wetlandfacts

No.2

Auckland Regional Council
TE RAUHITANGA TAIAO

Wonderful Wetlands

Wetland Restoration and Planting Guide for the Auckland Region

Wetland ecosystems are under threat in New Zealand with less than 10% remaining.

Do you want to help restore and protect these unique ecosystems?

You may wish to create or restore a wetland to encourage native plants and wildlife, to maintain water quality or for aesthetic reasons. With all restoration efforts, the aim should be to keep it simple. The goal should be a wetland that takes care of itself with little effort from you.

This factsheet provides a guide to restoring wetlands in the Auckland Region. It includes useful planting tips and a guide to what to plant, where and how. It also includes lists of plants suitable for planting in wetlands in the Auckland region.

We hope this guide will provide you with the information you need and, most importantly, with inspiration and motivation!

Important Things to Consider

- Fencing – keep stock out of the wetland. Often putting a fence around a wetland is all you need to do. Nature will do the rest!
- Restore the edges of the wetland with a buffer of native plants. This buffer planting will help to protect the wetland, act as a filter for runoff from surrounding land and provide habitat for wetland birds.
- Restore natural water levels and flows. Most native wetland plants should come back themselves once natural water levels are restored and stock are excluded. Check for any artificial obstructions to the passage of native fish. It is important that any major work, such as removing drains or artificial obstructions e.g. culverts, is done before any restoration planting is undertaken, so that new wetland plants can establish and then be left to adapt naturally to the water levels in the wetland. Artificial drains can also be left to silt up over time, and water flows encouraged to find their natural path. You may need a Resource Consent if you are doing any works in a watercourse or wetland. Seek advice from the Auckland Regional Council (ARC) about consent requirements and allowing for fish passage.
- Control weeds and pests such as willow - the Biosecurity team at the ARC can provide advice.
- The aim is to restore natural wetland systems. The creation of artificial ponds and open water bodies is not recommended. They can be difficult to keep free of weed and algae in summer and their growth may block fish access. Most native birds prefer swampy areas with rushes, raupo or flax rather than deep open water.
- Talk to your neighbours. Let them know what your plans are. Maybe you can each work on sites that can then be linked to increase the area of wildlife habitat and provide wildlife corridors.

Follow the flowchart below to find out how to do it...

Decide what you want and what suits your situation- look at what is growing in other wetlands around your area

Seek advice from ARC and others

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Get your water levels right

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Fence your wetland

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Prepare a restoration plan

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Begin weed and animal pest control

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Follow your restoration plan.
Keep weeds and animal pests under control!

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Think about long-term protection of your wetland through a covenant such as QEII Trust Covenant or Nga Whenua Rahui

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Enjoy your wetland!

Huutia te rito o te harakeke kei hea he korimako e koa

"Pull out the young shoot of the flax and where will the bellbird sing"

What are Wetland Plants?

Wetland plants are adapted to living with wet feet. Many have special adaptations such as buttress roots, hollow stems and aerial roots to cope with anerobic soil conditions. Different species of wetland plants are adapted to living with different water level tolerances. For example, raupo, kuta, *Baumea articulata* and kapungawha are adapted to living in standing water and on the edges of stream channels and lake edges. Other species such as *Baumea rubiginosa* and *Juncus gregiflorus* will grow around the swampy margins or in swamps with lower water levels. Wetland species adapted to saline environments include oioi, salt marsh ribbonwood, mangroves and sea rush. Other species will grow in brackish areas, at the interface between salt and fresh water, e.g. marsh club rush and *Baumea juncea*. Wetland plants are very adaptable and many will regenerate naturally if water levels are right and stock grazing pressure is removed from an area. You will be surprised how quickly a wetland can recover with a little care.

Preparing a Restoration Planting Plan

The following guide provides ideas on what to plant in a wetland. Before preparing a restoration plan you need to assess what is already there and decide what needs to be planted. All you may need to do is fence the wetland and then let it restore itself naturally.

Some check points:

- Refer to the species lists given in this fact sheet and check the tolerance limits for each species.
- Choose plants characteristic of your wetland. Look at other wetlands in your area to see what grows there. Be aware that some of the plants may be plant pests, or may have been planted but do not naturally occur in the area. Contact the ARC for advice on plant pests.
- Buy native plants from nurseries that source plants from your district, to ensure they are suited to your area's climate and soils
- You may be able to grow some of your plants from seeds or cuttings taken from neighbouring wetlands – always seek permission before taking any plant material.
- Refer to ARC's Riparian Zone Management Guidelines (TP148) for further information.

