

# ENCHANTED CREEK FOREST

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Owned by  
**ENCHANTED CREEK FORESTRY LIMITED**

**Forest Management Plan**

**For the period 2013 / 2019**



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## **1. INTRODUCTION**

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### **Principles and Criteria**

Enchanted Creek Forestry Limited is committed to adopt the Forest Stewardship Council (FSC) Principles and to meet their Criteria and the FSC standards of good forest management. These standards include ecological, social and economic parameters.

Enchanted Creek Forestry Limited is committed to the PF Olsen FSC Group Scheme that is implemented through the Group Scheme Member Manual and associated documents.

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### **About this Plan**

This document provides a summary of the forest management plan and contains:

- Management objectives;
  - A description of the land and forest resources;
  - Environmental safeguards;
  - Identification and protection of rare, threatened and endangered species;
  - Rationale for species selection, management regime and harvest plan and techniques to be used;
  - Appropriate management of unstocked reserve areas;
  - Maps showing plantation area, legal boundaries and protected areas;
  - Provisions for monitoring and protection.
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## 2. Forest Investment Objectives

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**Provision of services**

Enchanted Creek Forestry Limited’s objective is to obtain an economic return on investment while providing environmental benefits, including:

- Enhanced water quality;
  - Soil, stabilisation and conservation;
  - Providing a buffer against flooding during storms;
  - Shading waterways for aquatic life;
  - Enhance wildlife and plant habitat leading to increased biodiversity;
  - A reduction in greenhouse gases;
  - Economic and social benefits to the community and Enchanted Creek Forestry Limited.
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**Forest management goals**

The forest is managed to:

- Grow trees and produce logs for the manufacturing of different wood products in New Zealand and overseas with a focus on describe primary products;
- Ensure that the productivity of the land does not decline;
- Ensure that environmental values are identified and maintained;
- Ensure that historic sites are identified and protected;
- Ensure that other forest values and products are identified, protected and where possible enhanced;
- Harvest the trees as close as possible to their economic optimum age;
- Replant following harvesting; and
- Enter any other objectives specific to the forest area.

These objectives are delivered via the Quality Management System implemented by PF Olsen that includes ISO 9001 and ISO 14001 certification, and FSC environmental certification (when requested by the customer).

All activities within Enchanted Creek Forest are subject to management within a framework set by PF Olsen’s environmental policies and Environmental Management System (EMS).

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**Environmental  
policy**

**PF Olsen Limited Environmental Policy:**

*PF Olsen Ltd is committed to:*

- *Sustainable forest and land management;*
- *Promoting high environmental performance standards that recognise the input from the community in which we operate;*
- *Where appropriate applying the Principles and Criteria of the Forest Stewardship Council across forest management.*

Substantial additional detailed policies are contained within PF Olsen’s Environmental Management System (EMS).

**EMS framework**

The EMS is a core document defining the policies, processes and procedures that govern the physical implementation of forest management activities. The EMS applies a systematic approach certified to ISO 14001 standards to ensure that prevention of adverse and harmful impacts is effective.

An Environmental Management Group (EMG) assists the Environmental Manager, who is responsible for ensuring that the EMS is maintained and implemented. Internal audits to ensure compliance with the EMS and to improve the procedures of the EMS are undertaken at least once every two years.

### 3. Forest Landscape Description

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**Overview**

This section describes the physical and legal attributes of the land on which the forest is located. Included in this section are discussions of:

- Location and access;
  - Topography;
  - Soils;
  - Climate;
  - Legal ownership and tenure.
- 

**Location and access**

Enchanted Creek Forest is located off Northbank Road, which in turn is located to the west of State Highway 6. Internal access for vehicles is not maintained. A 4WD track on the neighbouring eastern boundary will provide access to the upper slopes of Cpt 1/02. Firebreaks are maintained within the forest and these will provide walking access when required.

The location of the forest in relation to potential markets is listed in the table below and shown in Map 1.

**Table 1: Distances from forest to log markets**

Potential Market or Export Port	Distance from Forest (km)	Log market
Port of Picton	80	Export
Kaituna Sawmill	45	Domestic
Nelson Pine Industries	155	Pulp

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**Topography**

The forestland is south facing steep hill country. Much of the forest is on slopes exceeding 30°.

Four streams bisect the forest from north to south, the most significant being Enchanted Stream.

Conventional uphill hauling log extraction methods will be utilised at harvesting:

Altitude is all below 400 metres above sea level.

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**Soils**

Soils are described broadly as “Onamalutu Steepland” soils which provide friable silt loam topsoil over granular silt clay loams on schist and greywacke. The soil is low in natural fertility however this is not a limiting factor to growth of *Pinus radiata*.

Earthworks involved in the construction of forest tracks and harvest roads need to take into account the high rainfall and highly erodable nature of the soils.

**Climate**

Rainfall: The average rainfall at nearby Top Valley is 1226mm per year. Enchanted Creek would be higher than this and is relatively evenly distributed during the year with heaviest falls at 130mm recorded in the months of April, May and August. January has the lowest annual average with 70mm.

Temperature: The mean annual temperature is around 12 degrees Celsius.

**Legal ownership**

The legal description of the land on which the forest is situated is:

<b>Certificate of Title</b>	<b>of</b>	<b>Appellation</b>	<b>Tenure</b>	<b>Area (ha)</b>
MB4D/656		Lot 1 DP 8010 & Lot 2 DP 7389	Freehold	38.146
MB4c/229		Lot 3 & 4 DP 7389	Freehold	60.51

The tenure of these two blocks is freehold but there is another section of forest (3.9ha) which is on land owned by another party for which Enchanted Creek Forestry Limited have a forestry right.

**The ecological landscape**

Enchanted forest falls within the Fishtail Ecological District running between the North Bank of the Wairau river and the ridgeline of the Mt Richmond Forest Park.

This area is typified<sup>1</sup> “by schist and greywacke mountains, high peaks to 1655m a.s.l.; cool, moderately wet; mainly strongly acid, stony, leached and podzolised steepland soils, minor areas of soils from moraines, outwash gravels, alluviums;” Vegetation is mainly beech forest (at lowland and montane levels) with distinctive sub alpine vegetation at upper levels.

While there has been extensive past lowland forest clearance for agricultural and exotic production purposes on the Wairau north bank penetrating a little into the Richmond valley systems, the great bulk of the area is formally protected within the conservation estate of Mt Richmond Forest Park.

While all significant tall indigenous forest has been removed from the sites forming the landscape in which the Enchanted Creek forests exist, the ecological niche retains a potential over time to return to some form of tall forest albeit in the case of beech forests, very extended time periods due to the poor seed distribution mechanisms of this genus.

**Protective Status**

The following table shows vegetation types as required by the National Standard for Plantation Forest Management in New Zealand revised in 2013.

**Table 2: Protective status of the ecological landscape**

	LENZ type: LENZ E 1.1	Fishtail Ecological District
Original (pre-Maori) percentage of ecosystem type in Ecological District within land title.	190,410ha 100%	53,209 ha 100%
Natural ecosystem area remaining.	83,028ha 43.6%	
Proportion of remaining natural ecosystem under protection.	37,943ha 45.6%	30,169 ha 56.6%
Added protection by certificate holder.	1.9ha 0.002%	1.9 ha 0.006%
Protected areas as a % by of total forest management area.		1.9ha 3.8%
Protected areas as a % of management estate by Ecological District.		1.9ha 3.8%

<sup>1</sup> [http://www.bush.org.nz/ecologicaldistrict/40\\_03.html](http://www.bush.org.nz/ecologicaldistrict/40_03.html)

**Threatened  
Environments  
Classification**

The Landcare Threatened Environments Classification (TEC) is a measure of how much indigenous vegetation remains within land environments, its legal protection status, and how past vegetation loss and legal protection are distributed across New Zealand’s landscape. The TEC is a combination of three national databases:

- Land Environments New Zealand (LENZ)
- Landcover Database 2
- Protected Areas Network

The TEC uses indigenous vegetation cover as a surrogate for indigenous biodiversity, which includes indigenous ecosystems, habitats, and communities; the indigenous species, subspecies and varieties that are supported by indigenous vegetation; and their genetic diversity. It uses legal protection as a surrogate for the relative vulnerability of indigenous biodiversity to pressures such as land clearance, extractive land uses, and the effects of fragmentation. The TEC is therefore most appropriately applied to help identify places that are priorities for formal protection against clearance and/or incompatible land uses, and for ecological restoration to restore lost species, linkages and buffers.

The table on the following page shows the threatened environments classifications as they pertain to this forest. The 1.9ha of reserves fall within threatened land environments where from 10% to only 20% of the original indigenous cover of the region remains.

