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Native Vegetation for South Marlborough

A PLANTING GUIDE

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Cover Photo Jarden Taukiri-Waaka, a year five student at Spring Creek School, participates in restoration planting at the Grovetown Lagoon.

Native Vegetation for South Marlborough A PLANTING GUIDE



**SOUTH MARLBOROUGH BOASTS A RICHLY DIVERSE
NATIVE FLORA, REFLECTING A LANDSCAPE SHAPED
BY CLIMATIC AND GEOLOGICAL EXTREMES.**

Whether you are planning an indigenous shelter belt for your vineyard or the protection of a large area of native bush on your farm, it is hoped that this Guide will provide practical advice and support.

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INTRODUCTION

Ecological surveys of much of South Marlborough - contracted by the Marlborough District Council and Department of Conservation between 2000 and 2005 - spurred an interest in protecting or enhancing natural areas identified as especially significant.

“Native Vegetation for South Marlborough” has been published with the aim of ensuring these and other efforts to protect and plant indigenous South Marlborough vegetation are well rewarded. Whether you are planning an indigenous shelter belt for your vineyard or the protection of a large area of native bush on your farm, it is hoped that this Guide will provide practical advice and support.

South Marlborough – for the purposes of this Planting Guide defined as that part of the Marlborough District Council territorial boundary that lies to the south of the Wairau River – boasts a richly diverse native flora, reflecting a landscape shaped by climatic and geological extremes.

A combination of extremely low rainfall and spectacularly strong winds along much of the east coast creates a harsh environment swept by drought and occasionally fire. Further inland, rapid tectonic plate uplift and active erosion wreaks constant change in the hill and high country, where temperatures can range from among the highest experienced in New Zealand to the lowest, with harsh winter frosts and sometimes snow.

These sometimes severe conditions shaped much of the original vegetation of South Marlborough, which includes a number of plants spectacular for their ability to survive, rather than showy foliage and flowers. Tightly divaricating grey shrubs, prostrate plants that hug the ground and leathery-leaved species impervious to drying winds have evolved to suit even the toughest sites.

A long history of first Maori occupation then European pastoralism with the associated introduction of animal and plant pests placed further pressure on native plants and animals of the area.

Surviving against all these odds, is a varied flora, especially adapted to a range of niche environments. Many plants - such as the Marlborough rock daisy and pink broom - are endemic to the area, meaning they are found nowhere else.

Original native vegetation is, however, found on as little as two percent of land area and secondary regenerating native vegetation on between five and ten percent (almost exclusively on private property). Despite the uniqueness of the South Marlborough ecology, the public conservation estate includes very little of the area's coastal and lowland environments. Therefore, efforts to protect and enhance scattered remnants of original vegetation, as well as the planting of indigenous plants on private land, are extremely valuable.

Unfortunately, the very extremes of nature which shaped the plants that grow here can work against the success of protection and planting projects. To give your planting a best chance at success, it is important to first understand your site and its challenges then employ recommended planting and maintenance procedures.

Over 120 species are listed in this Guide, with the focus on those that are widely-known and easy to grow. There are, however, many other native species which are indigenous to South Marlborough but not included because they are not readily available from local nurseries. Although these species are suitable for native restoration projects, they are likely to be more relevant for large-scale restoration projects, or only of interest to enthusiasts. Comprehensive lists which include these species are available from the Department of Conservation office in Renwick.



1 PLANTING PURPOSE

Why natives?

Why grow native plants in South Marlborough when exotic species such as pines, poplars, wattles and some oaks can thrive with often little effort for good effect?

There is certainly a place for exotic plants here yet it can be especially satisfying to grow native species. Not only are you helping to preserve the tremendous natural diversity of South Marlborough but if species that grow naturally on the site are selected, correctly planted and cared for they should require only basic maintenance, once established. In turn, they will attract native birds and insects, enriching Marlborough's natural 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 don't provide 'their' habitats, they may be lost.

Planting pioneer celebrates biodiversity

A pioneer of planting native plant species in Marlborough is Tua Marina octagenarian, Margaret Peace.

Margaret's garden includes a 1000 square metre forest of over 100 species of native trees, shrubs and groundcovers which - only 17 years after they were planted - are thriving and providing an ideal habitat for native birds and insects.

While delighted to see farmers, grapegrowers, lifestylers, home gardeners and regional authorities taking an interest in planting native species, Margaret warns that it's not as simple as buying a few plants at the local nursery and sticking them in the ground.

"It's better to take a corner of the property and plant a mixed patch of native species," she advises. "Let things grow as they would naturally. It does not take a large area to make a mini ecosystem, friendly to native birds and insects."

Margaret sourced her plants from the nearby Pukaka Valley where the odd kahikatea, rimu, totara and matai grow above a broadleaf canopy.

"Productive diversity" is also represented on the Tua Marina property by a vegetable garden, orchard with 30 species of fruit and a range of multi-functional trees used for food production, firewood, shelter and bird habitat.



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

The protection and inter-planting of native species into remnants of New Zealand's original vegetation offers the satisfaction and enjoyment of enhancing natural biodiversity while potentially improving water quality and protecting against erosion.

However, inter-planting requires special care. Not only should naturally-occurring species be selected but if at all possible these should be ecosourced, to avoid contaminating the genetic integrity of original plants.

Forest, wetland, stream and riverside, dry bank and beach remnants in South Marlborough are among those being enhanced by private landowners who value the district's ecological heritage.

Some reasons for conserving and enhancing Marlborough's natural environments include;

Indigenous biodiversity

Protection of remaining areas of primary native vegetation holds the highest priority. A covenanted area (of native bush, shrubland and grasslands surrounds) on The Waterfalls property inland from Seddon, for example, includes 200 native species, with about 250 species on the whole farm.

Stands of tall manuka or kanuka (secondary regeneration) provide a place where livestock can escape from the weather. Silver tussock (*Poa cita*) left on hillsides also provides shelter, especially for lambs.

Indigenous forest or shrubland can also be re-created from scratch on a scale ranging from the home garden to an entire hillside.

Marlborough daisy thrives at Waterfall covenant

Two hundred native species grow on a 130 hectare site covenanted by Charles and Clare Waddy to the QEII National Trust.

A feature of the covenant is the waterfall for which the Waddy farm – inland from Seddon – and Angus stud is named. One hectare around the 25 metre high waterfall is fenced off to exclude cattle and sheep but the remainder of the area consists of pasture interspersed with steep bluffs, inaccessible to stock apart from the odd goat.

The site's stand-out species is the red rock daisy, (*Pachystegia rufa*). About 80% of the total population of this Marlborough-specific rock daisy is found here and the remaining 20% in two gullies to the east. Other highlights include New Zealand lilac (*Heliohebe hulkeana*), titoki trees, fuchsia, flowering creepers including *Parsonsia capsularis* and sweet-scented orchid, *Earina autumnalis*.

The main motivator for formally protecting the site was the possibility that it could be mined for its solid rock, says Charles.

A management priority is controlling weeds before they get away; integral to the protection of any indigenous area, especially where wilding pines could be a problem.

