

Getting riparian planting right in Otago

Your step-by-step guide for successful riparian planting



Protecting our valuable water resource is important for dairying in New Zealand. It also benefits the community who use water for drinking and economic, recreational, aesthetic, ecological and cultural activities.

Riparian zones can be used to maintain and improve water quality. Once fenced and planted, they filter nutrients, sediment and bacteria that leave the land as runoff. Healthy riparian zones will improve the health of your waterway.

This practical 'how to' guide for riparian management covers planting and maintaining riparian zones for a sustainable and profitable dairy farm. It includes advice from industry and regional council experts.

What are riparian zones?

Riparian zones are the strips of land beside drains, streams, rivers and lakes. They include areas on-farm where the soils are wettest, such as wetlands, springs, seeps and gullies.

How to successfully manage your riparian zones

Have a plan to succeed

Having a plan is the key to getting value for your money and doing it right the first time. Your riparian plan should cover the three steps of fencing, planting and maintaining your riparian zones.

Use your farm knowledge to form your plan

1. To avoid losing plants in floods, determine how your waterway behaves in full flow. This will help you decide where to place fences and what to plant.
2. Identify areas on your farm where runoff or erosion occur most frequently and have the greatest effect on water quality. This includes seeps, springs, swales, gullies, eroding banks, boggy areas and wet soils. These should be part of the fenced area and prioritised for planting. Bank reconstruction might be needed before planting.
3. Decide what is manageable. Fencing can be completed reasonably quickly, whereas planting and follow-up maintenance takes longer. Set a realistic timeframe and budget for planting. For example, by planting 25% of the area per year, your riparian zones will be complete in four years.



TIP

Your Otago Regional Council community liaison and education officer (CLEO) can answer and discuss questions you have about fencing and riparian planting. It's free and it's the best way to find out what funding or support is available. Call 0800 474 082 for more information.



Set fences back from the regular high flow height. This may be quite different from the low flow height.

First things first – animals out

Livestock trample and graze plants. They also damage banks and defecate in water, adding sediment, nutrients and bacteria which reduce water quality. The Sustainable Dairy Water Accord requires all waterway fencing to be permanent to guarantee stock exclusion.

Map your waterways and create a fencing plan. Work out fence lines and crossing points.

Choosing a fencing setback distance

The aim of the setback is to slow runoff enough to ensure as much bacteria, nutrients and sediment as possible are filtered out before they enter your waterway. A setback distance for a healthy riparian zone should vary on-farm to reflect different soil types, slopes and flow.

A wider setback is needed on steeper paddocks, longer paddocks and heavier soils, because these all generate fast flowing runoff. On flat to undulating land, relatively small zones of 3-5 m are still capable of reducing nutrients, sediment and bacteria entering waterways.

When choosing the setback distance of your fence, keep in mind what you want to achieve by planting the zones. If you want to create shade for your stream to reduce weed growth and keep streams cool, you may need wider zones to allow more space for the trees. If you want to filter nutrients, sediment and bacteria from runoff, then smaller zones (3-5 m) with shrubs and grasses will still be effective.



TIP

You require council approval for fencing in or on any scheduled drains or flood protection works. Check the Otago flood protection bylaw (2012, section 3) or contact the Otago Regional Council on 0800 474 082 for more information.