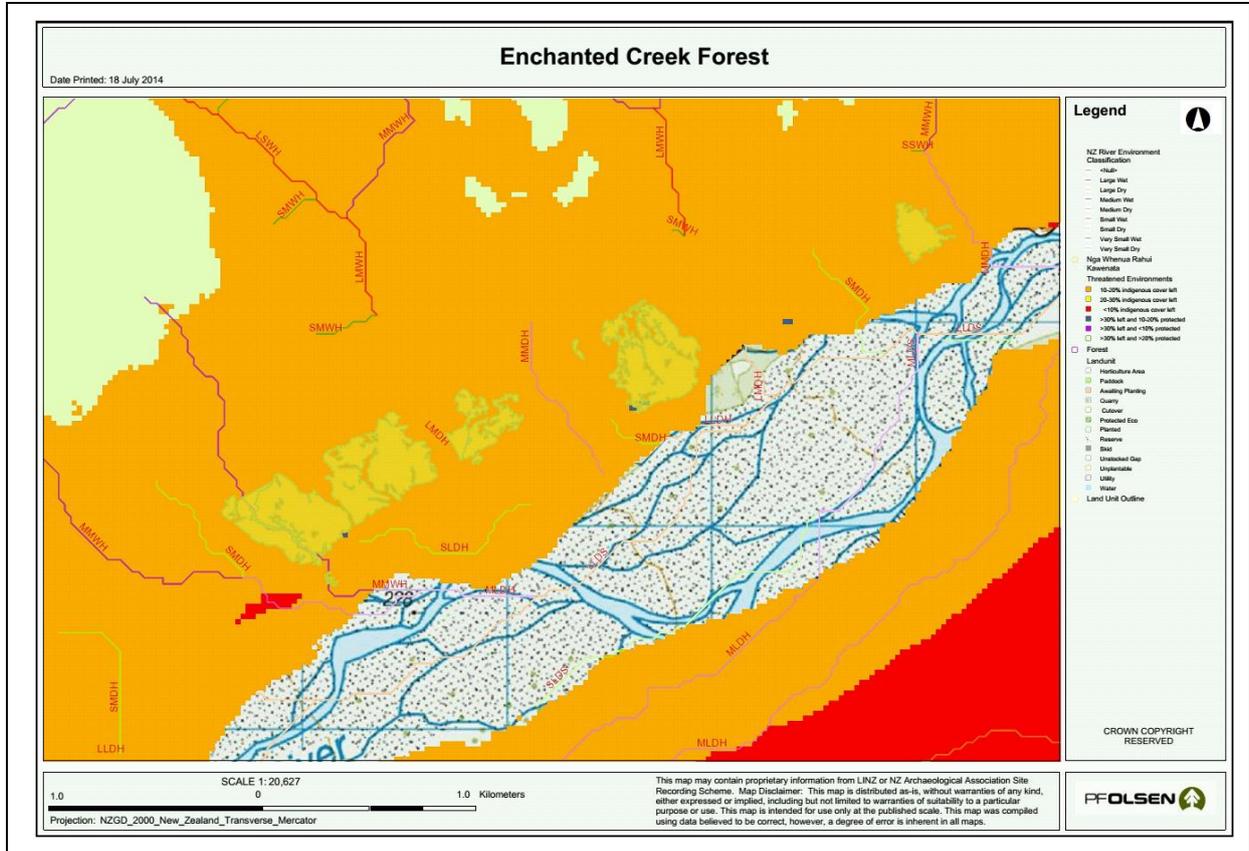
**Table 3: Reserve areas by Threatened Environments Classification**

	<b>Enchanted Creek</b>
<b>&lt;10% indigenous cover left</b>	
<b>10-20% left</b>	1.9 ha 100%
<b>20-30% left</b>	
<b>&gt;30% left and &lt;10% protected</b>	
<b>&gt;30% left and 10-20% protected</b>	
<b>&gt;30% left and &gt;20% protected</b>	
<b>TOTAL</b>	<b>1.9ha 100.0%</b>

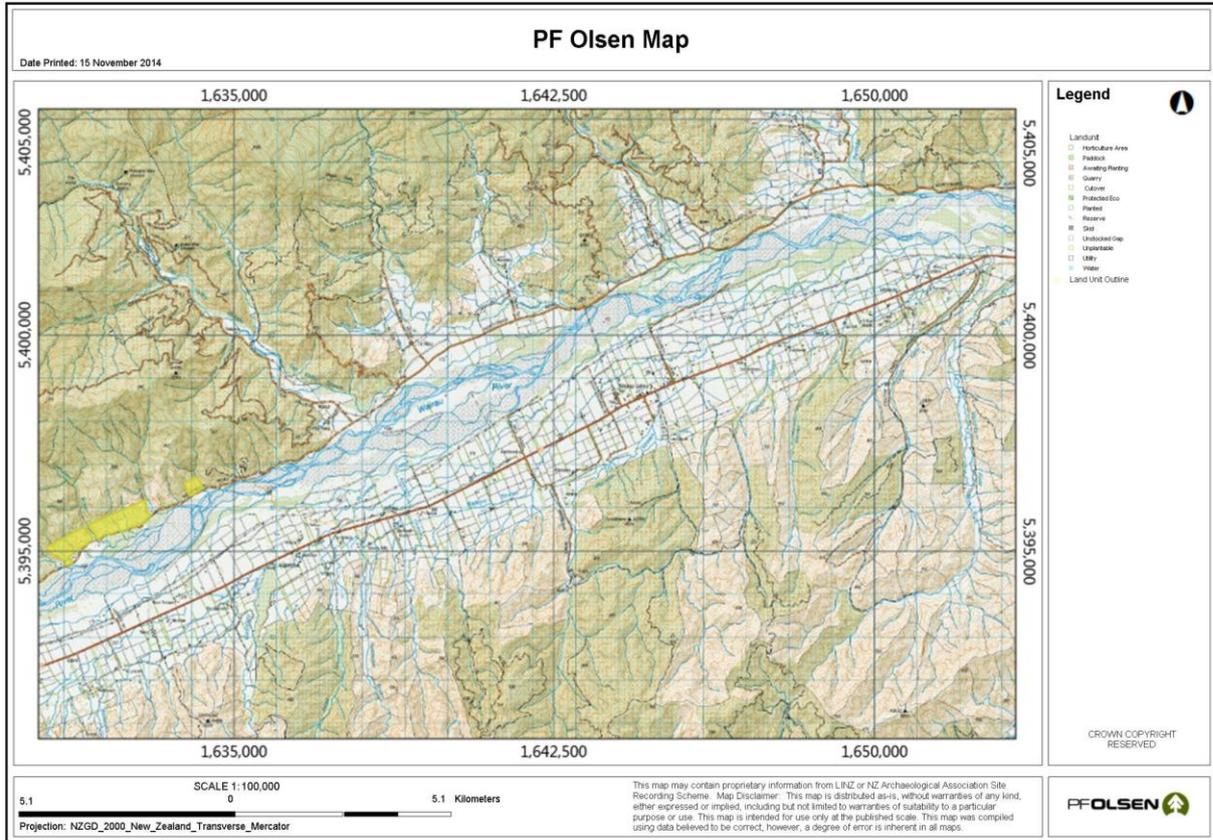
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The TEC status of the small reserves reflects the history of intensive pastoralism in the area. The reserves thus have value due to their paucity in the overall landscape.

**Forest by Threatened Environments Classification**



**Map 1 - Forest Location Map**



## 4. Socio-economic profile and adjacent land

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### Forest history

The forest was planted on reverting pasture land that showed signs of continual burning from the 19<sup>th</sup> century. Some fencing materials have been found on the upper slopes of the land that the present owners believe to be very old. Declining wool prices in the 1970's would have forced the farmers to abandon sheep farming and 20 years after this, with the property now covered in brush weeds, forestry became the most productive use of the land.

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### Current social profile

The Marlborough region, in which Enchanted Creek Forest falls, is one of the least populated in New Zealand (from Statistics NZ):

- 42,558 people
- 15<sup>th</sup> largest population out of the 16 regions in NZ
- 1.1% of New Zealand's population
- Maori population size ranks 13<sup>th</sup> out of the 16 regions in NZ

Combining data from the Atlas of Deprivation (Ministry of Health) and average income from Statistics NZ, it is apparent that the region fares reasonable well in terms of overall wealth. The area of the region where Enchanted Creek forest is also sits towards the least deprived end of the scale according to the Atlas of Deprivation. Age and family statistics show that there are a higher number of elderly and less families within the region than the national averages.

The forest was planted as a private forest investment. As a resource it forms a very small incremental part of a large permanently managed regional series of plantation estates owned by a number of corporate and private entities. In total these combine to produce a harvest of several hundred thousand cubic metres per annum.

