

Native plant establishment along riparian margins of the Sherry River, Motueka catchment

'Best bet' guidelines



Nick Ledgard and David Henley

Scion
Christchurch

October, 2009

These Guidelines have been produced as part of the
Integrated Catchment Management (ICM) Programme for the Motueka River.
(*‘From ridgetops to the sea’*)

The Programme was managed by Landcare Research,
with the riparian native plant establishment trials undertaken by Scion, Christchurch.

The trials were initiated in 2005 and completed in 2009, and were carried out on the
properties of local Sherry River Landcare Group members:
Paul and Nicky Bavin (‘Atholbrook’) and Bill and Jeanette Booth (‘Bluerock’).

Barbara Stuart of Landcare Trust, Nelson,
acted as the main co-ordinator between the researchers and the land owners.

These ‘best bet’ Guidelines are designed for use on the Sherry River.

*Although the basic establishment principles are likely to be the same elsewhere,
the underlining detail may need adapting to suit local circumstances.*



First of all, remember that:

- Better to establish small areas well. Try not to take on a large area.
- Successful 'establishment' means that plants are alive and growing well after 2 years; 'planting' only means placing seedlings in the ground - which is a waste of time if they die.
- Success is like a good chain – only as strong as its weakest link. Do not begin any plant establishment unless capable of implementing all the following steps outlined in these Guidelines.
- Probably the main consideration on the Sherry River is 'how can I keep on top of weeds?'. The worst are sprawling/climbing weeds such Old Man's Beard, blackberry, ivy, honeysuckle and *Convolvulus*.



1. Selection of site

A.



X

B.



??

<p>A. No good: Many woody and sprawling weeds (too great a challenge)</p>	<p>B. Not the best: Bare mineral soil, but an excellent seed bed for weeds</p>
--	---

C.



√√



√√√

C. Best: Good cover of grass, which can be readily herbicide killed. *Even better if rank*, as after spraying it can then act as a dead mulch (aids soil moisture retention, suppresses weed establishment) – into which seedlings are planted with minimum soil disturbance.

2. Site preparation

- This usually involves weed control. But this is unlikely to give 2 year release from weed competition, so post-planting control probably also required (see 8 below).
- Where weed control is needed prior to planting, it should be completed at least a month beforehand. Commonly used chemicals are glyphosate, metsulfuron, terbuthylazine, clopyralid, diquat and picloram; all sold under various trade names. Select according to the weeds to be controlled and always use at the label rate. Apply as blanket or in spots (1.2 x 1.2m / plant) when vegetation growth is active - late autumn or early spring. At planting, do not place sprayed soil in contact with roots.
- If tall existing weeds have to be removed physically (site A), then clear to mineral soil as cost-effectively as possible (most likely by machine), and:
 - Either, be prepared (labour and budget) for weed control commitment (most likely chemical) for at least 2 years
 - Or, sow with vigorous grasses (plus fertiliser) to suppress woody weeds, then spray sward prior to planting. Ideally, this sward should be dense - at least 2 years old.



Good site preparation. This site was rank grass, which has been sprayed prior to planting.

3. Animal control

- Permanent fence (never temporary!) for domestic animals.
- Shooting or poisoning of rabbits, hares and possums before planting – especially if numbers are high. Repellents (e.g. Treepel, Liquid Shotgun) can be useful if pest numbers are low, but must be applied the same day as planting.



Fences. Permanent fences will keep out domestic animals, but do not plant too close – unless an electric wire is added.



Pests. The best pest is a dead one – although repellents can be used in first year, if pest numbers are low.

