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MARLBOROUGH
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Native Vegetation for North Marlborough

A PLANTING & RESTORATION GUIDE

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Written By

Geoff Walls

Nicky Eade

Contributors

Paul Millen

Simon Moore

Philip Simpson

Hellen Munro

Nicole Chauval

Thanks to

Paul and Muff Newton

Tony and Joy Redwood

Plaisier Family

Graeme and Sue Moore

Rai Valley Area School

Photos

Geoff Walls, Philip Simpson, Nicky Eade

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INTRODUCTION

This guide is a companion to “Native Vegetation for South Marlborough” which was published by the Marlborough District Council (MDC) in 2004. Ecological surveys commissioned by MDC throughout North Marlborough (that is, north of the Wairau River) since then have stimulated interest in a matching guide. Many people are interested in enhancing their land with restoration planting. This has often been a suggestion for the management of the significant natural areas identified in the ecological surveys. Providing refuges for special North Marlborough plants is another reason for planting.

North Marlborough is typified by the labyrinthine system of waterways, fertile valleys and rugged hills. It has a benign climate that favours plant growth: reliable rainfall and a relatively mild temperature range. In its primeval state it would have been cloaked in forest from the coast to the tops, including the alluvial valley floors. It would have abounded with native creatures: flying birds, flightless birds, bats, lizards, frogs and a wealth of invertebrates such as giant land snails, weta and stick insects. Localised forest clearance occurred in the centuries prior to European settlement, but widespread clearance happened subsequently, in the quest for timber and farmland. Loss of habitat and predation by introduced mammals are responsible for the decimation of the native fauna.

Except in unusual places such as the ultramafic zone (Mineral Belt) in the NW of the region, forest quickly grows back on formerly cleared land, so long as farm stock and feral animals are in low numbers, fires are prevented and overbearing weeds such as wattles and wilding pines are eliminated. The power of natural regeneration to restore the bush cover, whether the clearance was done by people or was the result of severe winds, is probably as great as anywhere in New Zealand. Nevertheless there is plenty of scope to stimulate and supplement naturally regenerating vegetation with native plantings.

North Marlborough has an array of rare, threatened and unusual plants to rival those of South Marlborough. They include species that are unique to Cook Strait shores, endemic to the ultramafic zone, found only in very localised high-altitude sites or widespread but at risk nationally. Many lend themselves to propagation and planting. Some, such as Cook Strait kowhai and fierce lancewood, are better known in cultivation than in the wild. Others, such as large-leaved milk tree, will only be saved from regional extinction by propagation and planting in sites where they are secure.





1| PLANTING AND RESTORATION PURPOSE

WHY NATIVE VEGETATION?

By planting native plants or restoring areas of existing native vegetation you are helping to preserve the natural character and tremendous natural diversity of North Marlborough. Also, if species that grow naturally on the site are selected, correctly planted and cared for they should require only minimal maintenance, once established. In turn, they will attract native birds and insects, enriching Marlborough's ecosystems.

New Zealand supports over 50,000 native invertebrate species including insects and soil fauna, many associated with particular native plants/ecosystems. Some are specific to certain plant species, so if we do not provide 'their' habitats, they may be lost.

For a native planting to thrive with a minimum of fuss, the grower needs to put in some initial research, starting with identifying its purpose. The next step is to observe (or find out) what originally grew on the site, having adapted to suit the conditions. Only then, should species be selected.

Broadly, indigenous plantings tend to be motivated by a combination of conservation, aesthetic and practical purposes. The following description of some purposes for planting should help you clarify your own aims and objectives.

CONSERVATION/RESTORATION

Planting native species offers the satisfaction and enjoyment of enhancing natural biodiversity or reconstructing habitats based on natural patterns. It can be as simple as creating a pocket of native trees in the corner of a paddock, restoring native vegetation beside a stream or pond, or providing a buffer on an exposed bush edge. Plants can also be planted within successional scrub or low forest such as gorse, bracken, tauhinu, manuka and kanuka, to speed up the natural successional process. Species that can be used for this include beeches, podocarps (rimu, matai, kahikatea and totara) and broadleaved trees (such as kohekohe and tawa) and will eventually form tall forest. Species can also be chosen for their value to native birds, lizards and insects. Other potential benefits lie in the improvement of native fish habitat, water quality and erosion control.

The selection of which species to plant requires care, to maintain the natural character of North Marlborough. Not only should naturally occurring species be used, but if possible these should be ecosourced, to protect the genetic makeup of the original local plants.

Forest, wetland and streamside remnants and coastal scarps are among sites in North Marlborough being protected and enhanced by private landowners who value the district's ecological heritage. The highest priority for conservation is protection of remaining areas of primary native vegetation (e.g. unlogged forest). However, there is also value to natural ecology and native biodiversity in secondary native vegetation (e.g. manuka scrub, kanuka forest, tree fern forest, regenerating forests of kamahi or beech). In North Marlborough there are normally plentiful nearby seed sources to fuel the regeneration process, but management and planting can add valuable diversity and speed the transition.

Ideally, threatened plants are best protected in the wild where they occur. This is not always practical or adequate though. Fierce lancewood (*Pseudopanax ferox*), for example, is extremely rare in North Marlborough, so seeds from remaining wild plants have been collected and the resulting seedlings have been distributed to landowners who are within the natural range of fierce lancewood and have protected sites for planting. It is hoped that this will help the species to survive and flourish into the



Pygmy button daisy (*Leptinella nana*) is a threatened plant that occurs on flood-prone riverbanks in the Pelorus catchment.



future. The Department of Conservation offers information on threatened plants and is happy to advise and assist landowners wanting to establish or protect such plants on their properties.

ENHANCING WATER QUALITY

Wetlands

Natural wetlands, full of life, once occurred throughout North Marlborough on valley floors and coastal flats. Most have been drained for farming, but quite a few remain. Restoration can begin with exclusion of domestic stock and weed control if necessary, followed by planting of appropriate species such as flax, cabbage tree, toetoe, tussock sedges, kahikatea, ribbonwood and pukatea. Swamp maire (*Syzygium maire*), now rare in North Marlborough, could also be established in sites not prone to frost or drying out.

Ideally, a wetland site will include a mix of open water and swampy or dry land to encourage birds. Sloping edges rather than steep sides, provide access in and out of the water and unplanted areas allow for bird 'standing room'. Irregularly shaped edges provide shelter from a range of wind directions and islands can be predator-free nesting sites. Any modification or mechanical disturbance to a wetland, even if it is ultimately for restoration purposes, may require resource consent. Advice should be sought from the Marlborough District Council.

Wetlands can have a number of benefits including;

- purifying water by stripping nutrients such as nitrogen through bacterial
- acting as a giant sponge to control water flow
- trapping sediment and minimising silt entry to waterways and harbours
- providing habitat and a food source for fish, birds, insects and other animals

If you would like to know more about wetland restoration, the Marlborough District Council, Fish & Game New Zealand, the Department of Conservation and the Landcare Trust may be able to help with advice and, in some cases, financial assistance for protecting wetlands.

Paul and Muff Newton farm at “Kaituna Hills” near Havelock. In 2005 they decided to restore a one hectare remnant area of wetland on the flats near the Kaituna River. The site was relatively weed free and so the first job was to fence the area from stock to protect the few native plants that were still there and allow for more restoration planting. From an original base of only one remaining kahikatea tree and some rushes and sedges, the Newtons have added more kahikatea, flaxes, ribbonwoods and cabbage trees and five years later the wetland is starting to add natural character and habitat value to the flats. Because the flats are flooded by the Kaituna River from time to time willow invasion is an ongoing issue, as bits get left after a flood and become established within the fenced area.



The Newton wetland fenced and newly planted in 2006 (left).
Four years later the wetland is starting to add natural character to the flats (right).

Riparian Strips

A mosaic of diverse riparian forest that provided abundant habitat for native fauna once grew alongside rivers and streams of North Marlborough. Restoration of waterway margins by removing weeds and planting native species improves local biodiversity and has a number of other benefits including:

- shading and cooling of water to promote freshwater life
- providing habitat and food for plants and animals
- providing a seed dispersal corridor for native birds
- improving water quality by filtering some faecal matter, sediment and nutrients from surface run-off
- uptake of some nitrogen and phosphates by plant roots, which also protect against bank erosion
- aesthetic value, shade and shelter for stock on the other side of the fence and recreational opportunities.



Species suitable for riparian sites are listed in a separate column in the plant lists in Chapter 4. Planting should generally include low, overhanging species along wet stream margins (such as tussock sedges, toetoe and harakeke) and taller species (such as kowhai, cabbage trees, kanuka, lowland ribbonwood and narrow-leaved lacebark), planted back from the water's edge.



The Rai Valley Area School has been actively involved in native planting and restoration in their local area for a number of years. Environmental studies are woven into the school curriculum and the children have been involved in stream life studies and helping to restore the riparian areas along the rivers and streams. The school has its own propagating nursery where they grow a variety of native plants from local seed. Some of the species include kowhai, kanuka and cabbage trees. Once the plants are approximately two years old the school provides them to local farming families to plant along stream edges to help stabilise the banks and shade the waterways in the area.

PROVIDING A NATIVE BIRD, INSECT AND LIZARD HABITAT

Our forests are quieter and less full of life than they used to be. Native bird populations continue to decline, due to loss of habitat and predation by introduced pests. Native invertebrates (insects, spiders, etc.) and lizards are declining too, for the same reasons.

The planting of even a single native tree such as a kowhai in a garden can attract native birds. Plant or protect a larger area – from a garden to a hillside forest or wetland – and a whole range of bird, lizard and invertebrate species will benefit from the production of fruit, seeds, nectar and foliage. Even leaf litter and topsoil beneath native vegetation is valuable habitat for many species.

Locally-occurring plant species that are particularly bird, insect and lizard-friendly include harakeke, cabbage tree, five-finger, tree fuchsia, manuka, kanuka, kahikatea, totara, kowhai, lancewood, narrow-leaved lacebark and a range of small-leaved shrubs that produce numerous fleshy fruit.

Preventing extinctions and increasing the populations of native plants and animals may require eradicating or controlling pests such as possums, ferrets, stoats, feral cats, rats, hedgehogs, pigs, goats and deer.



A rare yellow form of the manuka gecko (*Naultinus manukanus*), found on Arapawa Island. This species (which is also known as the Marlborough green gecko) is endemic to North Marlborough and is on the list of nationally threatened fauna.

Long-tailed Bats at Pelorus Bridge

At Pelorus Bridge Scenic Reserve between Canvastown and Rai Valley a small population of long-tailed bats roost in the large forest around the bridge and camp site. On warm summer evenings, bats can sometimes be seen in the twilight, circling high in the forest canopy, flying along the river or foraging for moths above the street lights on the SH 6 bridge.

Bats are the only land based mammal species in New Zealand and fossil records show that before humans arrived three bat species were widespread and abundant. Now one of these (the greater short-tailed bat) is extinct and the other two (short-tailed and long-tailed bat), are declining rapidly and rarely seen.

Forest and Bird, along with local iwi Ngati Kuia and the rural community, have initiated a project to study and protect the few long-tailed bats living at Pelorus Bridge. Detector devices which pick up the sonar signals from bats have been used and bats have been detected on d'Urville island as well as in the Pelorus/Rai/Wakamarina area. Bats are threatened by both loss of habitat (they need good mature lowland podocarp forest), and introduced pests including possums, rats, stoats and wasps.

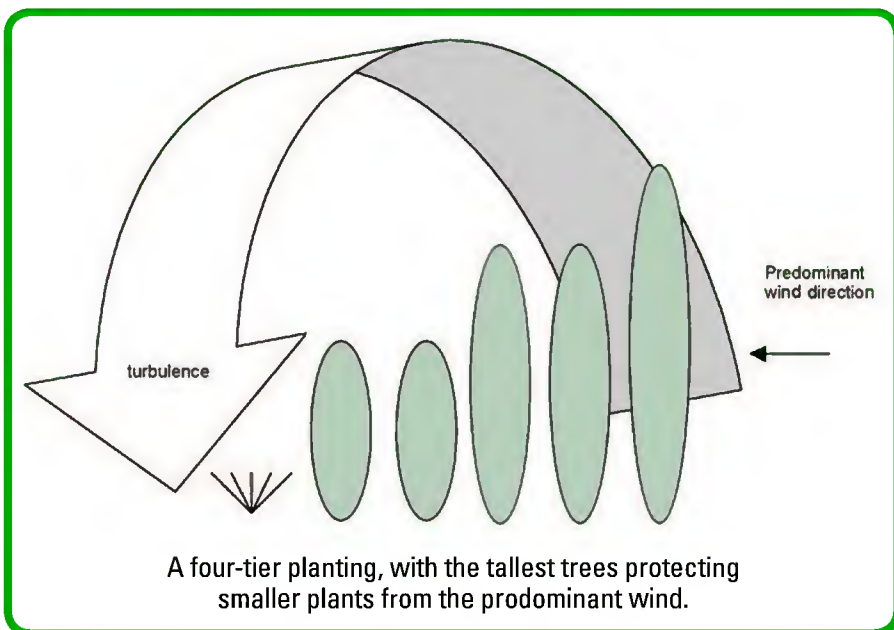
PRACTICAL PLANTINGS

Native plants can be used for various practical purposes. They include:

- shelter and shade (for buildings, gardens, farm animals, etc)
- landscaping
- filling unproductive areas
- protection from fire
- timber production
- honey production
- carbon sequestration

Shelter and shade

Native plants can provide effective shelter and shade for a range of settings, from the back to the farm or vineyard. Aesthetically, native shelter plantings are low-key yet attractive. Providing appropriate species are selected and become well established, they should thrive with little maintenance.



Exotic shelter species such as pines, macrocarpa, poplars, willows, gums and pampas grass are popular because they grow fast. However, on the downside, many, like the gorse, broom, elderberry, hawthorn and pines planted in our pioneering past and more recently pampas, wattles, sycamore and cotoneaster, have become weeds and do not provide optimum habitat for native wildlife.

Many landowners opt to plant both native and exotic species together, to suit particular sites or fulfil specific purposes (such as provision of autumn colour, fruit, nuts, etc). Exotic species are also used to provide shelter for interplanting or underplanting with native species. Tree lucerne (tagasaste) is frequently used like that, having the benefit of flowering through winter and spring when nectar and nutritious plant matter are scarce; bellbirds, tui and kereru are the prime beneficiaries. The tree lucerne can be progressively removed as the native plants grow up, or it can be left to die out (it is rapid-growing but fairly short-lived).



Landscaping

There is a growing trend towards using native plants in landscaping, as New Zealanders increasingly seek to express their identity through low-maintenance native plantings. The landscapes of North Marlborough have a lot of native vegetation, forming the setting for most baches, houses and farms, also amenity areas. It doesn't take much in such a setting to soften the outlines of buildings or facilities and make them blend into the landscape; for instance some lancewoods or tree ferns against a house, a few cabbage trees near the stock yards, or the use of flaxes to define and shelter a picnic spot. The scope beyond that is endless.

As for any plantings, the selection of appropriate species for the site, correct planting and follow-up maintenance will significantly contribute to the success of the planting.



Filling unproductive areas

Farm management has long trended towards fencing off areas that are not good for pastoral production and planting them in trees. In the past, exotic timber species have been planted as a rule. Increasingly though, awkward corners, very steep land, boggy sites, bony faces and coastal scarps are being retired from pastoral farming and either allowed to regenerate or planted in natives (or both). This is happening on a substantial scale on some properties, the landowners recognising the economic value of enhancing the natural character of their farm environments.

The benefits are in improved stock management, protection of native vegetation and enhancement of native biodiversity. There may also be harvests of high quality native timber (e.g. totara and rewarewa) or honey (e.g. manuka and kanuka).

Protection from fire

If planting close to a house or building, especially where the property is vulnerable to grass or scrub fires, avoid species that carry fire such as manuka and kanuka. Most other native trees and shrubs, also flaxes, are fire resistant. Many will recover after fire, including cabbage tree, kowhai, mahoe/whiteywood, broadleaf and ngaio.

Flammable vegetation, such as manuka scrub, bracken, pine trees or gorse, can similarly be given a measure of protection from fire by planting a margin of fire-resistant native plants. As natural regeneration progresses in North Marlborough, the vegetation becomes increasingly less vulnerable to fire; the same is true if native fire-resistant species are planted within the flammable vegetation.

Timber production

Many native tree species provide timber with various properties, however commercial forestry in New Zealand has focused primarily on exotic species. Farmers interested in native trees for timber have been establishing plantations in the last few decades. The NZ Farm Forestry Association has an Indigenous Forest Section and is a network for sharing information on establishment techniques and follow-up maintenance. The former NZ Forest Research Institute (now SCION), has put out a very useful book on growing totara for wood (Bergin 2003) and another on native trees for wood (Bergin & Gea 2005).

Totara is the obvious native timber tree for North Marlborough. It is hardy and relatively quick-growing. Other species that could be considered are rewarewa,

kahikatea, black beech, red beech, silver beech, pukatea, kohekohe, tanekaha and black maire. It would be wise to seek advice on matching species to sites, planting densities and management. Some species may need to be planted within the shelter of other vegetation.

Honey production and medicinal uses

Manuka and kanuka are probably the mainstays amongst native species of the honey industry. The nectar from their prolific flowers makes honey that is marketed as “manuka honey”. Also important in North Marlborough are kamahi and honeydew from black beech. Rewarewa and southern rata also produce good honey. All of these native plant species could be planted for honey production, as well as for other reasons.

Many common native plants have medicinal value, some scientifically verified and some known mostly through traditional Maori knowledge.

Carbon sequestration

With the Emissions Trading Scheme (ETS) and the Permanent Forest Sink Initiative (PFSI) now in place, there is the option to plant native trees or manage existing regenerating native vegetation to capture atmospheric carbon (carbon dioxide) and earn carbon credits that can be sold or used to offset emissions. A number of Marlborough landowners are already taking advantage of these opportunities.



While native plants may be slower growing than some exotic species they provide additional biodiversity benefits. In North Marlborough natural regeneration rates are probably as high as anywhere in the country, effectively sequestering more and more carbon as the complexity and stature of the regenerating forests increase over time. Whether planted or naturally regenerating, areas set aside for “carbon farming” will accumulate more carbon if browsing animals are excluded or controlled to low levels. Landowners should contact the local MAF office (details listed in the Appendices), or forestry consultants for more information on opportunities available to them through the Emissions Trading Scheme and the Permanent Forest Sink Initiative.



2| PLANNING YOUR PLANTING OR RESTORATION PROGRAMME

UNDERSTANDING THE SITE

Consider details such as:

- Location and microclimate - whether coastal (subject to sun, wind, sea salt and shore erosion/deposition) or inland (subject to fog and frost).
- Aspect - a north-facing slope will be markedly drier and more drought-prone than a slope with a southerly aspect.
- Slope - flat and easy slopes offer more options than steep slopes, which require careful plant choice, site preparation and planting.
- Soil type and stability - quite different soils can occur in close proximity; alluvial soils are usually deeper, more fertile and more stable than soils on hillsides; schist soils are more clayey and slip-prone than those formed on greywacke and volcanic rocks; Mineral belt (ultramafic) soils have peculiar combinations of elements that not all plants can tolerate.
- Drainage - wetlands require plants that can handle wet feet; elsewhere a wider range of species can be considered, but they need to be able to withstand dry periods when water levels are low.
- Risk of livestock damage - good fences are essential to protect plantings.
- Presence of animal and plant pests - feral animals can do major damage to new plantings and weeds can overwhelm planting sites unless kept under control.
- Existing native vegetation - what native species are growing naturally at or near the site, under similar conditions, and what shelter the existing native vegetation can provide for new plants.
- Timing of planting to avoid harsh frosts and dry soils, according to local conditions. Early spring planting while soil moisture is still high and after the worst of the frosts are over will give best results, in most areas.
- Stage and condition of existing vegetation (more on this below)

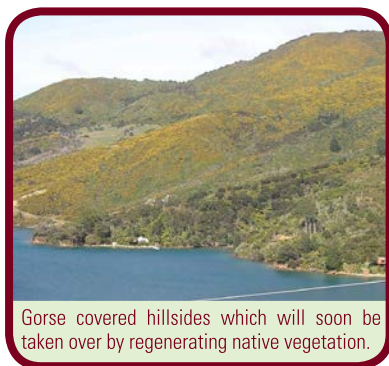
ESTABLISHMENT STAGES

Before people arrived, almost all of the land in North Marlborough was cloaked in forest. The valleys had towering forests of podocarps, beeches and broadleaved trees, festooned with vines and with abundant ferny undergrowth. On the slopes were beech forests, with various podocarps (especially rimu), a lot of kamahi and undergrowth of shrubs and ferns.

