

MARCH 2003

Wetland Action Plan

FOR FURTHER INFORMATION

Greater Wellington –
The Regional Council
Wellington
P O Box 11646
T 04 384 5708
F 04 385 6960
W www.gw.govt.nz

Greater Wellington –
The Regional Council
Upper Hutt
P O Box 40847
T 04 526 4133
F 04 526 4171
W www.gw.govt.nz

Greater Wellington –
The Regional Council
Masterton
P O Box 41
T 06 378 2484
F 06 378 2146
W www.gw.govt.nz

ISBN:

WRC PUBLICATION:

Executive summary

Wetlands have disappeared from our landscape, and at an alarming rate. We estimate that only 7 – 14% of our original wetlands remain. These remaining wetlands are valuable; not just because of the rich plant and animal life they support, but also because of the role they play in the hydrological cycle, in the maintenance of water quality, as habitat for commercially important species and as a recreational resource.

Our remaining wetlands are still threatened by:

- Conversion to agriculture or urbanisation;
- Changes to wetland hydrology;
- Construction of roads;
- Weeds and pests;
- Damage caused by stock;
- Pollution of water entering the wetland; and
- The loss of connection with the wider landscape.

Greater Wellington proposes enhanced action to protect and restore the Region's wetlands. Greater Wellington has responsibilities towards wetlands under the Resource Management Act 1991 and is committed to helping safeguard the Region's biodiversity.

Greater Wellington also has a responsibility as the landowner of a number of important wetlands.

The vision of this Action Plan is that the current decline in the number and condition of wetlands in the Wellington Region is *reversed* and that the Region supports a full range of wetland types, in a *healthy*, functioning condition.

We can make this vision a reality by making sure:

- Wetlands in good condition are protected from damage;
- Damaged wetlands are restored; and
- Wetlands are managed as part of a wider catchment and landscape.

To achieve the vision there are eight key actions we need to take. These are:

- (1) Develop an inventory of wetlands in the greater Wellington Region.
- (2) Increase our knowledge of wetlands and, in particular, wetland hydrology.
- (3) Protect and restore wetlands on land owned or managed by Greater Wellington.
- (4) Work in partnership with other agencies to improve Lake Wairarapa wetlands.
- (5) Protect the very best wetlands on private land under the Key Native Ecosystem programme.
- (6) Provide practical advice and assistance to encourage wetland restoration on private land.
- (7) Provide an effective regulatory bottom line for wetlands
- (8) Monitor our progress towards achieving our vision.

Reversing wetland decline is not something Greater Wellington can do on its own. We have identified a number of groups we would like to work with in implementing this action plan. They are:

- Landowners
- Iwi
- Interested community groups
- Local territorial authorities
- Wellington Fish and Game Council; and
- The Department of Conservation.

Contents

Executive summary

Introduction	1
Relationship with Greater Wellington’s biodiversity programme and other initiatives	2
1. The current state of wetlands in the greater Wellington Region.	3
The history of wetland loss in the Region	3
Why wetlands are valuable	4
What threats do our remaining wetlands face?	6
Conversion to agriculture or urbanisation	6
Changes to wetland hydrology, including changes in the wider catchment	6
The construction of roads	7
Weed and pests impacts	8
Damage caused by stock	8
Pollution of water entering the wetland	8
Loss of buffers and connections	9
2. Why Greater Wellington must act to protect and restore the Region’s wetlands	10
Greater Wellington has responsibilities under the Resource Management Act (1991)	10
Wetlands as part of a wider commitment to the Region’s indigenous biodiversity	10
Greater Wellington has adopted an ecosystem-based approach to resource management	11
The importance of ecological processes	11
Places	12
Implications for freshwater and wetland management	12
Responsibility as a landowner of a significant wetland resource	13
3. Vision, goals and key actions	14
Goal 1: Wetlands in good condition are protected from damage	14
Goal 2: Damaged wetlands are restored	14
Goal 3: Wetlands are managed as part of a wider catchment and landscape	15
4. What action will we take to meet the vision?	16
Develop an inventory of wetlands in the greater Wellington Region.	16
Increase our knowledge of wetlands	16
Protect and restore wetlands on land owned or managed by Greater Wellington	17
Work in partnership with other agencies and Iwi to improve Lake Wairarapa wetlands	18
What we are doing now?	19
What we would like to do	20

Protect the very best wetlands on private land under the Key Native Ecosystems programme.	20
Provide practical advice and assistance to encourage wetland restoration on private land	21
The Wetland Advisory Service	21
Other community programmes that contribute to wetland restoration on private land	22
Provide an effective regulatory bottom line for wetlands	23
5. What resources are needed and who should we be working alongside?	24
What resources are needed?	24
Who does Greater Wellington want to work with?	24
Landowners	24
Iwi	24
Interested community groups	25
Territorial authorities	25
Wellington Fish and Game Council	25
Department of Conservation	25
6. How do we know if we are achieving our vision?	26
Monitoring our wetland resource	26
Wetland indicators	26
Change in wetland extent	26
Number of wetlands fenced to keep out stock	27
Number of wetlands that are impacted by surrounding land usage	27
Number of wetlands that are protected by a buffer zone	27
Number of wetlands with damaged hydrology	27
Number of wetlands whose viability is threatened by weeds and pests	27
The amount of community voluntary action and care group participation in restoring wetlands	28
7. References and further reading	29
8. Glossary	30
Appendix 1: Wetlands on land owned or managed by Greater Wellington	32
Appendix 2: Wetland Action Plan funding requirements	38

Introduction

The purpose of this Action Plan is to describe how Greater Wellington Regional Council intends to address the significant problem of wetland decline in the Region.

It does this by:

- Describing the current state of the wetlands in the greater Wellington Region, their value, and the threats facing them (Chapter 1)
- Explaining why Greater Wellington must act to assist in their recovery (Chapter 2)
- Proposing a vision for the Region's wetlands to work towards, and relevant goals to support the vision (Chapter 3)
- Outlining the various existing and proposed programmes intended to achieve these goals (Chapter 4)
- Quantifying the resources needed to implement the programme, and identifying who else might help us. (Chapter 5)
- Describing the monitoring we will need to undertake to know if we are achieving the results we seek (Chapter 6)

This Action Plan spells out Greater Wellington's work programme for wetlands between now and June 2006.

Relationship with Greater Wellington's biodiversity programme and other initiatives

This document constitutes a major part of the Greater Wellington's programme to enhance the greater Wellington Region's ecosystems and biodiversity.

In 2000, Greater Wellington increased its investment in regional biodiversity because we recognised the need to halt the continued loss of remnant areas, species, and ecosystems. The Greater Wellington biodiversity programme addresses the following ecosystem types, which are depleted or under threat in the Region:

- Wetlands
- Rivers and streams
- Estuaries
- Dunes
- Lowland bush
- Coastal escarpments
- Marine ecosystems

Each of these types of ecosystem is addressed in different ways, through plans and strategies, and through a wide variety of programmes and projects.

The **Wetland** Action Plan provides for all wetlands, except those alongside rivers (with flowing water). It provides for those parts of estuaries above the Coastal Marine Area (that is, areas of salt marsh). Its focus is natural wetlands rather than constructed wetlands. That is, it does not provide for wetlands that are created in areas where there were none previously.

The strategic direction for **river ecosystems** is set out in the "Strategy for Achieving Riparian Management in the Wellington Region". This is being supplemented by a series of investigations into the health of river ecosystems, and the ecological communities that live in them (e.g. native fish).

Greater Wellington's work on **estuaries** has not yet been set out in a single document. The most significant activity is occurring in the Pauatahanui estuary, and this is described in "Towards Integrated Management - Pauatahanui Inlet Action Plan". Other estuaries where Greater Wellington is working are the Waitohu, Otaki, and Riversdale estuaries.

Similarly, there is no overall strategy for the Greater Wellington's **dune** restoration efforts. This is happening as discrete projects at a number of sites from Otaki to Castlepoint. It is expected that a strategy for dune restoration will be developed.

The Regional Pest Management Strategy provides overall direction for works and services relating to **lowland bush** "key native ecosystems". Programmes for **coastal escarpments** and **marine ecosystems** are still being developed but are site specific and unlikely to warrant strategic overviews or description at this stage.

1. The current state of wetlands in the greater Wellington Region.

We know that wetlands are a valuable but threatened part of our landscape. This chapter outlines:

- the history of wetland loss in the Region;
- why wetlands are valuable; and
- what threats our remaining wetlands face.

1.1 The history of wetland loss in the Region

The term ‘wetland’ covers all the different kinds of wet habitats where the land is covered in water for some period of time (the land does not have to be permanently wet). Wetlands occur in areas where surface water collects or where underground water seeps through to the surface. Wetlands include swamps, bogs, salt marshes, shallow lakes and the edges of some of our rivers.

Wetlands have disappeared from our landscape at an alarming rate. Maori lived with, and indeed depended on wetlands for centuries. Since pakeha settlement, wetlands have been drained, filled in, used as dumps, and built on. Before the early 1980s, such drainage and destruction of wetlands was accepted practice in New Zealand and encouraged by government because it allowed for the expansion of productive farmland. If it were not for the combined efforts of hunters and fishermen, concerned landowners, scientists, and environmentalists, there would be no wetlands left in the greater Wellington Region.

