# Green and blue infrastructure

**Nature-based solution type:** Wetland restoration

**Ecosystem:** Aquatic Ecosystem

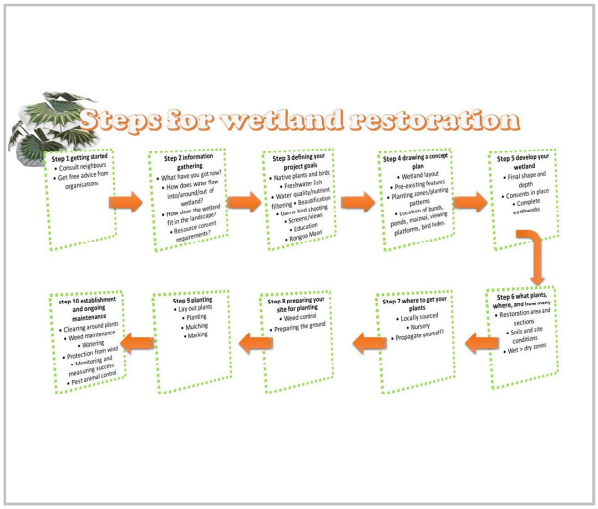
**Climate change impacts targeted:** Reduction of flooding.

**Societal challenges targeted:** Water security and quality

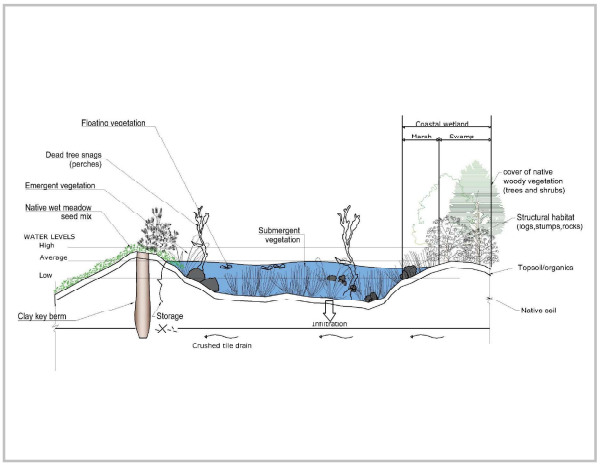
**Ecosystem services provided:** Disturbance prevention (flooding,

**Summary:**

A wetland is defined as any land that is permanently or regularly wet and supports a natural ecosystem of animals and plants adapted to wetland living. They are critical to humanity's future and are among the most biodiverse areas on the planet.
Many future challenges, such as food and water security, human health, disaster risk reduction, and climate change resilience, can be met by conserving and using wetlands sustainably. Urban wetlands are important habitats that provide a variety of advantages such as reducing urban flooding during monsoon or rainy periods, protecting biodiversity, and storing carbon. On the other hand, they are rapidly declining which is why wetland restoration is so important.
The manipulation of a former or degraded wetland's physical, chemical, or biological characteristics to restore its natural functions is known as wetland restoration. This works with a series of steps that are necessary for swamp recovery. The technical requirements for implementation are the treatment of invasive species, followed by the placement of clean sand and sediment on the site, seeding and planting native plants, and finally maintenance and monitoring. Wetland restoration is nearly impossible without maintenance. It is critical to maintain the plants and perform regular monitoring.




Laub, N. (2022). Steps for wetland restoration.




Laub, N. (2022). Demonstration of a wetland.

**Benefits:**

Wetlands are important landscape components that provide numerous benefits to all life forms. They can preserve and improve water quality because they can intercept surface runoff before it reaches open water and remove pollutants using physical, chemical, and biological processes. Wetlands are a low-cost alternative to conventional wastewater and stormwater treatment methods. Wetlands can help with flood mitigation by absorbing and storing floodwater. It can provide fish and wildlife habitats, storing floodwaters, maintaining surface connectivity flow during dry periods,reducing the effects of urban heat islands and improving habitats are examples of functions that help the climate and ecologically. Outdoor pursuits like hiking, fishing, bird viewing, photography, and hunting are popular in Wetlands as a cultural and social destination. Wetland protection can help communities, individuals, organisations, and others form partnerships while also giving various entities access to data and resources that would otherwise be unavailable. Wetland protection practises deliver great opportunities to inform people about wetlands science, wetlands preservation, and the importance of water resources.

**Opportunities, barriers, issues:**

There are numerous opportunities that can be used in any rural or urban area. Many Pacific Island countries demonstrate that they will be unable to meet the goal of universal access to basic water services by 2030, and wetland restoration in these areas will be critical. An example is Solomon Islands, they are dealing with a lack of fresh water, an absence of sanitation infrastructure, and inadequate and ageing water systems. Furthermore, urban population growth has resulted in reduced access to basic urban services such as water supply. A wetland restoration programme in this location could improve the population's future. The main causes of wetlands loss and degradation, which are often viewed as wastelands to be drained, filled, and converted to other purposes, include major changes in land use, particularly an increase in agriculture and grazing and urban infrastructure construction, pollution of the environment and excess nutrients, and water diversion (dams, dikes and canalization). Between 1996 and 2018, humans destroyed nearly 5400 hectares of freshwater wetland vegetation and nearly 140 hectares of saline wetland vegetation in New Zealand. More than 90% of the land was converted to grassland for grazing.

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**Case Study:**

**Location:** Ō Tū Wharekai (Canterbury)
**When implemented:** 2009
**Ecosystem type:** Aquatic Ecosystem
**Climate adaptation:** Deal with climate variability

Ō Tū Wharekai (Ashburton Lakes/upper Rangitata River), is one of the braided rivers that helped form the Canterbury Plains. The Arawai Käkäriki Wetland Restoration Programme has chosen three wetland sites: Lake Clearwater wetlands, Lambies Stream wetlands, and Maori Lakes wetlands.

The vegetation survey, water quality measurements, two different soil colors, and plant foliage of the dominant species were all collected for laboratory analysis. The percentage cover of live vascular plant species was recorded, and the presence or absence of each species of plants was documented as well. Wetland condition and pressure scores were also calculated. The threats to the ecological integrity that have been discovered are vegetation clearing recently, vegetation clearing in the past, increased sediment load from developed land, increased nutrient load from developed land, altered hydrology (drainage), livestock grazing recently (cattle/sheep), invasive flora (willow), and invasive fauna (e.g., predators). The Ashburton Lakes are home to a diverse array of aquatic plants, both native and exotic. According to LakeSPI scores, some lakes are in good condition while others are in poor condition. Maori Lake East was in critical condition because it has extensive benthic algae growth. Weed expansion, particularly by grey willow, potential increased nitrogen and phosphorus loads, and the future risk of water extraction impacts on wetland hydrology were the major threats to the wetlands assessed. Protecting braided river birds through predator control, restoring ecosystems through large-scale weed control, improving water quality in Ashburton lakes and streams, and supervising the status of threatened animal and plant species that rely on the site are all priorities for conservation efforts in Ō Tū Wharekai.


Department of Conservation, New Zealand Governmer

**References / resources:**

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