Widespread clearance of the original forest vegetation occurred for pastoral farm development. This was followed by a reduction in farmed area which has resulted in large areas of regenerating native vegetation since the 1950s. Vigorous regeneration occurs due to the warm moist climate, relatively fertile soils and proximity of mature forest that provides a seed source from both wind and bird spread seed.

Following natural disturbance, tall native forest gradually re-establishes (as long as seed sources are nearby) via three successional “stages”. The first stage is the cover provided by quick-growing pioneer species such as manuka, kanuka, tauhinu, bracken, kamahi, five-finger, karamu, mahoe and tree ferns; the second stage is the development of a more diverse forest with a wide range of broadleaved species and the third stage is the transition back to the dominance of larger long lived forest trees with a complex understorey. These stages are described in more detail below in relation to North Marlborough.

The **first stage** is the establishment of pioneer species. Mostly they are natives such as manuka, kanuka, tauhinu, bracken, kamahi, karamu and tree ferns but they can also be exotic species such as gorse, broom and Spanish heath. These provide a nursery for other species to establish within. Mostly they are overtaken quite quickly (within 15 - 30 years), but kanuka grows taller and can remain in the canopy for the best part of a century and kamahi can become large and long-lived also. This stage can also include various weeds including wilding tree species. Weeds such as gorse, broom, blackberry, barberry and Spanish heath are generally not an ecological threat as they will eventually be overtaken, but tree weeds like wilding pines, wattles and hawthorn can become dominant and require control.



Gorse covered hillsides which will soon be taken over by regenerating native vegetation.



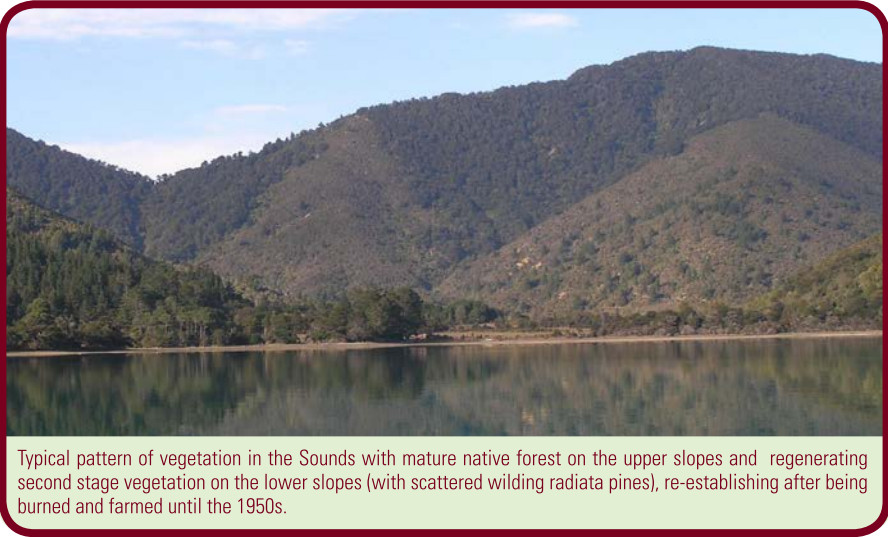
The **second stage** involves the establishment of a wider range of broadleaved trees and shrubs such as akeake, broadleaf, cabbage tree, five finger, hinau, heketara, kaikomako, kamahi, karamu, kawakawa, kohuhu, koromiko, lancewood, mahoe, mingimingi, pigeonwood, putaputaweta, rangiora, rewarewa and wineberry. They are usually accompanied by an array of ferns and ground-cover plants. Tree ferns, especially mamaku, are often abundant in moist or shaded places. These species can form a dense understorey for some time (in the case where the long lived kanuka is the original pioneer species), but usually begin to overtake and form low forests after twenty years or less (where shorter lived species such as gorse or tauhinu are the pioneer species). Broadleaved species provide a rich source of food for birds and gradually transition into taller more complex forests.



First stage kanuka forest with second stage ferns and broadleaved species coming through in the understorey.

The **third stage** is the transition to dominance by longer-lived canopy and sub canopy trees such as beeches, podocarps (rimu, totara, matai, miro and kahikatea) and large broadleaved species (kamahi, tawa, hinau, titoki, nikau, kohekohe, pukatea etc). This eventually results in forests like the existing mature remnants and tracts that are found in the district. This stage is dependent on the local availability of seeds or other plant material; all stages are dependent on lack of disturbance (by fire, mechanical clearance, weather extremes, domestic stock, feral animals or weed invasion).

Some sites would naturally have had different vegetation. Flood-prone stream and river banks would have had tough shrubs, small trees and flaxes. Wetlands and their margins would have had lowland flax, cabbage trees, sedges and rushes. Coastal faces had coastal flax, tough shrubs, silver tussock and a range of herbaceous plants tolerant of constant erosion, intense sun, salt spray and minimal soil. Most of these species are robust enough to plant in the open without a sheltering establishment stage.



Having noted conditions on the site and the native vegetation at the site or growing in similar conditions nearby, you can decide on the species you wish to plant or other management (for instance plant or animal pest control), you wish to put in place.



EARLY STAGE PLANTING

Pioneer (or first stage) native plants grow well in the open (retired pasture and bare ground), can be used to suppress competing vegetation (such as grass) and provide protection from sun, wind and frost for subsequent plantings. They also provide habitat for birds, lizards and invertebrates and a nursery for natural establishment of other native species. It is best to densely plant pioneer species, so that canopy cover is achieved quickly (within a few years).



Typical North Marlborough native pioneer species that lend themselves to initial planting include plants that would be occurring in both the first and second stages of natural succession described above and include:

COMMON NAME	LATIN NAME
Akeake	<i>Dodonaea viscosa</i>
Akiraho	<i>Olearia paniculata</i>
Broadleaf	<i>Griselinia littoralis</i>
Cabbage tree	<i>Cordyline australis</i>
Coastal shrub daisy	<i>Olearia solandri</i>
Flax	<i>Phormium tenax</i> & <i>P. cookianum</i>
Kanuka	<i>Kunzea ericoides</i>
Karamu	<i>Coprosma robusta</i>
Kohuhu	<i>Pittosporum tenuifolium</i>
Koromiko	<i>Hebe stricta</i> & <i>H. parviflora</i>
Lancewood	<i>Pseudopanax crassifolius</i> & <i>P. ferox</i>
Manuka	<i>Leptospermum scoparium</i>
Mapou	<i>Myrsine australis</i>
Mingimingi	<i>Coprosma propinqua</i> & <i>C. crassifolia</i>
Narrow-leaved lacebark	<i>Hoheria angustifolia</i>
Ngaio	<i>Myoporum laetum</i>
Wineberry	<i>Aristotelia serrata</i>

Some of the longer-lived third stage tree species are quite hardy also and can be planted in the open in some circumstances. Lowland totara for example, is relatively frost tolerant and drought hardy so can be planted in the open and will grow faster in the light. Beech species will also establish in direct sunlight but grow better if sheltered from wind.

Exotic species can also be used to provide the initial shelter, for instance a shelter belt of tree lucerne or conifers such as pines. However, species such as pines are increasingly troublesome as ecological weeds in North Marlborough and if they are used to shelter native plantings it is advised that they are viewed as temporary and are removed as soon as the need for shelter ends.

ENHANCING EXISTING VEGETATION (LATER STAGE PLANTING)

In North Marlborough there are extensive areas of naturally regenerating native and exotic vegetation, generally on hill slopes once cleared for pastoral farming. These areas will generally slowly go through a process of vegetation succession without human intervention although the process can be enhanced in a variety of

ways including:

- Plant and animal pest control to assist regeneration
- Interplanting to speed the succession process
- Restoring the understorey in treeland remnants on farms

Plant and animal pest control

The presence of even quite low numbers of either animal and/or plant pests can slow the regeneration and succession process down. In many cases the best management a landowner can apply is active management of pests such as pigs, deer, goat and possums and control of weeds such as wilding pines and climbers like old man's beard, banana passionfruit and Japanese honeysuckle. Each site is different and will require consideration of what type of management is most relevant and how this might be carried out. Along with impacts on native plants, some introduced animal pests also have a serious impact on native animals, including birds, bats, lizards and insects. More detailed information on animal pest and weed control can be found in Chapter 5.

Inter-planting to speed the succession process

Landowners with areas of naturally regenerating vegetation, or who have carried out a native planting from scratch and wish to further speed up the process of regeneration, could add forest species that would not naturally arrive until later in the successional process, by inter-planting third stage plants into first or second stage vegetation. Local forest composition and site conditions should be used as a guide. Plants should be a good size before they are planted out - at least 40 - 60 cm in height. Inter-planting could include third stage species such as:

COMMON NAME

LATIN NAME

Black beech

Nothofagus solandri

Kahikatea

Dacrycarpus dacrydioides

Kohekohe

Dysoxylum spectabile

Miro

Prumnopitys ferruginea

Matai

Prumnopitys taxifolia

Red beech

Nothofagus fusca

Rimu

Dacrydium cupressinum

Tawa

Beilschmiedia tawa

Titoki

Alectryon excelsus

Totara

Podocarpus totara

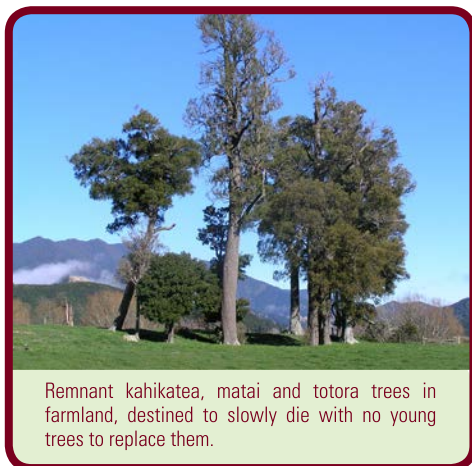


If inter-planting into well developed existing native vegetation, finding and utilising natural light wells may be all that is required. If interplanting on a bigger scale into exotic scrub like gorse, line cutting using a chainsaw, scrub bar, small excavator or bulldozer could be carried out.

As a general rule the width of the line cut should be about half of the height of the existing vegetation, ie, if being cut into 4 metre high gorse the line should be 1.5 – 2 metres in width. Line cutting is best completed in summer with planting to follow in the winter or spring, allowing time for the cut vegetation to decay and to allow control of any regrowth prior to planting. Further weed control along the lines until plants are well established may be required.

Restoring the understorey in treeland remnants on farms

Treeland remnants on farms can be very bare underneath if stock have had access to them for years. These areas will not last in the long term as the remnant older trees will eventually die out, unless replacement trees are planted or an understorey is allowed to develop, or is planted, underneath. In some instances simply removing stock by securely fencing the area will allow natural regeneration to occur (both from seed sources from the existing trees and from birds importing seed from elsewhere). Where conditions are favourable small seedlings will be evident on the ground under the trees within one to two years. However, if the ground is very compacted or there is rank grass growth, regeneration may not happen without some intervention and understorey planting. Rank grass will need to be sprayed at least six weeks prior to planting. If the treeland is dense enough to form a good canopy cover, plants that are frost tender can be planted (for instance five-finger, wineberry, kohekohe, titoki, akeake), along with a variety of other pioneer species from the first and second successional stages.



Remnant kahikatea, matai and totora trees in farmland, destined to slowly die with no young trees to replace them.



Koromiko school pupils learn about planting native trees (left).
Four year old new plantings under the old remnant trees are getting well established (right).

KOROMIKO FOREST RESERVE RESTORATION PROJECT

This reserve area supports old forest trees including matai, totara and beech species. While the area is owned by the Marlborough District Council it was leased and grazed for several decades until 2002 and so there was no understorey at all and over time as the old trees died out the area would have deteriorated. In 2002 the Council took over the management of the reserve and changed the focus to ecological restoration.

Since 2003 there has been extensive understorey planting, much of it carried out by the Koromiko school students and other community groups. Removing all stock has meant that most plants have done well and natural regeneration can also occur from the seeds from existing trees in the reserve and from birds bringing in new seed as they use the area.

Open areas where long grass had grown were sprayed about six weeks before planting, other areas under the trees did not need spraying before planting. The forest now has a healthy understorey and is developing into a functional lowland forest ecosystem. Toilets, a parking area and tracks through the forest mean that it is very accessible to the public travelling on State Highway 1 between Picton and Blenheim.

Funding for the project has come from the Council but also supported by the Honda Tree Fund over several years. The reserve was put into a Queen Elizabeth II Trust covenant in 2006 which protects it forever from any change of land use.



NOTABLE PLANTS AND RARE ECOSYSTEMS OF NORTH MARLBOROUGH

North Marlborough is home to a suite of plants that are notable because they are endemic (e.g. found only in the ultramafic zone or on the shores of Cook Strait), nationally or regionally threatened, at extremes of geographic distribution or associated with former Maori settlement. Quite a few of these species lend themselves to being propagated and planted out, so long as suitable sites are chosen and they receive special attention if required. That way you can make a contribution to the continued presence of these species in the region, especially if their use in your planting projects is documented. A selection of North Marlborough notable plants is included in the planting lists.

Naturally rare ecosystems that occur in North Marlborough include dunes, gravel beaches, sea cliff systems, coastal wetlands (including estuarine vegetation) and ultramafic communities. Now rare because of past land use (mostly logging, clearance and drainage for farming) are native forests and wetlands on lowland alluvial flats and terraces (valley floors and coastal flats). Riparian zones in the region have also been highly modified.




Cook Strait speargrass (foreground) grows only in exposed outer sounds locations.

If you have any of these rare ecosystems or plants on your property it is worth considering how to best protect and enhance these sites.

ECOSOURCING

Ecosourcing is one of the most important principles of native vegetation restoration. It is a key to successful planting and is the way to protect and celebrate our natural biodiversity. It involves the practice of sourcing plants or propagation material (seeds, cuttings, etc) solely from native plants growing locally, in the wild.

The definition of "local" varies with the species. For example, kanuka and karamu are widespread throughout North Marlborough, and it would be okay to use any North Marlborough material (but not that from South Marlborough). By contrast, swamp maire (*Syzygium maire*) occurs in only a few sites in North Marlborough, isolated from one another, and the nearest source should be used.



It is important to ecosourcing for three reasons. First, locally sourced stock is well adapted to local conditions, so has a best chance of survival and giving value to local native fauna.

Second, plants within the same species can adapt to local conditions to become genetically (and perhaps physically) distinct. For example, a tarata/lemonwood (*Pittosporum eugenioides*) tree growing in Nelson may look the same as one in the outer Marlborough Sounds, but there will be subtle differences in form and leaf characteristics and they will have quite different tolerances for frost, drought and wind.

Propagating from plant material of unknown origins risks interbreeding and therefore genetic “contamination” of local flora. This is true for several plants commonly used in revegetation including flaxes, kohuhu, cabbage trees, kowhai, manuka and kanuka.

Third, ecosourcing avoids the risk of planting species which are not native to North Marlborough. Some are potentially invasive and could spread into the wild, changing the nature of our native plant communities. Native species to avoid in an authentically North Marlborough planting include North Island lacebark (*Hoheria populnea*), North Island kowhai (*Sophora tetraptera*), karo (*Pittosporum crassifolium*, northern North Island), pohutukawa (*Metrosideros excelsa*, northern North Island) and *Pseudopanax lessonii* (northern North Island). Instead, plant narrow-leaved lacebark (*Hoheria angustifolia*), local kowhai (*Sophora microphylla* and *S. molloyi*), local kohuhu (*Pittosporum tenuifolium* and *P. colensoi*), southern rata (*Metrosideros umbellata*), lancewood and five-finger (*Pseudopanax crassifolius*, *P. ferox* and *P. arboreus*).

Some locally ecosourced plants may be available from local plant nurseries, as native plant nurseries are increasingly interested in producing ecosourcing plant material for restoration planting. Alternatively, you may like to collect your own seed for propagating by a local nursery or by yourself. This will require advance planning and patience, as it will mean at least a year (more likely two) before plants are ready to go in the ground. However, the payback in high plant survival and celebration of your local biodiversity should be worth it.

For seed collection, the closer the seed source to the restoration site, and the more similar the site conditions, the better. If collecting seed from private land permission from the landowner is obviously needed, and collection from conservation land requires a permit. Contact the Nelson/Marlborough Conservancy Office for information on permits (details in Appendices).



Beneath the canopy of rare lowland forest at the Redwood's place before it was fenced (left).

One year later regeneration is already underway with kawakawa and many other small seedlings including kahikatea, matai and kohekohe present (right).

Tony and Joy Redwood, along with their son Phil, farm on the western side of Anakoha Bay in the outer sounds. A survey of the property carried out by an ecologist in 2005 identified six significant natural areas, and since then the Redwoods have carried out protection fencing and weed control in two of these areas. They have also “helped” the regeneration process along in one of them – nine hectares of diverse lowland forest at the head of the bay which includes five podocarp species, including rimu and lowland totara, and several plants of botanical significance including ramarama, small-leaved milk tree (*Streblus heterophyllus*) and an unusual hybrid with the rare large-leaved milk tree (*S. banksii*).

Joy explains that while vigorous regeneration is happening naturally in parts of the forest now that stock are fenced out, other more open areas that get swamped with long grass could do with a helping hand to speed the process along. She has tried directly transplanting some species like cabbage trees but mostly she pots up excess natives like titoki, lacebark, whitey wood (mahoe), kaikomako and kohekohe when they are small and plants them out into the sprayed open areas a year or two later when they are a minimum of 30 cm high.

Joy says, “It’s just basic gardening really, I hate waste and if a plant is going to be removed or is in the way of another plant it may as well be relocated. We just thought it was a way of increasing the plantings, particularly in areas where pasture has been fenced off and it’s open and light.”

3| HOW TO PLANT - ENSURING PLANT SURVIVAL

The North Marlborough climate is generally favourable for plant growth. However, frosts occur regularly in inland valleys, summer drought is common and gales and rainstorms are quite frequent. Appropriate plant selection for the site and care during plant establishment (usually the first two years) will minimise losses.

The following are key factors for ensuring successful plant establishment.

PREPARATION

- Time planting to avoid harsh frosts and dry soils, according to local conditions. Early spring planting while soil moisture is still high and after the worst of the frosts are over will give best results, in most areas. This is particularly the case in inland and high altitude areas. In some years, early autumn planting of natives can be successful when there has been some early rain. This will allow roots to get well established before the cold of winter sets in.
- In frost-free coastal situations with free-draining soils, winter planting will make the most of higher rainfall.
- Summer is the best time to plant wetland margins and the flood zone behind, when water levels are at their lowest.
- The approach will vary according to soil type and conditions. In a dry site, for example, it may be possible to use machinery (ensuring it is cleaned so it will not spread new weeds) to clear the area before planting. This would, however, not be recommended in a fragile wetland.
- In large-scale revegetation projects, ripping the ground with a tractor or bulldozer a month or two before planting will concentrate all available rainfall deep in the rips, providing good initial soil moisture levels for plant establishment. Ripping has the added benefit of making planting much



quicker (thus potentially more economical). Do not, however, rip wet or puggy soils as this will cause compaction below the surface.

- Prior to planting, poison, trap and/or shoot wild pests in the area, then follow up.
- Eliminate all weeds that are likely to prevent growth and establishment of plantings. Remove ground vegetation on the soil surface, at least out to a one metre diameter from where the specimen will be planted. Either chip off with a spade to expose the soil or spray with herbicide. Plants will grow faster in the absence of competition for water, soil nutrients and light.
- Grass is a major competitor for moisture and sometimes light. If the area has not been tightly grazed, you could weed-eat to achieve a similar effect. Herbicides will be effective on fast-growing, tall (but not on dry, rank) grasses, leaving a mulch of dead material which will inhibit grass and weed seedling growth and retain moisture.
- Provide shelter where conditions are harsh. This can be done by constructing an artificial wind-break or by initially planting wind-tolerant species such as ngaio or kanuka. Tree lucerne, radiata pine and leyland cypress are exotic alternatives which should be used with caution and later removed.
- Source quality plants that are healthy, locally grown and hardened off. Discuss your planting aims and species selection with the nursery.
- Include a number of different species to spread risk, in case some do not cope with the conditions or become vulnerable to threats such as insect attack.
- Avoid planting shock by gradually hardening plants off on the site, a week or two before planting out. Ensure they are kept well watered.
- Soak roots for up to two hours before planting.

