

## Establishment Practice for Revegetation Projects

### Introduction

Revegetation plantings help protect land from soil erosion and the impacts of farming. Revegetation with native plant species also helps to restore local biodiversity and natural landscape values. Unfortunately many plantings fail to establish because people underestimate the time and resourcing required.

Successful establishment of revegetation plants involves more than just putting plants in the ground. Seedling plants face many threats, which must be properly managed if plants are to survive and grow well. To be effective this management must begin before plants go in the ground, and be continued until plants are well established.

### Planning

Be aware that a series of activities is required for successful establishment of revegetation plantings (see Table 1) and plan ahead. Develop a budget for time as well as materials or services, and schedule activities.

Native species do not compete well with invasive brush or scrambling weeds. Weedy sites require thorough preparation, involving a succession of control activities over several months. This work must be done before planting or survival will be severely compromised.

Once plants are in the ground, timing of work such as spot releasing (weeding) of plants is critical. If left too late plants are not only affected by weed/grass competition. Subsequent weeding demands extra time and care as plants are at greater risk of damage.

If eco-sourcing native plants or intending to use bare-rooted plant stock, these will have to be ordered from nurseries at least one year ahead. This will allow time for propagation and growing-on to the desired size.

### Exclude Livestock

Domestic stock can cause considerable damage to new plantings. Robust, durable and reliable stockproof fencing is essential for revegetation projects that are next to land used for grazing. Make sure an effective fence is in place before beginning any planting. Check that potential entry points like floodgates are properly constructed and maintained. Repair damage such as broken posts and wires.

To effectively keep a variety of livestock types out of a planting area, nine-wire post and batten fencing is recommended. This may be enhanced with electrified outriggers where heavy stock or goats are present.

All-electric fences are not recommended. They cannot be

relied upon to be continuously effective against livestock without frequent checking and maintenance. Electric fences are of light construction with fewer wires and posts than conventional fences. Any disruption of power to the wires creates the opportunity for livestock to readily breach the fence. For more information on fencing, see the **Sustainable Options** fact sheet [LM06 Protection Fences](#).

### Pest Animal Control

Pest animals like rabbits, hares, possums and wallabies can also cause considerable damage to new plantings. These animals are mainly active at night and their presence is often under-estimated.

They will leave distinctive signs however, and techniques like spotlight transects can be used to determine what pest animals are present in and around planting sites.



Successful establishment depends on robust fencing and good weed control. Note spots have been sprayed prior to planting.