We know that most wetlands in the greater Wellington Region have been lost. By looking at maps of soil types that developed under wetlands, we can estimate that 12% (or about 100,000 hectares) of land was once covered in wetland. Today, between 7 – 14% of those wetlands remain (the higher estimate includes the open water of Lake Wairarapa).

Most of our historical wetlands were in the flood plains of the major rivers: the Otaki, Waikanae, Hutt, Tauherenikau, Ruamahanga and Whareama rivers. These flood plains were shifting mosaics of riverbed, meanders, ox bows, bogs, swamps, and swamp forest. These wetlands are now almost all gone – and those that remain are no longer fed by the regular flooding of their rivers.

The largest areas of wetland left in the Region are within the Lake Wairarapa wetland complex. There are also small remnants of the peat bog that once extended in a nearly continuous strip from Paraparaumu to Foxton. Other important wetlands in the Region include the Taupo Swamp at Plimmerton, and the Pencarrow Lakes and their associated swamps at Pencarrow head.

Some wetlands have been created, but this can never compensate for the loss of natural wetlands. Created wetlands generally only serve adaptable and successful plant and bird species, and many wetland types can not be re-created.

'Measuring Up' – The State of the Environment Report for the Wellington Region states that our knowledge of wetlands is poor. A survey in 1993 showed that the average size of wetlands is small (the vast majority are under 30 hectares). About two-thirds of wetlands are in private ownership (this is by number of wetlands, rather than by area).

1.2 Why wetlands are valuable

Although the benefits of draining wetlands to gain productive farmland are well recognised, we remain largely ignorant of the economic, social, and environmental costs of wetland destruction. Many people know that wetlands support wildlife, particularly waterfowl, but few recognise their other values, such as their ability to store and cleanse water.

A summary of wetland values is listed in the table below:

Table 1: Wetland values

<p>Significance to Maori. Wetlands provide an important link in the history and culture of many hapu. The plants that grow in wetlands provided clothing, mats, and a source of medicine and dyes. Raupo could be used to thatch the walls and roof of a whare, the underground roots could be eaten and the pollen was used for making bread and porridge. Wetland animals, especially tuna (eels) were a valuable food supply.</p>
<p>Healthy fisheries. A number of commercially harvested fish spend some of their lifecycle in wetlands and estuaries. For example, Lake Wairarapa wetlands support a commercial eel fishery and a recreational fishery (whitebait, flounder, and brown trout). Wetlands are crucial for maintaining whitebait (inanga) runs in two ways: first, wetlands provide habitat for some adult whitebait species to live. Secondly, coastal wetlands provide ideal spawning grounds for inanga.</p>
<p>Hunting, sport fishing, and tourism. Thousands of dollars are spent annually by hunters, fishermen, and tourists visiting wetland areas.</p>
<p>Water purification. Wetlands have been described as the world's kidneys. Wetlands are vital to cleansing water, trapping sediment and capturing nutrients from waters that flow through them. In this way, wetlands improve water quality downstream. Removing excessive nutrients reduces the risk of algal blooms and dead zones (areas where no fish can survive) and ensures water is safe for human and stock consumption.</p>
<p>Shoreline stabilisation and storm protection. Wetland plants hold soil in place with their roots, absorb the energy of waves, and break up the flow of river currents. It is estimated that an unprotected shoreline erodes four times faster than those that are protected by salt marshes.</p>
<p>Climate control. Wetlands store carbon within their living material (plants) and preserved (peat) biomass. On a global scale, wetland destruction releases carbon dioxide and adds to the Greenhouse effect.</p>
<p>Flood damage reduction. By soaking up and storing water, wetlands help prevent flooding. They do this by slowing the flow of water during times of high rainfall so that it can be more easily adsorbed into the soil. Between rainfall, this stored water is released slowly, helping to maintain water flows.</p>
<p>Reservoirs of biodiversity. Wetlands support more bird species than any</p>

other type of habitat in New Zealand. Although wetlands comprise less than 2% of the county's land area, they support 22% of our bird species. Birds that live in wetlands include pukeko, bittern and fern bird. Many fish and insects and a disproportionate number of rare species, including a number of rare plants also rely on wetlands.

Of course not all wetlands have all of the values listed above, although many have multiple values. Patterson and Cole (1999) calculated the direct value that wetlands provide to the national economy is \$5,673 million (1994 dollars). This is an average of \$30,000 to \$40,000 per hectare. We need to be cautious when considering any activity that might damage a wetland because we often do not know what value that wetland has.

Box 1: Lake Wairarapa and its associated wetlands

No discussion of the wetlands in the greater Wellington Region is complete without considering Lake Wairarapa. Whilst 53% - 60% of the wetlands of the lower Wairarapa Valley have been lost since human settlement (Moore et al, 1984), the area still contains over half the wetlands left in the greater Wellington Region.

The National Water Conservation (Lake Wairarapa) Order was made in 1989. It recognises "that the wildlife habitat created in part as a consequence of the natural fluctuations of water levels, particularly over the eastern shoreline, is an outstanding feature of Lake Wairarapa".

The Lake Wairarapa wetlands, including the wetland areas surrounding Lake Wairarapa, and Lake Onoke and its associated wetlands, are considered of national and international importance for flora and fauna (Moore et al 1984). Five species of threatened or rare birds (Dabchick, Bittern, Variable Oystercatcher, Banded Dotterel, and Caspian Tern) breed at, and/or regularly use the wetlands, while other threatened species regularly or occasionally visit (e.g. Wrybill), (Lake Wairarapa Management Guidelines 1991, Department of Conservation).

The eastern lakeshore is also an important habitat for native turf plant communities. Turf plants are very short plants that grow on the water's edge and provide excellent habitat for wading birds. A number of the wetland plants are nationally threatened or rare in the North Island, e.g. *Leptinella maniototo*, *Crassula ruamahanga*, *Carex cirrhosa*, *Pilularia novae-zelandiae*, *Hypsela rivalis*, and *Amphibromus fluitans*.

The Lake Wairarapa wetlands have traditionally been important for the Ngati Kahungunu people as an area for food gathering, especially eels, and the Lake shoreline has a number of historical sites.

Lake Wairarapa is an integral part of the Lower Wairarapa Valley Development Scheme. In large floods the Lake is used as a storage reservoir. At high flows in the Ruamahanga River, excess river water is directed into Lake Wairarapa via the Oporua Floodway.

The water levels in Lake Wairarapa are controlled by the Blundell Barrage Gates. These link the Lake with the lower Ruamahanga River. Choosing appropriate water levels for Lake Wairarapa was contentious in the 1970s and early 1980s. A consultation group comprising landowners, South Wairarapa District Council, Department of Conservation, Greater Wellington, Fish & Game, Iwi, and recreationists, developed a lake level policy.

Box 2: The Kapiti Coast - the Great Swamp

Five thousand years ago the sea level was higher. Waves crashed at the base of cliffs that now form the Paekakariki Scarp. As the waves retreated, the wind formed a series of dunes on the uneven former seabed surface. These sand dunes trapped water – this eventually created a series of lakes and swamps behind and amongst the sand dunes.

Prior to clearance and drainage, the Kapiti Coast was cloaked in swamp forest, dominated by tall trees such as kahikatea, pukatea, swamp maire and rimu. There were extensive areas of flax swamp and a number of lakes fringed with sedges, rushes, and cabbage trees. It was so wet that the area from Paraparaumu to Foxton was referred to as the 'Great Swamp'. Centuries of growth of wet forests developed a deep fertile soil on all but the young sand dunes.

In the Wellington Region the 'Great Swamp' has been reduced from almost 2,000 hectares to small, heavily modified remnants, totalling less than 300 hectares.

1.3 What threats do our remaining wetlands face?

Our remaining wetlands are vulnerable. The threats are listed below:

1.3.1 Conversion to agriculture or urbanisation

The decision of the Government in the mid-1980s to end government subsidies for irrigation, flood control and drainage schemes has slowed the pressure on wetlands (Ministry for the Environment, 1997). Wholesale drainage and filling has stopped. It is likely that we will continue to lose small wetlands and small corners of larger wetlands, and the cumulative effects of this are high. At this stage we do not know how much of this is happening in the Region, because wetland extent has not been monitored.

1.3.2 Changes to wetland hydrology, including changes in the wider catchment

Wetlands are vulnerable to changes in their *hydrological regime*. That is, changes to water levels and the natural cycle of flooding and drying. Most changes to wetland hydrology result in the wetland either drying up or being

permanently flooded. This creates habitats that are similar over larger areas for long periods, reducing diversity.

Changes to a wetlands hydrological regime typically come from activities in the wetlands catchment (that is, where the water that feeds the wetlands comes from) rather than from changes to the wetland itself.