“We’ve pretty much got on top of a small infestation of barberry, cutting off any young bushes and painting them with Vigilant gel.”

Culling of possums to halt the spread of bovine tuberculosis has helped with the recovery of native mistletoe, *Tupeia antarctica* which – along with its host plant the five finger – had been eaten almost to extinction. The spread of calicivirus through rabbits has pretty much put paid to these pests as well.



Botanist Brian Molloy, Charles Waddy of The Waterfall and Philip Lissaman of the QEII National Trust (from left) look out at the inaccessible bluffs where numerous plant species have survived fire, drought and grazing.

Protecting threatened plants

Many of South Marlborough's threatened plants are not included in this Guide, as they are either not widely available or require skill and experience to establish. The Department of Conservation, however, offers information on these species and is happy to advise and assist landowners wanting to establish or protect threatened plants on their properties.

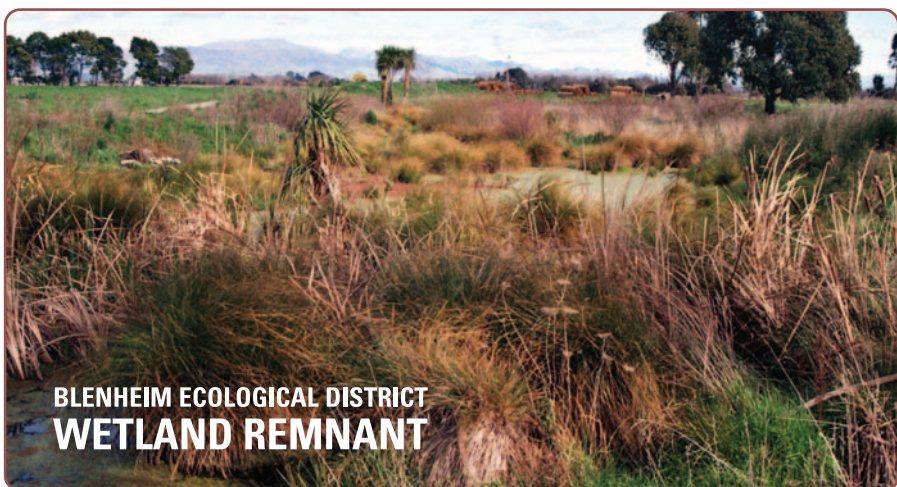
The Department has, for example, been supplying seedlings of the densely divaricating shrubby tororaro (*Muehlenbeckia astonii*) to farmers who have this shrub on their properties, in the hope that they will plant them out to provide shelter while promoting biodiversity.

ENHANCING WATER QUALITY

Wetlands

In the 1840s large areas of wetlands - lush environments rich in their diversity of flora and fauna - were found in the lowlands of Marlborough, particularly on the lower Wairau Plain. Today, only 1.25% of the Plain's original wetland area remains.

Recently, community groups, grapegrowers and wine companies have shown a growing interest in restoring wetland remnants. Nelson Marlborough Fish & Game is targeting pastoral farmers with a programme which will provide assistance and advice in applying for consents for wetland enhancement or development in appropriate areas.



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.

Wetlands can have a number of benefits including;

- > purifying water by stripping nutrients such as nitrogen through bacterial action
- > 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 restoring a wetland, it is recommended that you seek professional information and advice.

If you'd 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.



The Grovetown Lagoon is being transformed from a sump to a sumptuous waterway rich with waterfowl and fish species, thanks to members of the local community including pupils of Spring Creek School.

After the hard work of chopping out old man's beard and selective removal of willow trees, the satisfying task of planting native species is now underway. Locally sourced manuka, kanuka, kowhai, kahikatea and cabbage trees are among the species being planted.

Riparian strips

Replanting waterway margins in native species improves local biodiversity and has a number of other benefits including;

- > shading and cooling of water to promote freshwater life
- > 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.

A number of species included in the wetland plant list are also suitable for riparian sites. Planting should generally include low, overhanging species along wet stream margins (*Carex* species, *Phormium tenax*, *toetoe*) and taller species (such as manuka and cabbage trees), planted further back from the water's edge.



**MARLBOROUGH DISTRICT COUNCIL
LOWER SPRING CREEK PLANTING**



STAND-OUT SPECIES ON THE BEACH

They're not spectacular but they're special; that's the Rarangi Landcare Group's summing up of the ruggedly individual plants growing along the Rarangi foreshore.

Since 2000, the Landcare Group has been planting species that grow naturally on the Rarangi beach, some of which are hosts to at least 36 species of moths including several found only in Cloudy Bay. Members also carry out weed control.

PROVIDING A NATIVE BIRD, INSECT AND LIZARD HABITAT

Our forests are quieter than they used to be. Native bird populations continue to decline, due to loss of habitat and predation by introduced pests.

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 and invertebrate species will benefit from the production of fruit/seeds, nectar and foliage.

Some locally-occurring bird (and sometimes insect or lizard)-friendly plant species include kowhai, flax, five-finger and all the divaricating shrubs with berries such as coprosmas, muehlenbeckia and matagouri.

Preventing extinctions and increasing populations of native plants and animals may require eradicating or controlling pests such as ferrets, stoats, feral cats, rats, deer, goats and possums. Information on their control is available from the Department of Conservation, South Marlborough office, and the Marlborough District Council.

PRACTICAL PLANTINGS

Native plants can provide effective shade and shelter for a range of settings, from the farm to the vineyard. Aesthetically, native shelter plantings are low-key yet attractive. Providing appropriate species are selected, with good establishment native shelterbelts 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 and hawthorn planted in our pioneering past and more recently pampas, wattles, elderberry, sycamore and cotoneaster - have become weeds and do not provide an optimum habitat for native wildlife.

Of interest to vineyard owners is the (as yet unproven) possibility that native trees attract native birds which cause less damage to grapes than the exotic birdlife (such as starlings and finches) that roost in exotic trees. A joint project being carried out by the Marlborough District Council and Centre for Viticulture and Oenology, Lincoln University is testing the feasibility of investigating this possibility.

Shelterbelts and blocks

Native species which have successfully been included in shelterbelts in South Marlborough include kohuhu (*Pittosporum tenuifolium*), mapou (*Myrsine australis*), lacebark (*Hoheria angustifolia*), manuka (*Leptospermum scoparium*), kanuka (*Kunzea ericoides*), shining karamu (*Coprosma lucida*), ribbonwood (*Plagianthus regius*), cabbage trees (*Cordyline australis*), flax (*Phormium tenax* and *P. cookianum*), toe toe (*Cortaderia richardii*) and ake ake (*Dodonea viscosa*).

