



Native to the West

A guide for planting and restoring the nature of Waitakere City





moreimages.

Message from the Mayor

Waitakere City is blessed with a unique natural heritage. The city's landscape is stunning, dominated by native forest, and sea. At the city's heart, the Waitakere Ranges are a valued resource for the entire Auckland region. The coastline varies from rugged West Coast beaches and cliffs to the sheltered bays of the Manukau and Waitemata Harbours.

The Green Network programme encourages residents to look after the city's valuable natural assets, and allows streams, parks, patches of bush and forest to weave throughout the ranges, rural, urban and coastal areas. People are showing enormous enthusiasm towards greening the city on public and private land.

This updated planting guide builds on the success of the earlier publication and provides a valuable tool to help residents care for and restore the nature of Waitakere. Happy planting!

Bob Harvey
Mayor of Waitakere City

Produced for Waitakere City Council with funding from the Sustainable Management Fund, Ministry for the Environment.

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Cover photos by Stephen King and Diana Elliot.

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Designed by Paradigm
Printed by Business Print

Cover printed on 50% recycled card,
text on 100% recycled paper with vegetable oil-based inks.



Native to the West

A guide for planting and restoring the nature of Waitakere City



If you live in Waitakere City and want to know what native plants to grow on your property, this booklet is for you. It offers useful information, whether your patch is located in suburban New Lynn, backs onto bush in the Waitakere foothills or is within walking distance from a West Coast beach.

You may want to 'restore' a piece of land back to its original bush cover. The aim of restoring is to establish a habitat made up of plants that are as close as possible to the natural vegetation that used to grow on your property.

Or you may simply wish to create a corner for native plants in your urban garden to attract native birds.

Whatever the size and scope of your planting project, this booklet encourages you to research the ecosystem your backyard is part of, and to work out what natives are best suited to your conditions.

Use the booklet as a starting point and reference tool. You can also contact Waitakere City Council directly for advice and information. Refer to the inside back cover for helpful contacts and further reading material.



Diana

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Take a look at the big picture

Native plants are simply those plants that grew, evolved or migrated here without help from people. Nearly 80 percent of New Zealand's native plants live nowhere else in the world, and some are facing extinction.

Our own Waitakere Ranges forest is nationally important with a unique collection of native species and its own distinctive ecology. Its appearance and ecology are

entirely different from other kauri forests, especially Waipoua and Coromandel.

The more we learn about local plants, the more we appreciate what's special and unique about our place. Plants that are part of our lives are also part of our cultural heritage and identity.

The Green Network

By deciding to plant natives suitable for Waitakere City, you are doing something enjoyable for yourself but also creating a habitat for wildlife and helping grow the city's Green Network.



The Green Network programme has been underway since 1993 and is about greening up the city and enhancing, connecting, and extending existing natural areas.

The vision is to connect the Waitakere Ranges with the sea, and improve the ecological health of the city, via strands of greenery – bush, gardens, vineyards, and parks. Viewed from above, the network would look like a web of green intersecting built-up areas of the city.

Access to the Green Network might be at your front gate or your backyard. Your hedge or garden may connect with your neighbours' planting. The trees down your street might lead to a park that borders a stream. The stream may flow by a sports field, and run into a wetland and beyond into a mangrove forest, and on to the sea.

Or you may join the Green Network up in the Waitakere Ranges. The forest there meets scrubland and farm shelter belts. The paddocks of the farms merge with vineyards and orchards and these merge into neighbourhood parks and people's back gardens.

The Green Network helps increase Waitakere's biodiversity by enabling a greater number and range of creatures to live here. Having a variety of birds, fish, lizards and insects in good numbers is a sign of ecological health. Linking vegetation is especially important, as many native birds need continuous cover and access to sizeable tracts of bush as they will not fly over open or built-up areas. All native birds rely on the food that comes from native plants, including insects that live amongst these plants.

From the Green Network we also gain: great views and vistas, places to play, walk and talk, fresh air, wide open spaces and wilderness, clean water for drinking, clean surf

to swim in and stretches of nature that are good for the soul.

Our economy also relies on the 'services' provided by natural systems that are working healthily together. If a stream ecosystem is functioning well (this includes the vegetation on its banks), cleaner water then flows into our harbours. When these systems become overwhelmed or fail, economic costs go up and the quality of our lifestyle goes down.



Opanuku Stream at Corban's Art Estate, Henderson, part of the Green Net-

Refer to the contacts list for council and community projects that are expanding the Green Network.

Streamside planting

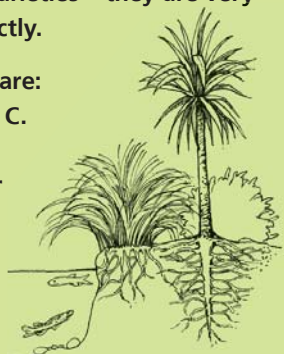
Is your place one of the hundreds of Waitakere properties with a stream running through it? These streams are vital native habitats and Green Network links. They are also often neglected and in a poor state of health.

The bush of the Waitakere Ranges protects the quality of water in streams in the upper catchment areas, but the lack of vegetation along the edges of waterways (the riparian margins) in our urban and rural areas is a major concern.

Carex is the name for the attractive native sedges that are especially beneficial planted right on the edge of a streambank. There are several varieties – they are very popular but can be used incorrectly.

The species to use in Waitakere are: *Carex lessoniana*, *C. flagellifera*, *C. maorica* for fast flowing stream edges and *C. dissita*, *C. secta* for still water edges, eg. ponds.

Refer to the reading list for more information on *Carex* and streamside planting.



By removing lawn edges and weeds and replanting even a metre either side of the stream with the right native plants, you can make a significant difference to the health of the stream's micro-ecosystem. It will also look great!



Replanting streamside:

- helps secure banks against slips and erosion
- provides a home and food source for aquatic creatures and other native animals and birds
- keeps invasive weeds at bay
- provides shade to keep water cool for stream life
- reduces flooding – appropriate plantings absorb water and improve drainage
- filters sediment from surface run-off before it reaches the stream.

For more information on streamside protection see the 'Contacts and Reading List', or contact the Council Call Centre 839 0400.

Ecosourced plants

You will have greater success with your backyard planting or larger restoration project, if you use 'ecosourced' plants.

These are plants grown from seeds that have been collected locally from a range of the naturally occurring vegetation in your area. Locally sourced plants are adapted to local conditions and frequently grow better than outside stock.

Eco-sourcing maintains the genetic diversity of local plants and helps keep the unique character of the Waitakere landscape. Although we may call them by the same name, there are often subtle genetic differences between the same types of plants from different regions. Plant species from the South Island are as alien to Waitakere as non-New Zealand species.

Ecosourced plants are of benefit in any area, including backyards, as whatever you plant will find its way (through seed dispersal by wind, water and birds) to natural parts of Waitakere. They are particularly important in areas:

- of outstanding vegetation – Green Bay cliffs and around Moire Park, Massey
- bordering streams
- close to 'wild populations' – bush properties like those on Scenic Drive and in Titirangi.

Native plants found in nurseries are not necessarily ecosourced. When buying plants, look for the council's 'ecosourced' label. Contact the council for a list of local nurseries that supply ecosourced plants.

Unwanted natives

Several plants native to other parts of New Zealand are not native to Waitakere. The following plants should not be grown as they can change the make-up or compromise the survival of local plant populations by hybridising with

Waitakere species. This may result in a dramatic change to the local identity and ecology of Waitakere forests.

- Houhere/lacebark
Keep *Hoheria sexstylosa* south of the Bombay Hills (*Hoheria populnea* is fine to plant in Waitakere)
- offshore island kawakawa *Macropiper* varieties
- Kamahi *Weinmannia racemosa*
- Kapuka *Griselinia littoralis* especially in Scenic Drive, Piha and Mountain Road areas
- Three Kings *Coprosma macrocarpa* subsp *macrocarpa* (large-fruited plant). Waitakere-sourced *Coprosma macrocarpa* subsp *minor* is ok

- Makamaka *Caldcluvia (Ackama) rosaefolia*
- Offshore pohutukawa, Tahitian (*Metrosideros collina*), and Kermadec (*M. kermadecensis*).

In the ranges and foothills – from Great North Road west to the coast – don't plant non-Waitakere:

- *Pseudopanax* (lancewood/horoeka, houpapa etc)

On West Coast and Manukau Harbour coast up to Huia avoid:

- non-Waitakere *Hebe* of any species capable of flowering in Auckland (alpine species are acceptable)
- any kowhai other than *Sophora fulvida*, the special local variety. *S. fulvida* grows west of Scenic Drive;

Gardening...eco-gardening...restoring

Imagine these three types of planting activities on a continuum with gardening at one end, restoring at the other.

Many of us love gardening. Traditional gardening methods usually aim to control and maintain nature to suit popular and personal notions of a lovely garden. Some natural processes still occur but generally we restrict them, through weeding, mulching, and the pruning or thinning of trees. We also organise plants into beds, grow specimen trees and like to keep things 'tidy' (raking etc). Often we modify ground conditions to suit chosen plants.

Think about expanding your gardening practice to incorporate eco-gardening principles. This is a way to combine a love of gardening with concerns for a healthy environment. Eco-gardening draws inspiration from the wild and seeks to maximise the benefits of nature – even in small spaces and residential areas. You can start with just one corner of your urban garden by taking the following steps:

- Cluster plants in groups (instead of as separated specimens), and keep leaf litter, old branches, and loose rocks on the ground. This will connect you to the wider Green Network (p2) and increase the potential for native birds, insects, worms, lizards, soil bacteria, fungi etc, to make a safe home and find food at your property.
- Provide green links – between such clustered plants and then to the hedge, the stream or the bush edge. This will help wildlife get safely to the homes and habitats you have provided.
- Plant species side-by-side that naturally grow together – 'natural neighbours'. Choose them not only for the form, texture, colour of the individuals but the effect they create together – refer to the plant tables p26–51.

- Use ecosourced plants native to the locale of your garden – refer to the ecosystem map p17.
- Keep your 'wild corner' free of invasive weeds.
- Doing any of the above is of benefit to the health and functioning of the Waitakere environment.

Restoring is a planting activity concerned with establishing wild vegetation and then letting nature take care of itself.

In a bush environment dense plant growth is a natural tool for inhibiting weeds. Even dying trees and dead branches contribute to the natural system by forming habitat for many other creatures. With good planning, and planting suited to the conditions, we humans can enhance or kick start these natural processes. We can also help by reducing threats to the restored habitat by removing invasive weeds and animal pests. Refer to p8 for priority areas to restore and guidelines for how to go about it.

Each part of this planting continuum has a place in our lives. Be sure to distinguish between them and choose which is appropriate where. Transferring common gardening practices into natural areas can have damaging consequences for wildlife.



Native plants provide essential food and habitat for insects and birds, even in small city spaces.

Gardening with natives



Native plants grow naturally where they 'compete' best. When they are planted outside their natural ecosystems, as often happens with gardening, they can still survive and do well because you the gardener keeps the competition at bay by weeding and pruning.

The plants listed in this section are safe to plant in all garden sites around the city. It is, however, vital to use only ecosourced plants if you are restoring bush.

The use of native plants in a garden offers so much. The big challenge is to familiarise yourself with the variety and features of available plants. You can 'pick and mix' natives or you can use them in combinations they would naturally grow in. Try some of the suggestions given below and look at the plant tables p26–51 for other ideas. There's plenty of potential to experiment. Refer to the reading list for *The Native Garden*, a book with more great ideas on this topic.

Trees for streets and gardens

Kanuka (*Kunzea ericoides*)
Hardy and fast growing. All soils suitable except boggy. Soft foliage and white flowers like a dusting of snow. An excellent landscape tree, visually softening and providing a link with the ranges.

Karaka (*Corynocarpus laevigatus*) Striking with bold, shiny foliage.

Karo (*Pittosporum crassifolium*) Naturally confined to coastal fringe.

Kohekohe (*Dysoxylum spectabile*) A striking tree with bold foliage, needing good soil. Susceptible to possum attack.

Kohuhu (*Pittosporum tenuifolium*) Use the distinctive small-foliage Waitakere form.

Kowhai (*Sophora microphylla*) A northern form belonging to Auckland and Northland. Buds and nectar bring birds to town – kereru and tui. Only plant in free-draining soils, with plenty of light. To protect the vulnerable trunk from damage from mowers, etc. plant with flax or shrubs at the base.

Check the plant tables for more information on kowhai.

Manuka (*Leptospermum scoparium*) Fast growing. Needs moist soil to grow well. Good companion plant in cluster plantings.

Miro (*Prumnopitys ferruginea*) Needs good soil to perform well. A slower growing, quality tree.

Nikau (*Rhopalostylis sapida*) A distinctive palm tree for groves and avenues. Inter-plant with other species during establishment. A long-term investment, as very slow to establish a trunk (12+ years). Needs moisture. (Note: faster growing exotic and offshore island species/varieties of palms are not appropriate in Waitakere)

Pohutukawa (*Metrosideros excelsa*) Natural range limited to narrow coastal fringe habitat. Use to reinforce natural patterns. A hardy street tree.

Ponga, silver tree fern (*Cyathea dealbata*) Drought

tolerant, slower growing.

A guide to plant heights:

Tall trees:
taller than 15 metres

Medium trees:
less than 15 metres

Small trees / large shrubs:
less than 5 metres

Shrub / flax like plants:
less than 3 metres

Grasses / sedges / rushes:
less than 1.5 metres

Low ground plants:

There are three species of kowhai found in Waitakere:

Sophora fulvida (West Coast kowhai)

Sophora microphylla (kowhai) and *Sophora chathamica*.

Plant West Coast kowhai only in areas west of Scenic Drive including the West Coast and Manukau Harbour from Whatipu to Cornwallis.



Mature native street trees (pohutukawa in this case) provide food and habitat for native birds, and character to streets.

Hedges and screens

Fine foliage screen planting:

Hangehange

(*Geniostoma rupestre*)

1–2m high

Karo (*Pittosporum*

crassifolium)

3–6m high

Kohuhu (*Pittosporum*

tenuifolium)

3–6m high

Mapou (*Myrsine australis*)

3–6m high

Totara (*Podocarpus totara*)

3–6m high

Formal low hedge (like Box):

Coprosma rhamnoides

Pohuehue

(*Muehlenbeckia complexa*)

Ramarama

(*Lophomyrtus bullata*)

Formal hedge:

Korokio (*Corokia*

buddleioides)

Bluff korokio

(*Corokia cotoneaster*)

Taupata (*Coprosma repens*)

Mamangi (*Coprosma arborea*)

Thin leaved coprosma

(*Coprosma areolata*)

Bird fodder

Harakeke (flax)

Hangehange

Kahikatea

Karaka

Karamu (*Coprosma robusta*)

Kohekohe

Kotukutuku (tree fuchsia)

Kowhai

Mahoe

Maire

Miro

Nikau

Pigeonwood

Pohutukawa

Puriri

Rewarewa

Rimu

Taraire

Tawa

Titoki

Whauwhaupaku (5-finger)

Showy flowers

From early spring to mid-summer there is a cascade of colour as a succession of trees burst into flower

Red:

Carmine rata vine Can grow as a shrub. Has large leaves. The Waitakere strain is distinct from standard horticultural stock.

Rata vine Can grow as a shrub. [Please do not grow introduced *Metrosideros* – Tahitian. Pollinated by bees and birds, the introduced forms threaten to pollinate and inter-breed with native rata and ruin our NZ heritage.]

Taurepo Grow in pots or garden.

Toropapa Grow in pot or garden. Scented.

Yellow:

Kowhai Pot or garden. Can be trimmed. Dwarf strains occur. Pollinated by birds.

White:

Pua waananga bush clematis vine (*Clematis paniculata*) The most showy of the native clematis. For results, plant with roots in the shade, and foliage in the sun. Plant with humus, peat and blood & bone.

Tree daisy (*Olearia furfuracea*) Clay tolerant. A mass of white flowers in summer. Hedge or screen use. *Olearia rani* too.

Manuka Fast-growing, hardy, colourful. Fast and inexpensive. Suitable for mass planting toward the back of a garden and interplant with special natives. Use local Waitakere manuka.

Kanuka Softly cascading foliage when in flower. A snowfall effect. Excellent landscape tree in urban areas to provide quick character and a softening effect. Use local Waitakere kanuka.

Ti kouka cabbage tree

Large flower panicles.

Perfumed plants

Karaka The ripe fruit has a distinctive smell

Pleasant forest flower scent:

Hangehange

Mahoe

Pigeonwood

Putaputaweta

Floral perfume:

Heketara

Rangiora

Karo Lightly scented, flowers October.

Toropapa Waitakere has beautiful pink and red forms with particularly good size blooms. Avoid other species or non-Waitakere stock, flowers August.

Clematis (*Clematis forsteri*) Sept-Oct. Beautiful scent, like feijoa fruit scent. Best in a rockery or a tub. Grows above Waitakere bluffs.

NZ jasmine vine (*Parsonsia heterophylla*) This one is not invasive!

Ti kouka cabbage tree

Scented foliage:

Wharangi

Mairehau

Kanuka The foliage makes an acceptable tea drink.

Kawakawa A relative of Fijian kava.



Low maintenance natives can be complemented with flowering annuals to provide additional colour.

Natural neighbours from special habitats



Some wild communities of native plants offer a distinctive look and interesting mix of plants for a garden. Listed below are examples of specific plant

groups that you could mimic in your garden. The heading for each group indicates the natural habitats where they grow in the wild.

Saltmarsh herbfield

Found beside estuaries and on bluff tops; plants are happy with salt, some with mowing, but none with trampling.

In pine bark, scoria mulch, plus a few rocks or shells:

Oioi (jointed rush)

Wonderful piupiu-type foliage

Wiwi – dark green rush

Wind grass – in rocks

Saltmarsh ribbonwood

plus native and flowering herbs such as:

Remuremu mix with others, or use alone as a courtyard lawn grown in fine, weed-free bark, not soil.

Shore pimpernel

NZ spinach (edible)

Native celery

In a setting of coastal fringe plants either:

Coastal karamu

(*Coprosma macrocarpa*)

Kawakawa

Kowhai

Wharangi

or, coastal alluvial flat plants:

Flax

Toetoe (not pampas)

Nikau

Kahikatea

Putaputaweta

Inner harbour shrub border

Kawakawa

Wharangi

Coastal karamu

(*Coprosma macrocarpa*)

Possibly also a saltmarsh herbfield planted in sand or fine bark mulch.

Blufftop shrubland

With rocks interspersed, a shrub garden with:

Korokio

Wharariki

Puka (*Griselinia lucida*)

Akepiro

Rata vines carmine, small white and red rata species.

Kiekie

Wharawhara coastal astelia (*Astelia banksii*)

Huia hebe (*H. bishopiana*)

Prickly mingimingi (*Cyathodes juniperina*)

Gahnia lacera bamboo cutty grass

Clematis *forsteri* scented clematis. Hard to obtain but a real delight.

Ferns (refer plant tables)

Mikoikoi NZ iris (*Libertia ixiodes*)

Large flowered iris (*Libertia grandiflora*)

Perhaps also associated trees, such as: tanekaha, kauri, or miro

Waitakere rockland

West Coast kowhai spring flowers

Puka (*Griselinia lucida*) shiny foliage

Coastal astelia (*Astelia banksii*) handsome foliage

Huia hebe (*H. bishopiana*) spring-summer flowers

Carmine rata spring flowers

White rata summer flowers

Korokio fine silver foliage

Taurepo orange flowers, summer

Waitakere forget-me-not (*Myosotis petiolata* var. *pansa*)

Kauri community

As in the leaf litter under each kauri tree:

Kauri grass a smart tussock

Toropara fragrant, winter flowers (also lovely pot plant)

Mairehau fragrant foliage often tinged red

Spiderwood

Neinei

Akepiro

Mingimingi (*Leucopogon fasciculatus*)

Prickly mingimingi (*Cyathodes juniperina*)

Kahakaha (*Collospermum hastatum*)

Kiekie

Turutu beautiful blue berries

Cool gullies

Parataniwha Plant a glade, with lots of moisture, mulch and good soil. Visit the ranges to see what a wonderful effect you can create!

Nikau

Hen & chicken fern

King fern Rare due to wild pigs. Needs fertile soil, good drainage, lot of summer moisture. Beautiful fronds 2–3m long

Lastreopsis hispida A beautiful fern with hanging stems.