What to plant and where

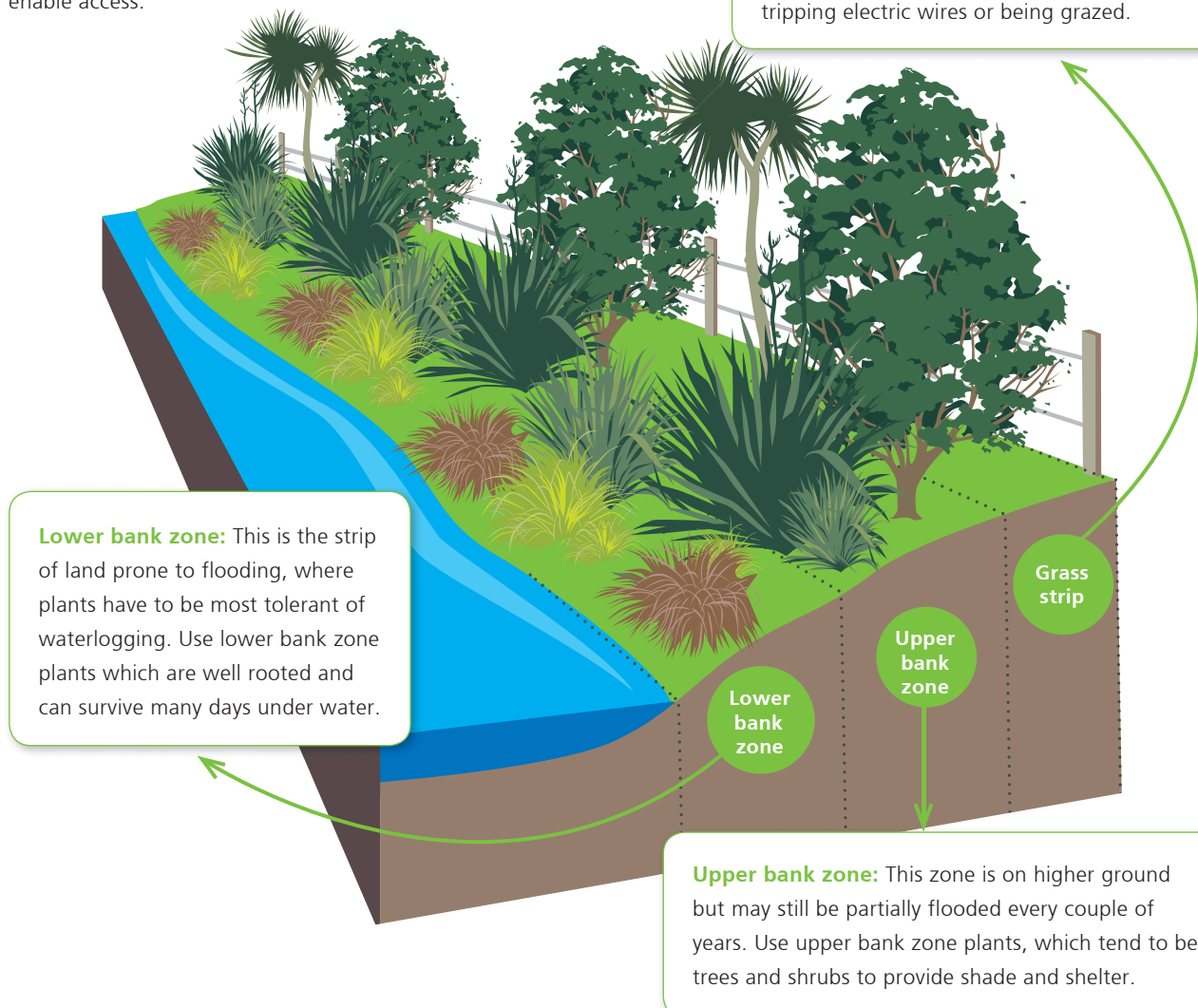
The next step is to decide what to plant, where and at what spacing.

There can be up to three zones of plant types on a healthy riparian zone, as illustrated in the picture below. Planting your upper and lower banks will improve your water quality more than using grass strips alone.

Use the Table of Riparian Plants in this guide to find out which plants are recommended for each zone in the Otago region and the correct plant spacings to ensure plants outcompete weeds.

Drains: Maintaining access to drains is important so only plant one side in tall species, preferably the north bank to provide the drain with shade in summer. Planting low growing species on the south bank, such as *Carex secta* or rank grass, will provide a filter for runoff but still enable access.

Grass strip: A one-metre wide grass strip should be left around all fences. This will help to filter out sediment, phosphorus and faecal bacteria from runoff and prevent plants from tripping electric wires or being grazed.



Steps for effective planting technique



1 Remove any grass or weeds.

- Four to six weeks before planting, spray 1 m diameter circles with a glyphosate-based herbicide at the location where you will plant each plant. Check product information to ensure the herbicide is applied correctly.



2 Put the plant in a hole that is big enough to accommodate plant roots without them being curled up or bent at the bottom or sides of the hole.

- On drier soils, ensure the base of the stem is 1-2 cm below the soil surface. Mulch around plants will help keep soils damp, reduce weeds and provide nutrients. Good mulches include straw, staked down cardboard or wool.
- On permanently wet soils, place the base of the stem (just above where the roots start) about 2 cm above the soil surface with soil mounded up to the root ball.