TYPES OF PLANTING STOCK

Root Trainers (RT) and Tubes

These are seedling (one-year-old) plant stocks that have been mass produced in small containers. They are generally the best choice for larger scale planting due to being easier to transport and handle than larger potted or bagged planting stock. Cost is generally low.

Potted or Bagged

These plant stocks are in plastic bags or pots that come in a range of sizes. They can be seedling plants or older. They generally require some root pruning to remove twisted or entangled roots prior to planting. It is important to select plants that have not outgrown the bag or pot i.e. they have a large top with only a small root system. These plants can be root-bound and may not survive or grow well.



Young totara seedlings coming through in the nursery.

Bare rooted/open ground (OG)

These are plant stocks that have been grown in an open nursery bed. They have been regularly root wrenched to encourage the strong development of a full, fibrous root system. Sale of bare rooted/open ground native plant stock is not common as it does not suit the production of many native species.

Bare rooted/open ground stock must be planted in winter or early spring in order to allow the root system to become well established. They need to be handled with care during transport and planting to minimise any damage to the root system and also to ensure the roots do not dry out.

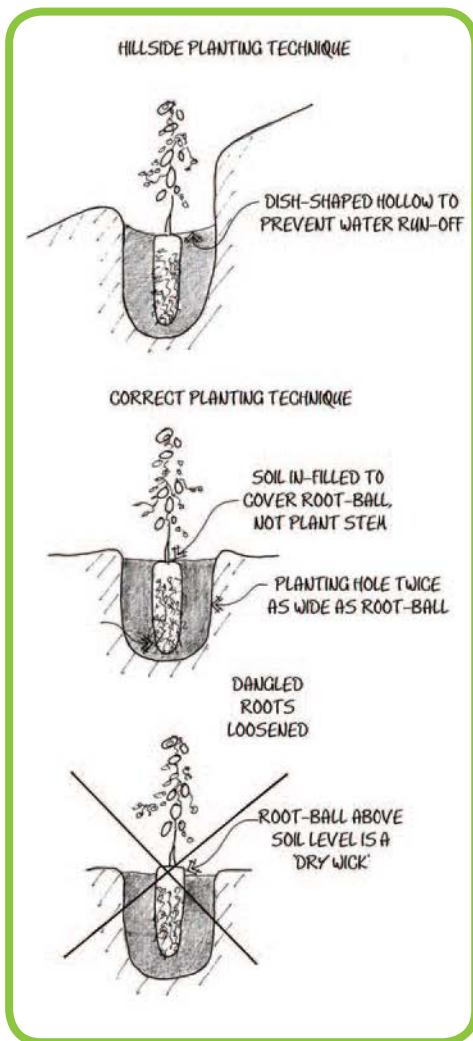
Splitting Flax

Flax plants can be prepared by lifting a large flax and splitting it up into individual fans for planting. This is best done in winter. Ensure the plants do not dry out. The outer (older) leaves on the flax fans can be trimmed off prior to planting, taking care not to damage the inner growing shoot.



THE PLANTING PROCESS

- Soak the rootball in water, until no bubbles emerge.
- Plant at the coolest time of the day (preferably evenings), on overcast days or when there is rainfall predicted. Avoid windy days.
- Dig a hole bigger and deeper than the root ball.
- Work soil in the planting hole well beyond the size of the container to encourage root development.
- Do not pull the plant out of the bag by its stem. Cut the bag or turn the plant upside down and carefully remove to minimise root damage.
- For root-trainers, open and push plant up and out.
- Cut off tangled and matted roots.
- Place the plant into worked soil at the bottom of the hole. Consolidate crumbled soil around roots and avoid air pockets.
- On slopes, leave a dish-shaped indentation around each plant to hold water.



- About a dessertspoon of slow release fertiliser (20-25g) sprinkled into the hole before planting will ensure fast initial growth. Alternatively, mix as much compost as you can afford with the soil.
- Just cover exposed potting mix with soil, not burying the stem.
- Plant deeper in dry environments (with the collar below the natural soil surface) and shallower in permanently moist sites (collar at soil surface). Never leave any of the original root ball showing above the soil, as it will act as a dry wick.
- Water plants in well directly after planting. For planting into moist, ripped ground with larger scale projects, watering will be unnecessary (providing the rootball is saturated).
- Plant in clusters so plants shelter one another as they grow.
- Mulch around the base to a depth of 8-10cm – 1m² per plant, to keep the root zone weed-free and the soil well-conditioned, cool, moist and insulated, especially at hot and dry sites. Good mulch materials include straw, leaves, compost, grass clippings, seaweed and newspaper (held down by rocks or bark), permeable weedmat, coconut matting or mixes from local landscaping and composting firms. Large stones placed around the plant create a shady area. Keep very wet mulching material from directly touching the stems (especially of non-woody plants), as contact can promote collar rot.

SOME GENERAL PRINCIPLES

- Plant in clusters so plants shelter one another as they grow.
- Where severe frosts are likely, plant frost-sensitive plants on north-facing slopes or beneath trees.
- To ensure fast growth and quick canopy cover, weed control is essential. To “release” a plant from competing species entails hand-pulling any growing close to the trunk then removing a metre square of weed cover from around the plant, either manually or by careful use of a herbicide.
- Fence plants from stock.



- In larger scale plantings where mulching is not feasible and grass or fern etc is likely to overtop plants, bamboo marker stakes will assist with finding plants for releasing.
- Tree protectors can be used to provide shelter for new plants. They should be removed, generally a year after planting. They may also prevent damage by rabbits and hares, otherwise use repellent sprays and/or shooting.
- To re-create bush plantings on a large scale, dense planting is essential. Plants should be spaced at between 1-1.5 metres on sites with good growing conditions. On harsher sites, such as those that are dry, exposed or with poor soils, plants should be less than one metre apart to minimise losses by providing group shelter and reduce gaps left by any that may die.
- For early stage plantings of revegetation projects, the area should be a minimum of four metres wide in any direction (i.e. five plants wide at one metre spacings) to minimise light penetration from the edges. Any narrower and shading and weed suppression will not be effective.
- If underplanting, select a site where the plant will get some sunlight and clear ground cover from the immediate area.

FOR NUMBER CRUNCHERS

A formula for calculating the number of plants required to fill a given area is:

$$(x/p + 1) \text{ times } (y/p + 1)$$

Where: x is the *length* of your area to be planted in metres
 y is the *width* of your area to be planted in metres
 p is the *spacing* between plants in metres

For example, if you had a 17m x 7m area you wanted to plant out at 1.5 metre spacings, then:

$$(17/1.5 + 1) \times (7/1.5 + 1) =$$

$$(11.33 + 1) \times (4.66 + 1), \text{ now round decimals downwards, } =$$

$$(11 + 1) \times (4 + 1) = 12 \times 5 = 60 \text{ plants required.}^*$$

*Note, that because 1.5m does not go into 17m or 7m exactly, there will be a little bit of land not able to be planted due to the rounding down. To fill the space up to all margins, round decimals upwards and plant at closer spacings at these two margins,

ie. $(12 + 1) \times (5 + 1) = 13 \times 6 = 78$ plants required.

MAINTENANCE/FOLLOW-UP

- Keep plants free of competing weeds until they are able to do this themselves with canopy closure. Remove weeds, then use mulch or weed mats.
- Ongoing mulching will also conserve water.
- The aim with irrigation should be to imitate nature. In dry country, a good drenching rather than frequent shallow watering is necessary to encourage deep rooting, enabling plants to subsequently survive droughts.
- Do not use weedeaters around young plants without hand-clearing the grass first. Ringbarking is one of the most common causes of plant mortality.
- Do not spray grass around your plants unless you get good advice on what herbicides to use. Many natives are very susceptible to spray drift.
- Control pests.
- Keep a photographic record and a diary of progress. This will help you learn what works and what does not and make changes as necessary.



New native plant surrounded by competing weeds and identified by a bamboo stake.

4| THE PLANT LISTS - USING THIS GUIDE

North Marlborough is rich in native plant species, especially forest and coastal plants and including many rare, threatened or otherwise notable species. For this guide, a selection has been made of species that are widely known, typically available from local nurseries specialising in natives and – if well planted and cared for – can be grown successfully.

Many other species are suitable for native restoration projects. For those taking on large-scale plantings, interested in propagating or ecosourcing their own plant material or particularly enthusiastic about North Marlborough flora, extra information is available from the Department of Conservation, Nelson.

Once you have clarified the purpose of your planting and studied conditions at your chosen site, the following lists can be used to select suitable plant species according to ecological district, site conditions and personal preferences (such as growth form, height at maturity, attractiveness to birds and rarity).



Nikau palms regenerating vigorously in a sheltered gully.

THE PLANT LISTS

There are eight lists of plants altogether.

The first three relate to different geographical areas in North Marlborough: Inland North Marlborough, Inner Sounds and Outer Sounds. These are shown on the map and also give a rough guide as to where plants should ideally be sourced from to ensure that ecosourcing principles are maintained. If it is not possible to obtain plants from within their own area, plants from elsewhere in North Marlborough should be used rather than plants from other parts of New Zealand.

The fourth and fifth lists identify plants most suited to coastal and wetland environments.

The sixth list relates to threatened plants in North Marlborough, with threat categories, ecosystem or habitat types and identified potential restoration places set out.

The seventh list identifies plants that are not ranked as threatened but are otherwise notable because of their unexpectedness, remnant status, cultural associations or representing extremes of distribution. They are listed along with ecosystem or habitat types and identified potential restoration.

The eighth and final list identifies exotic species and non-local natives which can be problematic because of their potential to spread vigorously and out-compete local native plants. Alternative more suitable native species are suggested.

Along with each plant's scientific and common name, the lists provide information on growing characteristics including frost tenderness, sunlight and moisture preferences and attractiveness as a food source for birds and other native fauna.

Inland North Marlborough

This is the inland part of North Marlborough, characterised by fertile lowland valleys, prone to frosts and occasional flooding, and steep hill country. It includes Pelorus, Para and Fishtail ecological districts and part of Red Hills ecological district. There are excellent opportunities to protect and restore old remnant treelands on farms in this area and also to carry out worthwhile riparian restoration planting.

Inner Sounds

The Inner Sounds occupy the south-western half of the Sounds ecological district. They have a flora of plants shared with the hinterland, with coastal species in addition. The climate has a maritime component but is largely sheltered from the prevailing westerly weather and the funnelling effects of Cook Strait. Kohekohe is absent, probably because of its intolerance of cool conditions. Natural regeneration is vigorous in this area.

Outer Sounds

The distribution of kohekohe, where it is still present, defines the Outer Sounds: D'Urville ecological district, the north-eastern half of the Sounds ecological district and the western (South Island) part of Cook Strait ecological district. The Outer



Sounds are exposed to the ferocity of the elements, particularly strong salt-laden winds. Unsurprisingly there are species adapted to the Cook Strait conditions and found nowhere else.

Coastal Sites

Plants in this list can generally tolerate salty conditions. Most can be planted on margins adjacent to the coast, while the groundcovers include species able to grow right on the beach or on coastal cliffs.

Wetland Sites

Wetland and estuarine areas can support a range of plants with varying tolerance to wet conditions. The list identifies plants more suited to the margins, very wet areas and coastal estuarine conditions.

Riparian Plants

Not listed separately but a column within the various lists is included to show whether plants are suitable for riparian planting alongside streams and waterbodies.

Threatened Plants

North Marlborough is home to a surprising number of New Zealand's threatened native species. They include plants endemic to the Cook Strait environment, others peculiar to the ultramafic zone, some alpine species, forest species and riparian (streamside) specialists. The list contains a selection of those that readily lend themselves to propagation and restoration planting.

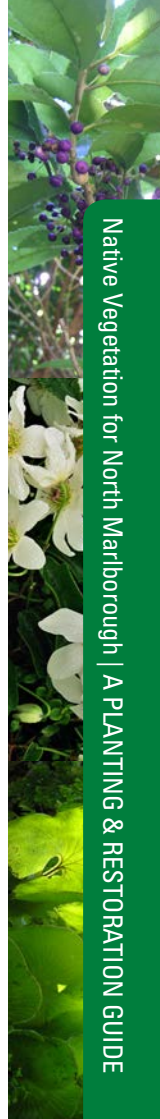
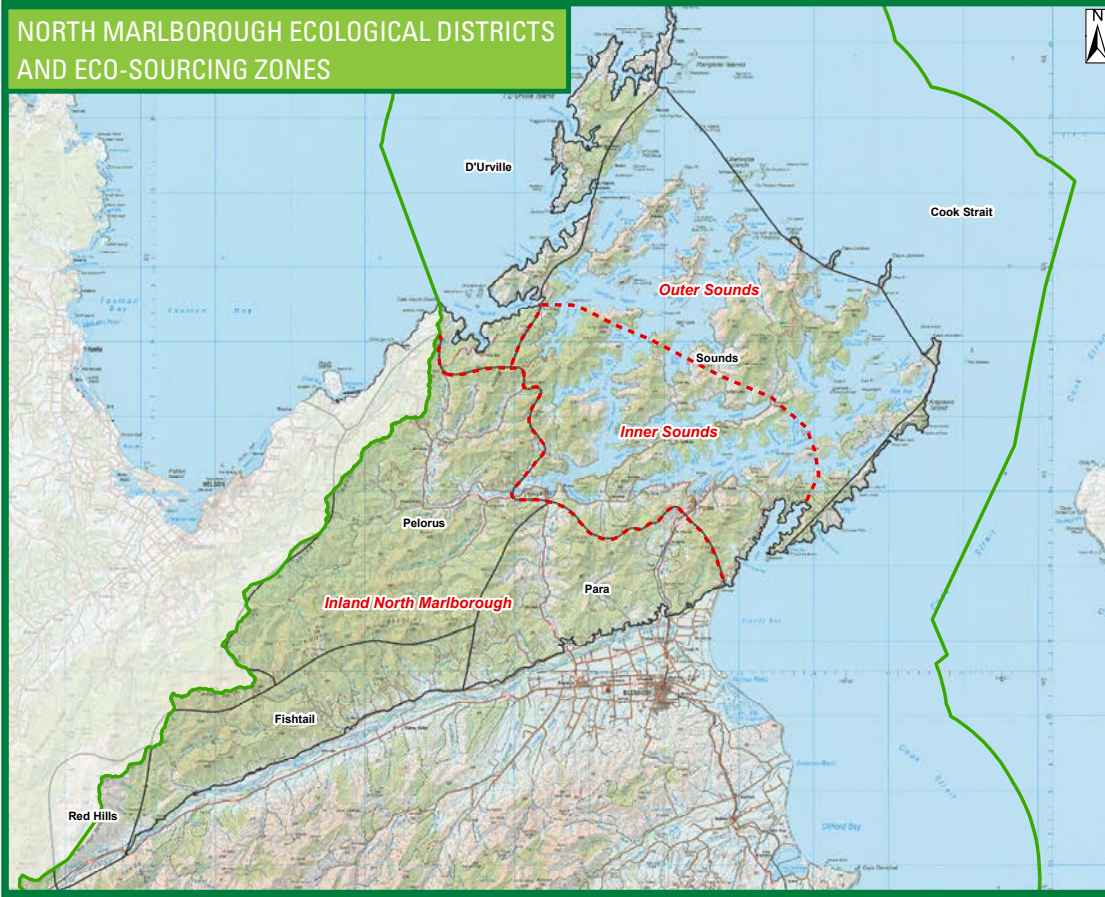
Notable Plants

A number of plants that occur in the district are notable because of their unexpectedness, remnant status, cultural associations or representing extremes of distribution. They are listed along with ecosystem or habitat types and identified potential restoration.

Plant Me Instead

Many plants have been brought to North Marlborough from near and far and planted. They are mostly exotic species, but they include an increasing number of New Zealand natives from outside the region. Several have become weeds and others have the potential to do so. This list offers alternatives that are more ecologically suited to North Marlborough.

NORTH MARLBOROUGH ECOLOGICAL DISTRICTS AND ECO-SOURCING ZONES



PLANTING LISTS FOR NORTH MARLBOROUGH

INLAND NORTH MARLBOROUGH

BOTANICAL NAME

TREES 5-20m+

Alectryon excelsus
Aristotelia serrata
Beilschmiedia tawa
Carpodetus serratus
Coprosma linariifolia
Cordyline australis
Cyathea dealbata
Cyathea medullaris
Cyathea smithii
Dacrycarpus dacrydioides
Dacrydium cupressinum
Dicksonia squarrosa

COMMON NAME

titoki
wineberry
tawa
putaputaweta, marbleleaf
mikimiki, yellow wood
ti kouka, cabbage tree
ponga, silver fern
mamaku
soft tree fern
kahikatea, white pine
rimu
wheki

KEY TO CHARTS ON FOLLOWING PAGES

Planting stage ratio ✓ Plant sparingly ✓✓ Plant commonly
Moisture preference ◆ Dry site ◆◆ Moist site ◆◆◆ Wet site
Sunlight preference ○ Prefers full sunlight ● Prefers filtered sunlight ●● Prefers total shade
Frost tenderness ❄ Frost tender ❄❄ Very frost tender
Bird food Fr Fruit Fl Flowers H Honeydew N Nectar L Leaves
Riparian suitability Yes/No **Coastland suitability** Yes/No **Wetland suitability** Yes/No
Wetland situation Wet: Wet sites Margin: Wetland edges/surrounds Est: Estuarine

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

WETLAND SUITABILITY

	✓	✓	◆◆	○●	❄❄	Fr	Yes	No		
	✓	✓	◆◆	○●	❄❄	Fr	Yes	No		
	✓	✓	◆◆	○●	❄	Fr	Yes	No		
	✓✓	✓✓	◆◆◆	○●	❄	Fr	Yes	No		
	✓✓	✓✓	◆◆◆	○●●●	❄❄	Fr,Fr	Yes	Yes		
	✓	✓	◆◆◆	○●●●	❄		Yes	Yes		
	✓	✓	◆◆◆	○●●●	❄	Fr	Yes	No		
	✓	✓	◆◆◆	○●●●		Fr	Yes	Yes		
	✓	✓	◆◆	○●●			Yes	Yes		

<i>Elaeocarpus dentatus</i>	hinau	✓	✓	●●	○●		Fr	Yes	No
<i>Elaeocarpus hookerianus</i>	pokaka	✓	✓	●●	○●		Fr	Yes	No
<i>Fuchsia excorticata</i>	kotukutuku, tree fuchsia		✓	●●	○●	*	N,Fr	Yes	Yes
<i>Griselinia littoralis</i>	papauma, broadleaf	✓	✓✓	●●	○●		Fr	Yes	Yes
<i>Hedycarya arborea</i>	pigeonwood	✓	✓	●●	○●	*	Fr	Yes	No
<i>Hoheria angustifolia</i>	houhere, narrow-leaved lacebark	✓✓	✓✓	●●	○●		Fl,L	Yes	Yes
<i>Kunzea ericoides</i>	kanuka	✓✓	✓✓	●●	○		N	Yes	No
<i>Leptospermum scoparium</i>	manuka	✓✓	✓✓	●●●●	○		N	Yes	Yes
<i>Lophomyrtus obcordata</i>	rohutu	✓	✓	●●	○●		Fr	Yes	Yes
<i>Meliccytus ramiflorus</i>	mahoe	✓	✓✓	●●	○●	*	Fr	Yes	No
<i>Metrosideros umbellata</i>	southern rata	✓	✓✓	●●	○●	*	N	Yes	No
<i>Myrsine australis</i>	mapou	✓	✓✓	●-●●	○●		Fr	Yes	No
<i>Myrsine salicina</i>	toro		✓	●●	○●		Fr	Yes	No
<i>Nothofagus fusca</i>	red beech	✓	✓✓	●●	○●		H	Yes	No
<i>Nothofagus menziesii</i>	silver beech	✓	✓✓	●●	○●			Yes	No
<i>Nothofagus solandri</i> var. <i>cliffortioides</i>	mountain beech	✓	✓✓	●●	○●		H	Yes	No
<i>Nothofagus solandri</i> var. <i>solandri</i>	black beech	✓	✓✓	●-●●	○●		H	Yes	No
<i>Nothofagus truncata</i>	hard beech	✓	✓✓	●-●●	○●		H	Yes	No
<i>Olearia rani</i>	heketara		✓✓	●●	○●			Yes	No
<i>Pennantia corymbosa</i>	kaikomako	✓✓	✓✓	●●	○●		Fr	Yes	No
<i>Pittosporum eugenioides</i>	tarata, lemonwood	✓✓	✓✓	●●	○●		Fr	Yes	No
<i>Pittosporum tenuifolium</i>	kohuhu	✓✓	✓	●-●●	○●		Fr	Yes	No
<i>Plagianthus regius</i>	manatu, lowland ribbonwood	✓✓	✓✓	●●	○●		L	Yes	Yes
<i>Podocarpus hallii</i>	mountain or thin-bark totara	✓✓	✓✓	●●	○●		Fr	Yes	No
<i>Podocarpus totara</i>	lowland totara	✓✓	✓✓	●-●●	○●		Fr	Yes	No
<i>Prumnopitys ferruginea</i>	miro		✓	●●	○●		Fr	Yes	No
<i>Prumnopitys taxifolia</i>	matai		✓	●●	○●		Fr	Yes	No
<i>Pseudopanax arboreus</i>	five finger	✓✓	✓✓	●●	○●	*	N,Fr	Yes	Yes
<i>Pseudopanax crassifolium</i>	lancewood	✓✓	✓✓	●-●●	○●		Fr	Yes	Yes
<i>Sophora microphylla</i>	kowhai	✓✓	✓✓	●-●●	○		N,L	Yes	Yes
<i>Streblus heterophyllus</i>	tourepo, small-leaved milk tree		✓	●●	○●			Yes	Yes
<i>Weinmannia racemosa</i>	kamahi	✓	✓✓	●-●●	○●		N	Yes	No
SMALL TREES 2-5m									
<i>Brachyglottis repanda</i>	rangiora	✓	✓	●●	●-●	*	Fr	Yes	No
<i>Coprosma areolata</i>		✓	✓	●●	○●		Fr	Yes	Yes

PLANTING LISTS FOR
NORTH MARLBOROUGHINLAND NORTH
MARLBOROUGH

BOTANICAL NAME

SMALL TREES 2-5m CONT.

