

MANGAPAKEHA FOREST

Owned by
ROBMIJON Holdings Ltd

Forest Management Plan

For the period 2016 / 2021



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1. Introduction

Principles and Criteria

ROBBIJON Holdings Ltd 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.

ROBBIJON Holdings Ltd is committed to the PF Olsen FSC Group Scheme that is implemented through the Group Scheme Member Manual and associated documents.

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; and
 - Provisions for monitoring and protection.
-

2. Management Objectives

Environmental and economic services

Mangapakeha Forest can provide 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;
 - Stock shelter; and
 - Providing economic and social benefits to the community and ROBMIJON Holdings Ltd.
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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 high quality pruned and structural logs depending on the growth capability and environmental factors of the site.
- Provide quality pruned or structural forest managed to maximise forestry return.
- Protect significant areas of soil conservation concern.
- Ensure that the productivity of the land does not decline.
- Ensure that environmental values are identified and maintained.
- Harvest the trees close to their economic optimum age.
- Replant following harvesting.
- Help to offset any ROBMIJON Holdings Ltd carbon liability under the New Zealand ETS.

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. All activities within Mangapakeha forest are subject to management within a framework set by PF Olsen's environmental policies and Environmental Management System (EMS).

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.

Operating Environment

3. Forest Landscape Description

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

Mangapakeha Forest is located off the Masterton Castlepoint Road in the Masterton District.

Internal forest roads and tracks provide access to the forest directly from the county road. The forest has previously been harvested so access for road going vehicles has been previously established.

The location of the forest in relation to potential markets is listed in Table1 below.

Table 1: Distances from Forest to Log Markets

Potential Market or Export Port	Distance from Forest (km)	Log market
Wellington		
Masterton		
Featherston		
Dannevirke		

Topography

Mangapakeha Forest lies on rolling to steep hill country of a generally northerly aspect. Altitude of the forested area ranges from 40m to 205m.

A combination of ground based and hauler log extraction methods will be utilised at harvesting.

Soils

The soil at Mangapakeha Forest is as follows:

Silty loams over crushed argillite with low to medium fertility.

The soil has the potential for severe, deep earthflow erosion and severe wind erosion on ridges.

Climate

Rainfall: The average rainfall at nearby Castlepoint is 1,250mm per year and is concentrated during the winter months. The forest can experience moisture deficits particularly in late summer.

Temperature: The mean annual temperature is around 13.1 degrees Celsius.

Legal ownership

Mangapakeha Forest comprises freehold tenure. There are no registered forest reserves or covenants within the title but 5.7 ha is currently reserved from production.

The legal description of the land on which Mangapakeha Forest lies is:

Part Section 4, Block XV Mangapakeha Survey District

CT WN20C/248

Map 1: Forest Location Map



4. The Ecological Landscape

The ecological landscape

Mangapakeha Forest is located in the Eastern Wairarapa Ecological District (ED). The ED is extensive hill country on the east coast of the southern north island. It is moderately steep, up to 633m a.s.l. The hill country is finely dissected and drained to east and west by small to moderate watercourses. Geology comprises mixed greywacke, limestone, sandstone and siltstone with localised marine and alluvial terraces.

The area was originally entirely podocarp-hardwood forest with podocarp dominance on the valley floors. Today, only scattered forest remnants remain and the ED is largely semi intensive sheep and cattle farmland, with small (but increasing) areas of exotic forest.

Protective Status

The natural vegetation cover within the district has suffered severe reductions relative to the original cover to the extent that the approximate 11 % remaining is well below recognised levels considered appropriate to ensure conservation of species and ecosystems.

Table 2 shows a broad categorisation of the status of ecosystem conservation within the ED described in the Department of Conservation data and the relative status of protected lands within Mangapakeha forest relative to the planted estate.