Timing

Plant wetland edge species and riparian plants in autumn. Depending on soil moisture, in many parts of Auckland you can plant throughout autumn, winter and spring. Concentrate on establishing pioneer vegetation first with species such as manuka, flax and cabbage trees. These plants will act as a nurse crop to shelter other species that can be planted later, or that will establish naturally (e.g. kahikatea, pukatea, putaputaweta, kowhai, tree ferns and nikau). If your area is susceptible to frosts, plant frost sensitive species in spring.

Plant wetland species that grow in standing water and swampy ground at the end of summer, when the water levels are low.

Site Preparation and Planting

1. The most important thing is to fence your site prior to planting. Remember that many native plants are vulnerable to stock grazing.
2. Clear away grass and weeds around each planting site to ensure the new plants get enough light and nutrients.
3. Set plants out in sites suitable to their growing requirements leaving space for them to grow. Ferns, rushes and small sedges can be planted 50cm apart. Larger plants can be placed 1m apart. Large tree species (e.g. kahikatea) need more room – plant them 5m apart in amongst nurse species.
4. Plan your planting in small stages – it is easier to maintain smaller areas.
5. Dig a hole larger than the plant container. Loosen the soil at the bottom of the hole, to allow the roots to penetrate the soil more easily. Place the plant in the hole, gradually add soil to the hole and firm the soil well around the plant after the hole is filled.
6. Form a hollow around the base of the plant to trap rainfall on dry sites. Give the plants and surrounding soil a good watering and remember to water young plants over dry spells.

Staking the plants at this stage will make them easier to locate later. Tall, thin bamboo stakes highlighted with spray paint are ideal.

Refer to the ARC Riparian Management Guidelines, the Good Start Guide and other ARC fact sheets on restoration planting for more information.

Clear all weeds from your planting site. Dig a hole deeper and larger than the root ball of your plant

Place the plant in the hole and fill the hole with soil to the height shown above. Press gently around the plant.

Water well because a good soak will help the plant to get established

Put mulch, compost and/or bark chips around the plant, not touching the stem.

Width of Riparian Planting

A 10m minimum riparian buffer width either side of a stream or wetland system is recommended. However, this will be dependent on the practicalities of your site. Refer to the ARC Riparian Management Guidelines (TP 148) for further information.

More Planting Tips

- For a higher chance of survival, use larger plants. They are also less likely to be uprooted by pukeko.
- Set your plants out in groups. The plants will soon shelter each other and begin to shade out surrounding weeds, making your job easier. More plants can be added to the edge of your planting as time and resources permit.
- In poor soils, a slow release fertiliser can be added.
- On dry sites, mulch around the plants will help conserve water, keep weeds down and provide nutrients.
- Fast growing plants such as manuka, kanuka, karamu, cabbage trees and flax can be used as nurse plants to provide shade for seedlings underneath.
- You may find native plants popping up on their own once the stock has been removed from the site. Plants like flax attract birds such as tui, and they will bring seeds of other species into the site for you.
- Most plants listed as tolerant of standing water, including rushes and sedges, kahikatea, cabbage trees, swamp maire and pukatea, must first be planted in moist conditions before becoming flooded. The best time to plant these species is near the end of summer, when water levels are lowest. This is particularly important for nursery raised plants that have not been subjected to waterlogged conditions.
- If your site is very wet you can build low (20-30 cm) mounds to plant the young plants on. This will keep their roots above water until they have become used to the local conditions.
- After 3-5 years, your plantings should take care of themselves and you can sit back and enjoy your wetland.
- Keep a photographic record as you go to remind yourself how much you've achieved.

