



Waipa District Peat Lakes and Wetlands

Issues and solutions in the conservation and management of the Peat Lakes and Wetlands of the Waipa District and the role of the Waipa Peat Lake and Wetland Accord

Contents

Purpose

This booklet describes the values of our peat lakes, highlights the threats faced by many, and offers actions to help their continued survival. It also provides information on the Waipa Peat Lakes and Wetlands Accord and the role the accord agencies play in the conservation and restoration of these habitats. A list of valuable resources which supply further information on key topics is available at the end of this booklet. All of these resources are readily available to the public.

Acknowledgments

A variety of sources have been drawn on in the formulation of this document. Many of these publications are listed in the 'other helpful information' section at the end of this booklet. Photographs have also been utilised from a variety of sources and have been credited to various individuals or agencies.

What is a peat lake?

Lake Serpentine East.
Photo courtesy of Environment Waikato.

Peat lakes and the wetlands that surround them are a unique and important resource. They are valued for their unique ecological values, their scientific and educational interest, the recreational opportunities they offer as well as their cultural, spiritual and historic significance.

The name ‘peat lake’ simply means that the lake is associated with peat soil. Peat forms from the build up of partially rotted plant material in wet environments. The peat found around the lakes in the Waikato has taken over 18,000 years to form and can be up to 11 metres deep. The lakes themselves would originally have had no inlets or outlets. Water would have come from rainfall and as groundwater from the surrounding peat bogs.

The high percentage of organic matter found in peat often causes water in the lakes to be the colour of tea. Peat can also make the water mildly acidic and can cause the bottom waters in the lakes to be low in dissolved oxygen. It also makes the lakes and surrounding wetlands naturally low in nutrients.

The peat lakes and wetlands of the Waipa District

The Waikato peat lakes are nationally significant and represent the largest collection of this wetland type in New Zealand. They are the few remaining areas of wetland associated with the formerly extensive Komakorau, Rukuhia and Moanatuatua peat bogs. Seventeen of the remaining Waikato region peat lakes and wetlands are found in the Waipa District. Similar peat lakes and wetlands are also found in both the Waikato District and Hamilton City.

Wetland ecosystems are unique and diverse, but are vulnerable to influences from surrounding land use, water level changes and introduced plants and animals. Recognition of their value has highlighted the importance of conservation and management of this resource.

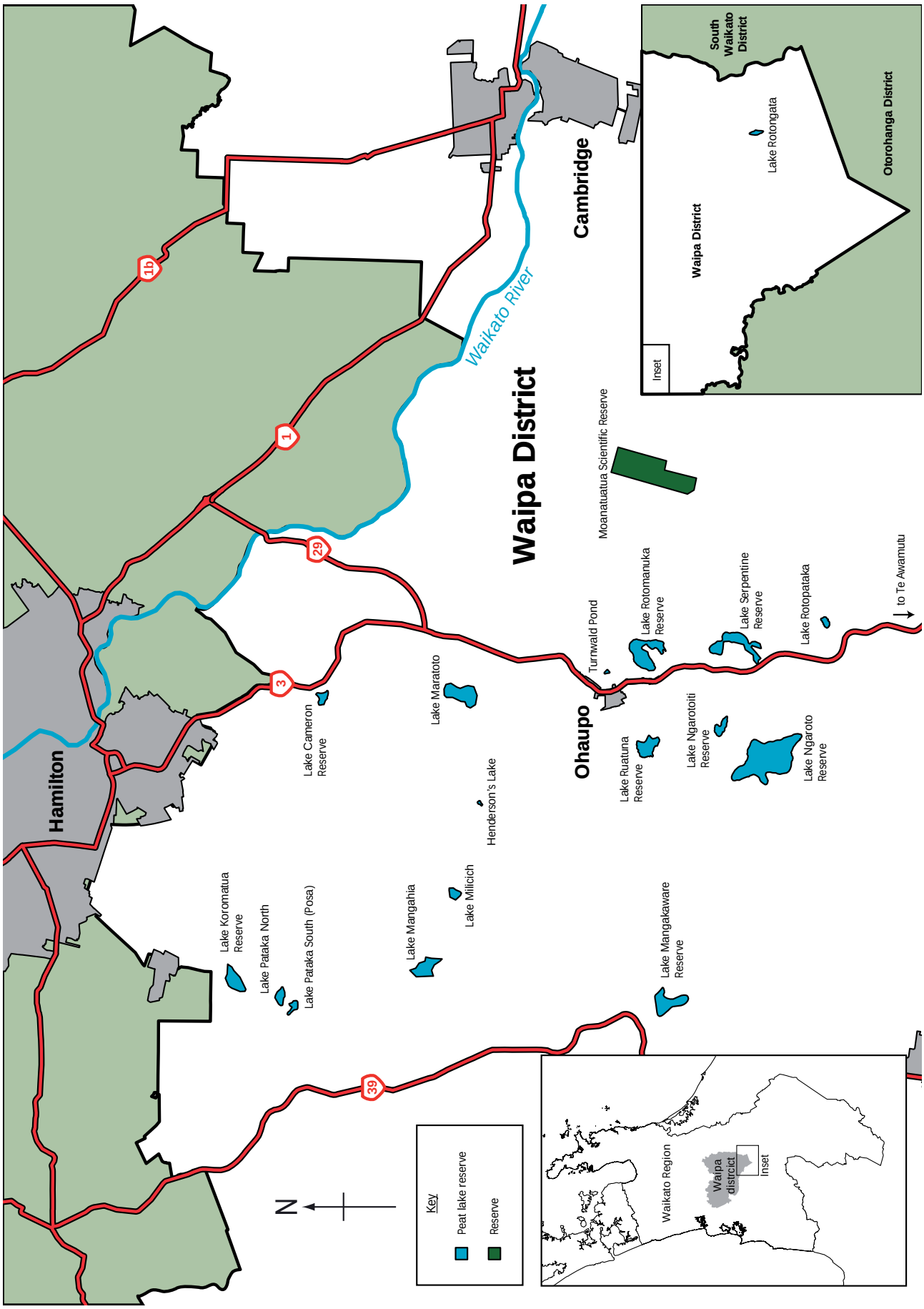
Waipa District has a rich cultural, historic and natural heritage. This has long been recognised by Waipa District Council with investment in a range of projects like the restoration of Lake Ngaroto and a joint Waipa District and Environment Waikato programme aimed at arresting the future loss of wetland and reducing impacts intensive land use poses to the environmental quality of the peat lakes.

