



# Wetlands



## What is a wetland?

A wetland is an area of permanently or intermittently wet land and shallow water, with fluctuating land-water margins. Wetlands may be fresh, saline or a mixture of both, and are characterised in their natural state by plants or animals adapted to living in wet conditions. They are unique habitats for many such species.

Wetlands on farms encompass a variety of waterbodies and landforms - a coastal salt-marsh or mangrove swamp; a freshwater lagoon; boggy seepages; wet margins of a lake, river, stream or drain; a peat bog; and even a stock water dam or effluent pond. They stand out in the landscape, with outlines etched sharply by a dramatic change in vegetation.

As there are few unmodified or undrained wetlands remaining in Taranaki, the Regional Council encourages landowners to preserve existing wetlands on their properties. Rules in the Regional Fresh Water Plan control drainage that affects the significant wetlands listed in the plan. A resource consent is also required for land drainage that affects any wetland greater than five hectares.

Wetland management should be viewed as an integral component of sustainable land management.

## Wetland functions & values

### Water Storage

Wetlands store water and during times of rainfall and flood slowly release it to downstream areas, lowering flood peaks. They also provide a reservoir of water for release during dry periods. In doing so, they help maintain base flows in streams and provide aquifers with an opportunity to recharge.

### Erosion & sediment control

In reducing flood flows and the velocity of floodwaters, wetlands reduce erosion and allow floodwater to drop its sediment. Wetland vegetation filters and traps sediment that would otherwise enter watercourses, lakes, ponds and the ocean. This helps preserve the quality of inland and offshore fisheries, such as those for whitebait or inanga, the short-finned eel and estuarine flounder.

### Pollution prevention & control

Wetland vegetation intercepts nutrients, sediment, and organic matter in slow-moving water, while micro-organisms utilise it and break it down. Runoff emerging from a wetland is typically much cleaner than when it enters. Wetlands, both natural and man-made, assist to extract nitrogen and phosphorus from farmland runoff. They are now increasingly used for tertiary treatment of agricultural and industrial effluents.

### Habitat for indigenous species

The land-water interface is among the richest ecosystems in the world. Many plants and animals are especially adapted to live in wetland conditions. The survival of a diversity of plant and animal life, including rare species, is threatened as many of our wetlands, particularly swamps, have been cleared and drained.

### Recreation

Wetlands, particularly lakes, are important for fishing, duck shooting, boating, swimming, bird watching and other forms of outdoor recreation.



**Figure 1: A wetland has multiple functions and many values**

### *Other values*

In addition to the above functions, wetlands also possess educational, scientific, cultural and scenic value. Wetlands offer study areas for ecology and biology. They are a source of information on historic climate and vegetation, and are a scenic part of the natural landscape. In addition, they are important to Maori as mahinga kai (food gathering areas) and are a source of plants for medicines and dyes. They were used to store tribal artefacts and remain resting-places for these taonga or treasures.

### **Wetland management**

The best form of management for a completely natural wetland might simply be to fence it and then leave it alone to look after itself. However, such unmodified ecosystems are rare and in most cases, a natural wetland area on a farm needs active restoration and manipulation of all its components - water level, plants and animals. The following information describes some of the considerations; more detail can be found in the Department of Conservation's publication *New Zealand's Wetlands - a Management Guide*.

### *Buffer zones*

A buffer zone protects a wetland from outside influences and is generally a strip of land between the outer wetland fringe and the adjacent land. It protects the wetland from outside influences such as grazing and runoff, as well as providing a refuge for birds, fish and other wildlife. A buffer zone is particularly important to the survival of small or sensitive wetlands. Stock access should be restricted, if not completely excluded.

The width and nature of a buffer zone depends on the purpose for which the zone is to be used. If it is to filter runoff, it needs to be a wide well-grassed strip of land. A buffer which is used as a visual screen does not need to be quite so wide, and can be planted with trees and shrubs. At the very least, any banks or steep slopes next to the wetland should have a narrow strip of protective vegetation. Any inlets and outlets should also have buffer zones. Make sure that the outline of the buffer zone follows the natural shape of the wetland and the contours of the land i.e. not square or straight; otherwise its visual appeal will be lost.

### *Control of grazing*

Fencing should be sufficient to protect the wetland from unplanned grazing. Fences should be well constructed, and of high quality. A conventional eight-wire fence or a five-wire electric fence is ideal, however not always practical. The most practical solution depends on the farming system and type of stock. A permanent 2 wire electric fence may be adequate on a dairy farm. See the Council's

information sheet ***Riparian Fences*** for several alternative designs.

Stock can cause erosion, trampling and pugging of soft ground in a wetland. They eat and trample desirable plants, introduce unwanted weeds, disturb wildlife and create high concentrations of nutrients by voiding dung and urine.

The level of grazing, if any, will depend on the reasons for which the wetland is being managed. For instance, a few open areas within the buffer zone are desirable for waterfowl, and low level grazing would achieve this. Light sheep grazing is preferable to heavy grazing by cattle.