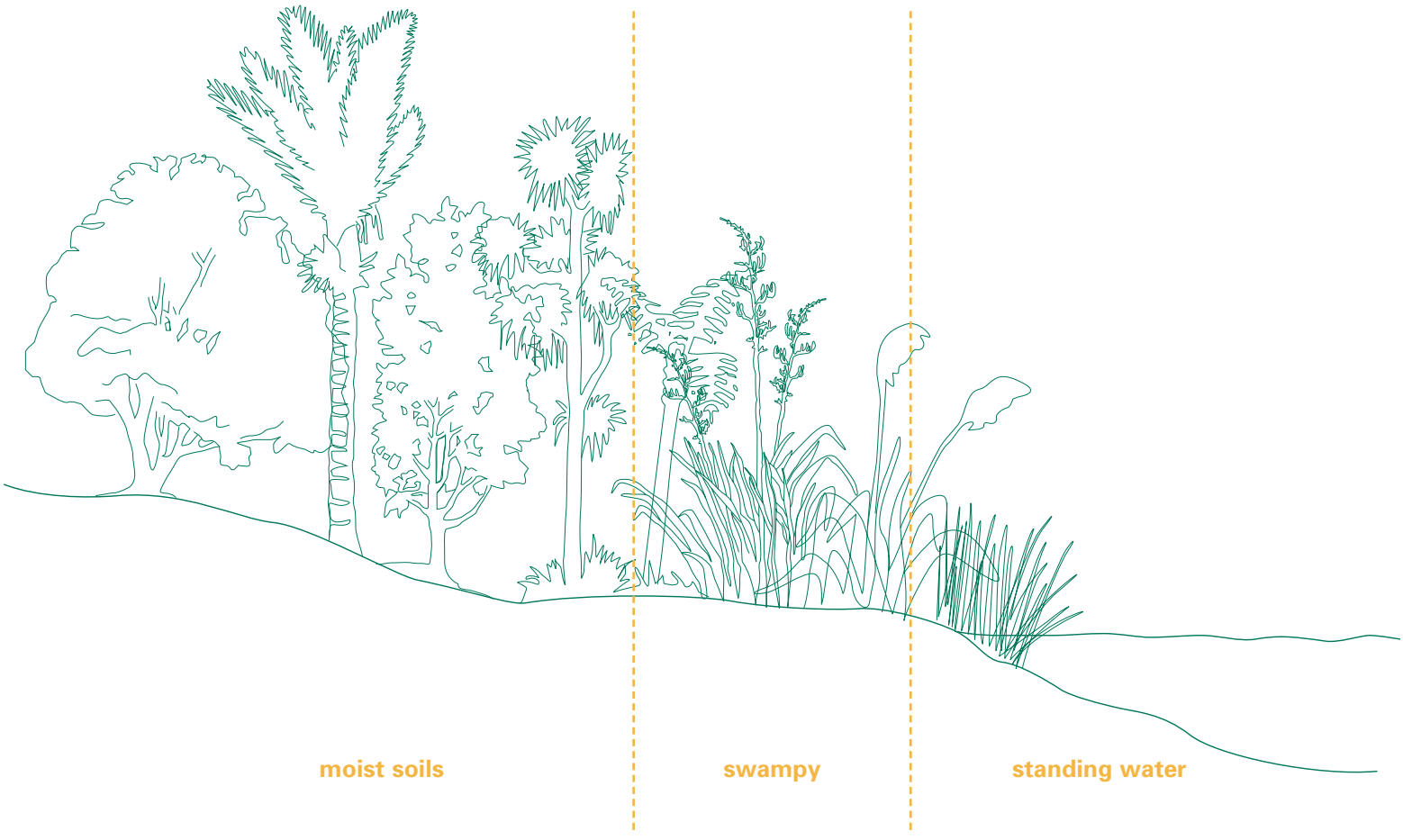
What to Plant & Where?

The following lists provide a guide to the typical plant species that live in and on the edges of wetlands in the Auckland Region. It also provides a general guide as to what to plant and where.

The lists have been divided into different zones around a wetland, depending on the distance from the edge of areas of open water and on the depth of the water table. A separate list is also provided for saline (saltmarsh) wetlands. Different wetland plant species are adapted to living in these different zones. These zones can been identified as:

- Moist soils around the edge of wetlands and in riparian zones.
- Swampy areas with temporary flooding.
- Standing water - where water lies above the soil surface for much of the year.

It should be noted that wetlands do not always have areas of open water. Some wetlands may only be temporarily wet, e.g. over winter.



If you are restoring an existing wet area you may not need to plant many wetland species. Wetland plants will often establish naturally once water levels are restored and stock is removed. Nature will work its own magic!

Site specific information on soils, topography, what is growing in the local area and historical information on what would have originally grown there, can be useful when developing a restoration plan. Contact the Natural Heritage Team at the ARC for information and advice.

ARC's Riparian Zone Management Guidelines (TP148) provide excellent information and planting lists for stream banks and the edges of wet areas. A riparian buffer will help to protect your wetland.

