

Riparian zones

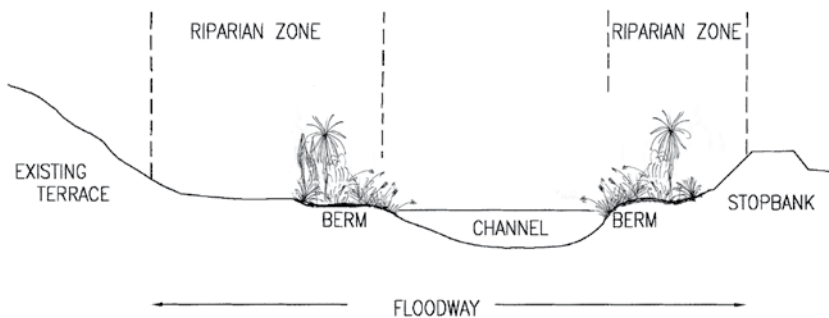
**A guide to the protection of
Canterbury's rivers, streams
and wetlands**



Everything is connected

What is a riparian zone?

- ▶ Riparian zones are strips of land bordering rivers, streams, lakes and wetlands. They link the dryland ecosystem to the aquatic ecosystem and are ideal sites for revegetation projects.
- ▶ Riparian zones have an importance much greater than their size implies. With a good cover of plant life these areas help to:
 - control stream bank erosion
 - provide habitat for wildlife
 - prevent the pollution of water



- ▶ The width of a riparian zone can vary from a few metres to tens of metres depending on topography, flow fluctuations and adjacent land uses. The width should be at least equal to the top height of trees or shrubs within the zone.

Erosion control

- ▶ Trees, shrubs and grasses greatly improve the stability of streambanks. Plants with flexible, multi-stemmed growth forms should be used on the margins at the waterway's normal flow level.

Photo succession showing the robust growth rates of local native species.

1994



1996



1998



- ▶ Higher runoff and flood peaks have a number of causes including forest clearance and the development of tussock grasslands to improved pasture. Riparian zones can store and retard drainage water flow.

Habitat

Wildlife in riparian zones is dependent upon vegetation for shelter, shade and food.

Fallen leaves in the water are colonised by aquatic fungi and bacteria which improve the digestibility of plant debris for freshwater insect life. Woody debris provides shelter for fish.

Many freshwater insects have winged adult life stages which provide food for other riparian inhabitants such as fantails. Eels feed in riparian zones during flooding and kokopu (whitebait) species feed largely on land based insect life.

Trees provide cover, perching and nesting for kingfishers and game birds and can provide seasonal food sources for the kereru - our native wood pigeon. Native frogs depend upon the moist conditions and insect life of riparian zones.



A simple measure of stream health is indicated by populations of stream insects such as mayflies. Small brown algal film covering stones indicates a healthy waterway. Long green or brown algal strands, however, suggest high nutrient presence or sewage pollution.

Pollution control

- ▶ Some land use activities such as the harvesting of forest, the application of pesticides or fertiliser and the unmanaged ranging of domestic stock in riparian zones can reduce water quality for downstream users.
- ▶ Ungrazed, well planted riparian zones act as 'filters' which settle out sediments for absorption into the soil. Riparian plants use some of the nutrients for growth. Most nitrates in riparian groundwater are returned to the atmosphere by the microbial process 'denitrification.'



- ▶ Contaminant inputs to waterways are most effectively restricted by targeting measures at the source. Riparian zones have an important environmental role but are not a substitute for wise land management practices.

Establishing riparian vegetation

For planting purposes, riparian margins can be grouped into three distinct zones - each reflecting the frequency of flooding.