Provide shade with fast-growing:

Mamaku

Pate

Houhere

Piha coastal cliff community

Small trees & shrubs such as: Houpara (& local hybrids)

Kawakawa

Karo

West Coast kowhai

Taupata

Coprosma macrocarpa

plus, over rocks:

Coastal astelia (*Astelia banksii*)

Waitakere rock daisy

on a sand pile:

Pohuehue

Native spinach (*Tetragonia implexicoma*)

Spinifex

Native Dichondra

Makaka

Groundcover Ferns:

Asplenium oblongifolium

Shield fern

Giant hypolepis

Rosy maidenhair

Associated large trees:

Pohutukawa

Karaka

Puriri

Kohekohe

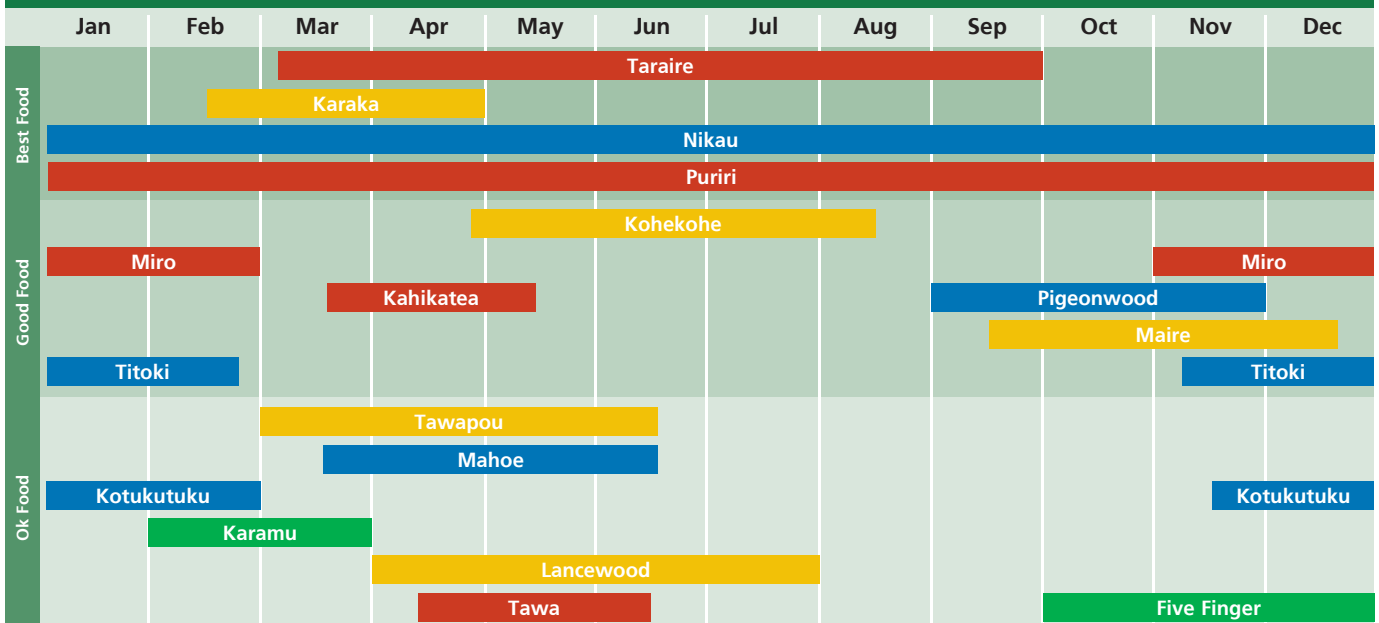


Hebe bishopiana

Planting for birds

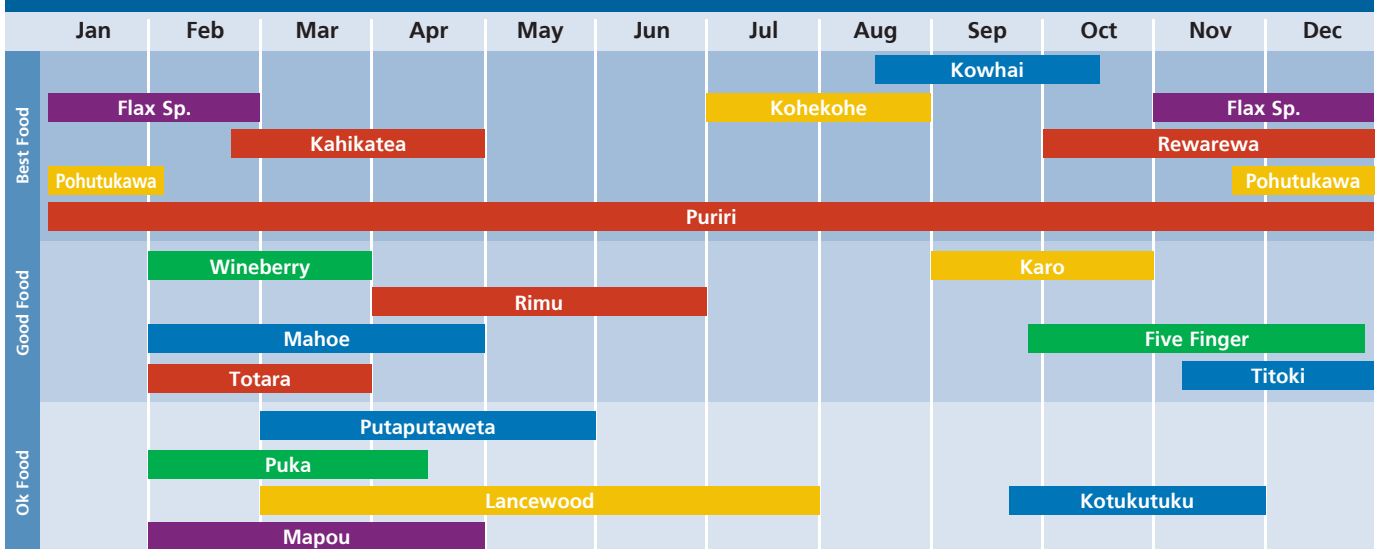


Native Trees for Kereru (Pigeon) Food



During the breeding season (July–February), the home range of Kereru can be 4-5 hectares or even smaller if there is sufficient food. During the non-breeding season Kereru will fly several kilometers for different foods. These tree fruiting times are a guide only and may differ slightly in your area.

Native Trees for Tui and Silver Eye Food



During their breeding season (September-January), tui have a home range of 4-5 hectares, but at other times will fly up to 50 kilometres in search of food. Silvereye have a breeding season range of just one hectare but at other times will typically travel up to 10 kilometres for food. These tree fruiting times are a guide only and may differ slightly in your area.

Plant Height	 Plants to 6 metres	 Plants to 6-8 metres	 Plants to 9-12 metres
	 Plants to 13-20 metres	 Plants over 20 metres	

The ABC of restoration



The ABC sections below offer guidelines for how to restore a piece of land back to its original vegetation. Mature native bush develops in several steps over many years, with each step providing conditions that will suit the next group of plants.

The basic ABC principles also apply when planting natives on a smaller scale in a garden setting, but refer to p 5–7 for specific ideas and explanatory notes on what to plant.

3 STAGES

A. Plan and Prepare

B. Plant

C. Maintain

A and C are the most important. B is the most

Some areas are especially important to restore, because of the large impact they have on the health of areas connected to them. These priority sites include:

Streamsidings – often called riparian planting – refer to p2.

Bush edges – healthy vegetation on the edges of existing bush keeps out invasive weeds and maintains a moist air environment. You can create a bush edge or repair damage to an existing one by eradicating weeds and filling in any gaps with the appropriate nurse plants (see p10 for more on nurse plants).

Gaps in a bush canopy – large gaps in the canopy of a bush area can leave the bush vulnerable because it takes a long time to repair. A ‘too large’ gap is one where the canopy species around the gap cannot fill the space by branches growing sideways from all sides; and where there are no young trees to grow up into the gap. To repair the gap use the appropriate nurse plants to cover the ground within the gap as the first step.

Passageways of green that connect two otherwise separate natural areas – this linkage provides cover through which birds and other wildlife can move, and contributes to the health of those areas and the Green Network (p2). The further a natural area is from a like area, the longer it takes for plant species to successfully travel from one to the other as part of the natural repair process. A distance of 300 metres in a straight line is a good measure. Beyond this, new plant species arrive very slowly.

Note: Except in the circumstances described above, weed-free, large or well-connected bush areas tend to maintain themselves, healing damage in both the canopy and the understorey and inhibiting new weeds. Such areas should be left to do so. The main thing we can do is to manage weeds or pests, exclude stock etc while the repair happens.

In all cases, when planting in or near already established bush, take great care to choose species appropriate to the ecosystem, and to use ecosourced plants.

Through its Green Network Community Assistance Programme the council is happy to assist and encourage you with technical advice and support for free. This incentive programme is designed to help you overcome obstacles that would otherwise stop your progress.



Healthy streamsidings are well planted to provide soil stability, retain water and provide shade.



A healthy forest margin is densely planted to keep out weeds and keep in moisture.

Plan and Prepare

Your time and money are involved, so think carefully about what you are doing before you begin spending either.

Over time it is possible to establish a naturally functioning ecosystem that is low maintenance and self-sustaining.

Check out your ecosystem and your site

- Use the map (p17) to locate what ecosystem your property belongs to. Read up on the description of this ecosystem (pp18–23).
- Assess the site you wish to plant and decide what habitats it has (eg. boggy area, steep or gentle slope...)
- Decide what needs doing – is it your aim to fill gaps in the existing bush, create new bush or plant up a bush edge? Imagine the end result when your plants are fully grown and mature. This may take several years to achieve but once a site is planted and well maintained for up to 5 years, it will mostly look after itself.

Work out what to plant where

- Look up the plant tables relevant to your area and ecosystem (pp26–51):
 - identify the nurse (look for the heart symbol) or colonising species appropriate to your site especially if you are restoring an open site
 - select a variety of plants suitable for the topography of your site, and check how many you should plant
 - check the tolerances list – sun, shade etc.
 - check out the comments on 'natural neighbours' – not all plants grow together
 - identify the tall or canopy species for filling 'gaps' or planting out after nurse plants are established
 - see over for more information on all of the above.
- You will now have a list of the plants you should be planting on your site, and an idea of where to plant them.
- Take this booklet into a native plant nursery and check out some of the species up close – this will help you visualise how your planting is going to look.
- Take time also to research nurseries that sell ecosourced plants. Call the council for a list of

nurseries that might sell ecosourced plants for your area.



Weed control. Jerry Birch and kaumatua Davey Paniora know from experience the importance of getting rid of the invasive weeds: it's more important than planting!

Nurse plants – the first stage

Nurse species are hardy and fast growing. They are good at colonising open areas because they grow well in exposed conditions enabling them to suppress weed species and shade out grass. When grown en masse a nurse crop creates an environment sheltered from the wind, with reduced direct sunlight which reduces competition from weeds, and with a leaf litter that provides nutrients and retains moisture – ideal conditions for our tall forest species to grow in.

Most common mistake –
planting tall (canopy) trees too early

Trees such as miro and kauri need the conditions created by earlier nurse species eg. side shelter. Without these conditions tall trees will struggle and need a lot of maintenance – or they may die.

See the diagram below for examples of nurse crop species to plant. Refer also to the heart symbol () in the plant tables.

Toetoe – a rising native plant star – is a valued nurse plant. Don't confuse it with pampas grass, an invasive weed from overseas, and not a nurse plant. Toetoe is for any restoration site that gets good levels of light eg. stream banks, bush edges, slips, roadsides. Two of the NZ species are native to Waitakere – *Cortaderia fulvida* and *Cortaderia splendens*. A detailed information sheet on toetoe is available from the council.



Forest

Nurse Crop Species

The first species to plant for establishing successful restoration

Coastal	Open Pasture	Regular Flood Zone	Stream Bank	Forest Edge & Extension
<i>Gahnia xanthocarpa</i> <i>Pseudodopanax lessonii</i> <i>Coprosma macrocarpa</i> <i>Melicytus ramiflorus</i>	<i>Gahnia setifolia</i> <i>Coprosma robusta</i> <i>Hoheria populnea</i> <i>Cordyline australis</i>	<i>Carex flagellifera</i> <i>Carex virgata</i> <i>Cordyline australis</i> <i>Melicytus ramiflorus</i>	<i>Gahnia setifolia</i> <i>Phormium tenax</i> <i>Coprosma robusta</i> <i>Melicytus ramiflorus</i>	<i>Gahnia lacera</i> <i>Coprosma lucida</i> <i>Hoheria populnea</i> <i>Melicytus ramiflorus</i>
<i>Cortaderia splendens</i> <i>Phormium tenax</i> <i>Coprosma repens</i> <i>Melicytus ramiflorus</i>	<i>Cortaderia fulvida</i> <i>Coprosma robusta</i> <i>Kunzea ericoides</i> <i>Hoheria populnea</i> <i>Leptospermum scoparium</i>	<i>Cortaderia fulvida</i> <i>Carex flagellifera</i> <i>Carex virgata</i> <i>Cordyline australis</i>	<i>Cortaderia fulvida</i> <i>Phormium tenax</i> <i>Coprosma robusta</i> <i>Melicytus ramiflorus</i> <i>Cordyline australis</i>	<i>Cortaderia fulvida</i> <i>Coprosma robusta</i> <i>Aristotelia serrata</i> <i>Melicytus ramiflorus</i> <i>Leptospermum scoparium</i>

Shady

Sunny

Second most common mistake – planting too sparsely

Nurse plants need to be able to touch each other within the first year of planting. This blocks sunlight at ground level and prevents weed invasion, moisture loss and lessens competition from grass, dock and other broadleaf weeds. Most nurse species should be planted no more than one metre apart. Good nurse planting will usually prevent the need for mulch.

Canopy trees – the second stage

Once the nurse cover is established (this usually takes up to two years) the next step is either to plant canopy species or allow them to regenerate naturally from seed distributed by wind, birds and water.

Big canopy trees like kauri and rimu or character trees like mamangi and puriri will dictate the overall shape of any restoration planting for many generations to come.

Care needs to be taken not to plant too many of the main or canopy trees. Well-planted, well-sited trees usually establish well so there is not normally any need to over-plant in anticipation of big losses. Allow them plenty of room to mature this doesn't mean thinning out other natives beside them.

In nature, many trees are scattered in the landscape in surprisingly low numbers, often on special sites, even though they may be conspicuous due to their size and contribute significantly to the character of any area. Before planting, take a look at some natural sites on similar slopes or habitats in the same ecosystem and at a similar altitude. Use these areas as your guide.

If your site already has a nurse crop canopy...

of weed species such as tree privet, wattle or willows:

- Keep the weed trees in the short term as nurse plants.
Plant under them with natives that will eventually grow to become the new canopy. While it may seem strange to leave weed trees, even weeds are better than a bare patch of earth. Choose semi-shade tolerant natives, such as rimu, kohekohe, tawa, kahikatea. Start by removing all environmental weeds from under the weed trees, then prune off some of the lower branches to create space and light for the new natives. Keep up this pruning every year to give the natives the ongoing space they need, and eventually cut down the weed trees but leave the roots, which will continue to provide soil stability.

of natives such as manuka, mahoe, bracken or karamu:

- Plant up the edge of the bush with nurse plants and wait for birds and the wind to bring in new native seeds, or seeds in the soil to germinate. If more than 300 metres away from a wild plant population that can provide seeds, you may need to plant second stage shade and semi-shade tolerant native species under the canopy in the gaps that exist.

Stop! Do a reality check

- Check again the practical issues and time-frames of eradicating invasive weeds that may affect plants establishing (p10,14).
- Check your site is totally clear of environmental weeds before you plant. Through site preparation before planting is easier than a lot of ongoing and fiddly weeding around small plants later.
- Work out in detail the quantities of plants required (p13).
- Re-evaluate the project at this stage for its achievability and sustainability (ecologically, financially, long-term commitment) and be prepared to modify your plans before committing yourself and others.



Good site preparation ensures success. Round Up™ is used to get rid of kikuyu grass before planting.



Very tall (rank) grass or thick piles of weeds often need follow-up sprays to achieve total control.

B.

Plant

Actual planting is the most enjoyable part, but there's still more to think about

- April to September is the best time for planting, when the soil is moist and more rain is predicted.
- Use plants big enough to cope with weed threats – 'root trainers' if site is very clear or planter bag (PB) size 3 and bigger if competing with broadleaf weeds.
- Use larger plants for the main trees such as PB 12 and larger.
- In a restoration site good nurse planting will usually prevent the need for mulch and encourage better 'ecological processes'. In a garden, however, mulch helps keep weeds at bay, and encourages good soil life. Wood mulch is better than bark mulch.
- Don't plant large trees where they could obscure views or result in excessive shading and loss of light to houses.
- Areas where you have replanted with natives look better and more natural if plants of the same species are grouped together in groups of 3, 5, 7 or 9.
- For most nurse crops, like manuka and toetoe, the maximum recommended spacing is one metre apart. For smaller plants, like Carex, or Coprosma robusta, plant closer, at 50 or 75 cm apart.

Planting Density Guide

	10 m ²	100 m ²	10,000 m ² (1 hectare)
PLANT SPACING	NUMBER OF PLANTS NEEDED		
50cm apart	40	400	40,000
75cm apart	18	180	18,000
1m apart	10	100	10,000



The fun part – planting a manuka nurse crop after weed control. In two years they should be a couple of metres tall.

Stephen

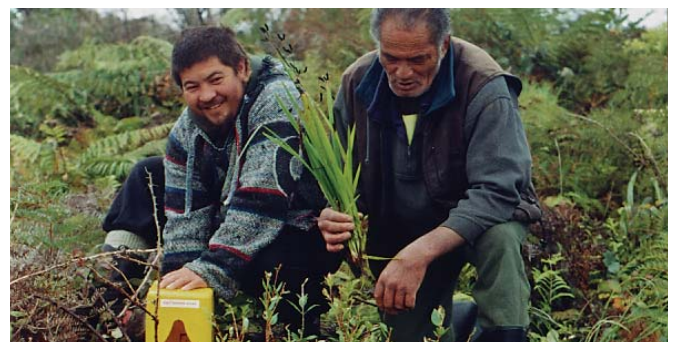
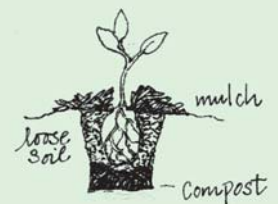
Planting Guide

Dig a hole deeper and double the width of the root ball of the plant. Have loose soil or compost in the bottom. Place the plant into the hole, fill with soil and press firmly but gently around the plant to remove air pockets. After planting, the soil level against the stem should be the same as before planting.

A slow release fertiliser pellet can be placed with each plant, to the manufacturer's specifications.

Water your plants as soon as you have planted them, and keep them moist.

Weed them regularly.



Keeping it up: experienced planters know the importance of dealing to pests and weeds to ensure success. A little maintenance goes a long way.

Stephen

C.

Maintain

Careful planning followed by regular maintenance are essential to ensure that your plants become established. The timeline opposite sets out a typical maintenance programme for the first three years of a restoration project.

For plantings on a smaller scale, it's just as important to follow up on removing and disposing of weeds.

For more detailed advice and information on managing a long-term restoration project, contact the council.

Remember

A well-sited, well-planted project will often largely take care of itself, especially if it's in a weed-free zone and natural regeneration can take place. Sometimes simply removing key weed sources, removing cattle and closing the gate, are enough to bring reward!



fence off bush

Maintenance Timeline

Year One:

- | | |
|--|-----------------|
| 1. Eradicate environmentally damaging plants. | Spring + Summer |
| 2. Cut back grass and broadleaf weeds to reduce competition. | Spring + Summer |
| 3. Plant nurse crop. | Autumn + Winter |

Year Two:

- | | |
|--|------------------|
| 4. Weed around plants.
Cut back grass and broadleafweeds to reduce competition. | Spring + Summer |
| 5. Weed around plants.
Remove any new invasive weeds that have appeared. | Autumn + ongoing |
| 6. Replace dead plants. | Autumn + Winter |

Year Three and Onwards:

- | | |
|-------------------------------|------------|
| 7. Remove any invasive weeds. | Year round |
|-------------------------------|------------|



In a couple of years there is enough shelter from the nurse crop to plant long term trees such as kauri.



The satisfaction of restored bush: in just 5 to 10 years you can create beautiful native bush like this! It's worth the effort!

The nature of Waitakere



The forests of Waitakere are unique. They sit on an ancient volcanic system and are strongly influenced by the marine coastal environment, being surrounded on three sides; by the Waitemata and Manukau Harbours, and the Tasman Sea.

However, of today's bush, much was burnt or logged last century and in the new urban lowlands only a few clumps of original native trees survive. When first purchased for park and water catchment, much Waitakere land was under 'scrub' or even grassland. There were also some substantial areas that had escaped logging. Given a few decades, the forest is now naturally regenerating back toward its former state – a rich pattern of a diverse range of lowland forest communities. From today's fragmented Waitakere landscape a picture of the original forest pattern has been recreated to illuminate our wonderful natural heritage and provide a guide for landowners to restore it.

The Waitakere Ranges were formed by an ancient massive uplift of hard volcanic basalt creating an elevated plateau with a cool climate, catching the clouds and a rainfall twice that of Auckland and Henderson. Rimu thrives on the cool plateau. Within the ranges, softer rock has eroded away creating steep rugged hills with good drainage that suits kauri. Very steep slopes of crumbling, actively eroding rock release nutrients in this infertile landscape and provide a refuge for trees like puriri that normally abound in its preferred fertile soils of lowland flats or young volcanic areas.

The hard basalt is exposed in many sites to form spectacular gorges, waterfalls and bluffs. These rockland habitats support communities of specialised plants that can tolerate droughts and little soil. In this habitat the Waitakere Ranges has an especially drought-tolerant kowhai, found elsewhere in a similar habitat near Waipoua Forest, Raglan Harbour and Whangarei Heads.

Silt has collected from slowly eroding hills in a few small valleys to form alluvial forests of kahikatea, pukatea, puriri and ti kouka (cabbage tree).

Some abundant Northland and Auckland trees, notably taraire and towai, are strangely almost absent from the ranges of Waitakere – there are some unusual groves of taraire at Karekare which may have been introduced by coastal-dwelling Māori 800–1000 years ago as fruit trees and to facilitate bird snaring.

Henderson, Te Atatu and Whenuapai were once covered by the great broadleaf forests of the Waitemata lowlands. A good impression of the magnificent glades that once stood can be glimpsed by taking a walk through similar areas such

as Smith's Bush in Takapuna, Murphy's Bush in Takanini or Kirk's Bush in Papakura.

On the Te Atatu Peninsula majestic 50m tall kahikatea-pukatea forest once stood high above a dense sea of nikau palms, overlooking Pollen Island, Waitemata and Auckland.

East of the Waitakere Ranges, around Titirangi and Laingholm, the soils are more sedimentary than volcanic, holding more moisture in summer and are highly fertile. Therefore, on these 'Waitemata' soils lowland totara is more common and the lush kohekohe, puriri, karaka and nikau are notably more widespread and abundant.