The formation of the Waipa Peat Lakes and Wetlands Accord was a milestone in working towards achieving focused multi-agency conservation and management. The Accord has been in place since 2002 and aims to align the activities of management agencies and iwi, in working towards the restoration and enhancement of peat lakes and wetlands in the Waipa District.

With a combination of best landuse practice by landowners, local conservation efforts and aligned management by Waipa Accord agencies, there is vision that these nationally significant heritage assets can be preserved and improved for future generations.

The Serpentine (Rotopiko) Lakes with Lake Ngaroto in the background. Photo courtesy of Waipa District Council and John Greenwood.

Map of peat Lakes



What's special about these places?

Plants and animals

Unique plants and animals have adapted to living in the conditions provided by peat lakes and adjoining wetlands.

A diverse range of bird species either depend on or frequent wetlands and can be found on the open water or around the margins of the lakes.

The Australasian bittern and the New Zealand dabchick are two resident species now classed as 'threatened' due to low numbers and disappearing habitat. Other species include waterfowl like grey duck, grey teal, New Zealand shoveler, little black and black shag. The margins provide habitat for species such as banded rail, marsh and spotless crake, white faced heron, pukeko and North Island fernbird.

Common introduced species include mallard duck, canada geese and black swan. These species, along with pukeko, are important for recreational game bird hunting.

Noth Island Fernbird nesting in reeds and coprosmas. Photo courtesy of Tony Petch, Environment Waikato.

Native fish found in the peat lakes include lake dwelling smelt, short and long finned eels and common bullies.

The nationally threatened black mudfish are found in other wetlands and drains throughout the Waikato and are also likely to occur in the Waipa peat lakes. Black mudfish have an interesting lifestyle and are able to burrow deep into mud or hide under logs and remain dormant during dry periods with low water levels. This lifestyle gives them an advantage over other fish as they can exploit seasonally wet areas.

Shortfin eel and Smelt can be found in several peat lakes. Photos courtesy of Stephen Moore.

Some interesting peat lake invertebrates (animals without backbones) found in peat lakes include Whirligig beetles which are found in Lake Rotomanuka and named because of their circular swimming motion. An interesting feature of the adults is they take a bubble of oxygen under their wing when they dive below the surface hunting for prey. This oxygen reserve improves their hunting efficiency and lengthens the time they can spend under water.

Other invertebrate species include a water mite recorded for the first time in New Zealand in Lake Maratoto, freshwater jellyfish and leeches, as well as a range of other beetles and insects.

The margins of the lakes are home to a diverse range of plants adapted to living in wet and peaty conditions. Tall emergent sedges and rushes are found around the margins to 1.5 metres in depth. Behind these sedges are floating mats of grasses, tangle fern and mosses, with species such as manuka, broad leaf shrubs and flaxes on the drier edges.

Spaghnum moss, manuka and flax on the shores of Lake Serpentine South.
Photo courtesy of Waipa District Council.

There are also some special types of aquatic plants found within some peat lakes. A native member of the group of water plants called bladderworts (*Utricularia genus*) can be found in Lake Rotomanuka. Bladderworts are carnivorous plants which suck their prey (such as mosquito larvae and waterfleas) into tiny bladder like traps before digesting them. Yellow bladderwort (*Utricularia australis*) is limited in distribution and declining in New Zealand, it prefers to live in the still backwaters of peaty pools and shallow lakes.

Another interesting species is *Wolffia australiana,* a type of duckweed. It is the world's smallest vascular plant (plants with vein-like structures for transporting sap).

Recreational use

Game bird hunting is a popular traditional activity on most of the peat lakes. Licensed hunters are permitted to take game during the annual hunting season – which for most species begins the first Saturday in May and runs through to the last Sunday in June. The season is extended for pukeko, geese, quail and pheasant through until the last Sunday in August. Most hunters elect to build and maintain hunting stands or mai mai and lure game to the stand using imitation calls and floating decoys.

Hunting around the margins of Peat Lakes.
Photo courtesy of Waipa District Council.