3 Put a stake or plant protector beside your plants so you can find them easily when you are weeding and can see if they have died or need replacing (don't attach the plant to the stake).

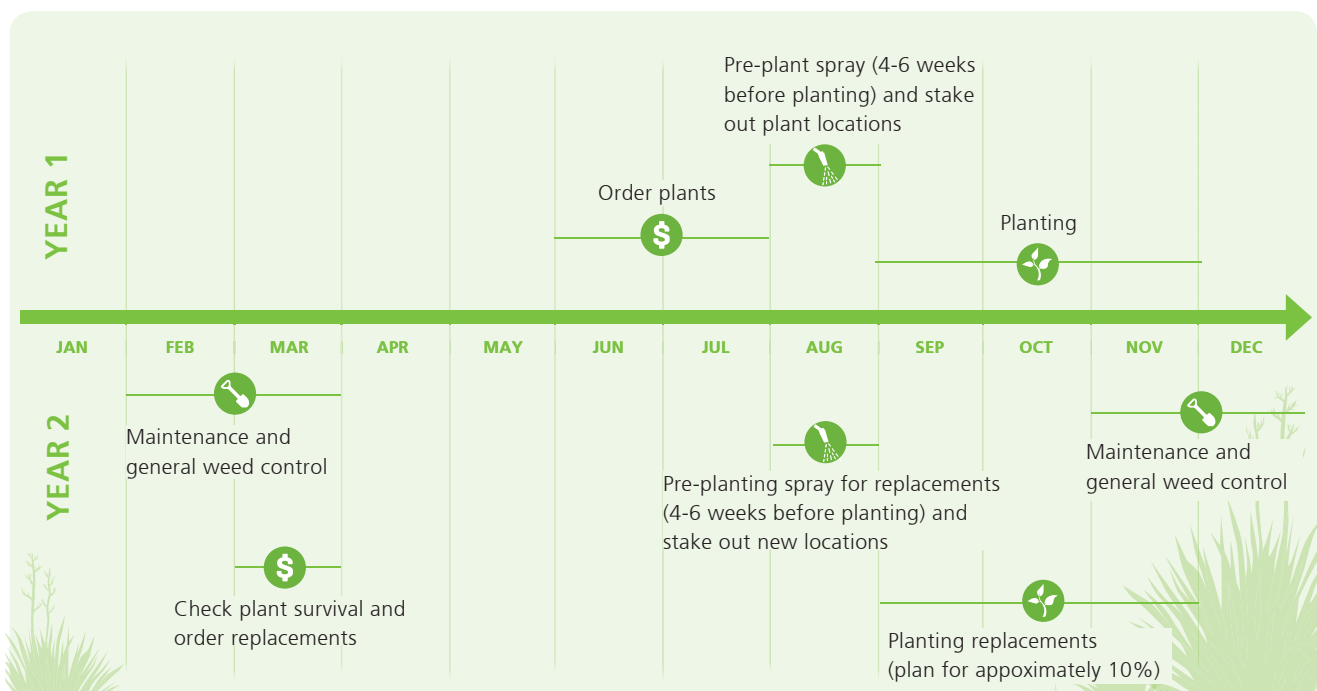


TIP

Plant protectors help protect plants from cold wind, maintenance spraying and rabbits and hares.



Riparian planting calendar – two year plan



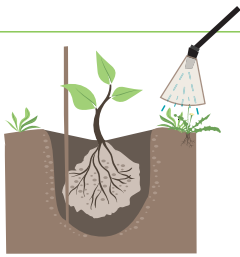
Effective plant maintenance

Keeping on top of weeds and pests is crucial in the first five years for a healthy riparian zone to become established.

Combining protective and active maintenance methods is recommended as the most effective maintenance option.



Protective maintenance – this is less labour intensive in the long run but comes at a greater initial cost. Surround each plant with at least a 30-40 cm diameter of biodegradable mat that suppresses weed growth. You can use mulch, biodegradable weed mat (not plastic) or old woollen carpet. Wood chip or sawdust from the calf shed can be used as mulch as it has added nutrients from the manure. Avoid using plain wood chip around the plant as it will strip all the nitrogen out of the soil causing the plant to yellow off and possibly die.



