THOMSONS PROJECT CONSTRUCTED WETLAND

Building a wetland from scratch

February 2024 Factsheet

Although years in the making, in just over a year we've built a functioning wetland to improve freshwater quality, exiting the Sluice channel tributary into Thomsons Creek and then into the Manuherekia River.

The project, part of the Thomsons Catchment Project, is funded by the 'At Risk Catchment Project', which is administered by the Ministry for the Environment.

This project is a testament to the community, supported by hundreds of volunteers and local businesses and organisations. Special acknowledgement must go the late Matt Hickey for his vision for how this wetland would improve the water quality and his support, skill and knowledge to get us on the journey of creating the wetland. Matt sadly passed away a couple of weeks after we got final sign off by the Manukerekia Exemplar Catchment Governance Group so never saw his vision make it into reality.

In just a year, we've built the key components of a thriving wetland, home to eels and a range of birds and plants, including the rare black-billed gull.

By January 2024, and one year of three into the build, the wetland is taking form.

16,000ha
Thomsons Creek Catchment

3.5ha water
1.5ha riparian and islands
5ha wetland

6,700ha
sluice channel
Catchment area above the wetland

41,000
carex secta
Planted in the wetted bed so far

2,200
native plants planned on the islands April 2024
More riparian planting to come

KEY DATES

March 2022 ▶ Willows sprayed

December 2022 ▶ First consent granted and pond drainage undertaken

January 2023 ▶ Willows removed

February 2023 to June 2023 ▶ Second consent granted and main construction

October 2023 ▶ Carex secta planting, construction continued and landscaping of excess material

Summer 2023-2024 ▶ Management of water levels and weeds

View in October 2021, prior to any changes, looking northwest of the ponding area at its most flooded. The main Sluice channel is clearly visible entering just left of centre, and Thomson's Creek (willow-lined channel entering from the right). The rail trail can be seen passing across the lower part of the picture.

Why we decided to create a wetland

At this site, seasonal drainage flowed from the Sluice catchment via old drainage channels into Thomson's Creek where it adjoins the Otago rail trail west of Omakau.

This drainage, along with runoff from the surrounding area, became impounded by mature crack willows forming shallow ponds near the confluence of the drainage channels and Thomson's Creek.

In addition to receiving contaminated flows via the drainage channels, wave action in the very shallow exposed ponded areas resuspended fine sediments.

While the ponds provided habitat for birds such as mallards, they were otherwise not bio-diverse, dominated by exotic vegetation and no fish. The water quality flowing from this area was high in suspended solids, nutrients (nitrogen and phosphorous) and faecal microbiological contaminants (i.e., E. coli), impairing the water quality of Thomson's Creek and the Manuherikia River downstream.

The wetland complements work by farmers in the catchment to improve water quality and biodiversity.

Proposed wetland site, February 2023, post draining and willow removal, with sluice channels clearly visible going through what had been the flooded paddocks.

A wetland was the answer!

The wetland was designed to replace the ponds, and drain-flows into the wetland are designed to pass through sedimentation ponds to capture the coarser fractions of suspended sediments. The sediments that accumulate in the ponds will need to be periodically removed mechanically using an excavator.

Water then flows into the wetland area moving slowly in a nearly 1km long serpentine pattern through the wetland directed by low earthen bunds. The wetland includes shallow (~ 0.1-0.25 m) densely vegetated zones (~70% of area) interspersed with deeper open-water areas (0.5-1.5 m). At the bottom of the wetland a low concrete weir between the earth bunds is designed to control normal reservoir levels in the wetland and to pass flood flows.

A native sedge-dominated wetland using Carex secta was chosen to plant in the water areas, as it already grows in the harsh local environment. Wiwi (rushes) are naturally re-establishing. The bunds, islands and riparian zones will be planted with other species of sedge (e.g., Carex virgata), harakeke (flax), kōwhai, and other local riparian species.

Carex secta thriving January 2024.

3rd March 2023 locals field day. Wetland in early construction.

As the wetland is built into the creek and not off to the side, a floodway direct from the inflow across to the outlet has been incorporated into the wetland design. This will protect the wetland and plantings from extreme flows and avoid excessive flooding of farmland around the wetland. To avoid erosion of the bunds, sections in this flow path are armoured with natural stone/rocks.