Activities that damage wetlands by changing their hydrological regime include:

- Drainage, including the deepening of nearby drains, which can lower the water table in wetlands. Draining one boggy paddock can lower the water table in a nearby wetland if they are connected by groundwater;
- Stormwater discharging into a wetland can scour out a channel through the wetland which lowers water levels. Stormwater is formed when rain falls on hard surfaces such as road, carparks, and buildings;
- Flood protection works such as the use of stopbanks that isolate rivers from their flood plains. Stopbanks stop the regular flooding of flood plain wetlands;
- The over-extraction of groundwater from bores leading to lowered water levels in connected wetlands; and
- The over-extraction of water from streams that feed wetlands.

The potential for these activities to damage wetlands is often difficult to predict because we have limited information on the hydrology of wetlands in the Region.

1.3.3 The construction of roads

Roads have been built through wetlands because they have been perceived as low value areas. Some of the effects that roads have on wetlands are:

- Reduction in the area of wetland;
- Sedimentation during road construction;
- Changing water flows by creating a barrier for water that would have otherwise flowed through the wetland;
- Contamination via polluted sediments washed into the wetland with stormwater; and
- Road noise which may affect sensitive bird species.

Wetlands along the Kapiti Coast are particularly vulnerable to roading construction. Current projects that will affect wetlands are the proposed State Highway One upgrade and the proposed Western Link Road from Raumati to Waikanae.

1.3.4 Weed and pests impacts

Wetlands can be invaded by aggressive, non-native plants such as grey willow, alder, tall fescue and other exotic grasses. Weeds in wetlands can replace native plants and change water flow and quality. Wetlands degraded by grazing or drainage are more vulnerable to weed invasion, but even healthy wetlands can be invaded and altered by some weed species.

Wetland and aquatic weeds are increasing in area in the greater Wellington Region. New weeds are establishing and established weeds are increasing in area. For example, the highly aggressive aquatic weed hornwort has recently invaded the Lake Wairarapa wetlands. The growth and spread of this species can be extremely rapid with the result that the natural flow of water is altered, light cannot penetrate water and oxygen is stripped from the water. Weed problems at Lake Wairarapa include the invasion of rare 'turf' plant communities on the eastern shoreline, elder and tall fescue.

Mustelids and other animal pests can greatly reduce wetland bird numbers. Exotic fish have big impacts on lakes. Fish such as koi carp feed on plants growing on the bottom of the lake bed and stir up the water making it more turbid. On the margins of wetlands, and in wetlands that are dry over summer, possums, hares and rabbits can cause major damage to native vegetation.

1.3.5 Damage caused by stock

Grazing livestock can degrade wetlands that they use as a food and water source. Livestock eat wetland vegetation, trample sensitive root systems, and pug wetland soils. Their dung and urine lead to increased nutrient levels. Wetland margins and wetlands that dry out naturally over summer are particularly vulnerable. For example, during the dry summer of 2000/2001 some wetland vegetation on the margins of the Pencarrow Lakes was destroyed by stock damage.

In some cases, limited grazing with low stocking rates may be used as a management tool to control weed species and increase plant diversity.

1.3.6 Pollution of water entering the wetland

Although wetlands can remove water borne pollutants their capacity to do so can be exceeded. Whilst wetlands can remove excessive nutrients and sediment from water high levels of these pollutants cause damage.

Low nutrient wetland types, such as bogs, are particularly vulnerable to the impact of nutrients. Wetlands that are naturally higher in nutrients are less vulnerable to increased nutrient levels but even in these areas, excessive nutrients promote aquatic weed invasions and may cause excessive growth of some native species such as raupo which can replace areas of open water.

Wetlands trap and hold sediment that is washed into a wetland. In areas of high erosion where the water carries a high sediment load, the rate at which the wetland is in-filling (going through a transition to dry land) is increased.

1.3.7 Loss of buffers and connections

The animals that live in wetlands often need vegetated margins, for example, for nesting sites. Vegetated margins can also shelter the wetlands from prevailing winds. On a larger scale, wetlands need connections to forests along vegetated forest corridors. Few wetlands have intact vegetated margins and corridors of vegetation (for example, vegetated riparian areas) to ‘link’ them with the landscape.

2. Why Greater Wellington must act to protect and restore the Region's wetlands

This chapter discusses why Greater Wellington must act to protect and restore wetlands. In summary, this is because of Greater Wellington's:

- responsibilities under the Resource Management Act 1991 (RMA);
- wider commitment to the Region's indigenous biodiversity;
- adoption of an ecosystem-based approach to freshwater management; and
- responsibility as the landowner of a significant wetland resource.

2.1 Greater Wellington has responsibilities under the Resource Management Act (1991)

The preservation of the natural character of wetlands, and their protection from inappropriate subdivision, use and development is a matter of national importance under section 6(a) of the Act.

There are two main ways that authorities implement this part of the Act:

- Adopting *regulations* to control the activities that affect wetlands; and
- Using *non-regulatory* methods (such as providing education, advice and incentives) to encourage voluntary action.

Through methods in the Regional Policy Statement (RPS), Greater Wellington has chosen to emphasise a *non-regulatory* approach, such as raising public awareness and providing advice and assistance to landowners who are protecting wetlands. Greater Wellington has recognised that more can be achieved by working with landowners than by relying on regulation to protect wetlands. This Action Plan is a key part of the development of Greater Wellington's non-regulatory approach and will meet Greater Wellington's commitments in the RPS (Freshwater Method 48) and in the Regional Freshwater Plan to develop a Wetland Strategy.

The responsibility for *regulating* activities that affect wetlands is shared between Greater Wellington and territorial authorities. District rules can be adopted to control the effects of land uses such as earthworks, while Regional rules can be adopted to control discharges, water diversions, and activities in the beds of lakes and rivers.

The complementary roles for the "wet" and "land" parts of wetlands mean that we must work together closely to achieve integrated management of wetlands.

2.2 Wetlands as part of a wider commitment to the Region's indigenous biodiversity

Greater Wellington is undertaking a broad programme of biodiversity management to help protect ecosystems. Much of the funding in this programme is devoted to the management and reduction of plant and animal

pests from areas of high ecological value (largely bush area but also wetlands, escarpments and dunes). Funds are also being applied to marine ecosystem management, and to the freshwater environments.

Activities in Greater Wellington's biodiversity programme that benefit wetlands include:

- plant and animal pest control;
- support for QEII covenanting;
- Iwi project funding;
- riparian management programme;
- freshwater ecosystem programme; and
- Take Care community action.

2.3 Greater Wellington has adopted an ecosystem-based approach to resource management

Greater Wellington signalled its intention to take an ecosystem-based approach to managing the environment in its RPS. A general description of the outcomes sought is:

- The overall quality (health) of ecosystems is increased by strengthening key processes;
- Healthy functioning ecosystems are distributed throughout the Region, including the rural and urban environments;
- The area and quality of indigenous ecosystems is increased;
- The Region has a diversity of healthy ecosystems which represent the full range of regional flora, fauna and habitats; and
- Special ecosystems are actively protected and appropriately managed (see 2.3.2 below)

2.3.1 The importance of ecological processes

What is Greater Wellington's "ecosystem approach"? All living things are a part of complex, interacting webs, or systems that are powered by natural processes and cycles (e.g. the hydrogen, carbon and nitrogen cycles, photosynthesis, energy flows and decomposition). An ecosystem approach to resource management means attempting to sustain and support these processes by managing water, land, air, plants and animals, in ways that help these wider systems function in a healthy and viable manner.

This type of management is different from our earlier efforts to control discrete parts of the environment, such as the quality of water in a river or the conservation of soil on an eroding hillside, in isolation from the ecosystem of which they are a part. This separation was often for economic or institutional reasons. An ecosystem approach means managing a system of interacting parts, not just a discrete area or species. If a single part does require

management, an ecosystem approach means doing so in a way that increases its contribution to the health and viability of the wider system, as well as ensuring its own viability.

Sustaining ecological processes is important in all places, from relatively pristine areas to urban and agricultural landscapes. It is just as important on private land, as it is on publicly owned parks and reserves. Of course, our ability to fund any type of intervention is limited and will necessitate some priority setting collaboration with stakeholders.

2.3.2 Places

As well as processes, Greater Wellington's ecosystem approach places an emphasis on certain types of ecosystem because of their rarity or absence from the protected lands in the Region. These special ecosystems are:

- wetlands;
- lowland bush;
- estuaries;
- dunes;
- escarpments;
- rivers and lakes; and
- marine ecosystems.

There are many places in the Region where ecosystems of these types need help to make them sustainable. Greater Wellington recognised this in 2000 and allocated significant additional funding to increase the management in these places.

Freshwater environments feature prominently on this list because of the marked loss of wetlands and the poor quality of many of the Region's streams and rivers.

2.4 Implications for freshwater and wetland management

Rivers and wetlands are complex ecological systems that exist in a constant state of flux, over time and space. To take an ecosystem approach to their management is to identify the ecological processes occurring within them, the key characteristics that enable them to function successfully and the ecological functions they perform within the wider landscape. Some of these functions might be the hydrological cycle, the nutrient cycle, sediment removal, habitat for animals, fish, birds, and plants, their levels of diversity, the presence of plant and animal pests, and so on. While it will not be possible to chart all of these once we have identified the most important ones, we can make choices about which processes or characteristics we will support or attempt to manage.