Coprosma crassifolia
Coprosma grandiflora
Coprosma lucida
Coprosma robusta
Coprosma rotundifolia
Cordyline banksii
Dicksonia fibrosa
Dracophyllum filifolium
Hebe salicifolia
Leucopogon fasciculatus
Lophomyrtus bullata
Melicope simplex
Melicytus lanceolatus
Myrsine divaricata
Neomyrtus pedunculata
Olearia aviceniifolia
Pseudowintera axillaris
Pseudowintera colorata

SHRUBS 1-2m

Carmichaelia arborea
Coprosma rhamnoides

COMMON NAME

raureka, kanono
 shining karamu
 karamu
 ti ngahere, forest cabbage tree
 wheki-ponga
 inaka
 koromiko
 soft mingimingi
 ramarama
 poataniwha
 narrow-leaved mahoe
 weeping matipo
 rohutu
 grey tree daisy
 lowland horopito
 horopito, pepperwood

South Island broom
 scrub coprosma

EARLY STAGE PLANTING



LATER STAGE PLANTING



MOISTURE PREFERENCE



SUNLIGHT PREFERENCE



FROST TENDERNESS



BIRD FOOD

Fr

Fr

Fr

Fr

Fr,Fr

Fr

Fr

Fr

Fr

Fr

Fr

Fr

Fr

Fr

Fr

RIPARIAN SUITABILITY

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

WETLAND SUITABILITY

Yes

No

No

Yes

No

Yes

No

Yes

Yes

Yes

No

Yes

Yes

No

No

No

No

Yes

<i>Coprosma tayloriae</i>		✓	✓	▲-▲-▲-▲	○-●		Fr	Yes	Yes
<i>Corokia cotoneaster</i>	korokio	✓	✓	▲▲	○-●		Fr	Yes	No
<i>Gaultheria antipoda</i>	snowberry	✓	✓	▲-▲▲	○		Fr	Yes	No
<i>Hebe divaricata</i>	koromiko	✓	✓	▲▲	○-●			Yes	No
<i>Hebe leiophylla</i>	koromiko	✓	✓	▲▲	○-●			Yes	No
<i>Helichrysum lanceolatum</i>	niniaio	✓	✓	▲-▲▲	●			Yes	No
<i>Leptecophylla juniperina</i>	prickly mingimingi	✓	✓	▲-▲▲	○-●		Fr	Yes	No
<i>Ozothamnus leptophyllus</i>	tauhinu	✓		▲-▲▲	○			Yes	No
<i>Pittosporum divaricatum</i>		✓	✓	▲▲	○-●			Yes	No
<i>Raukaua anomalus</i>		✓	✓	▲▲	○-●			Yes	No

GROUND COVERS

<i>Astelia fragrans</i>	bush lily		✓✓	▲▲-▲▲▲	●-●		Fr	Yes	Yes
<i>Blechnum novae-zelandiae</i>	kiokio	✓✓	✓	▲▲-▲▲▲	○-●			Yes	Yes
<i>Carex comans</i>	maurea	✓	✓	▲▲-▲▲▲	○-●			Yes	Yes
<i>Carex flagellifera</i>	bootlace sedge	✓	✓	▲▲-▲▲▲	○-●			Yes	Yes
<i>Carex secta</i>	purei, tussock sedge	✓✓	✓	▲▲▲	○-●			Yes	Yes
<i>Carex virgata</i>	pukio	✓✓	✓	▲▲▲	○-●			Yes	Yes
<i>Chionochloa cheesemanii</i>	bush tussock		✓	▲▲	●			Yes	No
<i>Chionochloa rubra</i>	red tussock	✓✓	✓	▲▲-▲▲▲	○			Yes	Yes
<i>Cortaderia richardii</i>	South Island toetoe	✓✓	✓	▲▲-▲▲▲	○			Yes	Yes
<i>Dianella nigra</i>	turutu, blueberry	✓	✓	▲-▲▲	○-●		Fr	Yes	No
<i>Libertia ixioides</i>	native iris	✓	✓	▲▲	○-●			Yes	No
<i>Phormium cookianum</i>	wharariki, mountain flax	✓✓		▲-▲▲	○		N	Yes	No
<i>Phormium tenax</i>	harakeke, lowland flax	✓✓		▲▲-▲▲▲	○		N	Yes	Yes
<i>Poa cita</i>	silver tussock	✓✓		▲-▲▲	○			Yes	No

CLIMBERS

<i>Clematis paniculata</i>	puawananga, bush clematis		✓	▲▲	○-●			Yes	No
<i>Metrosideros diffusa</i>	white rata vine		✓	▲▲	○-●		N	Yes	No
<i>Metrosideros fulgens</i>	winter rata, scarlet rata vine		✓	▲▲	○-●		N	Yes	No
<i>Metrosideros perforata</i>	lowland rata vine		✓	▲▲	○-●		N	Yes	No
<i>Muehlenbeckia complexa</i>	pohuehue, wiggly-wig	✓✓		▲-▲▲	○		Fr	Yes	No
<i>Parsonsia heterophylla</i>	NZ jasmine		✓	▲-▲▲	○			Yes	No
<i>Passiflora tetrandra</i>	NZ passionfruit		✓	▲▲	○-●	❄️	Fr	Yes	No
<i>Ripogonum scandens</i>	supplejack		✓	▲▲-▲▲▲	○-●	❄️	Fr	Yes	Yes

PLANTING LISTS FOR NORTH MARLBOROUGH

INNER SOUNDS

BOTANICAL NAME

TREES 5-20m+

Alectryon excelsus
Aristotelia serrata
Beilschmiedia tawa
Carpodetus serratus
Coprosma linariifolia
Cordyline australis
Cordyline indivisa
Corynocarpus laevigatus
Cyathea cunninghamii
Cyathea dealbata
Cyathea medullaris
Cyathea smithii
Dacrycarpus dacrydioides
Dacrydium cupressinum
Dicksonia squarrosa
Dodonaea viscosa
Elaeocarpus dentatus
Elaeocarpus hookerianus
Fuchsia excorticata
Griselinia littoralis
Griselinia lucida
Hedycarya arborea
Knightia excelsa
Kunzea ericoides

COMMON NAME

titoki
 wineberry
 tawa
 putaputaweta, marbleleaf
 mikimiki, yellow wood
 ti kouka, cabbage tree
 toi, mountain cabbage tree
 karaka
 gully tree fern
 ponga, silver fern
 mamaku
 soft tree fern
 kahikatea, white pine
 rimu
 wheki
 akeake
 hinau
 pokaka
 kotukutuku, tree fuchsia
 papauma, broadleaf
 puka
 pigeonwood
 rewarewa, NZ honeysuckle
 kanuka

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

COASTAL SUITABILITY

WETLAND SUITABILITY

			●●	○	❄️❄️	Fr	Yes	Yes	No
✓	✓	●●	○	❄️❄️	Fr	Yes	No	No	No
	✓	●●	○	❄️	Fr	Yes	No	No	No
✓	✓	●●	○	❄️❄️	Fr	Yes	No	No	No
✓	✓	●●	○	❄️❄️	Fr	Yes	No	No	No
✓	✓	●●	○	❄️❄️	Fr,Fr	Yes	Yes	Yes	Yes
✓	✓	●●	○	❄️❄️	Fr,Fr	Yes	No	No	No
	✓	●●	○	❄️❄️	Fr	Yes	Yes	Yes	No
✓	✓	●●	○	❄️❄️	Fr	Yes	No	No	No
✓	✓	●●	○	❄️❄️	Fr	Yes	Yes	Yes	No
✓	✓	●●	○	❄️❄️	Fr	Yes	Yes	Yes	Yes
✓	✓	●●	○	❄️❄️	Fr	Yes	No	No	No
✓	✓	●●	○	❄️❄️	Fr	Yes	Yes	Yes	Yes
✓	✓	●●	○	❄️❄️	Fr	Yes	Yes	Yes	No
✓	✓	●●	○	❄️❄️	Fr	Yes	Yes	Yes	No
✓	✓	●●	○	❄️❄️	Fr,L	Yes	Yes	Yes	No
✓	✓	●●	○	❄️	N	Yes	Yes	Yes	No
✓	✓	●●	○	❄️	N	Yes	Yes	Yes	No

<i>Laurelia novae-zelandiae</i>	pukatea		✓	▲▲-▲▲	○-○			Yes	Yes	Yes
<i>Leptospermum scoparium</i>	manuka	✓✓	✓✓	▲▲▲▲	○		N	Yes	Yes	Yes
<i>Lophomyrtus obcordata</i>	rohutu	✓	✓	▲▲	○-○		Fr	Yes	No	Yes
<i>Macropiper excelsum</i>	kawakawa		✓✓	▲▲	○-●	❄️❄️	Fr	Yes	Yes	No
<i>Melicope ternata</i>	wharangi	✓	✓	▲	○-○	❄️❄️		No	Yes	No
<i>Melicytus ramiflorus</i>	mahoe	✓	✓✓	▲▲	○-●	❄️	Fr	Yes	Yes	No
<i>Metrosideros umbellata</i>	southern rata	✓	✓✓	▲▲	○-○	❄️❄️	N	Yes	Yes	No
<i>Myoporum laetum</i>	ngaio	✓✓	✓✓	▲-▲▲	○-○	❄️❄️	Fl	Yes	Yes	No
<i>Myrsine australis</i>	mapou	✓	✓✓	▲-▲▲	○-○		Fr	Yes	Yes	No
<i>Myrsine salicina</i>	toro		✓	▲▲	●-●		Fr	Yes	No	No
<i>Nothofagus fusca</i>	red beech	✓	✓✓	▲▲	○-○		H	Yes	No	No
<i>Nothofagus menziesii</i>	silver beech	✓	✓✓	▲▲	○-●			Yes	No	No
<i>Nothofagus solandri</i> var. <i>solandri</i>	black beech	✓	✓✓	▲▲	○-○		H	Yes	Yes	No
<i>Nothofagus truncata</i>	hard beech	✓	✓✓	▲-▲▲	○-○		H	Yes	Yes	No
<i>Olearia paniculata</i>	akiraho	✓✓	✓✓	▲-▲▲	○-○			Yes	Yes	No
<i>Olearia rani</i>	heketara		✓✓	▲▲	○-●			Yes	No	No
<i>Pennantia corymbosa</i>	kaikomako	✓✓	✓✓	▲▲	○-○		Fr	Yes	Yes	No
<i>Phyllocladus trichomanoides</i>	tanekaha	✓	✓	▲▲	○-○	❄️		Yes	Yes	No
<i>Pittosporum eugenioides</i>	tarata, lemonwood	✓✓	✓✓	▲▲	○-○		Fr	Yes	Yes	No
<i>Pittosporum tenuifolium</i>	kohuhu	✓✓	✓	▲-▲▲	○-○		Fr	Yes	Yes	No
<i>Podocarpus hallii</i>	mountain or thin-bark totara	✓✓	✓✓	▲-▲▲	○-○		Fr	Yes	No	No
<i>Podocarpus totara</i>	lowland totara	✓✓	✓✓	▲-▲▲	○-○		Fr	Yes	Yes	No
<i>Prumnopitys ferruginea</i>	miro		✓	▲▲	○-●		Fr	Yes	No	No
<i>Prumnopitys taxifolia</i>	matai		✓	▲▲	○-○		Fr	Yes	Yes	No
<i>Pseudopanax arboreus</i>	five-finger	✓✓	✓✓	▲▲	○-○	❄️	N,Fr	Yes	Yes	Yes
<i>Pseudopanax crassifolius</i>	lancewood	✓✓	✓✓	▲-▲▲	○-○		Fr	Yes	Yes	Yes
<i>Raukawa edgerleyi</i>	rauikawa		✓	▲▲	○-○	❄️	Fr	Yes	No	No
<i>Rhopalostylis sapida</i>	nikau	✓	✓✓	▲▲-▲▲▲	○-●	❄️❄️	Fl,Fr	Yes	Yes	Yes
<i>Sophora microphylla</i>	kowhai	✓✓	✓✓	▲-▲▲	○		N,L	Yes	Yes	Yes
<i>Strelbit heterophyllus</i>	turepo, small-leaved milk tree		✓	▲	○-○			Yes	No	No
<i>Syzygium maire</i>	swamp maire	✓	✓	▲-▲▲▲	○-○	❄️	N,Fr	No	No	Yes
<i>Weinmannia racemosa</i>	kamahi	✓	✓✓	▲-▲▲	○-○		N	Yes	Yes	No
SMALL TREES 2-5m										
<i>Ascarina lucida</i>	hutu	✓	✓	▲▲	○-○	❄️❄️		Yes	No	No
<i>Brachyglottis repanda</i>	rangiora	✓	✓	▲▲	●-●	❄️		Yes	Yes	No

PLANTING LISTS FOR NORTH MARLBOROUGH

INNER SOUNDS

BOTANICAL NAME

SMALL TREES 2-5m CONT.

Coprosma areolata
Coprosma crassifolia
Coprosma grandiflora
Coprosma lucida
Coprosma propinqua
Coprosma repens
Coprosma robusta
Cordyline banksii
Dicksonia fibrosa
Dracophyllum filifolium
Dracophyllum urvilleanum
Hebe stricta
Leucopogon fasciculatus
Lophomyrtus bullata
Melicope simplex
Olearia aviceniifolia
Pseudowintera axillaris
Pseudowintera colorata

SHRUBS 1-2m

Alseuosmia pusilla
Carmichaelia arborea
Coprosma rhamnoides
Gaultheria antipoda

COMMON NAME

raurekau, kanono
 shining karamu
 mingimingi
 taupata
 karamu
 ti ngahere, forest cabbage tree
 wheki-ponga
 inaka
 neinei
 koromiko
 soft mingimingi
 ramarama
 poataniwha
 grey tree daisy
 lowland horopito
 horopito, pepperwood

horopito look-alike
 South Island broom
 scrub coprosma
 snowberry

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

COASTAL SUITABILITY

WETLAND SUITABILITY

	✓	✓	●●	○●		Fr	Yes	No	Yes
	✓	✓	●●	○●		Fr	Yes	Yes	Yes
	✓	✓	●●	○●	*	Fr	Yes	No	No
	✓	✓	●●	○●		Fr	Yes	Yes	No
	✓	✓	●●	○●	**	Fr	No	Yes	Yes
	✓	✓	●●	○●		Fr	Yes	Yes	No
	✓	✓	●●	○●		Fr,Fr	Yes	No	Yes
	✓	✓	●●	○●			Yes	Yes	Yes
	✓	✓	●●	○●			Yes	No	No
	✓	✓	●●	○●			Yes	Yes	No
	✓	✓	●●	○●	*	Fr	Yes	No	Yes
	✓	✓	●●	○●		Fr	Yes	No	Yes
	✓	✓	●●	○●	*	Fr	Yes	No	No
	✓	✓	●●	○●		Fr	Yes	No	No
	✓	✓	●●	○●	*	Fr	Yes	No	No
	✓	✓	●●	○●		Fr	Yes	Yes	No
	✓	✓	●●	○●		Fr	Yes	Yes	No
	✓	✓	●●	○●		Fr	Yes	No	Yes
	✓	✓	●●	○●		Fr	Yes	Yes	No

<i>Hebe stenophylla</i>	koromiko	✓	✓	●	○			Yes	Yes	No
<i>Helichrysum lanceolatum</i>	niiniao	✓	✓	●-●	○●			Yes	No	No
<i>Leptecophylla juniperina</i>	prickly mingimingi	✓	✓	●-●	○-○●		Fr	Yes	Yes	No
<i>Ozothamnus leptophyllus</i>	tauhinu	✓✓		●-●	○			Yes	Yes	No
<i>Plagianthus divaricatus</i>	saltmarsh ribbonwood	✓✓	✓	●-●-●	○-○●			No	Yes	Yes
<i>Pomaderris phyllicifolia</i>		✓	✓	●-●	○-○●			Yes	No	No
<i>Raukaua anomalus</i>		✓	✓	●	○-●			Yes	No	No
GROUND COVERS										
<i>Apodasmia similis</i>	oiioi, jointed rush	✓✓	✓	●-●-●	○-○●			No	Yes	Yes
<i>Arthropodium cirratum</i>	rengarenga, renga lily	✓✓	✓	●-●	○-○●	❄️❄️		No	Yes	No
<i>Asplenium oblongifolium</i>	shining spleenwort	✓	✓	●	○-●			Yes	Yes	No
<i>Astelia fragrans</i>	bush lily		✓✓	●-●-●	○-○●		Fr	Yes	No	Yes
<i>Blechnum novae-zelandiae</i>	kiokio	✓✓	✓	●-●-●	○-○●			Yes	Yes	Yes
<i>Carex secta</i>	purei, tussock sedge	✓✓	✓	●	○-○●			Yes	No	Yes
<i>Carex virgata</i>	pukio	✓✓	✓	●	○-○●			Yes	No	Yes
<i>Chionochloa cheesemanii</i>	bush tussock		✓	●	○			Yes	No	No
<i>Cortaderia richardii</i>	South Island toetoe	✓✓	✓	●-●-●	○			Yes	Yes	Yes
<i>Dianella nigra</i>	turutu, blueberry	✓	✓	●-●	○-○●		Fr	Yes	Yes	No
<i>Libertia ixioides</i>	native iris	✓	✓	●	○-○●			Yes	Yes	No
<i>Microsorium pustulatum</i>	hound's tongue fern		✓	●	○			Yes	Yes	No
<i>Phormium cookianum</i>	wharariki, mountain flax	✓✓		●-●	○		N	Yes	Yes	No
<i>Phormium tenax</i>	harakeke, lowland flax	✓✓		●-●-●	○		N	Yes	Yes	Yes
<i>Poa aff. cita</i>	coastal silver tussock	✓✓		●-●	○			No	Yes	No
CLIMBERS										
<i>Clematis forsteri</i>	clematis		✓	●	○-○●			Yes	Yes	No
<i>Clematis paniculata</i>	puawananga, bush clematis		✓	●	○-○●	❄️		Yes	No	No
<i>Freycinettia banksii</i>	kiekie		✓	●	○-○●	❄️	Fl,Fr	Yes	Yes	Yes
<i>Fuchsia perscandens</i>	climbing fuchsia		✓	●	○-○●	❄️	N,Fr	Yes	No	Yes
<i>Metrosideros diffusa</i>	white rata vine		✓	●	○-○●		N	Yes	No	No
<i>Metrosideros fulgens</i>	winter rata, scarlet rata vine		✓	●	○-○●		N	Yes	Yes	No
<i>Metrosideros perforata</i>	lowland rata vine		✓	●	○-○●		N	Yes	Yes	No
<i>Muehlenbeckia complexa</i>	poehuehue, wiggly-wig	✓✓		●-●	○		Fr	Yes	Yes	No
<i>Parsonia heterophylla</i>	NZ jasmine		✓	●-●	○			Yes	Yes	No
<i>Passiflora tetrandra</i>	NZ passionfruit		✓	●-●	○-○●	❄️❄️	Fr	Yes	Yes	No
<i>Ripogonum scandens</i>	supplejack		✓	●-●-●	○-●	❄️	Fr	Yes	Yes	Yes

