Christchurch City
& Lowland Canterbury

Streamside Planting

CHRISTCHURCH
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Plant Selection Guide

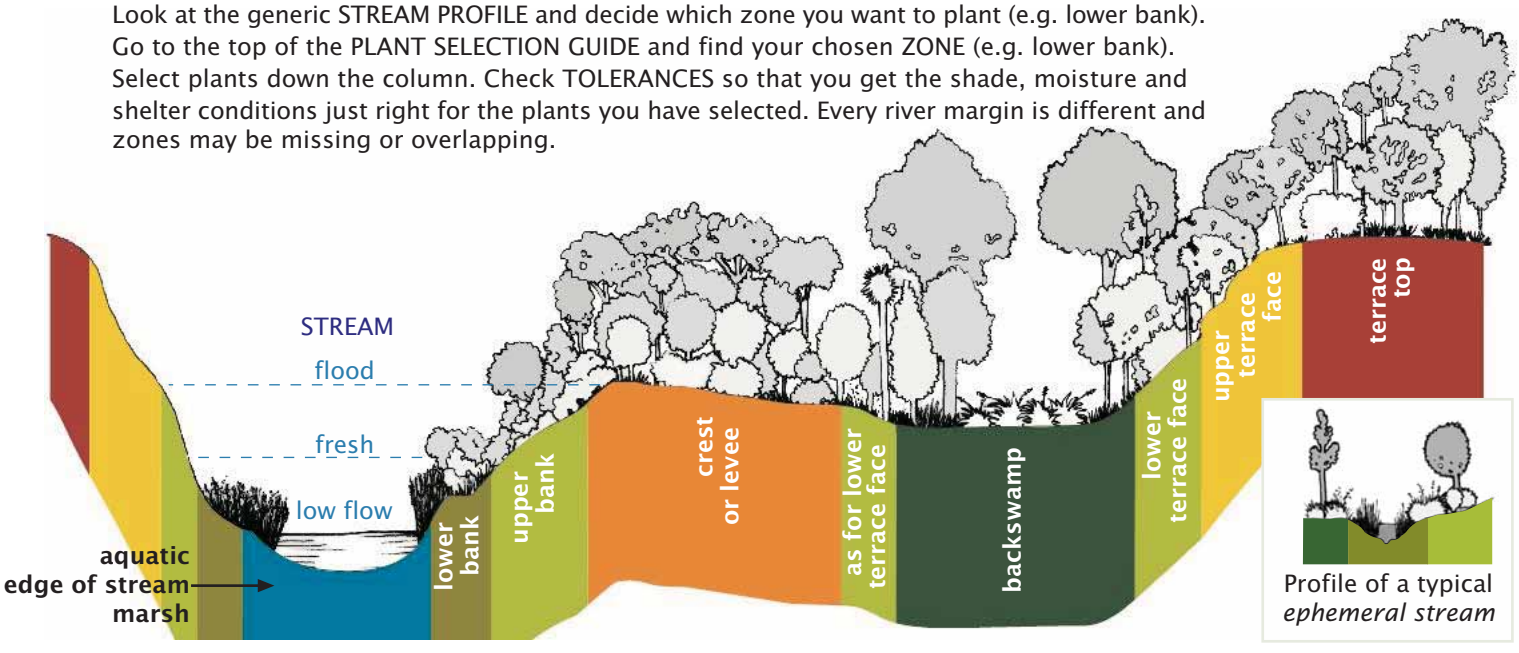
Key
to Plant Tolerances
● very well suited
◗ tolerant of some
❍ not suited