At least 400 plant species make up Waitakere in a diverse array of distinct forest communities, each related to its own particular habitat of terrain, geology and climate.

Climate and topography are key influences over what grows where and this is especially the case in Waitakere's wild West Coast. Storms from the Tasman Sea dump salt spray onto the rugged landscape creating a band of salt resistant pohutukawa forest and a whole array of other salt hardy plants. Native toetoe, NZ spinach and wild celery grow on the sand. Coastal ice plants, waxy taupata, hebes, and even tough ferns cling to sheer rock walls which are constantly blasted with the full force of salt spray.

The unrelenting coastal elements have moved mountains of sand, damming valleys to create wetlands and dune impounded lakes, partially burying pohutukawa trees, and creating a new coastline that has grown 1.5km this century! The Te Henga wetlands are the largest in the Auckland region, supporting bitterns and a wealth of other wetland birdlife. The Whatipu dunelands provide a nesting habitat for the rare banded dotterel, a haven for duneland plants and a human retreat in Auckland's best coastal wilderness.

The salt-storm forces diminish in the Manukau harbour so the pohutukawa belt narrows and salt-tolerant species dwindle but still the coastal air has its influence. As the coastal air moves inland up into valleys and even over the Titirangi ridge, plants respond to its warming climatic influence. The best indicator of this natural air conditioner is mamangi (*Coprosma arborea*), a handsome tree that hugs the gentle north-facing slopes and turns gold in the cool winter months.

A special feature of the Waitakere coast is the kowhai (*Sophora fulvida*) where rockland and coastal habitats are peppered with gold to herald the spring. A subsequent succession of flower colour from kanuka, pohutukawa and rata continues through to mid-summer.

From the coast to the interior a profusion of fern species abound in every niche from bare rock and dark waterfalls to tree tops to provide one of the richest fern havens available, supporting 110 species.

Exposed Coastal Ecosystem



Tough fleshy leaves of pohutukawa and houpara, hairy waxy leaves of spinifex grass withstand the rugged salty environment of the exposed coastal ecosystem. Pohutukawa on the rocks, spinifex on the sand and the houpara in the gullies. Each species has its preferred habitat.

Stormy Coastal Hill Ecosystem



Less salty than the exposed coastal ecosystem, the Stormy Coastal Hills ecosystem is still a rugged climatic environment.

Harbour Coastline Ecosystem



Kowhai overhang a shell bank, karaka and kohekohe grow in the damper shadows in the sheltered harbour coastline environment. Here pohutukawa is limited to a narrow fringe on exposed sites. Coastal karamu (*Coprosma macrocarpa*) and coastal astelia proclaim the character of this environment.

Warm Lowlands Ecosystem



A diverse array of luxuriant growth and forest communities feature in the lowlands. Kauri on ridges, rainforest with occasional puriri on slopes, kahikatea and lush nikau groves in valley bottoms. Interspersed are special habitats such as the bluff community at the Cascades complete with its own assemblage of species.

left: Tall podocarps grow on Scenic Drive lowland forests with pukatea and nikau in a wet hollow (lower

High Rainfall Hills Ecosystem



Abundant rimu, Hall's totara, miro and kiekie are features of the high rainfall ecosystem. An excellent example is growing here on the Scenic Drive near the transmitter dome (north of TV transmitter). Note the canopy of ancient rimu on the skyline.

Uplands Ecosystem



Head in the clouds, these ancient rimu and rata stand proud above an uplands forest canopy that includes cold tolerant tawheowheo (*Quintinia*) and toro (*Myrsine salicina*). These hardy species often have red or purple leaves.

Waitakere Ecosystems



1

Pohutukawa – Oi
Exposed Coastal Ecosystem



2

Manuka – Kahu
Stormy Coastal Hill Ecosystem



3

Kowhai – Kotare
Harbour Coastline Ecosystem



4

Puriri – Kereru
Warm Lowlands Ecosystem



5

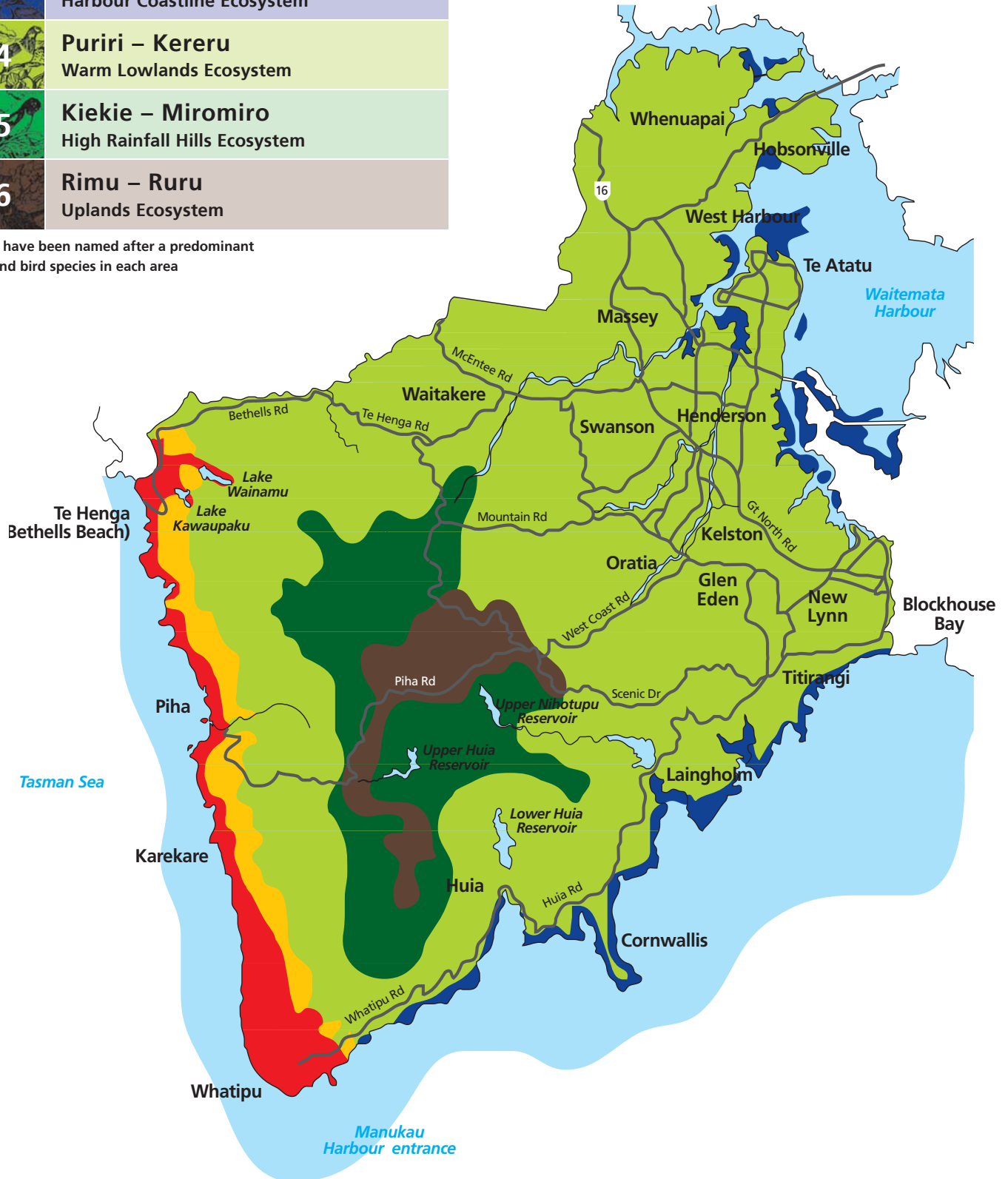
Kiekie – Miromiro
High Rainfall Hills Ecosystem



6

Rimu – Ruru
Uplands Ecosystem

These have been named after a predominant tree and bird species in each area



1

Pohutukawa – Oi Exposed Coastal Ecosystem

This area is a strip along the coast facing out to Tasman Sea, the Pohutukawa – Oi Exposed Coastal Ecosystem (p17, Ecosystems map). It has three main components – dune systems, dune lakes, and the areas above the dunes affected by saltspray.

Dune System

Dune systems of shifting sands support pingao, and small semi-stabilised dunes have spinifex. Stabilised dunelands are clothed with pohuehue, kawakawa and ti kouka (cabbage trees). There are also extensive wetlands.

Dune Impounded Lakes

The twiggy *Coprosma crassifolia* is one of the many divaricating – twiggy and tangled – plant forms that are a feature of the pohutukawa forest at the dune-impounded Lake Kawaupaku.

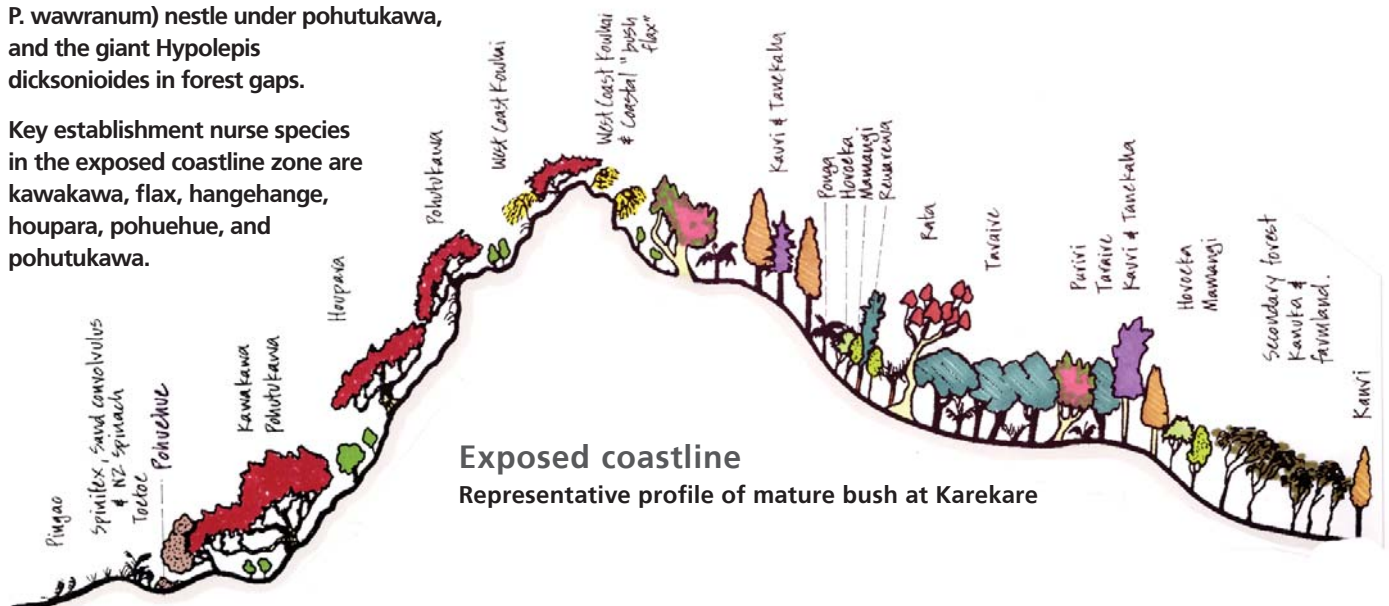
Exposed West Coast

This saltspray coastal zone is dominated by pohutukawa forest and supports its own endemic plant, the Waitakere rock daisy. Other saltspray tolerant plants include taupata, West Coast cliff hebe, and horokaka, an ice-plant. Sloping cliffs support pohutukawa forest with houpara, karo, karaka, kawakawa, nikau, coastal karamu, ti kouka (cabbage tree) and on more sheltered sites also West Coast kowhai, puriri and occasionally tawapou.

Harakeke (flax), toetoe and kawakawa are the main colonising shrub species. Pohutukawa growing on or partially buried by encroaching sand often supports lush growth of nikau, karaka, kawakawa and New Zealand spinach.

Ngaio and tree daisy *Olearia albida* are present but scarce. Taraire is also scarce, found at just one site at Whatipu. Interesting ferns include *Asplenium obtusatum*, on salt spray vertical cliffs, and *Blechnum banksii*. The dainty *Pteris saxatilis* and the shield fern (*Polystichum neozelandicum* and *P. wawranum*) nestle under pohutukawa, and the giant *Hypolepis dicksonioides* in forest gaps.

Key establishment nurse species in the exposed coastline zone are kawakawa, flax, hangehange, houpara, pohuehue, and pohutukawa.



Manuka – Kahu Stormy Coastal Hill Ecosystem

Above the exposed coastal system (see p17 Ecosystems map), this lowland forest is subject to occasional fierce storms that burn off the tops of puriri and other trees. Pohutukawa is present on rock outcrops, plus pohutukawa-rata hybrids. Flax is abundant in secondary vegetation.

Less salty than the exposed coastal ecosystem, the Stormy Coastal Hills Ecosystem is still a rugged climatic environment. Flax, cabbage trees and manuka predominate among pioneer vegetation. A meeting place between lowland forest and the coastal environment, interesting hybrids between species of the two realms grow in the stormy coastal hills. Notable are pohutukawa x rata, houpara x horoeka and *Coprosma robusta* x *C. macrocarpa* hybrids.



Stephen



Kowhai – Kotare Harbour Coastline Ecosystem

This ecosystem is located along the Manukau and Waitemata Harbour coastlines (see Ecosystem map p17). The vegetation on the coastline from the harbour mouth to Little Huia is different from that further in, and this area can be described as the semi-exposed harbour entrance.

Semi-Exposed Harbour Entrance

Pohutukawa-puriri coastline with very diverse lowland forest including abundant nikau, mamangi and West Coast kowhai. Ngaio and tawapou are present. A local feature is *Pittosporum ellipticum* on dry hillsides above the salt spray zone.

Sheltered Coastal Fringe

A narrow coastal fringe of pohutukawa and pohutukawa-rata hybrids joins the kowhai (*Sophora microphylla*), abundant kohekohe, puriri, kauri and very diverse lowland forest including karaka and occasionally titoki, *Coprosma macrocarpa*, and the coastal *astelia* are common. The handsome wharangi is present. Ngaio and tree daisy *Olearia albida* are rare. Numerous fern species include the abundant maidenhair *Adiantum cunninghamii*, and more rarely the dainty maidenhair *Adiantum diaphanum* and *Asplenium hookerianum* – all weed endangered. A wide range of lowland plants, including kauri, reach the shoreline.



Puriri – Kereru Warm Lowlands Ecosystem

Introduction – Overview

Throughout the warm lowlands ecosystem that is natural to most of Waitakere City (see on Ecosystems Map p17), kauri, rimu, rata, kahikatea, rewarewa and the occasional miro are the main high canopy or emergent trees. Below 200m altitude, tanekaha is abundant on ridges, but in the mature forest it occurs on the fringe. Kauri stands on spurs or dry sharp ridges and on summer – dry clay soils especially below 100m altitude. Lowland totara is common only in the Waitemata lowlands and foothills, the Manukau-Waitakere warm foothills, frosty Te Henga valley, alluvial valley floors and a small site at Karekare.

While lowland totara prefers fertile easy slopes or flats, Hall's totara typically grows on sharp ridges, knolls, rocky streamsides and infertile sites. An unusual feature is the absence of towai and kamahi (*Weinmannia* spp.) and rarity of taraire.

The forests of the lowlands have a characteristically irregular and broken lower canopy due to mid-canopy trees like taraire being uncommon resulting in an abundance of treeferns, small trees and shrubs. This reflects the hilly nature and low nutrient status of the ancient weathered volcanic soils. In fact, excepting the kohekohe glades on Exhibition Drive at Waima and taraire groves at Karekare, nowhere do broadleaf trees form a continuous upper canopy or extensive glades.

However on the fertile Waitemata lowlands, wherever the soils are friable and deep, broadleaf trees were once abundant. Scattered between tall forest emergents, extensive glades of broadleaf trees were previously dominated by taraire, huge puriri, karaka or titoki along with abundant kohekohe, frequent tawa, with mangaeo and hinau more rarely present. In wetter sites tall kahikatea, pukatea and nikau grew in profusion. Elsewhere, kauri, rimu, totara and occasionally rata, matai and miro stood as emergents.

Swampy depressions throughout support large tall kahikatea, rata and pukatea emerging high over swamp maire and abundant nikau, kiekie, and wheki. Kohekohe prefers at least moderate fertility and summer moist slopes and is thus more abundant in the Waitemata soils and south-east sector of the Waitakere.

Puriri prefers the fertile deep soils or alluvium found in the Waitemata lowlands. Elsewhere puriri is typically found scattered on mid-slopes but is also common on harbour coastal cliffs, rocky slopes, bluff bases, and mobile gullies especially near Titirangi-Laingholm, sites where light and nutrients favour puriri establishment.

Mamangi is perhaps the most sensitive climatic indicator, and common only on warmer mid-slope sites where it is influenced by the Tasman coastal airflow.

Titoki is a good fertility indicator and uncommon except abundant in the alluvial floodzone in Henderson Valley.

Nikau palm is widespread, clearly preferring gullies, depressions, steepland footslopes, slump sites and other seepage sites where moisture is abundant. Wheki, along with putaputaweta, favours wet depressions, and moist alluvial streamsides in frosty valley bottoms. Ponga, the silver tree fern is universally abundant, along with mapou, preferring gentle ridges and side slopes. Mamaku, the black tree fern, is abundant on very steep slopes and gullies (along with mahoe, pate, houhere and supplejack). Examples of these nikau palm and tree fern patterns are all visible from the Arataki Information Centre viewing platform.

Kowhai grows on sharp spurs, ridges, escarpments and along flood prone streambanks and coastal margins. White maire is widespread but never abundant and favours ridges and side slopes.

Shrubs common everywhere include mahoe, mapou, hangehange and karamu. Mahoe, pate and houhere thrive in damp gullies and wet rocky sites. A wide group of shrubs, eg. the shiny karamu, favour drier sites and former kauri forests; akepiro, prickly mingimingi and kumerahou being especially characteristic of former kauri forest as is tanekaha. Kawakawa favours the coast, sandy, rubbly, fertile sites.

Kohuhu and tarata feature everywhere on broad ridges, basins, wide valleys and the broad fertile terraces of Waitemata lowlands.

Native tree daisies are well-represented. Heketara is common in steeper hill country on infertile ancient volcanics, whereas akepiro is abundant on often infertile summer-dry, clay country of former kauri forest and on stormy coastal hills. Rangiora is particularly abundant on windy or rocky steep slopes. The beautiful, possum-prone kohurangi was once very common in the lowland kauri forests.

Recovery Species

Manuka, kanuka and bracken are nature's healers of burnt forests and bare land in the lowlands – hence their abundance today.

Mahoe, mapou, ponga, mamaku, hangehange, karamu, and pate are the principal broadleaf nurse plants for forest establishment in the warm lowlands.

Each lowland forest zone is defined by geological, climatic, topographic and soil features that significantly affect forest composition. The key habitat themes are outlined for each of the warm lowlands zones.

(a). Waitemata Lowland Forests

Hobsonville, Whenuapai, Te Atatu, Henderson, Kelston, Glendene, New Lynn, Sunnyvale, Lower Oratia

- Free-draining fertile soils, gentle slopes and broad terraces provide ideal habitat for lowland totara and abundant broadleaf trees – taraire, puriri, karaka, and titoki.

The key and characteristic feature of these gentle lowlands with fertile deep friable soils is the abundance of large broadleaf trees.

Puriri was common and locally abundant forming groves of very large epiphyte-laden trees with abundant karaka, kohekohe and tall mahoe. Tawa and titoki were probably somewhat less abundant but still common. On dry, free-draining sites, hinau, and less commonly mangaeo, were present. Subtle folds in the land created changes in species dominance and abundance. Evidence suggests taraire was at least locally abundant forming extensive glades and possibly abundant throughout. Ponga, mapou and mahoe were the most abundant low canopy or understorey trees and on wetter sites nikau and supplejack. The understorey included abundant kawakawa and turepo. Large forest vines were prolific, especially kohia and the native jasmine, kaiku.

Other trees included white maire and frequent kohuhu and tarata. Tall emergent trees would have been less scattered throughout but locally abundant especially on wet sites kahikatea, ridge crests and areas with poorer soil kauri. Other tall emergents were rimu, miro, matai and notably lowland totara. Large rata trees are likely to have been present in the damper sites especially in dense glades of puriri. Coastal karamu was common near the coast and it is possible mamangi inhabited some warm slopes.



Waitemata Lowland Forest

Representative profile of mature bush in Henderson

An attractive forest floor is frequently carpeted with creeping ferns including *Blechnum filiforme*, *Asplenium lamprophyllum*, *Phymatodes scandens* and *Arthropteris tenella*.

Waitemata Lowlands were a world apart from the present urban landscape – rich, tranquil and beautiful.

(b). Waitemata Coastal Peaty Alluvium

Harbour view on to Te Atatu Peninsula

- Free-draining peaty soils sheltered by a scarp.
- Deep peaty soils favour prolific growth of pukatea, kahikatea, nikau and ti kouka (cabbage tree).

Large, tall kahikatea, scattered pukatea and rata are emergent over occasional swamp maire, puriri, frequent karaka, kohekohe and abundant nikau, kawakawa and *Coprosma areolata*. Ti kouka (cabbage trees) grow on wetter sites. The forest formed a well-defined ecotone boundary grading to flax and coastal shrub and rushland and mangrove communities on the coastal margin. The giant bush astelia *Astelia grandis* probably grew here.

(c). Alluvial Flood-Zone Forests

Oratia, Opanuku and Swanson stream valleys

- Free-draining, deep fertile soils on flood-prone valley floors.
- Ideal habitat for titoki and totara, and kowhai on streamsides.