Greater Wellington's decision to put a greater emphasis on rivers and wetlands means that there are now programmes of work devoted to these ecosystems. For rivers, considerable effort is going into understanding how the Region's rivers function as ecosystems, and improving our understanding of the species that live in them. Greater Wellington's strategy for achieving riparian

management was adopted in June 2002 and funds are allocated for the period 2003-2006. The strategy proposes ways to manage the Region's riparian areas.

This wetland Action Plan spells out Greater Wellington's wetland programme over the next four years, and the funding necessary to implement the programme.

2.5 Responsibility as a landowner of a significant wetland resource

Greater Wellington is responsible for protecting and restoring wetlands on the land we own or managed. Reversing wetland decline in the Region will not be possible without this action. Greater Wellington investment in protecting and restoring wetlands will:

- protect some important wetlands in good condition (including Pencarrow Lakes and wetlands and Orongorongo wetland);
- restore some important wetlands (including the wetlands at Queen Elizabeth Park, Pakuratahi Ladle Bend Wetland and the Otaki River Mouth);
- demonstrate wetland restoration techniques to the public that can be applied on private land (Battle Hill wetland); and
- provide opportunities for community involvement in wetland restoration (Queen Elizabeth Park and Otaki River Mouth).

This work will strengthen Greater Wellington's position when encouraging wetland restoration on private land.

These same actions apply to Lake Wairarapa. Although Greater Wellington does not own all of the land surrounding Lake Wairarapa, we do control the water levels and can therefore influence the system.

3. Vision, goals and key actions

The vision: The current decline in the number and condition of wetlands in the greater Wellington Region is *reversed* and the Region supports a full range of wetland types, in a *healthy, functioning condition*.

The focus on a range of wetland types is important as the term wetland covers a number of different wet habitats (for example, swamps, bogs, estuaries, ephemeral wetlands, alpine wetlands, and shallow lakes).

We can make this vision a reality by breaking it into a number of smaller and more achievable goals. They are as follows.

3.1.1 Goal 1: Wetlands in good condition are protected from damage

It is easy, quick and cheap to damage natural wetlands. It is hard, slow and expensive to return them to their original state. Usually we are not capable of returning wetlands to anything approaching the subtlety and complexity of a natural system. For this reason the highest priority must be to avoid further damage to wetlands, especially those wetlands that remain in good condition.

Focusing on protecting the best wetlands does not mean that we should stop supporting the restoration of more degraded wetlands (for example, supporting a care group that is restoring an urban wetland). It just means that these activities should not occur at the expense of protecting wetlands in good condition.

We must identify wetlands in the Region that are in good condition on public and private land, and make every effort to ensure that they are protected from damage.

3.1.2 Goal 2: Damaged wetlands are restored

Unfortunately, very few wetlands in the Wellington Region are free from weeds and pests, fenced from stock and free from damage to their natural cycles of wetting and drying. Therefore, most wetlands need active management if they are to remain as part of the landscape. In a lot of cases, restoring wetlands to their original condition will not be possible. In such cases, the aim is to return the wetland to a healthy, self-sustaining and functioning condition, but not necessarily how the wetland was in the past.

Returning wetlands to a healthy state requires a whole range of activities starting with restoring the wetland's natural hydrological regime, and including fencing, replanting, removing barriers to fish passage and controlling weed and pests.

Wetland restoration is preferred to wetland creation because putting a wetland where it did not exist before is difficult and not always successful. Some wetland types, such as low nutrient bogs that take hundreds of years to develop, cannot be created. Greater Wellington does support the creation of

new wetlands for the treatment of stormwater and to create wildlife habitat but does not give it the same priority as restoring existing wetlands.

3.1.3 Goal 3: Wetlands are managed as part of a wider catchment and landscape

Achieving our vision for wetlands means more than simply fencing off these that remain. Wetlands are part of large ecological and hydrological systems, and cannot be managed in isolation. Wetlands are vulnerable to long term changes to their *hydrology*. It is the hydrology (the amount and timing of water entering the wetland via ground water or overland flow) that determines whether a wetland remains a wetland or becomes dry land. Changes to wetland hydrology can be caused by activities well beyond the wetland's surface boundary, for example the over use of groundwater. Restoration activities such as fencing, weed control, pest control and replanting can be doomed to failure if the hydrology has been altered and cannot be restored.

In many areas we simply do not understand wetland hydrology. Without research to address this knowledge gap we cannot effectively restore wetlands.

In addition to hydrology, there are many other influences on wetlands outside their boundaries. For example, if there are barriers to fish passage downstream of a wetland, there may be no fish even though the wetland provides good fish habitat.

To achieve these three goals there are eight key actions we need to take. These are:

- a) develop an inventory of wetlands in the greater Wellington Region;
- b) Increase our knowledge of wetlands and, in particular, wetland hydrology;
- c) protect and restore wetlands on land owned or managed by Greater Wellington;
- d) work in partnership with other agencies to improve the Lake Wairarapa wetlands;
- e) protect the very best wetlands on private land under the Key Native Ecosystem programme;
- f) provide practical advice and assistance to encourage wetland restoration on private land;
- g) provide an effective regulatory bottom line for wetlands; and
- h) monitor our progress towards achieving our vision.

4. What action will we take to meet the vision?

This chapter outlines how Greater Wellington intends to meet the vision and goals set out in Chapter 3. Greater Wellington has already made a commitment to wetlands and has a number of projects underway. This Action Plan proposes building on this commitment and outlines the current and proposed projects to meet our goals.

4.1 Develop an inventory of wetlands in the greater Wellington Region.

Knowledge of the extent, distribution and condition of wetlands is fundamental to their effective management. Previously, information on the Region's wetlands was scattered among databases in different organisations, and much of the information is now out of date. Greater Wellington collated all available information into a concise database in 2002.

We plan to visit all these wetlands and record information on wetland extent and condition by 2004. Wetlands on private land will not be visited without permission from the landowner. Contacting wetland owners will be used as an opportunity to promote the Wetland Advisory Service (see 4.6 below).

Once completed, this database will be used to prioritise wetlands for protection and restoration. The database will be maintained to monitor wetland extent and condition at least every 5 years.

4.2 Increase our knowledge of wetlands and, in particular, wetland hydrology.

Understanding wetland hydrology is vital in achieving the goal of a catchment based approach to reversing wetland decline.

Information on wetland hydrology is needed in the following areas:

- Shallow water aquifers on the Kapiti Coast:
Most wetlands on the Kapiti Coast are groundwater fed. With increased pressure on the Kapiti Coast groundwater resource, we need to understand how wetlands in this area function, so we can ensure their survival. This work was funded in 2002-2003.
- Understanding the hydrology of the most important wetlands:
For our best remaining wetlands we need long term hydrological monitoring. Hydrological studies are needed on all wetlands proposed as Key Native Ecosystems before any restoration activities are undertaken. The following significant wetlands, whose hydrology is not understood, could potentially be under threat from changes in ground water or surface flow:
 - Taupo Swamp, Plimmerton;
 - Pritchards Swamp, Otaki; and
 - Waingawa Freezing Works, Masterton.

4.3 Protect and restore wetlands on land owned or managed by Greater Wellington

Wetlands on land owned or managed by Greater Wellington include some of the most important in the region. The major wetlands are shown in **Figure 1**.