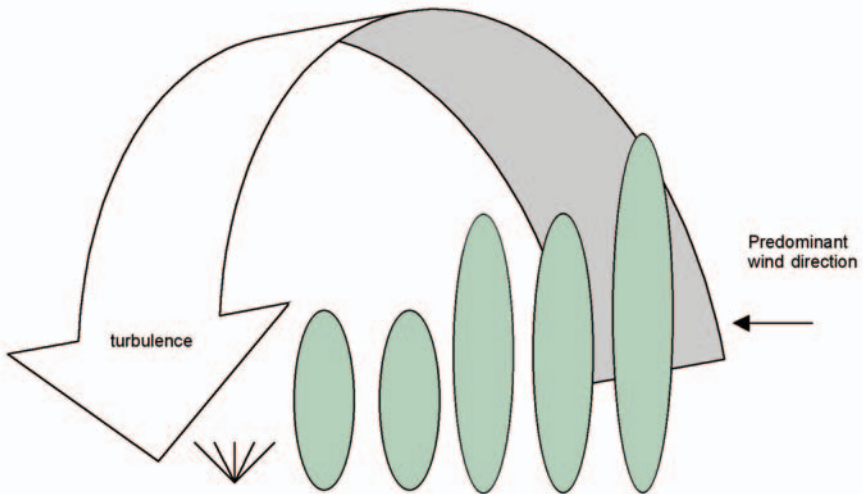
Native plants may offer a uniquely New Zealand landscaping option for grape-growers keen to plant trees without encouraging bird pests which eat and damage their crops.

Early findings of a pilot study carried out for the Marlborough District Council's Landscape Plan Working Groups included a low occurrence of starlings in areas of native vegetation growing in Marlborough's primary viticulture regions, the Wairau Plain and Awatere Valley. Numbers of blackbirds and thrushes – also major culprits in the consumption of grapes – were also low.



Some important planting principles for shelterbelts include: select species that suit site conditions (ecosourcing if possible), plant hardy pioneer species which will colonise a site ahead of more sensitive plants, prepare the site, exclude stock, control weeds and pests, plant correctly, then mulch and manage the plants through to self-maintenance.

In general, aim for 1-2 metre spacings of plants in 2-7 rows that eventually form 2-4 tiers with a diverse array of species.



A four-tier planting, with the tallest trees protecting smaller plants from the predominant wind.

Mixed native and exotic plantings

Mixtures of both native and exotic species may give optimal benefits of shelter, permeability, low maintenance, biodiversity and resistance to drought and frost.

Many landowners opt to plant both native and exotic species to create a varied landscape, suit particular sites or fulfil specific purposes (such as provision of autumn colour, fruit and/or nuts).

Existing exotic shelterbelts and hedges can be enhanced by planting of native species. With protection from wind and frost already in place, native plants should grow well and ultimately their exotic backdrop could be removed.

To interplant or underplant, you will need to thin or find gaps among the existing trees and shrubs. Ideally, dig out competing roots for at least a 50cm diameter before planting. Conditions will be very tough around very old trees so plant as far away from trunks as possible. Seedlings will eventually fill any gaps.



MIXED PLANTINGS AT AUNTSFIELD

Grapevines, mature willow, eucalypt, pine and macrocarpa trees and recent plantings of both native and exotic trees, shrubs and grasses grow in attractive harmony at the Cowley family's 100 hectare Fairhall property, Auntsfield.

Creating a balanced landscape is a high priority for Graeme and Linda Cowley, shared by their son Ben and his wife Deirdre who manage Auntsfield. Three years ago they started removing dense willow from the often dry Doctors Creek, now planted predominantly in drought-tolerant Australian species on its northern bank with natives including flaxes, sedges, and kowhai on the south.

Another major project is the development of a wetland alongside the original Auntsfield cottage.

"We would advise using a consultant, especially in harsh environments where species decisions are so important," says Ben Cowley. "Knowing what to plant and where for survival, is even more important than aesthetics."

In the first two-year establishment period it is especially important to keep plants weed-free and watered, and to be careful when applying pesticide.



Filling unproductive areas

There is a trend towards balancing production on farms with the planting or protection of sites where continued inputs are not justified.

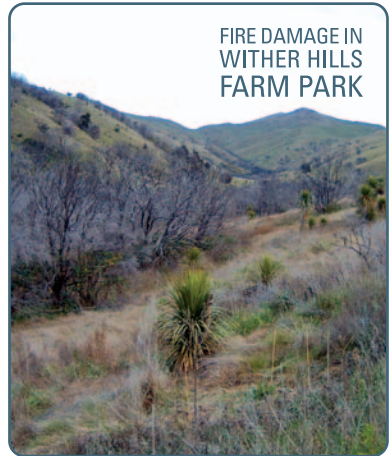
Awkward corners, steep banks, dry faces and reverting back country for example, are often planted in timber species, especially radiata pine. Allowing these areas to naturally regenerate or planting them in native species is another option, combining the satisfaction of enhancing South Marlborough's natural landscape with practical purposes.

On farms, fencing off of these sites will ensure stock aren't left behind when mustering and will help channel a muster onto the desired route. It can also keep animals away from natural hazards such as swamps and bluffs and will protect the vegetation from browsing.

A number of grapegrowers have planted sites unsuitable for vines in native species, recognising that this gives the vineyard a distinct Marlborough feel, plus that the protection of natural biodiversity builds on the New Zealand wine industry's "riches of a clean, green land" promotion.

Fire resistant plantings

If planting close to a house or building, especially in a lifestyle block situation where the property is vulnerable to grassfires, avoid flammable species such as manuka and kanuka. If possible, keep the surrounding area watered when the fire risk is high.



Experience in the Wither Hills Farm Park has been that native species which both recover after fire and are drought tolerant are cabbage trees (*Cordyline australis*), wigglywig (*Muehlenbeckia complexa*), prostrate kowhai (*Sophora prostrata*), kowhai (*Sophora microphylla*), *Coprosma* species (including *C. robusta*, *C. crassifolia* and *C. propinqua*), mahoe (*Melicactus ramiflorus*), native broom (*Carmichaelia* species), broadleaf (*Griselinia littoralis*) and ngaio (*Myoporum laetum*). All the above survive by coppicing, while kanuka and manuka will regenerate from seed in the soil, after burning. Flax and *Carex* species also withstand fire.

LANDSCAPING AND AMENITY PLANTING

There is a growing trend towards using native plants in landscaping and amenity planting. In gardens, the “textured” (rather than brightly coloured) look of native trees, shrubs, climbers, grasses and ferns is finding favour as New Zealanders seek to express their identity through low-maintenance indigenous plantings.

They provide a low impact “screen” for unsightly buildings and useful filler for amenity areas such as roundabouts and road lane dividers.

Again, the selection of appropriate species for the site, correct planting and maintenance will be important for plants’ survival.



III PLANNING YOUR PLANTING

The key principles of successful planting are;

UNDERSTANDING THE SITE

Consider details such as;

- > Existing vegetation – what native species are growing naturally on the site, under similar conditions?
- > Aspect – a north-facing slope, for example, will be markedly drier than slopes with a southern aspect.
- > Slope – flat and easy slopes offer more options than steep slopes, which require careful site preparation and planting.
- > Soil stability – pioneering species such as manuka (*Leptospermum scoparium*), kanuka (*Kunzea ericoides*) wire-netting bush (*Corokia cotoneaster*), wigglywig (*Muehlenbeckia* species including *M. astonii* and *M. complexa*) and silver tussock (*Poa cita*) should help stabilise an eroded site. Inter-planting of canopy species may become possible, once a slope (or stream-edge) has been stabilised.
- > Soil type – quite different soils can occur in close proximity, each with especially adapted vegetation. This is demonstrated by the creek and river terraces throughout South Marlborough. Another example is the limestone soils found at certain sites along the South Marlborough Coast that support a special group of small plants suited to the high calcium content of the soil and rock.
- > Drainage – consider if this can be improved by deep ripping.
- > Susceptibility to frosts
- > Exposure to sun, wind and sea-salt
- > History of fire and drought
- > Grazing by livestock. Good fences are essential.
- > Prevalence of animal and plant pests

Having noted conditions on the site and native vegetation growing under similar conditions, you can start selecting the species you wish to plant.