Table 2: **Protective Status of the Ecological Landscape**

Ecological District Vegetation type:	Eastern Wairarapa ED
Original (pre-Māori) percentage of ecosystem type in Ecological District within land title	407,000 ha
Natural ecosystem area remaining	45,093 ha 11 %
Proportion of remaining natural ecosystem under protection in ED	<1 %
Protection by PF Olsen as a % of management estate	7.3 ha 4.5 %
Protection by PF Olsen as a % of ED	7.3 ha <0.01 %
Protected areas as a % of the aggregated Group Scheme management estate within the Ecological District	7.3 ha 4.5 %

The regional situation is further compounded by the very low level of formal protection of the remnants which implies that any areas of natural vegetation or ecosystems on private land albeit in themselves of relatively degraded status, do warrant efforts to ensure protection.

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In terms of areas identified for protection within the Mangapakeha forest, the total currently reserved quantum does not meet the minimum threshold of 10 % as proposed in the NZ FSC National Standards. See Section 15 Property Management.

**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

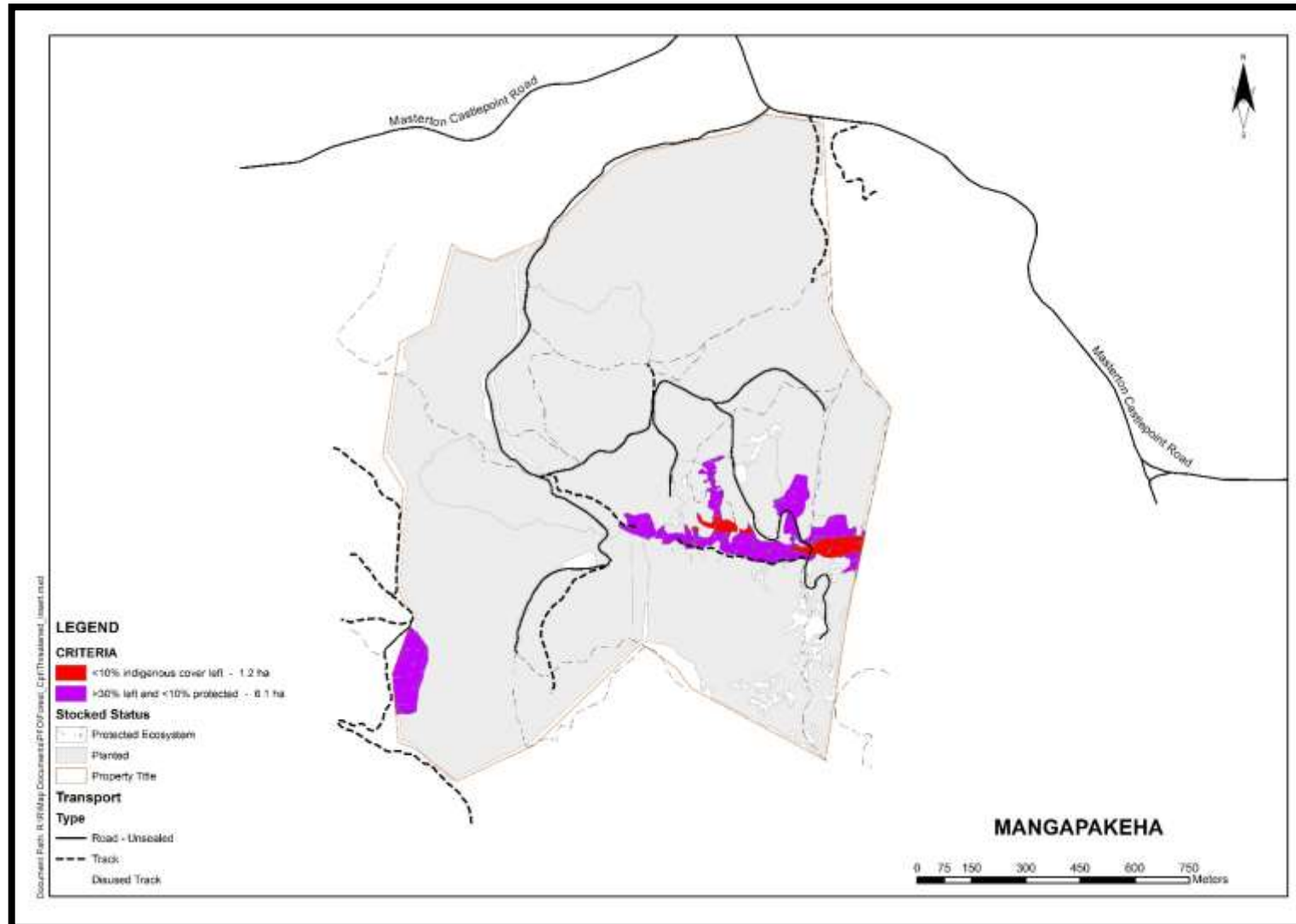
The TEC uses indigenous vegetation cover as a surrogate for indigenous biodiversity, which includes indigenous ecosystems, habitats, and communities; the indigenous species, subspecies and varieties that are supported by indigenous vegetation; and their genetic diversity. It uses legal protection as 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 following map (Map 2) on the following page illustrates that most of the protected ecosystems in the Mangapakeha forests occur either within environments for which between 20 and 30% or >30% of the original vegetation cover types still remain.