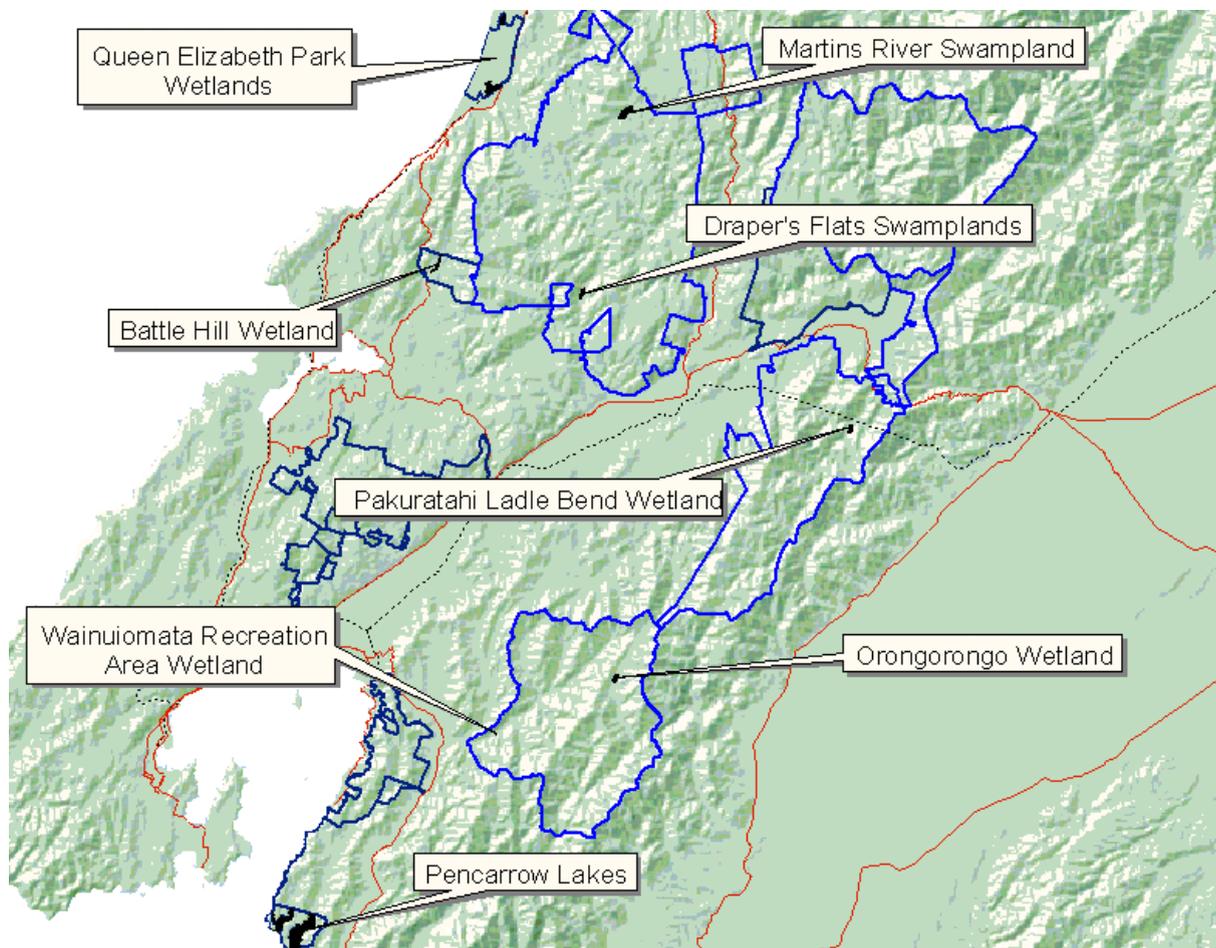


Figure 1: The location of major wetlands on land owned or managed by Greater Wellington.

These wetlands cover a variety of types, from the ephemeral wetlands at Queen Elizabeth Park, to a high altitude wetland at Orongorongo valley, and a rain fed bog at Pakuratahi. The Pencarrow Lakes and wetlands, which are considered to be of national importance, are only partly on land that is under control of Greater Wellington.

The wetlands on Greater Wellington land can be categorised as follows:

- Wetlands in good condition. Small effort needed to keep wetland in good condition (Orongorongo Wetland).
- Wetlands in good condition. Large effort needed to keep wetland in good condition (Pencarrow Lakes and associated wetlands, Ladle Bend wetland).

- Wetlands in bad condition. Active restoration (large effort) required to improve condition (Queen Elizabeth Park, Battle Hill Farm Forest Park, Wainuiomata Recreation Area wetland, Otaki River Mouth).
- Wetlands currently being investigated because we do not know enough to assess their importance and condition (Akatarawa Forest Park Wetlands).

Although protecting the best wetlands on Greater Wellington land is the top priority, restoring degraded wetlands on our land is also a vital part of the wetland strategy. Wetland restoration, especially in areas that are accessible to the public provides opportunities to demonstrate restoration techniques to private landowners, and involve the wider community. Wetland creation on Greater Wellington land is not a priority, unless it is as mitigation for flood protection works.

Appendix 1 contains detailed information on each wetland and the actions necessary to protect or restore them.

4.4 Work in partnership with other agencies and Iwi to improve Lake Wairarapa wetlands

Lake Wairarapa wetlands form the largest wetland complex in the southern North Island. For centuries Lakes Wairarapa and Onoke were vital food sources for Maori of the Wairarapa. Tuna (eels) were the most significant resource and were traded with groups further north and in the South Island. Modification of the area over the last 150 years destroyed many traditional mahinga kai (food gathering) sources. The Lake and the fishery are subject of claims to the Waitangi Tribunal.

The changes that have occurred over the last 150 years include:

- uplift of the former lake bed in the 1855 earthquake;
- drainage for agricultural development;
- the diversion of the Ruamahanga River in 1967, and the installation of barrage gates to manage water levels;
- the introduction of exotic plants and animals; and more recently
- agricultural intensification, which has increased demand for water.

Despite this history of modification, the area retains its importance to Iwi and is considered to be of international importance because of the unique plant and animal life it supports. Relatively few people visit Lake Wairarapa because developed access points are limited. Nevertheless, Lake Wairarapa is regionally important for game bird hunting, fishing and nature study.

The number of landowners of the Lake Wairarapa wetlands complicates their management. The Department of Conservation (DoC) administers most of the wetland complex. Other parts are administered by:

- *Private landowners:* Some, like the Pearce Wetlands, have conservation covenants on their title.

- *Wellington Fish and Game Council*: Their land is at the north end of the Lake and they administer and control water levels in some of the wetlands on the Eastern side of the Lake for recreational hunting.
- *South Wairarapa District Council*: Administer the Lake reserve area at the Featherston end of the Lake.
- *Greater Wellington*: own land associated with the Oporua Floodway on the eastern side of Lake Wairarapa, and is responsible for controlling water levels through the operation of the Barrage Gates under the terms of the resource consent.

River flows and lake levels that affect the Lake Wairarapa wetlands are primarily managed for flood protection purposes as part of the Lower Wairarapa Valley Development Scheme. The target lake levels were set by a committee of interested parties including lakeshore farmers, Iwi, and DoC. The Lake acts as a flood storage area in large floods with river flows being directed to the lake via the floodway system. A subcommittee of Greater Wellington's Rural Services committee oversees the Scheme's physical and financial management. This subcommittee is made up of elected scheme ratepayers, Greater Wellington representatives and South Wairarapa District Councillors.

Discrete parts of these wetlands are managed for other reasons, including providing opportunities for recreational hunting and the conservation of the areas unique plant and animal life. Other interests include cultural harvest and commercial/recreational fishing.

DoC has tried to address the lack of co-ordination in the management of the Lake Wairarapa wetlands by convening the Lake Wairarapa Co-ordinating Committee. The Committee produced the 'Lake Wairarapa Management Guidelines' in 1991 and now meet annually. In 2000, DoC produced the *Lake Wairarapa Wetland Action Plan 2000 – 2010*.

Greater Wellington has allocated funds in 2007/2008 to set up a new Regional Park based on the eastern shoreline of Lake Wairarapa.

4.4.1 What we are doing now?

- Investigating fish passage through the barrage gates:
Greater Wellington and DoC began a fish sampling programme in 2002 to assess the impact of the Barrage gates on the ability of fish to enter Lake Wairarapa. During the survey the gates are opened daily at high tide for one hour. This project will continue until 2005 and the data analysed over 3-4 years to establish any trends.
- Restoring wetlands on the Oporua Spillway:
Greater Wellington has retired the lower lying land on the spillway from grazing in 2001. This area is now reverting to a more natural state.

- **Monitoring the Lake margin:**
Changes in the Lake's vegetation and profile are monitored using transects that were set up by the Wairarapa Catchment Board in 1985.
- Monitoring water quality in Lake Wairarapa as part of Greater Wellington's state of the environment monitoring.

4.4.2 What we would like to do

- Continue research into the impact of the barrage gates on fish passage.
- Continue sampling the water quality in Lake Wairarapa. A sampling programme may be needed for adjacent wetlands, subject to the assessment of wetland health.
- Continue to monitor the shore line profile.
- Explore ways of involving the community in activities at Lake Wairarapa.
- Continue to restore the wetland within the Oporua Floodway, and support further wetland development where appropriate.

Irrespective of the regional park proposal we would like more regular contact with the Department of Conservation, Iwi and other agencies involved in active management at Lake Wairarapa.

4.5 **Protect the very best wetlands on private land under the Key Native Ecosystems programme.**

Key Native Ecosystems (KNE) are areas of native bush, dune vegetation, or wetlands on private land that are vital to the long-term viability of the Region's unique plant and animal life. Under the KNE programme, Greater Wellington can help landowners manage these areas. The KNE programme is voluntary, and landowners must have a conservation covenant in place to receive Greater Wellington assistance.

When the programme began in 1996, all KNE were native bush, and the chief management activity was possum control. In 2001, the KNE programme was extended to include wetlands. There are now three wetland KNE sites:

- Te Harakeke Swamp (Waikanae);
- Lake Pounui (South Wairarapa);
- O Te Pua Swamp (Otaki).

At these sites, Greater Wellington is funding fencing upgrades, weed control, and studies into wetland hydrology and ecology to aid management decisions.

Several more wetland KNE sites need to be added to the programme to ensure that regionally important wetlands sites are protected. Three more wetland KNE sites will be added to the programme over the next four years and further will be added after June 2006.

Because the sites included in the wetland KNE programme are of regional significance, the benefit in protecting these is shared by the Region as a whole. Greater Wellington will therefore provide 100% funding for KNE work provided the landowner has covenanted the site.

4.6 Provide practical advice and assistance to encourage wetland restoration on private land

4.6.1 The Wetland Advisory Service

Greater Wellington has provided advice on wetland restoration on private land since June 2000 under the Wetland Advisory Service. The service is aimed at landowners and other groups interested in restoring wetlands. The Wetland Advisory Service has not been advertised and most landowners learn about the programme through contact with Greater Wellington staff on other related matters. The Wetland Advisory Service is run from the Resource Policy department.