Table 1 – Plant Establishment Planner

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|---|--|
| <b>SITE PREPARATION</b><br>October to May before planting | <p><b>Brushweed/willow control</b></p> <ul style="list-style-type: none"> <li>• Brush gun application of suitable herbicides, spring and autumn growth periods.</li> <li>• Machine assisted removal of heavy brushweed or willow.</li> <li>• Autumn over sowing of grass seed on bare or disturbed soil.</li> </ul> <p><b>Pest Animal Control</b></p> <ul style="list-style-type: none"> <li>• Assess pest animal threats and develop control plan.</li> <li>• Rabbits – fumigation and nightshooting.</li> <li>• Hares – nightshooting.</li> <li>• Possums and wallabies – baitstations and buffer zone treatment if pest habitat adjacent planting sites.</li> </ul> <p><b>Fencing and Earthworks</b></p> <ul style="list-style-type: none"> <li>• Earthworks include benching for fences or tracks and formation of crossings or run-off control structures.</li> <li>• To encourage sustainable native plant canopies, fence sites to be at least 10 m wide.</li> <li>• Complete earthworks by end of March and over sow with grass seed.</li> <li>• Complete fencing by beginning of May.</li> <li>• If practical, allow stock access to graze planting site late April/early May. This will control rank growth and facilitate pre-plant spot-spraying.</li> </ul>   |
| <b>PLANTING</b><br>May to August                          | <p><b>Pre-planting weed control</b></p> <ul style="list-style-type: none"> <li>• Spot-spray three weeks before planting.</li> <li>• Use knapsack sprayer with 'T Jet' type nozzle.</li> <li>• Spot-spray one metre square moving wand in double 'Z' pattern.</li> <li>• Use marker dye in spray to indicate spots.</li> <li>• As well as a knockdown herbicide (e.g. RoundUp®), a residual herbicide (e.g. Gardoprim®) is recommended to give ongoing control in the first season.</li> <li>• If using residual herbicide do not exceed label rates. Calibrate equipment and use consistent application technique, and do not use on wet soils (leaching risk).</li> </ul> <p><b>Planting</b></p> <ul style="list-style-type: none"> <li>• Select plants suitable for the site and revegetation objectives.</li> <li>• Plan the planting. Include delivery of plants to site and allow time for laying out.</li> <li>• Dig holes slightly bigger than root ball, loosen soil in bottom of hole.</li> <li>• If residual herbicide used in pre-plant spray, remove slice of turf over planting hole and discard. <u>Do not</u> place in planting hole (risk of herbicide contact with roots).</li> <li>• Add fertiliser if planting on an eroded site or where top soil has been removed.</li> <li>• Loosen root balls and prune as required.</li> <li>• Place plant in hole and return soil to hole. Ensure top of root ball is covered.</li> <li>• Firm with heel press either side of plant.</li> </ul> |
| <b>AFTERCARE</b><br>September onwards                     | <p><b>For two seasons after planting</b></p> <ul style="list-style-type: none"> <li>• Budget time and resources for aftercare.</li> <li>• Maintain pest animal control.</li> <li>• Check site for brushweed growth October/November. Control emergent brushweeds before they become established, avoiding spray drift to non-target plants.</li> <li>• In November control grass/annual weed growth within one metre of plants (releasing).</li> <li>• Use knock down herbicides such as Versatil™ and Gallant® to minimise risk to non-target plants.</li> <li>• Apply herbicide with care, use shields.</li> <li>• Re-check plantings February – March and repeat weed control as required.</li> <li>• Monitor condition of fences, floodgates, etc to ensure planting site is stock proof at all times.</li> <li>• Maintain pest animal control.</li> </ul>   |

Seek advice from an Environment Bay of Plenty pest animal officer several months before any planting takes place. This will allow for an effective control programme to be implemented, using methods which are appropriate and safe for the situation. **Sustainable Options** fact sheets are available from Environment Bay of Plenty offices on a number of common pest animal and control method topics.

### Pest Plant Control

Failure to adequately control pest plants is probably the greatest cause of poor establishment for revegetation plantings. Native revegetation plantings are especially vulnerable to weed competition. Uncontrolled pest plants will smother new plantings or rob them of moisture during the summer.

Brushweeds and scrambling/climbing weeds (e.g. blackberry) must be fully controlled in advance of any planting. This work should commence in the spring before planting the following winter. Control can involve various chemical and mechanical methods, and Environment Bay of Plenty pest plant staff should be consulted for advice on best practice.

**Sustainable Options** fact sheets on a number of common pest plants and control methods are available from Environment Bay of Plenty offices.

Planting spots will also need weed control and this should start before planting. Herbicides are often the least labour demanding option for effective weed control. Mulching with weed cloth or material such as used carpet may be preferred alternatives, but will require more labour input.

Herbicides should be used strictly in accordance with the



*Hole prepared for Pb3 container stock. Note discarded turf slice at left of hole because a pre-emergent herbicide has been used (see Table 1, Planting).*

manufacturer's instructions. Operators should use appropriate equipment, calibrated as required, and follow recommended safety practice. It is advised that anyone applying herbicides be trained and certified to NZS 8409: 2004. This training can be accessed through a one-day 'GrowSafe' course at a local polytechnic institute.

### Site Factors

Site conditions may require further attention. If there is already soil erosion, works to control run off or stabilise slopes may be needed. Ask an Environment Bay of Plenty land management officer for advice.

If soils are compacted from heavy use by machinery, ripping before planting may be useful to encourage deep root growth.