Active maintenance – this can be labour intensive but has a lower initial cost. Each plant should be staked for easy location and brush cut, hand weeded or carefully sprayed around with a glyphosate-based herbicide, twice a year. If you choose to spray, follow product guidelines; desired plants are usually highly sensitive to herbicides so caution must be taken to protect against spray drift or accidental spray.



TIP

Grass strips do a great job at filtering runoff. Avoid the temptation to let livestock graze your margins, even if it is just rank grass. If you need to, brush cut your grass filter strips – don't spray them.



TIP

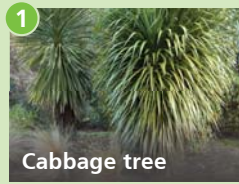
Pests such as rabbits, hares, possums and deer will eat your plants. Contact your Otago Regional Council Environmental monitoring officer for information regarding animal pest control by calling 0800 474 082.

Common weeds to remove in Otago



Find out how to manage weeds in Otago Regional Council's guide *Environmental Considerations for Clean Streams*, available online at orc.govt.nz.

FAST 5 PLANTS FOR OTAGO



Cabbage tree



Carex secta



Mānuka



Mingimingi



Swamp flax

These five go-to plants are ideal to start your planting with – they are hardy, fast-growing, can be planted straight into pasture and don't require shelter. Ask your nursery for eco-sourced plants as they are grown from local wild seed and are best adapted to your climate and soils.

Table of Riparian Plants

Tolerates key: Full sun Wind Salt wind Frost hardy Poorly drained soil (boggy) Dry soil conditions

Benefits key: Attracts birds Attracts bees Slope stabilisation Filters runoff Shade Fish habitat

Plant name	Type	Tolerates	Benefits	Size (height x width)
Lower bank zone				
Space 1-1.5 m between plants				
Cabbage tree (tī kōuka) <i>Cordyline australis</i>	Tree			10 x 3 m
Purei <i>Carex secta</i>	Sedge			0.75 x 1 m
Red tussock grass <i>Chionochloa rubra</i>	Grass			1 x 1 m
Swamp sedge (pūrei) <i>Carex virgata</i>	Sedge			0.75 x 1 m
Upper bank zone				
Space 1.5-2 m between plants				
Mānuka <i>Leptospermum scoparium</i>	Small tree			4 x 1.5 m
Mingimingi <i>Coprosma propinqua</i>	Shrub			4 x 1.5 m
Swamp flax (harakeke) <i>Phormium tenax</i>	Other			2 x 2 m
Black matipo (kōhūhū) <i>Pittosporum tenuifolium</i>	Small tree/tree			8 x 3 m
Fragrant shrub daisy <i>Olearia odorata</i>	Shrub			3 x 3 m
Griselinia littoralis <i>Griselinia littoralis</i>	Tree			10 x 3 m
Koromiko <i>Hebe salicifolia</i>	Shrub			1.8 x 1 m
Lemonwood (tarata) <i>Pittosporum eugenoides</i>	Tree			9 x 4 m
Lowland ribbonwood (manatu) <i>Plagianthus regius</i>	Tree			3 x 15 m
Mahoe wao <i>Melicytus lanceolatus</i>	Shrub			4 x 1.5 m
Mountain flax <i>Phormium cookianum</i>	Grass			2 x 2 m
Narrow leaved lacebark <i>Melicytus lanceolatus</i>	Tree			6 x 3 m
Shining karamu <i>Coprosma lucida</i>	Shrub/small tree			3 x 6 m
Tree daisy <i>Olearia hectori</i>	Shrub			4.5 x 4.5 m

Successful riparian planting in Otago



Helen and Peter Gilder manage Waitepeka Farm, a 1600 hectare (effective) Landcorp farm south of Balclutha. They milk 1580 cows through two sheds and manage a large drystock block.

Helen and Peter started planting before the farm was in dairy in the early 2000s. They were motivated to improve water quality and stock shelter and have won several awards for their efforts, including the 2011 Ballance Farm Environment Award.

Helen says stock control and pasture management have improved and they enjoy seeing the extra birdlife on the farm and working in an attractive environment.

Planting at Waitepeka Farm occurs between August and September. Plants get a few pellets of fertiliser or sheep manure in the base of their hole to encourage growth. "Plants grow slower down here so they need a bit of help," says Helen. Plant protectors are used as shelter against frosts, hares and maintenance spraying.