Sedges, Rushes, Ferns and Ground Covers

		Tolerances							Zones						
		frost	sun	shade	wet	dry	wind	grazing (once established)	Aquatic / Edge of stream / Marsh	lower bank	upper bank	crest or levee	backswamp	lower terrace face	upper terrace face	terrace top (if moist)
pondweed	*Myriophyllum propinquum/triphyllum*	●	●	◗	●	❍	❍	●	A							
pondweed	*Potamogeton cheesemanii/ochreatus*	●	●	◗	●	❍	❍	●	A							
raupo	*Typha orientalis* (invades open water)	●	●	❍	●	❍	●	●	A E				■			
kapungawha, lake club rush	*Schoenoplectus validus/tabernaemontani*	●	●	❍	●	❍	●	●	A E							
spike sedge	*Eleocharis acuta*	●	●	◗	●	❍	●	●	A E M				■			
pukio, tussock sedge	*Carex secta/virgata*	●	●	◗	●	❍	●	◗	E M	■			■			
makura	*Carex maorica/geminata*	●	●	◗	●	❍	●	●	E M	■			■			
bog rush	*Schoenus pauciflorus*	●	●	❍	●	❍	●	●	E M							
swamp kiokio	*Blechnum minus*	◗	◗	●	●	❍	◗	●	E M	■			■			
swamp nettle	*Urtica linearifolia*	◗	●	◗	●	❍	❍	●	E	■			■			
puniu, prickly shield fern	*Polystichum vestitum*	◗	◗	●	●	◗	◗	◗	E M	■	■		■	■		
harakeke, NZ flax	*Phormium tenax*	●	●	❍	●	◗	●	●	E M	■	■		■	■	■	
tussock rushes, wiwi	*Juncus gregiflorus/pallidus/sarophorus*	●	●	❍	●	◗	●	●	E M	■			■			
umbrella sedge, upoko-tangata	*Cyperus ustulatus*	●	●	❍	●	◗	●	◗	E	■			■			
gully fern, pakauroharoha	*Pneumatopteris pennigera*	❍	❍	●	◗	●	◗	◗		■	■					
nini	*Blechnum chambersii*	❍	❍	●	◗	❍	❍	●	E							
kiwakiwa	*Blechnum fluviatile*	❍	❍	●	◗	❍	❍	◗	E							
hen & chickens fern	*Asplenium bulbiferum*	❍	❍	●	◗	❍	❍	❍			■			■		
mata, water-fern	*Histiopteris incisa*	❍	❍	●	◗	❍	❍	●		■			■			
rough pigfern	*Hypolepis ambigua*	◗	◗	●	●	◗	◗	●		■	■			■		
toetoe grass, toetoe	*Cortaderia richardii*	●	●	❍	◗	●	●	◗		■	■	■	■	■		
kakaha, bush lily	*Astelia fragrans*	◗	◗	●	◗	◗	◗	❍		■	■			■		
pikopiko	*Polystichum richardii*	◗	◗	●	◗	◗	❍	◗			■	■		■	■	■
ink berry, turutu	*Dianella nigra*	◗	●	●	◗	◗	●	❍			■	■		■	■	■
wind grass, bamboo grass	*Anemanthele lessoniana*	◗	◗	●	◗	◗	●	◗			■	■		■	■	■
hounds tongue fern	*Microsorum pustulatus*	❍	◗	●	◗	◗	◗	❍			■	■		■	■	■
tarawera, button fern	*Pellaea rotundifolia*	❍	◗	●	◗	●	❍	❍			■	■		■	■	■
NZ iris, mikoikoi	*Libertia ixioides*	●	●	●	❍	●	●	●			■	■		■	■	■

Stream Profiles - *diagram*

Look at the generic STREAM PROFILE and decide which zone you want to plant (e.g. lower bank). Go to the top of the PLANT SELECTION GUIDE and find your chosen ZONE (e.g. lower bank). Select plants down the column. Check TOLERANCES so that you get the shade, moisture and shelter conditions just right for the plants you have selected. Every river margin is different and zones may be missing or overlapping.



