



Swamp Wetlands

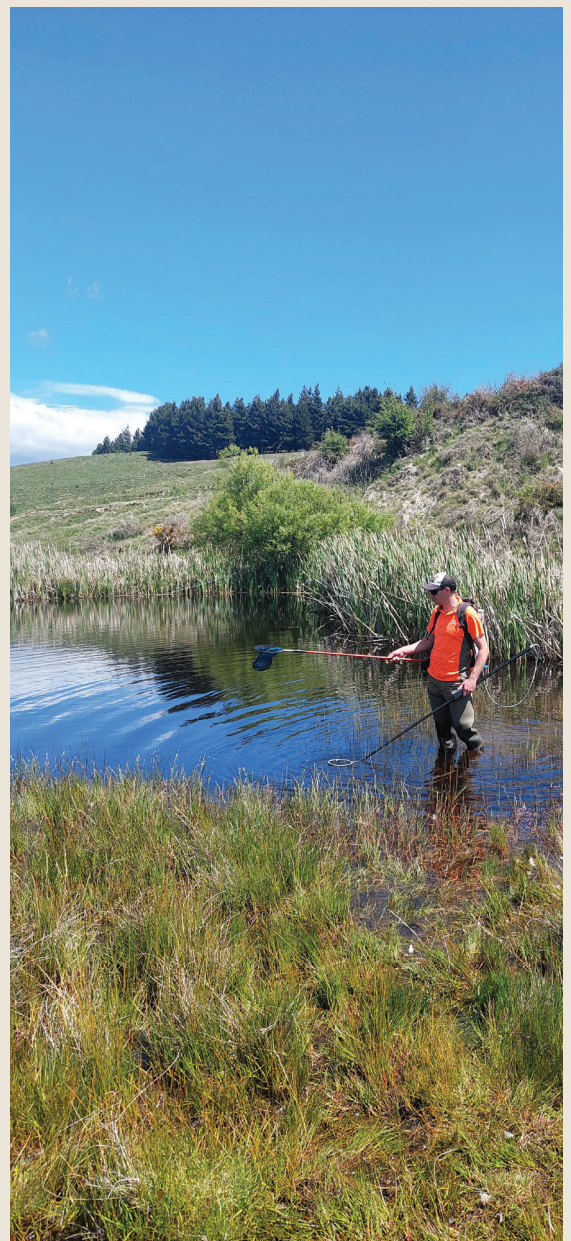
Swamps are wetlands primarily fed by surface water, with some groundwater contribution.

They always have visible and permanent surface water and can be found in basins, valley floors, deltas, and plains. Swamps typically have deeper and more permanent water than other wetland types, with some seasonal fluctuation. The substrate is usually peat or mineral, with peat being dark red-brown and partially decayed, while mineral substrate is gritty and silty. Vegetation in swamps varies based on human impact and location. Lowland swamps are dominated by pūkio, *Carex diandra*, native trees, and shrubs, while upland swamps have pūkio, rautahi, *Olearia bullata*, and bog rush. Modified swamps often feature exotic vegetation like crack willow, blue sweet grass, monkey musk, and water cress.

How to identify a 'healthy' swamp wetland

- ▶ Wetland is hydrologically intact, for example, no drains are present.
- ▶ Exotic woody weeds (e.g. crack willow) are largely absent from the wetland. There may be scattered plants, but not extensive areas of gorse and broom or dense, large crack willow.
- ▶ The swamp is dominated by native plants. This can include large, distinctive native plants like raupō and pukio, as well as native trees and shrubs. Smaller native sedges, rushes, and grasses can also be present.
- ▶ Stock are excluded from the wetland and/or there is little evidence of stock damage (e.g. pugging or browsing).

The extent of swamp wetlands has been greatly reduced in Otago, particularly in coastal habitats. Even if a swamp wetland does not have any of the 'healthy' characteristics, these wetlands still have ecological value and can provide a number of benefits to the wider catchment. Swamp wetlands help mitigate flood risk by acting as a pool of water. Rank grassland surrounding the wetland may provide habitat for lizards, even if it is dominated by exotic grasses. Exotic trees and shrubs may also provide habitat for birds, particularly if there are few native examples in the surrounding area.



Managing and enhancing swamp wetlands

Remove and exclude livestock: Retiring areas from grazing, combined with fencing to exclude livestock, is essential. Any fences should also include the main wetland area, ideally incorporating any nearby waterways.