Grazing, however, should cease or be significantly reduced one month prior to the breeding season for birds. It should definitely cease during the breeding season. Similarly, in areas where fish spawn, it should cease during the time they are spawning. Generally, the most sensitive months for wildlife are October to December.

### *Water Level Control*

Natural fluctuations in water level are a feature of wetlands. Some species adapt to the fluctuations which may provide additional food sources or activate breeding stages in fish, birds and insects. It is important that these natural water fluctuations are maintained, as unnatural water levels can adversely affect plant growth and animal reproduction.

In situations where natural fluctuations in water level can no longer occur because of outside influences such as dams deliberate raising or lowering of the level may retain some of the wetland's values. Consult the Taranaki Regional Council if planning to undertake any drainage or damming near a wetland, as these activities may require a resource consent.

Drainage or reclamation, diversion of water out of, or discharge of contaminants into regionally significant wetlands (listed in the Regional Freshwater Plan) is in some cases discretionary and in others prohibited.



**Figure 2: Adequate fencing is an important step in protecting wetlands.**

A resource consent is required for drainage near other wetlands, if the area being drained exceeds 25 ha.; or if significant flooding, scour erosion or deposition may result; or if there may be significant adverse effects on aquatic life and habitat.

Land use outside the wetland can and will affect the wetland itself. Where possible, altering drainage in a wetland or immediately outside a wetland should be avoided. Side-effects should be assessed before undertaking drainage and precautions put in place to minimise them.

Precautions must also be taken when cleaning drains. Drains should be cleared in stages to minimise harmful effects (excess sediment loads, disturbance of fish habitat). Avoid deepening drains when cleaning them, as this may over-drain the wetland.

#### *Fish access*

Wetlands are habitat for native fish, notably galaxid species (whitebait) and eels. If the wetland is connected to a stream or drain which is used as a fish migration pathway, make sure that the inlets and outlets allow fish access to and from the wetland. For instance, culverts should not discharge water from a height into a streambed, but rather should be partially submerged so that there is no drop below. For further information on designing and developing appropriate structures and fish passes, contact the Taranaki Regional Council or the Taranaki Fish & Game Council.

Avoid introducing exotic fish species into natural wetlands - some, such as grass carp, displace native fish from their habitat; others like mosquito fish attack and kill them.

#### *Enhancing habitat for birds*

Artificial nesting sites may increase bird numbers in wetlands by encouraging breeding and providing protection from predators. Islands can provide permanent nesting sites - just about any material can be used for an island so long as it will not contaminate water, sits just above the water level and is easily covered with sufficient soil to support plants. Rafts are alternatives to islands in deeper water or where water levels fluctuate markedly. Again, they can be made of any durable material but should be secured at both ends to prevent them swinging in the wind.

Trees, stumps and old posts protruding from open water can provide important nesting and loafing sites for birds such as kingfisher and heron. Where birds do not have the specific materials for building nests, nesting boxes can be built to encourage breeding.



**Figure 3: Koaro (*Galaxias brevipinnis*)**

It is important to leave a stretch of pond margin free of taller vegetation, as birds like access to land for resting, mating and breeding.

In time, natural nesting sites of waterfowl will begin to develop as wetland vegetation increases. However, it is important to ensure that the wetland is capable of supporting the increasing birdlife.

The most common waterfowl in the district are the paradise shelduck, mallard, and grey duck. Paradise ducks principally feed on pasture and use wetlands as 'loafing' sites, evening refuges, and sometimes to raise their young. Mallards and grey ducks tend to make wetlands their home. They feed in the shallow water and on the muddy shores. The submerged plant zone is suited to the shoveler, swan and New Zealand's only diving duck, the scaup. The shoveler is able to sift plankton and seed with its large bill, which is surrounded by a fine sieve-like structure. The swan's long neck enables it to feed on submerged roots and plants, while the scaup grazes on invertebrate life and shifts bottom sediments.