Profile of a typical *ephemeral stream*

Shrubs and Trees

		Tolerances							Zones						
		frost	sun	shade	wet	dry	wind	grazing (once established)	lower bank	upper bank	crest or levee	backswamp	lower terrace face	upper terrace face	terrace top (if moist)
mikimiki (shrub)	*Coprosma propinqua*	●	●	◗	●	●	●	●	■	■	■	■	■	■	■
cabbage tree, ti kouka	*Cordyline australis*	●	●	◗	●	●	●	◗	■	■	■	■	■	■	■
mikimiki (shrub)	*Coprosma pedicellata*	●	●	◗	●	◗	●	●	■	■		■			
manuka, tea tree	*Leptospermum scoparium*	●	●	❍	●	●	●	●	■	■	■	■	■		■
kahikatea, white pine	*Dacrycarpus dacrydioides*	◗	●	◗	●	❍	◗	●		■		■	■		
pokaka	*Elaeocarpus hookerianus*	●	●	●	●	❍	●	●		■		■	■		
karamu	*Coprosma robusta*	◗	●	●	●	●	●	❍		■	■	■	■	■	■
mikimiki (shrub)	*Coprosma* aff. *parviflora* (sp.t)	●	●	❍	●	◗	●	●	■	■	■	■	■	■	■
kohuhu, black matipo, tawhari	*Pittosporum tenuifolium*	●	●	◗	●	●	●	◗		■	■	■	■	■	■
weeping mapou (shrub)	*Myrsine divaricata*	●	●	◗	●	◗	●	●	■	■	■	■	■		
turepo, milk tree	*Streblus heterophyllus*	❍	●	●	●	❍	❍	◗		■		■	■		
shrubby panax (shrub)	*Pseudopanax anomalus*	◗	◗	●	◗	❍	◗	◗		■		■	■		
horopito, peppertree (shrub)	*Pseudowintera colorata*	◗	●	●	●	❍	◗	●		■		■	■		
kaikomako	*Pennantia corymbosa*	◗	●	◗	●	◗	◗	●		■	■	■	■	■	■
putaputaweta, marbleleaf	*Carpodetus serratus*	❍	●	●	◗	❍	❍	●		■	■		■		
pigeonwood (protect from frost)	*Hedycarya arborea*	❍	●	◗	◗	◗	❍	❍		■	■		■		
hinau	*Elaeocarpus dentatus*	❍	●	◗	◗	◗	❍	❍			■	■	■	■	■
veined mikimiki	*Coprosma areolata*	❍	◗	●	◗	❍	❍	❍		■		■	■	■	
round-leaved coprosma	*Coprosma rotundifolia*	❍	◗	●	◗	❍	❍	❍		■		■	■	■	
kotukutuku, tree fuchsia (deciduous)	*Fuchsia excorticata*	❍	◗	●	◗	❍	❍	❍		■	■		■		
poataniwha (shrub)	*Melicope simplex*	◗	●	●	◗	◗	●	◗		■	■		■	■	■
rohutu, NZ myrtle	*Lophomyrtus obcordata*	◗	●	◗	◗	◗	●	●		■	■		■	■	■
wheki, hard treefern (protect from frost)	*Dicksonia squarrosa*	◗	◗	●	◗	❍	❍	◗		■			■		
silver fern (protect from frost)	*Cyathea dealbata*	❍	◗	●	◗	❍	❍	●					■		
matai, black pine	*Prumnopitys taxifolia*	●	●	◗	●	◗	●	●		■		■	■	■	■
kapuka, broadleaf	*Griselinia littoralis*	◗	●	●	◗	●	●	❍		■	■		■	■	■
mapou, red mapou	*Myrsine australis*	❍	●	●	◗	◗	●	◗		■	■		■	■	■
lancewood, horoeka	*Pseudopanax crassifolius*	◗	●	●	◗	◗	●	❍		■	■		■	■	■
shining karamu	*Coprosma lucida*	❍	●	●	◗	◗	●	❍		■	■		■	■	■
titoki (protect from frost)	*Alectryon excelsum*	❍	●	●	◗	◗	❍	❍		■	■		■	■	
yellow wood	*Coprosma linariifolia*	◗	◗	●	◗	◗	❍	❍		■	■		■	■	■
makomako, wineberry (deciduous)	*Aristotelia serrata*	❍	●	◗	◗	❍	❍	❍		■	■		■	■	■
houhere, narrow-leaved lacebark	*Hoheria angustifolia*	●	●	◗	◗	●	●	◗		■	■		■	■	■
manatu, lowland ribbonwood (deciduous)	*Plagianthus regius*	●	●	◗	●	◗	●	◗		■	■	■	■	■	■
mahoe (protect from frost)	*Melicytus ramiflorus*	❍	●	●	◗	◗	❍	❍		■	■		■	■	■
red mikimiki	*Coprosma rubra*	◗	●	◗	◗	◗	◗	◗		■	■		■	■	■
koromiko (shrub)	*Hebe salicifolia*	◗	●	◗	◗	◗	◗	❍		■	■		■	■	■
totara	*Podocarpus totara*	●	●	◗	◗	●	●	●		■	■		■	■	■
five finger, whauwhaupaku	*Pseudopanax arboreus*	❍	●	●	◗	◗	◗	❍		■	■		■	■	■
green mikimiki (shrub)	*Coprosma virescens*	●	●	◗	◗	●	●	●		■	■		■	■	■
golden akeake, akiraho	*Olearia paniculata*	●	●	❍	❍	●	●	●			■			■	■
South Island kowhai (deciduous)	*Sophora microphylla*	●	●	❍	◗	●	●	❍		■	■		■	■	■
akeake (protect from frost)	*Dodonaea viscosa*	◗	●	◗	❍	●	●	●			■			■	■
kanuka	*Kunzea ericoides*	●	●	❍	❍	●	●	●		■	■		■	■	■
thick-leaved mikimiki	*Coprosma crassifolia*	●	●	◗	❍	●	●	●			■			■	■