Control invasive weeds: The control of woody weeds in and around swamp wetlands is a key priority for managing and enhancing wetland habitats.

- ▶ Crack willow is common within swamp wetlands. It readily spreads and forms large, dominant treelands, which can alter the hydrology of the wetland. Willows can also reduce water flow in waterways, block channels, and increase flood impacts. Removal of willows should be followed by native planting of ecologically appropriate trees and shrubs to fill gaps before exotic species reinvade.
- ▶ Other woody weeds may be present in and around wetlands. Common alder (*Alnus glutinosa*) is found in swamp wetlands throughout New Zealand, and if detected in a wetland in the Manuherekia, it warrants control.

Control rodents and mustelids: Rodents and mustelids are predators of native animals, including birds and lizards, that may be present around wetland margins. Large rodent populations can also attract other predators, such as feral cats.

Limit recreational access and maintain tracks: Swamp soils are wet, soft, and vulnerable to compaction, making them incompatible with vehicles.

Avoid drainage and habitat modification: Drainage of wetlands for development and agriculture has greatly reduced their extent in Otago. Where swamps have been 'reclaimed' through earthworks (bunds and dams), these can be broken down when the swamp is dry or left to collapse naturally. Historic drainage channels in or around these habitats should not be maintained. Over time, these drains will fill in with plants and debris and close naturally. Any connected drainage channels outside of these habitats should be considered for blocking or closure. Maintenance of drains adjacent to swamp wetlands should be evaluated for potential hydrological impacts on the wetland.





Planting lists and guidance

Restoration planting in and around swamp wetlands can help to maintain and enhance the ecological values of these habitats. In general, spacing should be approximately 0.5–1 metre between sedges, grasses, and rushes; 1–2 metres between shrubs; and 2 metres between trees. Best practice is to source plants as locally as possible.

Good planting technique is also important. The following video, prepared by the Manuherekia Catchment Group, provides guidance on planting: www.youtube.com/watch?v=2j9ohGo9Tc8

Wetland planting

Planting directly into the swamp can occur if the wetland is dominated by exotic species or if large gaps have opened up following the removal of weeds such as crack willow. Care must be taken not to plant in areas where native species are already present.

Terrestrial planting

Terrestrial planting of native species around the wetland perimeter will create a buffer, which helps to protect the wetland habitat.



Notable plants and animals

Swamp wetlands provide key habitat for various threatened and At Risk avifauna.

Kōtuku/white heron will forage and roost in inland swamps outside their breeding season. Swamps with areas of raupō and sedges offer favourable habitat for matuku-hūrepo/Australasian bittern, pūteketeke/Australasian crested grebe, kotoreke/marsh crake, and Australian coot. Shag species such as māpunga/black shag and kawaupaka/little shag are also likely to use swamp wetlands where roosting opportunities exist, such as dead logs or trees overhanging the water.

Some species of native skinks, including Otago green skink and tussock skink, may be present around the margins of swamps. These species require lizard refuges (such as dense ground cover vegetation and rock piles) that remain safe from flooding.

Notable plant species found in swamps include swamp willowherb and sedges such as Buchanan's sedge.

Swamps are expected to be highly valuable habitat for freshwater invertebrates, including the larvae of various fly and beetle species.

Threatened and At Risk native fish may be found in waterways and channels associated with swamp wetlands. Roundhead galaxias, found only in Otago, are commonly present in weedy drains and cobble streams. Upland bullies, while not threatened, are a notable and widespread freshwater fish species that inhabit a range of slow-flowing environments.

Threats

The main threats to swamp wetlands in the Manuherekia include:

- ▶ drainage,
- ▶ nutrient run-off
- ▶ weed invasions.

Drains surrounding a wetland, or other earthworks in or near wetlands, can negatively impact hydrology. Hydrology can also be altered over time by the establishment of woody weeds such as crack willow.

Stock can damage wetlands by pugging and compacting wetland substrates. This disturbance can create gaps in existing vegetation, allowing weeds to colonise and spread.

High nutrient run-off from surrounding farmland can also harm swamp wetlands, leading to algal blooms, excessive growth of undesirable plants, and reduced water quality and habitat for native aquatic invertebrates and fish.

Pest animals further impact wetlands by damaging native plants, depleting the seed bank, and preying on the eggs of native fauna.

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