Remember that not all sites were necessarily forested. Dry shrubland species will be more suitable for many South Marlborough sites.

ESTABLISHMENT STAGES

The original vegetation of inland South Marlborough was predominantly forest, dry shrubland and grassland. Areas of forest were cleared by occasional natural, and later frequent human-lit fires, then would regenerate through these stages, creating a mosaic effect.

The first trees and shrubs to colonise a site are hardy species which create a sheltered, shaded environment where taller trees including canopy species later establish.

For the best chance of success when planting tree species (especially those which are frost-tender), imitate nature not only in the selection and siting of plants, but also in their order of establishment. If starting on open ground, for example, begin with pioneer species. Later, forest trees and understorey shrubs and ferns may be planted in their shade.

If, however, the site is sheltered then all species could be planted together.

In some shrubland and coastal sites, all species are hardy and could be established at the same time.

Early stage planting

Pioneer (or primary stage) species grow well in the open and their relatively fast growth suppresses weeds upon closure of the canopy and protects subsequent plantings from sun, wind and frost. They also attract birds which may further encourage natural seeding of other native species.

Typical South Marlborough pioneer species include silver tussock (*Poa cita*), bracken fern (*Pteridium esculentum*), tauhinu (*Ozothamnus leptophyllus*), matagouri (*Discaria toumatou*) and, where wet, raupo (*Typha orientalis*).

It is important to densely plant pioneer species, so canopy cover is achieved as quickly as possible (ideally within three to five years).

The planting of exotic species such as tree lucerne as an initial shelterbelt to protect native plantings requires careful management. Timely pruning and removal before stems become woody (at about five years) is essential, or they can take over a site. A shelterbelt of Leyland cypress (*Cupressocyparis leylandii*) or radiata pine can be established around the windward side of a site to protect the native plants, then removed after five to 10 years.

Another option is underplanting into an existing gorse shrubland, for example. The gorse will provide shade and shelter during establishment and may need to be cut out as the native plants reach full height. If the planting is dense, however, the gorse may become progressively shaded out and disappear of its own accord.

Later stage planting

Later stage forest species typically include the tallest and longest-lived of our forest trees as well as a set of understory shrubs, ferns and ground cover herbs that need a canopy overhead to thrive.

Some tree species are however, more hardy than others. Totara and matai for example, are relatively frost resilient and can be planted in the open – so long as their roots are shaded – and will grow faster in the light. Totara is also fairly drought-hardy.

Many of the beech species will also establish in direct sunlight. Moisture-loving rimu and kahikatea will, however, require shelter in South Marlborough's sometimes harsh conditions as do many of the taller broadleaved species such as titoki (*Alectryon excelsus*).

ECOSOURCING

Ecosourcing is one of the most important principles of native vegetation restoration. It involves the practice of sourcing propagation material (seeds/cuttings) solely from native plants growing locally, in the wild.

It is important to ecosource for three reasons. Firstly, locally sourced stock is well adapted to local conditions so has a best chance of survival.

Secondly, plants within the same species can adapt to local conditions to become genetically (and sometimes physically) distinct "provenances". A tarata/lemonwood (*Pittosporum eugenoides*) tree growing in Nelson for example may look the same as one in inland Marlborough but will have quite different tolerances for frost and drought.

Propagating from unknown plant material risks interbreeding and thus genetic contamination of local flora. This is true for several commonly used revegetation plants including flax, kohuhu (*Pittosporum tenuifolium*), cabbage trees, kowhai, manuka and kanuka.

Thirdly, ecosourcing avoids the risk of planting species which are not native to South Marlborough.

Some are potentially invasive and may spread into the wild thereby changing the nature of our indigenous plant communities. Native species to be avoided in an authentically South Marlborough planting include lacebark (*Hoheria populnea* and *H. sexstylosa*); tainui (*Pomoderris apetela*); some forms of kohuhu; taupata (*Coprosma repens*) south of Rarangi; karo (*Pittosporum crassifolium*, northern North Island) and *Pseudopanax lessonii* (northern North Island). Plants which are imports and becoming a coastal 'weed' locally include pohutukawa, and North Island and Tasmanian ngaio.

Some locally ecosourced plants may be available from local plant nurseries. Alternatively, you may be interested in collecting your own seed for propagating by a local nursery. This will of course, require patience as seed collected one year must then be grown out for one or two years. However, the payback should be ecologically worthwhile results and high plant survival.

Ensure that you collect seed not only from the area near where you plan to plant but also from a similar habitat. Plants propagated from a kanuka growing on a wet site for example, might not survive dry conditions. Earlier guidance on sourcing material is given on page 31 and shown on the map on page 33.

Take care not to damage plants when collecting seed or cuttings. If collecting on private land, you will need to seek permission from the landowner. Collection from the conservation estate without a permit is illegal.



**MEDWAY ECOLOGICAL DISTRICT
CABBAGE TREELANDS**

III ENSURING PLANT SURVIVAL

The South Marlborough climate can be very harsh with low rainfall, strong winds, severe frosts, frequent drought and occasional fire all threats to the survival of plantings. However, with appropriate species selection and establishment, satisfying results can be achieved.

Once site characteristics have been taken into account and appropriate species selected, key factors for survival include;



Threatened plant, shrubby tororaro (*Muehlenbeckia astonii*) has adapted to survive on harsh, dry coastal and lowland sites.

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.
- > The best time to plant wetland margins and the flood zone behind, is summer 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 won't 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.
- > Pre-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

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.

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

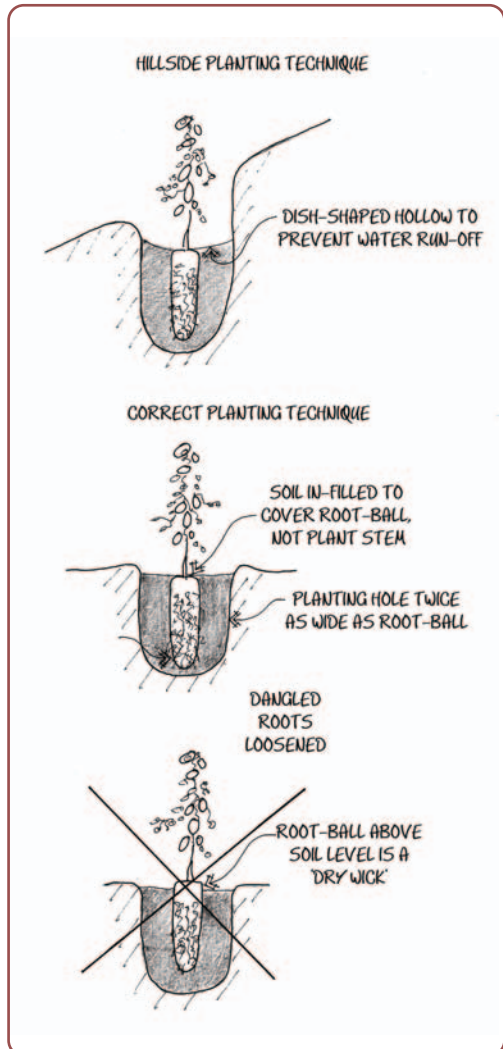
These plant stocks are in plastic bags or pots that come in a range of sizes. They can be seedling plants or older. They generally require some root pruning to remove twisted or entangled roots prior to planting. It is important to select plants that have not outgrown the bag or pot i.e. they have a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