Ten Steps to Planting and

1. Get to know your stream, and start to design a plan

- Observe your stream over different seasons, and see what opportunities there are for improvement. Consider if existing retaining walls or structures can be removed and banks re-graded.
- Characterise the stretch of riverbank by referring to the stream waterway profiles in this brochure.
- Check flood risk (refer to your local council if unsure) and avoid obstructing water flow with structures or large trees.
- Organise resources, including labour, for site preparation and planting.

2. Seek advice on resource consents and your design

- It is your responsibility to ensure that any work complies with local body regulations. Your local Council will be able to advise what legislation applies to your site.
- A Resource Consent will be required if you are filling, building, or excavating within a defined "setback" area alongside a waterway. You may also be required to submit a planting plan to your local council for approval.
- Disturbance to the bed of a river also requires Resource Consent.
- If required, a landscape architect will be able to assist with the design aspects of the site.
- Ensure that everyone who will be affected by any changes knows what will happen and has a chance to have their input.

3. Prepare a planting plan

- Identify the different vegetation zones for your stream area as illustrated in the diagrams and photos overleaf. Consider slope, distance from stream, how damp the area is, overhead cover, how your stream flows throughout the year, and size of stream.
- Compile a list of plant species for each zone identified along the stream bank according to their tolerances.
- Space plants according to the zone they belong in, and the size they grow to. You will need approximately one plant per square metre although rushes, small sedges and ferns can be planted up to three per square metre. Those plants that will develop into large trees, such as totara, matai, kahikatea, or pokaka, should be spaced at least five metres apart from others of the same kind.
- Tussocks and reeds may be placed near the edge of the water with shrubs and small trees located on the bank above these.
- The rush *Juncus pallidus* is better suited to wider or brackish waterways.
- On higher terraces and banks plant larger trees. Plant rarer species, such as kaikomako, turepo or poataniwha, in groups to ensure cross-pollination.

Key Factors

in any restoration programme are:

- *preparation*
- *matching plants to place*
- *on-going maintenance*

The native aquatic plant Potamogeton cheesemanii provides habitat/food for fish and invertebrates

Restoring a Waterway for

4. Order plants well in advance

- Order plants well in advance of planting.
- Select a nursery specialising in Canterbury sourced native plants. Eco-sourced plants will be especially adapted to local conditions and therefore more likely to survive. They will preserve the genetic integrity of regional floras.
- If plants are not being planted immediately, make sure the containers are watered every day otherwise they will dry up and plants will die.

5. Planting seasons

- Plant species that tolerate wetness down to the water's edge/margin during the summer. Other species should be planted during autumn (hardy plants) or spring (frost-tender plants).
- Some ground cover plants, slow growing, and/or frost sensitive species, such as ferns and tree ferns, should be planted after some initial cover has become established and any dense grass has been managed – this usually occurs 2-3 years after the first plantings.

6. Prepare the site

- Prepare the site well in advance of planting. Remove invasive weeds, such as convolvulus, ivy, periwinkle, wandering willy, aluminium plant, pampas grass, female grey willow (these have seed capsules that spread vigorously after flowering), sycamore and yellow flag iris. Some overhead cover may be retained temporarily as a protection to help tender new plants establish.
- Clear all vegetation for about half a metre radius around each planting position, but retain the topsoil.
- If the ground is heavily compacted rip or fork up to half a metre depth.

Heathcote River (Ernle Reserve) showing plant sequences associated with steep, high bank on left (tussock sedge & harakeke), low bank on right with tussocks, cabbage tree and pathway through floodplain backswamp, rising to terrace face on far right.

Natural Character

7. Set out plants

- Set out plants in their correct zones, remembering to space plants according to how large they will grow (see stream profile diagrams).
- Ensure the plants have been well soaked with water and that they do not sit in the sun for a long time before planting.
- Dig a hole that is deeper and broader than the container. Never cram roots into a hole too small for them.