Sailing on Lake Ngaroto.
Photo courtesy of Waipa District Council.

Lake Ngaroto is a popular sailing, paddling, wind surfing, rowing and fishing venue with well established public facilities. Lakes Ruatuna and Rotomanuka also offer opportunities for canoeing, particularly during the summer season.

Public access is available to lakes that have been reserved for either recreation or wildlife management purposes (public ownership).
A walking track circles Lake Ngaroto, while several lakes offer picnic areas. Public use is increasing, as people make the most of opportunities the lakes offer for exercise or passive activities such as bird watching.

Conservation and educational opportunities

Each lake has its own individual characteristics and offers a variety of opportunities for studying wetland ecology. Intermediate schools from Hamilton have invested in buildings and constructed tent sites on the Lake Ruatuna Recreation Reserve, which adjoins the lakes southern margins. These facilities are utilised to provide a base for school or community groups interested in observing and learning about the lake and its wildlife.

A number of community conservation groups are undertaking restoration projects at peat lakes in the Waipa District. These projects provide an opportunity for like minded people to work together and achieve conservation outcomes. Lakes Ngaroto, Mangakaware, Cameron and Koromatua are examples where extensive restoration by community groups has been undertaken.

Historic sites

A number of lakes have pa, or fortified Maori settlement associated with them. These pa are usually found around the lake margin either on a natural mound, or a mound 'built' by the importation of solid fill.

Some of these pa, like those adjoining Lake Mangakaware, are recognised by archaeologists as being the best preserved prehistoric open air stone-age settlements in the world. The sites around the lakes have been relatively well preserved due to the peat being semi waterlogged which has aided in the preservation process.

One of the pa sites at Lake Mangakaware outlined by a darkened trench.
Photo courtesy of Waipa District Council and John Greenwood.

Ownership and management of the lakes

Ownership of the Waipa peat lakes and wetlands is a mix of private and public titles. Most of the land in the surrounding catchments is privately owned. The different reserve classifications of the publicly owned lakes has implications for their management.

Lake/wetland name	Ownership status	Management agency
Ngaroto	Crown (public) recreation reserve	Waipa District Council
Mangakaware	Crown (public) recreation reserve	Waipa District Council
Cameron	Crown (public) recreation reserve	Waipa District Council
Serpentine (Rotopiko)	Crown (public) wildlife management reserve	Department of Conservation
Rotomanuka	Crown (public) wildlife management reserve	Department of Conservation
Ruatuna	Crown (public) wildlife management reserve	Department of Conservation
Ngaroto-iti	Crown (public) wildlife management reserve	Department of Conservation
Koromatua	Crown (public) wildlife management reserve	Department of Conservation
Rotopataka	Crown (public) wildlife management reserve	Department of Conservation
Pataka (North)	Private	Private
Pataka (South) (Posa)	Private	Private
Mangahia	Private	Private
Hendersons Lake	Private	Private
Turnwald Pond	Private	Private
Milicich Lake	Private	Private
Maratoto	Private	Private/QE II Trust Covenant
Rotongata	Private	Private/QE II Trust Covenant
Moanatuatua Wetland	Crown (public) scientific reserve	Department of Conservation

Lake Rotomanuka – managed by Department of Conservation.

Lake Ngaroto – managed by Waipa District Council.

The Waipa Peat Lake and Wetland Accord

During the late 1990's, management agencies and research organisations were meeting regularly to discuss and work together on issues relating to wetlands throughout the Waikato.

The management agencies (with a specific interest in the Waipa peat lakes and wetlands) recognised that the formation of a collective agreement between agencies would help in gaining momentum towards protecting and enhancing this valuable resource.

On World Wetlands Day, 1 February 2002, the Waipa Peat Lake and Wetland Accord was signed. The signatories are Environment Waikato, Waipa District Council, Department of Conservation, Auckland/Waikato Fish and Game Council and Ngaa Iwi Toopu O Waipa.

Purpose of the Accord

To align the activities of management agencies when working with landowners, tangata whenua and interested parties, towards the restoration and enhancement of lakes and wetlands in the Waipa District.

The Accord members meet on a regular basis to discuss projects, share information and to look at opportunities of working together on various initiatives. The Accord has also raised awareness of the Waipa peat lakes and wetlands and enabled key management issues to be recognised and appropriately resourced.

Objectives of the Accord

Supporting the overriding purpose of the Accord is a series of objectives. These objectives relate to ways in which the Accord agencies can work collaboratively towards the restoration and enhancement of lakes and wetlands in the Waipa District.

The objectives are to:

Promote the sustainable use and conservation of lake and wetland resources by developing and implementing relevant local management projects, regional and national policies and action plans, and international conventions.

Encourage restoration of degraded lakes, wetlands and associated species that are in an unfavourable conservation status, through the application of sound environmental management and research.

Maintain an overview of the status of lake and wetland resources by developing, promoting and coordinating assessment and monitoring programmes and disseminating the results.

Develop a regional network of experts for the transfer of know how, research and information through effective partnerships with like-minded organisations.

Raise awareness of the functions and values of lakes and wetlands through education, information and awareness programmes.