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 ends of the flax fronds can be cut back one half to two thirds of their length 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.
- > Don't 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 to new plants. These 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 groundcover 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

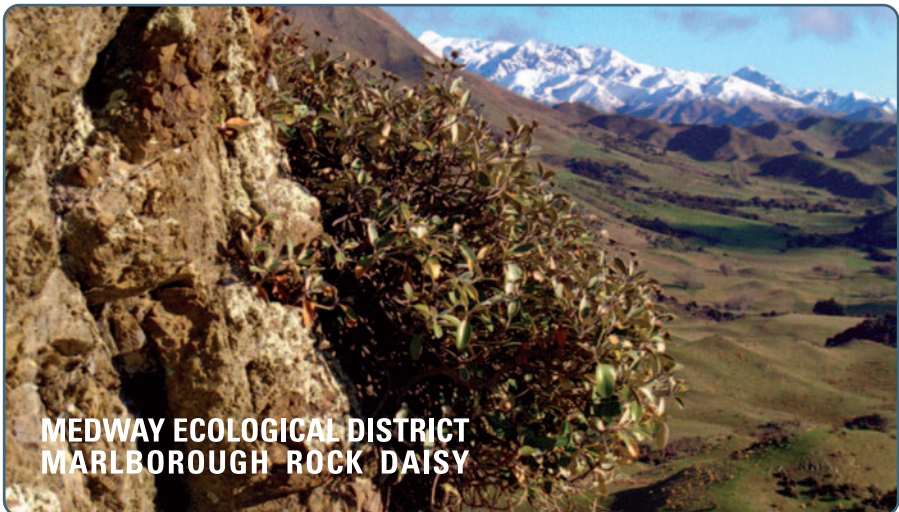
For example, if you had a 17m x 7m area you wanted to plant out at 1.5 metre spacings, then:

$$\begin{aligned} &(17/1.5 + 1) \times (7/1.5 + 1) = \\ &(11.33 + 1) \times (4.66 + 1), \text{ now round decimals downwards, } = \\ &(12 + 1) \times (5 + 1) = 12 \times 6 = 72 \text{ plants required.}^* \end{aligned}$$

*Note, that because 1.5m doesn't 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, i.e. $(12+1) \times (5+1) = 13 \times 6 = 78$ 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.
- > Don't use weedeaters around young plants without hand-clearing the grass first. Ring-barking is one of the most common causes of plant mortality.
- > Don't 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 doesn't and make changes as necessary.



**MEDWAY ECOLOGICAL DISTRICT
MARLBOROUGH ROCK DAISY**

IV USING THIS GUIDE

South Marlborough boasts hundreds of indigenous plant species, so selecting those to include in this Guide was no easy task. To ensure maximum success for planting projects, the lists were narrowed down to 127 plants that are widely-known, should be available from local nurseries (especially those specialising in natives) and - if well planted and cared for – can be grown successfully.

Many other species are, however suitable for native restoration projects. For those tackling large-scale projects, interested in propagating or ecosourcing their own plant material or especially enthusiastic about the flora of South Marlborough, comprehensive lists of species suitable for South Marlborough revegetation below 500 metres (on which this Guide was based) are available from the Department of Conservation office in Renwick.

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 priorities (such as mature height, attractiveness to birds and rarity).

THE PLANT LISTS

Plants are listed under three types of area; inland and lowland South Marlborough, coastal South Marlborough and freshwater wetlands. There is also a list of threatened plants.

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 insects.

Also indicated is the ecological district where each plant would have naturally occurred and could therefore be planted (numbers 1-8, see map on page 33). Ideally, propagation material would be sourced from wild plants within that ecological district, but unfortunately this will not always be possible due to localised extinction.

In that case, two broader zones for ecosourcing plant material are suggested. Inland Zone A includes the Waihopai and Medway (ecological districts 2 and 3), and Lowland Zone B includes Hillersden, Flaxbourne, Wither Hills, Blenheim, Grassmere and Kekerengu (ecological districts 1,4,5,6,7 and 8).

Inland and Lowland South Marlborough

This list covers all of South Marlborough, with the exception of coastal and wetland sites. Micro-site information including frost tolerance, sunlight preference, and moisture preference will help identify which species are most suitable for your planting.

Coastal South Marlborough

The coastal list provides information on the type of coastal environment plants will be suitable for, including fore dune, upper beach, shrublands, coastal margin/forest and bluffs. The plants listed have been especially selected for their ability to survive salty conditions.

South Marlborough freshwater wetlands

Careful planning and design helps create a successful wetland, and professional advice is recommended. Resource consent will be required for damming or diverting water.

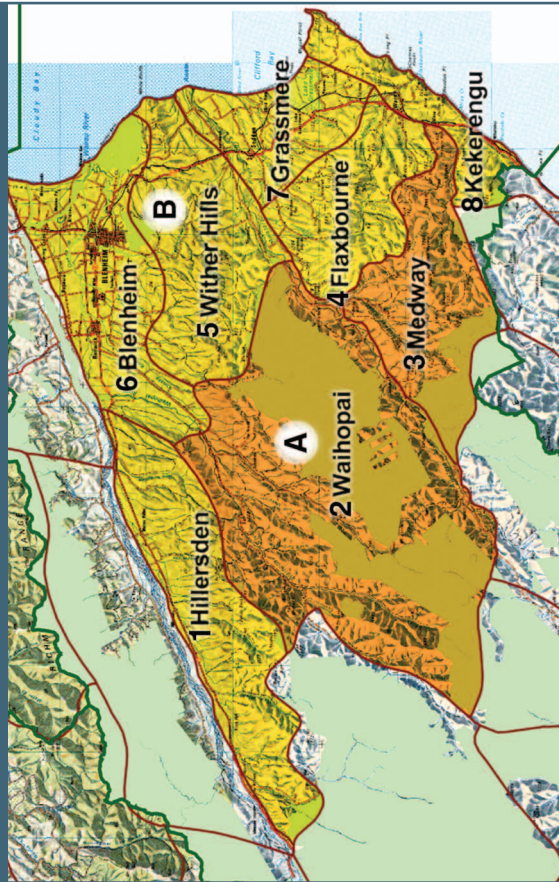
The wetland list is arranged according to species' preferred proximity to water. Beyond the wet fringe margins, the higher ground can be used as a buffer zone. Species suitable for creating the buffer zone can be chosen from those on the general planting list that show a preference for a moist growing site.

