SITE PREPARATION FOR FOREST PLANTING

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Summary

The vegetation types prevalent in areas for new planting in the Kinleith Forests are listed and the hand, mechanical and chemical methods of dealing with these vegetation types are described.

INTRODUCTION

THE COMMENCEMENT of a second forest planting boom in New Zealand during the past ten years has created problems for the forester, owing to the many and varied types of vegetation and terrain which have to be dealt with during site preparation, as well as the availability of manpower and resources.

Site preparation during the initial planting boom 40 to 50 years ago was restricted to areas of fern, tussock and light manuka scrub, which only required burning prior to planting.

Extensive areas of these types of vegetation are not now available, particularly in the Tokoroa area, so that the company for the past 5 to 10 years has been faced with the conversion of indigenous cutover on a wide range of **terrain**.

VEGETATION TYPES

The major vegetation types which have been or will be converted to exotic species are listed below, together with the methods of site preparation normally used. A list of the main weed species is given under the section on **spraying**.

INDIGENOUS CUTOVER AND HEAVY SCRUB 30 TO 40 FT IN HEIGHT

- (a) Hand-fell, spray and burn.
- (b) Crush understorey, hand-fell overstorey, spray and burn.

MEDIUM SCRUB 15 TO 30 FT IN HEIGHT

- (a) Hand-fell or crush, depending on terrain, spray and burn.

FERN AND LIGHT SCRUB UP TO 15 FT IN HEIGHT

- (a) Burn and double disc where terrain allows.
- (b) Some desiccation may be carried out prior to burning on cold southerly and easterly faces.

GRASS AND REVERTED PASTURES

- (a) Machine or hand planting followed by spraying.

The broad vegetation types listed range from cutover podocarp forest of varying age and density of hardwood shrub regrowth with kamahi (*Weinmannia racemosa*) as the main sub-dominant species; recently cut-over tawa (*Beilschmiedia tawa*) forest, through rewarewa (*Knightia excelsa*)/kanuka (*Leptospermum ericoides*)/manuka (*L. scoparium*) association to manuka/bracken (*Pteridium aquilinum* var. *esculentum*) association and lastly, but by no means the easiest to deal with, both introduced and native grasses.

LAND PREPARATION

HAND METHODS

The common tool used nowadays is the petrol-driven chainsaw, usually 3 to 5 h.p., operated by one man. Underscrubbing the understorey vegetation with slashers prior to felling the overstorey was commonly practised before the advent of the modern light-weight chainsaw. This underscrubbing provided the kindling to ignite the heavier fuel; however, together with the light-weight saws and the use of desiccating chemicals, the underscrubbing operation has been largely dispensed with.

The continued use of hand-felling as the major method of initial site preparation has been dictated by the type of terrain and the size of tree species to be dealt with.

MECHANICAL METHODS

(a) The Lowther planting machine equipped with sod scalpers to cut a furrow, turn a 6 in. sod back on either side of the furrow, and plant trees in one operation, is possibly the most economical and efficient method of combined site preparation and establishment yet devised.

(b) Double discing of burnt bracken and light scrub prior to planting using giant or super giant discs towed by 40 to 60 h.p. tractors has proved to be an extremely economic method of site preparation, with the added advantage of reducing the growth of bracken considerably during the first season, thus eliminating at least one releasing.

(c) Windrowing of previously crushed vegetation and logging debris using 100 to 200 h.p. tractors equipped with angle blades, or preferably rootrakes, has proved to be effective where the terrain is suitable and burning is either too hazardous or has been prevented by adverse weather conditions. However, soil compaction, loss of topsoil, and a loss of up to 15% of the productive area owing to unburnt windrows, are in some cases severe disadvantages associated with this method.

(d) Tractors of the horsepower range mentioned in (c) have also been used to crush regrowth of hardwood shrub species in indigenous cutover with or without towing cutting rollers. This operation is equivalent to the underscrubbing described under "Hand Methods", with overstorey vegetation being felled by chainsaw. Provided that a minimum of soil disturbance is created during the crushing operation, this method provides good conditions for burning and reduces the labour content for the hand-felling of a similar area by up to 80%.

(e) Recent developments in mechanical clearing equipment have been the crushing rollers introduced by a Bay of Plenty contractor.