► Margin

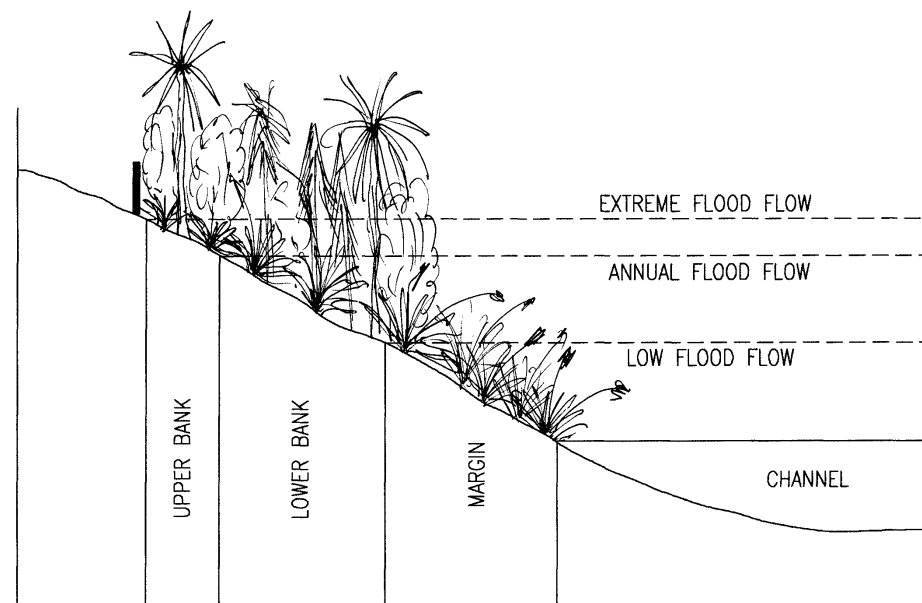
This zone includes frequently submerged lower banks and wetlands next to the channel. Plantings should have a natural multi-stemmed growth form with flexible stems or branches to bend and sway with frequent low flood flows.

► Lower bank

This zone is less frequently submerged but is subject to regular flood flows. Again, low multi-stemmed growth forms resist toppling and reduce water velocity. The plants must have vigorous fibrous root growth to control bank erosion.

► Upper bank

This zone is normally above all but the largest flood flows. Taller species are less likely to cause problems with toppling.



Species

Margin		Lower bank		Upper bank	
Tussocks		Cabbage Tree	<i>Cordyline australis</i>	Ribbonwood	<i>Plagianthus betulinus</i>
Sedges		Toetoe	<i>Cortaderia richardii</i>	Cabbage Tree	<i>Cordyline australis</i>
Rushes		Kohuhu	<i>Pittosporum tenuifolium</i>	Ake ake	<i>Dodonea viscosa</i>
Ferns		Kowhai	<i>Sophora microphylla</i>	Kohuhu	<i>Pittosporum tenuifolium</i>
Toetoe	<i>Cortaderia richardii</i>	Koromiko	<i>Hebe salicifolia</i>	Lancewood	<i>Pseudopanax crassifolium</i>
Harakeke/Flax	<i>Phormium tenax</i>	Wineberry	<i>Aristotelia serrata</i>	Kowhai	<i>Sophora microphylla</i>
Mikimiki	<i>Coprosma propinqua</i>	Manuka	<i>Leptospermum scoparium</i>	Broadleaf	<i>Griselinia littoralis</i>
Manuka	<i>Leptospermum scoparium</i>	Five Finger	<i>Pseudopanax arboreus</i>	Golden ake ake	<i>Olearia paniculata</i>
Coprosma varieties		Coprosma varieties			

- Unless special landscape values are identified a mix of exotic and LOCAL native species is acceptable. Introduced species are faster growing to give quicker results while native species provide greater biodiversity. Exotics which have aggressive self-seeding habits should not be used. Advice on which species may be appropriate for your site can be sought from Resource Care at Environment Canterbury.

- Where possible, riparian plantings should be linked along the waterway creating corridors for wildlife to extend along the catchment.

Guidelines for riparian planting

Fencing

Domestic stock must be excluded from riparian plantings. Because streamside fencing can be difficult to maintain, siting should be above moderate flood levels.

Weed control

Sustained growth rates and survival counts are improved where good weed control has been achieved. Environment Canterbury can advise on appropriate weed control techniques and supply information on biological control agents (insects or fungi) to reduce or contain weed infestation.

Planting

Container-grown plants require a hole at least twice the size of the container and the bottom of the hole should be well cultivated to assist drainage. Techniques to assist the survival of plants in the drier upper bank zone include irrigation, mulching around the stem with rock or gravel and planting to a depth which permits the soil surface to be slightly dishd to retain moisture.

Frost-tolerant plants may be established during late autumn or winter when good moisture availability permits the development of a root system before the more stressing drier seasons. A number of native plants, however, are frost-sensitive so their establishment should be delayed until spring (October-November). Watering may be required.

Spacing

Generally native revegetation requires an overall stocking rate equal to approximately 1 m² per plant. Grasses and sedges need to be established at twice this density while larger-growing natives could be planted at >2 m intervals.

Maintenance



During the two or three year establishment phase, the success of the project depends upon:

- attending to weeds
- replacing failed plants
- controlling pests
- irrigating when appropriate



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