Threatened plants

South Marlborough is home to several of New Zealand's threatened species. Of particular note are those endemic only to South Marlborough such as the flowering tree brooms, *Carmichaelia stevensonii*, *C. muritai*, *C. carmichaeliae* and *C. glabrescens* (the only one currently not threatened). Many of these are very specific in where they occur, for example, in the wild, *C. carmichaeliae* only occurs north of the Awatere Fault, and *C. glabrescens* only south of the Awatere Fault. In restoration it is important to recognise these geographic areas. Extra care needs to be taken when collecting material and it is advisable to first approach DOC.

The threatened plants included in this Guide were selected as being commercially available and relatively easy to grow. For a comprehensive list, refer to "Threatened Plants of South Marlborough; a Field Guide" by Cathy Jones and Ingrid Hutzler, available from DOC, South Marlborough.

SOUTH MARLBROUGH ECOLOGICAL DISTRICTS AND ECOSOURCING ZONES



South Marlborough Ecological District Boundaries

- | | | | |
|----------------|----------------|-------------|--------------|
| 1 Hillersden | 2 Waihopai | 3 Medway | 4 Flaxbourne |
| 5 Wither Hills | 6 Blenheim | 7 Grassmere | 8 Kekerengu |
| Inland Zone A | Lowland Zone B | | |

KEY TO CHARTS ON FOLLOWING PAGES

- Prefers maximum sunlight
- ◐ Prefers filtered sunlight
- Prefers total shade
- ⊖ Will grow in sun or shade
- * Frost tender
- ** Very frost tender
- Fr Fruit
- Fl Flowers
- H Honeydew
- L Leaves
- N Nectar
- △ Dry site
- ▲ Moist/moderate site
- ◆ Wet/poor drainage site
- # Threatened plant list

INLAND & LOWLAND SOUTH MARLBOROUGH

TREES 5-20m+

	COMMON NAME	FROST TENDERNESS	SUNLIGHT PREFERENCES	MOISTURE PREFERENCES	BIRD FOOD	ZONE A: INLAND ECOLOGICAL DISTRICTS	ZONE B: LOWLAND ECOLOGICAL DISTRICTS	COMMENTS
<i>Alectryon excelsus</i>	Titoki	**	☉	☉	Fr	3	4,5,6,7,8	Sheltered moist site
<i>Aristotelia serrata</i>	Makomako, wineberry	*	☉	☉	Fr	2,3	1,4,5,6,7,8	
<i>Carpodetus serratus</i>	Putaputaweta, marbleleaf		☉	☉	Fr	2,3	1,4,5,6,7,8	
<i>Cordyline australis</i>	Cabbage tree		☉	☉☉	Fr, Fr	2,3	1,4,5,6,7,8,9	
<i>Cyathea dealbata</i>	Ponga, silver fern	*	☉	☉		2,3	1,4,5,6,7,8	Sheltered moist site
<i>Cyathea smithii</i>	Soft tree fern	**	☉	☉		2	1,5,6,7,8	Sheltered moist site
<i>Dacrycarpus dacrydioides</i>	Kahikatea		☉	☉☉			1,4,6,7,8	
<i>Dacrydium cupressinum</i>	Rimu		☉	☉	Fr		6,8	Cool root run, shelter when young
<i>Griselinia littoralis</i>	Broadleaf		☉	☉☉	Fr	2,3	1,4,5,6,7,8	Free draining soil
<i>Hoheria angustifolia</i>	Narrow-leaved lacebark		☉	☉☉	Fr, L	2,3	1,4,5,6,7,8	
<i>Kunzea ericoides</i>	Kanuka		☉	☉☉	N	2,3	1,4,5,6,7,8	Free draining soil
<i>Laurelia novae-zelandiae</i>	Pukatea	*	☉	☉☉	N	2,3	6,8	Cool root run, shelter when young
<i>Leptospermum scoparium</i>	Manuka	*	☉	☉☉	N	2,3	1,4,5,6,7,8	
<i>Meliclytus ramiflorus</i>	Mahoe	*	☉	☉	Fr	2,3	1,4,5,6,7,8	
<i>Metrosideros umbellata</i>	Southern rata	*	☉	☉	N		6,8	
<i>Myoporum laetum</i>	Ngaio	**	☉	☉☉	Fr		1,4,5,6,7,8	
<i>Myrsine australis</i>	Mapou, red matipo		☉	☉☉	Fr	2,3	1,4,5,6,7,8	

<i>Nothofagus fusca</i>	Red beech	☉	Fr,H	2	1,5,6,8	Cool root run, prefers shelter
<i>Nothofagus solandri</i>	Black beech	☉	Fr,H	2,3	1,4,5,6,7,8	Cool root run, prefers shelter
<i>Olearia paniculata</i>	Akiraho	☉	Fr	2,3	1,4,5,6,7,8	Free draining soil
<i>Pennantia corymbosa</i>	Kaikomako	☉	Fr	2,3	1,4,5,6,7,8	
<i>Pittosporum eugenioides</i>	Lemonwood	☉	Fr	2,3	1,4,5,6,7,8	
<i>Pittosporum tenuifolium</i>	Kohuhu, black matipo	☉	Fr	2,3	1,4,5,6,7,8	
<i>Plagianthus regius</i>	Lowland ribbonwood	☉	Fr	2,3	1,4,5,6,7,8	
<i>Podocarpus hallii</i>	Halls totara*	☉	Fr	2,3	1,4,5,6,8	*Montane/inland-upland
<i>Podocarpus totara</i>	Totara	☉	Fr	2,3	1,4,5,6,7,8	Lowland
<i>Prumnopitys ferruginea</i>	Miro	☉	Fr	2,3	6,7,8	Prefers shelter
<i>Prumnopitys taxifolia</i>	Matai	☉	Fr	2,3	1,4,5,6,7,8	Prefers shelter
<i>Pseudopanax arboreus</i>	Five finger	☉	Fr	2,3	1,4,5,6,7,8	
<i>Pseudopanax crassifolius</i>	Lancewood	☉	Fr	2,3	1,4,5,6,7,8	
<i>Sophora microphylla</i>	Kowhai	☉	NL	2,3	1,4,5,6,7,8	
SMALL TREES 2-5m						
<i>Aristotelia fruticosa</i>		☉	Fr	2,3	1,7,8	
<i>Carmichaelia carmichaeliae</i> #	Pink tree broom (north)	☉	Fr	2	5,6	Free draining soil
<i>Carmichaelia glabrescens</i>	Pink tree broom (south)	☉	Fr	3	4,7,8	Free draining soil
<i>Carmichaelia stevensonii</i> #	Weeping tree broom	☉	Fr	2	8	Free draining soil
<i>Coprosma crassifolia</i>		☉	Fr	2,3	1,4,5,6,7,8	Free draining soil
<i>Coprosma lucida</i>	Shining karamu	☉	Fr	2,3	1,4,5,6,7,8	Likes shade to establish
<i>Coprosma propinqua</i>		☉	Fr	2,3	1,4,5,6,7,8	Free draining soil
<i>Coprosma rhamnoides</i>		☉	Fr	2,3	1,4,5,6,7,8	Free draining soil
<i>Coprosma robusta</i>	Karamu	☉	Fr	2,3	1,4,5,6,7,8	
<i>Coprosma virescens</i>		☉	Fr	2,3	8	
<i>Dicksonia squarrosa</i>	Wheki	☉	Fr	2,3	1,4,5,6,7,8	Sheltered moist site
<i>Discaria toumatou</i>	Matagouri	☉	N,Fr	2,3	1,4,5,6,7	Free draining soil
<i>Dodonaea viscosa</i>	Akeake	☉	Fr	2,3	4,5,6,7,8	Frost tender when young
<i>Fuchsia excorticata</i>	Fuchsia	**	N,Fr,L	2,3	1,4,5,7	Likes shelter to establish
<i>Hebe parviflora</i>	Tree hebe	☉	Fr	2,3	4,5,6,7	