In the draft Wetland Action Plan we indicated that the Wetland Advisory Service should:

- Increase the advice available for wetland landowners interested in wetland restoration; and
- provide financial incentives for land owners for restoration activities such as weed control.

Consultation on the draft Wetland Action Plan showed strong support for the Wetland Advisory Service operating as the focal point for enquiries about wetlands. It should also provide a comprehensive list of the agencies that are involved in wetlands, what each agency's focus is and what services they can offer. Consultation also highlighted that other agencies (such as the Department of Conservation, Territorial Authorities and Forest and Bird) would like to work with Greater Wellington in developing and running the Wetland Advisory Service.

The Wetland Advisory Service has an annual budget of \$40,000. There will be scope for providing landowners with incentives, such as providing money for the preparation of a management plan, weed and pest control, and fencing.

Greater Wellington will seek input to the Wetland Advisory Service from other interested agencies by inviting them to participate in a meeting each year to assess progress and priorities. The purpose of the annual assessment process will be to:

- ensure Greater Wellington's effort is integrated with other agencies;
- exchange information; and
- consider priorities.

The annual assessment will not replace the ongoing co-operation with other agencies on individual wetland restoration projects.

4.6.2 Other community programmes that contribute to wetland restoration on private land

a) Iwi Project Funding:

In 2001/2002, two proposals from Iwi to restore wetlands were supported by the Iwi project budget, both in the Wairarapa (Ngawi and Homewood).

Iwi initiated projects to restore wetlands can continue be supported through the Iwi projects funding.

b) Take Care – Community Environmental Care Programme

Greater Wellington supports community groups working on restoring parts of their local environment. Assistance is given to groups working on wetlands, riparian and coastal areas. Groups working on wetland restoration projects supported by the Greater Wellington are:

- Queen Elizabeth Park group (restoring wetlands in the Park);
- Te Horo Beach Residents Association (restoring the Mangaone coastal wetland);
- Waimeha Restoration Group (working on the Waimeha lagoon);
- Forest and Bird Fensham Group (restoring the Fensham wetland near Carterton);
- Manuka Street Residents Association (improving a wetland and stream in Masterton);
- Pauatahanui Wildlife Reserve Group (creating a freshwater wetland at Pauatahanui);
- O Te Pua Wetland Landowners (supporting the landowners undertake weed control and other wetland management)
- Forest and Bird, Upper Hutt Branch (restoring Hulls Creek and wetland at Silverstream);
- Riversdale Stream Care Group (restoring the stream and lagoon at Riversdale)
- Henley Trust (improving the wetlands at Henley, Masterton); and
- Waitohu Stream Care Group (helping protect wetlands near the Waitohu Stream).

Wetland projects will continue to be a priority for Greater Wellington support through the Take Care programme.

c) Greater Wellington's Support for the QE II National Trust

Greater Wellington provides funding for the QE II National Trust to increase the amount of private land in the Region that is covenanted. Of the 44 covenants supported since June 2000, ten are wetlands.

d) Connection with the Riparian Strategy

Methods in this Action Plan are closely linked with the work that will be promoted through provisions in Greater Wellington's Strategy for Achieving Riparian Management. Wetland seeps that flow into small streams are part of the riparian environment. Fencing and planting these seeps improves their ability to remove nutrients that would otherwise enrich the stream. Wetland seeps can also be protected and planted under the Riparian Strategy. Retirement of these seeps will also be encouraged through the provision of information.

4.7 Provide an effective regulatory bottom line for wetlands

Rules in the Regional Freshwater Plan provide the regulatory framework for activities that affect wetlands.¹ Rule 16 requires a water permit to take, use, dam, or divert water in or from a wetland unless the diversion is allowed by Rule 8 or Rule 9. Rule 18 provides a higher level of control for some of the more important wetlands, the majority of which are owned by the Crown. To date, Greater Wellington has only received and approved six applications to divert water from a wetland.

Many other activities such as earthworks, stormwater discharges and the use of groundwater can affect wetlands. Greater Wellington needs more information about how these activities are affecting wetland health to ensure that the limits in the Regional Freshwater Plan are adequate to allow natural processes in wetlands to continue. This information needs to be collected now to check whether any changes are needed in the Freshwater Plan when it is reviewed.

As Greater Wellington shares the responsibility for regulating wetlands with territorial authorities, providing an effective regulatory bottom line will mean that Greater Wellington will need to work more closely with territorial authorities.

¹ details on the rules can be found in the online User Guide <http://www.gw.govt.nz/em/planguide/rmguide.htm>.

5. What resources are needed and who should we be working alongside?

This chapter describes the resources needed to implement the actions described in Chapter 4. In 2000, Greater Wellington made funds available for the care and protection of wetlands. These funds largely provide for the actions outlined in this plan. However, there are additional costs involved in implementing some parts of this Action Plan. The additional funding is being considered through the development of the Long Term Council Community Plan (LTCCP) and the Annual Plan process.

Greater Wellington cannot reverse wetland decline on its own. We need to work with landowners and other organisations, many of whom have a longer tradition of protecting and restoring wetlands. This chapter describes who the Greater Wellington would like to work alongside to achieve this.

5.1 What resources are needed?

This Action Plan builds on what Greater Wellington is already doing. A number of projects are already underway and have ongoing funding. The expenditure required to implement this Plan is outlined in Appendix 2.

Funding is subject to confirmation through the 2003 – 2012 LTCCP and Annual Plan processes.

5.2 Who does Greater Wellington want to work with?

Greater Wellington cannot reverse wetland decline on its own. We need to work collaboratively with the following groups.

5.2.1 Landowners

Landowner involvement is crucial to halting the decline of wetlands in the Region. We need to talk to wetland owners to find out their level of interest and commitment to restoring wetlands on their land, before developing a programme of education and incentives. Farmers in particular will be targeted because there are a number of wetland remnants on farm land.

5.2.2 Iwi

As part of implementing this Action Plan, we have been developing a co-operative working relationship with tangata whenua. For example, Te Runanga o Ati Awa ki Whakarongotai have shown a desire to be actively involved in all wetland restoration in their rohe.

There is potential for more wetland projects to be funded as part of Iwi Project Funding.

5.2.3 Interested community groups

A number of community groups are interested in wetlands. This includes environmental groups, such as local branches of Forest and Bird, to neighbourhood groups such as Residents and Ratepayers Associations. We need to work with these groups.

5.2.4 Territorial authorities

Territorial authority involvement is important because:

- They may have significant wetlands in their districts or on land they manage;
- We have a joint responsibility to regulate the activities that impact on wetlands; and
- Together we can co-ordinate non-regulatory programmes of advice and assistance for landowners.

We will strive to work with territorial authorities to co-ordinate the provision of non-regulatory assistance for private landowners.

5.2.5 Wellington Fish and Game Council

The Wellington Fish and Game Council manage a large number of wetlands and represent a large number of wetland ‘users’. They also have expertise in wetland management and a rapport with many landowners.

5.2.6 Department of Conservation

The Department of Conservation (DoC) and Greater Wellington need to work together because we sometimes manage separate parts of whole systems. For example;

- At Lake Wairarapa, DoC manages most of the wetlands surrounding the Lake and Greater Wellington controls the water levels and has a role in managing the catchment use; and
- At the Pencarrow Lakes, DoC control the Lakes themselves, and Greater Wellington controls some land around the Lakes.

There are also opportunities for DoC and Greater Wellington to co-operate in:

- developing a wetland monitoring programme;
- prioritising wetlands in the Region for protection and restoration; and
- providing advice and assistance to landowners.

6. How do we know if we are achieving our vision?

This chapter describes the monitoring Greater Wellington will undertake to see if we are making progress towards our vision.

Finishing the wetland inventory is the first step in setting up wetland monitoring.

Some simple wetland indicators are proposed. These are change in:

- wetland extent (i.e. total hectares of wetland);
- number of wetlands fenced to keep out stock;
- number of wetlands that are impacted by surrounding land use;
- number of wetlands that are protected by a buffer zone;
- number of wetlands with damaged hydrology;
- number of wetlands whose viability is threatened by weeds and pests; and
- the amount of community voluntary action and care group participation in restoring wetlands.

6.1 Monitoring our wetland resource

We will monitor the Region's wetlands to see whether if the efforts of the wider Wellington community achieve our goal of reversing wetland decline. The information generated will tell us if wetlands are getting better or worse with time, and what is causing this change. It will also allow us to evaluate our policies.

Monitoring will:

- Measure known and potential wetland threats (pressures);
- Assess the condition (state) of wetlands; and
- Gauge the response of the Wellington community to wetland protection and restoration policies.

We have identified some indicators for monitoring wetland change. These are described in 6.2 below. These indicators are designed to monitor the overall health and abundance of wetland areas in the Region – they are not designed to be sufficient for our most important wetlands, which will require extra monitoring, particularly of their hydrology.

6.2 Wetland indicators

6.2.1 Change in wetland extent

The extent of wetland habitat types across the Region will be monitored. This monitoring will tell us if we are holding the line or if we are continuing to lose wetlands.

