranunculus trichophyllus*, water forget-me-not (*Myosotis laxa* subsp. *caespitosa*), and oxygen weed (*Lagarosiphon major*). At the eastern (upper) end of the reservoir, the crack willow canopy is only interrupted by open water. Reservoir margins in this area contain crack willow over sweet brier (*Rosa rubiginosa*), *Coprosma propinqua*, and a few rowan (*Sorbus aucuparia*). The ground is covered in cocksfoot (*Dactylis glomerata*), tall fescue (*Schedonorus phoenix*), water celery (*Apium nodiflorum*), and Californian thistle (*Cirsium arvense*).



Plate 5: Crack willow and raupo, Lower Manorburn Dam Margins.

Birds

Thirteen bird species (six native) were recorded at the site. Little shag (*Phalacrocorax melanoleucos brevirostris*) is classified as At Risk-Naturally Uncommon in Miskelly *et al.* (2008).

Species	Common Name	Threat Classification
<i>Anas platyrhynchos</i>	Mallard	Introduced and Naturalised
<i>Anas rhynchotis variegata</i>	New Zealand shoveler	Not Threatened
<i>Aythya novaeseelandiae</i>	New Zealand scaup	Not Threatened
<i>Carduelis carduelis</i>	Goldfinch	Introduced and Naturalised
<i>Carduelis chloris</i>	Greenfinch	Introduced and Naturalised
<i>Carduelis flammea</i>	Redpoll	Introduced and Naturalised
<i>Circus approximans</i>	Australasian harrier	Not Threatened
<i>Emberiza citrinella</i>	Yellowhammer	Introduced and Naturalised
<i>Fringilla coelebs</i>	Chaffinch	Introduced and Naturalised
<i>Fulica atra</i>	Australian coot	Native - Coloniser
<i>Gerygone igata</i>	Grey warbler	Not Threatened
<i>Phalacrocorax melanoleucos brevirostris</i>	Little shag	At Risk - Naturally Uncommon
<i>Turdus philomelos</i>	Song thrush	Introduced and Naturalised

ORC Regional Significance Criteria

This site meets criterion A1 (Habitat for nationally or internationally rare or threatened species or communities) due to the presence of little shag (At Risk-Naturally Uncommon). The site also meets criterion A5 (Wetland scarce in Otago in

terms of its ecological or physical character) as it is located in Manorburn Ecological District where only c.2% of land cover comprises lakes and ponds and herbaceous freshwater vegetation (Landcover Database v2).

3.5 Shotover River Confluence Swamp

Vegetation

This swamp contains rautahi sedgeland with giant buttercup (*Ranunculus acris*) and *Festuca rubra*. Other species present include white clover, cocksfoot, sweet vernal, browntop, lotus, and *Galium palustre*. *Carex virgata* is dominant near the centre of the wetland. Crack willow and grey willow are scattered throughout. To the northeast, there is a drainage ditch with watercress (*Nasturtium microphylla*), *Juncus articulatus*, rautahi, and a few purei (*Carex secta*). Further east are several ponds with purei, raupo (*Typha orientalis*), and *Juncus articulatus*. Patches of *Carex virgata* and rushes (*Juncus* spp.) border a pond. On the northern margins of the site, tall crack willow form a canopy over Yorkshire fog, sweet vernal, *Mimulus mochatus*, and open water with duckweed (*Lemnor minor*).



Plate 6: Sedgeland (left) and *Olearia lineata* shrub (right), Shotover River Confluence Swamp.

Flora

Three shrubs of *Olearia lineata* (At Risk-Declining in de Lange *et al.* 2009) were recorded at the following locations:

- NZMG E2177061 N5568915 / NZTM E1267084 N5007142;
- NZMG E2177022 N5568871 / NZTM E1267045 N5007098;
- NZMG E2176999 N5568867 / NZTM E1267022 N5007094.

One shrub of *Olearia virgata* (Not Threatened) was also recorded at:

- NZMG E2176872 N5568896 / NZTM E1266895 N5007123.

Birds

Three common species were recorded, two native and one introduced.

Species	Common Name	Threat Classification
<i>Circus approximans</i>	Australsian harrier	Not Threatened
<i>Fringilla coelebs</i>	Chaffinch	Introduced and Naturalised
<i>Porphyrio melanotus</i>	Pukeko	Not Threatened

ORC Regional Significance Criteria

This site meets criterion A1 (Habitat for nationally or internationally rare or threatened species or communities) due to the presence of *Olearia lineata*. The site also meets criterion A5 (Wetland scarce in Otago in terms of its ecological or physical character) as it is located in Shotover Ecological District where only c.0.01% of land cover comprises herbaceous freshwater vegetation and c.7.25% lakes and ponds (Landcover Database v2).