Waipa Lakes Focus

Role of the agencies in the Accord

Waipa District Council

Waipa District Council through its district plan, is responsible for managing the effects of land use – the development, subdivision and protection of land, and for the management of public or Crown land and reserves vested in its control. It undertakes fencing, weed control and restoration activities, promotes the retention of heritage assets and features, as well as fostering recreational activities on it parks and reserves.

Environment Waikato

Environment Waikato monitors the state of the environment and collects information on water quality and quantity, and reports on other ecological values such as vegetation, fish and other animals. The regional council is also responsible for setting water levels and controlling resource use such as water abstraction, discharge of contaminants to water and damming.

Environment Waikato also promotes sustainable and integrated catchment management practices. This includes soil conservation, land use, riparian management, biosecurity and biodiversity protection and enhancement. The regional council also manages and maintains flood control and drainage networks throughout the region.

Fish and Game Council

The Fish and Game Council (Auckland/Waikato) is responsible for the management of game bird and sports fish populations and hunter opportunities. Fish and Game actively promote and advocate for management actions and initiatives which promote sustainable and renewable populations of game species. The council are also active in habitat restoration and actively source funding for wetland enhancement and other restoration opportunities.

The Department of Conservation

The Department of Conservation's primary responsibility is the management of the Crown land vested with the department. This role includes the development of management plans, fencing, weed control, and other actions required to maintain or restore these sites. It is also the department's role to promote appropriate recreation and increased public enjoyment of reserve areas and restore, protect, maintain and provide interpretation of sites of historic and cultural importance on this land. Other key roles carried out by the department include identifying and protecting key indigenous habitat, threatened species management and conservation of native fish, plants and wildlife.

Ngaa Iwi Toopu O Waipa

Ngaa Iwi Toopu O Waipa are a collective group of iwi representatives from within the Waipa area. They advise the district council and other agencies on the management of natural resources, and, in particular, provide a cultural and historic perspective in relation to the Waipa peat lakes and wetlands.

Conservation and management

of the Waipa peat lakes and wetlands

Since the arrival of Europeans, the landscape of the Waipa District has changed dramatically. Most of the original vegetation cover has been removed, and the wetlands and peat bogs have been drained to utilise the rich organic soils for farming. Land use has intensified with increasing cultivation and addition of fertilisers and plant and animal pests have flourished. All of these activities have had pronounced detrimental effects on native species and the habitats in which they live.

Many of the management issues facing the peat lakes and wetlands can be reduced or even eliminated by the adoption of best practice guidelines. Along with the Accord partners, landowners and interest groups can play an important role in the conservation and protection of these wetland ecosystems.

Lake Rotomanuka surrounded by pasture catchment.
Photo courtesy of Waipa District Council and John Greenwood.

The role of landowners

Most of the land surrounding peat lakes and wetlands is privately owned and the predominant land use is farming. Landowners can play a key role, ensuring farming does not unduely impact the peat resource, peat lakes and wetlands both in the Waipa and elsewhere.

It is important to remember that although rural and land based businesses need to be profitable they also need to be sustainable. The adoption of best practice guidelines by landowners can help in achieving this.

The role of interest and conservation groups.

Interest and conservation groups can successfully help in addressing environmental issues in local areas. Care groups can be effective in helping with activities such as stream and lake fencing, propagating plants, planting, protecting areas of vegetation, plant and animal pest control and the construction of tracks and walkways.

By working in groups and combining different skills and ideas significant progress has already been made. It is also easier to obtain resources by demonstrating there is communtiy support for a project.

Threats and management actions

The problem with drainage and cultivation

Peat is formed naturally in wet and saturated conditions. Growing any agricultural crop on peat soils requires drainage to aerate the soil. Although this allows for productive plant growth, aeration also results in oxidation which causes peat to decompose, dry and shrink. Cultivation accelerates this oxidation and shrinkage process. This loss of peat is irreversible and results in a continued subsidence of the land surface.

When managing peat soils for farming purposes, a delicate balance of water levels is required. Water needs to be low enough not to drown the pasture yet high enough to still provide the necessary moisture for grass or crops during summer. As peat shrinks, this balance needs constant readjusting.

Drain which has been excessively cleaned and deepened. Photo courtesy of Environment Waikato.

This leads to drains being regularly deepened to combat the continued process of oxidation, decomposition of peat and surface subsidence.

Continued lowering of the water levels by drainage and drain deepening can have detrimental effects on water levels in adjoining wetlands and peat lakes.

As water levels drop, water starts to flow away from these systems instead of towards them as would naturally occur. Peat lakes become smaller and shallower, and wetlands become drier. This change affects the lakes ability to buffer against excessive temperature fluctuations and wind effects. Bottom sediments are often stirred up by wind more easily in shallow lakes, making them much more turbid (cloudy). Smaller and shallower lakes heat up faster than large, deep lakes. Many animals and plants have limited capacity to deal with higher temperatures, low oxygen and increased turbidity in water environments. When wetlands become drier, plants adapted to grow in wet areas can no longer tolerate the drying conditions. The wetland effectively loses the ‘wet’ and become ‘dry’ land.

The objectives of a farmer using peat soils are usually inconsistent with the requirements for sustainable management of our peat lakes and wetlands. Farmer’s need aerated unsaturated soils, the lakes and wetlands need consistently high water levels and saturated peat. The challenge is to work together to minimise the rates of peat soil shrinkage through good drainage management and minimal cultivation, and take measures that create buffer zones to ensure lake levels do not continue to decline and the wetlands stay wet.