Frequent kahikatea, totara and occasional pukatea, matai, rimu emergent over a mid-canopy of titoki –

tawa – karaka, over a dense low canopy of mahoe. Large turepo and kaiku are common. *Hoheria populnea*, kowhai and occasional wheki grow along riverbanks.

The flood-prone forest floor supports hen-and-chicken fern (*manamana Asplenium bulbiferum*), *Asplenium lamprophyllum*, and abundant *Phymatodes scandens* ferns. The rare round-leaved maidenhair (*makaka Adiantum aethiopicum*) is present but endangered, the small maidenhair (*Adiantum diaphanum*) was probably formerly present. This is a seriously weed-endangered ecosystem.

(d). Waitemata-Waitakere Foothills

Massey, West Harbour, Waitakere Village, Sturges Rd, Green Bay, North Titirangi, Glen Eden, Konini and upper Oratia/Forest Hill

- Waitemata and Waitakere volcanic soils.
- Abundant kahikatea, rata, rimu, nikau, features of moist easy land.
- Waitakere foothills contain volcanic material otherwise moist Waitemata clay soils favouring kohekohe, lowland totara, nikau.

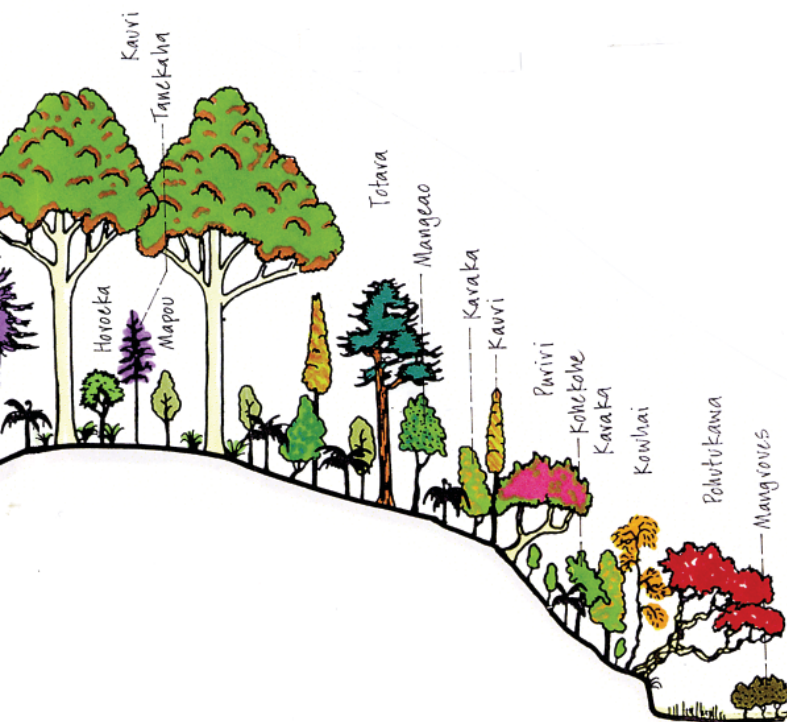
Low lying hill country sheltered from Tasman coastal airflow influences. Characterised by extensive ridges dominated by kauri with tanekaha and rimu; and on the valley sides puriri, rata, rimu, kahikatea with kohekohe and nikau, abundant ponga, mahoe and other broadleaf shrubs/trees. Putaputaweta, mahoe, pate, makomako, nikau in gullies. (Similar to Manukau lowland gullies).

Gentle terraces and sheltered easy terrain characteristically host abundant rimu-kahikatea-rata, with occasional miro, kauri and totara emergent over a low broadleaf canopy including ponga, kohekohe, mahoe and abundant nikau.

Occasional rock outcrops feature kowhai, kohekohe, nikau, puriri, while abundant kohekohe, nikau, puriri and supplejack grow on steep gullies. Large kohia vines feature in moist valleys such as Oratia.

Urban Massey, Glen Eden, Henderson, Glendene and New Lynn once supported the following forest types: extensive areas were covered with kauri, rimu, tanekaha with occasional totara and puriri on broader ridges, kahikatea, rata, kohekohe and occasional karaka on the valley sides and damp sites. Nikau and ponga grew abundantly.

Kahikatea, pukatea, rata, nikau forest wetland communities and forest ponds are a feature on old slump sites and depressions, especially around the Rangemore Track.



(e). Manukau – Waitakere Warm Lowlands

slopes and valley floors.

Titirangi South, Wood Bay, French Bay, Waima, Woodlands Park, Laingholm, Parau and Cornwallis

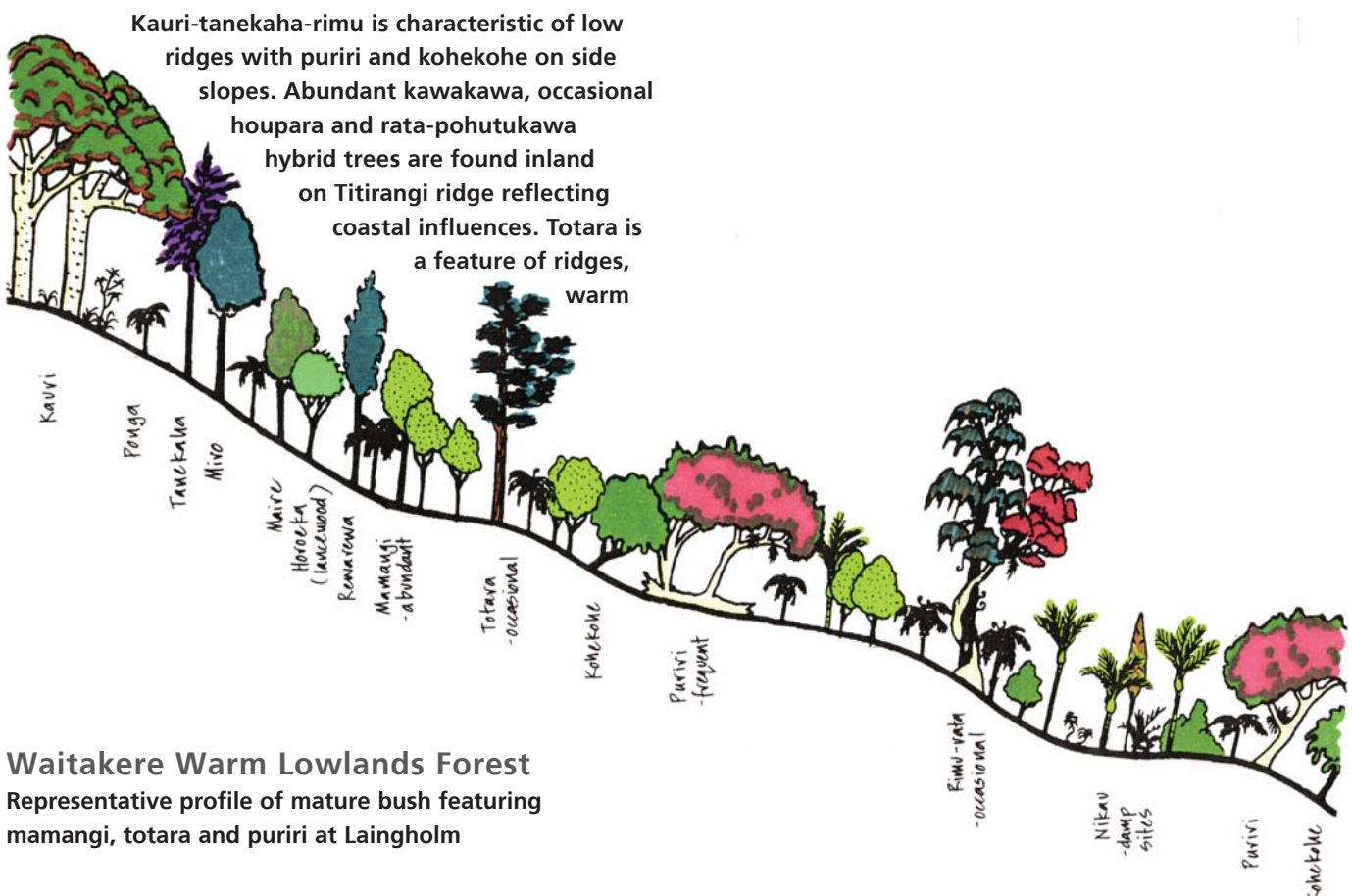
- Mix of volcanics and sedimentary; easy terrain with some steep scarps.
- Kohekohe abundant and lowland totara significant.
- Tasman coastal airflow provides a moderating climatic influence.

These Manukau Lowlands are geologically, topographically and climatically between the Waitakere Ranges Warm Lowlands and the Waitemata-Waitakere Foothills zones. With a mixture of Waitakere volcanic and Waitemata sedimentary soils on predominantly fairly gentle relief with steep scarps, the zone is strongly influenced by the moderating Tasman coastal airflow.

Coastal Waitakere links include mamangi-puriri forests (some of the best).

Waitemata links include frequent totara and abundant kohekohe (the best) often growing with puriri, tawa, kowhai, karaka and nikau on south-facing slopes (Waima-Woodlands).

Abundant kowhai is a special feature of steep ridges and scarps. Here kowhai grows to 10m in height and 50cm diameter trunk. Some of the best are at Laingholm. Kahikatea-rimu-rata-kauri-nikau forest, with pukatea, titoki, kohekohe and putaputaweta, is a feature of easy terrain (Waima).



(f). Waitakere Ranges Warm Lowlands

Waiatarua, Scenic Drive North, Bethells Valley, Lone Kauri Rd, Te Ahu Ahu Rd, Whatipu Rd and Little Huia

- Infertile weathered ancient volcanics.
- Predominantly rugged hill country but wide local topographic diversity.
- Mostly West Coast climate influenced.

A diverse range of forest communities characterised by the following patterns:

- Kauri-tanekaha forest on ridges, spurs, and bluff tops – Huia, near dam, and Cascades.
- Rimu-kahikatea-rata forest with occasional kauri on gentle terrain – Huia catchment (Christie's).
- Steepland ridges of Hall's totara, miro with rata – Fairy Falls.
- Steepland slopes of widely scattered rata, kahikatea, rimu, miro, occasional puriri and scattered tawa emergent over a low broadleaf shrub canopy characterised by mamaku, heketara, houhere, mahoe, ponga, nikau, supplejack and abundant parataniwha – Fairy Falls.
- Steepland rocky sites with kowhai and often tawa and puriri – Cascades.
- Gentle warm mid-slopes of occasional rata, podocarps and scattered puriri. Nikau emergent over mamangi, ponga, and horoeka (lancewood). – Karekare, Te Henga, Piha Valley.
- Kahikatea, pukatea emergent over swamp maire and abundant nikau, kiekie, putaputaweta and often with wheki.
- Very diverse mixed semi-coastal hill forest



5 Kiekie – Miromiro High Rainfall Hills Ecosystem

This area is situated above the climatic zone of puriri in the cool, high rainfall belt – 2000–2500mm/year (an annual rainfall twice that of Auckland!) and characterised by high rainfall species. It lies above the zone of tanekaha and mamangi; lowland totara is absent and Hall's totara is common. Kauri, rata, rimu, kahikatea are abundant emergent trees, with frequent Hall's totara and miro on ridges, and occasional pukatea, hinau, maire, and frequent rewarewa. The Waitakere, Upper Huia and Upper Nihotupu reservoirs and their catchments are within this ecosystem (see Ecosystem Map, p17).

Limited areas of sheltered easy slopes and 'terraces' support a dense high canopy dominated by rimu-rata-kahikatea with occasional kauri, miro and Hall's totara.

An abundance of kiekie, wheki, pigeonwood, supplejack and kanono is characteristic, reflecting the high rainfall climate. Horoeka (lancewood), nikau, mahoe, houhere, rata and ponga are common.

Although not abundant, a special characteristic feature is high rainfall tree ferns. Katote and punui and the now rare possum-vulnerable raukawa tree.



6 Rimu – Ruru Uplands Ecosystem

The top 'level' stretch of the Piha Road passes through this ecosystem from approximately Waiatarua to the Karekare-Piha fork. Rimu dominate the high rainfall upland forest areas, with distinctive cool climate species – tawheowheo, tawari, toro growing on an elevated plateau of erosion-resistant volcanic basalt.

Rimu is emergent with an occasional rata, miro, kahikatea, Hall's totara and kauri – usually with short rounded crowns and laden with epiphytes. These species emerge over a low canopy characterised by an abundance of heketara, kiekie, wheki and cool climate species such as tawheowheo, tawari and toro. Hinau, mountain maire, horoeka, ponga, wheki, pigeonwood and rata are common. Nikau are present. Kanuka and kohuhu are common second growth or recovery species.

The uplands embrace a plateau, a sheltered basin with a warmer climate but characteristically subject to heavy frosts. Remnant frost-hardy species find their last Waitakere refuge including wheki-ponga, mahoe and giant swamp astelia. Tawheowheo and toro are less common. The isolated presence of lowland totara, although infrequent, reflects the gentle terrain and frosty microclimate. Kiokio ferns and the giant cutty grass, tokiwi, are notably abundant in this wet environment.

The plateau is an ideal habitat for ancient giant kauri and once supported the biggest kauri trees in the Auckland region.

Note: On this plateau Auckland's largest kauri tree – of Tane Mahuta proportions – was purchased by a visiting English lord to ensure its protection. Unfortunately local loggers could not resist the temptation and set fire to the tree to justify their subsequent 'rescue' of its timber.

Rocklands – Bluff System



Rocklands, found usually as steep outcrops from the bush or as coastal rock faces, are fascinating places. In their usually small terrain they contain a range of plants not likely to be found in surrounding areas. Their rugged exposed situation both protects them (goats, people and possums find them unfriendly places) but weeds such as agapanthus, can destroy these valuable communities in just a few years.

Exposed bluffs typically of basalt, occasionally also conglomerate, support West Coast kowhai, puka, coastal astelia and the rock lily, rengarenga. Wharariki (flax) and rata vines, including rare carmine rata, are sometimes present. Bluff tops are characteristically kauri-tanekaha communities in the lowlands, and abundant parataniwha, and kauri-Hall's totara-rata-miro in the high rainfall zone.

Coastal astelia, puka or West Coast kowhai are almost always present at the top.

Nutrient-rich rocky footslopes support tawa, karaka lowland forest, often enriched with taurepo and wharanui, and abundant houhere, nikau, mahoe, and puriri, kawakawa and para, the king fern, in the Cascades.

All Waitakere endemic plants are confined to the bluff systems or coastal rocklands. These are nationally significant systems including these endemic plants:

Celmisia major var. major	Waitakere rock daisy (coastal) also on Great Barrier Is
Myosotis petiolata var. pansa	Waitakere forget-me-not (coastal)
Hebe bishopiana	Huia hebe (semi-coastal)
Sophora fulvida	West Coast kowhai (also at Maunganui Bluff, Piwakawaka, Mt Karioi near Raglan, Whangarei Heads)

Associated nationally rare or restricted species include:

- Hebe obtusata West Coast cliff hebe (coastal), and
- Metrosideros carminea carmine rata, akakura (not exclusive to Northland).

Dominant fall-face species are puka, coastal astelia and the rock lily, rengarenga. For a full list of Rocklands species, refer to the Rocklands column in the species charts for trees, shrubs etc.

Key secondary or recovery species are kanuka on bluff-

Key Rockland/Bluff System Plants

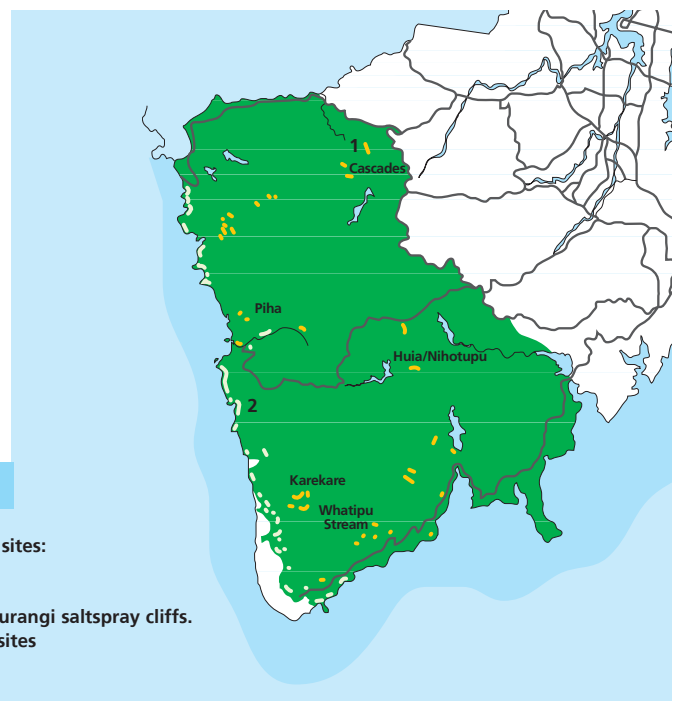
Arthropodium cirratum	rengarenga, rock lily	EC HC L
Astelia banksii	coastal astelia	EC HC L
Celmisia major var major	Waitakere rock daisy	EC
Coprosma repens	taupata	EC
Disphyma australe	horokaka, NZ iceplant	EC
Griselinia lucida	puka	HC
Hebe obtusata	cliff hebe	EC
Metrosideros carminea	carmine rata	HC L
Metrosideros perforata	akatea, small white rata	HC L
Myosotis petiolata var. pansa *	Waitakere forget-me-not	EC L
Sophora fulvida	West Coast kowhai	EC L

EC = Exposed Coastline HC = Harbour Coastline L = Lowlands

* = Waitakere endemic plants = rare

Key Rockland Invasive Weeds

Agapanthus praecox	agapanthus
Ageratina riparia	mistflower
Asparagus asparagoides	smilax
Asparagus densiflorus	bushy asparagus
Asparagus scandens	climbing asparagus
Cortaderia jubata	pampas grass
Cortaderia selloana	pampas grass
Cotoneaster spp.	cotoneaster
Erigeron karvinskianus	Mexican daisy
Hedera helix	ivy
Hedychium flavescens	yellow ginger
Hedychium gardnerianum	wild ginger
Nephrolepis cordifolia	tuber ladder fern
Polygala myrtifolia	sweetpea shrub
Polygonum capitatum	pink-head knotweed
Ulex europaeus	gorse



Rocklands Bluff System



Exposed coastal rocklands
lowland rocklands
(predominately West Coast kowhai)



Kowhai or hybrids may occur in
upper Nihotupu-Upper Huia sites

Key Rockland plant sites:

1. Cascades
2. Mercer Bay/Hikurangi saltspray cliffs.
Weed infested sites

Māori Glossary



The following is a list of Māori plant names used in the previous

māori	latin	common	māori	latin	common
akatea	<i>Metrosideros perforata</i>	white rata	para	<i>Marattia salicina</i>	king fern
akakura	<i>Metrosideros carminea</i>	carmine rata	parataniwha	<i>Elatostema rugosum</i>	
akepiro	<i>Olearia furfuracea</i>		pate	<i>Schefflera digitata</i>	seven finger
hangehange	<i>Geniostoma ligustrifolium</i>		pingao	<i>Desmoschoenus spiralis</i>	
harakeke	<i>Phormium tenax</i>	flax	pohuehue	<i>Muehlenbeckia complexa</i>	
heketara	<i>Olearia rani</i>		pohutukawa	<i>Metrosideros excelsa</i>	
hinau	<i>Elaeocarpus dentatus</i>		ponga	<i>Cyathea dealbata</i>	silver fern
horoeke	<i>Pseudopanax crassifolius</i>	lancewood	poroporo	<i>Solanum aviculare</i>	
horokaka	<i>Disphyma australe</i>	ice plant	puka	<i>Griselinia lucida</i>	
houhere	<i>Hoheria populnea</i>	lacebark	pukatea	<i>Laurelia novae-zelandiae</i>	
houpara	<i>Pseudopanax lessonii</i>		puriri	<i>Vitex lucens</i>	
kahakaha	<i>Collospermum hastatum</i>		pua waananga	<i>Clematis paniculata</i>	bush clematis
kahikatea	<i>Dacrycarpus dacrydiodes</i>	white pine	punui	<i>Cyathea cunninghamii</i>	gully fern
kaikomako	<i>Pennantia corymbosa</i>		putaputaweta	<i>Carpodetus serratus</i>	
kaiku	<i>Parsonsia capsularis</i>	NZ jasmine	ramarama	<i>Lophomyrtus bullata</i>	
kamahi	<i>Weinmannia racemosa</i>		rangiora	<i>Brachyglottis repanda</i>	
kanuka	<i>Kunzea ericoides</i>	tea tree	rata	<i>Metrosideros robusta</i>	northern rata
karaka	<i>Corynocarpus laevigatus</i>		raupo	<i>Typha orientalis</i>	bull rush
karamu	<i>Coprosma robusta</i>		raukawa	<i>Pseudopanax edgerleyi</i>	
karo	<i>Pittosporum crassifolium</i>		remuremu	<i>Selliera radicans</i>	
katote	<i>Cyathea smithii</i>		rengarenga	<i>Arthropodium cirratum</i>	rock lily
kauri	<i>Agathis australis</i>		rewarewa	<i>Knightia excelsa</i>	NZ honeysuckle
kawakawa	<i>Macropiper excelsum</i>		rimu	<i>Dacrydium cupressinum</i>	
kiekie	<i>Freycinetia banksii</i>		tanekaha	<i>Phyllocladus trichomanoides</i>	
kiokio	<i>Blechnum novae-zelandiae</i>		taraire	<i>Beilschmiedia tarairi</i>	
kohekohe	<i>Dysoxylum spectabile</i>		tarata	<i>Pittosporum eugeniioides</i>	lemonwood
kohia	<i>Passiflora tetrandra</i>	NZ passion vine	taupata	<i>Coprosma repens</i>	
kohuhu	<i>Pittosporum tenuifolium</i>		taurepo	<i>Rhabdothermus solandri</i>	
kohurangi	<i>Brachyglottis kirkii</i>		tawa	<i>Beilschmiedia tawa</i>	
korokio	<i>Corokia buddleioides</i> , <i>C. cotoneaster</i>		tawapou	<i>Planchonella costata</i>	
kotukutuku	<i>Fuchsia excorticata</i>	tree fuchsia	tawari	<i>Ixerba brexioides</i>	
kowhai	<i>Sophora microphylla</i> , <i>S. fulvida</i> , <i>S. chathamica</i>		tawheowheo	<i>Quintinia</i>	
kumaraho	<i>Pomaderris kumerahou</i>		ti kouka	<i>Cordyline australis</i>	cabbage tree
mahoe	<i>Melicactus ramiflorus</i>	whitey wood	titoki	<i>Alectryon excelsus</i>	
mahoewao	<i>Melicactus lanceolatus</i>		toetoe	<i>Cortaderia fulvida</i>	
maire	<i>Nestegis</i> spp.		toikiwi or toetoekiwi	<i>Gahnia lacera</i>	
mairehau	<i>Phebalium nudum</i>		toro	<i>Myrsine salicina</i>	
makaka	<i>Adiantum aethiopicum</i>	maidenhair	toropapa	<i>Alseuosmia macrophylla</i>	shrubby
makomako	<i>Aristotelia serrata</i>	wineberry	toru	<i>Toronia toru</i>	
mamaku	<i>Cyathea medullaris</i>	black tree fern	totara	<i>Podocarpus totara</i>	
mamangi	<i>Coprosma arborea</i>		towai	<i>Weinmannia silvicola</i>	
manamana	<i>Asplenium bulbiferum</i>	hen & chicken fern	turepo	<i>Streblus heterophyllus</i>	
mangeao	<i>Litsea calicaris</i>		turutu	<i>Dianella nigra</i>	NZ blueberry
manuka	<i>Leptospermum scoparium</i>	tea tree	tutu	<i>Coriaria arborea</i>	
mapou	<i>Myrsine australis</i>	red matipo	wharangi	<i>Melicope ternata</i>	
matai	<i>Prumnopitys taxifolia</i>		wharanui	<i>Phormium tenax</i>	flax
mingimingi	<i>Cyathodes juniperina</i>		wharariki	<i>Phormium cookianum</i>	coastal flax
miro	<i>Prumnopitys ferruginea</i>		whau	<i>Entelea arborescens</i>	
ngaio	<i>Myoporum laetum</i>		whauwhaupaku	<i>Pseudopanax arboreus</i>	five finger
nikau	<i>Rhopalostylis sapida</i>		wheki	<i>Dicksonia squarrosa</i>	
oiioi	<i>Apodasmia similis</i>	jointed wire rush			

