Christchurch District Plan
Site of Ecological Significance

Site Significance Statement

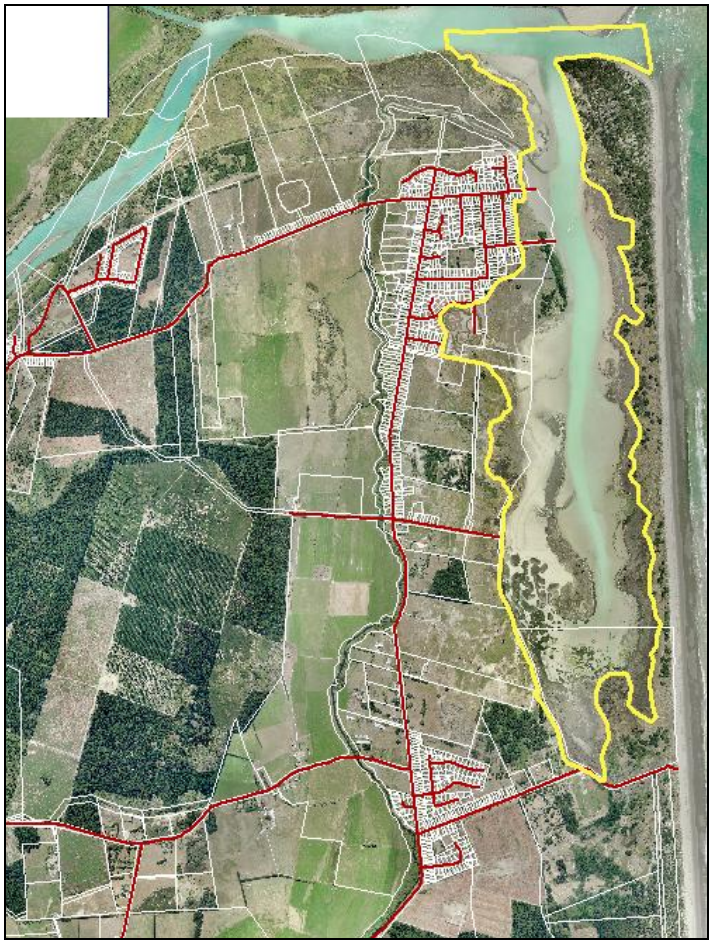
Site name: Brooklands Lagoon

Site number: SES/LP/5

Summary of Significance:

The Brooklands Lagoon SES is an originally rare ecosystem that contains indigenous vegetation communities that have been greatly reduced within the Low Plains Ecological District, and is also of local, national and international importance in terms of it supporting a representative assemblage of indigenous and migratory birdlife, including 20 threatened, at-risk or uncommon species.

Site Map



Additional Site Information

Central point NZTM: N5193870, E1576221

Area of SES (ha): 293.82ha

Site Description

Brooklands Lagoon and its surrounding associated features comprise a mosaic of coastal environments, ecological units and vegetation types including extensive mudflats, salt marsh, and turf saltmeadow on riparian terraces, freshwater wetlands, a constructed tidal wetland, low dunes, remnant shrubland and planted coastal bush.

Extent of Site of Ecological Significance

The Brooklands Lagoon SES extends from the mouth of the Waimakariri River in the north, to Heyders Road (Spencerville) in the south. The width of the SES varies along its length as defined by the base of the stable sand dunes along the eastern side (i.e. where the lagoon environment has more influence over the ecological values than does the coastal environment) , and by the extent of indigenous plant communities along the western site, including the constructed Beacon Street tidal wetland.

Assessment Summary

The Brooklands Lagoon Site has been evaluated against the criteria for determining significant indigenous vegetation and significant habitat of indigenous fauna listed in Appendix 3 of the Canterbury Regional Policy Statement (Environment Canterbury, 2013) (see below) referring also to the Wildland Consultants (2013) Guidelines and advice from the relevant Specialist Ecologist Groups. Under these criteria the site is ecologically significant because it meets the representativeness (criteria 1 & 2), rarity/distinctiveness (criteria 3, 4 & 6), diversity and pattern (criterion 7) and ecological context criteria (criteria 9 & 10).

Assessment against Significance Criteria

Representativeness

1. ***Indigenous vegetation or habitat of indigenous fauna that is representative, typical or characteristic of the natural diversity of the relevant ecological district. This can include degraded examples where they are some of the best remaining examples of their type, or represent all that remains of indigenous biodiversity in some areas.***

   The site is significant under this criterion.