The area of all known wetlands will be mapped in GIS at 1:5000 scale or smaller, based on the extent of wetland vegetation. This kind of mapping will be carried out every five years and the differences in the areas mapped calculated. This information will be included in future state of the environment reports.

In the future, determination of hydrological and vegetative extent may be able to be done digitally, using satellite imagery or aerial photography. At present, the technology is not available and we are mapping the areas by hand using aerial photographs and ground referencing work.

6.2.2 Number of wetlands fenced to keep out stock

Grazing, especially by cattle has a major impact on wetlands. The number of wetlands that are fenced to exclude grazing is a simple indicator of wetland protection.

6.2.3 Number of wetlands that are impacted by surrounding land usage

Some land uses, such as intensive agriculture and horticulture, can threaten wetlands by elevating nutrient levels entering the wetland and by diverting water away from the wetland. We will report on the number of wetlands whose surrounding land use means they are threatened by agricultural pollutants, or by stormwater in urban areas.

6.2.4 Number of wetlands that are protected by a buffer zone

A buffer zone protects a wetland from outside influences. A buffer zone generally consists of a strip of land around the wetland that contains dry land vegetation. Without a buffer zone the outer edge of the wetland is compromised. A buffer zone is particularly important to the survival of small and sensitive wetlands. We will monitor the number of wetlands that have an intact 'buffer zone.

6.2.5 Number of wetlands with damaged hydrology

Wetlands are vulnerable to changes in their hydrological regime. That is, changes to water levels and their natural cycles of flooding and drying. Damage to hydrological regimes occurs at two levels:

- Wetland level including drains, earthworks, stormwater discharges, and flapgates; and
- Catchment level, including over extraction of surface water or groundwater, impervious surfaces and flood protection works.

We will measure and report on the level of damage to wetlands' hydrological regimes.

6.2.6 Number of wetlands whose viability is threatened by weeds and pests

A number of our wetlands are now dominated by non-native species and, in some cases, the long-term viability of the wetland is threatened by their

presence. Greater Wellington's Biosecurity Department already monitors wetlands for the presence of wetland weeds included in the Regional Pest Management Strategy (RPMS). Other weeds that threaten wetland viability will be monitored and assessed for future control.

6.2.7 The amount of community voluntary action and care group participation in restoring wetlands

The condition of wetlands will not improve without the co-operation and action of private landowners. We will monitor the percentage of priority wetlands being covenanted, and which organisations hold those covenants.

The work of volunteers participating in the recovery of public wetlands can also be measured.

7. References and further reading

Department of Conservation (2000) *Lake Wairarapa Wetland Action Plan 2000 – 2010*. Department of Conservation. Wellington.

Ministry for the Environment (1997) *State of the Environment Report*. Wellington.

Fuller (1993) *Wetlands in the Wellington Region*. Wellington Regional Council. Wellington.

Mitsch, WJ and Gosselink JG. 2000. *Wetlands* (3rd Ed). John Wiley and Sons.

Moore, P.J., Ogle, C.C., and Moynihan K.T. (1984) *Habitat requirements of wetland birds in the Lake Wairarapa Wetlands, Wellington*. New Zealand Wildlife Service, Department of Internal Affairs. (Occasional Publication/New Zealand Wildlife Service, no. 5)

Patterson, M and Cole A. (1999) *Assessing the Value of New Zealand's Biodiversity*. Massey University. Palmerston North.

Stephenson, G.K., B.Card, A.F.Mark, R.McLean, K.Thompson, R.M.Priest.1983. *Wetlands: A diminishing resource*. A report for the Environmental Council. National Water and Soil Conservation Organisation. Water and Soil Miscellaneous Publication, No. 58. Wellington.

Tanner, C.C. (1992) A review of Cattle Grazing effects on Lake Margin Vegetation with Observations from Dune Lakes in Northland, New Zealand. *New Zealand Natural Sciences* 19: 1-14.

8. Glossary

a) Wetland

The Resource Management Act 1991 defines wetlands as “permanently or intermittently wet areas, shallow water or land/water margins that support a natural ecosystem of plants and animals that are adapted to living in wet conditions”. They may be saline or freshwater, with or without areas of open water.

Within this definition, ecologists identify wetlands as falling into four main types. These are palustrine, lacustrine, riverine, and estuarine. Whether these wetland types are provided for by Greater Wellington is stated in Table 1 below.

Table 1: Wetland types

Wetland Type	Description	Covered by this Action Plan?
Palustrine	Wetlands with emergent wetland vegetation (e.g. swamps, bogs, and fens).	Yes
Lacustrine	Wetlands with open water (e.g. lakes, ponds, pools)	Yes
Riverine	Wetlands with flowing water (e.g. streams, rivers, canals)	No. Covered by the Riparian Strategy.
Estuarine	Wetlands with alternating salt and freshwater. (e.g salt marshes, estuaries, lagoons)	Partly. Generally wetlands above the Coastal Marine Area, such as salt marsh, are covered by this plan. Areas in the Coastal Marine Area (such as cockle beds) are not addressed.

b) Wetland creation

Wetland creation is the construction of a wetland in an area *where no wetland existed in the past*, and where it is isolated from existing wetlands.

c) Wetland enhancement

Wetland enhancement is the modification of a wetland to produce conditions that did not previously exist. Although enhancement implies a positive change, some features may be lost. For example, increasing the area of deep water by excavating parts of a wetland will provide more duck habitat, but may decrease foraging and cover for young fish.

d) Wetland hydrology

Wetlands continually receive or lose water through evaporation, rain, streams, and groundwater. For each wetland, the proportion of water gained and lost from different sources is different. Wetland hydrology is the single most important determinant of the establishment and continuation of wetlands and wetland processes (Mitch and Gosslink, 2000).

e) Wetland protection

Wetland protection is removing threats to, or preventing the decline of, a wetland. Activities include securing legal protection through covenants, repairing fences, monitoring wetlands for new weeds and controlling them before they establish.

f) Wetland rehabilitation

The aim of wetland rehabilitation is to return the wetland to a healthy, self-sustaining and functioning condition, but not necessarily how the wetland was in the past. Rehabilitation activities include restoring natural hydrological regimes, fencing, replanting and controlling weeds and pests.

g) Wetland restoration

Wetland restoration is returning a wetland to how it was in the past, before substantial land clearance and development. 'Restore' and 'restoration' are more commonly used and understood than 'rehabilitate' and 'rehabilitation'. Restore is used in this Action Plan in cases where strict restoration (that is returning the wetland to its original condition) may not be possible.

Appendix 1: Wetlands on land owned or managed by Greater Wellington

1. Pencarrow Lakes, East Harbour Regional Park

The lakes and wetlands at Pencarrow head are nationally significant. The Department of Conservation manages the Pencarrow Lakes (Kohangapiripiri and Kohangatera) as a Wildlife Management Reserve. Hutt City Council manages the esplanade reserve around the lakes and Greater Wellington manages the land surrounding the lakes and esplanade reserve (the Lakes Block). Large portions of the headwaters to the lakes and the wetlands are in private ownership.

These wetlands are some of the largest in the Region; Lake Kohangapiripiri has 13 hectares of open water with about 43 hectares of associated wetlands and Lake Kohangatera has 17 hectares of open water and around 150 hectares of associated wetlands. The wetlands and beaches support largely indigenous plant communities, some of which are regionally threatened. The lakes, wetland, beaches and surrounding area provide habitat for a range of bird, fish, and insects, some of which are rare.

a) What we are doing now

Greater Wellington is managing the environmental values of the Lakes Block with both the City Council and Department of Conservation (DoC). We are investigating weed control in conjunction with DoC and discussing options for long-term sustainable management of the area. DoC has prepared '*Pencarrow Lakes: Conservation Values and Management*' which provides an assessment of the area's conservation values and management recommendations.

Greater Wellington is reviewing its management plan for East Harbour Regional Park (including the Lakes Block). We have developed a concept development plan for the Lakes Block. This includes retiring stock from the area, allowing large areas of existing farmland to regenerate or actively revegetating parts, and developing walking tracks around the Block.

We are also talking to DoC and Hutt City about taking over the management of the following areas:

- the Hutt City Esplanade Reserve around the lakes; and
- the Department of Conservation's small Lighthouse Reserve.

Greater Wellington recently completed a fish survey of the Pencarrow Lakes. The results of this survey indicated that eel numbers were unusually low and that the culvert at the head of Lake Kohangatera may be limiting fish passage. This is being followed up by DoC.

b) What we would like to do

- stop grazing when the grazing licence expires October 2003 to enable the area to regenerate; and

- actively revegetate important areas and undertake weed control; and
- protect the wetlands and riparian areas flowing into the lakes.

Like all proposals on regional parks, feedback will be sought as part of the Parks Management Plan review.