Pohutukawa • Oi

exposed coastal ecosystem

KEY ♥ Nurse plant ■ Main component ✿ rare ✕ toxic to toddlers 🐟 coastal sites

For restoration, in this habitat: ●●● plant liberally ●● plant generally ● plant sparingly

Recommended planting sites

			Back Dunes	Boggy Area	Escarpment	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
Medium trees											
<i>Beilschmiedia tarairi</i>	taraire	✿						●		●	
<i>Corynocarpus laevigatus</i>	karaka	✕■	●				●	●			●
<i>Kunzea ericoides</i>	kanuka	♥■	●●			●●●	●●●	●●●	●●●	●●●	●●●
<i>Metrosideros excelsa</i>	pohutukawa	♥■	●		●	●	●●	●	●●	●	●
Small trees, large shrubs											
<i>Coprosma lucida</i>	shining karamu	♥			●●	●●●	●●●		●●	●●	
<i>Coprosma macrocarpa</i>	coastal karamu	🐟♥	●●			●●	●●	●	●	●	●
<i>Coprosma robusta</i>	karamu	♥	●				●	●	●	●	●
<i>Cordyline australis</i>	ti kouka, cabbage tree	♥	●	●●		●●	●	●●	●	●	●●
<i>Dodonaea viscosa</i>	akeake	🐟	●			●	●		●		
<i>Entelea arborescens</i>	whau	🐟♥	●				●	●			●●
<i>Geniostoma rupestre</i>	hangehange	♥■	●●			●	●●	●●	●●	●●	●●
<i>Leptospermum scoparium</i>	manuka	♥■	●●	●●	●	●●●	●●●	●●●	●●●	●●●	●●●
<i>Leucopogon fasciculatus</i>	mingimingi		●		●●	●●●	●●●	●	●●	●●	●
<i>Macropiper excelsum</i>	kawakawa	♥■	●		●		●●	●	●	●●	●●●
<i>Melicope ternata</i>	wharangi	🐟	●			●	●		●	●	●
<i>Melicytus ramiflorus</i>	mahoe					●	●●●	●●	●	●●	●●●
<i>Myoporum laetum</i>	ngaio	✕	●			●	●		●	●	●
<i>Olearia furfuracea</i>	akepiro				●	●●●	●●●		●●	●●	
<i>Pittosporum crassifolium</i>	karo	🐟	●●		●	●	●	●	●	●	●
<i>Pittosporum ellipticum</i>						●	●		●	●	
<i>Pseudopanax lessonii</i>	houpara	🐟	●			●	●		●	●	●
<i>Rhopalostylis sapida</i>	nikau	■					●	●●		●	●●
<i>Sophora fulvida</i>	west coast kowhai	✕■			●●	●	●				
Shrubs and flax-like plants											
<i>Coprosma crassifolia</i>	stiff-stemmed coprosma	🐟	●●		●			●		●	●●
<i>Coprosma repens</i>	taupata	🐟♥	●●	●	●	●●				●●	
<i>Coprosma rhamnoides</i>			●			●●	●●		●●	●●	
<i>Corokia cotoneaster</i>	bluff korokio	🐟✿			●●	●					
<i>Freycinetia baueriana</i>	kiekie							●			●
<i>Hebe macrocarpa</i>	koromiko		●			●●	●		●●		
<i>Melicope simplex</i>	poataniwha		●			●	●		●		●
<i>Ozothamnus leptophylla</i>	tauhinu	🐟	●●		●	●●	●●		●		
<i>Phormium cookianum</i>	wharariki, coastal flax	♥■	●●		●●●	●●●	●		●		●
<i>Phormium tenax</i>	harakeke, flax	♥■		●●●			●●●	●●	●	●	●
<i>Rhabdothamnus solandri</i>	taurepo		●				●				
Vines and trailers											
<i>Metrosideros perforata</i>	akatea, small white rata				●●	●	●		●	●	



KEY ● fully tolerant ◐ tolerates some ✕ not tolerant
 ◆ tolerates shade during establishment ◇ needs some shade to establish

	Tolerance								Planting notes, comments
	Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind		
	●	●◊	×	●	×	×	◐		Natural neighbours, these medium trees (except taraire) often form groves, ie. a monocultural canopy.
	●	●◊	◐	●	×	×	◐		
	●	×	●	●	×	●	●		
	●	×	●	●	×	●	●		
	●	◐	●	●	×	●	●	The understory of these groves is often kawakawa, hange-hange, nikau and houpara.	
	●	◐	◐	●	×	◐	◐		
	●	●	●	●	×	●	◐		
	●	◐	◐	●	●	◐	●		
	●	×	●	●	×	×	●		
	●	◐	◐	●	×	×	×		
	●	●	●	●	×	◐	◐		
	●	×	●	●	●	×	●		
	●	◐	●	●	×	×	◐		
	◐	●	◐	●	×	×	◐		
	●	◐	◐	●	×	◐	◐		
	●	●	◐	●	×	◐	◐		
	●	×	●	●	×	◐	●		
	●	×	●	●	×	×	●		
	●	×	●	●	×	×	●		
	●	◐	●	◐	×	◐	×		
	●	◐	◐	●	×	×	●		
	×	◊	×	●	◐	×	◐		
	●	×	●	●	×	×	●		
	●	◐	●	●	×	×	◐		
	●	●	●	●	×	●	●		
	●	●	●	●	×	●	●		
	●	◐	●	●	×	●	●		
	●	●	×	●	●	×	◐		
	●	◐	●	●	×	●	●		
	●	×	●	◐	×	●	●		
	●	◐	●	●	×	●	●		
	●	×	◐	●	●	◐	●		
	◐	●	●	◐	×	×	×		
	●	◊●	◐	●	×	×	●		

Pohutukawa • Oi

exposed coastal ecosystem

KEY ● fully tolerant ◐ tolerates some ✕ not tolerant ♥ Nurse plant
 ♦ tolerates shade during establishment ♦ needs some shade to establish

		Tolerance						
		Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind
Ferns								
<i>Adiantum aethiopicum</i>	makaka, maidenhair (round-leaved)	◐	●	◐	●	✕	✕	✕
<i>Adiantum cunninghamii</i>	common maidenhair	◐	●	◐	●	✕	✕	✕
<i>Adiantum hispidulum</i>	rosy maidenhair	●	◐	●	●	✕	✕	✕
<i>Asplenium appendiculatum</i> spp	<i>maritimum</i>	◐	●	●	●	✕	✕	✕
<i>Asplenium flabellifolium</i>	necklace fern	●	✕	●	●	✕	●	●
<i>Asplenium northlandicum</i>	leather-leaf asplenium	●	●	◐	●	●	✕	✕
<i>Blechnum blechnoides</i>	coastal blechnum	●	●	◐	●	✕	✕	✕
<i>Blechnum membranaceum</i>		✕	●	✕	●	✕	✕	✕
<i>Blechnum novae-zealandiae</i>	kiokio ♥	◐	●	✕	●	◐	●	◐
<i>Doodia australis</i>	pukupuku	●	●	●	●	✕	✕	●
<i>Hypolepis dicksonioides</i>	giant hypolepis	●	◐	◐	●	✕	✕	✕
<i>Lindsaea linearis</i>		●	◐	●	●	✕	✕	◐
<i>Pellaea falcata</i>		●	◐	●	◐	✕	✕	●
<i>Polystichum neozelandicum</i>	tutoke, shield fern	◐	✕	◐	●	✕	✕	◐
<i>Polystichum wawranum</i>	tutoke, shield fern	◐	✕	◐	●	✕	✕	◐
<i>Pteridium esculentum</i>	bracken	●	◐	●	●	✕	◐	●
<i>Pteris comans</i>	NZ coastal brake	◐	◐	◐	●	✕	✕	✕
<i>Pteris macilenta</i>		✕	●	✕	●	✕	✕	✕
Low ground plants etc								
<i>Astelia banksii</i>	coastal astelia	●	◐	●	◐	✕	✕	●
<i>Calystegia soldanella</i>	nihinihi, shore bindweed	●	✕	✕◐	●	✕	✕	✕
<i>Celmisia major</i> var. <i>major</i>	Waitakere rock daisy	●	✕	●	●	✕	✕	●
<i>Centella uniflora</i>	marsh pennywort	●	◐	●	●	✕	●	●
<i>Coprosma acerosa</i>	sand coprosma	●	✕	●	●	✕	✕	●
<i>Cordylone pumilio</i>	ti rauriki, dwarf cabbage tree	●	◐	●	●	✕	●	◐
<i>Cotula coronopifolia</i>	bachelor's buttons	●	✕	✕	●	●	✕	●
<i>Dianella nigra</i>	turutu, NZ blueberry	●	●	●	●	✕	●	◐
<i>Dichondra repens</i>	mercury bay weed	●	◐	●	●	✕	✕	●
<i>Disphyma australe</i>	horokaka, NZ iceplant	●	✕	●	✕	✕	✕	●
<i>Hebe bishopiana</i>	Huia hebe	●	✕	◐	●	✕	✕	●
<i>Hebe obtusata</i>	west coast cliff hebe	●	✕	●	●	✕	✕	●
<i>Leucopogon fraseri</i>	patotara	●	✕	●	●	✕	✕	●
<i>Muehlenbeckia complexa</i>	pohuehue	●	✕	●	●	●	✕	●
<i>Nertera depressa</i>	nertera	●	●	✕	●	◐	✕	◐
<i>Peperomia urvilleana</i>		◐	●	●	●	✕	✕	◐
<i>Samolus repens</i>	shore pimpernel	●	✕	✕	●	◐	✕	●
<i>Scandia rosifolia</i>	coastal angelica	●	✕	◐	●	✕	✕	●
<i>Selliera radicans</i>	remuremu	●	✕	◐	●	◐	✕	●
<i>Tetragonia implexicoma</i>	NZ spinach	●	◐	◐	●	✕	✕	●



KEY ● fully tolerant ◐ tolerates some ✕ not tolerant ♥ Nurse plant
 ♦ tolerates shade during establishment ⬤ needs some shade to establish

			Tolerance						
			Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind
Grasses, Sedges, Rushes									
<i>Apodasmia similis</i>	oioi, jointed rush		●	◐	◐	●	●	✕	●
<i>Austrofestuca littoralis</i>	sand tussock		●	✕	●	◐	✕	✕	◐
<i>Carex lambertiana</i>			◐	●	◐	●	✕	◐	✕
<i>Carex secta</i>	pukio		●	◐	✕	✕	●	✕	◐
<i>Carex solandri</i>			◐	●	◐	●	✕	✕	✕
<i>Carex raotest</i>	orange dune sedge		◐	●	●	●	✕	✕	●
<i>Carex virgata</i>			●	●	✕	●	●	◐	◐
<i>Cortaderia splendens</i>	coastal toetoe	♥	●	✕	●	●	✕	●	●
<i>Cyperus ustulatus</i>	upoko tangata, giant umbrella sedge		●	✕	✕	●	●	✕	●
<i>Desmoschoenus spiralis</i>	pingao		●	✕	●	◐	✕	✕	●
<i>Gahnia lacera</i>	bamboo cutty grass		◐	●	●	●	✕	●	◐
<i>Juncus pallidus</i>	giant rush		●	✕	◐	●	●	●	✕
<i>Microlaena polynoda</i>	bamboo rice grass		◐◐	◐◐	●	✕	✕	✕	◐
<i>Microlaena stipoides</i>	rice grass		●	●	●	✕	✕	●	●
<i>Poa anceps</i>	plumed tussock		●	◐◐	●	●	✕	✕	●
<i>Spinifex sericeus</i>	kowhangatara, silver sand grass		●	✕	●	●	✕	✕	●

Planting notes, comments

Coastal Plants:

Pingao grows in shifting sand.

Silver sand grass, sand tussock and tauhinu (*Oxothamnus leptophylla*) grow in settled sand.

Horokaka, shore pimpernel and remuremu naturally grow at the high tide mark, but will also grow in sandy gardens.

Carex secta only grows in still, not flowing, water

Carex virgata grows in flowing water and areas prone to flooding. *C. virgata* is more commonly found and has a wider habitat range than *C. secta*.

Manukau • Kahu

stormy coastal hills ecosystem

KEY ♥ Nurse plant ■ Main component ♣ rare ✕ toxic to toddlers 🐟 coastal sites only 🗨 epiphyte
For restoration, in this habitat: ●●● plant liberally ●● plant generally ● plant sparingly

Recommended planting sites

		Gully Head	Boggy Area	Rock-land	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
Tall trees										
<i>Agathis australis</i>	kauri				●●	●		●●	●	
<i>Dacrycarpus dacrydioides</i>	kahikatea	●	●●				●		●	●●
<i>Dacrydium cupressinum</i>	rimu				●	●		●	●	
<i>Metrosideros excelsa</i>	pohutukawa	●		●	●	●				
<i>Phyllocladus trichomanoides</i>	tanekaha				●	●				
<i>Prumnopitys ferruginea</i>	miro	●			●	●		●		
Medium trees										
<i>Beilschmiedia tarairi</i>	taraire	●●				●	●		●	
<i>Beilschmiedia tawa</i>	tawa	●				●		●	●	
<i>Corynocarpus laevigatus</i>	karaka ✕	●				●●			●	●●
<i>Dysoxylum spectabile</i>	kohekohe	●				●			●	
<i>Elaeocarpus dentatus</i>	hinau				●	●		●	●	
<i>Hedycarya arborea</i>	porokaiwhiri, pigeonwood	●●				●	●			
<i>Knightia excelsa</i>	rewarewa	●			●	●●		●	●	
<i>Kunzea ericoides</i>	kanuka ♥	●●		●●	●●●	●●●	●●●	●●●	●●●	●●
<i>Laurelia novae-zelandiae</i>	pukatea		●							
<i>Litsea calicaris</i>	mangeao				●	●		●		
<i>Nestegis lanceolata</i>	white maire	●				●		●	●	
<i>Vitex lucens</i>	puriri	●				●	●	●	●	●
Small trees/large shrubs										
<i>Brachyglottis repanda</i>	rangiora ♥✕	●			●●	●●	●	●●	●●	
<i>Carmichaelia australis</i>	NZ broom				●	●		●		
<i>Carpodetus serratus</i>	putawetaweta		●●				●			●●●
<i>Coprosma arborea</i>	mamangi ♥	●●					●	●●	●●●	
<i>Coprosma lucida</i>	shining karamu ♥			●●●	●●●	●●		●●	●●	
<i>Coprosma robusta</i>	karamu ♥	●●●			●●●	●●●	●●●	●●●	●●●	●●
<i>Cordyline australis</i>	ti kouka, cabbage tree	●●	●●●		●	●●	●●●	●●	●●●	●●
<i>Cordyline banksii</i>	forest cabbage tree	●●			●●	●●		●●	●●	
<i>Cyathea dealbata</i>	ponga, silver tree fern	●●●			●●	●●●	●●●	●●●	●●●	●●
<i>Cyathea medullaris</i>	mamaku, black tree fern	●●				●●●	●●		●●	●●
<i>Dodonaea viscosa</i>	akeake				●●	●		●		
<i>Geniostoma rupestre</i>	hangehange ♥	●●●			●●	●●●	●●●	●●●	●●●	●●●
<i>Griselinia lucida</i>	puka 🗨			●						
<i>Leptospermum scoparium</i>	manuka	●●●	●●●		●●●	●●●	●●●	●●●	●●●	●●●
<i>Leucopogon fasciculatus</i>	mingimingi ♥	●●●		●	●●●	●●●		●●●	●●	
<i>Macropiper excelsum</i>	kawakawa ♥	●●				●●●	●●●	●	●●	●●●
<i>Melicytus macrophyllus</i>	large leaved mahoe	●●			●●	●●		●●	●●	
<i>Melicytus ramiflorus</i>	mahoe	●●		●	●	●●	●●	●●	●●	●●●
<i>Myoporum laetum</i>	ngaio 🐟									



KEY ● fully tolerant ◐ tolerates some ✕ not tolerant
 ◆ tolerates shade during establishment ◇ needs some shade to establish

	Tolerance								Comments
	Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind		
	●	❖	☐	●	✕	●	☐		
	●	❖	✕	●	●	✕	✕		
	●	⬆	✕	●	☐	☐	✕		
	●	✕	●	●	●	☐	☐		
	●	☐	●	●	✕	●	☐		
	●	⬆●	☐	●	✕	✕	☐		
	●	⬆●	✕	●	✕	✕	☐		Natural neighbours: karaka, kohekohe, kanuka and pohutukawa can form groves, ie. a monocultural canopy.
	●	⬆●	✕	●	✕	✕	☐		Karaka and kohekohe are often the dominant components of the coastal forest. The main understory is hangehange, kawakawa, mahoe and gahnia.
	●	⬆	✕	●	✕	✕	✕		
	●	☐	●	●	✕	●	●		
	●	⬆	✕	☐	●	●	☐		
	●	⬆	●	●	✕	●	☐		
	●	☐	☐	●	✕	☐	✕		
	●	☐	☐	●	✕	✕	✕		
	●	☐	☐	●	✕	●	☐		
	●	⬆☐	✕	●	☐	☐	☐		
	●	☐	●	●	✕	●	●		
	●	☐	●	●	☐	☐	☐		
	●	☐	☐	●	✕	●	✕		
	●	⬆	✕	●	✕	☐	☐		
	●	✕	●	●	✕	●	●		
	●	●	●	●	✕	☐	☐		
	●	☐	●	●	✕	☐	☐		Puka is naturally epiphytic when growing in the wild.
	●	✕	●	●	●	●	●		
	●	☐	●	●	✕	●	☐		
	☐	●	✕	●	✕	✕	☐		
	●	●	☐	●	✕	☐	✕		
	●	●	☐	●	✕	☐	☐		
	●	✕	●	●	✕	☐	●		

Manukau • Kahu

stormy coastal hills ecosystem

KEY ♥ Nurse plant ■ Main component ❀ rare ✕ toxic to toddlers 🌊 coastal sites only 🍄 epiphyte
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Recommended planting sites

