



Sites for Planting Native Trees



The most common sites for planting of natives are those retired recently from grazing usually to meet a range of environmental objectives such as improved water quality of waterways on farms.

INTRODUCTION

There are several broad site types to consider when planting native tree species particularly relating to existing vegetation cover, history of landuse and current management. The most common sites where natives are being planted are open grassed sites, but other site types are those with a cover of regenerating scrub that can comprise various mixtures of native and exotic species, partially logged native forest, and where replacement of exotic forest cover with native is under consideration.

Each site type demands a different approach to establishment of natives. Detailed methods for the planting of natives on the different sites are provided in Section 7 of this Handbook.

OPEN SITES

Pasture sites

Sites dominated by a cover of exotic grass, such as those retired from pastoral farming, are common areas for the planting of native trees and shrubs and are therefore the major focus in these guidelines (Dodd and Ritchie 2007). These sites range from fertile sheltered sites such as along retired riparian areas where good growth rates would be expected, to retired steep erosion-prone sites or exposed sites where revegetation to a native cover can be challenging. Many urban or peri-urban areas being planted in natives are also open grass sites.

Competing grass can be one of the major factors limiting establishment of natives on open sites. Site preparation usually involves a pre-plant spray of herbicide followed by careful post-plant spraying to avoid loss of planted natives under dense regrowth of grass or herbaceous weeds. Details on preparing grassed sites for the planting of natives are given in Technical Article 7.3 in this Handbook.

Recently cleared sites

Mechanical clearing of a previous cover of exotic forest (e.g., pines – *Pinus* spp.; Willow – *Salix* spp.) or woody brush weeds (e.g., gorse – *Ulex europaeus*) or other vigorous scrambling weeds (e.g., blackberry – *Rubus fruticosus*) also creates an open site for planting of natives. Unlike exotic grass sites with a long history of grazing, recently cleared forest or scrubby sites, even if burnt over, will invariably have major ongoing weed problems which must be intensively managed to ensure successful establishment of natives.



Mechanically cleared dense woody weed sites will require intensive ongoing control of exotic re-growth.

Over-sowing sites that have been recently cleared of problem weed species with exotic grass to reduce emergence of woody and scrambling exotic species may be a practical strategy on some sites. This may be particularly useful where large areas which will regenerate in gorse or blackberry is sown for grass, and if practical, grazed until resources are sufficient to allow planting of native trees and shrubs. This option of incremental retirement can be achieved by moving fences to increase planting areas as grazed areas are retired.

Where establishing a grass sward with or without grazing is not practical, areas to be cleared of exotic cover should not exceed the resources available for replanting the area with natives. This includes factoring in the significant commitment for post-plant weed control required over several years for any recently planted areas.

REGENERATING SCRUB

Many previously cleared or farmed areas have reverted to shrubland cover naturally. This usually consists of native pioneers, predominantly manuka (*Leptospermum scoparium*) and kanuka (*Kunzea ericoides*). For instance, large tracts of erosion-prone hill country on the East Coast of the North Island have reverted to manuka and kanuka after periodic downturns in the farming industry (Bergin *et al.* 1995).

Large areas of previously cleared land in New Zealand have or are also reverting to exotic-dominated woody species, often referred to as scrub. The species composition

of exotic-dominated scrub varies regionally throughout the country depending on several factors including local climate and soils, history of land management, and whether species have been introduced to local districts and timing of their introductions. Gorse and broom (*Cytisus scoparius*) are significant weed species nationally occupying vast areas in many regions while other scrubby weeds such as blackberry can be dominant locally.

With some shrubland sites, natural regeneration of a range of native woody tree species may be sufficient to obviate the need for planting shrubland. Surveys that representatively sample such areas will indicate natural succession of land in scrub by the presence of later successional species such as the native conifers or hardwood trees local to the region.



Substantial tracts of marginal hill country pastoral land are reverting to manuka and kanuka.

Planting

Significant areas of pioneer shrubland, however, lack local seed sources of later successional tree species required for the establishment of high native forest. Particular native tree species that may be desired by landowners for managing as a long-term timber resource may be absent or scarce. Land clearance, fires and ongoing grazing have seen large tracts of marginal hill country with a low diversity of native tree species. In these situations, planting of selected native tree species on appropriate sites will be necessary and trials are ongoing in determining effective methods (e.g., Steward 2000).