The Brooklands Lagoon SES comprises a continuous area of mostly undisturbed salt marsh vegetation, and most of the expected Canterbury salt mash plants were recorded in a survey by Worner and Partridge (2008) (Refer also Appendix 1). Both the extent and native flora of Brooklands Lagoon are considered superior to that of the Avon Heathcote Estuary (Ibid).

Brooklands Lagoon hosts a typical association of indigenous snails, shellfish, worms, crustacean and other taxa recorded by ECan (2012) that are restricted to the estuarine environment, including:

Austrovenus stutchburyi	cockle
Arithritica bifurca	
Mactra ovata	soft shelled bivalve
Paphies spp.	pipi and tuatua
Amphibola crenata	mudflat snail
Potamopyrgus estuarinus	
Capitellid spp.	worm
Nicon aestuariensis	worm
Scolecolepides benhami	worm
Scolelepis spp.	worm
Oligochaetes	worm
Paracorophium spp.	speckled hopper
Halicarcinus varius	pill-box crab
Helice crassa	mud crab
Macrophthalamus hirtipes	stalk-eyed mud crab
Elminius modestus	barnacle
Nemertine	ribbon worm

2. Indigenous vegetation or habitat of indigenous fauna that is a relatively large example of its type within the relevant ecological district.

The site is significant under this criterion. The Brooklands Lagoon wetland complex (comprising the lagoon proper, Brooklands Spit, inland saltmarsh and dune environments on the lagoon's western margin, the lower Styx ponding area, Styx rivermouth marshes, Kainga Road saltmeadow, Waimakariri Rivermouth and the Kaiapoi Oxidation Ponds) comprises one of the largest coastal wetland complexes in Canterbury (Crossland 2008). Brooklands Lagoon is the second largest of the two estuaries within Christchurch City. In terms of nesting habitat for wetland birds, Brooklands Lagoon is also the 4th most extensive area for nesting after Lake Ellesmere, the Ashley-Saltwater Creek Estuary, and Lake Ki-Wainono in the Low Plains Ecological District (Crossland 2004).

Rarity/Distinctiveness

3. Indigenous vegetation or habitat of indigenous fauna that has been reduced to less than 20% of its former extent in the Region, or relevant land environment, ecological district, or freshwater environment.

The site is significant under this criterion.

The site contains wetland vegetation that has been reduced to less than 20% of it‘s former extent in the Low Plains Ecological District. The Threatened Environment Classification reports that less that 10% of indigenous cover

remains in the Low Plains Ecological District (See Walker *et al.* 2007; Lloyd *et al.* 2013).

4. ***Indigenous vegetation or habitat of indigenous fauna that supports an indigenous species that is threatened, at risk, or uncommon, nationally or within the relevant ecological district.***

The site is significant under this criterion.

The site supports 20 bird species listed as threatened under the Department of Conservation threat classifications system (Robertson *et al.* 2013) as listed by Crossland (2013), including:

Threatened/Nationally Critical

- Grey Duck — *Anas superciliosa superciliosa*
- White Heron — *Ardea modesta*
- Black-billed Gull — *Laurs bulleri*

Threatened/Nationally Endangered

- Australasian Bittern — *Botarus poiciloptilus*
- Black Fronted Tern — *Sterna albostriata*

Threatened/Nationally Vulnerable

- Pied Cormorant — *Phalacrocorax v. varius*
- Banded Dotterel — *Charadrius obscurus*
- Wrybill — *Anarhynchus frontalis*
- Red-billed Gull — *Larus novaehollandiae scopulinus*
- Caspian Tern — *Hydroprogne caspia*
- White-flippered Penguin — *Eudyptula minor albosignata*
- Red Knot — *Calidris canutus rogersi*

At Risk/Declining

- South Island Pied Oystercatcher — *Haematopus finschi*
- Pied Stilt — *Himantopus leucocephalus*
- White Fronted Tern — *Sterna striata striata*
- Eastern Bar-tailed Godwit — *Limosa lapponica baueri*

At Risk/Relic

- Marsh Crake — *Porzana pusilla affinis*

At Risk/Naturally Uncommon

- Black Cormorant — *Phalacocorax carbo novaehollandiae*
- Little Black Cormorant — *Phalacocorax sulcirostris*
- Royal Spoonbill — *Platalea regia*

The site supports two threatened plant species (See Worner and Partridge 2008; de Lange *et al.* 2012):

- Shore sedge — *Carex litorosa* — At Risk/Declining
- Native musk — *Mimulus repens* — At Risk/Naturally Uncommon

5. ***The site contains indigenous vegetation or an indigenous species at its distribution limit within Canterbury Region or nationally.***

   Site not assessed under this criterion

6. ***Indigenous vegetation or an association of indigenous species that is distinctive, of restricted occurrence, occurs within an originally rare ecosystem, or has developed as a result of an unusual environmental factor or combinations of factors.***

   The site is significant under this criterion.