4. Selecting right species

- See species choice and seedling specification table below:

Species <i>(if possible, use local seed source)</i>	Comment	Minimum height required (cm)	Minimum RCD * required (mm)
<i>Cortaderia richardii</i> (toe-toe)	Tolerates flood inundation	20	NA
<i>Phormium tenax</i> (harakeke, NZ flax)	Tolerates flood inundation	25	NA
<i>Carex secta</i> (purei)	Tolerates flood inundation	20	NA
<i>Cordyline australis</i> (cabbage tree, ti)	Distinctive tall element of vegetation	25	NA
<i>Carpodetus serratus</i> (putaputaweta)		25	6
<i>Coprosma lucida</i> (glossy karamu)		25	6
<i>Coprosma robusta</i> (karamu)	Good early nurse species, but sensitive to frosts when young	25	6
<i>Dacrydium cupressinum</i> (rimu)	For later planting once some cover established (yrs 2-3)	30	6
<i>Dacrycarpus dacrydioides</i> (kahikatea)	For later planting once some cover established (yrs 2-3)	30	6
<i>Griselinia littoralis</i> (broadleaf)		25	6
<i>Hebe salicifolia</i> (S. Island koromiko)	Bushy, good early site dominance	25	6
<i>Kunzea ericoides</i> (kanuka)	Medium growth, poor site dominator	30	5
<i>Nothofagus solandri</i> var <i>cliffortioides</i> (mountain beech)	For later planting once some cover established (yrs 2-3)	30	6
<i>Nothofagus menziesii</i> (silver beech)	For later planting once some cover established (yrs 2-3)	30	6
<i>Olearia avicennifolia</i> (mountain akeake)		25	6
<i>Pittosporum tenuifolium</i> (kohuhu)	Bushy, good early site dominance, but competitive	25	5
<i>Plagianthus regius</i> (mountain ribbonwood)	One of the tallest (fastest growing) species in early years	30	5
<i>Podocarpus totara</i> (lowland totara)	Can be planted in the first year	30	6
<i>Prumnopitys ferruginea</i> (miro)	For later planting once some cover established (yrs 2-3)	30	6
<i>Prumnopitys taxifolia</i> (matai)	For later planting once some cover established (yrs 2-3)	30	6
<i>Sophora microphylla</i> (kowhai)		30	5

* RCD = Root collar diameter



Site dominance. Kohuhu and koromiko dominating site (suppressing weeds) compared to kanuka (middle).



Flooding. Toe-toe, flax and purei, species which tolerate high water levels in regular flood zone.

5. Ordering planting stock

- Try to use local (eco-sourced) species if possible.
- In weedy (or harsh) environments it is imperative that seedlings start well, and to do this they must be of high quality at planting. Therefore, state minimum seedling specifications when ordering stock (see 4 above). Put simply, always buy according to quality, not price.
- The main specification criteria, regardless of whether bare-rooted or container grown, are root collar diameter and size of fibrous root mass (not compacted). Shoot height is not so important – stocky plants are often best.
- Order well in advance – this will help assure the supply of quality stock.



Root collar diameter. This is the best indication of a plant's reserves and resilience. Small diameter stock will suffer first from animals, and when conditions get tough. Give specifications when ordering from nurseries.



Stock height. Tall stock is more susceptible to wind damage and moisture loss from larger leaf-surface areas. Before planting, have no hesitation to cut back to a more suitable size.

6. Handling between nursery and planting site

- Keep plants moist and cool – do not leave out in sun.



√



??

Plant handling. If plants are allowed to dry out or be stressed between the nursery and planting time, survival will be lower. When transporting and storing plants prior to planting, always try to give protection from prolonged extremes of wind and heat.

7. Correct planting

- Spring planting is best – make sure that stock from lower altitude nurseries is hardened (no fresh spring growth) before planting alongside Sherry.
- Spacing. Aim for canopy closure as soon as possible (to deter weeds). Therefore, plants should be planted no further than 1.5 m apart (c. 4000/ha).
- For larger areas, spend the extra time marking spots (with spray paint) before planting. This reduces likelihood of gaps, and the regular spacing enables easier location of trees during subsequent release spraying.
- Most soils alongside the Sherry River are not compacted, and therefore extra cultivation of planting spot may not be vital. Too much cultivation can expose bare soil and create suitable sites for weeds to establish.
- Container grown stock. Remove plant from container. Compacted or tangled roots will lead to future instability. Therefore, use a sharp knife or secateurs to remove any tangled roots from base (usually bottom 1 cm), and to slit down sides of root mass (3 places). This encourages new roots to grow out from root mass. For root-trainers, cut 2-3 cm off the bottom of the plug before planting, once again to encourage new outward root formation.
- It is most important to plant deep enough to cover surface of potting-mix – remembering that in-fill soil will compact after planting. If the potting mix surface is exposed, it can act as a ‘wick’ which promotes soil moisture to be lost more quickly.
- Bare-rooted stock. Well-prepared bare-rooted stock (see specifications) will not have contorted roots. Plant in ‘freed-up’ soils to just above the depth at which seedlings were growing in the nursery (root collar); however, in dry, free-draining sites, seedlings should be planted deeper (around 3-5 cm above root collar).