Moist Edges

Scientific name	Common name	Type of plant	Tolerances
Carpodetus serratus	putaputaweta	Small tree	Grows in swamp forests and riparian areas.
Coprosma robusta	karamu*	3m shrub	Fast-growing shade tolerant species. Can be used as a nurse crop. Pioneer.
Cordyline australis	cabbage tree*, ti kouka	8m tree	Tolerates wet and dry soils. Hardy.
Cortaderia fulvida	toetoe*	1.5m grass	Native toetoe (not pampas). Pioneer. Damp and dry soils, can grow on poor soils.
Dacrycarpus dacrydiodes	kahikatea*	60m tree	New Zealand's tallest tree. Plant with shelter in a moist site.
Hebe stricta var. stricta	koromiko	2m shrub	Very hardy. Fast growing pioneering native shrub species, fibrous roots reduce erosion. Propagate by cuttings or seed. Possum hardy.
Laurelia novae-zelandiae	pukatea	30m tree	Slow growing. Tolerates wet sites and periodic flooding.
Leptospermum scoparium	manuka*	4m tree	Grows vigorously and has a wide ecological tolerance, including the ability to colonise inhospitable, low fertility sites and the lower slopes along brackish streams. Needs to be planted in autumn with minimal root disturbance during planting.
Macropiper excelsum	kawakawa	2m shrub	Common understorey species in coastal forests and riparian areas. Frost tender, likes sun or shade.
Melicytus ramiflorus	mahoe*	7m tree	Best planted in autumn. Common in young riparian vegetation throughout the region. Very fast growing once established. Good nurse crop and excellent for erosion control.
Phormium tenax	harakeke, flax*	2m monocot clump former	Very hardy. Tolerates wet and dry soils. Forms large clumps.
Rhopalostylis sapida	nikau	10m palm	Grown from seed. Slow to germinate. Wind sensitive.
Schefflera digitata	pate	3m tree	Grows rapidly in damp shaded sites. Highly palatable to possums & rabbits.
Sophora microphylla	kowhai	6m tree	Fast growing, semi-deciduous. Can be grown from seed or cuttings. Useful for erosion control.

* Pioneer species. Useful to plant as an initial nurse crop.

Boggy/Swampy Areas

Scientific name	Common name	Type of plant	Tolerances
Baumea rubiginosa		0.9m sedge	Swamps, bogs, lake margins
*Blechnum minus**	swamp kiokio	0-5m fern	Tolerates some frost and sun. Not tolerant of wind. Found in flax and sedge swamps and under manuka scrub.
Bolboschoenus fluviatilis	Marsh club rush, kukuraho, purua	1.5-2m tall sedge	Margins of streams, swamps, mainly coastal.
Carex geminata	rautahi	1m sedge	Lowland swamps.
Carex lessoniana	rautahi	0.5m sedge	Lowland swamps.
Carex secta	purei, makura	2m sedge	Shallow open water, swampy areas.
Carex virgata	purei, makura	1m sedge	Swampy areas.
Carpodetus serratus	putaputaweta	Small tree	Grows in swampy ground, riparian areas
*Coprosma tenuicaulis**	Swamp coprosma, hukihuki	3m shrub	Found in bogs or swamps, its black fruit attracts birds.
Cortaderia fulvida	toetoe	2m grass	Native toetoe (not pampas). Pioneer. Damp and dry soils, can grow on poor soils.
Cordyline australis	cabbage tree, ti kouka	8m tree	Tolerates wet and dry soils. Hardy.
Cyperus ustulatus	toetoe upoko tangata	0.8m sedge	Open damp places, may grow in 10cm of standing water, coastal and lowland.
Dacrycarpus dacrydiodes	kahikatea	60m tree	New Zealand's tallest tree. Plant with shelter in a moist site.
Eleocharis acuta	Sharp spike sedge	0.9m sedge	Stream margins, swampy areas.
Gahnia xanthocarpa	tupari maunga	2-3m tussocky sedge	Leaves very harsh. Lowland bogs, swamp forest.
*Gleichenia dicarpa**	waewae kotuku, tangle fern	0.5m fern	Low fertility damp wetlands, often with manuka.
Isolepis prolifer	clubrush	0.5m sedge	Edges of pools, streams, swamps
Juncus gregiflorus Juncus sarophorus	rushes, wiiwii	1-2m tall rushes	Swampy ground
Laurelia novae-zelandiae	pukatea	30m tree	Slow growing. Tolerates wet sites and periodic flooding.
Leptospermum scoparium	manuka	4m tree	Grows vigorously and has a wide ecological tolerance, including the ability to colonise inhospitable, low fertility sites and the lower slopes along brackish streams. Needs to be planted in autumn with minimal root disturbance during planting.
Phormium tenax	flax, harakeke	2m	Very hardy. Tolerates wet and dry soils. Forms large clumps.
*Schoenus tendo**		2m sedge	Tall, sprawling sedge. Common in damp or infertile manuka scrub and gumland.
*Syzygium maire**	maire tawake, swamp maire	30m tree	Red berries, develops breathing roots in waterlogged soils.