Table 3: Reserve areas by Threatened Environments Classification

Threat Class	Area (ha and %)
<10% indigenous cover left	1.2 ha 16.4%
10-20% indigenous cover left	
20-30% indigenous cover left	
>30% left and <10% protected	6.1 ha 83.6%
>30% left and 10-20% protected	
>30% left and >20% protected	
TOTAL	7.3 ha 100.0%

Map 2: Forest by Threatened Environments Classification



5. Socio-economic profile and adjacent land

Forest history

Mangapakeha Forest is a production forestry operation established with radiate pine. The forest is now in its second rotation having been previously harvested over the period 2003 to 2009.

Forestry was established on the land by a previous owner primarily for investment purposes.

The area established in forest was predominantly a low productivity site in agricultural terms due to the instability of the slopes and potential for slips and erosion.

Current social profile

Mangapakeha Forest is a small, currently passive, incremental contributor to the social profile of the area. The forest is privately owned; contribution to the local economy by way of added incremental employment and infrastructure is negligible.

Associations with Tangata Whenua

Greater Wellington regional council have identified two iwi organisations that may have an interest in Mangapakeha Forest:

- Rangitaane O Wairarapa
- Kahungunu ki Wairarapa.

Each group has been included in our stakeholder register and comment sought in respect of this plan. Rangitaane have indicated their support for the FSC registration.

Tenure & resource right

At February 2016, another search, via Māori Land Online, found that no Māori interest exists for the CT WN20C/248 block.

Neighbours

Neighbours to the forest estate boundaries have a special relationship 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.

Table 3 lists the forest neighbours as per PF Olsen’s FIPS records system and TerraView. Some or all of these parties should be consulted when operations are proposed in forest areas adjacent to their boundaries and all have been approached for comment in respect of this plan. A map of neighbour locations can be found in Appendix 1.

Table 4: Mangapakeha Forest Neighbours

Parcel ID	Title Owners	Date Title Issued	Address	Neighbour
	Susan Jane Johnston Timothy Eric Graeme Johnston Woodhouse Trustees Limited			
	Langdale Station Limited			
	Melvyn James Cherry Louise Joy Doust Paul Gibson Doust			
	Audrey Anne Mclennan Stuart Ross Mclennan			
	Susan Jane Johnston Timothy Eric Graeme Johnston Woodhouse Trustees Limited			
	The Wairarapa Catchment Board ¹			
	Melvyn James Cherry Louise Joy Doust Paul Gibson Doust			
	Langdale Station Limited			
	John Carl Wright			

¹ Now under the control of the Greater Wellington Regional Council.

6. 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 & voluntary controls that currently apply to forest operations in the forest.