The forest provides intermittent low levels of employment in its mid rotation stage and at harvest will contribute minor additional contract labour opportunities to the wider regional pool.

The local economy is diverse comprising viticulture, pastoral farming, forestry, tourism and aquaculture/fishing.

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**Associations with  
Tangata Whenua**

There has been no active interest from local iwi to date. The Marlborough District Council identified those iwi that may have an interest and opportunity to contribute to the planning process has been communicated in accordance with FSC requirements. The iwi are:

- Ngati Apa Ki Te Waipounamu Trust
- Te Runanga O Rangitane O Wairau
- Ngati Toa Rangitira Ki Wairau.

**Tenure & resource  
rights**

A search of the Maori Land Online website returned no results.

**Neighbours**

Neighbours to the forest estate boundaries have a special interest in the management of the forest. Activities within the forest may positively or negatively impact upon their quality of life or businesses in a number of ways, while inappropriately managed operations could create risks of adverse health, safety and environmental hazards. Neighbours may use the forests for recreational purposes or place reliance on the forests for provision of water quality or quantity services. Boundary issues such as weed and pest control, access and boundary alignment issues may also involve neighbours.

The following table lists the forest neighbours and their primary activities. Some or all of these parties should be consulted when operations are proposed in forest areas adjacent to their boundaries.

**Table 4: Forest neighbours**

Owner/Occupier	Contact #	Location	Activities
J MacDonald		Marlborough Road, RD 5, Blenheim	Lifestyle owner
Neil Black		8 Monro Street, Blenheim	Absentee farmer
DOC (Nelson/Marlborough)		186 Bridge Street, Nelson	Property manager
A J MacDonald		Marlborough Road, RD 5, Blenheim	Lifestyle owner
N Coker		Marlborough Road, RD 5, Blenheim	Lifestyle owner/farmer
A Drew		Marlborough Road, RD 5, Blenheim	Farmer
A J Uren		Marlborough Road, RD 5, Blenheim	Lifestyle owner/farmer

## 5. The Regulatory Environment

**Regulatory considerations**

In order to minimise the risk to forest owners, managers and contractors, it is important that relevant legislation and agreements are identified and appropriate measures put in place to ensure that breaches of legislation are avoided.

The following legislation and agreements summarise key regulatory and voluntary controls that currently apply to forest operations in the forest.

**Resource Management Act**

Enchanted Creek Forest is subject to the provisions of the Resource Management Act (RMA) 1991. The RMA sets up a resource management system that promotes the sustainable management of natural and physical resources and is now the principal statute for the management of land, water, soil and other resources in New Zealand.

Under the RMA, Enchanted Creek Forest falls under the Marlborough District Council for land management issues. It also falls under the Marlborough District Council for soil conservation and water quality issues because it is a unitary authority.

**District Plan**

Enchanted Creek Forest falls under the jurisdiction of the Marlborough District Council. The current plan is the Wairau Awatere Resource Management Plan. Most of this plan was made operative in March 2009.

Under the plan this block is zoned as Rural Four Zone and forestry is a permitted land use.

**Table 5: Resource Management Plan rules as they affect forestry**

Rule Ref	Status	Requirement
30.1.4.1	Noise	Must not exceed noise limits of 55 dBA L <sub>10</sub> between 7am-10pm or 45 dBA L <sub>10</sub> at all other times.
30.1.6.1	Indigenous Vegetation Clearance	<200m <sup>2</sup> in area is allowed to be cleared from a wetland, for other land the allowable clearance area depends on the type of vegetation (refer to the plan).
30.1.7.1	Vegetation Clearance	Permitted subject to best practice conditions (refer to the plan) such as: trees within 8m of any water body must be directionally felled away from the water, after clearance vegetative cover must be restored so that within 24 months the bare ground is no more than 20% greater than prior to clearance, depth of topsoil removed shall not exceed 20mm over more than 15% of any vegetation clearance site.

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<b>Rule Ref</b>	<b>Status</b>	<b>Requirement</b>
30.1.7.3	Excavating and Tracking	On land greater than 20% slope no more than 1000m <sup>3</sup> may be excavated in any 2 year period. Batters and side-casting must be stabilised by appropriate measures such as seeding, compacting, drainage and/or re-vegetation.
30.1.7.5	Land Disturbance	No woody material greater than 100mm diameter shall be left in waterways as the result of any land disturbance operations.
30.1.8.3	Fertiliser Application	Permitted subject to conditions 30.1.8.3.1 – 30.1.8.3.5
30.1.8.5	Agrichemical Application	Permitted subject to conditions 30.1.8.5.1 – 30.1.8.5.9
30.1.8.13	Dust	Must adopt best practice to avoid adverse effects resulting from objectionable dust emissions on the receiving environment.
30.1.9	Commercial Forestry	30.1.9.1 – no commercial forestry planting to occur where trees will shade any formed public road between 10am-2pm. 30.1.9.2 – 8m planting setback from streams. 30.1.9.3 – no planting to take place within 100m of any residential unit. 30.1.9.4 – 10m planting setback from property boundary. 30.1.9.7 – no commercial forestry may be planted on Outstanding Landscape Value areas. (See plan for all rules)

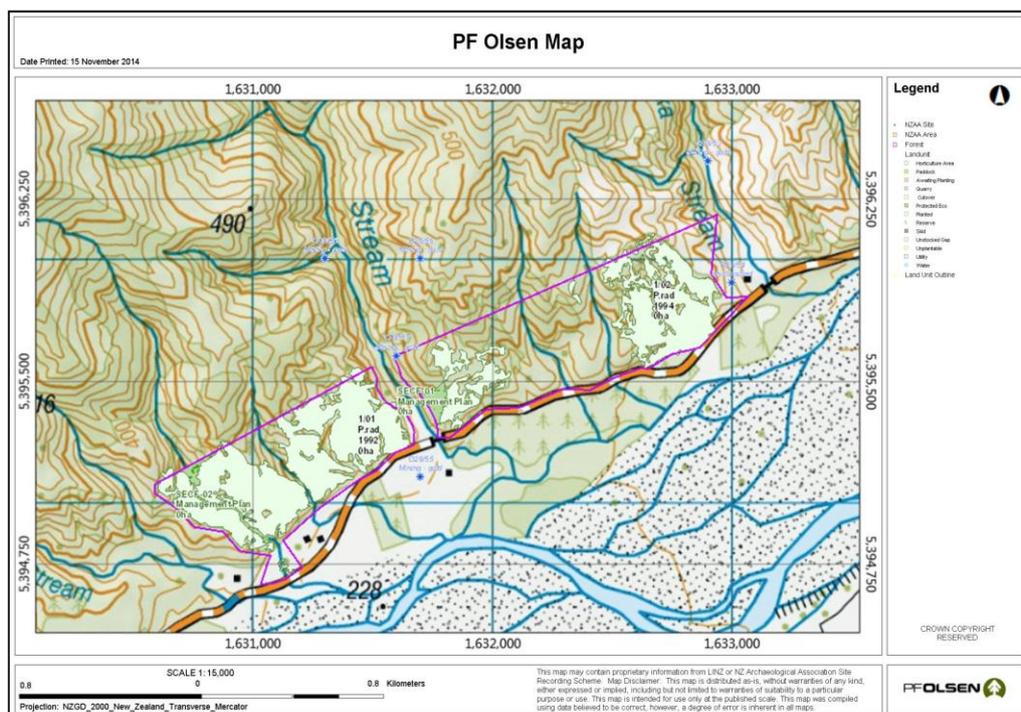
**Historic and archaeological sites**

Under the Historic Places Act 1993 it is the landowner’s responsibility to identify any historic sites on their land prior to undertaking any work which may disturb or destroy such sites. Records of archaeological and historical places are maintained in the NZ Archaeological Association (NZAA) Site Recording Scheme <http://www.archsite.org.nz/> .

If a site is found or suspected on any block, the protocols specified in PF Olsen’s EMS, and any others specifically developed in conjunction with HPT and Iwi or other stakeholders, must be observed. Where such circumstances require, an ‘Authority to Modify or Destroy’ will be sought from HPT. Such authorities are similar in function to a resource consent and, if granted, normally come with conditions that must be met. The process to apply for authorities is documented in PF Olsen’s EMS.

Note also that authorities to modify an archaeological site may sometimes be required from the local District Council and sites of cultural significance are often included in schedules of places and sites of significance in District Plans. Update checks for any sites will be required before any harvesting or related earthworks commences.

Checks of the NZAA database (map below) show that there are 6 known archaeological sites within or near the forest. There is a history of small scale gold mining in the area and all sites are associated with European habitation and mining. Archaeological advice will be required during planning for harvest to establish the requirements for further survey or specific protocols.



**Consents & authorities held**

The current resource consents and HPT authorities that apply to Enchanted Creek Forest are listed below.