PLANTING LISTS FOR NORTH MARLBOROUGH

OUTER SOUNDS

BOTANICAL NAME

TREES 5-20m+

Alectryon excelsus
Aristotelia serrata
Beilschmiedia tawa
Carpodetus serratus
Cordyline australis
Cordyline indivisa
Corynocarpus laevigatus
Cyathea cunninghamii
Cyathea dealbata
Cyathea medullaris
Dacrycarpus dacrydioides
Dacrydium cupressinum
Dicksonia squarrosa
Dodonaea viscosa
Dysoxylum spectabile
Elaeocarpus dentatus
Entelea arborescens
Fuchsia excorticata
Griselinia littoralis
Griselinia lucida
Hedycarya arborea
Knightia excelsa
Kunzea ericoides
Laurelia novae-zelandiae

COMMON NAME

titoki
 wineberry
 tawa
 putaputaweta, marbleleaf
 ti kouka, cabbage tree
 toi, mountain cabbage tree
 karaka
 gully tree fern
 ponga, silver fern
 mamaku
 kahikatea, white pine
 rimu
 wheki
 akeake
 kohekohe
 hinau
 whau, NZ cork tree
 kotukutuku, tree fuchsia
 papauma, broadleaf
 puka
 pigeonwood
 rewarewa, NZ honeysuckle
 kanuka
 pukatea

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

COASTAL SUITABILITY

WETLAND SUITABILITY

			●●	○●	☆☆	Fr	Yes	Yes	No
✓	✓	●●	○●●	☆☆	Fr	Yes	No	No	No
	✓	●●	○●●	☆☆	Fr	Yes	No	No	No
✓	✓	●●	○●●	☆☆	Fr	Yes	No	No	No
✓	✓	●●	○●●	☆☆	Fr,Fr	Yes	Yes	Yes	Yes
✓	✓	●●	○●●	☆☆	Fr,Fr	No	No	No	No
	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆		Yes	No	No	No
✓	✓	●●	○●●	☆☆		Yes	Yes	Yes	Yes
✓	✓	●●	○●●	☆☆		Yes	Yes	Yes	Yes
✓	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	Yes
✓	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	Fr	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	Fr,L	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	N	Yes	Yes	Yes	No
✓	✓	●●	○●●	☆☆	N	Yes	Yes	Yes	Yes
	✓	●●	○●●	☆☆	N	Yes	Yes	Yes	Yes

<i>Leptospermum scoparium</i>	manuka	✓✓	✓✓	●●●●	○		N	Yes	Yes	Yes
<i>Macropiper excelsum</i>	kawakawa		✓✓	●●	○●	❄️❄️	Fr	Yes	Yes	No
<i>Melicope ternata</i>	wharangi	✓	✓	●●	○●	❄️❄️		No	Yes	No
<i>Melicytus ramiflorus</i>	mahoe	✓	✓✓	●●	○●	❄️	Fr	Yes	Yes	No
<i>Metrosideros umbellata</i>	southern rata	✓	✓✓	●●	○●	❄️❄️	N	Yes	Yes	No
<i>Myoporum laetum</i>	ngaio	✓✓	✓✓	●-●●	○●	❄️❄️	Fl	Yes	Yes	No
<i>Myrsine australis</i>	mapou	✓	✓✓	●-●●	○●		Fr	Yes	Yes	No
<i>Nothofagus solandri var. solandri</i>	black beech	✓	✓✓	●●	○●		H	Yes	Yes	No
<i>Nothofagus truncata</i>	hard beech	✓	✓✓	●●●●	○●		H	Yes	Yes	No
<i>Olearia paniculata</i>	akiraho	✓✓	✓✓	●-●●	○●			Yes	Yes	No
<i>Olearia rani</i>	heketara		✓✓	●●	○●			Yes	No	No
<i>Pennantia corymbosa</i>	kaikomako	✓✓	✓✓	●●	○●		Fr	Yes	Yes	No
<i>Pittosporum eugenioides</i>	tarata, lemonwood	✓✓	✓✓	●●	○●		Fr	Yes	Yes	No
<i>Pittosporum tenuifolium</i>	kohuhu	✓✓	✓	●-●●	○●		Fr	Yes	Yes	No
<i>Podocarpus totara</i>	lowland totara	✓✓	✓✓	●-●●	○●		Fr	Yes	Yes	No
<i>Prumnopitys ferruginea</i>	miro		✓	●●	○●		Fr	Yes	No	No
<i>Prumnopitys taxifolia</i>	matai		✓	●●	○●		Fr	Yes	Yes	No
<i>Pseudopanax arboreus</i>	five-finger	✓✓	✓✓	●●	○●	❄️	N,Fr	Yes	Yes	Yes
<i>Pseudopanax crassifolius</i>	lancewood	✓✓	✓✓	●-●●	○●		Fr	Yes	Yes	Yes
<i>Pseudopanax ferox</i>	fierce lancewood	✓	✓	●●	○●		Fr	Yes	Yes	No
<i>Raukawa edgerleyi</i>	raukawa		✓	●●	○●	❄️	Fr	Yes	No	No
<i>Rhopalostylis sapida</i>	nikau	✓	✓✓	●-●●●	○●	❄️❄️	Fl,Fr	Yes	Yes	Yes
<i>Streblus banksii</i>	turepo, large-leaved milk tree	✓	✓	●●	○●	❄️		Yes	Yes	No
<i>Weinmannia racemosa</i>	kamahī	✓	✓✓	●-●●	○●		N	Yes	Yes	No
SMALL TREES 2-5m										
<i>Brachyglottis repanda</i>	rangiora	✓	✓	●●	○●	❄️		Yes	Yes	No
<i>Coprosma crassifolia</i>		✓✓	✓	●-●●	○●		Fr	Yes	Yes	Yes
<i>Coprosma grandiflora</i>	raurekau, kanono	✓✓	✓	●●	○●	❄️	Fr	Yes	No	No
<i>Coprosma lucida</i>	shining karamu	✓✓	✓	●●	○●		Fr	Yes	Yes	No
<i>Coprosma propinqua</i>	mingimingi	✓✓	✓	●●●●	○●		Fr	Yes	Yes	Yes
<i>Coprosma repens</i>	taupata	✓✓	✓	●-●●	○●	❄️❄️	Fr	No	Yes	No
<i>Coprosma robusta</i>	karamu	✓✓	✓	●-●●	○●		Fr	Yes	Yes	Yes
<i>Cordyline banksii</i>	ti ngahere, forest cabbage tree	✓	✓	●●	○●		Fl,Fr	Yes	No	Yes
<i>Dicksonia fibrosa</i>	whēki-ponga	✓	✓	●●	○●			Yes	No	Yes
<i>Dracophyllum filifolium</i>	inaka	✓	✓	●-●●	○●			Yes	No	No

PLANTING LISTS FOR
NORTH MARLBOROUGHOUTER
SOUNDS

BOTANICAL NAME

SMALL TREES 2-5m CONT.

Dracophyllum urvilleanum
Hebe parviflora
Hebe stricta
Leucopogon fasciculatus
Lophomyrtus bullata
Melicope simplex
Olearia aviceniifolia
Pseudowintera axillaris
Pseudowintera colorata
Sophora molloyi

SHRUBS 1-2m

Carmichaelia odorata
Coprosma rhamnoides
Gaultheria antipoda
Hebe elliptica
Hebe stenophylla
Hebe urvilleana
Helichrysum lanceolatum
Leptecophylla juniperina
Meliccytus crassifolius
Olearia solandri
Ozothamnus leptophyllus
Pimelea gnidia

COMMON NAME

neinei
 tree hebe, koromiko
 koromiko
 soft mingimingi
 ramarama
 poataniwha
 grey tree daisy
 lowland horopito
 horopito, pepperwood
 Cook Strait kowhai

 fragrant broom
 scrub coprosma
 snowberry
 southern coastal hebe/koromiko
 koromiko
 D'Urville Island hebe/koromiko
 niniao
 prickly mingimingi
 Cook Strait porcupine shrub
 coastal shrub daisy
 tauhinu
 native shrub daphne

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

COASTAL SUITABILITY

WETLAND SUITABILITY

	EARLY STAGE PLANTING	LATER STAGE PLANTING	MOISTURE PREFERENCE	SUNLIGHT PREFERENCE	FROST TENDERNESS	BIRD FOOD	RIPARIAN SUITABILITY	COASTAL SUITABILITY	WETLAND SUITABILITY
<i>Dracophyllum urvilleanum</i>	✓	✓	●-●●	○ ○ ●			Yes	No	No
<i>Hebe parviflora</i>	✓	✓	●●	○ ○ ●			Yes	Yes	Yes
<i>Hebe stricta</i>	✓ ✓	✓	●●	○ ○ ● ●			Yes	Yes	Yes
<i>Leucopogon fasciculatus</i>	✓	✓	●●	○ ○ ● ●		Fr	Yes	No	Yes
<i>Lophomyrtus bullata</i>	✓	✓	●●	○ ● ● ●	✱	Fr	Yes	No	Yes
<i>Melicope simplex</i>	✓	✓	●●	○ ○ ● ●			Yes	No	No
<i>Olearia aviceniifolia</i>	✓	✓	●●	○ ○ ● ●			Yes	Yes	No
<i>Pseudowintera axillaris</i>	✓	✓	●●	○ ● ● ●	✱	Fr	Yes	No	No
<i>Pseudowintera colorata</i>	✓	✓ ✓	●●	○ ○ ● ●		Fr	Yes	No	No
<i>Sophora molloyi</i>	✓ ✓	✓	●-●●	○ ○ ●		N,L	No	Yes	No
<i>Carmichaelia odorata</i>	✓	✓	●	○ ○			Yes	Yes	No
<i>Coprosma rhamnoides</i>	✓	✓	●-●●	○ ○ ●		Fr	Yes	Yes	No
<i>Gaultheria antipoda</i>	✓	✓	●-●●	○ ○ ○		Fr	Yes	Yes	No
<i>Hebe elliptica</i>	✓	✓	●●	○ ○ ○ ○			No	Yes	No
<i>Hebe stenophylla</i>	✓	✓	●	○ ○ ○ ○			Yes	Yes	No
<i>Hebe urvilleana</i>	✓	✓	●●	○ ○ ○ ○			No	No	No
<i>Helichrysum lanceolatum</i>	✓	✓	●●●	○ ○ ●			Yes	No	No
<i>Leptecophylla juniperina</i>	✓	✓	●-●●	○ ○ ●		Fr	Yes	Yes	No
<i>Meliccytus crassifolius</i>	✓ ✓	✓	●●●	○ ○ ●		Fr	No	Yes	Yes
<i>Olearia solandri</i>	✓ ✓		●-●●	○ ○			Yes	Yes	No
<i>Ozothamnus leptophyllus</i>	✓ ✓		●●●	○ ○			Yes	Yes	No
<i>Pimelea gnidia</i>	✓	✓	●-●●	○ ○ ●		Fr	No	Yes	No

<i>Pimelea longifolia</i>	native shrub daphne	✓	✓	●-●●	○-●		Fr	Yes	Yes	Yes
<i>Plagianthus divaricatus</i>	saltmarsh ribbonwood	✓✓	✓	●-●●●	○-●			No	Yes	No
<i>Pomaderris phyllicifolia</i>		✓	✓	●-●●	○-●			Yes	No	No
<i>Raukaua anomalus</i>		✓	✓	●●	○-●			Yes	No	No
GROUND COVERS										
<i>Aciphylla squarrosa</i>	Cook Strait speargrass	✓	✓	●-●●	○	❄️		No	Yes	No
<i>Apodasmia similis</i>	oiioi, jointed rush	✓✓	✓	●-●●●	○-●			No	Yes	No
<i>Arthropodium cirratum</i>	rengarenga, renga lily	✓✓	✓	●-●●	○-●	❄️❄️		No	Yes	No
<i>Asplenium oblongifolium</i>	shining spleenwort		✓	●●	●-●			Yes	Yes	Yes
<i>Astelia fragrans</i>	bush lily		✓✓	●-●●●	●-●		Fr	Yes	No	Yes
<i>Blechnum novae-zelandiae</i>	kiokio	✓✓	✓	●-●●●	○-●			Yes	No	Yes
<i>Carex secta</i>	purei, tussock sedge	✓✓	✓	●●●	○-●			No	No	Yes
<i>Carex virgata</i>	pukio	✓✓	✓	●●●	○-●			No	No	No
<i>Chionochloa cheesemanii</i>	bush tussock		✓	●●	●			Yes	No	Yes
<i>Cortaderia richardii</i>	South Island toetoe	✓✓	✓	●-●●●	○			Yes	Yes	No
<i>Dianella nigra</i>	turutu, blueberry	✓	✓	●-●●	○-●		Fr	Yes	Yes	No
<i>Gahnia lacera</i>	soft cutty grass		✓	●●	○-●	❄️		Yes	No	No
<i>Libertia ixioides</i>	native iris	✓	✓	●●	○-●			Yes	Yes	No
<i>Microsorium pustulatum</i>	hound's tongue fern		✓	●●	●			Yes	No	No
<i>Phormium cookianum</i>	wharariki, mountain flax	✓✓		●-●●	○		N	Yes	Yes	Yes
<i>Phormium tenax</i>	harakeke, lowland flax	✓✓		●-●●●	○		N	Yes	Yes	
<i>Poa aff. cita</i>	coastal silver tussock	✓✓		●-●●	○					
CLIMBERS										
<i>Clematis forsteri</i>	clematis		✓	●●	○-●			Yes	Yes	Yes
<i>Clematis paniculata</i>	puawananga, bush clematis		✓	●●	○-●	❄️		Yes	No	No
<i>Freycinettia banksii</i>	kiekie		✓	●●	○-●	❄️	Fl,Fr	Yes	Yes	Yes
<i>Fuchsia perscandens</i>	climbing fuchsia		✓	●●	○-●	❄️	N,Fr	Yes	No	Yes
<i>Metrosideros diffusa</i>	white rata vine		✓	●●	○-●		N	Yes	No	Yes
<i>Metrosideros fulgens</i>	winter rata, scarlet rata vine		✓	●●	○-●		N	Yes	No	Yes
<i>Metrosideros perforata</i>	lowland rata vine		✓	●●	○-●		N	Yes	Yes	No
<i>Muehlenbeckia complexa</i>	pohuehue, wiggly-wig	✓✓		●-●●	○		Fr	Yes	Yes	Yes
<i>Parsonsia heterophylla</i>	NZ jasmine		✓	●-●●	○			Yes	Yes	Yes
<i>Passiflora tetrandra</i>	NZ passionfruit		✓	●●	○-●	❄️❄️	Fr	Yes	Yes	Yes
<i>Ripogonum scandens</i>	supplejack		✓	●-●●●	○-●	❄️	Fr	Yes	Yes	

PLANTING LISTS FOR NORTH MARLBOROUGH

COASTAL SITES

BOTANICAL NAME

TREES 5-20m+

Alectryon excelsus
Cordyline australis
Corynocarpus laevigatus
Cyathea dealbata
Cyathea medullaris
Dacrycarpus dacrydioides
Dacrydium cupressinum
Dicksonia squarrosa
Dodonaea viscosa
Dysoxylum spectabile
Elaeocarpus dentatus
Entelea arborescens
Griselinia littoralis
Griselinia lucida
Hedycarya arborea
Knightia excelsa
Kunzea ericoides
Laurelia novae-zelandiae
Leptospermum scoparium

COMMON NAME

titoki
 ti kouka, cabbage tree
 karaka
 ponga, silver fern
 mamaku
 kahikatea, white pine
 rimu
 wheki
 akeake
 kohekohe
 hinau
 whau, NZ cork tree
 papauma, broadleaf
 puka
 pigeonwood
 rewarewa, NZ honeysuckle
 kanuka
 pukatea
 manuka

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

COASTAL SUITABILITY

WETLAND SUITABILITY

			☹☹	☹	☹☹	☉	☹☹	Fr	Yes	Yes	No
✓✓		✓✓	☹☹☹☹	☹☹	☉☉	☉☉	Fl,Fr	Yes	Yes	Yes	Yes
		✓	☹☹	✓	☉☉	☹☹	Fr	Yes	Yes	No	No
✓		✓	☹☹	✓	☉☉	☹☹		Yes	Yes	No	No
✓		✓	☹☹	✓	☉☉	☹☹		Yes	Yes	Yes	Yes
✓		✓	☹☹☹☹	✓	☉☉☹☹	☉☉	Fr	Yes	Yes	Yes	Yes
✓		✓	☹☹	✓	☉☉☹	☉☉	Fr	Yes	Yes	No	No
✓		✓	☹☹	✓	☉☉	☉☉	Fr	Yes	Yes	Yes	No
✓		✓	☹☹	✓	☉☉	☉☉	Fr	Yes	Yes	Yes	No
✓✓		✓✓	☹☹	✓✓	☉☉	☉☉	Fl,L	Yes	Yes	Yes	No
✓✓		✓✓	☹☹	✓✓	☉☉	☉☉	N	Yes	Yes	Yes	Yes
✓✓		✓✓	☹☹	✓✓	☉☉	☉☉	N	Yes	Yes	Yes	Yes
✓✓		✓✓	☹☹☹☹	✓	☉☉☹☹	☉☹☹☹	N	Yes	Yes	Yes	Yes
✓✓		✓✓	☹☹☹☹	✓✓	☉☉	☉☉	N	Yes	Yes	Yes	Yes

<i>Macropiper excelsum</i>	kawakawa		✓✓	●●	○-●	☼☼	Fr	Yes	Yes	No
<i>Melicope ternata</i>	wharangi	✓	✓	●●	○-○	☼☼		No	Yes	No
<i>Melicytus ramiflorus</i>	mahoe	✓	✓✓	●●	○-●	☼	Fr	Yes	Yes	No
<i>Metrosideros umbellata</i>	southern rata	✓	✓✓	●●	○-○	☼	N	Yes	Yes	No
<i>Myoporum laetum</i>	ngaio	✓✓	✓✓	●-●●	○-○	☼☼	Fl	Yes	Yes	No
<i>Myrsine australis</i>	mapou	✓	✓✓	●-●●	○-○		Fr	Yes	Yes	No
<i>Nothofagus solandri</i> var. <i>solandri</i>	black beech	✓	✓✓	●●	○-○		H	Yes	Yes	No
<i>Nothofagus truncata</i>	hard beech	✓	✓✓	●-●●	○-○		H	Yes	Yes	No
<i>Olearia paniculata</i>	akiraho	✓✓	✓✓	●-●●	○-○			Yes	Yes	No
<i>Pennantia corymbosa</i>	kaikomako	✓✓	✓✓	●●	○-○		Fr	Yes	Yes	Yes
<i>Pittosporum eugenioides</i>	tarata, lemonwood	✓✓	✓✓	●●	○-○		Fr	Yes	Yes	No
<i>Pittosporum tenuifolium</i>	kohuhu	✓✓	✓	●-●●	○-○		Fr	Yes	Yes	No
<i>Podocarpus totara</i>	lowland totara	✓✓	✓✓	●-●●	○-○		Fr	Yes	Yes	No
<i>Prumnopitys taxifolia</i>	matai		✓	●●	○-○		Fr	Yes	Yes	No
<i>Pseudopanax arboreus</i>	five-finger	✓✓	✓✓	●●	○-○	☼	N,Fr	Yes	Yes	Yes
<i>Pseudopanax crassifolius</i>	lancewood	✓✓	✓✓	●-●●	○-○		Fr	Yes	Yes	Yes
<i>Pseudopanax ferox</i>	fierce lancewood	✓	✓	●●	○-○		Fr	Yes	Yes	No
<i>Rhopalostylis sapida</i>	nikau	✓	✓✓	●●-●●●●	○-●	☼☼	Fl,Fr	Yes	Yes	Yes
<i>Sophora microphylla</i>	kowhai	✓✓	✓✓	●-●●	○		N,L	Yes	Yes	Yes
<i>Streblus banksii</i>	turepo, large-leaved milk tree	✓	✓	●●	○-○	☼		No	Yes	No
<i>Weinmannia racemosa</i>	kamahi	✓	✓✓	●-●●	○-○		N	Yes	Yes	No
SMALL TREES 2-5m										
<i>Brachyglottis repanda</i>	rangiora	✓	✓	●●	○-●	☼		Yes	Yes	No
<i>Coprosma crassifolia</i>		✓✓	✓	●-●●	○-○		Fr	Yes	Yes	Yes
<i>Coprosma propinqua</i>	mingimingi	✓✓	✓	●-●●●	○-○		Fr	Yes	Yes	Yes
<i>Coprosma repens</i>	taupata	✓✓	✓	●-●●	○-○	☼☼	Fr	No	Yes	No
<i>Coprosma robusta</i>	karamu	✓✓	✓	●-●●	○-○		Fr	Yes	Yes	Yes

PLANTING LISTS FOR NORTH MARLBOROUGH

COASTAL SITES

BOTANICAL NAME

SMALL TREES 2-5m CONT.