8. Plant

- After carefully extracting a plant from its container, prune off any entangled roots. Set the plant into a bed of soft, worked soil at the bottom of the hole, repack crumbled soil around the root mass tightly to prevent air gaps.
- On wet sites, plant in a shallower hole so that the top of the root mass and associated soil is at ground level or, in permanently saturated conditions even slightly mounded above it. On dry, steep sites set the plant into a deep hole so that after repacking of soil there is a hollow left in the ground around the stem to catch the rain. Give the plants and the surrounding dry ground a good watering after planting.
- Where possible, stake plants so they are easily identified.
- Ensure plants within the waterway are well planted, and compacted around their base.
- In moving currents it may be necessary to anchor aquatic plants to the bed of the stream with stones or other weight.

9. Fertiliser and mulch

- If top soil has been stripped off, apply slow-release fertiliser to each plant and spread short-term fertiliser (e.g. super-phosphate) onto the ground after planting and before mulching.
- If required, it is best to fertilise in the second year after planting, as plant roots are not developed enough to utilise fertiliser prior to this.
- On dry sites mulch with bark chips (up to 10 cm depth), newspaper, woollen mats, or other degradable materials such as carpet underlay (not rubberised).
- Do not use mulch on wet sites or anywhere near the water flow, as mulch may restrict aeration to the plant. Mulch is also likely to be washed away and cause stream blockage.

Harakeke/NZ flax (Phormium tenax), a nectar-bearing plant for upper bank and floodplain

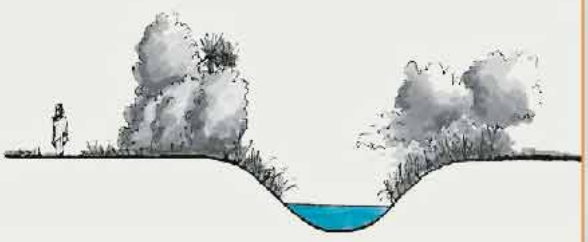
10. Establishment, watering and on-going maintenance

- Make regular checks on the health of plants for several years following planting, replacing any plants that may have died.
- Plants on dry banks will survive and thrive if watered regularly in summer. Plants should be weaned off watering after the second year.
- Weeding around plants is essential to avoid competition and stress. This should be carried out on a monthly basis or more frequently if required.
- If stock or pests (for example sheep, goats, cows, rabbits, or possums) have access to your plants, you will need to adopt some form of control. This could include fencing or spraying plants with repellent.
- Do not use "weed-eaters" near trees as they can be ring-barked and die.
- If spraying broad spectrum weedkillers be aware that most native plants are highly sensitive to spray drift.
- Nearer the water, careful on-going weed control is needed until the area is self-maintaining, or until the plantings have overtopped the wild grass.

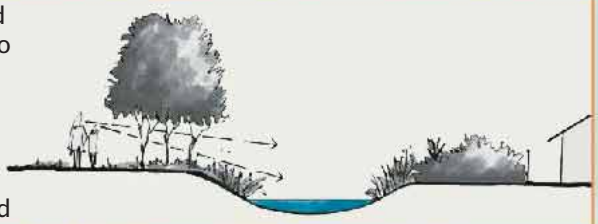
Kowhai (Sophora microphylla) a nectar-bearing tree for levee and terrace face

Some design considerations

- Establish massed vegetation in random groups along riverbanks to create wildlife habitats and interest
- Allow plenty of space for large plants to grow and spread
- Maintain a wide band of low ground cover plants adjacent to paths



- Canopy trees and low ground cover allow for visual access to the watercourse. Trees take time to mature
- Use massed vegetation to screen site and where access to the waterway is not required



- Provide access to waters' edge, particularly where bank gradients are shallow
- Ensure planting around these points is low for visibility and safety
- Seating may be provided at these points where the waterway can be seen.

Benefits of restoring your stream may include:

- Increased value of property by improving privacy and aesthetic qualities
- Establishing a place for peaceful contemplation and enjoyment especially within an urban environment
- Satisfaction of knowing that you have contributed to your local environment by enhancing natural habitat and wildlife
- A sense of accomplishment that you have contributed to local biodiversity and natural character for the next generation to appreciate and enjoy.

The waterways and wetlands of Canterbury are one of our greatest natural assets. Their restoration not only enhances the environment and our enjoyment of them, but allows us to leave a legacy of increased value for generations that follow.

For more information

Christchurch City Council
Phone: 941 6840
Email: leisureandparks@ccc.govt.nz

With thanks to ecologist Dr Colin Meurk for much of the information in this guide, and Tanya Cathel-Black for the graphic design and majority of the photography.

Thanks to Waimakariri District Council for their financial contribution.

Refer to the website for a comprehensive reference list and more detailed information on this guide

http://www.ccc.govt.nz/streamside