**Table 6: Consents and authorities held**

Forest	Enchanted Creek				
Job					
Region:	<u>Marlborough</u>				
Consent Id	Forest	Granted	Expiry	Status	Details
U130550	Enchanted Creek	22/10/13	01/11/18	Current	Consent for earthworks, rods & skids. Also for use of an existing ford.

**\*\* End Of Report \*\***

**The Emissions Trading Scheme**

Forests in New Zealand are governed by rules related to New Zealand’s Kyoto commitments to reduce the nation’s carbon footprint and contribution to associated climate change.

The forest was planted on ‘Kyoto compliant’ land that was vacant as at 31<sup>st</sup> December 1989. These forest areas have not been registered to participate in the NZ Emissions Trading Scheme and are not subject to the accrual of emissions credits and liabilities under that scheme.

**Environmental Code of Practice**

All operations carried out on the property should be undertaken to the standards specified in the New Zealand Environmental Code of Practice for Plantation Forestry. This document sets out guidelines which ensure safe and efficient forest operations that meet the requirements of sound and practical environmental management.

**Forest Road Engineering Manual**

Roading and engineering techniques employed within the forest should conform to the industry best practice as outlined in the New Zealand Forest Owners Association publication, “NZ Forest Road Engineering Manual”, published 2012.

**Other relevant legislation**

For a comprehensive list of relevant legislation refer to PF Olsen’s EMS. Forest owners can be held liable for breaches of these Acts and may be held responsible for damage to third party property. Appropriate protection should be taken to minimise these risks.

Other relevant legislation includes:

- Animal Welfare Act 1999.
- Biosecurity Act 1993.
- Climate Change Response Act 2002.
- Conservation Act 1987.
- Crown Forest Assets Act 1989.
- Fencing Act 1978.
- Forests Act 1949.
- Forest and Rural Fires Act 1977.
- Forests Amendment Act 1993.
- Forestry Rights Registration Act 1983.
- Freshwater Fisheries Regulations 1983.
- Hazardous Substances and New Organisms Act 1996.
- Health in Safety in Employment Act 1992.
- Heritage New Zealand Pouhere Taonga Act 2014.
- Injury Prevention, Rehabilitation and Compensation Act 2001.
- New Zealand Forest Accord.
- Noxious Plants Act 1978.
- Pesticides Act 1979.
- Reserves Act 1977.
- Resource Management Act 1991.
- Soil Conservation and River Control Act 1971.
- Trespass Act 1980.
- Wildlife Act 1953.

For a comprehensive list of relevant legislation refer to PF Olsen’s EMS. Forest owners can be held liable for breaches of these Acts and may be held responsible for damage to third party property. Appropriate protection should be taken to minimise these risks.

## 6. Forest Estate Description

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**Forest area** The net stocked areas have been measured from a map produced by PF Olsen. The estimated net stocked areas of each stand are set out in the following table.

**Table 7: Forest area (ha)**

Gross area	Net stocked area	Area awaiting restocking	Reserves	Other
51.0	49.1	0	1.9	0

Unproductive areas include stocking gaps, roads and tracks, and other small unplanted areas. Total unproductive area has been derived by subtraction.

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**Current species** The species grown at Enchanted Creek Forest is *Pinus radiata* (radiata pine). This species has been chosen to best meet the management objectives set out above and in section 2 given the characteristics of the forest land as described in section 3.

Treestocks established in the forest are summarised in the table below:

**Table 8: Treestock Seedlot and GF Rating**

Stand	Treestock
ENCH-01-01	GF 17
ENCH-01-02	GF 17
ENCH-01-03	GF 17

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**Productivity indices**

The two most common estimators of the productivity of a site are the Site index and 300 index.

Site index is a measure of productivity of a site in terms of height growth of radiata pine at age 20. The 300 index is a measure of productivity of a site based on stem volume growth (mean annual increment) of 300 stems per hectare.

The site index for Enchanted Creek Forest is approximately 31. The 300 index for Enchanted Creek Forest is approximately 26.

Enchanted Creek Forest is at the middle to higher end of site productivity in the general area for forestry sites.

**Current crop status**

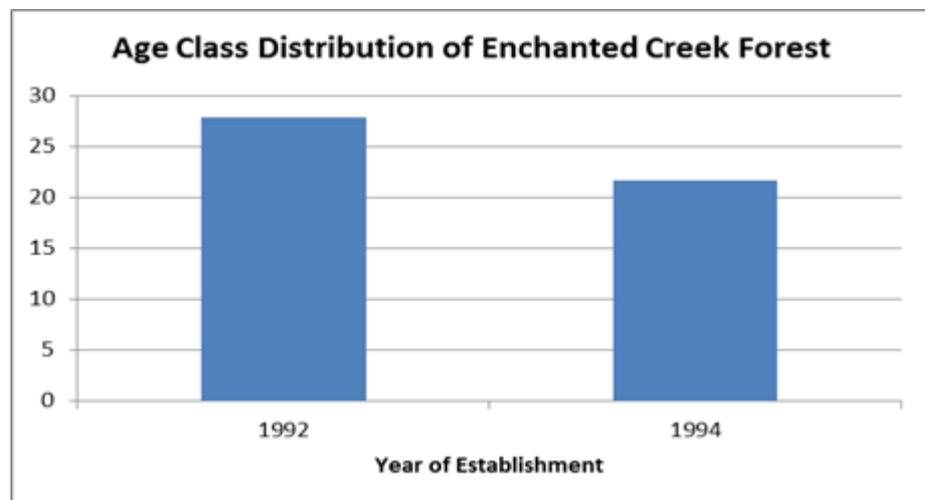
Measurement data from the most recent inventory was summarised to give the current status of the crop. This is shown in the table below.

**Table 9: Current crop status**

Stand	Year planted	NSA (ha)	Total stocking (s/ha)	Basal area (m <sup>2</sup> /ha)	Mean top Ht (m)	Mean DBH (cm)	Pruned stocking (s/ha)	Pruned height (m)
ENCH-01-01	1992	27.9	420		9.2			
ENCH-01-02	1994	17.8	585		16.0			
ENCH-01-03	1994	3.9	533		14.6			

**Age class distribution**

The age class distribution of Enchanted Creek Forest is illustrated below:



## 7. Reserve areas and significant species

### Introduction

Indigenous biodiversity management in or associated with exotic forests is an essential component of everyday forest management. Although exotic forests can provide a level of biodiversity, the reserve areas are usually the source of most indigenous biodiversity. Rare and threatened species can also be found associated with exotic forests and require special attention for management.

### Reserve areas

As a landscape, Enchanted Creek Forest forms a matrix of plantation stands sitting within a wider cover of regenerating brushweeds, ferns and indigenous scrub species that are steadily reclaiming old pasture. Primary species include gorse, bracken, low manuka and occasional groves of developing shrub hardwoods, cabbage trees and widely scattered mature beech that withstood the original fires. Old wilding pines originating from adjacent conservation land are also widely distributed.

Within the forest boundaries, two small indigenous regeneration stands are identified, neither of which form an ecologically significant system. However, as a developing cover that provides good riparian protection to the streams passing through the property and as part of a linkage between the Wairau river margins and the hinterland of Mt Richmond Forest, these areas should be protected from clearance, grazing and fire to ultimately regenerate to tall forest.

For similar reasons, operational planning should also provide for the creation of riparian margins either side of the two streams passing through the naturally regenerating pine stands.

The protected ecosystems are shown on the Forest Stands Map in Section 9.

**Table 10: Protected ecosystems and reserve areas**

Forest	Geo Unit	Area	Reserve Type	Protective Status	Protective Function	HCV Status	Forest Type	LENZ		Ranking	Protection Cat
								Remaining %	Protected %		
ENCH											
Enchanted Creek											
<b>! CAUTION RARE &amp; THREATENED SPECIES PRESENT IN FOREST !</b>											
	ENCH-SECF-02	1.0	02 Secondary Forest	Management Plan	Riparian Ecosystem	No Status	Manuka/kanuka/Broadleav	41.0	17.0	2048	Limited
	ENCH-SECF-01	0.9	02 Secondary Forest	Management Plan	Terrestrial Ecosystem	No Status	Manuka/kanuka/Broadleav	41.0	17.0	128	Passive
		1.9									
	<b>TOTAL</b>	<b>1.9</b>									

**Riparian reserves**

A standardised GIS-based stream classification system has been developed specifically for PF Olsen, based on NIWA’s River Environment Classification (REC) and Freshwater Environments of New Zealand (FWENZ) models. Categorisation of each stream reach is done by the physical characteristics of the particular reach, e.g. underlying geology, streambed slope, climate, and reach order. Each stream category corresponds with a set of rules in the EMS that apply to operations occurring near the riparian reserve.