The "gravity" roller, which is a completely new concept, consists of a 6 ft diameter steel drum 16 ft in length with 9 in. cutters running the length of the drum. This roller is controlled and steered by two winches mounted on a turntable on the rear of a TD25 tractor and is capable of crushing vegetation up to 8 to 10 in. diameter on topography previously restricted solely to handwork.

The "self-propelled" rollers consist of two 16 ft rollers 6 ft in diameter connected together by a central pivot. Each roller is powered by a 150 hp motor and the unit is steered by hydraulic rams. This self-propelled unit is capable of handling 12 to 15 in. diameter vegetation on gently to moderately undulating terrain.

Both these units have been used to prepare vegetation for burning and also to crush vegetation after burning with equally good results, at a greatly reduced cost compared with conventional methods.

BURNING

With the exception of machine planting and complete clearing or windrowing, the various site preparation methods described are all dependent on burning of the cut, crushed or sprayed vegetation to achieve final site preparation.

During the first planting boom, burning off was undertaken with the minimum of labour, machines and risk to surrounding areas. Controlled burning-off operations these days require large labour and machinery resources to be readily available, to reduce the risk involved in burning adjacent to established exotic forests and to areas of indigenous vegetation which are set aside for conservation.

The advent of chemicals for preparing the fuel in site preparation burning has given the forester some insurance against adverse weather conditions, as a clean burn is of far greater importance to the forester than the farmer in land-clearing operations.

SPRAYING

DESICCANT SPRAYING

This operation is standard practice where indigenous hardwood shrub or coppice regrowth precludes a good burn. The standard mixture used per acre is: sodium chlorate (18 lb), the butyl ester of 2,4,5-T (3.6 lb), diesel (1½ gal) and water up to 30 gal.

The amounts of water and sodium chlorate may be varied according to the density of vegetation. At least 4 weeks should elapse between spraying and burning. If not burnt, coppice regrowth may occur within 3 or 4 months. Effects are scored using the following system:

- 0—No effect
- 1—Slight browning or slight wilting
- 2—One-third of plant browned
- 3—Two-thirds of plant browned
- 4—Very heavy desiccation—stems alive
- 5—Aerial parts of plant dead
 - (a)—Twigs or small branches affected
 - (b)—Main branches or stems affected

The effects 4 weeks after treatment on the major species involved in past operations are listed below:

Tree fuschia (<i>Fuschia excorticata</i>)	4 (a)
Pate (<i>Schefflera digitata</i>)	4 (b)
Wineberry (<i>Aristotelia serrata</i>)	5
Rangiora (<i>Brachyglottis repanda</i>)	4 (a)
Fivefinger (<i>Pseudopanax arboreum</i>)	3 (a)
Tutu (<i>Coriaria sarmentosa</i>)	4 (a)
Wire vine (<i>Muehlenbeckia complexa</i>)	4 (b)
Kamahi (<i>Weinmannia racemosa</i>)	4 (a)
Karamu (<i>Coprosma robusta</i>)	3 (a)
<i>Coprosma australis</i>	3-4 (a)

This treatment has been used successfully by N.Z. Forest Products Ltd. since 1966. It must be stressed that desiccant spraying will not by itself ensure a good burn; but it is, nevertheless, a necessary operation for many of the company's areas.

GRASS CONTROL

The standard mixture used per acre for reverted pasture is: amitrole (1.5 lb), ammonium thiocyanate (1.37 lb), atrazine (3.2 lb) and water up to 30 gal.

Originally used as a pre-planting treatment, the mixture is now applied over planted radiata pine (*Pinus radiata*). There are two advantages gained by the post-planting treatment. First, as the chemical is applied later in the year (normally September, as opposed to July for a pre-planting treatment), a longer period of control is achieved; and, secondly, the planting operation does not disturb the atrazine layer.

This treatment effectively controls perennial ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*) and white clover (*Trifolium repens*), and reduces the amount and the vigour of cocksfoot (*Dactylis glomerata*). A ground cover of flat weeds is formed, which does not compete with the young trees. The main species are dandelion (*Taraxacum officinale*), hawksbeard (*Crepis capillaris*), sorrel (*Rumex acetosa* and *R. acetosella*) and yarrow (*Achillea millefolium*).

The trees show a temporary chlorosis of the terminals and needle tips, which persists until the start of active growth. Current trial work indicates that the effect is short-lived if the chemical is applied once the trees have become established. As long as the chemical is applied in time to prevent the grass competition, spraying may be done at any time of year.

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