Dicksonia fibrosa

Dracophyllum filifolium

Hebe parviflora

Hebe stricta

Olearia aviceniifolia

Sophora molloyi

SHRUBS 1-2m

Carmichaelia odorata

Coprosma rhamnoides

Hebe elliptica

Hebe speciosa

Hebe stenophylla

Leptecophylla juniperina

Meliccytus crassifolius

Meliccytus aff. obovatus

Olearia solandri

Ozothamnus leptophyllus

Pimelea gnidia

COMMON NAME

wheki-ponga

inaka

tree hebe, koromiko

koromiko

grey tree daisy

Cook Strait kowhai

fragrant broom

scrub coprosma

southern coastal hebe/koromiko

naupuka/titirangi

koromiko

prickly mingimingi

Cook Strait porcupine shrub

coastal shrub daisy

tauhinu

native shrub daphne

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

COASTAL SUITABILITY

WETLAND SUITABILITY

✓	✓	●●	○●			Yes	Yes	Yes
✓	✓	●●●	○●●			Yes	Yes	No
✓	✓	●●	○●●			Yes	Yes	No
✓✓	✓	●●	○●●			Yes	Yes	Yes
✓	✓	●●	○●●			Yes	Yes	No
✓✓	✓	●●●	○●●		N,L	No	Yes	No
✓	✓	●	○			Yes	Yes	No
✓	✓	●●●	○●		Fr	Yes	Yes	Yes
✓	✓	●●	○			No	Yes	No
✓	✓	●	○	*		No	Yes	No
✓	✓	●	○			Yes	Yes	No
✓✓	✓	●●●	○●●		Fr	Yes	Yes	No
✓✓	✓	●●●	○●●		Fr	No	Yes	No
✓	✓	●	○	*	Fr	No	Yes	No
✓✓		●●●	○			Yes	Yes	Yes
✓✓		●●●	○			Yes	Yes	No
✓	✓	●●●	○●		Fr	No	Yes	No

<i>Pimelea longifolia</i>	native shrub daphne	✓	✓	●-●●	○-●		Fr	No	Yes	No
<i>Plagianthus divaricatus</i>	saltmarsh ribbonwood	✓✓	✓	●●-●●●	○-●			No	Yes	Yes
GROUND COVERS										
<i>Aciphylla squarrosa</i>	Cook Strait speargrass	✓	✓	●-●●	○	✱		No	Yes	No
<i>Apodasmia similis</i>	oiioi, jointed rush	✓✓	✓	●●-●●●	○-●			No	Yes	Yes
<i>Arthropodium cirratum</i>	rengarenga, renga lily	✓✓	✓	●-●●	○-●	✱✱		No	Yes	No
<i>Asplenium oblongifolium</i>	shining spleenwort		✓	●●	●-●			Yes	Yes	No
<i>Cortaderia richardii</i>	South Island toetoe	✓✓	✓	●●-●●●	○			Yes	Yes	Yes
<i>Euphorbia glauca</i>	shore milkweed	✓	✓	●-●●	○-●			No	Yes	No
<i>Dianella nigra</i>	turutu, blueberry	✓	✓	●-●●	○-●		Fr	Yes	Yes	No
<i>Ficinia spiralis</i>	pingao	✓	✓	●	○			No	Yes	No
<i>Libertia ixioides</i>	native iris	✓	✓	●●	○-●			Yes	Yes	No
<i>Phormium cookianum</i>	wharariki, mountain flax	✓✓		●-●●	○		N	Yes	Yes	No
<i>Phormium tenax</i>	harakeke, lowland flax	✓✓		●●-●●●	○		N	Yes	Yes	Yes
<i>Poa aff. cita</i>	coastal silver tussock	✓✓		●-●●	○			No	Yes	No
<i>Raoulia aff. hookeri</i>	coastal mat daisy	✓	✓	●	○			No	Yes	No
<i>Tetragonia implexicoma</i>	NZ spinach	✓	✓	●	○-●		Fr	No	Yes	No
CLIMBERS										
<i>Clematis forsteri</i>	clematis		✓	●●	○-●			Yes	Yes	Yes
<i>Freycinettia banksii</i>	kiekie		✓	●●	○-●	✱	Fr,Fr	Yes	Yes	No
<i>Metrosideros perforata</i>	lowland rata vine		✓	●●	○-●		N	Yes	Yes	Yes
<i>Muehlenbeckia complexa</i>	pohuehue, wiggly-wig	✓✓		●-●●	○		Fr	Yes	Yes	No
<i>Parsonsia heterophylla</i>	NZ jasmine		✓	●-●●	○			Yes	Yes	Yes
<i>Passiflora tetrandra</i>	NZ passionfruit		✓	●●	○-●	✱✱	Fr	Yes	Yes	Yes
<i>Ripogonum scandens</i>	supplejack		✓	●●-●●●	○-●	✱	Fr	Yes	Yes	Yes

PLANTING LISTS FOR NORTH MARLBOROUGH

WETLAND SITES

BOTANICAL NAME

TREES 5-20m+

<i>Cordylina australis</i>	ti kouka, cabbage tree
<i>Cyathea medullaris</i>	mamaku
<i>Dacrycarpus dacrydioides</i>	kahikatea, white pine
<i>Dicksonia squarrosa</i>	wheki
<i>Elaeocarpus hookerianus</i>	pokaka
<i>Fuchsia excorticata</i>	kotukutuku, tree fuchsia
<i>Griselinia littoralis</i>	papauma, broadleaf
<i>Hoheria angustifolia</i>	houhere, narrow-leaved lacebark
<i>Kunzea ericoides</i>	kanuka
<i>Laurelia novae-zelandiae</i>	pukatea
<i>Leptospermum scoparium</i>	manuka
<i>Lophomyrtus obcordata</i>	rohutu
<i>Olearia rani</i>	heketara
<i>Pennantia corymbosa</i>	kaikomako
<i>Plagianthus regius</i>	manatu, lowland ribbonwood
<i>Pseudopanax arboreus</i>	five-finger
<i>Pseudopanax crassifolius</i>	lancewood
<i>Rhopalostylis sapida</i>	nikau
<i>Sophora microphylla</i>	kowhai

COMMON NAME

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

COASTAL SUITABILITY

WETLAND SITUATION

✓✓	✓✓	▲▲▲▲	○●		Fl,Fr	Yes	Yes	Margin
✓		▲▲	○●	✱		Yes	Yes	Margin
✓	✓	▲-▲▲▲	○●		Fr	Yes	Yes	Margin
✓	✓	▲▲	○●			Yes	Yes	Margin
	✓	▲▲	○●	✱	N,Fr	Yes	No	Margin
✓	✓✓	▲▲	○●		Fr	Yes	No	Margin
✓	✓	▲▲	○●	✱	Fr	Yes	Yes	Margin
✓✓	✓✓	▲▲	○●		Fl,L	Yes	No	Margin
✓✓	✓✓	▲▲	○		N	Yes	Yes	Margin
	✓	▲-▲▲▲	○●			Yes	Yes	Wet
✓✓	✓✓	▲-▲▲	○		N	Yes	Yes	Margin
✓	✓	▲▲	○●		Fr	Yes	No	Margin
✓✓	✓✓	▲▲	○●			Yes	No	Margin
✓✓	✓✓	▲▲	○●		Fr	Yes	Yes	Margin
✓✓	✓✓	▲▲	○●		L	Yes	No	Margin
✓✓	✓✓	▲▲	○●	✱	N,Fr	Yes	Yes	Margin
✓✓	✓✓	▲-▲▲	○●		Fr	Yes	Yes	Margin
✓	✓✓	▲-▲▲▲	○●	✱✱	Fl,Fr	Yes	Yes	Margin
✓✓	✓✓	▲-▲▲	○		N,L	Yes	Yes	Margin

<i>Streblus heterophyllus</i>	turepo, small-leaved milk tree		✓	●●	○-●			Yes	No	Margin
<i>Syzygium maire</i>	swamp maire	✓	✓	●●-●●●	○-●	✪	N,Fr	No	No	Wet
SMALL TREES 2-5m										
<i>Coprosma areolata</i>		✓	✓	●●	○-●		Fr	Yes	No	Margin
<i>Coprosma crassifolia</i>		✓✓	✓	●-●●	○-●		Fr	Yes	Yes	Margin
<i>Coprosma propinqua</i>	mingimingi	✓✓	✓	●●-●●●	○-●		Fr	Yes	Yes	Wet
<i>Coprosma robusta</i>	karamu	✓✓	✓	●-●●	○-●		Fr	Yes	Yes	Margin
<i>Cordyline banksii</i>	ti ngahere, forest cabbage tree	✓	✓	●●	○-●		Fl,Fr	Yes	No	Margin
<i>Dicksonia fibrosa</i>	wheki-ponga	✓	✓	●●	○-●			Yes	Yes	Margin
<i>Hebe stricta</i>	koromiko	✓✓	✓	●●	○-●			Yes	Yes	Margin
<i>Leucopogon fasciculatus</i>	soft mingimingi	✓	✓	●●	○-●		Fr	Yes	No	Margin
<i>Lophomyrtus bullata</i>	ramarama	✓	✓	●●	●-●	✪	Fr	Yes	No	Margin
<i>Melicope simplex</i>	poataniwha	✓	✓	●●	●-●			Yes	No	Margin
SHRUBS 1-2m										
<i>Coprosma rhamnoides</i>	scrub coprosma	✓	✓	●-●●	○-●		Fr	Yes	Yes	Margin
<i>Olearia solandri</i>	coastal shrub daisy	✓✓		●-●●	○			Yes	Yes	Margin
<i>Plagianthus divaricatus</i>	saltmarsh ribbonwood	✓✓	✓	●●-●●●	○-●			No	Yes	Est
GROUND COVERS										
<i>Apodasmia similis</i>	oioi, jointed rush	✓✓	✓	●●-●●●	○-●			No	Yes	Est
<i>Astelia fragrans</i>	bush lily		✓✓	●●-●●●	●-●		Fr	Yes	No	Margin
<i>Blechnum minus</i>	swamp kiokio	✓	✓	●●-●●●	○-●			No	No	Wet
<i>Blechnum novae-zelandiae</i>	kiokio	✓	✓	●●-●●●	○-●			Yes	No	Margin
<i>Carex comans</i>	maurea	✓	✓	●●-●●●	○-●			Yes	No	Margin
<i>Carex flagellifera</i>	bootlace sedge	✓	✓	●●-●●●	○-●			Yes	No	Margin
<i>Carex secta</i>	purei, tussock sedge	✓✓	✓	●●●	○-●			No	No	Wet

PLANTING LISTS FOR NORTH MARLBOROUGH

WETLAND SITES

BOTANICAL NAME

GROUND COVERS CONT.

Carex virgata

Chionochloa rubra

Cortaderia richardii

Phormium tenax

CLIMBERS

Clematis forsteri

Clematis paniculata

Fuchsia perscandens

Metrosideros diffusa

Metrosideros fulgens

Metrosideros perforata

Parsonsia heterophylla

Passiflora tetrandra

Ripogonum scandens

COMMON NAME

pukio

red tussock

South Island toetoe

harakeke, lowland flax

clematis

puawananga, bush clematis

climbing fuchsia

white rata vine

winter rata, scarlet rata vine

lowland rata vine

NZ jasmine

NZ passionfruit

supplejack

EARLY STAGE PLANTING

LATER STAGE PLANTING

MOISTURE PREFERENCE

SUNLIGHT PREFERENCE

FROST TENDERNESS

BIRD FOOD

RIPARIAN SUITABILITY

COASTAL SUITABILITY

WETLAND SITUATION

✓✓

✓✓

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THREATENED PLANTS OF NORTH MARLBOROUGH

The following is a tabulation of threatened plants that occur in the district, with threat categories, ecosystem or habitat types and identified potential restoration places. Not all of the plants lend themselves to restoration planting (e.g. Mt Stokes daisy), but may be restored by other forms of management.

PLANT NAME(S)	THREAT CATEGORY	ECOSYSTEM / HABITAT	POTENTIAL RESTORATION PLACES & NOTES
Pitpat <i>Pittosporum patulum</i>	Nationally Critical	Upland beech forest and shrubland	Rai and Pelorus rivers and tributaries; North Bank valleys.
NZ skullcap <i>Scutellaria novae-zelandiae</i>	Nationally Critical	Inland valley floor forest	Rai and Pelorus rivers and tributaries; North Bank valleys.
Pygmy button daisy <i>Leptinella nana</i>	Nationally Endangered	River banks	Rai and Pelorus rivers and tributaries.
Hector's tree daisy <i>Olearia hectorii</i>	Nationally Endangered	River banks	Rai and Pelorus rivers and tributaries. Extinct in wild in North Marlborough; recently planted at Onamalutu.
Napuka/Titirangi <i>Hebe speciosa</i>	Nationally Vulnerable	Exposed coastal scarp	Outer and Inner Sounds. Introduced to Sounds and associated with former Maori settlement (Titirangi-Waitui).
Native daphne <i>Pimelea tomentosa</i>	Nationally Vulnerable	Dry, open forest and shrubland, favours ridges	Dry, open sites, rocky places. Now very rare.
<i>Carex litorosa</i>	Declining	Estuary margins	Estuary margins and intertidal vegetation.
Shore milkweed <i>Euphorbia glauca</i>	Declining	Foredunes, cliffs and gravel beaches	Dunes and gravel beaches. Only remains on D'Urville Island.
Coastal mat daisy <i>Raoulia aff. hookeri</i>	Declining	Coastal cliffs and dunes	Dunes (D'Urville Island and Port Underwood).

THREATENED PLANTS OF NORTH MARLBOROUGH CONT.

PLANT NAME(S)	THREAT CATEGORY	ECOSYSTEM / HABITAT	POTENTIAL RESTORATION PLACES & NOTES
Native verbena <i>Teucrium parvifolium</i>	Declining	River banks and bush edges	Rai and Pelorus rivers and tributaries; North Bank valleys.
Red mistletoe, Pikirangi <i>Peraxilla tetrapetala</i>	Declining	Beech forest and trees (black, red)	Beech forest and edges. Need to control possums. Sow seeds on beech saplings.
Scarlet mistletoe, Pirita <i>Peraxilla colensoi</i>	Declining	Beech forest and trees (silver)	Beech forest and edges. Need to control possums. Sow seeds on beech saplings.
White mistletoe, Tupia <i>Tupeia antarctica</i>	Declining	Regenerating bush, shrubland & trees	Regenerating vegetation. Need to control possums. Sow seeds on saplings; favours five-finger and putaputaweta.
Yellow mistletoe <i>Alepis flavida</i>	Declining	Beech forest and trees (black, red)	Beech forest and edges. Need to control possums. Sow seeds on beech saplings.
Native verbena <i>Teucrium parvifolium</i>	Declining	River banks and bush edges	Valley flats, river banks and shrubland; all catchments.
Cook Strait porcupine shrub <i>Melicytus crassifolius</i>	Declining	Coastal cliffs and rock outcrops	Outer Sounds. Cook Strait endemic.
Gossamer grass <i>Anemanthele lessoniana</i>	Declining	Lowland forest and edges; scrub; cliffs, screes and outcrops	Almost anywhere. Only remains on d'Urville Island, confined to gentle coastal landforms.
<i>Melicytus aff. obovatus</i>	Declining	Exposed coastal cliffs and scarps	Outer Sounds. Highly vulnerable to browsing.
Pingao <i>Desmoschoenus spiralis</i>	Relict	Foredunes	Dunes (D'Urville Island, Titirangi, Port Underwood). Extinct in N. Marlborough.

Large-leaved milk tree <i>Streblus banksii</i>	Relict	Forest/shrublands of exposed coasts and islands	Outer Sounds (also Inner). Easily grown but vulnerable to browsing.
Mt Stokes daisy <i>Celmisia macmahonii</i> var. <i>macmahonii</i>	Naturally Uncommon	Shaded rock ledges on mountain top	Endemic to Mt Stokes summit (conservation land) and stable there.
Neinei <i>Dracophyllum urvilleanum</i>	Naturally Uncommon	Beech forest and shrubland	Dry, open forest on coast and ridges.
Coral mistletoe <i>Korthalsella salicornioides</i>	Naturally Uncommon	Manuka and kanuka	Scrub, low forest and individual trees. Try sowing seeds on young twigs (hasn't been successfully done yet).
Fierce lancewood <i>Pseudopanax ferox</i>	Naturally Uncommon	Exposed coastal scarps; river banks; rock outcrops	Outer Sounds (cliffs, headlands, etc); Rai, Pelorus valleys and tributaries; North Bank valleys.
Forest forget-me-not <i>Myosotis spathulata</i>	Naturally Uncommon	Rock overhangs; forest floor; scrub; riverbanks; terraces	Rai, Pelorus valleys and tributaries; North Bank valleys.
Cook Strait kowhai <i>Sophora molloyi</i>	Naturally Uncommon	Exposed coastal cliffs and scarps	Outer Sounds.
<i>Hebe rigidula</i>	Naturally Uncommon	Riparian bluffs and river beds; subalpine scrub	Riparian sites. Mainly occurs in the Pelorus Valley.

NOTABLE PLANTS OF NORTH MARLBOROUGH

The following is a tabulation of plants that occur in the district that are notable because of their unexpectedness, remnant status, cultural associations or representing extremes of distribution. They are listed along with ecosystem or habitat types and identified potential restoration.

PLANT NAME(S)	SIGNIFICANCE	ECOSYSTEM / HABITAT	POTENTIAL RESTORATION PLACES & NOTES
Black maire <i>Nestegis cunninghamii</i>	Distribution anomaly	Lowland valley forest and treeland	Lowland valleys not subject to heavy frost. Single tree known at Linkwater only.
Cabbage tree <i>Cordyline australis</i>	Cultural associations	Lowlands, wetlands, often archaeological sites	Wetlands, forest edges, alluvial sites.
Climbing fuchsia <i>Fuchsia perscandens</i>	Uncommon	Riparian, coastal screes	Riparian sites, lowland rock outcrops.
Cook Strait speargrass <i>Aciphylla squarrosa</i>	Endemic form	Very exposed coasts and rocks	Salt turf areas retired from stock influence.
Coprosma rubra	Uncommon, localised	Riparian and alluvial sites	Riparian sites and alluvial forest edges.
Dwarf broom <i>Carmichaelia corrugata</i>	Distribution anomaly	Stony open ground	Wairau Valley. Manuka Island is the only known Marlborough locality.
Dwarf mistletoe <i>Korthalsella lindsayi</i>	Uncommon	Riparian vegetation and alluvial forest edges	Not really amenable to restoration planting; could try sowing seeds on shrub twigs.
Green mistletoe <i>Ileostylus micranthus</i>	Uncommon	Riparian and estuarine shrubland	Sow seeds on potential hosts; benefits from possum control.
Kahikatea <i>Dacrycarpus dacrydioides</i>	Nearly logged out	Lowland alluvial and gully sites	Lowland wetland margins and alluvial sites.