			Gully Head	Boggy Area	Rock-land	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
Small trees/large shrubs											
<i>Myrsine australis</i>	mapou, red matipo	♥	●●			●●●	●●●		●●	●●	
<i>Olearia furfuracea</i>	akepiro	♥				●●●	●●		●●●	●●	
<i>Pittosporum ellipticum</i>						●			●	●	
<i>Pseudopanax arboreus</i>	whauwhaupaku five finger		●●						●●	●●	
<i>Pseudopanax crassifolius</i>	horoeka, lancewood					●			●●	●●	
<i>Pseudopanax lessonii</i>	houpara					●	●●		●	●●	●●●
<i>Rhopalostylis sapida</i>	nikau		●●	●●				●●		●●	●●●
<i>Sophora fulvida</i>	west coast kowhai	✕			●●●	●●●	●●				
<i>Toronia toru</i>	toru					●●			●●	●	
Shrubs and flax like plants											
<i>Coprosma crassifolia</i>	stiff stemmed mingimingi					●●	●			●	●●
<i>Coprosma rhamnoides</i>			●●			●●●	●●		●●●	●●●	●●
<i>Corokia cotoneaster</i>	bluff korokio					●					
<i>Dracophyllum sinclairii</i>	spiderwood					●●			●		
<i>Freycinetia banksii</i>	kiekie			●●			●	●●			●
<i>Gaultheria antipoda</i>	bush snowberry					●●	●●				
<i>Hebe macrocarpa</i>	koromiko					●●			●●		
<i>Hebe stricta</i>	koromiko					●●			●●		
<i>Leucopogon fraseri</i>	patotara					●●●	●●		●●●	●●	
<i>Lophomyrtus obcordata</i>	rohutu					●			●	●	●
<i>Melicope simplex</i>	poataniwha					●	●		●	●	●
<i>Ozothamnus leptophylla</i>	tauhinu					●●	●●		●		
<i>Phormium cookianum</i>	wharariki, mountain flax	♥		●●●	●●						
<i>Phormium tenax</i>	harakeke, flax	♥		●●●			●●●	●●●	●●	●●	●●
<i>Pomaderris kumeraho</i>	kumerahou					●●			●●	●●	
<i>Pomaderris phyllicifolia</i>	tauhinu					●●●			●●		
<i>Rhabdothermus solandri</i>	taurepo		●		●●						
Vines and trailers											
<i>Metrosideros carminea</i>	akakura, carmine rata	❀	●		●		●			●	
<i>Metrosideros perforata</i>	akatea, small white rata				●		●			●	
<i>Parsonsia capsularis</i>	kaiwhiria, native jasmine	❀						●		●	●
<i>Parsonsia heterophylla</i>	kaiku, native jasmine							●		●	●
Ferns											
<i>Adiantum cunninghamii</i>	common maidenhair							●		●	●
<i>Adiantum hispidulum</i>	rosy maidenhair							●		●	●
<i>Asplenium flaccidum</i>	makawe, hanging spleenwort							●		●	●
<i>Asplenium lamprophyllum</i>	glossy asplenium							●		●	●
<i>Asplenium oblongifolium</i>	huruhuruwhenua shining spleenwort							●		●	●



KEY ● fully tolerant ◐ tolerates some ✕ not tolerant
 ◆ tolerates shade during establishment ◊ needs some shade to establish

	Tolerance								Comments
	Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind		
	●	◈◐	●	●	✕	◐	✕		
	●	✕	●	●	✕	●	●		
	●	◐	◐	●	✕	◐	●		
	●	◐	✕	●	✕	✕	✕		
	●	❖	◐	●	✕	◐	✕		
	●	◐	◐	●	✕	✕	●		
	●	◈	✕	●	◐	✕	◐		
	●	◐	●	●	✕	✕	●		<i>Sophora fulvida</i> grows on rock outcrops and bluffs, west of
	●	◐	●	●	✕	●	◐		Scenic Drive, including the west coast and Manukau Harbour, from Whatipu to Cornwallis
	●	◐	●	●	✕	✕	◐		
	●	●	●	●	✕	●	●		
	●	◐	●	●	✕	●	●		
	●	●	●	●	✕	●	✕		
	●	●	✕	●	●	✕	◐		
	●	◐	●	●	✕	●	●		
	●	◐	●	●	✕	●	◐		
	●	◐	◐	●	✕	●	●		<i>Hebe macrocarpa</i> and <i>Hebe stricta</i> do not occur naturally
	●	◐	◐	●	✕	✕	✕		together. Plant one or the other.
	●	◐	●	●	✕	●	●		
	●	✕	●	◐	✕	●	●		
	●	◐	●	●	✕	●	●		
	●	✕	◐	●	●	◐	●		
	●	✕	●	◐	✕	●	◐		
	●	◐	●	◐	✕	●	●		
	◐	●	●	●	✕	✕	✕		
	●	●	◐	●	✕	✕	✕		
	●	◈◐	◐	●	✕	✕	●		
	●	❖	✕	●	✕	✕	◐		
	●	❖	✕	●	✕	✕	✕		
	◐	◐	◐	●	✕	✕	✕		
	●	◐	●	●	✕	✕	✕		
	✕	●	✕	●	✕	✕	✕		
	✕	●	✕	●	✕	✕	✕		
	✕	●	✕	●	✕	✕	✕		

Manukau • Kahu

stormy coastal hills ecosystem

KEY ● fully tolerant ◐ tolerates some ✕ not tolerant ☞ epiphyte
 ◆ tolerates shade during establishment ⬢ needs some shade to establish

			Tolerance						
			Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind
Ferns									
<i>Blechnum chambersii</i>	rereti		✕	●	✕	●	✕	✕	✕
<i>Blechnum discolor</i>	crown fern		◐	●	✕	●	✕	●	✕
<i>Blechnum filiforme</i>	thread fern		✕	●	✕	●	✕	✕	✕
<i>Blechnum fraseri</i>	hard fern		◐	●	✕	●	✕	✕	✕
<i>Blechnum fulvatile</i>			✕	●	✕	●	◐	●	✕
<i>Blechnum membranaceum</i>			✕	●	✕	●	✕	✕	✕
<i>Blechnum novae-zelandiae</i>	kiokio	♥	◐	●	✕	●	◐	●	◐
<i>Doodia australis</i>	pukupuku		✕	●	✕	●	✕	●	●
<i>Hymenophyllum spp.</i>	filmy ferns		✕	●	✕	●		✕	✕
<i>Lastreopsis glabella</i>			✕	●	✕	●	✕	✕	✕
<i>Lastreopsis hispida</i>	hairy legs		✕	●	✕	●	✕	✕	✕
<i>Lastreopsis microsora</i>			✕	●	✕	●	✕	✕	✕
<i>Lastropsis velutina</i>	velvet fern		✕	●	✕	●	✕	✕	✕
<i>Lindsaea linearis</i>			●	◐	●	●	●	●	◐
<i>Lindsaea trichomanoides</i>			◐	●	◐	●	✕	●	✕
<i>Lygodium articulatum</i>	mangemange			●	✕	◐	✕	✕	✕
<i>Pellaea rotundifolia</i>	tarawera, button fern		●	●	◐	●	✕	✕	✕
<i>Phymatosorus pustulatum</i>	kowaowao, maratata		◐	●	◐	●	✕	✕	◐
<i>Phymatosorus scandens</i>	moki, fragrant fern		✕	●	✕	●	✕	✕	✕
<i>Polystichum neozelandicum</i>	tutoke, shield fern		◐	✕	◐	●	✕	✕	◐
<i>Polystichum wawranum</i>	tutoke, shield fern		◐	✕	◐	●	✕	✕	◐
<i>Pteridium esculentum</i>	bracken		✕	◐	✕	●	✕	◐	●
<i>Pteris macilentia</i>			✕	●	✕	●	✕	✕	✕
<i>Pteris tremula</i>	tuawera, trembling brake		✕	●	✕	●	✕	✕	✕
Low ground plants etc									
<i>Arthropodium cirratum</i>	rengarenga, rock lily		●	●	●	●	✕	✕	●
<i>Astelia banksii</i>	coastal astelia	☞	●	◐	●	◐	✕	✕	●
<i>Astelia solandri</i>	kowharawhara, perching lily	☞	●	●	●	●	✕	✕	●
<i>Astelia trinervia</i>	kauri grass		◐	●	◐	●	✕	✕	●
<i>Centella uniflora</i>	marsh pennywort		●	◐	●	●	✕	●	●
<i>Cordylone pumilio</i>	ti rauriki, dwarf cabbage tree		●	◐	●	●	✕	●	◐
<i>Collospermum hastatum</i>	kahakaha	☞	●	●	◐	●	✕	✕	◐
<i>Dianella nigra</i>	turutu, NZ blueberry		●	●	●	●	✕	●	◐
<i>Hebe bishopiana</i>	Huia hebe		●	●	◐	●	✕	✕	●
<i>Libertia grandiflora</i>	large flowered iris		◐	●	●	●	✕	◐	✕
<i>Libertia ixioides</i>	mikoikoi, NZ iris		◐	●	●	●	✕	◐	✕
<i>Lycopodium deuterodensum</i>	tree clubmoss		◐	●	◐	●	✕	●	✕
<i>Nertera dichondrifolia</i>	northern nertera		●	◐	◐	●	✕	✕	✕
<i>Peperomia urvilleana</i>		☞	◐	●	●	●	✕	✕	◐
<i>Pimelea prostrata</i>	prostrate daphne		●	✕	●	●	✕	✕	●



KEY ● fully tolerant ◐ tolerates some ✕ not tolerant ☞ epiphyte
 ♦ tolerates shade during establishment ◊ needs some shade to establish

		Tolerance						
		Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind
Grasses, Sedges, Rushes								
<i>Cortaderia fulvida</i>	toetoe	●	✕	●	●	●	●	●
<i>Cortaderia splendens</i>	coastal toetoe	●	✕	●	●	✕	●	●
<i>Cyperus ustulatus</i>	upoko tangata, giant umbrella sedge	●	✕	✕	●	●	✕	✕
<i>Gahnia lacera</i>	bamboo cutty grass	◐	◐	●	●	✕	●	◐
<i>Gahnia setifolia</i>	cutty grass	●	◐	●	●	✕	●	●
<i>Gahnia xanthocarpa</i>	toikiwi, cutty grass	◐	●	✕	●	●	●	●
<i>Juncus pallidus</i>	giant rush	●	✕	◐	●	●	●	●
<i>Machaerina sinclairii</i>	tuhara, pepepe	●	◐	◐	●	✕	◐	✕
<i>Microlaena avenacea</i>	forest rice grass	◐	◐	◐	●	✕	✕	◐
<i>Microlaena stipoides</i>	meadow rice grass	◐	◐	◐	●	✕	✕	◐

Planting notes, comments

Coastal astelia, kowharawhara, kahakaha and wharanui are all epiphytes

Kauri grass only grows in association with kauri trees

Kowhai • Kotare

harbour coastline ecosystem

KEY ♥ Nurse plant ■ Main component ♣ rare ✕ toxic to toddlers 🐟 coastal sites only 🍄 epiphyte
For restoration, in this habitat: ●●● plant liberally ●● plant generally ● plant sparingly

Recommended planting sites

			Gully Head	Boggy Area	Coastal Escarpment	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
Tall trees											
<i>Agathis australis</i>	kauri	■				●			●	●	
<i>Dacrycarpus dacrydioides</i>	kahikatea	■	●	●				●			●●
<i>Metrosideros excelsa</i>	pohutukawa	🐟	●				●		●	●	
<i>Phyllocladus trichomanoides</i>	tanekaha					●●	●		●	●	
<i>Podocarpus totara</i>	lowland totara								●	●	●
<i>Prumnopitys ferruginea</i>	miro		●						●	●	
<i>Prumnopitys taxifolia</i>	matai									●	●
Medium trees											
<i>Alectryon excelsus</i>	titoki		●				●	●		●	●
<i>Beilschmiedia tarairi</i>	taraire [local]		●●					●		●	
<i>Beilschmiedia tawa</i>	tawa		●				●●			●	
<i>Corynocarpus laevigatus</i>	karaka	✕■	●				●●			●	●
<i>Dysoxylum spectabile</i>	kohekohe	■	●●				●●	●		●	
<i>Elaeocarpus dentatus</i>	hinau						●		●		
<i>Knightia excelsa</i>	rewarewa		●			●	●		●	●	
<i>Kunzea ericoides</i>	kanuka	♥■			●	●●●	●	●	●●●	●●●	●●●
<i>Laurelia novae-zelandiae</i>	pukatea			●●							●●
<i>Litsea calicaris</i>	mangeao					●	●		●		
<i>Metrosideros excelsa</i>	pohutukawa	♥■			●	●	●				●
<i>Nestegis lanceolata</i>	white maire						●		●	●	●
<i>Pittosporum eugenioides</i>	tarata, lemonwood								●	●	●
<i>Pittosporum tenuifolium</i>	kohuhu							●	●	●	
<i>Pouteria costata</i>	tawapou 🐟						●		●	●	●
<i>Sophora chathamica</i>	kowhai	✕■				●●	●●		●	●	●
<i>Sophora microphylla</i>	kowhai	✕■				●●	●●	●		●	●
<i>Vitex lucens</i>	puriri	■	●				●	●	●	●	●
Small trees/large shrubs											
<i>Alseuosmia macrophylla</i>	toropapa		●				●		●	●	
<i>Aristotelia serrata</i>	makomako, wineberry		●					●			
<i>Avicennia marina</i>	manawa, mangrove [estuary]										
<i>Brachyglottis repanda</i>	rangiora	✕♥■	●				●●	●		●●	
<i>Carmichaelia australis</i>	NZ broom					●	●		●		
<i>Coprosma arborea</i>	mamangi	♥■					●			●●	
<i>Coprosma lucida</i>	shining karamu	♥■			●	●●●	●●		●●●	●●	●●
<i>Coprosma macrocarpa</i>	coastal karamu		●			●	●		●●	●●	●●
<i>Coprosma robusta</i>	karamu	♥	●			●	●	●●●	●●●	●●●	●●●
<i>Coriaria arborea</i>	tutu	✕♥	●		●		●	●●			●
<i>Cordyline australis</i>	ti kouka, cabbage tree	■		●●●				●●			●●
<i>Cordyline banksii</i>	ti ngahere, forest cabbage tree						●	●	●	●	

Key: ● fully tolerant ◐ tolerates some ✕ not tolerant

◈ tolerates shade during establishment ◊ needs some shade to establish ○ shade needed at base

Tolerance								Comments
Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind		
○	◈	◐	●	✕	●	◐		
●	◈◐	✕	●	●	✕	✕		
●	✕	●	●	✕	◐	◐		
●	◐	●	●	✕	●	◐		
●	◐	●	●	✕	◐	◐		
○	◊●	◐	●	✕	✕	◐		
●	◈◐	◐	●	✕	✕	◐		
●	◊●	✕	●	✕	✕	✕		
●	◊●	✕	●	✕	✕	◐		
○	◊●	✕	●	✕	✕	✕		
●	◊◐	◐	●	✕	◐	✕		
●	◐	◐	●	✕	◐	◐		
●	◐	●	●	✕	●	●		
○	◊	✕	◐	●	✕	✕		
●	◊	●	●	✕	●	◐		
●	✕	●	●	✕	●	●		
○	◐	◐	●	✕	◐	✕		
●	◐	◐	●	✕	◐	●		
●	◐	◐	●	✕	◐	◐		Kowhai distribution:
●	◐	●	●	✕	✕	●		Sophora chathamica is found mostly on forest margins and
●	◈✕	◐	●	✕	✕	◐		lowland sites. Plant east of Scenic Drive and Cornwallis.
●	◈✕	●	●	✕	✕	◐		Sophora microphylla has a wide habitat range and occurs
●	◐	◐	●	✕	✕	✕		throughout Waitakere on terraces and hillslopes.
◐	●	✕	●	✕	✕	✕		
○	●	✕	●	✕	✕	✕		
●	◊●	✕	●	●	✕	✕		Requires estuarine conditions
●	◐	◐	●	✕	●	◐		
●	◊◐	✕	●	◐	◐	✕		
●	◊	◐	●	✕	✕	✕		
●	◐	●	●	✕	●	●		
●	◐	◐	●	✕	◐	◐		
●	◈✕	●	●	✕	●	◐		
●	◐	●	●	✕	◐	◐		
●	◐	◐	●	●	◐	●		
●	◐	●	●	✕	◐	◐		

Kowhai • Kotare

harbour coastline ecosystem

KEY ♥ Nurse plant ■ Main component ♣ rare ✕ toxic to toddlers 🐟 coastal sites only 🍄 epiphyte
For restoration, in this habitat: ●●● plant liberally ●● plant generally ● plant sparingly

Recommended planting sites

Small trees/large shrubs continued			Gully Head	Boggy Area	Escarpment	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
<i>Cyathea dealbata</i>	ponga, silver tree fern	■	●●				●●	●	●●	●●●	●●
<i>Cyathea medullaris</i>	mamaku, black tree fern		●●●				●●●	●●		●	●
<i>Cyathodes juniperina</i>	prickly mingimingi					●			●		
<i>Dicksonia squarrosa</i>	wheki										●
<i>Dodonaea viscosa</i>	akeake				●	●					
<i>Entelea arborescens</i>	whau 🐟		●					●			
<i>Geniostoma rupestre</i>	hangehange	♥■	●●●		●	●	●●●	●●●	●●●	●●●	●●●
<i>Griselinia lucida</i>	puka				●●	●					
<i>Hedycarya arborea</i>	pigeonwood		●●				●	●	●	●	●●
<i>Hoheria populnea</i>	houhere, lacebark	♥■	●●				●●	●●		●	
<i>Leptospermum scoparium</i>	manuka	♥■	●●	●●		●●●	●●	●●●	●●●	●●●	●●●
<i>Leucopogon fasciculatus</i>	mingimingi					●●●	●	●	●●●	●●●	●
<i>Macropiper excelsum</i>	kawakawa	♥■	●●●				●●	●	●	●●	●●
<i>Melicope ternata</i>	wharangi 🐟♣		●				●		●	●	
<i>Melicytus macrophyllus</i>	large leaved mahoe		●			●			●	●	
<i>Melicytus micranthus</i>	manakura									●	●
<i>Melicytus ramiflorus</i>	mahoe	♥■	●●●				●●	●	●	●●	●
<i>Mida salicifolia</i>	maire taiki							●		●	●
<i>Myoporum laetum</i>	ngaio 🐟✕					●	●				
<i>Myrsine australis</i>	mapou, red matipo	■				●●	●●	●	●●	●●●	●●
<i>Olearia furfuracea</i>	akepiro	♥■				●●	●●		●●●	●●	
<i>Olearia rani</i>	heketara		●●				●●	●			
<i>Olearia solandri</i>	coastal tree daisy 🐟♥			●							●
<i>Pittosporum crassifolium</i>	karo										●
<i>Pseudopanax arboreus</i>	whauwhaupaku, fivefinger		●				●	●	●	●●	
<i>Pseudopanax crassifolius</i>	horoeka, lancewood		●			●	●		●●	●●	
<i>Pseudopanax lessonii</i>	houpara 🐟		●			●	●		●●	●●	
<i>Schefflera digitata</i>	pate		●●				●	●●		●	●
<i>Sophora fulvida</i>	west coast kowhai 🐟✕■				●●●	●●					
<i>Streblus heterophyllus</i>	turepo		●					●		●	●●
<i>Rhopalostylis sapida</i>	nikau	■	●●	●●			●●	●●		●●	●●
<i>Toronia toru</i>	toru					●●			●●	●	
Shrub & flax-like plants											
<i>Brachyglottis kirkii</i> var. <i>angustior</i>	kohurangi, Kirk's daisy					●	●		●	●	
<i>Coprosma propinqua</i>	mingimingi			●							
<i>Coprosma rhamnoides</i>					●●●	●●		●●●	●●	●●	
<i>Coprosma spathulata</i>						●●	●		●●●	●●	●●
<i>Corokia buddleioides</i>	korokio					●				●	
<i>Corokia cotoneaster</i>	bluff korokio				●	●					
<i>Dracophyllum sinclairii</i>	spiderwood					●●			●●	●	
<i>Freycinetia banksii</i>	kiekie		●●	●●				●●			

KEY: ● fully tolerant ◐ tolerates some ✕ not tolerant

◈ tolerates shade during establishment ◑ needs some shade to establish ○ shade needed at base

Tolerance								Comments
Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind		
○	◑	●	●	✕	●	✕		
○	◑	✕	●	✕	◐	◐		
●	●	●	●	✕	●	✕		
○	◑	✕	●	✕	✕	✕		
●	✕	●	●	✕	●	●		
●	◐	●	●	✕	✕	✕		
●	●	◐	●	✕	◐	◐		
●	◐	●	●	✕	◐	◐		
●	◐	●	●	✕	◐	✕		
●	◈	●	●	✕	◐	✕		
●	✕	●	●	◐	●	●		
●	◐	●	●	✕	◐	◐		
○	●	●	●	✕	◐	◐		
●	◐	●	●	✕	◐	◐		
●	◐	●	●	✕	◐	✕		
◐	◐	●	●	✕	◐	✕		
●	◐	●	●	✕	◐	✕		
◐	◐	●	●	✕	◐	✕		
●	◐	●	●	✕	●	●		
●	◈	●	●	✕	●	●		
●	◐	●	●	✕	◐	●		
●	◐	●	●	✕	◐	◐		
●	✕	✕	●	✕	●	●		
●	◐	●	●	✕	◐	●		
●	◐	✕	●	✕	◐	✕		
●	◐	●	●	✕	◐	✕		
●	◐	●	●	✕	◐	●		
○	◈	✕	●	✕	◐	✕		Kowhai distribution:
●	◐	●	●	✕	◐	●		Sophora fulvida grows on rock outcrops and bluffs west of
○	◐	✕	●	✕	◐	✕		Scenic Drive, including the West Coast and Manukau
○	◐	✕	●	✕	◐	◐		Harbour, from Whatipu to Cornwallis.
●	◐	●	●	✕	◐	◐		
◐	●	✕	●	✕	✕	✕		
●	✕	✕	●	●	◐	◐		
●	●	●	●	✕	●	●		
◐	●	●	●	✕	●	✕		
◐	●	●	●	✕	●	✕		
●	◐	●	●	✕	●	●		
●	●	●	●	✕	●	✕		
○	◑	✕	●	●	✕	◐		

Kowhai • Kotare

harbour coastline ecosystem

KEY ♥ Nurse plant ■ Main component ❀ rare ✕ toxic to toddlers 🐟 coastal sites only 🗨 epiphyte
For restoration, in this habitat: ●●● plant liberally ●● plant generally ● plant sparingly