**Species that occur naturally in wetlands but may be difficult to source or propogate.*

Standing Water

Scientific name	Common name	Type of plant	Tolerances
Baumea articulata	jointed twig rush	1.8m sedge	Grows in 0-30cm of water, around edges of dune lakes, streams and open water.
Carex secta	purei, makura	2m sedge	Shallow open water, swampy areas.
Carex virgata	purei, makura	1m sedge	Swampy areas.
Cyperus ustulatus	toetoe upoko tangata, (giant umbrella sedge).	0.8m sedge	Open damp places, may grow in 10cm of standing water, coastal and lowland
Eleocharis sphacelata	bamboo spike sedge, kuta kuta	1m sedge	Grows in up to 0.5m water, margins of lakes, open water.
Myriophyllum propinquum	water millfoil	Aquatic herb	Submerged, tolerates temporary drying. Wildlife and fisheries value. Shallow to 3.5m water depth.
Potomogeton cheesmanii	red pondweed, manihi	Aquatic herb	Sheltered water, up to 4m deep, bottom rooted with floating leaves, tolerates temporary drying. Wildlife value.
Schoenoplectus tabernaemontanii	kapungawha, lake clubrush	1-2m sedge	Margins of lowland lakes, streams and ponds, both freshwater and brackish. Grows in shallow water.
Typha orientalis	raupo	1-3m herb	Grows in up to 1m depth of water, edges of lakes and streams, swampy areas.

Saline (saltmarsh) Wetland Plant Species*

Scientific name	Common name	Type of plant	Tolerances
Apodasmia similis	oioi, jointed wire rush	1.5m rush	Bordering saltmarshes and estuaries, or in dune hollows on coast. Distinctive grey-green, orange, purple, rainbow colouring.
Avicennia marina var. resinifera	mangrove	8m tree	Common in estuaries and tidal creeks.
Baumea juncea		1m sedge	Coastal areas, lowland swamps, saltmarsh
Bolboschoenus fluviatilis	marsh clubrush, kukaraho, purua	1.5m sedge	Margins of coastal streams, brackish water.
Cotula coronopifolia	bachelor's button	Fleshy herb	Wet hollows, banks, ditches, estuaries and swamp margins.
Isolepis nodosa	knobby clubrush	0.5m rush	Coastal banks, dunes, sometimes wet ground
Juncus krausii var. australiensis	sea rush	1m rush	Damp sand, saltmarsh and estuary margins
Leptospermum scoparium	manuka	4m tree	A very widespread shrub, coastal to subalpine in many habitats, dry to wet, often fringing lakes, in swamps and bogs. An important pioneer in many plant successions.
Olearia solandri	coastal shrub	2m shrub	On edges of saltmarsh.
Phormium tenax	harakeke, flax	2m monocot clump former	Throughout lowlands, swamps and many other open habitats, coastal areas.
Plagianthus divaricatus	saltmarsh ribbonwood, maakaka	2m shrub	Coastal, along margins of salt marshes and estuaries near top of tidal range, in dune hollows and coastal gravels.
Samolus repens	sea primrose, maakoako	Sprawling herb	Coastal salt marshes, banks and cliffs.
Sarcocornia quinqueflora	glasswort, ureure	Succulent herb	Saltmarshes and salt meadows.
Selliera radicans	remuremu	Creeping herb	Coastal in salt marshes, turfy banks, and dune hollows.

**Most saltmarsh plants do not need to be planted but will establish naturally if saline intrusion is restored.*

Weeds and Pests

Maintain plantings by clearing weeds around them for 3-5 years until your plants are well established. Pests such as rabbits and possums will need to be controlled, particularly during the seedling stage.

To find out more about weeds and pests, contact the ARC's Biosecurity team or check out the information available on the ARC website (www.arc.govt.nz).

Acknowledgements

The ARC gratefully acknowledges Environment Waikato for information contained in this factsheet.

Further ARC Information and Factsheets

- Wonderful Wetlands Factsheet – No 1
- Auckland's Wetlands – Vital and at Risk
- ARC Riparian Zone Management Guidelines, 2001 (TP148)
- ARC Fish Passage Guidelines, 2000 (TP131)
- Native Forest and Wetlands – A Guide to the Care and Protection of Natural Areas.
- The Good Start Guide – Planting Guide for Volunteers.

Need More Information?

The Auckland Regional Council can provide further information on ecological restoration, plant and animal pests, consent requirements and funding opportunities.
Contact ARC Enviroline (09) 366 2000 or visit **www.arc.govt.nz**