The stream categories within Enchanted Creek Forest are summarised below:

**Table 11: Riparian reserve categories**

Category code	Category name	Total length (m)
MMWH	Medium, moderate, wet, hard	2452.3
<b>Total forest stream length (m): 2452.3</b>		

**Rare and threatened species**

New Zealand falcon and Buff weka have been sighted in Enchanted Creek Forest. Given the proximity to Mount Richmond Forest Park, it is possible that the forest will be used as a transitory habitat by rarer birds such as kereru, NZ falcon, kea and kaka.

As the crop and adjacent indigenous areas mature, long tailed cuckoo may also be present. The skeletal nature of soils with adjacent rock outcrops also lends to the possibility of native lizards being present. The manager should remain observant for the potential presence of the native brooms *Carmachaelia* spp that might conceivably be present in the rocky stream gorges.

No fisheries records exist for Enchanted Stream, however records held in the NIWA Freshwater Biodata Information System (Appendix 1) indicate that there may be longfin eel, dwarf galaxias, alpine galaxias, upland bully, redfin bully and trout present in the bigger adjacent catchments of the Top Valley and Staircase Streams. While not threatened, it is likely that some of these smaller species will be represented in the Enchanted Stream which passes through the property.

**Table 12: Rare species sightings**

Forest	Species	Date Seen	Threat Class	Number	Eastings	Northing	Area Seen
ENCH Enchanted Creek	0004 New Zealand Falcon						
		31/12/13	05 Nationally Vulnerable	1			010343 Enchanted Creek
	0007 Buff Weka						
		28/09/09	10 Relict	1			010343 Enchanted Creek
		24/04/09	10 Relict	1			010343 Enchanted Creek

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**CITES species**

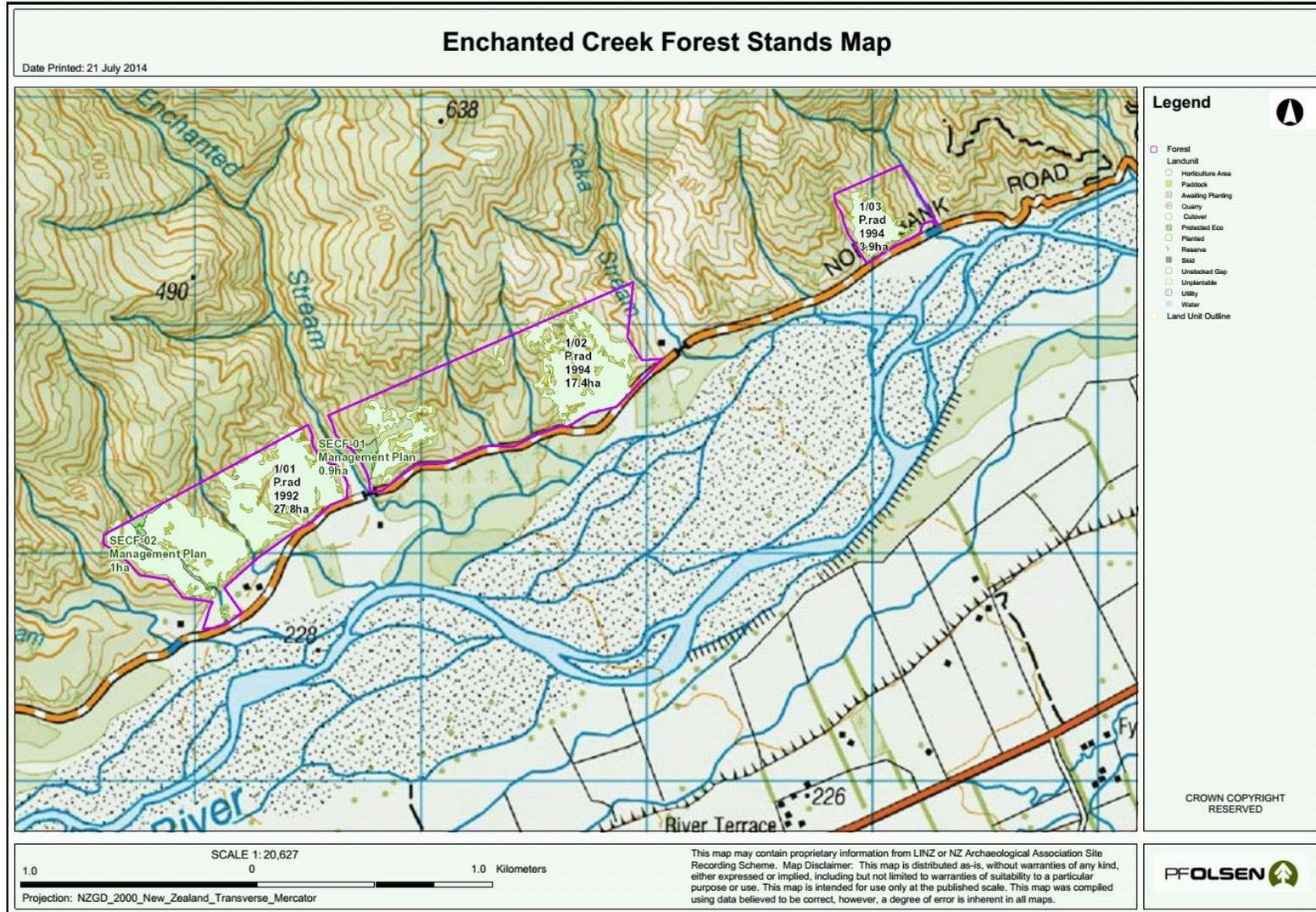
CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments.

Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species in the wild, and it accords varying degrees of protection to more than 34,000 species of animals and plants.

The full list of New Zealand CITES listed species are available in the EMS, or online at <http://www.doc.govt.nz/about-doc/role/international/endangered-species/cites-species/nz-cites-listed-species/>.

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**Map 2 - Forest Stands Map**



## 8. Forest Products and Other Special Values

### Introduction

Forest plantations can provide non-timber forest products and special values that enhance the economic wellbeing of the owner or legitimate forest users. Non-timber products are an important means of maximising the production capacity of the forest whilst maintaining environmental and social values. The forest management plan provides procedures for developing and managing these resources.

### Environmental and Social cost-benefit analysis

Forests can deliver numerous social and environmental products, both positive and negative to varying degrees. These non-timber products can be difficult to quantify, unlike financial costs and benefits.

The table below rates the relative positivity and negativity of the more common social and environmental products produced by Enchanted Creek Forest relative to the most likely alternative primary production system, pastoral drystock farming.

**Table 13: Environmental and social cost-benefit analysis**

Environmental or social product	Increasingly negative				Neutral			Increasingly positive			
	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Soil stabilisation										✓	
Erosion/soil loss				HP							MR
Water quality				HP							MR
Riparian shading			HP							MR	
Water quantity					MR	HP					
Carbon sequestration			HP								✓
Native wildlife habitat										✓	
Threatened fauna								✓			
Native fish										✓	
Air quality					HP		MR				
Native reserve protection									✓		
Landscape/visual			HP					MR			
Recreation								✓			
Commercial forest use										✓	
Firewood											HP
Local employment				MR					HP		

*NB: where the ratings differ throughout a rotation, 'MR' is used to indicate the mid rotation (growing) stage of the forest, and 'HP' refers to during or post-harvest.*

**Non-timber forest products** There are no non-timber products currently being produced or developed in Enchanted Creek Forest.

**Other special values** The following special values have also been identified in Enchanted Creek Forest:

- Evidence of gold mining exists along this area of the north bank of the Wairau River. There are visible workings in the valley floor, not on Enchanted Creek Forest land but on neighbouring land. There are no marked or known sites in the forest but they may exist.
- The book “Gold in a Tin Dish” Volume Two, contains several references to gold mining in Enchanted Creek. A photo on page 73 of the book shows a cutting that was used to divert Enchanted Creek, probably around 1888. Further, on page 111, there is mention of Percy Larkin, living at Enchanted Creek from the 1880’s, and building a 2 km water race in 1909.

Any mining remains or artefacts dating back to this time are protected by law and protocols will be followed as per the Historic Places Act.

**Recreational usage** Enchanted Creek Forest receives some recreational demand from the wider public mainly for hunting.

The forest will continue to be open for legitimate use subject to entry by permit.

Enchanted Stream has “Queens Chain” status on both banks.

Permit Category	Permit Type	Total Permits	% of Total
Commercial	MINERALEXP	1	33.33
Recreational	HUNTPIG	2	66.67
		3	

## 9. Environmental Risk Management

### Assessment of environmental risks

Several areas of typical forest management have been identified as posing a possible environmental risk within Enchanted Creek Forest. The Environmental Assessment Matrix below summarises the identified risks for Enchanted Creek Forest. The level of risk has been evaluated in the matrix as high 'H' or low 'L', or not applicable 'NA'.