The wetland will remove finer fractions of suspended sediment and associated particulate-associated nutrients (particularly phosphorus) and faecal contaminants. Nitrogen will be predominantly removed by microbes that use the decomposing wetland plant-litter as a carbon-rich fuel to convert nitrate back to nitrogen gas (comprising 78% of the atmosphere) and by plant uptake during seasonal growth periods. Deeper open-water zones will encourage reaeration and mixing of the through-flowing water and provide exposure to sunlight to inactivate faecal pathogens.

The wetland will additionally provide a rich habitat for wildlife and become a biodiversity hotspot in the area. Already the rare, black-billed gull has nested on the flood zone rocks on the islands in the wetland within months of its construction. Pied stilts, teal, mallards and other wading birds are using the area. It is hoped, if funding can be raised, to provide a pathway and viewing platforms to connect to the rail trail near Omakau township.

Keeping track of changes

Monitoring of the changes to the wetland started in August 2020 with water quality and sediment sampling monthly by farmers in a Beef + Lamb NZ catchment project, and now carried on by the senior school pupils from Omakau school on the channels going into and out of the wetland, as well as in Thomsons Creek.

Invertebrate and sediment monitoring happens annually.

Fish and Game Otago have conducted bird surveys in January 2021, 2022 and 2024, now supported by a group of local volunteers.

A fish survey was undertaken in the channels adjacent to the wetland in January 2021 prior to work beginning and will be undertaken again once the wetland is finished and fully operational.

NEXT STEPS

- Plant the islands and area around the wetland with native plants
- Finish landscaping the excess soil
- Ongoing bird monitoring group
- Assess opportunities for predator control
- Apply for funding for a walkway around the wetland
- Fencing around the outside of the wetland

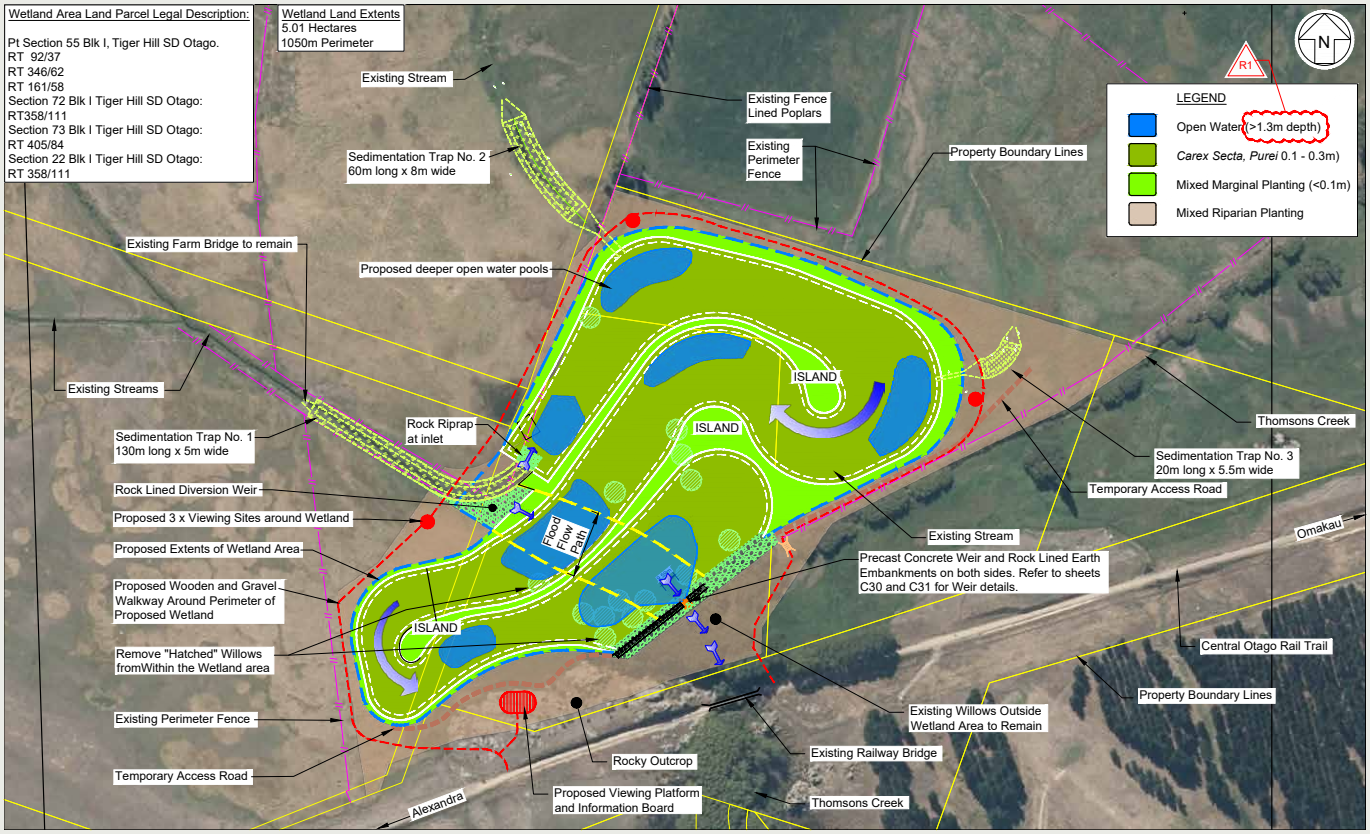
Future visualisation of the finished wetland.

