



The first essential step to take when establishing riparian vegetation is to:

- Plant varieties of tree, shrub or grass that are appropriate for the intended purpose - whether water quality improvement, erosion control, ecological restoration, landscape enhancement or timber production.

The second is to plant in the right places (See graphic). A sensible layout for a grazed streambank is:

- Rushes, sedges or water-tolerant shrubs at the water's edge (Zone C) to protect against scour. They should be flexible, not bulky, so they don't impede floodwater
- Erosion-control shrubs and trees farther up (Zone B), where there is less risk that erosion will topple growing plants into the channel before their roots can stabilise its bank
- Timber trees at the top of the bank (Zone A), next to the paddock, so that they can be extracted without disturbing the stream's bed or banks.

The third is to:

- Provide adequate post-planting maintenance, by protecting from browsing by stock or feral mammals; releasing from competing weeds; and keeping vegetation out of the channel and floodway.

SHRUB AND TREE ESTABLISHMENT ON RETIRED RIPARIAN MARGINS

Some general considerations

When planting any type of tree or shrub in a retired riparian zone:

- Construct a stock-proof fence, to protect what's planted from browsing
- Avoid planting anything that will be a rod for the back in future years, blocking the stream or
- spreading along its banks like a weed
- Use plants that are fast-growing and deep-rooting to stabilise banks; with canopies sufficiently dense to shade banks and lower water temperature, but still admit enough light for under-storey growth.

Choice of plants for retired banks

The choice is extremely wide. The main factor to consider, apart from cost, is purpose of the planting. Is it erosion control, water quality improvement, landscape enhancement, timber production, or a mix of all four?

For guidance, refer to the Taranaki Regional Council's information sheet **Plants for riparian margins**. This lists indigenous and exotic species, suitable for each of these purposes, which grow well in the local climate.

Establishing seedlings

In coastal parts of the region, seedlings are best planted in June, so that they establish over the winter and spring months, before summer drought sets in. Inland - on higher parts of the ringplain and the eastern hill country - seedlings are best planted in mid-winter or early spring, when the plants are dormant and after they have been hardened off by frost. Any species vulnerable to out-of-season frosts should be planted as late as possible, in September or October.

For further advice or information about sustainable land management contact:

TARANAKI REGIONAL COUNCIL

Land Management Section
Private bag 713, Stratford
Ph: 06 765 7127
Fax: 06 765 5097 www.trc.govt.nz

Grass and weeds should be sprayed or hand-weeded 3-4 weeks prior to planting. A 1 m diameter spot at each planting site is usually sufficient (apply early enough to allow the breakdown of vegetation so that a residual herbicide is able to be sprayed on bare soil at the time of planting). This gives seedlings a chance to put on a spurt of growth before the grass and weeds grow back. If you are concerned about spray side-effects or residues, amine-salt based preparations such as glyphosate have a low toxicity and break down fast.

Obtain seedlings from nursery stock, preferably propagated from local seed sources. These have a better chance of survival, as they have been selected from trees that are adapted to local soils and climate.



Retired streambanks can be planted with indigenous or exotic species, for erosion control, habitat enhancement or timber production.

Bare-rooted seedlings are easiest to handle, but have to be planted within a day or two of lifting. Potted seedlings can be held for longer, but are bulky. Root-trainer seedlings can be held for a long time, and are light to shift, but do not have much foliage which lessens their chances of survival (though good results can often be obtained). Seedlings should preferably be no shorter than 30 cm and no taller than 50 cm, as smaller or larger seedlings can be difficult to establish. All plants should be hardened off in the open for about one month prior to planting.

Dig a planting hole that's large enough to accommodate the seedling's roots with plenty of loose earth around and underneath once back-filled. Take care that the seedling isn't too deeply buried. Seedlings should be planted with potting mix, but ensure that the potting mix is not exposed. Keep it about 2 cm below ground level and cover with soil or mulch.

Direct seeding of sprayed or hand-weeded sites may be worth trying, as an alternative to plantation of seedlings. Australian landcare groups report good results with this technique. In New Zealand there has been little experience with species other than manuka and kanuka, which may be established by scattering seed-pods or laying brush with ripe seed-pods still attached.