Drainage best practice for landowners

There are a few easy steps landowners can take to help when managing drainage and cultivation of peat soils. By utilising these methods, the impacts of drainage activities can be reduced.

Good practices include the following.

- Keeping all drains shallow and taking care not to deepen drains when maintenance is carried out.
- Reducing the need for mechanical maintenance by fencing an adequate buffer (greater than one metre) either side of the drain, and preventing stock from collapsing drain edges and causing sediment inflow.
- Maintaining ground water levels particularly over the summer period. Temporary weirs can be installed in drainage networks to help achieve this. Peat shrinkage can be reduced and pasture growth can be improved.
- Avoiding continuously cultivating peat soils close to lakes, as this can double the peat shrinkage rate and accelerate the flow of sediments into the lake.

Good management of drainage and cultivation of peat will ensure greater productivity and may extend the life of the peat soils. It will also reduce the impact on the nearby lakes and wetlands.

Well fenced and maintained peat drain.
Photo courtesy of Environment Waikato.

What role do the management agencies play?

Rules exist under the Waikato Regional Plan which limit and control land drainage in areas adjacent to identified wetlands and wetlands bigger than one hectare. The wetlands which are covered by these rules are listed in the regional plan and include some peat lakes. The creation of any new drains, or deepening of drain invert levels in areas adjacent to and within 200 metres of the edge of identified wetlands are discretionary activities and require resource consents. These rules aim to avoid further degradation and size reduction of these specified wetland areas.

One mechanism to help protect the level of peat lakes is to set a minimum water level and install a water control structure to maintain this level. This isolates the lake from the impacts of drainage immediately downstream. It can also help maintain a constant level within the lake and surrounding wetland providing groundwater levels do not drop significantly.

Water level recorder at Lake Serpentine East.
Photo courtesy of Environment Waikato.

Lake level setting is an ongoing project in many of the peat lakes at risk in both the Waipa and Waikato. The level in each lake is set is by collecting data on how the lake level fluctuates over a minimum of two years.

After careful review of both the collected data and existing information, a minimum level is set in the Waikato Regional Plan.

Some peat lakes are already protected by this mechanism and work on this project is ongoing.

Water control structure on the outlet of Lake Rotomanuka North. Photo courtesy of Environment Waikato.

Reduction of habitat and diversity

Most lakes only have small strips of original vegetation along their margins and several lakes are unfenced allowing stock access to the lake edge. Stock damage wet areas by causing pugging and by grazing on vegetation next to the lake edge. Vegetation clearance has resulted in a loss of indigenous plant diversity and a reduction of habitat for birds and invertebrates that were once abundant in these areas.

Changes in water quality and natural water flow regimes have also reduced the availability of habitat within lakes for native plants and animals.

Habitat protection and biodiversity enhancement actions for landowners

A stock proof fence around the lake and wetland margin is the first priority to protect the wetland habitat.

The larger the fenced margin, the greater the habitat potential. Often areas close to the lake or wetland can be wet, low lying and difficult to manage, so fencing these off may be beneficial from a farm management perspective. The second step is to look at either letting rushes and sedges to regenerate naturally or where appropriate replanting the areas that have been fenced. Even retaining the areas in rank pasture is preferable to continued stock access. These areas are often poor grazing anyway and any lost production is often offset by the reduced need to fertilise and reseed them every year.

Fencing and retaining or planting drains and seeps can increase habitat and aid in providing connectivity between other lakes, heritage features and bush stands. The need for drain maintenance can also be substantially reduced.

Lake Rotomanuka with well fenced and planted buffer. Photo courtesy of Environment Waikato.

What role do the management agencies play?

Work is underway by Waipa District Council and the local community at Lake Ngaroto, Lake Mangakaware and also, in conjunction with Fish and Game at Lake Cameron. Large areas around all lakes are being fenced, planted and managed for weeds. Council's annual community grants may be available to assist restoration projects.

Environment Waikato has adopted rules under the Waikato Regional Plan which require fencing of peat lakes within the Waikato region.

The Department of Conservation has ongoing restoration programmes at Lake Rotomanuka and Lake Serpentine, and is working towards fencing off all other peat lakes it administers.

Fish and Game, together with lake care groups have undertaken extensive restoration projects at both Lake Koromatua and Lake Cameron to enhance and restore habitat. This has included the removal of willows, other weed control, revegetation using native plants and other activities. Other lakes also benefit from work undertaken by game bird hunters who are actively involved in planting, controlling weeds and animal pests around the lakes on which they hunt.

There may be some funding assistance available under programs such as Environment Waikato's Clean Streams or the Department of Conservation's Waikato Conservancy Community Conservation fund. There are also other funding sources that may be available to assist you in protecting and restoring peat lake and wetland habitats.

Advice and information is available from all agencies on what to plant, where to plant, weed control and useful funding options. There are a wealth of publications and contacts listed in the 'other helpful information' section at the back of this booklet. These have been put together by the partners in the Waipa Peat Lakes and Wetlands Accord and other groups for you to use.

Community groups rolling cut weeds at Lake Koromatua. Photo courtesy of Fish and Game (Auckland/Waikato).