3.6 Diamond Lake Wetland

Vegetation and Habitats

Diamond Lake wetland extends from the shores of Diamond Lake towards the east. Most of the site is covered in rautahi sedgeland with giant buttercup (*Ranunculus acris*), sweet vernal (*Anthoxanthum odoratum*), red clover (*Trifolium pratense*), and Yorkshire fog (*Holcus lanatus*). Other *Carex* species are also present but are less abundant. Closer to the lake in the northern part of the site, *Carex* sedges are predominant, including rautahi, with moss, including *Sphagnum*, being common. There is a small patch of *Coprosma propinqua* shrubland and toetoe (*Cortaderia richardii*), and a few crack willow (*Salix fragilis*) and grey willow (*S. cinerea*) are scattered across the wetland. In general, pasture species become more common further from the lake. In the southern part of the site, near the Otago Fish and Game New Zealand access track, the sedgeland contains abundant *Potentilla anserinoides*. Shallow stream channels dissect the site and are dominated by rautahi. Wetter areas have a few *Carex secta*. The largest waterway is steeper-sided, with sedgeland to its margins. Other species observed include *Coprosma rugosa*, *Coriaria plumosa*, *C. arborea*, *Cerastium fontanum*, *Stelleria graminea*, *S. alsine*, and *Viola cunninghamii*.

Flora

One small shrub of *Olearia lineata* (At Risk - Declining in de Lange *et al.* 2009) was recorded on a stream margin at NZMG E2144998 N5597419/NZTM E1234960 N5035655.



Plate 7: Rautahi sedgeland (left) and a *Olearia lineata* shrub alongside a waterway (right), at the Diamond Lake Wetland.

Birds

Only two (one native and one exotic) bird species were recorded in or near the wetland. New Zealand pied oystercatcher (*Haematopus finschi*) was observed flying overhead.

Species	Common Name	Threat Classification
<i>Anas platyrhynchos</i>	Mallard	Introduced and Naturalised
<i>Haematopus finschi</i>	New Zealand pied oystercatcher	At Risk - Declining

ORC Regional Significance Criteria

The part of the site on the Thomson property meets criterion A1 (Habitat for nationally or internationally rare or threatened species or communities) due to the presence of *Olearia lineata*. This part of the wetland is also likely to meet Criterion A9, as it filters water entering Diamond Lake.

The site is also likely to meet criterion A5 (Wetland scarce in Otago in terms of its ecological or physical character) as it is located in Dart Ecological District where <2% of land cover comprises lakes and ponds and herbaceous freshwater vegetation (Landcover Database v2).

3.7 Lake Reid Wetland

The easternmost margins of this site incorporate dryland habitats containing shelter belts and a shrubland of *Coprosma propinqua*, matagouri (*Discaria toumatou*), hawthorn (*Crataegus monogyna*), and pohuehue (*Muehlenbeckia australis*).

The waterway (a subsidiary channel of Earnslaw Burn) immediately to the west of the shrubland contains abundant *Myriophyllum triphyllum* and water forget-me-not (*Myosotis laxa* subsp. *caespitosa*) with *Callitriche stagnalis*, *Glyceria fluitans*, and *Juncus articulatus*. Wetland habitats in the north-eastern part of the site are dominated by rautahi and other *Carex* spp. but also Yorkshire fog and sweet vernal, with scattered *Juncus effusus* and *Luzula multiflora*. There are a few areas where *Sphagnum* moss, *Gonocarpus micranthus*, *Celmisia gracilentia*, and patchy *Oreobolus pectinatus* are present, possibly outside the boundary of the mapped site. The southernmost part of the site is more modified and contains scattered *Juncus effusus* over sweet vernal and Yorkshire fog, with sharp spike-sedge (*Eleocharis acuta*), *Juncus articulatus*, moss, and *Gonocarpus micranthus*.



Plate 8: Shrubland (in the foreground), a subsidiary channel of the Earnslaw Burn, and sedgeland at the Lake Reid Wetland.

Flora

Deschampsia cespitosa (At Risk-Declining) has been previously recorded at the Lake Reid Wetland (LINZ 2002). This species was not recorded during this survey, but may still be present on the Thomson property.

ORC Regional Significance Criteria

The small south-eastern part of the site on the Thomson property does not appear to meet any significance criteria as it comprises wet pasture. If *Deschamsia cespitosa* is present, the wetland would meet criterion A1. Other parts of the wetland on the Thomson property are likely to meet criterion A9, as they filter water entering Lake Reid and are part of the larger Diamond Lake-Lake Reid wetland complex. The site is also likely to meet criterion A5 (Wetland scarce in Otago in terms of its ecological or physical character) as it is located partly in the Dart Ecological District and partly in the Richardson Ecological Districts, where lakes and ponds and herbaceous freshwater vegetation comprise <2% and c.10.4% of land cover respectively (Landcover Database v2).

ACKNOWLEDGMENTS

We gratefully acknowledge the landowners who granted access and provided useful information about their wetlands: I. & J. Isbister, William Begg, Ladies Mile Partnership, Paul O'Neill, and Geoffrey Thomson. A special thank you also to the O'Neills for providing transport to Trig Q Ephemeral Pool.

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