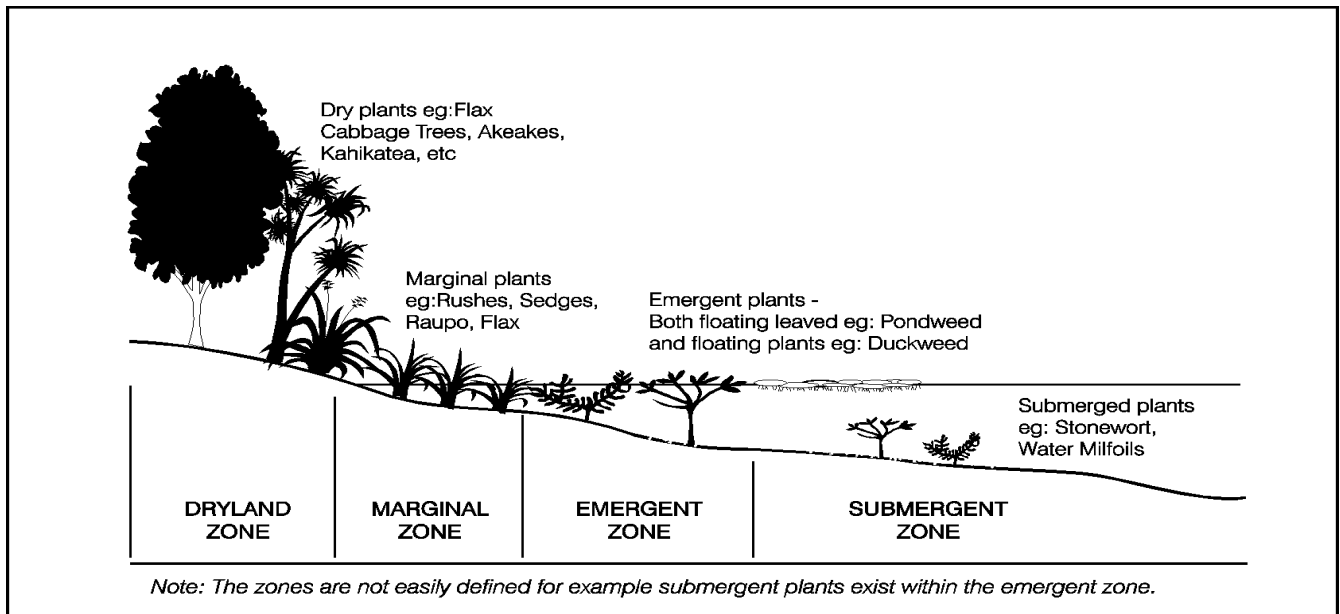
#### **Planting in wetlands**

A wetland can be divided into different zones - dryland, marginal, emergent and submerged (Fig 4). Different plants survive in each zone, so when restoring wetland vegetation, it's important to choose the right species.

Depending on the type of wetland, and its restoration or management requirements, plantings in each zone may not always be needed. Planting some zones may not be feasible. A simple approach can often be implemented to suit the practicalities of each situation.

#### *Dryland zone*

At the outer edge of the wetland are dryland plant associations which can include grassland, scrubland and forest trees such as kahikatea. Although the plants in this zone encounter and survive sporadic flooding, the water table is generally below ground level. The plants themselves provide shelter from



**Figure 4: Wetland plant zones**

cold winds, shading and cover for fish, and protection from predators.

#### *Marginal zone*

Within the area of the water's edge are marginal plants such as rushes, sedges, raupo and flax. These plants can survive prolonged periods of flooding and drought. Marginal vegetation easily establishes itself in new habitats.

#### *Emergent zone*

Within permanent shallow water, emergent plants such as pond weed and watercress grow with submerged roots and stems, but require their leaves to be exposed for oxygen transfer. Floating plants such as waterfern and duckweed are also regarded as emergent plants. Emergent plants can survive short periods of total immersion or exposure, but are rare in unsheltered open water because of turbulence from waves.

#### *Submerged zone*

In deep water such as pond bottoms and streambeds, submerged plants such as stonewort and quillwort are completely covered with water for most of the time. The extent to which these plants occur depends on the substrate, light, chemical and biological conditions prevailing in deep parts of the wetland.

#### *Guidelines for planting*

- Refer to the Council's information sheet ***Establishing Riparian Vegetation*** for details of planting techniques. Some additional guidelines, specific to wetlands, are :
- Blend in plantings with the natural features
- For a more natural effect, plant groups of 3 to 5 trees and shrubs in groups i.e. not a straight line

- Avoid planting the wetland margin completely. This impedes the natural flight path of waterfowl
- Use low growing species near the water's edge, with occasional tall trees over hanging the water and some gaps to provide waterfowl with escape cover
- Select a variety of plants that will provide a continuous food source around the wetland
- The wetland should be visually attractive - consider the mix of plant species; tall and short, deciduous and evergreen, flowering and non-flowering, and colour for all seasons
- Where possible, source plants from the local district, as they will establish more easily
- If an area has been dammed, do not plant the dam wall. The roots seek the nearest water and become seepage channels, weakening the wall
- Do not plant pampas grass or similar dense-growing species. These plants act as havens for rats, ferrets, weasels, and possums. All are destructive to the wetland wildlife or vegetation
- It may be necessary or desirable to control plants which are not wanted or which invade wetlands - examples are gorse, broom, willows, spartina and water hyacinth. In some places, even native wetland plants can be a problem. For example, raupo tends to crowd out other plants. Control is probably more practical than total eradication, and should be carried out in autumn to minimise damage to wildlife and desirable plants.

**For more information please contact:**  
**The Land Management Section,**  
**Taranaki Regional Council,**  
**Private Bag 713, Stratford**  
**Ph: 06 765 7127 Fax: 06 765 5097**  
**[www.taranakiplants.net.nz](http://www.taranakiplants.net.nz)**