Recommended planting sites

Shrub & flax-like plants continued

		Gully Head	Boggy Area	Rock-land	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
<i>Gaultheria antipoda</i>	bush snowberry				●					
<i>Hebe macrocarpa</i>	koromiko				●●	●		●		
<i>Hebe stricta</i>	koromiko	♥			●			●	●	
<i>Leionema nudum</i>	mairehau				●			●		
<i>Melicope simplex</i>	poataniwha				●			●	●	●
<i>Phormium cookianum</i>	wharariki, mountain flax	♥■		●●	●●	●●				
<i>Phormium tenax</i>	harakeke, flax	♥■	●●●				●			●
<i>Pimelea longifolia</i>	taranga, long-leaved pimelia				●			●		
<i>Pittosporum cornifolium</i>	tawhirikaro	🗨		●	●	●				
<i>Plagianthus divaricatus</i>	marsh ribbonwood	🐟				●			●	
<i>Pomaderris kumeraho</i>	kumerahou				●	●		●●	●	
<i>Pomaderris phyllicifolia</i>	tauhinu			●	●●			●●		
<i>Rhabdothamus solandri</i>	taurepo			●		●				
<i>Typha orientalis</i>	raupo		●							

Vines and trailers

	powhiwhi, convolvulus		●				●			●
<i>Clematis forsteri</i>	puataua, scented clematis				●					
<i>Clematis paniculata</i>	puawananga, bush clematis	●				●	●	●	●●	
<i>Metrosideros carminea</i>	akakura, carmine rata	❀		●		●			●	
<i>Metrosideros fulgens</i>	rata vine	●				●	●		●●	
<i>Metrosideros perforata</i>	akatea, small white rata	●		●●		●			●●	
<i>Parsonsia heterophylla</i>	kaiku, NZ jasmine					●			●●	●●
<i>Passiflora tetrandra</i>	kohia, NZ passion vine	●					●		●	●●
<i>Ripogonum scandens</i>	kareao, supplejack	●●	●			●●	●●		●	●
<i>Rubus australis</i>	bush lawyer					●	●	●	●	
<i>Rubus cissoides</i>	tataramoa, bush lawyer	●				●●	●	●	●●	●●

Ferns

<i>cunninghamii</i>	common maidenhair			●		●		●	●	
<i>Adiantum fulvum</i>	downy maidenhair								●	●
<i>Adiantum hispidulum</i>	rosy maidenhair			●		●				
<i>Adiantum viridescens</i>						●			●	
<i>Asplenium flabellifolium</i>	necklace fern			●		●				
<i>Asplenium flaccidum</i>	makawe, hanging splenwort	🗨			●	●		●	●	●
<i>Asplenium lamprophyllum</i>	glossy asplenium					●		●		

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◈ tolerates shade during development ◊ needs some shade to establish ○ shade needed at base

Tolerance								Comments
Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind		
●	◐	●	●	✕	●	●		
●	◐	●	●	✕	●	◐		
●	◐	●	●	✕	●	●		
●	●	●	●	✕	●	✕		
●	◐	●	●	✕	●	●		
●	◐	●	●	✕	●	●		
●	✕	◐	●	●	◐	●		
●	◐	●	◐	✕	◐	✕		
◐	◐	●	●	✕	✕	✕		
●	✕	✕	●	●	✕	●		Natural neighbours: plant marsh ribbonwood in the salt marsh zone, between mangroves and land shrubs, such as oioi and mingimingi (<i>Coprosma propinqua</i>)
●	✕	●	●	✕	●	◐		
●	✕	●	✕	✕	●	●		
◐	●	●	●	✕	✕	✕		
●	✕	✕	✕	●	✕	✕		
●	✕	◐	●	●	◐	✕		
●	◊	●	●	✕	✕	✕		
●	◊	✕	●	✕	✕	✕		
●	●	◐	●	✕	✕	✕		
●	◊	✕	●	✕	✕	✕		
●	◊●	◐	●	●	✕	◐		
●	◊	✕	●	✕	✕	✕		
●	◐	✕	●	✕	✕	✕		
●	◊	✕	●	◐	✕	✕		
●	◐	◐	●	✕	✕	✕		
◐	●	◐	◐	✕	✕	◐		
✕	●	✕	●	✕	✕	✕		
●	◐	●	●	✕	✕	✕		
✕	◐	●	●	✕	✕	✕		
●	◐	●	●	✕	✕	✕		
✕	●	✕	●	✕	◐	✕		
✕	●	✕	●	✕	◐	✕		

Kowhai • Kotare

harbour coastline ecosystem

Key: ● fully tolerant ◐ tolerates some ✕ not tolerant ☞ epiphyte
 ◆ tolerates shade during establishment ⬤ needs some shade to establish

		Tolerance						
		Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind
Ferns continued								
<i>Asplenium oblongifolium</i>	huruhuruwhenua, shining spleenwort	✕	●	✕	●	✕	✕	✕
<i>Asplenium northlandicum</i>	leatherleaf asplenium	●	●	●	●	✕	✕	✕
<i>Asplenium appendiculatum</i> ssp. <i>maritimum</i>		◐	●	◐	●	●	✕	✕
<i>Azolla filiculoides</i>	floating fern			✕		●	✕	✕
<i>Blechnum chambersii</i>	rereti	✕	●	✕	●	✕	✕	✕
<i>Blechnum discolor</i>	piupiu, crown fern	◐	●	✕	●	✕	●	✕
<i>Blechnum filiforme</i>	thread fern	✕	●	✕	●	✕	✕	✕
<i>Blechnum fraseri</i>	hard fern	◐	●	✕	●	✕	✕	✕
<i>Blechnum membranaceum</i>		✕	●	✕	●	✕	✕	✕
<i>Blechnum novae-zealandiae</i>	kiokio ♥	◐	●	✕	●	◐	●	◐
<i>Doodia australis</i>	pukupuku	●	●	●	●	✕	●	●
<i>Doodia mollis</i>	mokimoki	◐	●	●	●	✕	✕	✕
<i>Gleichenia microphylla</i>	waewaekaka	●	✕	◐	●	✕	●	◐
<i>Grammitis pseudociliata</i>		●	●	✕	●	✕	✕	✕
<i>Hymenophyllum</i> spp.	filmy ferns	✕	●	✕	●		✕	✕
<i>Lastreopsis glabella</i>		✕	●	✕	●	✕	✕	✕
<i>Lastreopsis hispida</i>	hairy legs	✕	●	✕	●	✕	✕	✕
<i>Lastreopsis microsora</i>		✕	●	✕	●	✕	✕	✕
<i>Lastreopsis velutina</i>	velvet fern	✕	●	✕	●	✕	✕	✕
<i>Lindsaea linearis</i>		●	◐	●	●	✕	✕	◐
<i>Lindsaea trichomanoides</i>		◐	●	◐	●	✕	●	✕
<i>Lygodium articulatum</i>	mangemange	◐	●	◐	●	✕	●	✕
<i>Paesia scaberula</i>	matata, ring fern	●	◐	◐	●	✕	◐	◐
<i>Pellaea rotundifolia</i>	tawawera, button fern	●	●	◐	●	✕	✕	✕
<i>Phymatosorus scandens</i>	moki, fragrant fern	✕	●	✕	●	✕	✕	✕
<i>Polystichum neozelandicum</i>	tutoke, shield fern	◐	✕	◐	●	✕	✕	◐
<i>Polystichum wawranum</i>	tutoke, shield fern	◐	✕	◐	●	✕	✕	◐
<i>Pteridium esculentum</i>	bracken	●	◐	●	●	✕	◐	●
<i>Pteris macilenta</i>	sweet fern	✕	●	✕	●	✕	✕	✕
<i>Pteris tremula</i>	turawera, trembling brake	✕	●	✕	●	✕	✕	✕
<i>Pyrrosia eleagnifolia</i>	leatherleaf fern ☞	◐	●	◐	●	✕	✕	◐
Low ground plants								
<i>Apium prostratum</i>	sea celery	●	✕	●	●	✕	✕	●
<i>Astelia banksii</i>	coastal astelia ☞	●	◐	●	◐	✕	✕	●
<i>Astelia solandri</i>	kowharawhara, perching lily ☞	●	●	●	●	✕	✕	●
<i>Astelia trinervia</i>	kauri grass	◐	●	◐	●	✕	✕	✕
<i>Calystegia soldanella</i>	nihinihi, shore bindweed	●	✕	◐	●	✕	✕	◐
<i>Celmisia major</i> var. <i>major</i>	Waitakere rock daisy	●	✕	●	✕	✕	✕	●
<i>Centella uniflora</i>	marsh pennywort	●	◐	●	●	✕	●	●
<i>Collospermum hastatum</i>	kahakaha ☞	●	●	◐	●	✕	✕	◐

KEY: ● fully tolerant ◐ tolerates some ✕ not tolerant

◆ tolerates shade during establishment ◇ needs some shade to establish ○ shade needed at base

		Tolerance						
		Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind
Low ground plants continued								
<i>Cordyline pumilio</i>	ti raurika, dwarf cabbage tree	●	◐	●	●	✕	●	◐
<i>Cotula coronopifolia</i>	bachelor's buttons	●	✕	✕	●	●	✕	●
<i>Dianella nigra</i>	turuturu, NZ blueberry	◐	●	●	●	✕	●	◐
<i>Dichondra repens</i>	Mercury Bay weed	●	◐	●	●	✕	✕	●
<i>Elatostema rugosum</i>	parataniwha	✕	●	✕	●	●	●	✕
<i>Hebe bishopiana</i>	Huia hebe	◆	✕	◐	●	✕	✕	●
<i>Hebe obtusata</i>	west coast cliff hebe	●	✕	●	●	✕	✕	●
<i>Leucopogon fraseri</i>	patotara	●	✕	●	●	✕	●	●
<i>Libertia grandiflora</i>	large flowered iris	●	◐	●	●	✕	◐	✕
<i>Libertia ixioides</i>	mikoikoi, NZ iris	●	◐	●	●	✕	◐	✕
<i>Lycopodium cernuum</i>	creeping clubmoss	●	◐	✕	◐	◐	●	●
<i>Lycopodium deuterodensum</i>	tree clubmoss	◐	●	◐	●	✕	●	✕
<i>Muehlenbeckia complexa</i>	pohuehue	●	✕	●	●	✕	✕	●
<i>Myosotis petiolata</i> var. <i>pansa</i>	Waitakere forget-me-not	◆	◐	✕	●	✕	✕	●
<i>Nertera depressa</i>	nertera	●	●	✕	●	◐	✕	◐
<i>Nertera dichondrifolia</i>	northern nertera	●	◐	◐	●	✕	✕	✕
<i>Peperomia urvilleana</i>		◐	●	●	●	✕	✕	◐
<i>Pimelea prostrata</i>	strathmore weed	●	◐	●	●	✕	✕	●
<i>Samolus repens</i>	shore pimpernel	●	✕	✕	●	◐	✕	●
<i>Scandia rosifolia</i>	coastal angelica	●	✕	◐	●	✕	✕	●
<i>Selliera radicans</i>	remuremu	●	✕	◐	●	◐	✕	●
Grasses, Sedges, Rushes								
<i>Apodasmia similis</i>	oiioi, jointed rush	●	◐	◐	●	●	✕	●
<i>Carex flagellifera</i>		●	●	●	●	✕	◐	◐
<i>Carex lambertiana</i>		◐	●	◐	●	✕	◐	✕
<i>Carex ochrosaccus</i>		◐	●	◐	●	✕	◐	✕
<i>Carex solandri</i>	Solander's sedge	◐	●	◐	●	◐	◐	◐
<i>Carex virgata</i>		●	●	◐	●	●	◐	◐
<i>Cortaderia fulvida</i>	toetoe	●	✕	●	●	●	●	●
<i>Cortaderia splendens</i>	coastal toetoe	●	✕	●	●	✕	●	●
<i>Cyperus ustulatus</i>	giant umbrella sedge	●	✕	✕	●	●	✕	✕
<i>Gahnia lacera</i>	bamboo cutty grass	◐	◐	●	●	✕	●	◐
<i>Gahnia setifolia</i>	cutty grass	●	◐	●	●	✕	●	●
<i>Gahnia xanthocarpa</i>	toikiwi, cutty grass	◐	●	✕	●	●	●	●
<i>Juncus kraussii</i> ssp. <i>australiensis</i>	wiwi, sea rush	●	✕	✕	●	●	◐	●
<i>Juncus pallidus</i>	giant rush	●	✕	◐	●	●	●	●
<i>Machaerina sinclairii</i>	tuhara, pepepe	●	◐	◐	●	✕	◐	✕
<i>Microlaena avenacea</i>	bush rice grass	◐	◐	◐	●	✕	✕	◐
<i>Microlaena polynoda</i>	bamboo rice grass	◐	◐	●	●	✕	✕	✕
<i>Microlaena stipoides</i>	meadow rice grass	◐	◐	◐	●	✕	✕	◐
<i>Oplismenus imbecillis</i>	slender panic grass	◐	◐	◐	●	✕	✕	✕
<i>Poa anceps</i>	plumed tussock	●	◐	●	●	✕	✕	●

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warm lowlands ecosystem

KEY ♥ Nurse plant ■ Main component ❀ rare ✕ toxic to toddlers 🌊 coastal sites only 🍄 epiphyte
For restoration, in this habitat: ●●● plant liberally ●● plant generally ● plant sparingly

Recommended planting sites

			Gully Head	Boggy Area	Rock-land	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
Tall trees											
<i>Agathis australis</i>	kauri	■				●●	●	●	●●	●	●
<i>Dacrycarpus dacrydioides</i>	kahikatea	♥■	●	●●				●			●
<i>Dacrydium cupressinum</i>	rimu	■				●	●		●	●●	●
<i>Metrosideros robusta</i>	northern rata	■	●			●	●	●	●	●●	●
<i>Phyllocladus trichomanoides</i>	tanekaha	♥■				●●	●		●	●	
<i>Podocarpus totara</i>	lowland totara	🌊♥						●	●	●	●
<i>Prumnopitys ferruginea</i>	miro		●			●	●		●	●	
<i>Prumnopitys taxifolia</i>	matai										●
Medium trees											
<i>Alectryon excelsus</i>	titoki		●				●	●		●	●●
<i>Beilschmiedia tarairi</i>	taraire		●							●	●
<i>Beilschmiedia tawa</i>	tawa		●				●●	●		●	●
<i>Corynocarpus laevigatus</i>	karaka	✕■	●				●	●		●	●
<i>Dysoxylum spectabile</i>	kohekohe	■	●●				●●	●		●	●
<i>Elaeocarpus dentatus</i>	hinau					●	●		●	●	
<i>Knightia excelsa</i>	rewarewa	♥■	●			●	●●		●●	●●	●●
<i>Kunzea ericoides</i>	kanuka	♥■	●●			●●●	●●●	●●	●●●	●●●	●●●
<i>Laurelia novaezelandiae</i>	pukatea			●●							●●
<i>Libocedrus plumosa</i>	kawaka					●			●	●	
<i>Litsea calicaris</i>	mangeao					●			●	●	
<i>Nestegis cunninghamii</i>	black maire					●	●		●	●	●
<i>Nestegis lanceolata</i>	white maire					●	●		●	●	
<i>Pittosporum eugenioides</i>	tarata, lemonwood	♥■							●●	●	●●
<i>Pittosporum tenuifolium</i>	kohuhu	♥■						●	●●	●	●●
<i>Sophora microphylla</i>	kowhai	✕■				●●	●	●			
<i>Syzygium maire</i>	maire tawake			●●							●
<i>Vitex lucens</i>	puriri	■	●●			●	●		●●	●	●
Small trees/large shrubs											
<i>Aristotelia serrata</i>	makomako, wineberry	♥	●●				●	●●			●
<i>Brachyglottis repanda</i>	rangiora	✕♥■	●			●	●●●		●●	●●●	●
<i>Carmichaelia australis</i>	NZ broom				●			●			
<i>Carpodetus serratus</i>	putaputaweta	♥	●	●				●			●●
<i>Coprosma arborea</i>	mamangi	■	●				●		●	●●	●
<i>Coprosma areolata</i>	thin leaved coprosma	♥					●			●●	●●
<i>Coprosma grandifolia</i>	kanono	♥■	●●	●			●●	●		●●	●●
<i>Coprosma lucida</i>	shining karamu	♥■			●●	●●●	●●		●●	●	●
<i>Coprosma propinqua</i>	mingimingi			●				●			
<i>Coprosma robusta</i>	karamu	♥■	●●			●	●	●●	●●	●●●	●●●



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Tolerance								Comments
Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind		
○	◈	◐	●	✕	●	◐		
●	◐	✕	●	●	✕	✕		
●	▲	✕	●	◐	◐	✕		
●	✕	●	●	●	◐	◐		
●	◐	●	●	✕	●	◐		
●	◐	●	●	✕	◐	◐		
○	◈●	◐	●	✕	✕	◐		
●	◈	◐	●	✕	✕	◐		
●	◈●	✕	●	✕	✕	◐		
○	◈●	✕	●	✕	✕	◐		
○	◈●	✕	●	✕	✕	✕		
○	◈◐	◐	●	✕	◐	✕		
○	◐	◐	●	✕	◐	●		
●	◐	●	●	✕	●	●		
○	▲	✕	◐	●	✕	✕		
○	▲	◐	●	✕	◐	✕		
○	▲	●	●	✕	●	◐		
●	●	●	●	✕	●	●		
○	◐	◐	●	✕	◐	✕		
●	◐	◐	●	✕	◐	◐		
●	◐	◐	●	✕	◐	◐		
●	✕	◐	●	✕	✕	◐		Plant east of Scenic Drive
○	◐	✕	◐	●	✕	✕		
●	◐	◐	●	✕	✕	✕		
◐	●	✕	●	✕	✕	✕		
●	◐	◐	●	✕	●	◐		
●	◈◐	✕	●	◐	◐	✕		
○	◈◐	✕	●	◐	◐	✕		
●	▲	◐	●	✕	✕	✕		
●	◐	◐	●	◐	◐	◐		
◐	●	✕	●	◐	✕	◐		
●	◐	●	●	✕	●	●		
●	✕	✕	●	●	◐	◐		
●	◐	●	●	✕	●	◐		

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warm lowlands ecosystem

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For restoration, in this habitat: ●●● plant liberally ●● plant generally ● plant sparingly

Recommended planting sites

Small trees/large shrubs continued			Gully Head	Boggy Area	Rock-land	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
<i>Coriaria arborea</i>	tutu	♥✕	●				●	●			●
<i>Cordyline australis</i>	ti kouka, cabbage tree	♥■	●	●●●				●●			●●
<i>Cordyline banksii</i>	ti ngahere, forest cabbage tree		●			●●		●	●●	●	
<i>Cyathea dealbata</i>	ponga, silver tree fern	■	●					●	●	●	●
<i>Cyathea medullaris</i>	mamaku, black tree fern	■	●				●	●	●	●	●
<i>Cyathodes juniperina</i>	prickly mingimingi					●●			●●	●	
<i>Dicksonia squarrosa</i>	wheki	■	●●	●			●	●●			●●
<i>Dodonaea viscosa</i>	akeake (local)					●	●			●	
<i>Fuchsia excorticata</i>	kotukutuku, tree fuchsia		●●				●	●			●
<i>Geniostoma rupestre</i>	hangehange	♥■	●●●			●	●●●	●●	●●	●●●	●●●
<i>Griselinia lucida</i>	puka	🗨			●●	●					
<i>Hedycarya arborea</i>	porokaiwhiri, pigeonwood	♥■	●●●	●			●●●	●●		●●	●●
<i>Hoheria populnea</i>	houhere, lacebark	♥■	●●	●			●●●	●●		●●	●
<i>Leptospermum scoparium</i>	manuka	♥■	●	●●●	●	●●●	●●●	●●●	●●●	●●●	●●●
<i>Leucopogon fasciculatus</i>	mingimingi	■				●●●	●●	●	●●●	●●	●
<i>Macropiper excelsum</i>	kawakawa	■	●●	●			●●	●		●	
<i>Melicytus macrophyllus</i>	large leaved mahoe	♥■									
<i>Melicytus micranthus</i>	manakura		●			●●	●●		●●	●●	●
<i>Melicytus ramiflorus</i>	mahoe	♥■	●●●			●	●●●	●●	●	●●	●●●
<i>Mida salicifolia</i>	maire taiki		●					●	●	●	●
<i>Myrsine australis</i>	mapou, red matipo	■				●●	●	●	●●●	●●●	●
<i>Olearia furfuracea</i>	akepiro	♥■				●●	●		●●●	●●	●
<i>Olearia rani</i>	heketara	♥■	●			●●	●●●		●●	●●	
<i>Pennantia corymbosa</i>	kaikomako (local)			●				●●		●	●●
<i>Pittosporum ellipticum</i>		🐟				●	●		●	●	
<i>Pseudopanax arboreus</i>	whauwhaupaku, five finger	♥■				●	●●		●●	●●	●●●
<i>Pseudopanax crassifolius</i>	horoeaka, lancewood					●	●		●	●●	●●
<i>Schefflera digitata</i>	pate	♥■	●●●	●			●●	●●		●	●
<i>Solanum aviculare</i>	poroporo	♥■	●				●	●		●	●
<i>Streblus heterophyllus</i>	turepo							●●		●	●●
<i>Rhopalostylis sapida</i>	nikau	■	●●●	●●			●●	●●		●●	●
<i>Toronia toru</i>	toru					●●	●		●		
Shrubs & flax-like plants											
<i>Alseuosmia macrophylla</i>	toropapa		●●			●●			●●	●●	
<i>Brachyglottis kirkii</i> var. <i>angustior</i>	Kirk's daisy					●	●●	●		●●	●
<i>Coprosma crassifolia</i> stiff stemmed coprosma, kohurangi (Te Henga)		🐟					●●		●●	●●	
<i>Coprosma rhamnoides</i>		♥				●●●	●●		●●●	●●	●
<i>Coprosma spathulata</i>						●●	●		●●	●	
<i>Coprosma tenuicaulis</i>	swamp coprosma			●●●				●			
<i>Corokia buddleioides</i>	korokio					●			●		
<i>Dracophyllum sinclairii</i>	spiderwood					●			●	●	●



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Tolerance								Comments
Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind		
●	◐	●	●	✕	◐	◐		
●	◐	◐	●	●	◐	●		
●	◐	●	●	✕	◐	◐		
●	●	◐	●	✕	●	✕		
○	◊	✕	●	✕	◐	◐		
●	●	●	●	✕	●	✕		
○	◊	✕	●	✕	✕	✕		
●	✕	●	●	✕	●	●		
○	●	✕	●	✕	✕	✕		
●	●	●	●	✕	◐	◐		
●	◐	●	●	✕	◐	◐		
●	●	✕	●	◐	◐	✕		
●	●	✕	●	✕	✕	✕		
●	✕	●	●	●	●	●		
●	◐	●	●	✕	●	◐		
◐	●	✕	●	✕	✕	◐		
●	●	◐	●	✕	◐	✕		
	●	●	●	✕	✕	✕		
●	●	✕	●	✕	✕	✕		
◐	●	✕	●	✕	✕	✕		
●	◈	●	●	✕	◐	●		
●	✕	●	●	✕	●	●		
●	●	◐	●	✕	◐	◐		
○	◐	✕	●	✕	✕	✕		
●	◐	◐	●	✕	◐	●		
●	◐	✕	●	✕	✕	✕		
●	◊	◐	●	✕	◐	✕		
●	◊	✕	●	✕	✕	✕		
●	◐	✕	●	✕	✕	✕		
●	●	●	●	✕	✕	✕		
○	◈	✕	●	●	✕	◐		
●	◐	●	●	✕	●	◐		
◐	●	✕	●	✕	✕	✕		
◐	●	●	◐	✕	◐	✕		
●	●	●	●	✕	●	●		
◐	●	✕	●	●	✕	✕		
◐	●	●	●	✕	●	✕		
●	●	●	●	✕	●	✕		

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Recommended planting sites

Shrubs & flax-like plants cont.