INLAND & LOWLAND SOUTH MARLBOROUGH	COMMON NAME						FROST TENDERNESS		SUNLIGHT PREFERENCES		MOISTURE PREFERENCES		BIRD FOOD		ZONE A; INLAND ECOLOGICAL DISTRICTS		ZONE B; LOWLAND ECOLOGICAL DISTRICTS		COMMENTS
SMALL TREES 2-5m CONT.	<i>Lophomyrtus obcordata</i>						*	⊖	○	☹	Fr	2,3							
	<i>Melicope simplex</i>						*	⊖	○	☹	Fr	2,3							
	<i>Myrsine divaricata</i>							⊖	○	☹		2							Free draining soil
	<i>Olearia avicenniifolia</i>							○	○	☹									Free draining soil
	<i>Olearia solandri</i>							⊖	○	☹	Fr	2,3							Free draining soil
	<i>Pseudopanax ferox</i> #							⊖	○	☹	Fr	3							Free draining soil
	<i>Solanum aviculare</i>							⊖	○	☹									Free draining soil
SHRUBS 1-2m	<i>Brachyglottis monroi</i>							○	○	☹		2,3							Free draining soil
	<i>Brachyglottis repanda</i>							○	○	☹									Free draining soil
	<i>Coprosma acerosa</i>							○	○	☹	Fr	2,3							Free draining soil
	<i>Corokia cotoneaster</i>							○	○	☹	Fr	2,3							Free draining soil
	<i>Cortaderia richardii</i>							○	○	☹									Free draining soil
	<i>Cyatodes juniperina</i>							○	○	☹	Fr	2,3							Free draining soil
	<i>Fuchsia perscandens</i>							●	○	☹									Sheltered moist site

<i>Hebe salicifolia</i>	Koromiko	*	○	△	2,3	1,6,7,8	Free draining soil
<i>Hebe stricta</i>	Koromiko	*	○	△	3	4,5,7	Sheltered moist site
<i>Heliohebe hulkeana</i> ssp <i>hulkeana</i>	New Zealand lilac	**	○	△	2,3	4,5,6,7,8	Free draining soil
<i>Macropiper excelsum</i>	Kawakawa	**	●	Fr		6,8	
<i>Melicactus "Waipapa" #</i>	Porcupine shrub		○	Fr	2,3	1,4,5,6,7,8	
<i>Muehlenbeckia astonii</i> #	Shrubby tororaro		○	Fr	2,3	1,4,5,6,7,8	
<i>Ozothamnus leptophyllus</i>	Tauhinu		○	△	2,3	4,5,6,7,8	
<i>Pachystegia insignis</i>	Marlb. rock daisy		○	△	2,3	4,5,8	
<i>Sophora prostrata</i>	Prostrate kowhai		○	△	2,3	1,4,5,8	
<i>Teucrium parvifolium</i> #			●	△			
GROUND COVERS							
<i>Astelia fragrans</i>	Bush lily	*	⊖	△	2,3	1,4,5,6,7,8	
<i>Blechnum novae-zelandiae</i>	Kiokio		⊖	△		6,8	
<i>Carex comans</i>	Sedge		⊖	△	2,3	6	
<i>Carex dipsacea</i>	Sedge		○	△	2,3	1,4,5,6,7,8	
<i>Carex dissita</i>	Sedge		⊖	△		1,6,8	
<i>Carex flagellifera</i>	Sedge		○	△	2,3	1,4,5,6,7	
<i>Carex testacea</i>	Sedge		○	△	2,3	1,4,5,6,7	
<i>Chionochoa flavescens</i>	Snow tussock		○	△		8	
<i>Dianella nigra</i>	Blueberry		⊖	△	2	1,6,7,8	Free draining soil
<i>Libertia ixioides</i>	Native iris		○	△	2,3	1,4,5,6,7,8	
<i>Phormium cookianum</i>	Wharariki		○	△	2,3	1,4,5,6,7,8	Open rocky site
<i>Phormium tenax</i>	Harakeke		○	△	2,3	1,4,5,6,7,8	
<i>Poa cita</i>	Silver tussock		○	△	2,3	1,4,5,6,7	Open rocky site
<i>Uncinia uncinata</i>	Hookgrass		●	△	2,3	1,4,5,6	
VINES							
<i>Clematis afoliata</i>	Leafless clematis		○	△		1,4,6	Forest species, hard to grow
<i>Clematis paniculata</i>	Clematis		●	△	2	1,6	Shaded roots, top sun
<i>Muehlenbeckia complexa</i>	Pohuehue, wiggly wig		○	△	2,3	1,4,5,6,7,8	Open rocky site

<i>Carmichaelia australis</i>	Common broom	★	★	5,6,7,8	Groundcover
<i>Coprosma acerosa</i>	Sand coprosma	★	★	5,7,8	
<i>Coprosma propinqua</i>	Mingimingi	★	★	5,6,7,8	
<i>Discaria toumatou</i>	Matagouri , wild Irishman	★		8	
<i>Heliohebe hulkeana</i>	NZ lilac		★	8	Shade to establish
<i>Macropiper excelsum</i>	Kawakawa		★	5,6,7,8	
<i>Meliclytus "waipapa" #</i>	Porcupine shrub	★	★	5,6,7,8	
<i>Muehlenbeckia astonii #</i>	Shrubby tororaro	★	★	6,7,8	Vine
<i>Muehlenbeckia complexa</i>	Tauhinu	★	★	5,6,7,8	
<i>Ozothamnus leptophyllus</i>	Marlborough rock daisy		★	8	
<i>Pachystegia insignis</i>	Native daphne	★		6,7	Groundcover
<i>Pimelea prostrata</i>	Saltmarsh ribbonwood	★		5,6,7,8	
<i>Plagianthus divaricatus</i>	Coastal cushion daisy	★		6,7,8	Groundcover
<i>Raoulia "hookeri coast"</i>	Prostrate kowhai	★	★	5,6,7,8	
<i>Sophora prostrata</i>					
GRASSES/SEDGES/FLAX					
<i>Anemanthele lessoniana #</i>	Gossamer grass	★	★	9	No persistent salt winds
<i>Austrofestuca littoralis #</i>	Sand tussock	★	★	5,6,7,8	
<i>Bolboschoenus caldwellii</i>	Sedge		★	5,6,7,8	Estuary wetland plantings
<i>Carex flagellifera</i>	Toetoe		★	5,6,7,8	
<i>Cortaderia richardii</i>	Umbrella sedge			5,6,7,8	Estuary wetland plantings
<i>Cyperus ustulatus</i>	Pingao	★	★	5,6,7,8	
<i>Desmoschoenus spiralis #</i>	Shore spurge	★	★	5,6,7,8	Estuary wetland plantings
<i>Euphorbia glauca #</i>	Sea rush	★		7	Estuary wetland plantings
<i>Juncus maritimus</i>	Wharariki, flax		★	5,6,7,8	
<i>Phormium cookianum</i>	Harakeke, flax	★	★	5,6,7,8	
<i>Phormium tenax</i>	Silver tussock		★	5,6,7,8	
<i>Poa cita</i>	Spinifex			5,6,7,8	
<i>Spinifex sericeus</i>					