Prior to operations such as clearfelling, land preparation and production thinning, an assessment is undertaken to quantify the risk involved in carrying out the particular operation, and steps are implemented to manage the risks.

<u>Forestry Operational Activities</u>	<u>ENVIRONMENTAL VALUES/ISSUES</u>											
	Erosion & Sediment Control	Water Quality	Soil Conservation & Quality	Air Quality	Aquatic Life	Native Wildlife	Native Vegetation	Historical & Cultural Values	Landscape & Visual Values	Neighbours & other forest users	Public Utilities	Recreation Values
Harvesting	M	M	L	L	L	L	M	M	M	H	L	L
Earthworks	H	H	M	L	M	L	L	M	M	L	L	L
Slash Management	L	L	L	L	L	L	L	L	L	L	L	L
Stream Crossings	H	H	L	L	H	L	L	M	L	L	L	L
Mechanical Land Preparation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Burning	L	L	L	H	L	L	L	L	H	H	L	H
Planting	L	L	L	L	L	L	L	L	L	L	L	L
Tending	L	L	L	L	L	L	L	L	L	L	L	L
Fertiliser Application	L	H	L	L	H	L	L	L	L	L	L	L
Agrichemical Use	L	H	L	L	H	L	H	L	L	H	H	H
Oil & Fuel Management	L	H	L	L	H	H	L	L	L	H	L	L
Waste Management	L	L	L	L	L	H	L	L	L	L	L	L
Forest Protection	L	L	L	L	L	L	L	L	L	L	L	L

**Hazardous substances management**

Hazardous substances are any substances, which may cause adverse environmental impacts and/or injury or health problems if incorrectly handled or used.

The hazardous materials which may be used within Enchanted Creek Forest are:

- Pesticides;
- Fuels and oils;
- Fire retardants;
- Surfactants.

Transportation, storage and labelling of these hazardous materials must all comply with the provisions of the Health and Safety Manual, which is maintained under ISO 9001 certification and incorporate legislative controls under EPA and NZS 8409:2004 Management of Agrichemicals code of practice.

Furthermore, the forest manager is committed to reducing the use of hazardous substances as much as possible. This involves use of alternative methods for the control of weeds, pests and diseases where these are effective and efficient. The use of fuels and oils is minimised where possible. Fire retardants are only used when required and surfactants are only used to make more efficient use of specific herbicides.

**FSC highly hazardous chemicals**

There are four agrichemicals that have been classified ‘highly hazardous’ by FSC that are used in forestry and conservation operations within PF Olsen certified forests. Special derogations to continue usage subject to conditions are maintained by PF Olsen.

**Table 14: Highly hazardous chemicals used by PF Olsen**

<b>Active ingredient</b>	<b>Purpose</b>	<b>Common usage</b>
Terbuthylazine	Gorse and grass control to aid establishment	Once/twice per rotation
Hexazinone	Bracken, grass, pampas and blackberry	Some specific sites
Sodium cyanide	Possum control (ground-based)	Rare
Sodium Monofluoroacetate (1080)	Possum control	Rare; usually by Animal Health Board

## **10. Commercial Crop Establishment and Silvicultural Operations**

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### **Introduction**

Forest operations are implemented to ensure a good quality crop and maximum growth. These operations include land preparation, establishment, weed control, pest and disease control, fire protection, pruning and thinning, and general property asset maintenance.

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### **Crop species**

In Enchanted Creek Forest, the main crop species grown radiata pine.

Radiata pine, when intensively managed, will produce a range of different log types suitable for various processing options. The pruned butt log can be used to make knot-free veneer or decorative timber. The unpruned logs can be used for structural timber, for veneer or for feedstock for fingerjointing. The small logs and those with defects and excessive knots can be used for pulp and paper, MDF and other reconstituted wood products such as tri-board and particle board.

Radiata pine is the most common species processed in New Zealand and export markets are well developed for both finished products and logs.

In New Zealand radiata pine is also the main focus in terms of research and development. Past research and development has resulted in improvements in growth, form and wood characteristics as well as development of a range of finished products, building codes and timber standards.

Individual specimens and small groups of alternate species such as blackwood, Douglas fir and eucalypts have been planted for amenity purposes and will provide a useful benchmark for future restocking decisions.

Alternative species have been considered, but these did not meet the Enchanted Creek Forestry Limited objectives.

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### **Establishment**

No establishment is planned at Enchanted Creek Forest during the period of this management plan.

Re-establishment will aim to use high quality treestocks suitable for the site and market. These will be investigated at time of establishment.

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**Pre-establishment forest flora and fauna**

Prior to re-establishment of the tree crop, a review will be conducted to identify whether there are any rare, threatened or endangered species of flora or fauna within the area to be planted and what, if any, adjustments in planning may be required. This may include the extension of an existing wildlife corridor or riparian area by increasing setbacks at the time of crop replanting. A plantation crop is likely to confer beneficial habitat buffering rather than cause adverse effects.

These considerations are covered by the afforestation checklist and riparian rules contained within the EMS.

**Tending**

The tending regime executed at Enchanted Creek Forest is variable. Cpt 1/01 and 1/03 have been partially pruned and thinned to waste while Cpt 1/02 is an unpruned stand and is thinned to 585 stems per hectare. No further tending operations are required during the period of this management plan.

**Tree nutrition**

The soils in Enchanted Creek Forest are not likely to be deficient in nutrients for healthy tree growth. However, there are soils within New Zealand that are deficient in one or more nutrients. The most common nutrient deficiencies are likely to be:

- **Nitrogen** – Generally west coast sands in the North Island and the Canterbury Plains, West Coast and Nelson regions in the South Island.
- **Phosphate** – Upper North Island, Marlborough and West Coast have marginal available phosphate concentrations. This is often associated with clay soils.
- **Magnesium** – Magnesium deficiency is a particular problem of the Central North Island and is associated with the phenomenon known as mid crown yellowing where the middle of the tree crown turns a yellow colour. Heavily pruned trees and some seedlots are more predisposed to the deficiency than others.
- **Boron** – Boron deficient trees can suffer dieback from the terminal buds and this symptom is closely associated with moisture stress and drought. Trees growing on the drier East Coast of both Islands and on the pumice soils of the Central North Island are prone to boron deficiency.

Foliar samples will be taken if nutrient deficiency symptoms are seen or expected. Fertiliser will only be applied if the health and the growth of the trees are significantly affected.

## **11. Forest Inventory, Mapping and Forest Records**

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### **Inventory**

Forest growth and development is monitored through forest inventory. Forest inventories providing stand information are required at different times and for different reasons throughout the life of the rotation. PF Olsen have procedures for each of the following four types of inventory to be applied on Enchanted Creek Forest:

- Pre-assessment: for silviculture rate setting and validating operational timing versus silvicultural targets;
  - Quality control: to check contractor’s performance and update stand records;
  - Mid crop: to collect measurement inputs for growth modelling;
  - Pre-harvest: to obtain estimates of recovery by log grade.
- 

### **Mapping**

Digital mapping of Enchanted Creek Forest currently exists, but will require updating from time to time as the forest changes.

The digital data is retained, processed and managed on PF Olsen’s GIS (Geographic Information System) to an accuracy fit for purpose.

Stands are remapped from new aerial photography around age four (when the trees are visible on aerial photography) to accurately determine boundaries and areas and around two years prior to harvesting to assist with harvest planning.

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### **Forest records**

Forest records are essential in monitoring the forest operations by providing a historic perspective to the physical condition of each stand.

Enchanted Creek Forest records are maintained on PF Olsen’s FIPS system (Forest Information and Planning System). These record systems allow for fast retrieval of information, production of reports and statistics and provide a comprehensive audit trail.

Forest records are essential to understand the status and condition of forest stands, reserves, and important fauna species as well as the retention of inventory data and operation monitoring data.

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## 12. Harvesting Strategy and Operations

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**Harvesting strategy** As a plantation with a non-normalised age-class structure, the harvesting strategy employed at Enchanted Creek Forest is to harvest the forest or constituent stands as close as possible to the optimum economic age as practical. This is the age at which the growth in volume and improvement in quality is offset by the cost to maintain the forest for another year. The optimum rotation length (for radiata pine) is expected to be within 25 to 30 years (this may be less for framing or unpruned stands).

Of importance in this assessment is the actual growth of the tree crop, the market for the wood at the time of the harvest and the outlook then and for the near future. These factors, together with logistics such as the availability of suitable harvest contractors and the requirements of resource consents, will determine the actual harvest time.