Karaka <i>Corynocarpus laevigatus</i>	Cultural associations	Archaeological sites; coastal forest	Coastal forest edges. Brought to the region from Northland by Maori in the past and cultivated for food (fruit); fruit toxic unless properly cooked.
Kowhai <i>Sophora microphylla</i>	Uncommon, localised, possibly also cultural	Estuary margins; riparian in lower Pelorus; a few archaeological sites	Enigmatic in the Sounds, possibly planted by former Maori settlers. Could be planted in riparian sites, wetland margins and forest edges.
Lowland ribbonwood <i>Plagianthus regius</i>	Uncommon	Alluvial forest, usually riparian	Alluvial sites (forest edges, riparian strips and wetland margins).
Matai <i>Prumnopitys taxifolia</i>	Largely logged out	Alluvial forest, lowland gullies and (rare) rear dunes	Alluvial sites and coastal flats.
Mountain cabbage tree <i>Cordyline indivisa</i>	Uncommon, localised	Cloud forest (uplands)	Upland sites in the Sounds.
Narrow-leaved lacebark <i>Hoheria angustifolia</i>	Uncommon	Alluvial forest, usually riparian	Alluvial sites (forest edges, riparian strips and wetland margins).
Native daphne <i>Pimelea gnidia</i>	Localised	Shrubland, rock outcrops	Dry, rocky sites. Uncommon.
Pokaka <i>Elaeocarpus hookerianus</i>	Uncommon in lowlands	Alluvial forest	Alluvial sites. Uncommon in lowlands, more common at higher altitudes.
Pygmy mistletoe <i>Korthalsella clavata</i>	Very uncommon	Estuarine shrubland	Known from very few sites. Not really amenable to restoration planting; could try sowing seeds on shrub twigs.
Rengarenga <i>Arthropodium cirratum</i>	Cultural associations	Archaeological site proximity, usually on steep rocky shores out of reach of stock and feral animals	Brought to the region from Northland by Maori in the past and cultivated for food and medicinal use. Indicative of former gardening activity. Plant near the shore, using material from the nearest wild source; protect from stock and feral animals.

NOTABLE PLANTS OF NORTH MARLBOROUGH CONT.

PLANT NAME(S)	THREAT CATEGORY	ECOSYSTEM / HABITAT	POTENTIAL RESTORATION PLACES & NOTES
Rewarewa <i>Knightia excelsa</i>	Limited distribution	Lowland forest and regenerating vegetation	Scattered in a strip through the Sounds from D'Urville Island to Port Underwood. On the increase and likely to be a new arrival from the North Island within the last 150 years.
Rimu <i>Dacrydium cupressinum</i>	Largely logged out	Lowland and montane forest	Forest edges and regenerating vegetation.
Sand coprosma <i>Coprosma acerosa</i>	Uncommon, localised	Sand dunes and blown sand	Dunes and dry coastal sites. Rare in North Marlborough, more common nationally.
Scented broom <i>Carmichaelia odorata</i>	Uncommon	Coastal and riparian sites	Lowland, coastal and riparian sites. Uncommon in Marlborough.
Scented shrub daisy <i>Olearia odorata</i>	Very uncommon	Inland valley floor	Inland valley sites. In North Marlborough known only from Pine Valley.
Shore koromiko <i>Hebe elliptica</i>	Uncommon, localised	Vegetation of rocky shore	Rocky shore vegetation. In North Marlborough known only from western d'Urville Island.
Small-leaved mahoe <i>Meliclytus micranthus</i>	Uncommon, localised	Alluvial forest	Alluvial sites (forest edges, riparian strips).
Swamp maire <i>Syzigium maire</i>	Uncommon, localised	Lowland wetlands, mostly coastal	Lowland wetlands. Rare in the South Island (northern SI only). Possibly associated with former Maori settlement sites.
Southern rata <i>Metrosideros umbellata</i>	Localised, showy when in flower	Sheltered rocky shores; upland/cloud forest (usually beech)	Forest edges and regenerating vegetation; sheltered coastal sites. Vulnerable to possum browsing and now rare at the shore.

Tanekaha <i>Phyllocladus trichomanoides</i>	Uncommon, near S limit	Lowland forest and regenerating vegetation	Lowland sheltered sites (forest edges, regenerating vegetation). Very localised in Sounds.
Tawhirikaro <i>Pittosporum cornifolium</i>	Uncommon	Lowland forest and rock outcrops	Lowland and coastal forest edges and regenerating vegetation.
Totara <i>Podocarpus totara</i>	Logged almost to extinction	Lowland forest, especially alluvial and riparian	Lowland forest, forest edges and regenerating vegetation, and coastal sites behind beaches.
Tree hebe <i>Hebe parviflora</i>	Localised occurrence	Exposed coastal vegetation	Lowland and coastal sites in eastern Sounds. On Arapawa Island and Cape Jackson.
Wharangi <i>Melicope ternata</i>	Not very common	Exposed coastal forest	Outer Sounds. Coastal forest edges, shore sites, regenerating vegetation.
Whau <i>Entelea arborescens</i>	Cultural associations	Archaeological sites; coastal forest	Coastal forest. In North Marlborough, known only from D'Urville Island, associated with former Maori settlement.
White maire <i>Nestegis lanceolata</i>	Localised, uncommon	Lowland forest and treeland	Inner Sounds, lowland valleys. Known only from a few sites between Havelock and Pukaka Valley.

PLANT ME INSTEAD NORTH MARLBOROUGH

List of local native plants to use in place of a selection of imported problem plants, North Marlborough

IMPORTED PLANT	ORIGIN	PROBLEM	LOCAL NATIVE PLANT(S) TO USE INSTEAD
Exotic conifers: pines, firs, larches, spruces, cypresses, macrocarpa, cedars, etc. <i>Pinus</i> , <i>Abies</i> , <i>Pseudotsuga</i> , <i>Larix</i> , <i>Picea</i> , <i>Cupressus</i> , <i>Chamaecyparis</i> , <i>Thuja</i> , etc.	Northern hemisphere	Spread onto scarps & outcrops and into regenerating native vegetation via wind-blown seeds and becoming dominant; pines especially	Native conifers: rimu, totara, matai, miro, kahikatea <i>Dacrydium cupressinum</i> , <i>Podocarpus totara</i> , <i>Prumnopitys taxifolia</i> , <i>P. ferruginea</i> , <i>Dacrycarpus dacrydioides</i>
Wattles, Brush wattle <i>Acacia</i> spp, <i>Paraserianthes lophantha</i>	Australia	Rapid-growing and spread via long-lived seeds into open sites, including coastal scarps and scrub	Kowhai <i>Sophora microphylla</i> Cook Strait kowhai <i>Sophora molloyi</i>
Hakea <i>Hakea</i> spp.	Australia	Hardy, rapid-growing & fire-tolerant; invasive in open sites, scrub and bracken	Rewarewa <i>Knightia excelsa</i> Five-finger <i>Pseudopanax arboreus</i>
Willows <i>Salix</i> spp.	Europe, West Asia, North Africa	Aggressive and invasive in wetlands and riparian zones, via seeds or branch fragments	Narrow-leaved lacebark <i>Hoheria angustifolia</i> Lowland ribbonwood <i>Plagianthus regius</i>
Poplars <i>Populus</i> spp.	Europe, China, North America	Spread via seeds or suckers in open sites	Narrow-leaved lacebark <i>Hoheria angustifolia</i> Lowland ribbonwood <i>Plagianthus regius</i>

Sycamore
Acer pseudoplatanus

Europe

Spreads aggressively via winged seeds onto open sites, scrub, bracken and secondary native bush

Narrow-leaved lacebark
Hoheria angustifolia
Lowland ribbonwood
Plagianthus regius

Fan palm, Chinese windmill palm
Trachycarpus fortunei

Asia (Central China to Burma)

Spreads into native forest via bird-borne seeds

Nikau
Rhopalostylis sapida
Tree ferns
Cyathea & *Dicksonia* spp.

Buddleia
Buddleja davidii

China

Spreads rapidly by fine seeds dispersed by wind and water into open sites, especially stream gravels and banks

Koromiko
Hebe stricta, *H. parviflora*

Cotoneaster
Cotoneaster spp.

China, Himalayas, Northern temperate Old World regions

Spread into open sites (scarps, outcrops, etc) via bird-borne seeds

Korokio
Corokia cotoneaster
Grey tree daisy
Olearia avicenniifolia
Karamu, Shining karamu
Coprosma robusta, *C. lucida*

Exotic brooms
Cytisus, *Spartium*, *Genista* etc.

Europe, South Africa

Spread via long-lived seeds into open sites including scrub

Native brooms
Carmichaelia spp.

Agapanthus
Agapanthus praecox

South Africa

Almost indestructible, spreads via wind-blown seeds into open sites, including coastal scarps

Wharariki, Coastal flax
Phormium cookianum
Rengarenga, Renga lily
Arthropodium cirratum
Kakaha
Astelia fragrans
Turutu, blueberry
Dianella nigra

PLANT ME INSTEAD NORTH MARLBOROUGH CONT.

IMPORTED PLANT	ORIGIN	PROBLEM	LOCAL NATIVE PLANT(S) TO USE INSTEAD
Marram grass <i>Ammophila arenaria</i>	Europe, North Africa	Out-competes native sand-binding plants on dunes and prevents sand ebb and flow	Pingao, Golden sand sedge <i>Ficinia spiralis</i> Spinifex <i>Spinifex sericeus</i> Sand tussock <i>Poa billardieri</i>
Pampas grass <i>Cortaderia jubata</i> , <i>C. selloana</i>	South America	Spreads via wind-borne seeds into open sites including coastal scarps, dunes and stream banks	Toetoe <i>Cortaderia richardi</i> Harakeke, Lowland flax <i>Phormium tenax</i>
Chilean rhubarb <i>Gunnera tinctoria</i> ,	South America (Andes)	Produces massive amounts of seeds spread by birds and water; invasive and domineering with wide tolerance range of site conditions	Kiokio <i>Blechnum novae-zelandiae</i> Wharariki, Coastal flax <i>Phormium cookianum</i> Rengarenga, Renga lily <i>Arthropodium cirratum</i> Kakaha <i>Astelia fragrans</i>
Mexican daisy <i>Erigeron karvinskianus</i>	Mexico	Vigorous invader of open sites via prolific small wind-borne seeds	Everlasting daisy, Hell's bells <i>Anaphaloides bellidioides</i> Mountain and lowland daisies <i>Celmisia spp.</i>
Banana passionfruit <i>Passiflora spp.</i>	South America	Rampant smothering vine with appetising fruit containing seeds distributed by birds	NZ passionfruit <i>Passiflora tetrandra</i> Supplejack <i>Ripogonum scandens</i> Puawananga, Bush clematis <i>Clematis paniculata</i>

Ivy <i>Hedera helix</i>	Eurasia	Vigorous vine that forms smothering ground cover and climbs trees; seeds spread by birds	NZ passionfruit <i>Passiflora tetrandra</i> Supplejack <i>Ripogonum scandens</i> Puawananga, Bush clematis <i>Clematis paniculata</i>
Japanese honeysuckle <i>Lonicera japonica</i>	East Asia	Rampant smothering vine with small fruit containing seeds distributed by birds	NZ passionfruit <i>Passiflora tetrandra</i> NZ jasmine <i>Parsonsia heterophylla</i> Puawananga, Bush clematis <i>Clematis paniculata</i>
Karo <i>Pittosporum crassifolium</i>	Northern North Island, NZ	Spreads onto coastal scarps via birds carrying seeds	Kohuhu <i>Pittosporum colensoi</i> , <i>P. tenuifolium</i>
Pohutukawa <i>Metrosideros excelsa</i> , <i>M. kermadecensis</i>	Northern North Island, NZ	Spreads onto coastal scarps via wind-blown seeds	Southern rata <i>Metrosideros umbellata</i>
Puriri <i>Vitex lucens</i>	Northern North Island, NZ	Potential to spread via birds carrying seeds	Kohekohe <i>Dysoxylum spectabile</i>
North Island lacebark, houhere <i>Hoheria populnea</i>	Northern North Island, NZ	Spreads via wind-blown seeds, very rapid growing	Narrow-leaved lacebark <i>Hoheria angustifolia</i> Lowland ribbonwood <i>Plagianthus regius</i>
Houpara <i>Pseudopanax lessonii</i>	Northern North Island, NZ	Spreads via birds carrying seeds	Five-finger <i>Pseudopanax arboreus</i> Lancewood <i>P. crassifolius</i>
North Island kowhai <i>Sophora tetraptera</i>	Northern North Island, NZ	Spreads via long-lived seeds	Kowhai <i>Sophora microphylla</i> Cook Strait kowhai <i>Sophora molloyi</i>



5| PEST CONTROL - ANIMALS AND PLANTS

North Marlborough's relatively warm sheltered environment provides good conditions for a large array of introduced plant and animal pests. Some of these can have a serious impact on both native vegetation through browsing and grazing, and native animals through both competition for food and direct predation. For some areas of existing vegetation the best improvement in habitat values can be gained through carrying out suitable plant and animal pest control. This chapter describes the various threats that introduced animals and weeds can pose to native vegetation areas and also sets out control methods for a number of pest species.

DOMESTIC STOCK

Domestic stock (sheep, cattle, deer, horses, goats, etc) in general destroy native vegetation and undergrowth – particularly in forest and wetland sites – and prevent regeneration. They also favour certain plant species over others as food and therefore can change the composition of the vegetation. For instance, areas purely of kanuka or manuka are invariably the result of selective browsing of the broadleaved plants and ferns that would otherwise be present in substantial quantities. Fencing to exclude stock is therefore essential within a productive farming landscape if natural remnants or areas for restoration are to remain and flourish. Fencing can provide benefits for both the farming operation and conservation, particularly around the coast, on erosion-prone slopes and in gullies and swamps. However, in situations where severe weeds such as old man's beard and wilding pines are present, continued grazing by stock can prevent their spread so follow up weed control may also be required.



A remnant area of native vegetation which will be unable to regenerate unless it is fenced from stock.

FERAL ANIMALS

Feral pigs, deer, goats, possums and hares are present throughout North Marlborough, and are a general problem. Their populations appear to have built to quite high densities in recent years. All can have serious impacts on native flora and fauna, and in combination their effects can be devastating. As a result, much of the bush has a

“hollowed out” structure, lacking undergrowth. Pigs are extremely destructive of soil and litter and have nearly eliminated the large land snails. Goats can inflict intensive local damage. Possums are general browsers but target species such as kohekohe and southern rata, doing severe damage in places. Deer live throughout but can be locally damaging through grazing and extensive bark-stripping of trees such as five-finger. Chamois are present in the Richmond Range and contribute to degradation of high country vegetation.

Evidence of possum damage on kohekohe trees, favoured food along with other broadleaved species like five finger (left).

Dieback and complete destruction of areas of kohekohe forest can occur in the worst case scenario (right).



Mustelids (ferrets, stoats and weasels), rodents (rats and mice), feral cats and hedgehogs are throughout the region. Largely uncontrolled, they are responsible for great damage to the small native fauna (birds, lizards and larger invertebrates). Rabbits are beginning to spread into the Sounds and are already having a negative impact on the native vegetation, even well within bush remnants.

Some feral animal control is carried out by some landowners, but it is a difficult task and the extensive areas of public conservation lands and the wide roving habits of several of the pest species (especially if regularly hunted), means that continual re-invasion is an issue. Deliberate introduction for recreational hunting is another problem in some areas. The pest-free status of many of the islands in the Sounds is vital to their value as sanctuaries for native flora and fauna. The lack of possums on Arapawa Island, and the lack of both possums and goats on D’Urville Island also contributes much to the sanctuary quality of North Marlborough.

Several “mainland island” type sanctuaries are in the process of being established on private land in the Sounds, taking advantage of peninsulas with narrow necks that can be intensively managed or fenced to exclude farm stock and feral animals. Full exclusion could result in areas which offer the opportunity to reintroduce rare land birds, burrowing sea birds, tuatara, skinks, geckos and land snails. Kaipupu Point



near Picton, jointly administered by Port Marlborough NZ Ltd and the Department of Conservation, is also being managed as a “mainland island”, with Council encouragement and strong community involvement.



Domestic cats and dogs are an added threat to weka, listed as nationally threatened and the last of our remarkable flightless native birds. North Marlborough is one of the last strongholds for these birds (left).

Native land snails are very vulnerable to predation by possums, pigs, rodents, mustelids, cats and hedgehogs (right).

Feral animal control

Many landowners are motivated to carry out pest control in an attempt to lessen the impact of feral animals in their surrounding area. While any control effort is useful, to be effective in reducing the impact of feral animals over time, quite comprehensive pest control programmes are likely to be required. Because every situation is different, expert advice is probably required to set up these more comprehensive programmes. The information provided here gives a general overview of basic accepted control methods for the various feral animal pest species. Further detailed information is available from organisations such as:

Landcare Research www.landcareresearch.co.nz

Department of Conservation www.doc.govt.nz

Biosecurity New Zealand www.biosecurity.govt.nz

Sanctuaries of New Zealand www.sanctuariesnz.org

Pigs, deer and goats – The purpose of controlling these species is to reduce the impacts of grazing, browsing, bark stripping and ground disturbance on forest vegetation and habitat. High to moderate densities of these feral animals can significantly affect the habitat quality available for native animal species and over time potentially change the entire forest structure. Pigs also prey on ground dwelling organisms (insects, worms etc) and of particular significance, the threatened native land snail species.

Control methods: Control of these three species is best achieved through intensive ground hunting with appropriately trained dogs (ideally trained for the individual pest species). Initially an intensive hunting effort (two to four hectares per hour) by experienced hunters carried out in a systematic and planned way can effectively reduce the populations of these species, although migration of animals from non-hunted neighbouring areas is a factor to be considered. Ongoing follow up control is likely to be required. Experience has shown that for native vegetation to show significant recovery, the animal population needs to be reduced to a level where one experienced hunter and dog will only encounter one animal per day's hunting time. Control that does not achieve this level will still reduce the pressure on the native habitat but not to the extent that full recovery will be able to occur.

Possums – The purpose of controlling possums is to reduce general browsing pressure on native vegetation as well as targeted browsing pressure on some favoured species such as kohekohe and five-finger which can ultimately kill these species. Possums also prey on nesting birds, taking eggs and chicks over the spring and summer months.

Control methods: Possums can be controlled through a variety of both trapping and poisoning methods.

Trapping

Kill traps – the animal is killed almost instantly and these traps do not have to be checked daily. These traps are generally more expensive, but are suitable for small scale use.

Non kill traps (cage traps and leg hold traps) – have to be checked daily to meet animal welfare guidelines and require that the animal is then humanely killed. Recent legislation has banned various leg hold traps. Information on approved leg hold trap types can be found at:

www.biosecurity.govt.nz/regs/animal-welfare/stds/traps

For both types of traps if weka are present it is recommended that traps are positioned a minimum of 700mm off the ground. It is an offence to kill weka.

Poisoning

Anticoagulant type poisons are most commonly used in small scale possum control around smaller properties and baches. However some are highly lethal to mammals



and birds, and extremely lethal to fish. Strict adherence to label recommendations is necessary, to minimise secondary poisoning and negating it getting into the food chain, especially in scavenging feral pigs. The use of bait stations is a condition of use to circumvent access to the toxin by wildlife and livestock. Weka are particularly vulnerable to this. Anticoagulants do not produce signs of poisoning for several days after the toxic dose has been consumed therefore bait stations should be kept baited for three to four days and then bait removed for up to five days and then rebaited. This helps to prevent “over ingestion” of bait, beyond that required to kill the possum. Those animals requiring a greater dose will receive it in the second baiting.

Acute poisons such as Cyanide in both encapsulated pellet (Feratox) and paste form are commonly used for possum control, but require a licensed operator.

A summary of poison types can be viewed at;

www.landcareresearch.co.nz/publications/infosheets/possums/pros_cons_of_poisoning.pdf

Mustelids (ferrets, stoats and weasels) and rats, also cats

The purpose of controlling these species is to provide some relief from predation of breeding birds, as well as insect and lizard populations over the spring/summer months. Stoats and ship rats, in particular, are key pests in forest ecosystems. There can be quite a complex relationship between the various predators with impacts on one affecting another and this needs to be considered when control programmes are planned. Cats for instance, while preying on native species, also prey on both rats and stoats. Cats should be particularly targeted when numbers are known to be generally high or particular species are at risk from cats – eg, penguins at nesting time.

Stoats prey on nesting birds, including larger species like kereru and kaka. They have a large range being able to travel many kilometres per day.

Rats also prey on nesting birds with particular impacts known on robins, tomtits and kereru, but also prey heavily on invertebrates and feed on seeds and fruit, potentially reducing forest regeneration. Rat numbers build up seasonally in response to food availability, numbers can also build when there is effective control of stoats, as rats are preyed on by stoats. On the other hand when rat and mouse numbers are high, stoat breeding kicks in and rapidly accelerates. Rats have smaller home ranges (100 – 200 metres), and high productivity when conditions are favourable and therefore populations need monitoring and periodic control to be effective.