Select plants that are suitable for the site and its management objectives. If revegetating with native plants use hardy, colonising species to establish the primary canopy and add tree species two to three years later if required.

Eco-source nursery stock wherever possible to get plants that are well adapted to local conditions. Be aware of frost tender species or stock types and do not plant these in hollows or on shady faces.

Failed establishment is often the result of poor management rather than poor plant stock. Nevertheless, ensure plants are robust enough for field situations. Plants should be 20–40 cm high and have well-developed roots.

For more information about suitable species see the **Sustainable Options** fact sheets [LM07 Plant Selection for Retirement Areas](#), [LM12 Native Plants for Revegetation Projects](#) and [LM13 Plant Selection for Disturbed Soils](#).

## Planting Techniques

Once the site is prepared and all threats properly controlled, planting should be done in winter, i.e. May to August. This will minimise transplant shock and means plants are in-ground before the new growing season. If planting stock from containers, dig a hole slightly bigger than the potted root ball and loosen the soil in the bottom of the hole. Remove the container and inspect the root ball. If roots have formed a compact mass at the base of the root ball, or are spiralling around the outside of the root ball, use a pair of secateurs or a sharp knife to prune densely matted or gangly roots.

Place the plant in the hole and refill the hole with soil. Firm with a heel press either side of the plant and make sure soil covers the top of the root ball.

If planting bare-rooted stock, dig a hole as above and prune any gangly or broken roots. When returning soil to the hole, partly fill the hole and carefully firm soil around the lower root system. Finish filling the hole and firm again. This will eliminate air pockets and ensure the plant is well supported.

For sites that are degraded through soil disturbance, have minimum topsoil, or have little organic matter, fertiliser can be a useful aid to establishment. As a general guide use 50 g of MagAmp or a slow release fertiliser tablet. On farm sites that have been subject to regular fertiliser applications, additional fertiliser at planting is not necessary.

## Plant Spacing

For revegetation plantings initial spacing is largely determined by the desired time to canopy closure, and cost. If using colonising native shrubs, high-

density spacings at 1 x 1 m spacings will close canopy at two years. Low-density spacings around 2–2.5 m will close canopy at four to five years, but at 20–25% of the cost of high-density spacing. Close spacing is desirable for landscaping purposes or where there is a threat of rapid weed invasion after planting.

While more open spacing will cost much less at initial planting, extra pest plant control costs may be incurred on weedy sites during years three to five, before canopy closure.

For most revegetation sites, with good preparation and pest control, a maximum spacing of 2 x 2 m is recommended. Use robust (pb2/pb3 grade) plant stock. At least two releasings (spot weedings) per year are recommended for the first three years, to control weed reinfestation.

## After Care

Patience and vigilance are required. It will take 2–3 years for a significant visual change to occur on site. Regular inspections and maintenance will be required throughout this time.

Routinely check fences, especially where there is a risk of erosion or windfall damage. Ensure revegetation planting sites remain stockproof at all times. Continue pest animal control with monthly night shoots throughout March/February and October/November until plants are one metre high.

Maintain annual weed control around seedlings for three years or until plants are 1.2–1.5 m high. This will require at least two releasings per season, in spring and mid summer. Otherwise maintain pest plant control by treating re-infestations of brush weed as and when they occur.

Be especially vigilant for regrowth of blackberry, barberry or willow, and smothering climbers such as honeysuckle. Make time to regularly check for pest plant problems.

When using herbicides for releasing and pest plant control, be careful to prevent spray drift that will damage non-target plants. Spray in calm conditions only and use nozzle hoods when spraying close to young seedlings.

## Further Reading

**Native Trees – Planting and Early Management for Wood Production.** David Bergin and Luis Gea. NZ Indigenous Tree Bulletin No. 3, Forest Research, Rotorua, 2005.

**Native Forest Restoration – A Practical Guide for Landowners.** Tim Porteous, Queen Elizabeth II National Trust, 1994.



For further information and advice, contact your local soil conservator at Environment Bay of Plenty:

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