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**Getting harvest ready** Forward planning is essential when considering harvesting activities. Harvest planning should ideally commence 2 years before harvesting to enable roading infrastructure to be developed and any resource consents, archaeological surveys, etc. to be undertaken. This reduces the chance of hold-ups to the commencement of harvesting, which can be costly when log prices are fluctuating.

Harvest planning is conducted within a detailed structured framework controlled within the PF Olsen FIPS system. Planners are guided through a total of 100 elements involving environmental, cultural, community, infrastructural, and safety issues that must be addressed as well as direct operational and economic considerations, prior to the issuing of final prescriptions.

Harvesting operations will be undertaken by contractor and supervised by the forest manager.

By the end of this management plan term, advanced considerations should be being given to preparation for harvesting and may even need to have started if market opportunities are good.

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### 13. Property Management and Protection

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**Statutory pest obligations**

Pest management within Enchanted Creek Forest is subject to statutory obligations under the Regional Pest Management Strategy administered by the Marlborough District Council (unitary authority).

The Strategy applies to both pest plants and animals and categorises them in terms of management objectives. The categories and landowner obligations are summarised in the table below.

**Table 15: Statutory pest regulations**

Pest Category	Plant pest objectives	Animal Pest Objectives
Total Control Pests	Eradication	To eradicate rooks from Marlborough
Containment Control Pests	Prevent the spread of containment control plant pests	Prevent the spread of containment control pests and/or maintain numbers at low levels
Surveillance Pests	Monitor distribution of surveillance pests to prevent establishment or increase in region	Monitor distribution of surveillance pests to prevent establishment or increase in region
<b>Forest Landowner Obligations</b>		
Total Control Pests	Notify council of new infestations, fund 25% of control costs	Notify council of the presence of rooks
Containment Control Pests	Responsible for the control of containment species on their land	Responsible for the control of containment species on their land
Surveillance Pests		
Full details of classifications and obligations are listed in the Marlborough Pest Management Strategy.		
The full list of plant and animal pest species are contained in Appendix 2.		

**Pest control**

The PF Olsen Integrated Pest Management provides guidance on application and execution of the PF Olsen Ltd Environmental Management System (EMS) for pest control and chemical use.

The main animal pest in Enchanted Creek Forest is the introduced possum. Possums attack the growing tips of both plantation and native trees, causing stem malformation and die back. Possums are also a threat to neighbouring property owners who are farmers as they can carry and spread tuberculosis to domestic stock.

*Continued on next page...*

*...continued* Other pests include rabbits and hares at the time of establishment and wild goats during the first half of the crop rotation when bark is soft and palatable.

Animal pests in Enchanted Creek Forest will be controlled using ground control methods as required, which prevent impacts on non-target species. The forest manager will coordinate operations with organisations such as the Regional Council and the Department of Conservation to achieve effective and efficient control within the forest area and on neighbouring land, where required.

The primary pest plants in the forest are gorse and broom. These are to be managed in accordance with their containment status under the Regional Pest Management Strategy and by attention to outbreaks associated soil disturbance related to track formation and road metal.

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**Disease control**

Diseases, which can affect the forest trees and adjacent native vegetation, are monitored throughout the year by the forest manager, and once a year by a professional independent forest health assessor. Most diseases cause little damage and do not require control. The exception is *Dothistroma*, a fungus which attacks pine needles. This fungus is controlled using a copper-based fungicide, but only when the infection reaches a critical level.

*Dothistroma* infection can also be controlled through silviculture by timely thinning and pruning operations, which increases air movement and lowers humidity levels.

There is no *Dothistroma* control carried out at present in Enchanted Creek Forest.

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**Protected ecosystems, reserves and species**

PF Olsen’s Conservation and Ecology Manual provides detailed guidance and specification on the application and execution of ecological management targets and actions, as are broadly laid out in the Environmental Management System (EMS). Programs for ecological management are specified and monitored in FIPS Ecological Management module.

All the protected ecosystems within the forest are heavily modified associations reverting from farmland. In all cases, the general management applied will be to secure and enhance regeneration of tall native vegetation along the primary corridors and riparian areas separating the various plantation stands. This will be achieved by:

- Maintenance of fences to retain a stock free condition,
- Protection from fire
- Protection from harvesting and road construction damage during harvest periods.
- Encouragement of sufficient hunting pressure to maintain low pest numbers, noting that the vegetation associations are relatively robust against the primary pest species and not favoured habitat.
- Removal of wilding pines when evident.

**Ecological equivalence**

Enchanted Creek Forest is a small (SLIMF) forest as defined under the FSC New Zealand Standard. By these definitions the forest avoids the requirement to have 5% of its area under protection but the FSC estates within the Group Scheme must in aggregate achieve a level of 10% of the certified estate within each Ecological District also under protection. Where such thresholds cannot be met, there are other mechanisms generally termed ‘ecological equivalence actions’ that can be undertaken to meet the standard.

	<1000 ha SLIMF	>1000 ha L
<b>5% Forest Reserves</b>	NA	
<b>10% Ecological District Reserves</b>		
- Met within forest	N	
- Met within eco district	N	
- Met within forest eco equivalence	Y	
- Met by eco district adjacency eco equivalence effort	-	
- Met by eco region adjacency eco equivalence effort	-	

Enchanted Creek Forest falls into the Fishtail ecological district which has 3.8% of its managed area in reserves.

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The table above illustrates how the requirements will need to be met. In the case of this forest there is a considerable area of unstocked reverting land. There is an occurrence of wilding pines that have spread from early government plantings in the hills above the property.

By commencing a programme to remove wildings from at least a further 3.0 ha of the scrublands and ensuring its retirement for natural reversion, the requirements of the FSC standards will be met.

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**Fire prevention and control**

With the weather patterns normally experienced in New Zealand during the period late spring/summer, fire can be a real threat to the forest. This can be minimised by:

1. Having an effective fire plan;
  2. Active prevention measures which include restrictions on allowable access, fire prevention signage, publicity when fire danger prevails, access to adequate water sources, constructing and maintaining firebreaks, and selective forest grazing to reduce fuel within stands;
  3. Effective detection systems which includes good communication systems, mapping, and fire plan alert procedures;
  4. A close link with the relevant fire authorities, and an understanding of equipment and trained manpower requirements, and
  5. Good forest management that recognises the influence of terrain, roading network and accessibility, and fuel build-up from silvicultural practice, that will influence fire prevention and control measures.
- 

**Fire authority responsibilities**

The legal responsibility for fighting forest fires lies with the respective territorial land authorities where the forest is situated. In the case of Enchanted Creek Forest the Rural Fire Authority (RFA) is the Marlborough Kaikoura Rural Fire Authority.

In the event of a fire that starts within the forest, the RFA is responsible for attending and providing the resources to extinguish the fire. Where a fire starts outside the forested area and moves into the forest, the RFA has recourse to the Rural Fire Fighting Fund to compensate for fire fighting costs.

There is a close liaison with the RFA in terms of developing the 'fire plan' and the maintenance of good communication relative to potential risks and fire danger ratings.

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**Fire insurance**

With regard to the location of the forest and the high public activity around the fringes, there will always be the potential for fire. If a fire originates within the forest, the owners will ultimately be liable for suppression costs. A major fire may cost many thousands of dollars to extinguish, with the main costs being the use of heavy machinery, helicopters, and manpower.

Insurance for Enchanted Creek Forest is held by Enchanted Creek Forestry Limited. The current extent of cover is:

- Fire fighting cover (the costs of fire suppression) of \$ .
- Cover for the crop value and re-establishment costs are retained based on a recognised crop valuation, but reviewed on an annual basis.

Enchanted Creek Forestry Limited should liaise closely with the forest manager at the time of fire insurance renewals and if necessary instruct the forest manager to keep premiums paid up.

**Public liability insurance**

It is recommended that Enchanted Creek Forestry Limited maintain public liability insurance cover, with a fire fighting extension, to indemnify against unforeseen adverse activity both within the forest area and adjoining land tenure. In the case of fire spreading from Enchanted Creek Forest onto adjoining land, Enchanted Creek Forestry Limited would be liable for the fire fighting costs and any damage to property.

There is public liability insurance currently held by Enchanted Creek Forestry Limited for Enchanted Creek Forest.

## 14. Monitoring

### Introduction

To ensure that the management objectives identified in this plan are being achieved, various monitoring exercises outside normal operations management have been developed. Monitoring results are summarised and reported to Enchanted Creek Forestry Limited as and when required and are also, where appropriate, made publicly available through the PF Olsen webpage.

### Values monitored

Management inspections are completed regularly during operations and periodically between times to monitor all aspects of the forest growth, health and conditions. The findings of the inspections are detailed and, where appropriate, summarised on the PF Olsen FSC website. The full monitoring framework implemented and applicable to Enchanted Creek Forest is tabulated below.