FRESHWATER WETLANDS

COMMON NAME	ENVIRONMENT					COMMENTS
	DEEP WATER > 50cm	SHALLOW WATER 10-50cm	WET WATER MARGINS < 10cm	WET FIRMER MARGINS	ZONE A: INLAND ECOLOGICAL DISTRICTS	
<i>Baumea rubiginosa</i>			★	★	2,3	1,6
<i>Blechnum minus</i>			★	★	2,3	1,4,5,6,7,8
<i>Bolboschoenus caldwelii</i>				★	2,3	1,6,8
<i>Carex buchananii</i>				★	2,3	1,4,5,6,7,8
<i>Carex dipsacea</i>				★	2,3	1,4,5,6,7,8
<i>Carex maorica</i>				★	2,3	1,4,5,6,7,8
<i>Carex secta</i>			★	★	2,3	1,4,5,6,7,8
<i>Carex virgata</i>				★	2,3	1,4,5,6,7,8
<i>Coprosma propinqua</i>				★	2,3	1,4,5,6,7,8
<i>Cordyline australis</i>				★	2,3	1,4,5,6,7,8
<i>Cortaderia richardii</i>				★	2,3	1,4,5,6,7,8
<i>Cyperus ustulatus</i>				★	2,3	4,5,6,7,8
<i>Dacrycarpus dacrydioides</i>				★	2,3	1,4,5,6,7,8
<i>Eleocharis acuta</i>				★	2,3	6,7,8
<i>Juncus greigiflorus</i>				★	2,3	1,4,5,6,7,8
<i>Juncus pallidus</i>				★	2,3	1,4,5,6,7,8
<i>Leptospermum scoparium</i>				★	2,3	1,4,5,6,7,8
<i>Schoenoplectus validus</i>	★	★		★	2,3	4,5,6,7,8
<i>Phormium tenax</i>				★	2,3	1,4,5,6,7,8

THREATENED PLANT LIST

BOTANICAL NAME	COMMON NAME	THREATENED STATUS
<i>Anemathele lessoniana</i>	Gossamer grass	Sparse
<i>Austrofestuca littoralis</i>	Sand tussock	Gradual decline
<i>Carmichaelia carmichaeliae</i>	Pink broom	Nationally vulnerable
<i>Carmichaelia muratai</i>	Coastal tree broom	Nationally critical
<i>Carmichaelia stevensonii</i>	Weeping tree broom	Gradual decline
<i>Desmoschoenus spiralis</i>	Pingao	Gradual decline
<i>Euphorbia glauca</i>	Shore spurge	Serious decline
<i>Meliccytus "Vaipapa"</i>	Porcupine shrub	Gradual decline
<i>Muehlenbeckia astonii</i>	Shrubby tororaro	Nationally vulnerable
<i>Pseudopanax ferrox</i>	Fierce lancewood	Sparse
<i>Teucriidium parvifolium</i>		Gradual decline

V APPENDICES

BIBLIOGRAPHY

- “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.
- “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.
- “South Marlborough Biodiversity Overview”, Geoff Walls and Philip Simpson, Marlborough District Council technical report, 2004.
- “Wairau Ecological Region; Blenheim, Grassmere, Flaxbourne, Wither Hills and Hillersden Ecological Districts. Survey report for the Protected Natural Areas Programme”, Michael North, Department of Conservation, Nelson/Marlborough Conservancy, June 2004.

WHERE TO FIND OUT MORE

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

“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”, Yvonene 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; South Marlborough Area Office, 03 572 9100

Queen Elizabeth II National Trust; contact Nelson/Marlborough field officer, Philip Lissaman, 03 540 3442, plissaman@xtra.co.nz, www.nationaltrust.org.nz

Marlborough District Council; 03 578 5249

Marlborough Environment Centre; contact Hazel Kirkham, 03 573 6994, hazelkirkham@xtra.co.nz

Marlborough Farm Forestry Association; contact Bill Peter, 03 578 8412

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, www.tanestrees.org.nz, contact Ian Barton 09 292 4825

POTENTIAL FUNDING SOURCES FOR CONSERVATION PROJECTS

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

Landcare Research New Zealand; Emissions/Biodiversity Exchange project (EBEX21) operated by to raise awareness of economic opportunities emerging from the Kyoto Protocol and National Biodiversity Strategy through the restoration of indigenous forest on pastoral land and the consequential sequestration of carbon. www.ebex21.co.nz

Marlborough District Council; Natural areas Protection Fund. Contact Nicky Eade, 03 578 5249, nea@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.

New Zealand Landcare Trust; offers the Transpower Landcare Trust Grants programme which supports environmental projects being carried out by community groups on private rural land. Contact Barbara Stuart, 03 545 0443, barbara.stuart@landcare.org.nz, www.landcare.org.nz

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.

Queen Elizabeth II National Trust; contact Nelson/Marlborough field officer, Philip Lissaman, 03 540 3442, plissaman@xtra.co.nz, www.nationaltrust.org.nz

BIODIVERSITY INITIATIVES IN MARLBOROUGH

Rarangi Landcare Group; contact Trudie and Barry Lasham 570 5073 or John and Betty Petterson 579 5178.

Grovetown Lagoon Restoration Project; contact Lynda Neame, Marlborough District Council.

Koromiko Deer Park Restoration Project, contact Robin Dunn, Marlborough District Council.

Opaua Forest Reserve; Marlborough Forest and Bird. The forest – on the flood plain below the Opawa/Taylor River confluence - includes kahikatea planted in the 1940's and three hectares of recent (last 10 years) plantings. Contact Mike Harvey, 03 577 6086, opaua@xtra.co.nz

Marlborough Rural Environment Awards; contact Nicky Eade or Ian Shapcott, Marlborough District Council.

South Marlborough boasts a richly diverse native flora, reflecting a landscape shaped by climatic and geological extremes.

Whether you are planning an indigenous shelter belt for your vineyard or the protection of a large area of native bush on your farm, it is hoped that this Guide will provide practical advice and support.



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National Trust
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Department of Conservation
Te Papa Atahua



MARLBOROUGH
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