   Estuaries are listed by Williams *et al.* (2007) as historically rare ecosystems, and as such the associations of indigenous species that occur within Brooklands Lagoon are significant under this criterion.

Diversity and Pattern

7. ***Indigenous vegetation or habitat of indigenous fauna that contains a high diversity of indigenous ecosystem or habitat types, indigenous taxa, or has changes in species composition reflecting the existence of diverse natural features or ecological gradients.***

   The site is significant under this criterion.

   The Brooklands Lagoon complex is made up of a range of micro-habitats, including inter-tidal mudflats, back-shore salt meadow and coastal shrubland (Crossland 2004).

   In terms of its avifauna community, since the 1850s 106 species of bird have been recorded using Brooklands Lagoon, comprising 44 resident species, 24 seasonal visitors, 30 vagrants, and eight species which are now locally extinct. 55 of these species are indigenous species and still occur in and around the site (Crossland 2013). In terms of species richness, the Brooklands area probably has the fifth highest ranking in Canterbury behind Lake Ellesmere, the Avon-Heathcote Estuary/Bromley Oxidation Ponds, Lake Ki-Wainono and Ashley-Saltwater Creek Estuary. With 100 bird species recorded, Brooklands Lagoon has a comparable or higher species list than most other New Zealand estuarine systems. 70 species are classified as wetland/coastal birds, and numbers peak at >6000 in the late summer/autumn (Crossland 2008).

   44 bird species occur year-round on Brooklands Lagoon, with 37 species breeding locally (Crossland 2008).

Ecological Context

8. ***Vegetation or habitat of indigenous fauna that provides or contributes to an important ecological linkage or network, or provides an important buffering function.***

   Site not assessed under this criterion

9. ***A wetland which plays an important hydrological, biological or ecological role in the natural functioning of a river or coastal system.***

   The site is significant under this criterion.

   The extensive mudflats support an abundant and diverse invertebrate community which forms much of the food source for a wide variety of fish species, as well as resident and migratory waterfowl (Cromarty and Scott 1996).

10. ***Indigenous vegetation or habitat of indigenous fauna that provides important habitat (including refuges from predation, or key habitat for feeding, breeding, or resting) for indigenous species, either seasonally or permanently.***

    The site is significant under this criterion.

    The Brooklands Lagoon wetland complex is an important wintering site and migration stop for wetland/coastal birdlife that breed on the Waimakariri Riverbed as well as in other parts of Canterbury and the eastern South Island. Brooklands is also an important breeding ground in its own right.

    The saltmarshes along the inside of the spit comprise good breeding habitat, especially for swampbirds (Pukeko, Bittern, Marsh Crake), waterfowl (Black Swan, Mallard, Grey Duck, NZ Shoveler), Harrier and Pied Stilt (Crossland 2008).

    Mudflat habitats found within Brooklands Lagoon and along the banks of the lower Waimakariri River are important feeding grounds and low tide loafing areas for herons, spoonbills, waders, gulls and waterfowl. Mudflat and saltmarsh habitats along the inner (western) side of the spit comprise important feeding habitats for White-faced Heron, Australasian Bittern, Royal Spoonbill, Pied Stilt, South Island Pied Oystercatcher, Bar-tailed Godwit, Black-backed Gull, Caspian Tern, Black Swan, Canada Goose, Paradise Shelduck, Mallard, Grey Teal, NZ Shoveler, Pukeko, Marsh Crake and NZ Kingfisher (Crossland 2008).

The following 24 indigenous wetland/coastal bird species use Brooklands Lagoon and its environs in numbers of national (N), regional (R) or local (L) significance, where significance is defined by Crossland (2008) as >5% of local and/or regional populations, or > 1% of national populations, based on monitoring data and estimates for local, regional and national populations for each species.