<b>Environmental Process Monitoring Framework</b>					
<b>Monitored Element</b>	<b>Include</b> √	<b>Components</b>	<b>Data Source</b>	<b>Data medium</b>	<b>Reporting / Website frequency</b>
Chemical usage	√	A.I usage/ Area overuse	operations supervisors	FIPS Form	On demand / annual
Consultation activity	√	Complaints	operations supervisors & planners	Form	Annual / annual
Environmental incidents	√	Incident number / categories	operations supervisors	FIPS Form	On demand / annual
Flora & fauna	√	Species & Status frequencies/ new finds	operations supervisors, public, crews	FIPS Form	Annual / annual
Forest estate structure	√	Area (plantation & Protected ecosystem)/ age-class/ species/forest type/protection status	management plans/stand records	FIPS stand records	On demand / annual
Forest growth	√	PSP protocols / periodic inventory. ISO 9001	contractors	To be established	Periodic-annual – not on web
Forest health	√	Disease & health	National Forest surveillance program <sup>2</sup>	document	Periodic-annual – not on web

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<sup>2</sup> Forest health inspections are undertaken annually, by an independent specialist forest health assessor, through the NZ Forest Owners Association forest health scheme.

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FSC membership	√	Block/ location/name	FIPS register	FIPS client database	On demand / annual
Health and safety statistics	√	LTI / accidents & incidents.	operations supervisors	FIPS	Monthly/ annual
Internal Audit CAR activity	√	Frequency * category	Auditors/ees	FIPS Form	Annual / annual
Log production	On harvest	Total logs/ FSC markets	log docket	Woodtrack	On demand / annual
Operational monitoring	√	Audit trends/cause analysis	operations supervisors	FIPS Form	Monthly / annual
Pests	√	kill returns or other	supervisors /contractors	permits	Annual where relevant
Protected ecosystem condition	√	Condition trends/photopoint monitoring	Contractors/ supervisors	To be established for wildings	Bi-annual if restoration initiated
High Conservation Value forests	NA	Condition trends/photopoint monitoring	Contractors/ supervisors	To be established	Bi-annual if restoration initiated
Recreational & non-timber	√	Permits issued	branch offices / forest security	FIPS Form	Annual / annual
Resource consents	√	Number/compliance	operations planners	FIPS	6 monthly / annual
Stream monitoring	NA	Clarity +/- other specific	supervisors /contractors	Spreadsheet	Monthly / annual where relevant
Environmental training	√	Courses, numbers, names	Staff	FIPS Form	Annual/as relevant
Client satisfaction	√	Post-operation client survey	clients	Survey form	Post-operational /annual
Social survey	√	Demographics, values, work conditions	contractors	Survey form	5 yearly/annual

**Financial**

Budget versus expenditure is monitored through the PF Olsen FIPS system and presented to Enchanted Creek Forestry Limited when requested. This information is not made public.

**Social**

Consultation with stakeholders has been undertaken and constant feedback from these stakeholders (and others as they become apparent) is monitored. This includes actions undertaken to resolve disputes and issues.

## **15. Future Planning**

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### **Introduction**

This plan pertains to the management of Enchanted Creek Forest and will be adhered to for the next 5 years. Any deviation from this plan will be justified only on the basis that the changes do not adversely affect the environment. Any changes which are contrary to the policies contained in this management plan require a full review of this plan.

The next review date for this plan is July 2019.

The forest management plan is used for both medium and long term planning.

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### **Operation plans**

For the short term we use operation plans. These plans are prepared annually in accordance with this management plan. This operation plan and associated budget are subject to approval by Enchanted Creek Forestry Limited at the beginning of each financial year.

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## Appendix 1: NIWA Fisheries Record

Top Valley Stream									Distance	
Genus	Species	Common name	Locality	Catchmen	Indigenous f	Map	Easting	Northing	Altitude (m)	Inland (kms)
Anguilla	dieffenbachii	Longfin eel	Top Valley Stream	Wairau R	t	o28	2549520	5960582	170	56
Galaxias	divergens	Dwarf galaxias	Top Valley Stream	Wairau R	t	o28	2546300	5960400	200	60
Galaxias	divergens	Dwarf galaxias	Top Valley Stream	Wairau R	t	o28	2549520	5960582	170	56
Galaxias	paucispondylus	Alpine galaxias	Top Valley Stream	Wairau R	t	o28	2541400	5965200	270	69
Galaxias	paucispondylus	Alpine galaxias	Top Valley Stream	Wairau R	t	o28	2541400	5965300	270	69
Gobiomorphus	breviceps	Upland bully	Top Valley Stream	Wairau R	t	o28	2541400	5965200	270	69
Gobiomorphus	breviceps	Upland bully	Top Valley Stream	Wairau R	t	o28	2549520	5960582	170	56
Gobiomorphus	huttoni	Redfin bully	Top Valley Stream	Wairau R	t	o28	2546300	5960400	200	60
Salmo	trutta	Brown trout	Top Valley Stream	Wairau R	f	o28	2541400	5965200	270	69
Salmo	trutta	Brown trout	Top Valley Stream	Wairau R	f	o28	2541400	5965300	270	69
Salmo	trutta	Brown trout	Top Valley Stream	Wairau R	f	o28	2546300	5960400	200	60
Salmo	trutta	Brown trout	Top Valley Stream	Wairau R	f	o28	2549520	5960582	170	56
Staircase Stream										
Galaxias	paucispondylus	Alpine galaxias	Staircase Stream	Wairau R	t	o28	2542500	5962400	270	66
Gobiomorphus	breviceps	Upland bully	Staircase Stream	Wairau R	t	o28	2542500	5962400	270	66
Salmo	trutta	Brown trout	Staircase Stream	Wairau R	f	o28	2542500	5962400	270	66

## Appendix 2: Regional Pest Management Strategy Pests

**Table 4 - Plants Declared to be Pests**

Common Name	Scientific Name	Pest Designation
African Feather Grass	<i>Pennisetum macrourum</i>	Total Control
Bathurst Bur	<i>Xanthium spinosum</i>	Total Control
Boneseed	<i>Chrysanthemoides monilifera</i>	Total Control
Bur Daisy	<i>Calotis lappulacea</i>	Total Control
Cathedral Bells	<i>Cobaea scandens</i>	Total Control
Chinese Pennisetum	<i>Pennisetum alecuroides</i>	Total Control
Climbing Spindleberry	<i>Celastrus orbiculatus</i>	Total Control
Eel Grass	<i>Vallisneria australis</i>	Total Control
Evergreen Buckthorn	<i>Rhamnus alaternus</i>	Total Control
Giant Needlegrass	<i>Stipa rudis</i>	Total Control
Madeira Vine	<i>Anredera cordifolia</i>	Total Control
Moth Plant	<i>Arauja sericifera</i>	Total Control
Parrots Feather	<i>Myriophyllum aquaticum</i>	Total Control
Saffron Thistle	<i>Carthamus lanatus</i>	Total Control
Senegal Tea	<i>Gymnocoronis spilanthoides</i>	Total Control
Spartina Grass	<i>Spartina anglica</i>	Total Control
Broom	<i>Cytisus scoparius</i>	Containment Control
Chilean Needlegrass	<i>Nassella neesiana</i>	Containment Control
Contorta Pine	<i>Pinus contorta</i>	Containment Control
Gorse	<i>Ulex europaeus</i>	Containment Control
Kangaroo Grass	<i>Themeda triandra</i>	Containment Control
Nassella Tussock	<i>Nassella trichotoma</i>	Containment Control
Nodding Thistle	<i>Carduus nutans</i>	Containment Control
Ragwort	<i>Senecio jacobaea</i>	Containment Control
Reed Sweet Grass	<i>Glyceria maxima</i>	Containment Control
White-Edged Nightshade	<i>Solanum marginatum</i>	Containment Control
Blue Morning Glory	<i>Ipomoea indica</i>	Surveillance
Climbing Asparagus	<i>Asparagus scandens</i>	Surveillance
Cotton Thistle	<i>Onopordum acanthium</i>	Surveillance
Egeria	<i>Egeria densa</i>	Surveillance
Kahili Ginger and Yellow Ginger	<i>Hedychium gardineramum and H. Flavescens</i>	Surveillance
Lagarosiphon	<i>Lagarosiphon major</i>	Surveillance
Purple Loosestrife	<i>Lythrum salicaria</i>	Surveillance

**Table 5 - Animals Declared to be Pests**

Common Name	Scientific Name	Pest Designation
Rooks	<i>Corvus frugilegus</i>	Total Control
Feral Rabbits	<i>Oryctolagus cuniculus</i>	Containment Control
Possums	<i>Trichosurus vulpecula</i>	Containment Control
Darwin Ants	<i>Doleromyrma darwiniana</i>	Surveillance