Helen and Peter know plant maintenance is a long term commitment. They remove weeds and grass around plants by hand during June and July and spray in August to September and February to March.

Maintenance is done by staff on the farm. Helen says "You need to have someone with a passion for planting and the environment who realises the sensitivity of natives to the slightest spray drift. We mentor young farm staff to encourage this passion."



TOP TIPS Helen and Peter Gilder

"Plant up one side of your drains to maintain access"

We plant one side of our drains in trees and shrubs and let the other side grow long grass. Drains can still be accessed from that side if needed and the grass does a great job at filtering runoff. We have found that planting actually prevents blockages by reducing sediment entering and waterweeds growing in the channel.

"Plan ahead to make the most of your time"

Make fencing off waterways, drains and wet areas a priority. You don't have to plant them straight away, just fence them and keep on top of the weeds.

"Don't bite off more than you can chew"

You have to prioritise planting with maintaining plants already in the ground. Sometimes we do less planting in a year so we don't cut into maintenance time. It's really important to replant any gaps where plants have died to ensure the overall success and attractiveness of your planting.

A valuable asset for your farm

When fenced and planted, riparian zones are a valuable asset for your dairy farm. They function like a sieve, helping to filter out sediment and nutrients that leave farmland in runoff before they enter waterways and provide valuable habitats for animals, birds, insects and fish.

How do healthy riparian zones improve water quality?

- Riparian zones help to reduce sediment into waterways, improving water clarity and the habitat for insects and fish. Less sediment means less cost for drain clearing and less risk of flooding.
- Riparian zones reduce nutrients into waterways, decreasing weed growth, improving biodiversity and water quality, and providing a better environment for swimming and fishing for you and your community.

On your farm, well managed riparian zones will improve stock management and protect them from getting stuck or drowning in waterways. Taller trees will provide shelter from wind, increase shade and reduce heat and wind stress.

Riparian plants stabilise banks with their roots, limiting the loss of your land through erosion.

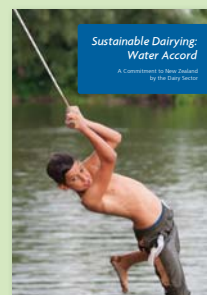
The Sustainable Dairying: Water Accord (Water Accord) was developed in 2013 by the dairy industry and is a commitment to manage the land in a way that contributes to achieving water quality desired by New Zealanders. Good riparian management is a requirement of the Water Accord.

The Water Accord requires dairy farmers to ensure:

- Stock exclusion from 90% of farm waterways* and drains** greater than 1 m in width and deeper than 30 cm and significant wetlands by 31 May 2014 and 100% by 31 May 2017.
- 50% of dairy farms with waterways* have a riparian planting plan by 31 May 2016 and all by 31 May 2020.
- Of these farms half of their riparian plan commitments have been met by 31 May 2020, with full implementation by 2030.

*A water accord waterway is a "lake, spring, river or stream (including streams that have been artificially straightened but excluding drains) that permanently contains water and any significant wetland. This does not include temporary watercourses that flow during or immediately following extreme weather events".

**A water accord drain is an artificially created channel designed to lower the water table and/or reduce surface flood risk and which has permanently flowing water but does not include any modified (e.g. straightened) natural watercourse.



Otago Regional Council has rules about what can and cannot be done near or to waterways. It's best to check with a community liaison officer (0800 474 082) before any work is started to find out more about the rules.

Some activities will require consent, including:

- Using pesticide or herbicide in, near or over water
- Construction of bridges, culverts and dams
- Discharges of sediment and contaminants into water
- Undertaking any activity in the bed of a lake, river or regionally significant wetland, including willow removal
- Drainage of a wetland or the creation or deepening of drains close to a regionally significant wetland
- Fencing or planting on certain drains, floodbanks and floodways (refer to bylaw 2012, section 3)
- Cleaning out waterways for drainage purposes.

The Resource Management Act and Otago Regional Council define a river as:

"A continually or intermittently flowing body of fresh water and includes a stream or modified watercourse, but does not include any artificial watercourse (e.g. a constructed farm drainage canal)"

From 2020, any discharges that are about to enter a lake, river or wetland from a drain, tile drain or from surface runoff, will need to meet the Schedule 16 contaminant thresholds as set out in the Water Plan. For more information contact your community liaison officer on 0800 474 082.