Inter-planting options for establishing a range of native tree species within shrubland will depend on many factors including species composition, and height and density of the existing canopy cover. Where possible, using existing canopy gaps will allow establishment of native tree species within the shrub cover to supplement or substitute for natural regeneration. For other sites with a low cover of shrubs, lanes cut through the vegetation using chainsaws or scrub-bars will allow planting in lines or small groups at appropriate spacing. In tall scrub it may be preferable to cut access tracks through existing cover and plant within circular gaps spaced at intervals that coincide with natural gaps or within cut canopy gaps where there are appropriate planting sites.



Manuka and kanuka are regenerating in many regions on previously cleared sites, especially hill country.



Depending on a range of factors such as lack of local seed sources and presence of grazing animals, regeneration of native trees is non-existent or can be slow to develop even where sites become dominated by several species like manuka.

FOREST SITES

Native forests have often been degraded by partial logging, earlier attempts at clearing for farmland, or a long history of browsing by wild animals. Natural regeneration often occurs if sites are fenced off and animals are controlled. However, planting and management may be desired by landowners to increase the proportion of native timber tree species and to speed up the process of natural regeneration back to an intact high forest (Beveridge and Bergin 2000).

A survey of the existing plant community will indicate areas where key tree species are non-existent or suppressed. It may be practical to plant native conifer or hardwood trees within any natural or logging-induced gaps in the forest canopy. Site preparation in disturbed forest areas must include removal of ferns and shrub hardwoods that may suppress the young planted trees. Vigorous regrowth often requires control for up to five years after planting to prevent loss of planted seedlings (Forest Research Institute 1980; Pardy and Bergin 1992).

Gaps in cutover native forest may be suitable for the establishment of groups of key native tree species if natural regeneration is not occurring.



Canopy gaps within heavily disturbed forest can be occupied by regenerating pioneer natives which should act as a nurse for infilling of tree species. However, such gaps can also be densely covered in problem exotic weeds such as pampas, Himalayan honeysuckle, gorse or scramblers such as blackberry and gorse.

REPLACING EXOTIC FOREST

There is increasing interest in returning stands of exotic trees to native vegetation. Most stands are radiata pine (*Pinus radiata*) and other exotic conifers but there are also a range of exotic hardwood stands such as eucalypts (*Eucalyptus* spp.), willows and poplar (*Populus* spp.). Clearfelling to allow removal of merchantable logs is likely to remain the most common scenario in order to give a commercial return from the existing crop. While regenerating native plants can be a significant component of the understorey of mature exotic forests, logging

operations invariably destroy any understorey and groundcover layers. Some coppicing of understorey natives smashed by clearfelling operations may occur along with regeneration of natives. However, these highly disturbed open sites are receptive to regrowth of problem brush weeds and reversion to native forest will take decades. Such sites are difficult to restore to native forestry without considerable resources and ongoing commitment required for control of weeds and animal pests.

Regenerating understorey

Where there are only scattered exotic trees amongst regenerating native scrub or forest, felling may be practical. Damage will be much less where timber is not recovered and where directional felling is employed to minimise damage to understorey native plants. This is most likely to be feasible where crowns of trees to be removed are relatively small, density of the stand is relatively low, and an open stand structure will allow felling that will avoid too much damage to desirable native regeneration. Poisoning an overstorey of exotic trees may be practical on some sites for encouraging gradual development of native regeneration. However, dying and dead crowns devoid of foliage can be unsightly for several years as trees rot and gradually disintegrate.

Under-planted natives

Stem poisoning or directional felling may also be practical options for removing an exotic overstorey on some sites where native trees have been planted under or within the sheltered environment of the original forest cover. This can arise where fast growing exotic species have been used as nurse crop to provide shelter for establishment of native species. Careful planning including an appropriate planting layout is required to minimise damage to under-planted natives as the exotic overstorey is removed.



Where pines are too difficult to remove or it is uneconomic, poisoning of the overstorey exotics is a practical method for gradual removal of the exotics without severely damaging the developing natives. This option is only practical away from high use areas due to the instability of deteriorating crowns of poisoned trees.

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ISSN 2230-3014 April 2011. Revised May 2012.

Tāne's Tree Trust promotes the successful planting and sustainable management of New Zealand native trees and shrubs for multiple uses.

Printed by Scion Digital Print Centre, Rotorua