Establishment of seedlings can be helped by fertilising with one or two 25g magamp pellets in the planting hole. Alternatively use 25-50 gms of granulated magamp. Magamp is preferable to urea or nitrolime which can easily burn plant roots. It is better to under-fertilise than over-do it; too much fertiliser around its roots will kill a plant.

For indigenous seedlings, an initial spacing of 1.75 to 2.75 m is recommended, so that growing trees establish reasonably dense ground cover. Most native species are naturally self-thinning, but if timber production is contemplated, hand-thinning to 5-7 m at 20-plus years may help improve growth rates.

Wider spacings are adequate for exotic species likely to be planted on streambanks for erosion control, amenity or timber; principally the willows, poplars, eucalypts and acacias. All are fast-growing, so can be planted at an initial spacing of 5-6 metres, and thinned to 10-12 m between 10 and 20 years of age.

TREE-PLANTING ON REGULARLY-GRAZED RIPARIAN MARGINS (Hill Country)

Some general considerations

This practice is more applicable for Taranaki's hill country farms. When planting an unfenced riparian zone that's still regularly grazed, look for trees that:

- Resist browsing by stock
- Are fast-growing and deep-rooting, but won't turn into weeds

- Won't collapse into channels, block them, sucker or regrow in the channel
- Don't form dense, almost impenetrable thickets that suppress grass growth or impede stock access.

Choice of plants for regularly-grazed banks

If the intent is to plant trees on streambanks that are unfenced and regularly grazed, choice of plants is somewhat restricted by palatability to stock. For suggestions, refer to the Taranaki Regional Council's information sheet *Plants for riparian margins*.

Establishing trees

The most commonly used trees for erosion control on grazed banks are willows and poplars. These are planted as stakes (1 m) or poles (2.5-3.0 m).

The best time to plant is winter, before the stakes or poles sprout fresh growth. In coastal districts, plant as early as possible, in June or July. In colder-temperature inland districts, planting can be delayed to July or August.

Plant with about a third of the length below ground level. On waterlogged ground they can be forced in by hand. On firm ground, poles usually have to be sharpened at one end, and driven in with a rammer. Stakes can be planted by inserting into a hole made with a length of reinforcing rod. Whatever the planting method, ensure that the stakes and poles are firm, not loose.

For effective bank stabilisation:

- Along straight reaches of streambank, pair-plant ie: one tree on one bank, one on the opposite, offset at 5 to 6 m spacings, so that the second tree prevents any bank scour by current deflected from the roots of the first
- At weak points such as the outsides of bends, where current cuts into the bank when the stream is in flood, plant at 2 to 3 m spacings
- Avoid planting the insides of bends, as these are sites of deposition, not erosion. Trees here will trap sediment and force current against the outer bank
- Avoid planting narrow channel reaches where growing trees may impede floodwater.

These densities provide early protection; by the time trees are 4 or 5 years old there will be a solid mass of roots along the bank. As the trees grow, they can be thinned to 10-12 m spacings at between 10 and 20 years of age. Do not thin

erosion-control plantings to wider spacings, as their roots will not provide adequate bank reinforcement, and the stream may erode through gaps in between their roots.

Similar spacings are adequate for other fast-growing exotic species, notably eucalypts and acacias, that are likely to be planted on streambanks for timber production as well as erosion control.

Keep down planting failure (and replanting costs next year) by:

- Excluding stock immediately after planting so that trees have a chance to take root
- Fitting netlon or dynex sleeves on poles, before stock are let back in
- Placing timber or wire tree-guards around seedlings.

MAINTAINING RIPARIAN VEGETATION

Remember the importance of post-planting maintenance, if planting riparian margins. Release-weeding and pest control ensure good establishment. Silviculture helps prevent trees from falling into channels, avoids suppression of ground cover by lower branches, and ensures good growth form for timber production. Where banks are control-grazed, good stock management is essential to maintain pasture composition and density. It also helps suppress weeds. The Council's information sheet ***Maintaining riparian vegetation*** contains information about these topics.

WHERE TO GET MORE ADVICE

Taranaki Regional Council provides a free advisory service for landowners wishing to revegetate riparian zones. This service includes site visits, preparation of riparian planting plans, and supply of plant stocks.