Nutrients and sediment in water

Peat soils generally have a high water level compared to other soil types. This high water level causes surface runoff to be higher on peat than other soils. Surface runoff can contain nutrients, sediment and bacteria and can easily make its way into waterways that drain pasture and can eventually move into rivers and lakes through the drainage network.

The peat soils of the Waikato are generally low in nutrients. To increase productivity, lime and fertilisers are often applied. Excess fertiliser can make its way into drains via surface runoff.

In peat lakes, the addition of nutrients such as nitrogen and phosphorous from surface runoff can affect the delicate, low nutrient balance within the lake. Plant growth can increase in the form of algae and cause the water to become more turbid or cloudy. This turbidity can reduce light available to submerged aquatic plants and threaten their ability to survive. Losing aquatic plants can impact on animals living in the lake and also make it easier for sediments to be stirred up in the lake without aquatic plant roots to hold them together.

Fenced wet area on a farm retained to reduce and treat run-off. Photo courtesy of Environment Waikato.

In wetlands, increases in nutrient levels through surrounding land use enable introduced plant species which were originally unable to grow in these low nutrient environments to flourish.

Increased sediment can also impact on water quality. Erosion, stock in waterways, and earthworks can all contribute to an increase in soil particles getting into drains and lakes when it rains. Sediment can reduce lake depth, increase turbidity and smother aquatic plants and animals. Sediment can also act as a mechanism to transport nutrients into lakes and streams.

Landowner nutrient management actions

Managing nutrients and sediment on farms can be beneficial for both the environment and the farmer. By targeted fertiliser application and nutrient budgeting, peak production can be maintained with minimum input and cost. Here are some important tips and practices.

- Think about preparing a nutrient budget that targets which nutrients are required and in what quantities. Environment Waikato administers rules under the Waikato Regional Plan which require a nutrient budget to be prepared if nitrogen application exceeds 60kg per hectare per year.

- Keep stock out of waterways. Stock with direct access to waterways can damage natural habitat, pug ground, erode banks and deposit dung and urine, often with bacteria and viruses, directly into the water.

- Fence drains, particularly those ones which flow into peat lake systems. Allow a good margin between the fence and the waterway – a grass buffer or other plantings can help absorb some of the nutrients and reduce sediment before it reaches a stream or drain.

- Wet areas, soaks and swampy areas act as sponges slowing runoff and by utilising and converting nutrients to harmless products. This process is known as denitrification. So, where possible retain these ‘wetlands’ and discharge drains into wetlands areas before they enter lakes.

- Use good fertiliser application practice. Load fertilisers away from waterways and use targeted application.

Lifestyle block owners can help protect against nutrients from septic tank effluent reaching drains, streams and lakes. Good installation of the tank and field tile system as well as ongoing maintenance is essential in ensuring the system runs effectively.

Inflowing drain into Lake Ngaroto showing Azolla – characteristic of high levels of nutrients. Photo courtesy of Waipa District Council.

What role do the management agencies play?

All agencies involved in the Waipa Accord promote best practice in regards to nutrient management on land and near waterways. The primary role is to provide information and assistance to landowners to achieve good environmental outcomes. Agencies also initiate and undertake research and restoration projects to manage nutrients and their effects in and around peat lakes and wetlands.

Regulation of nutrient management is governed by both Waipa District Council and Environment Waikato. Waipa District Council administers various rules relating to lifestyle blocks, peri-urban development and septic tanks, and provides advice and information relating to these issues.

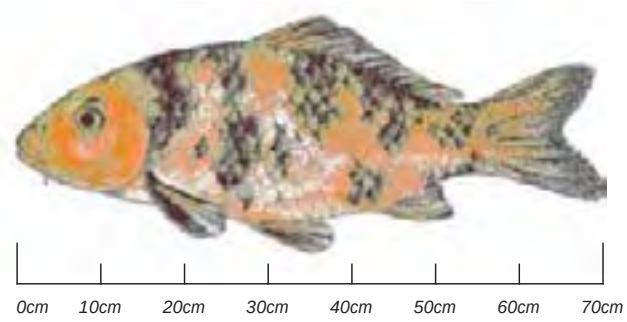
Environment Waikato has rules which cover fertiliser use, effluent management and fencing, and provide best practice advice and information on consent requirements.

Further information relating to nutrient management can be found on the ‘other helpful information’ page at the end of this booklet.

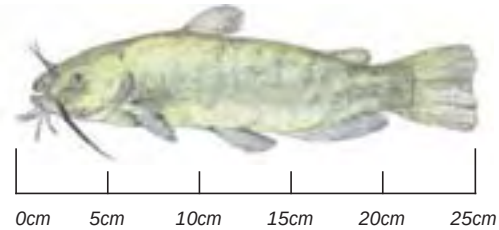
Introduced plants and animals

Introduced plants and animals can impact on native species through predation, competition or displacement. Impacts can be within the lake (aquatic) as well as on the land surrounding the lake or wetland margin.