Cats are difficult to target, but can be caught in leghold or kill traps. They can also be caught in cage traps and then shot.

Control methods: Mustelids and rats can be controlled through both trapping and poisoning methods.

Stoats – Trapping for stoats includes approved kill traps such as the Fenn or DOC 250s, 200s or 150s set at approximately 200m intervals along tracks, ridges and prominent points. For larger operations the trap lines should be 1km or less apart. Rats are also likely to be trapped in these, but not to the extent that the rat population will be significantly reduced.

Rats – The current best practice for controlling rat populations involves installing bait stations on a 100m x 100m grid and using an anticoagulant poison (such as “Talon”). Typical active ingredients are: brodifacoum, diphacinone, warfarin, and others. Most of these products include green dyes to deter birds; however, dogs and cats have poor colour vision and to them these pellets may look like pet food.

Anticoagulant rodenticides do not produce signs of poisoning for several days after the toxic dose has been consumed therefore bait stations should be kept baited for three to four days and then bait removed for up to five days and then rebaited. This helps to prevent “over ingestion” of bait, beyond that required to kill the rat. Those rats requiring a greater dose will receive it in the second baiting.

However, in North Marlborough there is a problem with weka taking baits and eating poisoned rats. Bait stations are the most prudent way to apply the bait as it gives a measure of protection to birds from eating the bait.

Trapping of rats can be done in smaller areas using 100m x 50m grids or ideally 50m x 50m grids and checked weekly or as frequently as possible. Several kill trap types are available and need to be set up in a weka-proof tunnel.

Rat numbers can rebuild very rapidly, so to maintain them at low levels programmes need to be repeated at least every third year and if possible more frequently. Some mice will be poisoned/trapped using these methods also. Mustelids will also be reduced following a rat poison operation as a proportion of them die by feeding on the poisoned rodents.

Feral Cats – Cats can be trapped in any of the three trap types – kill traps, leg hold



traps or cage traps. Cage traps are only suitable for control in small areas but are useful in that they avoid pet cats being injured or killed in instances where this is an issue. For more serious control operations, an extensive network of either leg hold or kill traps can be used on 100-200 metre lines. Cat control is quite complex and currently there is no effective monitoring technique for feral cat control operations. The Department of Conservation has detailed fact sheets on feral cat control using the three trapping techniques available.

The Plaisier family of Tui Nature Reserve in the outer Pelorus Sound own about 40 hectares which they have put into a QEII covenant to ensure the area is protected for nature conservation in the long term. Along with their neighbours, they have been working to get animal pest numbers down to low levels so that the native plants and animals on their peninsula, can flourish. They know that research has shown that most native forest birds like tui, bellbird and robins have a less than 20% breeding success rate when no pest control is in place and they are determined to break this cycle in their own area. The Plaisiers have worked from large to small, firstly tackling the pigs, goats and deer on the property by hunting to low numbers, then getting to work on the possum population with an extensive trapping programme using Timms kill traps set up in trees to avoid wekas being accidentally caught.

More recently they have begun even more intensive work on rats, getting specialist help to design and set up grids of suitable traps every 50 metres and checking these every two weeks. By getting all these pest species down to lower numbers they are seeing good recovery of species with kohekohe trees flowering and fruiting prolifically, and insect and bird numbers increasing dramatically. The work is ongoing, but future plans to erect a deterrent fence along the neck of the peninsula will help reduce the long term effort needed to keep pests in this area at sustainable low levels.



The Plaisier family with sponsors at the Marlborough Environment Awards dinner in 2009 where they won both the Habitat Enhancement Award and the overall Supreme Award (left).

Kohekohe flowers growing directly out of the trunk and branches, a feature that indicates tropical ancestry. Possums seek out kohekohe and it would not be flowering like this if possum numbers were not very low (right).

WEEDS

Along with feral animals, introduced plants are placing North Marlborough's natural ecosystems under pressure. Some weed plants that are a threat to native vegetation are managed as "total control" plants through the Regional Pest Management Strategy (for instance boneseed, madeira vine and climbing spindleberry). However many more widespread weeds, including those discussed below, are too widespread to be eradicated and control generally relies on landowners or wider community efforts.

Brochures and information on all of the weeds discussed here are available at the Marlborough District Council.

Wilding Trees

Wilding conifers (mostly *Pinus radiata*) have become the greatest weed threat in North Marlborough, proliferating since the wind-down of pastoral farming and the advent of commercial exotic forestry in about the mid 1970s. They are throughout the region and are rapidly invading regenerating vegetation and sensitive places such as coastal scarps and ultramafic areas. Relatively easy to control at the early stages, they have the ability to rapidly proliferate and destroy the integrity of the native vegetation. Control programmes are underway in several places in the Sounds, where individual landowners are carrying out work. The Marlborough Sounds Restoration Trust is an independent organisation established in 2006 to work on a larger scale programme of wilding pine control in the Marlborough Sounds with the backing of the Marlborough District Council and the Department of Conservation.

Scattered wilding pines within regenerating kanuka forest that could be relatively easily controlled by poisoning at this stage.



Control methods – the most effective way to control large wilding pines where they are located within regenerating native vegetation and away from areas where people could be endangered by falling branches, is to poison them standing and allow them to die and break down over a period of several years. This method does not create gaps in the vegetation where seeds in the ground can germinate and become an



ongoing problem. The method involves drilling on a downward angle from 2-8 holes (depending on the size of the tree), into the growth layer of the tree under the outer bark layer (about 100mm), and filling with a chemical mix of high concentration metsulfuron based herbicide like Meturon, Escort or Matrix (200g per litre of water).

Young smaller pre-coning trees can be felled with a handsaw or chainsaw.

Graeme and Sue Moore – Hitaua Bay, Tory Channel – are pioneers in the wilding pine management field and after trialling other methods (helicopter removal and ring barking), have been controlling trees through stem poisoning for about 20 years. They have killed many thousands of trees with the help of local couple, Len and Helen Dunwoodie, who have steadily worked their way right over the property over the years, building expertise and experience as they went.

As the trees die off over a period of months, more light and moisture get to ground level and regeneration of native species is often rapid. Plots set up in some areas on the property found up to 18 native species established under trees after two years. The dead standing trees make ideal perches for birds which bring more seed into the system fairly quickly, including nearby podocarp species like rimu, totara and matai. Because there is no ground disturbance using this method few weed species tend to establish.

After 20 years the Moore's property is a great showcase for what can be achieved and the different stages and patterns that emerge depending on factors such as climate, soil fertility and so on. Trees disintegrate to single stems in anything from five to 20 years – these stems will gradually blow or fall down and the regenerating native vegetation will be dominant once again. More extensive wilding pine control using similar stem poisoning methods is now carried out throughout the Sounds by other landowners and since 2008 by the Marlborough Sounds Restoration Trust.



Graeme Moore and environmental consultant Paul Millen tour the property (left).

Trees poisoned about five years ago stand amongst vigorously regenerating native vegetation (right).

Old man's beard

Old man's beard is also a major and burgeoning problem. It is beyond the capacity of individual landowners to control in several places, even though biological control agents are present. The main control tools are grazing or cutting stems and painting the cuts with herbicide. Preventing the spread of this weed should be a regional aim.



Old man's beard plants showing prolific wind spread seeds after flowering.



Old man's beard smothering native vegetation - the weed can take over areas of native vegetation if left uncontrolled.

Control - the most effective control method is to find and cut the vines near the ground and paint the stumps with herbicide, either Vigilant gel, one part Glyphosphate to four parts water, or, one part Grazon to 20 parts water. Ongoing control will be required for some years to continue removing seedlings. Hand pulling and grubbing is possible with smaller plants. As plants can re-grow from stem fragments ensure these are not left on the ground.

Other weed species

Banana passionfruit, Japanese honeysuckle and climbing asparagus are also becoming severe problems, though as yet they are more localised.

Willows threaten natural riparian sites and wetlands. They can be controlled by drilling and poisoning using similar methods outlined above for wilding pine trees.



Banana passionfruit, Japanese honeysuckle and climbing asparagus, all weeds that could become major problems if allowed to spread (left to right).



Willows spread vegetatively, so if they are going to be mechanically removed they should still be killed by poisoning first, otherwise any pieces left on the ground are likely to re-grow.

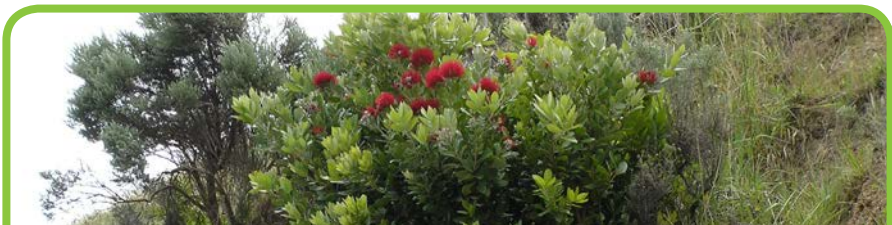
Cotoneaster, agapanthus and shrubby stonecrop (*Sedum praealtum*) – all garden escapees – are threats to coastal scarps and should be controlled wherever they become established in the wild.

Gorse and broom are threats to areas where native vegetation regeneration is slow, for instance ultramafic areas and some coastal scarps; otherwise they are benign and are generally quickly outstripped by regenerating native vegetation.

Spanish heath, hawthorn, barberry, Himalayan honeysuckle and blackberry are localised but widespread; they are not usually a threat to the native vegetation. For many of these weeds, exclusion of stock and prevention of fire and other disturbance may be sufficient for the regeneration of native vegetation to prevail.

On the few sand dunes, marram grass has invaded and is a severe threat to the natural sand dynamics, as well as to the last remnants of native sandbinding vegetation and mat daisy populations. Control of marram and planting of native sandbinders such as spinifex, pingao and sand tussock will be necessary for these special communities to survive long into the future.

“Exotic natives” – New Zealand native plants not naturally occurring in North Marlborough – also pose threats to the natural integrity of the region. They include beloved species such as pohutukawa, kauri, puriri and karo. Pohutukawa and karo have become established in the wild in several places in the Sounds. In terms of ecological integrity it is better not to plant these species but to plant the local equivalents instead: southern rata, totara, kohekohe and kohuhu. Even then it is preferable to use plants raised from the nearest available source, rather than what can be obtained “off the shelf” from a commercial nursery.



Although Pohutukawa is a native species and attractive to native birds, is not natural to Marlborough and is spreading in places. From an ecological perspective it is better to plant southern rata, which is natural to the region.

APPENDICES

BIBLIOGRAPHY

“North Marlborough Significant Natural Areas project – A Summary of Results from an Ecological Survey of Significant Natural Areas on Private Land in Marlborough, North of the Wairau River”, Geoff Walls and Nicky Eade, Marlborough District Council technical report, June 2009.

“Native Vegetation for South Marlborough – A Planting Guide”, Marlborough District Council, December 2004.

“Totara: Establishment, Growth and Management”, David Bergin, Forest Research, 2003.

“Native Trees: planting and Early Management for Wood Production”, David Bergin and Luis Gea, Forest Research, 2005.

“Establishing Shelter in Canterbury with Nature Conservation in Mind. A practical guide – for the true Cantabrian!” Environment Canterbury and Isaac Centre for Nature Conservation. Lincoln University, March 2003.

“Backyard Biodiversity in Canterbury” Al Check and Mike Bowie, Lincoln University, 2009.

“Farm Management Guidelines for Protection of Native Vegetation in South Marlborough” (draft), Marlborough District Council, August, 2004.

“Growing Native Plants in Kaptiti”, Kaptiti Coast District Council, June 1999.

“Living Heritage; Growing Native Plants in Nelson”, Department of Conservation, Nelson-Marlborough Conservancy and Nelson City Council, August 2003.

“Native Forest Restoration; A Practical Guide for Landowners”, Tim Porteous, Queen Elizabeth the Second National Trust, 1993.

“Planting Native Plants in Hawke’s Bay”, Hawke’s Bay Regional Council, Department of Conservation, Hawke’s Bay Conservancy.

Recommended Reading – Background

“Clean Streams; A Guide to Managing Waterways on Tasman and Marlborough Farms”, Dexcel, May 2004.

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BIBLIOGRAPHY

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“Native Vegetation for South Marlborough – A Planting Guide”, Marlborough District Council, December 2004.

“Totara: Establishment, Growth and Management”, David Bergin, Forest Research, 2003.

“Native Trees: planting and Early Management for Wood Production”, David Bergin and Luis Gea, Forest Research, 2005.

“Establishing Shelter in Canterbury with Nature Conservation in Mind. A practical guide – for the true Cantabrian!” Environment Canterbury and Isaac Centre for Nature Conservation. Lincoln University, March 2003.

“Backyard Biodiversity in Canterbury” Al Check and Mike Bowie, Lincoln University, 2009.

“Farm Management Guidelines for Protection of Native Vegetation in South Marlborough” (draft), Marlborough District Council, August, 2004.

“Growing Native Plants in Kaptiti”, Kaptiti Coast District Council, June 1999.

“Living Heritage; Growing Native Plants in Nelson”, Department of Conservation, Nelson-Marlborough Conservancy and Nelson City Council, August 2003.

“Native Forest Restoration; A Practical Guide for Landowners”, Tim Porteous, Queen Elizabeth the Second National Trust, 1993.

“Planting Native Plants in Hawke’s Bay”, Hawke’s Bay Regional Council, Department of Conservation, Hawke’s Bay Conservancy.

Recommended Reading – Background

“Clean Streams; A Guide to Managing Waterways on Tasman and Marlborough Farms”, Dexcel, May 2004.



“Marlborough’s Freshwater Flora & Fauna – A Field Guide”, Peter Hamill, Marlborough District Council, April 2004.

“Threatened Plants of South Marlborough; A Field Guide”, Cathy Jones and Ingrid Hutzler, Department of Conservation, Nelson/Marlborough Conservancy.

“Wairau Plain Landscape Concept; The Plan and Guidelines”, Lucas Associates, Marlborough District Council, November 2002.

“Wonderful Wetlands”, a collection of brochures published by Fish & Game New Zealand, New Zealand Game Bird Habitat Trust.

The Environment Waikato website has good background information on wetland and streamside riparian management and planting. www.ew.govt.nz/cleanstreams

RECOMMENDED READING – IDENTIFICATION AND GARDENING ADVICE

The New Zealand Plant Conservation Network – established in 2003 to protect and restore New Zealand’s indigenous plant life and their natural habitats and associated species. The website provides comprehensive plant identification information. www.nzpcn.org.nz

“Going Native: Making use of New Zealand’s Native Plants”, Ian Spellerberg and David Given, Canterbury University Press.

“Growing New Zealand Plants, Shrubs and Trees”, Muriel Fisher and Margaret Forde, David Bateman Ltd.

“Native Trees of New Zealand”, J.T. Salmon, Reed Publishing (NZ) Ltd. (Field edition, “Reed Field Guide to New Zealand Native Trees”, J.T. Salmon, Reed Books.)

“The Gardener’s Encyclopaedia of New Zealand Native Plants”, Yvonne Cave and Valda Paddison. Random House New Zealand Ltd.

“Small-leaved Shrubs of New Zealand”, Hugh Wilson and Tim Galloway, Manuka Press.

“The Cultivation of New Zealand Trees and Shrubs”, L.J. Metcalf, Reed Books.

“The Cultivation of New Zealand Plants”, L.J. Metcalf, Godwit.

“Trees and Shrubs of New Zealand”, A.L. Poole and N.M. Adams, Manaaki Whenua Press.

The New Zealand Indigenous Plant Species Selector is an expert-in-a-box tool to help choose and evaluate plants for a variety of land management applications.

<http://www.landcareresearch.co.nz/research/biodiversity/greentoolbox/gtbweb/default.asp>

SUPPORTIVE ORGANISATIONS

Department of Conservation; North Marlborough Area Office, Picton, (03) 520 3002

Department of Conservation: Nelson-Marlborough Conservancy Office, (03) 546 9335

Queen Elizabeth II National Trust; Contact Nelson/Marlborough field officer, Tom Stein, (03) 574 2978. tstein@openspace.org.nz, www.openspace.org.nz

Marlborough District Council; (03) 520 7400

Marlborough Environment Centre; Contact Tim Newsham, (03) 570 5745, timnewsham@xtra.co.nz

Marlborough Farm Forestry Association; Contact Bill Peter, (03) 579 4227 ben.est.ltd@xtra.co.nz

Marlborough Forest and Bird; Contact Mike Harvey, (03) 577 6086, opaua@xtra.co.nz

Nelson Marlborough Fish & Game; Contact Vaughan Lynn, (03) 578 8421, vlynn@xtra.co.nz

New Zealand Ecological Restoration Network; a non-profit, community-driven organisation dedicated to sharing knowledge and experiences about native habitat protection, management and ecological restoration. www.bush.org.nz

New Zealand Landcare Trust; contact regional co-ordinator Barbara Stuart. 03 545 0443, barbara.stuart@landcare.org.nz

Tane's Tree Trust; aims to see the majority of New Zealand landowners planting and sustainably managing indigenous trees by 2020, contact Jan Barton 09 292 4825, www.tanestrees.org.nz,

MAF – for information on the Emissions Trading Scheme – Nelson/Marlborough Sustainable Programme Advisor – Ben Doherty (03) 543 9185 ben.doherty@maf.govt.nz



POTENTIAL FUNDING SOURCES FOR CONSERVATION PROJECTS

Department of Conservation/Ministry for the Environment; Biodiversity Condition and Advice Fund. www.biodiversity.govt.nz/land

Marlborough District Council; Natural Areas Protection Fund. Contact Nicky Eade, (03) 520 7400, nicky.eade@marlborough.govt.nz

Ministry of Agriculture and Forestry; Sustainable Farming Fund. The purpose is to bring together "communities of interest" drawn together by a shared problem and/or opportunity in the sustainable use of resources. Contact. 0800 100 087, sffund@maf.govt.nz

New Zealand Game Bird Habitat Trust; a charitable body that receives and distributes the proceeds of the Game Bird Habitat Stamp Programme. Fish & Game New Zealand services the programme on behalf the Trust Board. Funds are allocated for the protection, enhancement or creation of game bird habitat.

Nga Whenua Rahui; a contestable Ministerial fund established to help protect indigenous ecosystems on Maori land by providing incentives for voluntary conservation. www.doc.govt.nz and click on community/Maori.

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 Department of Conservation
Te Papa Atawhai


MARLBOROUGH
DISTRICT COUNCIL


QEII National Trust
Open Space New Zealand
Ngā Kārauhi Papa



“Marlborough’s Freshwater Flora & Fauna – A Field Guide”, Peter Hamill, Marlborough District Council, April 2004.

“Threatened Plants of South Marlborough; A Field Guide”, Cathy Jones and Ingrid Hutzler, Department of Conservation, Nelson/Marlborough Conservancy.

“Wairau Plain Landscape Concept; The Plan and Guidelines”, Lucas Associates, Marlborough District Council, November 2002.

“Wonderful Wetlands”, a collection of brochures published by Fish & Game New Zealand, New Zealand Game Bird Habitat Trust.

The Environment Waikato website has good background information on wetland and streamside riparian management and planting. www.ew.govt.nz/cleanstreams

RECOMMENDED READING – IDENTIFICATION AND GARDENING ADVICE

The New Zealand Plant Conservation Network – established in 2003 to protect and restore New Zealand’s indigenous plant life and their natural habitats and associated species. The website provides comprehensive plant identification information. www.nzpcn.org.nz

“Going Native: Making use of New Zealand’s Native Plants”, Ian Spellerberg and David Given, Canterbury University Press.

“Growing New Zealand Plants, Shrubs and Trees”, Muriel Fisher and Margaret Forde, David Bateman Ltd.

“Native Trees of New Zealand”, J.T. Salmon, Reed Publishing (NZ) Ltd. (Field edition, “Reed Field Guide to New Zealand Native Trees”, J.T. Salmon, Reed Books.)

“The Gardener’s Encyclopaedia of New Zealand Native Plants”, Yvonne Cave and Valda Paddison. Random House New Zealand Ltd.

“Small-leaved Shrubs of New Zealand”, Hugh Wilson and Tim Galloway, Manuka Press.

“The Cultivation of New Zealand Trees and Shrubs”, L.J. Metcalf, Reed Books.

“The Cultivation of New Zealand Plants”, L.J. Metcalf, Godwit.

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