2. Orongorongo Montane Wetland, Wainuiomata/Orongorongo water collection area

The Orongorongo wetland is the most pristine wetland of significant size in the greater Wellington Region. This high altitude wetland is on a terrace beside the Orongorongo River, within the Wainuiomata-Orongorongo Water Collection Area. It is surrounded by high quality forest. The primary species present in the wetland are manuka, sedges, swamp coprosmas and kahikatea.

a) What we are doing now

Current management of the wetland and adjacent forest includes:

- possum control (part of a 5-year 1080 control program);
- ungulate control – intensive goat, deer and pig control since January 2000; and
- research - wetland vegetation, snail populations and moth species (undertaken by staff and students at Victoria University).

b) What we would like to do

- a hydrological survey to determine wetland age and wetland hydrology;
- continue to protect the wetland from introduced animals and plants; and
- continue to encourage research by Victoria University including research on the age and hydrology of the wetland frog species and more insect work.

Care needs to be taken to avoid long-term impact on the wetland through trampling during research activities. These effects may be minimised by limiting the number of people allowed in the area at any one time.

3. Ladle Bend Wetland, Pakuratahi Forest

The Ladle Bend is a 1.5 hectare rain fed bog. The wetland catchment is largely in pine trees. The dominant plant in the wetland is manuka overtopping smaller wetland plants that are adapted to low nutrient conditions. The wetland contains 49 species of native plants. There are few exotic species in the wetland apart from some small patches of gorse, although the perimeter of the wetland contains large areas of blackberry.

The wetland provides regionally significant habitat for invertebrates; there are twelve species of native land snails living in the wetland's leaf litter.

a) What we are doing now

Greater Wellington did some restoration plantings in June 2000 in the logged area uphill of the wetland. We will continue to monitor and weed the plantings where necessary. We are also undertaking a research project on the viability of nursery-grown seedlings versus natural re-growth.

Possums are controlled in this area as part of the Mangaroa Block Tb program. Recreational hunting occurs in the surrounding area and some contract hunting of goats will be funded each year. The rangers also undertake pest control of possums, rabbits, hares, goats and deer in the area.

Weeds are a problem, especially blackberry, though the wetland itself is relatively weed-free. Self-seeding pine trees may also become a problem in drier parts.

b) What we would like to do

- continue current pest animal and plant pest control;
- monitor restoration plantings; and
- record nutrient levels in the water to determine if there are any effects from adjacent land uses.

4. Whakatikei, Martins River, Valley View wetlands, Akatarawa Forest

The three Drapers Flat wetlands are relatively small in size and dominated by raupo. A four-wheel drive track has been built between on the edge of one of the wetlands altering its hydrology.

Martins River ephemeral wetland is a natural Kahikatea Swamp containing sedges, swamp coprosma, and other small divaricating shrubs. A botanical survey of the wetland was completed in 2003.

There are several other small wetlands in the Akatarawa Forest:

- Valley View ephemeral wetland planted with exotics by the Farm Forestry Association, also containing manuka and sphagnum moss;
- Hukinga; and
- Western Whakatikei, which has kahikatea around the fringes, toetoe, sedge species.

a) What we are doing now

Possum control has been completed in Drapers Flat and Western Whakatikei (1996 and 2001), Martins River, Hukinga and Valley View (1997 and 2002) as part of a 5-year 1080 possum control rotation. There is recreational hunting in the forest and a professional operation is planned for goats in 2003. Weeds in the forest have been mapped and some control of wilding pine species is planned.

b) What we would like to do

- continue animal control and undertake more intensive plant control;

- continue to advocate for fencing of neighbouring boundaries to minimise stock intrusion;
- undertake some weed control; and
- research the wetlands' hydrology and take any remedial steps identified as appropriate.

5. **Queen Elizabeth Park Wetlands**

Queen Elizabeth Park contains large areas of peat land drained years ago for farming. The Park Management Plan provides for some of these areas to be fenced off and retired from grazing. Greater Wellington set aside money for wetland restoration in the Park, along with money for restoring a lowland forest remnant (in association with Kapiti Environment Action and Forest & Bird) and dune restoration in the Park.

a) **What we are doing now**

Around 17 hectares of wetland in the southern portion of the Park has been fenced off to protect an ephemeral wetland containing a nationally rare native grass. There are two small water bodies that retain water most of the year. We have undertaken a wetland restoration design and associated hydrological study for this area of wetland. There has been some planting in the area and we are doing some plant and animal pest control, although further work is needed.

We are planning to excavate one of the small water bodies to enlarge it, then plant it with wetland species. In addition to this, we will need to do further plant and animal pest control. We are monitoring water levels in the area and may do further hydrological studies in the future.

Some of the wetland restoration will be funded by Transit to mitigate the loss of wetland that is happening as a result of the State Highway 2 upgrade.

b) **What we would like to do**

There are large areas of peat land still being farmed in the northern area of the Park. Subject to the outcome of the up-coming Park Management Plan review, we would like to gradually retire further areas of former wetland and restore them. This is a long-term objective.

6. **Poplar Avenue Wetland (also in Queen Elizabeth Park)**

In 2000, Greater Wellington acquired a small peat wetland near Poplar Avenue. Growing in the wetland are manuka, sedges, and swamp fern. The northern end of the wetland beside to the road is infested with plant pests.

a) **What we are doing now**

In 2002 the wetland was fenced off from stock and the park ranger has prepared a re-vegetation plan for the surrounding land. A botanical survey of the site has been conducted and the wetland will be surveyed for mudfish. We are currently controlling pest plants in the wetland, but will need to increase

our level of funding in the area to tackle the dense infestations of willow and Japanese honeysuckle at the northern end.

b) What we would like to do

- prepare a five-year pest plant plan for the wetland and implement the plan;
- work with KCDC and other neighbouring landowners to advocate for pest plant control on their adjacent land; and
- Start a re-vegetation programme around the wetland.

7. Swampy Gully, Battle Hill Farm Forest Park

Greater Wellington is restoring a wetland in Swampy Gully, Battle Hill Farm Forest Park. This area was drained many years ago for farming, however a small ephemeral wetland remains at the top of the valley. The project involves creating wetland habitat and stabilising the earthflows in Swampy Gully. Three small earth dams create ponds and associated wetlands on the main stream through the Gully, and two small earth dams create ponds on a subsidiary branch of the stream. The project has created around 8300 square metres of wetland and around 5.2 hectares of valley floor and hillside, as well as protecting the small ephemeral wetland.

Interpretation signs are being developed for this wetland, as part of the development of a self-guided walk. The walk also passes an area of streamside planting on the Horokiri Stream, and a small wetland seep that has been fenced off and planted in 2001 to improve water quality.

a) What we are doing now

The earthworks have been completed and a planting programme will take place over the next few years. The walkway and signage will be completed by 30 June 2003.

8. Sledge Gully Wetland, Wainuiomata Recreation Area

There is a very small wetland in the Wainuiomata Recreation Area near the Sledge Track. It contains sedges and flax species, along with a range of introduced grasses and rushes.

a) What we are doing now

A partnership with local Iwi has been initiated and traditional flax cultivars suitable for weaving have been planted in the area by local school children. These flaxes will be cared for and harvested by the Iwi. School groups will also be encouraged to plant other species around the site. There are no plans to do further research or work on this wetland.

8.2 Old Wainuiomata Dam

The Wainuiomata River was dammed in the late 1800s to create a public water supply. The lower dam was decommissioned in 1911 when a larger dam was

built upstream. At present, the river flows through the dam's open scour valves and only forms a large water body during floods. There is funding proposed in 2003/2004 to investigate reinstating the lake created by the dam and to develop the area as a wetland.

9. Otaki River Mouth

The natural values of this site have been enhanced by:

- formalising vehicle access;
- removing weeds and replanting in two community planting days; and
- erecting signs to inform the community of the work.

The Friends of the Otaki River are looking to continue work enhancing this site.

Appendix 2: Wetland Action Plan funding requirements

Table 1: Wetland Action Plan funding requirements*

Description	Funded Department	2002/2003	2003/2004	2004/2005	2005/2006
Battle Hill Wetland Restoration (demonstration project)	Regional Parks – Landcare Division	\$10,000	\$6,000	\$10,000	\$5,000
Queen Elizabeth Park wetland	Regional Parks – Landcare Division	\$13,707	\$41,000	\$17,000	\$15,000
Orongorongo Montane Wetland	Regional Parks – Landcare Division		\$6,000 (research wetland hydrology)	\$3,000 (research)	\$3,000 (research)
Pakuratahi Ladle Bend Wetlands	Regional Parks – Landcare Division		\$3,000 (weed control and research)	\$2,000 (weed control)	\$2,000 (weed control)
Akatarawa Forest Wetlands	Regional Parks – Landcare Division				\$6,000 (investigation into Martins River)
Wainuiomata Lower Dam. Investigation/development of wetland/fish passage.	Utilities		\$50,000		
Hydrological Investigations	Resource Investigations (Environment Division)		\$5,000	\$5,000	\$5,000
Wetland Advisory Service	Resource Policy (Environment Division);	\$50,000 (development of resources)	\$40,000 (grants and subsidies)	\$40,000 (grants and subsidies)	\$40,000 (grants and subsidies)
Wetland KNE Programme (new KNE sites, to be identified as part of database project, and maintenance of existing KNE areas)	Biosecurity, Wairarapa Division.		\$25,000 (add one new KNE site)	\$25,000 (add one new KNE site)	\$25,000 (add one new KNE site)

* subject to consideration through the Long Term Council Community Plan