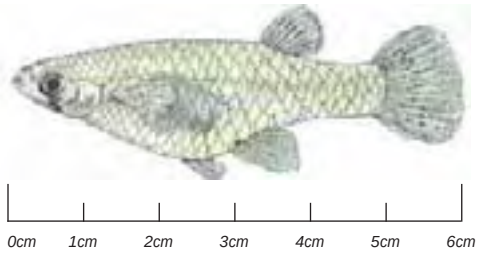
Introduced fish can play a major role in causing the disappearance of native aquatic plants from lakes where they are present. Rudd can be found in some peat lakes and actively feed on aquatic plants. They have been linked to the almost complete de-vegetation of some lakes.



Koi Carp.
Drawing by Sonia Frimmel.



Brown Bullhead Catfish.
Drawing by Sonia Frimmel.



Gambusia (Mosquitofish).
Drawing by Sonia Frimmel.

Koi Carp and Brown Bullhead Catfish compete with native fish for food and can affect water quality by stirring up lake sediments and uprooting vegetation. The more sediment within the water the more difficult it is for plants to get the light they need to grow.

Goldfish and *Gambusia* (Mosquitofish) can also be found in some of the peat lakes in the Waipa District.

Introduced aquatic plants such as oxygen weeds (*Lagarosiphon and Egeria*) and Hornwort can grow faster and taller than native aquatic plants. They take over areas and limit light and space available for native species.

Around lake margins the main plant pests are blackberry, Japanese honeysuckle, *convolvulus*, gorse and grey willow (*Salix cinerea*). They can replace and smother native woody vegetation like manuka and flax and shade out native grasses and sedges. Introduced mammalian pests such as rats, possums, cats, stoats and ferrets have a profound impact on native animals. New Zealand's native species have evolved without pressure from mammalian predators so even low numbers of pests can influence their survival and ability to breed.

Grey Willow invades and surrounds the margins of many peat lakes. Rushes can be seen in the foreground.

Practical pest management actions for landowners and lake users

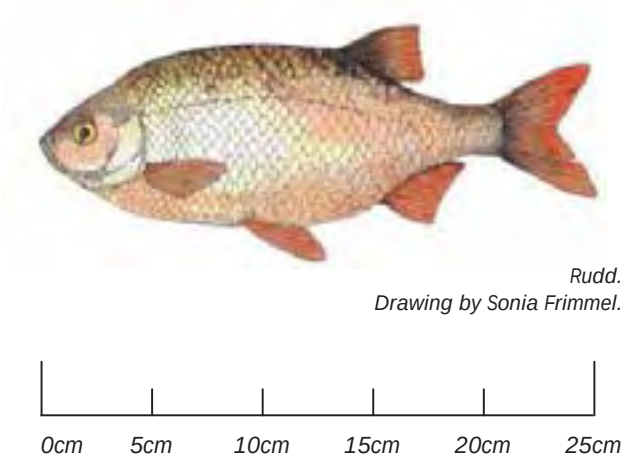
On the land, local pest control of both pest plants and animals can be effective at reducing their impact on native species. By clearing plant species such as willows and other weeds, native vegetation can have an opportunity to re-grow from seeds stored in the ground. It can be useful to team up with neighbours to extend the area where animal pest control occurs and reduce reinvasion rates. For the best effect, ongoing, sustained control of both plant and animal pests needs to be undertaken.

For lake users it's important not to introduce any new fish or plant species into any waterway – in most circumstances this is illegal and there are large penalties particularly for introducing species such as Koi carp and Gambusia (Mosquitofish). It's also just as important to remember to clean all your equipment and remove any plant or fish eggs or juveniles from fishing gears and boats before entering another river or lake. Good equipment hygiene will help in limiting the spread of many pest species.

What role do the management agencies play?

Management agencies are responsible for the control of plant and animal pests on the land that they administer. Some, such as Environment Waikato have wider responsibilities which can extend to private land, under guidance from documents such as the Regional Pest Management Strategy. Environment Waikato is also responsible for various possum control programmes in conjunction with the Animal Health Board.

In recent years, Environment Waikato and the Department of Conservation have been carrying out control of the herbivorous fish Rudd within the Serpentine Lake system. These lakes (Serpentine North in particular) has the best assemblage of aquatic native plant species left in a peat lake within the Waikato region. By controlling Rudd, it is hoped the values of all the Serpentine lakes can be protected.



Rudd.
Drawing by Sonia Frimmel.

Weed control is ongoing around many of the recreation reserves managed by Waipa District Council and the wildlife reserves managed by the Department of Conservation. Fish and Game Council volunteers are also active in controlling weeds around key hunting sites and as part of peat lake and wetland restoration projects.

Underwater aquatic vegetation surveys are conducted in some peat lakes as a means of monitoring lake health. One aspect of this work is to look for aquatic plant pests and respond quickly to manage any new or potential infestations.

Advice, information and support is provided by the management agencies on what plants and animals are considered pests, why they are pests and what to do to control them. Further information sources are provided in the 'other helpful information' section at the end of this booklet.

Public access

Access to some peat lakes and wetland reserves is limited and may be across private land or via unformed ‘paper’ roads across farmland. The wetlands and areas immediately around peat lake margins are often difficult to negotiate because of boggy areas and thick vegetation. This can sometimes make it difficult for members of the public to visit, enjoy and appreciate the lakes.

What role do the management agencies play?

Improving public access to public reserves is important to encourage use, enjoyment and understanding of these unique habitats. The accord agencies are always looking for opportunities to increase the ability of the public to access and utilise these environments.