			Gully Head	Boggy Area	Rock-land	Sharp Ridge	Steep Slope	Valley Bottom	Broad Ridge	Gentle Slope	Alluvial Flat/Tce
<i>Freycinetia banksii</i>	kiekie	■	●●●	●●			●●	●●	●	●	●
<i>Gaultheria antipoda</i>	bush snowberry			●	●			●			
<i>Hebe macrocarpa</i>	koromiko				●			●		●	
<i>Hebe stricta</i>	koromiko	♥			●			●		●	
<i>Lophomyrtus bullata</i>	ramarama		●				●	●		●	
<i>Leionema nudum</i>	mairehau				●			●			
<i>Melicope simplex</i>	poataniwha				●	●		●	●		
<i>Phormium cookianum</i>	wharariki, mountain flax	■		●●	●●	●					
<i>Phormium tenax</i>	harakeke, flax	♥■	●●●				●				
<i>Pimelea longifolia</i>	taranga	🐟			●			●			
<i>Pittosporum cornifolium</i>	tawhirikaro			●	●	●					
<i>Pomaderris kumeraho</i>	kumerahou	♥				●●			●●	●●	●
<i>Pomaderris ericifolia</i>	tauhinu	♥					●●			●●	●●
<i>Pseudopanax anomalus</i>	shrub pseudopanax						●		●	●	
<i>Rhabdothamnus solandri</i>	taurepo				●		●●				
<i>Typha orientalis</i>	raupo										

Vines and trailers

<i>Calystegia tuguriorum</i>	powhiwhi, convolvulus			●●				●			●
<i>Clematis forsteri</i>	puataua, scented clematis	🐟			●	●	●				
<i>Clematis paniculata</i>	puawananga, bush clematis		●				●●	●●	●	●●	●●
<i>Metrosideros carminea</i>	akakura, carmine rata	❀		●		●					
<i>Metrosideros diffusa</i>	white climbing rata		●		●●		●			●	
<i>Metrosideros fulgens</i>	rata vine	■	●		●		●		●	●	●
<i>Metrosideros perforata</i>	akatea, small white rata	■			●●	●	●●		●	●●	●
<i>Ripogonum scandens</i>	supplejack, kareao	■	●●●	●●			●●	●●		●	●
<i>Parsonsia heterophylla</i>	kaiku, NZ jasmine						●	●		●	●●
<i>Passiflora tetrandra</i>	kohia, NZ passion vine	🐟	●					●		●	●●
<i>Rubus australis</i>	bush lawyer					●			●	●	●
<i>Rubus cissoides</i>	tataramoa, bush lawyer										

Ferns

<i>Adiantum cunninghamii</i>	common maidenhair							●		●	●
<i>Adiantum fulvum</i>	downy maidenhair										●
<i>Adiantum hispidulum</i>	rosy maidenhair							●		●	●
<i>Adiantum viridescens</i>											●
<i>Anarthropteris lanceolata</i>											●
<i>Asplenium bulbiferum</i>	manamana, hen & chicken fern										●



KEY: ● fully tolerant ◐ tolerates some ✕ not tolerant

◈ tolerates shade during establishment ▲ needs some shade to establish ○ shade needed at base

Tolerance									Comments
Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind			
○	●	✕	●	●	✕	◐			
●	◐	●	●	✕	●	●			
●	◐	●	●	✕	●	◐			
●	◐	●	●	✕	●	●			
◐	●	✕	●	◐	✕	✕			
◐	◐	●	●	✕	◐	✕			
●	◐	●	●	✕	●	●			
●	◐	◐	●	✕	◐	●			
●	✕	◐	●	●	◐	●			
●	◐	●	◐	✕	●	✕			
◐	◐	●	●	✕	✕	✕			
●	✕	●	●	✕	●	◐			
●	✕	●	●	✕	●	●			
●	◐	✕	●	✕	◐	◐			
◐	●	●	●	✕	✕	✕			
●	✕	✕	✕	●	✕	✕			
●	✕	◐	●	●	◐	✕			
○	▲	●	●	✕	✕	✕			
○	▲	✕	●	✕	✕	✕			
●	●	◐	●	✕	✕	◐			
●	▲	✕	●	✕	✕	✕			
●	▲	✕	●	✕	✕	◐			
●	▲●	◐	●	✕	✕	●			
○	▲	✕	●	◐	✕	✕			
○	▲	✕	●	✕	✕	✕			
◐	◐	✕	●	✕	✕	✕			
●	◐	◐	●	✕	✕	✕			
●	◐	◐	●	✕	✕	✕			
◐	●	◐	●	✕	✕	◐			
✕	●	✕	●	✕	✕	✕			
●	◐	●	●	✕	✕	✕			
●	◐	●	●	✕	✕	✕			
✕	●	◐	●	✕	✕	✕			
◐	●	✕	●	✕	✕	✕			

Puriri • Kereru

warm lowlands ecosystem

KEY: ♥ Nurse plant ● fully tolerant ◐ tolerates some ✕ not tolerant ☞ epiphyte
 ✦ tolerates shade during establishment ⬆ needs some shade to establish

Ferns continued			Tolerance						
			Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind
<i>Asplenium flaccidum</i>	makawe, hanging spleenwort	☞	✕	●	✕	●	✕	✕	✕
<i>Asplenium hookerianum</i>			✕	●	✕	●	✕	✕	✕
<i>Asplenium lamprophyllum</i>	glossy asplenium		✕	●	✕	●	✕	✕	✕
<i>Asplenium oblongifolium</i>	huruhuruwhenua shining spleenwort		✕	●	✕	●	✕	✕	✕
<i>Asplenium polyodon</i>	sickle spleenwort	☞	✕	●	●	✕	✕	✕	✕
<i>Blechnum chambersii</i>	rereti		✕	●	✕	●	✕	✕	✕
<i>Blechnum discolor</i>	crown fern		◐	●	✕	●	✕	●	✕
<i>Blechnum filiforme</i>	thread fern		✕	●	✕	●	✕	✕	✕
<i>Blechnum fraseri</i>	hard fern		◐	●	✕	●	✕	✕	✕
<i>Blechnum membranaceum</i>			✕	●	✕	●	✕	✕	✕
<i>Blechnum minus</i>	swamp kiokio		◐	●	✕	●	✕	✕	✕
<i>Blechnum novae-zelandiae</i>	kiokio	♥	◐	●	✕	●	◐	●	◐
<i>Deparia petersenii</i>			◐	●	✕	●	✕	✕	✕
<i>Diplazium australe</i>			✕	●	✕	●	✕	✕	✕
<i>Doodia australis</i>	pukupuku		●	●	●	●	✕	●	●
<i>Gleichenia dicarpa</i>	tangle fern		●	✕	✕	●	●	✕	✕
<i>Gleichenia microphylla</i>	waewaekaka		●	✕	✕	●	✕	●	✕
<i>Lastreopsis glabella</i>			✕	●	✕	●	✕	✕	✕
<i>Lastreopsis hispida</i>	hairy legs		✕	●	✕	●	✕	✕	✕
<i>Lastreopsis microsora</i>			✕	●	✕	●	✕	✕	✕
<i>Lastreopsis velutina</i>	velvet fern		✕	●	✕	●	✕	✕	✕
<i>Leptopteris hymenophylloides</i>	heruheru, crepe fern		✕	●	✕	●	✕	✕	✕
<i>Lindsaea linearis</i>			●	◐	✕	●	✕	✕	◐
<i>Lindsaea trichomanoides</i>			◐	●	●	●	✕	●	✕
<i>Lygodium articulatum</i>	mangemange		◐	●	✕	◐	✕	✕	✕
<i>Marattia salicina</i>	para, king fern	♣	◐	●	✕	●	✕	✕	✕
<i>Paesia scaberula</i>	matata, ring fern		●	◐	◐	●	✕	◐	◐
<i>Pellaea rotundifolia</i>	tarawera, button fern		●	●	◐	●	✕	✕	✕
<i>Phymatosorus pustulatum</i>	kowaowao, hounds tongue		✕	●	◐	●	✕	✕	✕
<i>Phymatosorus scandens</i>	moki, fragrant fern		◐	●	◐	●	✕	✕	◐
<i>Pteridium esculentum</i>	bracken		●	◐	●	●	✕	◐	●
<i>Pteris macilenta</i>			✕	●	✕	●	✕	✕	✕
<i>Pteris tremula</i>	turawera, trembling brake		✕	●	✕	●	✕	✕	✕
<i>Pyrosia eleagnifolia</i>	leatherleaf fern		◐	●	◐	●	✕	✕	◐
<i>Sticherus cunninghamii</i>	umbrella fern		◐	●	◐	●	✕	✕	✕
<i>Trichomanes reniforme</i>	raurenga, kidney fern		✕	●	✕	●	✕	✕	✕



KEY: ● fully tolerant ◐ tolerates some ✕ not tolerant 🍄 epiphyte
 ✦ tolerates shade during establishment ⬆ needs some shade to establish

			Tolerance						
			Sun	Shade	Dry	Moist	Boggy	Poor clay	Harsh wind
Low ground plants									
<i>Arthropodium cirratum</i>	rengarenga, rock lily		●	●	●	●	✕	✕	●
<i>Astelia banksii</i>	coastal astelia	🍄	●	●	●	◐	✕	✕	●
<i>Astelia solandri</i>	kowharahara, perching lily	🍄	●	●	●	●	✕	✕	●
<i>Astelia trinervia</i>	kauri grass		◐	●	◐	●	✕	✕	✕
<i>Collospermum hastatum</i>	kahakaha	🍄	●	●	◐	●	✕	✕	◐
<i>Cordyline pumilio</i>	ti rauriki, dwarf cabbage tree		●	◐	●	●	✕	●	◐
<i>Dianella nigra</i>	turutu, NZ blueberry		◐	●	●	●	✕	●	◐
<i>Elatostema rugosum</i>	parataniwha		✕	●	✕	●	●	●	✕
<i>Libertia grandiflora</i>	large flowered iris		●	◐	●	●	✕	◐	●
<i>Libertia ixioides</i>	mikoikoi, NZ iris		●	◐	●	●	✕	◐	✕
<i>Lycopodium cernuum</i>	creeping clubmoss		●	◐	✕	◐	◐	●	●
<i>Lycopodium deuterodensum</i>	tree clubmoss		◐	●	◐	●	✕	●	✕
<i>Nertera depressa</i>	nertera		●	●	✕	●	◐	✕	◐
<i>Nertera dichondrifolia</i>	northern nertera		●	◐	◐	●	✕	✕	✕
<i>Peperomia urvilleana</i>		🍄	◐	●	●	●	✕	✕	◐
<i>Pratia angulata</i>	panakenake		●	◐	✕	●	◐	✕	✕
Grasses, Sedges, Rushes									
<i>Apodasmia similis</i>	oioi, jointed rush		●	◐	◐	●	●	✕	●
<i>Carex lambertiana</i>			◐	●	◐	●	✕	◐	✕
<i>Carex lessoniana</i>			◐	●	✕	●	●	✕	✕
<i>Carex maorica</i>			◐	●	✕	●	●	✕	✕
<i>Carex ochrosaccus</i>			◐	●	◐	●	✕	◐	✕
<i>Carex virgata</i>			●	●	◐	●	●	◐	◐
<i>Cortaderia fulvida</i>	toetoe		●	✕	●	●	●	●	●
<i>Cortaderia splendens</i>	coastal toetoe		●	✕	●	●	✕	●	●
<i>Cyperus ustulatus</i>	giant umbrella sedge		●	✕	✕	●	●	✕	✕
<i>Gahnia lacera</i>	bamboo cutty grass		◐	◐	●	●	✕	●	◐
<i>Gahnia setifolia</i>	cutty grass		●	◐	●	●	✕	●	●
<i>Gahnia xanthocarpa</i>	toikiwi, cutty grass		◐	●	✕	●	●	●	●
<i>Juncus kraussii ssp.australiensis</i>	wiwi, sea rush		●	✕	✕	●	●	◐	●
<i>Juncus pallidus</i>	giant rush		●	✕	◐	●	●	●	●
<i>Machaerina sinclairii</i>	tuhara, pepepe		●	◐	◐	●	✕	◐	✕
<i>Microlaena avenacea</i>	bush rice grass		◐	◐	◐	●	✕	✕	◐
<i>Microlaena polynoda</i>	bamboo rice grass		◐	◐	●	●	✕	✕	✕
<i>Microlaena stipoides</i>	meadow rice grass		◐	◐	◐	●	✕	✕	◐
<i>Oplismenus imbecillis</i>	slender panic grass		◐	◐	◐	●	✕	✕	✕
<i>Poa anceps</i>	plumed tussock		●	◐	●	●	✕	✕	●

Glossary of Terms

alluvial soil and silt by streams which has been deposited during floods, usually very fertile and free draining

biodiversity a combination of: diversity of species, genetic diversity within populations and diversity of ecosystems

canopy the tall layer of trees in a forest, made up of species like tawa, karaka, kohekohe, taraire, puriri

divaricating plants (mainly shrubs) with tangled branches, generally small leafed

eco-site planting plants in the location where they would occur naturally

eco-source to use plants grown from seeds collected locally from a range of the naturally occurring vegetation in that place

ecology the interaction between living organisms, and between them and the physical environment. This includes all kinds of organisms from algae and fungi to plants, insects, lizards, birds and mammals. The processes that are included in these interactions are the basis for the potential of natural areas to be self-maintaining, and for the benefits (ecosystem services) on which we rely in gardening (composting, formation of topsoil including fertility and friability, availability of water etc) and in our wider lives (cleaning of water and air, detoxification of wastes, regulation of climate, etc)

ecosystem a biological system comprising a community of living organisms and its associated non-living environment, interacting as an ecological unit eg. wetland, dune system, forest, grasslands

ecosystem services fundamental life-support services provided by ecosystem functioning without which human civilisations would cease to thrive; Includes purification of air and water, detoxification and decomposition of wastes, regulation of climate, regeneration of soil fertility, and production and maintenance of biodiversity

ecotone the boundary between ecosystems, where one merges into the other

emergents the tallest trees in a forest which stick out above the canopy, eg. kauri, rimu

endemic occurs only in a particular country or region. For example, kiwi are endemic to New Zealand, Australian harrier is native as it also occurs in other Pacific countries

epiphyte a plant which sits on another plant but doesn't harm its growth eg. 'widow maker' plants which sit in the tops of large kauri and rimu

exotic an introduced species; a plant which does not naturally occur in the area or country

friable easily crumbled

gully a low point in the area where a channel has been cut by water (usually quite moist)

gully heads the top of gully (not as moist as a gully)

habitat a place where a plant naturally grows

indigenous native to an area or country

invasive a plant which spreads easily through native bush and kills the plants in it

knoll a small hill or mound

juvenile form many native plants look different when they are young

compared to when they are adults, eg. lancewood

local not widespread, but occurring in a few places

microsite a small area with specific conditions which only a few plants are suitable for (eg. a damp bit by the stormwater drain)

naturalised a plant which is not native to an area, but has spread and established in the wild there

non-invasive a plant (usually exotic/introduced) which will not spread into native bush or other natural areas

nurse species the first species planted or sown (eg. manuka or kanuka), or existing vegetation such as gorse or brush wattle which creates good conditions for other species to be able to grow

pioneer a colonising species, plants which naturally establish on an open site and are able to withstand changes in temperature and moisture

ridge a long narrow hill top, usually quite dry and wind exposed

scarp a steep slope

secondary vegetation the plants which grow up underneath the nurse, or pioneering species

spur a small side ridge sticking out from the main ridge

understory shrubby and ground cover plant layers of the forest

wetland these are permanently or seasonally wet areas that have plants and animals which are suited to wet conditions

Contacts and Reading List



USEFUL BOOKS AND RESOURCES

Native Forest Restoration:
A Practical Guide for Landowners
by Tim Porteous, Queen Elizabeth
the Second National Trust, 1993

The Native Garden
by Isobel Gabites & Rob Lucas,
Random House, 1998

The Gardener's Encyclopaedia of
New Zealand Native Plants
by Yvonne Cave & Valda Paddison,
Random House, 1999

Which Native Forest Plant? and
Which Native Fern?
by Andrew Crowe, Viking, 1994

The Cultivation of New Zealand
Native Grasses
by Lawrie Metcalf,
Random House, 1998

Weedbusting: A guide to
recognising and controlling invasive
weeds. Weedbusters.
(www.weedbusters.org.nz)

A Dictionary of Maori Plant Names
by James Beever,
Auckland Botanical Society, 1991

AUCKLAND REGIONAL COUNCIL

Contact Enviroline ph (09) 366 2000
for copies of:

Pests Plants of the Auckland Region
– various flyers on pest plants and
animals to help with identification
and control methods.

Plant Me Instead – plants to use in
place of common weeds

Coastal Planting Guide – a series of
six brochures on coastal planting

WAITAKERE CITY COUNCIL (WCC)

For any of the publications below
contact the Call Centre phone (09)
839 0400 (www.waitakere.govt.nz)

Riparian Restoration Guidelines
by Rachel Ebbitt – specific stream
planting information

Slip Sliding Away – dealing with
erosion problems on streams

The Whau: our streams, our river,
our backyards 2002 – a booklet
on the Whau River produced by
the community group Friends of
the Whau (see contact details) in
partnership with WCC; contains lots
of information about streamside
ecosystems and planting

Carex in Auckland: A field guide
by Chris McKain, WCC, 2004

The Waitakere Gardening Guide
– for urban gardens

Amenity Planting Guidelines – for
landscape designs and subdivisions;
includes a list of high risk plants

Planting Guidelines for Reserve
Boundaries – for properties
bordering a park or reserve

Planting Guidelines for Stormwater
Detention Ponds

Toetoe Information Sheet – why
toetoe makes a great nurse crop

Eco-Sourcing Code of Practice (draft)

Eco-sourcing flyer – a short
explanation and guide

Invasive or Environmental Weeds
of Waitakere – a full list of over
250 plants considered weeds in
Waitakere

Weed Fact Sheets on the worst
weeds in Waitakere with specific
detail on how to eradicate them

The Green Network – an overview
of the Green Network vision

Green Network Community
Assistance Programme – a summary
of the assistance available from
Council, or a specific flyer on the
assistance you require

WCC also runs seminars, produces
templates and fact sheets to guide
the running of community projects.
If you would like support for your
Green Network project on public or
private land, phone (09) 839 0400.

COMMUNITY PROJECTS WHICH ENHANCE THE GREEN NETWORK

These are some of the many
community groups active in
Waitakere. For more information
contact the Call Centre: ph (09) 839
0400 (www.waitakere.govt.nz)

Keep Waitakere Beautiful (www.ecomatters.org.nz) works on
beautification projects including
Operation Spring Clean, Trees for
Babies, Clean Stream Waitakere and
War on Weeds

Landcare groups do vital weed
control and restoration work
eg. pingao planting at Te Henga
(Bethells) and Piha, and ginger
clearing at Karekare

The Friends of the Whau
(www.friendsofthewhau.org.nz)
are rehabilitating, restoring and
monitoring the Whau River

Ark in the Park (arkinthepark@paradise.net.nz) are creating an
open sanctuary for native birds at
the heart of the Waitakere Ranges

Weedfree Waitakere Trust
(www.ecomatters.org.nz) provides
weed control services and advice to
protect and restore native bush on
both public and private land.