Plant spacing. Plant close (1.5 m apart or closer) in order to get canopy closure as soon as possible - to suppress unwanted weeds.



Root compaction. This can be a problem with container-grown stock – use secateurs or a sharp knife to remove the bottom-most compacted roots.

8. Post-planting weed control

- **Essential** for at least first 2 years – *poor weed control is the commonest reason for poor survival*. Even if site pre-plant controlled (see 2), the need for additional control is likely. Weed control is also the best means for retaining soil moisture.
- **Mulches / weed mats**. OK, especially if in form of dead vegetation - killed prior to planting (see 2). Artificial mulches (weedmat, carpet, imported waste material such as bark and wood chips) can a) be very labour intensive to install, b) prevent light rains reaching soil and c) create anaerobic soil conditions if too deep. Mulches rarely control all weeds, so some additional weed control is likely.
- **Chemical / herbicides**. Select for weeds to be controlled, and calibrate sprayer so that correct label rate is applied (important). Glyphosate is commonly used but only gives short-term control; haloxyfop (eg Gallant), terbutylazine (eg Gardoprim) and clopyralid (eg Versatil) will give longer control. *BUT no chemical should touch the plants*. Be aware of neighbouring plants when using a spray guard, as drift can occur, even when using 'low-pressure' (knapsack not fully pumped). Also remember - 'low pressure' requires slower spraying, which could lead to heavier than recommended application rates, potentially damaging plants.



Mulches. Such as carpet, weedmat, barkchips, may not be as ideal as often thought (see text above).



Samples of summer-dry soils. Under living grass (left – dry), dead grass mulch (middle – moist), bare soil surface (right – drying). Hence, a dead-grass mulch is recommended.



Chemicals. Spraying usually gives better weed control, but requires careful application (seen here using a guard), and must be repeated 2-3 times annually – at least for first 2 years.



Grass cover. Where rainfall is reasonable (as on the Sherry River), a good grass cover after the seedling establishment period (2 years) can prevent the later invasion of taller, more vigorous weeds (such as broom and Old Man's Beard).

9. Fertilisers, irrigation, staking and tree guards

- **Fertilisers.** Generally not needed on the Sherry River, but if used, mix slow release fertilisers with soil at bottom of hole at time of planting.
- **Irrigation.** Once again, irrigation should not be needed on the Sherry River, except in very dry summers during the first season. Remember that good weed control means all soil moisture is available for the planted seedling. Any species requiring water for long-term survival is the wrong choice for that site. If water is essential for early survival, ensure it goes deep (a pipe can be used), so that roots seek water at depth and do not stay near the ground surface.
- **Staking.** Yet again, staking should not be needed with robust, quality stock less than 1.5m tall. If it is needed, only support at one third tree height, so that the mid/upper stem can move and hence strengthen.
- **Tree guards or shelters.** A luxury and expensive – should not be needed if stock quality, site preparation and animal control are properly addressed. However, small 'special' plants can benefit from use of shelters.



Fertilising. Often unnecessary, but if used, mix slow-release granules in soil at bottom of hole below root level. Never place on soil surface.



Watering. Only for keeping plants alive in their first season. Make sure water goes deep to encourage deep rooting.



Staking. This is not needed for well grown seedlings of correct specifications. However, if staking is required, only hold firm at one third tree height.



Tree guards or shelters. A luxury and expensive – although can be used to give small 'special' plants (such as the potted beech seedling pictured here) a better chance of early survival and growth.

10. Longer term maintenance

On the Sherry River, watch out for sprawling and woody weeds (eg., Old Man's Beard, honeysuckle and broom), as these can quickly suppress established native plants.