• New Zealand Shoveler	N
• Grey Teal	N
• New Zealand Scaup	N
• South Island Pied Oystercatcher	R
• Bar-tailed Godwit	R
• Pied Stilt	R
• Paradise Shelduck	R
• Pied Cormorant	R
• White-faced Heron	R
• Royal Spoonbill	R
• Caspian Tern	R
• White-fronted Tern	R
• Black-fronted Tern	R
• Black-billed Gull	R
• New Zealand Kingfisher	R
• Variable Oystercatcher	L
• Banded Dotterel	L
• Black Swan	L
• Black Cormorant	L
• Little Cormorant	L
• Spotted Shag	L
• Pukeko	L
• Red-billed Gull	L
• Black-backed Gull	L

Site Management

Existing Protection Status

- Site is wholly contained within a CCC reserve

Threats and risks	Management recommendations	Support package options N/A
• Pest plant incursion	• Monitor pest plant infestations and implement control as required. • Assess new pest plant incursions and implement control as required	•
• Animal pest incursion	• Monitoring of possible animal pest incursions and trapping as necessary	•
• Damage to vegetation and mudflats by vehicles, motorbikes and quad-bikes	• Continue to restrict vehicles to official vehicles only.	•
• Unknown future disturbances from surrounding new land uses	• Ensure any future developments do not compromise the ecological functioning of the Horseshoe Lake ecosystem	•
• Loss of safe high-tide roosting sites	• Maintain condition of Beacon Street wetland as a roosting habitat (ie; keep weeds down, maintain bare substrate surface).	•
• Disturbance of birds by humans and dogs.	• Ensure levels of human disturbance are minimised, for example by erecting temporary fencing and signage around nest sites. • Ensure that dogs are under control or on a leash. • Limit areal extent (and potentially phase out) waterfowl hunting on the lagoon and saltmarshes. • Prohibit hunting of non-game regulated bird species (like Canada Goose) outside of the prescribed duck-shooting season.	•
• Gamebird hunting disturbing non-target waterfowl.	• Consider identifying sensitive locations where hunting is best prohibited and appropriate locations	•

	for gamebird hunting. This is considered to be particularly important now that Canada geese can be hunted year round. The hunting window now extends through the breeding season, the moulting season and the period of peak occupancy of non-target indigenous bird species (including threatened and at risk species).	
• Natural process of change in wetland ecology and function	• If natural changes in wetland ecology, composition or functioning are determined to be detrimental to the ongoing viability of the values of the site, a recovery action plan should be initiated.	•

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Assessment completed by: Dr Antony Shadbolt
Date: 9th September 2014

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Date: 9th September 2014

Statement updated by: XXX
Date: XXX

PLEASE NOTE THIS STATEMENT IS BASED ON INFORMATION AVAILABLE AT THE TIME OF WRITING. DUE TO THE DYNAMIC NATURE OF ECOSYSTEMS, FUTURE REASSESSMENT OF THE SITE MAY BE NECESSARY TO REFLECT ANY CHANGES IN KNOWLEDGE OF ITS ECOLOGICAL SIGNIFICANCE.

Appendix 1: Indigenous Salt Marsh Flora

List of native flora recorded within the Brooklands Lagoon salt marsh areas by Worner and Partridge (2008)

TREES & SHRUBS

BOTANICAL NAME	**COMMON NAME(S)**
Leptospermum scoparium	manuka
Plagianthus divaricatus	saltmarsh ribbonwood

MONOCOT HERBS

Apodasmia similis	oioi
Bolboschoenus caldwellii	grassy club sedge
Carex litorosa	shore sedge
Eleocharis acuta	spike sedge
Juncus caespiticius	grass-leaved rush
Juncus kraussii var. *australiensis*	sea rush
Juncus pallidus	giant rush
Phormium tenax	harakeke, swamp flax
Puccinellia stricta	salt grass
Schoenoplectus pungens	three-square
Schoenus concinnus	dwarf cushion sedge
Triglochin striatum	arrow grass
Typha orientalis	raupo
Zostera capricorni	eel grass

DICOT HERBS

Apium prostratum	NZ celery
Chenopodium glaucum	glaucous goosefoot
Cotula coronopifolia	bachelor's button
Leptinella dioica	turf daisy
Mimulus repens	native musk
Samolus repens	sea primrose
Sarcocornia quinqueflora	glasswort
Selliera radicans	remuremu
Senecio glomeratus	fireweed
Spergularia media	sea spurrey
Suaeda novaezelandiae	sea blite