WAIORA
MANUHEREKIA

# Bogs and Fen Wetlands

**Bog and fen wetlands are types of wetlands that form peat – an accumulation of partially decayed vegetation or organic matter, often dark red–brown in colour and containing remnants of moss and plants.**

Bog and fen wetlands are superficially similar and have comparable management requirements. Both are poorly drained, with the water table typically just below the surface, and generally lack the standing water found in swamp and marsh wetlands.

Bog wetlands typically occur on flat land or gentle slopes, while fen wetlands are found on sloping land and in gullies, often at the margins of other wetland types. Bogs are poorly drained, with little to no water flow and a stable water table.

True bog wetlands are fed exclusively by rainwater. They are more acidic than fens, have lower nutrient levels, and contain deeper peat layers. In contrast, fen wetlands receive inputs of water and nutrients from groundwater, rainwater, and surrounding land, and typically have a moderate flow of water.

Bog and fen wetlands are mostly restricted to upland areas in the Manuherekia Catchment.

## How to identify a bog or fen wetland on your property

### Bogs and fens are typically 'less wet' than other wetland types, and walking through them in gumboots is unlikely to result in wet feet.

**The presence of peat (dark brown, partially decayed organic material) combined with a low water table indicates that the wetland is likely a bog or fen.**

**Vegetation in bogs and fens includes mosses such as sphagnum, along with sedges, herbs, tussocks, and woody plants.**

**Bogs typically have lower plant diversity and are often dominated by sphagnum moss. Fens tend to have more variable vegetation; a common type found in fen wetlands is copper tussock fen.**

# How to identify a 'healthy' bog or fen wetland

**The wetland is healthy if it's hydrologically intact, for example no drains are present, and if exotic woody weeds (gorse and broom) are largely absent. There may be scattered plants but not extensive areas of gorse and broom. Ideally, stock are excluded from the wetland area and there is little or no evidence of stock damage (pugging and browse). It's also healthy if the bog or fen is dominated by native plants, including tussock grasses, sphagnum moss, sedges and woody plants.**

Bog and fen wetlands, even when not classified as healthy, have ecological value. Fens are likely to provide a buffer to other wetland habitats. Bog and fen wetlands are a type of peatland, which excel in carbon storage and hold the largest long-term store of carbon of any ecosystem type. Protecting and restoring wetlands is one of many measures needed to retain important carbon sources and mitigate climate change.

# Managing bog and fen wetlands

**Remove and exclude livestock:** Retiring areas from grazing, combined with fencing to exclude livestock, is important. To reduce the impact of surrounding land use on the wetlands, fence or establish a buffer zone that includes some terrestrial (non–wetland) areas to help filter nutrients. Any fences should include the entirety of the wetland area, as well as any waterways near the wetland. Once stock are excluded, wetland restoration can begin.

**Control feral ungulates such as deer, goats, and pigs:** The greatest protection is provided by deer exclusion and fencing.

**Consider infilling or blocking drains:** Blocking or infilling drains will help restore the hydrological integrity of fen and bog wetlands. Restoring hydrology will prevent further woody weed invasion. Any connected drainage channels outside these habitats should be considered for blocking or closing, and maintenance of drains adjacent to bog or fen wetlands should be evaluated for potential hydrological effects on the wetland. Rodent populations can also attract other predators, such as feral cats.

**Control invasive weeds:** Managing woody weeds in and around bog and fen wetlands is a priority for enhancing wetland habitats. Weeds can outcompete native vegetation, especially where disturbance has occurred, and may alter hydrology. Bog and fen wetlands are typically drier than marsh and swamp wetlands and support a different suite of invasive woody plants.

More details on specific management steps are available on pages 24 and 25 of our **Management Plan**.

**Exotic grasses and herbs** are common in bog and fen wetlands. In most cases, removal is not required; focus should be on promoting conditions for native plants to thrive, for example by removing livestock and controlling woody weeds. Planting native species into areas dominated by exotic grasses, sedges, and herbs can increase native vegetation cover and provide a seed source.

## Ecologically appropriate planting and limiting fertiliser application

Vegetation in bogs and fens is dominated by species adapted to low–fertility environments. Addition of nutrients can cause weed invasions that outcompete native species.

Planting directly into bog and fen wetlands can occur if the wetland is dominated by exotic species, if very large gaps have opened up following weed removal, or if restoring indigenous woody cover is a goal. For example, if a wetland is currently dominated by sphagnum moss but does not appear diverse, it's best to focus on other management actions. Bog and fen wetlands often have naturally low diversity of native species.

**Control rodents and mustelids:** Rodents and mustelids are predators of native animals, including cryptic birds in marshlands and lizards around wetland margins. Large rodent populations can attract other predators, such as feral cats. Control methods include trapping and baiting.

# Notable plants and animals

### Large bog and fen wetlands often support mātātā/fernbirds.

Some native skinks, such as Otago green skink and tussock skink, may be present around the margins of bogs and fens where the water table is not too high and lizard refuges (such as dense ground cover vegetation and rock piles) are not flooded.

Bogs and fens can be among the most valuable wetland types for moths and flies, and are particularly important habitats for Sphagnum ghost moths and the locally endemic Otago ghost moth, along with other Aoraia species. These sites are also expected to support a wider range of typically terrestrial species, including naturally rare ground beetle genera such as *Holcaspis*, *Mecodema* and *Megadromus*. Ida Valley carabids may also be present, as they are known from both wetlands and drier habitats, although they have not been observed in over 50 years.

Notable plants in bog wetlands include the herbs swamp, *Chaerophyllum colensoi* var. *delicatulum* and the rush, *Juncus pusillus*. A wide assortment of notable sedges in the genus Carex live in these habitats, including several At Risk and threatened species.

# Threats

### Changes due to drainage are the main threats to bog and fen wetlands in the Manuherekia. The invasion and establishment of woody weeds such as gorse can be a sign that the hydrology has been impacted.

Stock can damage wetlands through pugging and compacting wetland substrates; this disturbance can also create gaps in existing vegetation and allow weeds to colonise and spread.

Stock can contribute to increased nutrients in wetlands and often browse on native vegetation. Pest animals and predators can have a negative impact on native fauna.

Black-backed gull colonies are known to breed on upland bogs. Their nutrient input changes the character of the bog by promoting exotic grass growth.

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