S&B Civil's Cody West and Thomsons chairperson Hamish Stratford on site during construction.

Ross Mitchell, Kirk Samuel and Dick Brown from Breens constructing the exit weir.

MCG Co-Chair Anna Gillespie and Jo Wakelin in front of dead willows removed from site.

View of the completed exit weir.



Conceptual plan of the proposed Thomson's Creek constructed wetland, showing sedimentation ponds at main inlets (hatched lime green; including main inflow drain) and wetland area (outlined in blue) with low earthen bunds (in white) to direct flow evenly through the area and reduce wind and wave fetch. Dashed yellow lines delimit the flood flow channel provided across the centre of the wetland area to limit damage to the wetland and excess flooding of farmland.

Thomsons committee member Roger Williams with Omakau senior students Will and Zac.

Wetland planting Matakanui Combined Rugby Club helping move plants for planting the following day.

Matukituki Natives planting team busy planting.

Habitat Restoration Aotearoa planting in the foreground.

A community effort

The Thomsons wetland could not have happened without the support and help from hundreds of volunteers, local businesses and organisations and the funding from Ministry for Environment.

Special thanks to

- Matt Hickey for his vision
- Ministry for the Environment for their funding support
- Nicola McGrouther, our Project Manager
- Robyn and Pete McLeod who have kindly provided the land for the project
- Chris Tanner from NIWA who created the wetland design and NIWA for their support
- Brendan Sheehan (Mt Aurum Engineering) who took the design and developed the engineering design to suit the site and oversaw its implementation
- Jo Wakelin of Koinga Consulting who provides us plant advice
- Roger Williams who is managing the water levels
- Haines Battrick drone footage and general help
- Habitat Restoration Aotearoa and Matukituki Nursery planting teams
- Cody and Simon from the team at S&B Civil who constructed the wetland
- Chris Robinson from Central Excavating who prepared the site
- Landpro who surveyed the site
- Meg Kinney & Susie McKeague from McKeague Consultancy who prepared the consents
- Mark Edgar from Whitestone Contracting for the weed control
- Adam Finlay for sorting our dead willow piles
- Lee Cowan (Avalon Communications) for sharing our story
- Blue Mountain, Matukituki Nursery and Blueskin Bay Nurseries who grew the plants
- Andrew Kerr and the team from Breens Civil who built the exit weir
- Matakanui Combined Rugby Club, Matt O'Malley and others who helped cart plants
- Omakau school for doing the water monitoring with help from Lucy Francke from Enviroschools and now ORC's Becky Clements
- Fish and Game's Ben Sowry who conducted the bird counts
- Otago Regional Council's consent and expert support, including Pete Ravenscroft, as well as the support from the Chair and CE.
- Iwi and DOC support of the wetland
- The Stratford, Hills, Williams family's, NIWA & Omakau camping ground for helping with accommodation