Protection of historic sites

The preservation of archaeological artefacts and features associated with pa and other settlements on the lake margins rely on the peat soils around them remaining saturated. Any reduction in water level could cause deterioration and potential loss of artefacts and features such as terracing and storage pits.

How landowners can help in protecting historic sites

If you have an historic site associated with a lake or within peat located on your property then it is important to manage the water tables to try to maintain saturation of the soils.

If there is a possibility that a site on your land may be of historic relevance – contact Waipa District Council or the Historic Places Trust to discuss what to do next. Protection measures may include fencing the site to protect from stock damage and the council or trust may wish to come and visit to assess the value of your site.

What role do the management agencies play?

All accord agencies have an interest in identifying and protecting historic sites to enable them to be preserved for future generations. Waipa District Council and the Department of Conservation have an active role in protecting these sites and are the key players within the accord agencies. Waipa District Council is interested in the greater Waipa District while the Department of Conservation is particularly interested in historic sites located on the department’s estate.

Where to from here?

Progress on work in the Waipa peat lakes and wetlands has shown what is possible when individuals and agencies work together to achieve a common goal.

The conservation, restoration and enhancement of these important resources relies on a joint effort between management agencies, landowners and interest groups. Everyone has a contribution to make and by working together progress will continue to move forward.

However, although great progress has been made, there is still much work to be done. If you are interested in finding out more information on the Waipa peat lakes and wetlands, there are a wealth of publications and websites available to answer your questions. These are listed in the 'other helpful information' list at the back of this booklet. If your questions go beyond the scope of this information it may help to call the management agency which will be best placed to answer your question.

The path forward involves a joint effort between landowners, interest groups and management agencies.

Other helpful information

Environment Waikato

Information relevant to peat lakes and wetlands can be found at the following links.

Management of peat for farming purposes
www.ew.govt.nz/enviroinfo/land/management/peat.

To find out more about managing peat and good practice you can also download for free a copy of the publication **'For Peat's Sake – Good Management Practices For Waikato Peat Farmers'** from this website.

Peat lakes

www.ew.govt.nz/enviroinfo/water/lakes/shallowlakes/peatlakes.

Types of freshwater wetlands found in the Waikato region as well as threats and tips on restoration
www.ew.govt.nz/enviroinfo/water/wetlands.

A series of **wetland factsheets** can be ordered from www.ew.govt.nz/publications.

Aquatic and Marginal Vegetation of Lake Serpentine North – a technical report 2003
www.ew.govt.nz/publications/technicalreports/tr0103.

Water Quality Trends in Lake Rotomanuka North and their Implications for restoration and Management – a technical report 2003
www.ew.govt.nz/publications/technicalreports/tr0203.

Environment Waikato **Regional Pest Management Strategy** can be downloaded from
www.ew.govt.nz/policyandplans/rpmsintro.

Plant pests – identification and control options
www.ew.govt.nz/enviroinfo/pests/plants/index.

Animal pests – identification and control options
www.ew.govt.nz/enviroinfo/pests/animals.

For further information on fencing and planting waterways, copies of **Clean Streams – A guide to Managing Waterways on Waikato Farms** can be downloaded from
www.ew.govt.nz/enviroinfo/water/cleanstreams.

A guide to choosing and planting native trees and shrubs in the Waikato region: **Planting Natives in the Waikato Region** can be obtained by calling the Environment Waikato freephone
0800 800 401.

Another useful guide to planting natives in the Waipa area is **What to plant in the Maungatautari Ecological District** and you can also obtain a copy of this by also ringing the Environment Waikato freephone.

Waipa District Council

For further information and access to technical and recreation publications, call into Waipa District offices at: 101 Bank Street, Te Awamutu or
23 Wilson Street, Cambridge.
Phone 0800 924 723.

You can also find more information on the website
www.waipadc.govt.nz/

Department of Conservation

A resource kit for Lake Ngaroto and other Waikato wetland information especially designed for teachers can be found at
www.doc.govt.nz/Community.

Fish and Game Council

www.fishandgame.org.nz.
This site will also link to local information for the Auckland/Waikato area.

Other websites and useful links

The National Wetland Trust has information on wetland appreciation, enhancement and restoration from a national perspective.
www.wetlandtrust.org.nz.

New Zealand Landcare Trust are involved in various work which includes wetlands. They also provide support to community groups.
www.landcare.org.nz.

Waikato Biodiversity Forum and Biodiversity Advice Waikato can provide information on a range of topics relating to biodiversity, events, funding and links to other organisations within the Waikato region.
www.waikatobiodiversity.org.nz.

The New Zealand Fertiliser Manufacturers' Research Association Inc (Fert Research) have produced guidelines for best practice – you can obtain a copy of these guidelines from the website.
www.fertresearch.co.nz/fertiliser.

New Zealand Water and Wastes Association has drainage guidelines that can provide information to assist landowners. You can download a copy on this website.
www.nzwwa.org.nz/nzwerf.

Waipa
DISTRICT COUNCIL

Environment Waikato
REGIONAL COUNCIL

Department of Conservation
Te Papa Atawhai

Fish & Game
NEW ZEALAND

NGĀ IWI TOOPU o WAIPA