Resource Management Act

Mangapakeha 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, Mangapakeha Forest falls under the Masterton District Council for land management issues and the Greater Wellington Regional Council for soil conservation and water quality issues.

District Plan

Mangapakeha Forest falls under the jurisdiction of the Masterton District Council. Masterton District Council, South Wairarapa District Council and Carterton District Council have prepared a Combined Plan². The latest combined district plan was operative as at 25th May 2011 and last amended 1st July 2014.

Under the plan this block is zoned rural and forestry is a permitted activity. Table 5 details the District Plan rules specific to Mangapakeha Forest.

Table 5: District Plan Rules as they Affect Forestry

Rule Ref	Activity	Requirement	Page
4.5.2 (f)	Noise Limits	Mobile noise sources associated with forestry activities may exceed noise control rules	4-13
4.5.2 (j)	Plantation Forestry	<ul style="list-style-type: none"> • 20 m from centreline of the carriageway of any public road • 10 m from any boundary • 35 m from any residential zone boundary • 20 m from a high voltage powerline • 10 m from any permanent flowing waterbody with a bed width of 1 m or more. 	4-18

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² <http://www.mstn.govt.nz/planning/combinedplan/WaiCombinedDistrictPlan20150714.pdf>

...continued

21.1.6	Indigenous Vegetation and Habitats	Not more than 50m ³ may be removed in any 10 year period for personal use.	21-8
21.4.2	Indigenous Vegetation	Any disturbance, removal, damage or destruction of indigenous vegetation within 20 m of a water body is restricted discretionary activity.	21-29

Regional Plan

The forest comes under the jurisdiction of Greater Wellington Regional Council (GWRC). The GWRC Plan³ became operative on 9th October 2000 and is currently under review. The proposal of new Natural Resources Plan for the Wellington Region was approved on 31 July 2015.

Table 6 details the GWRC Plan rules as they currently affect Mangapakeha Forest.

Table 6: Regional Plan Rules as they Affect Forestry

Rule Ref	Activity / Status	Requirement
Soil Plan • Rule 1	Roading and Tracking - <i>Permitted</i>	a) Continuous length of new upslope batter of 1.5m constructed in any 12 month period in Area 1 (all land to the east of the Ruamahunga River) does not exceed 200m.
Soil Plan • Rule 2	Large Scale Soil Disturbance on Erosion Prone Land - <i>Permitted</i>	a) Disturbance of less than 1000 cubic metres or 10,000 square metres unless associated with road and track construction in any 12 month period. b) Root raking of less than 10,000 square metres in any 12 month period.
Soil Plan • Rule 3	Large Scale Vegetation Disturbance on Erosion Prone Land – <i>Permitted</i>	a) Council given 21 days prior written notice. b) Area re-established with woody vegetation within 18 months. c) Groundbased harvesting methods follow the New Zealand Code of Practice. d) No vegetation or slash with diameter greater than 100mm left in any water course.

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³ <http://www.gw.govt.nz/regional-plans-policies-and-strategies/>

...continued

<p>Freshwater Plan</p> <ul style="list-style-type: none"> • Rule 1 	<p>Discharges of Stormwater – <i>Permitted</i></p>	<ol style="list-style-type: none"> 1. Unless to a waterbody being managed in its natural state (see Appendix 2 of the Regional Freshwater Plan). 9. Activity must not cause erosion of land or bed of water body beyond the point of discharge.
<p>Freshwater Plan</p> <ul style="list-style-type: none"> • Rule 25 	<p>River Crossings - <i>Permitted</i></p>	<ol style="list-style-type: none"> 1. Has a catchment less than 200 hectares. 2. Does not dam or divert the natural course of the stream. 3. Does not impede fish passage.
<p>Air Quality Plan</p> <ul style="list-style-type: none"> • Rule 2 	<p>Aerial Agrichemical Spray and Powder Application - <i>Permitted</i></p>	<p>See the GWRC Air Quality Plan document for the complete list of rules.</p>

Cultural, historic and archaeological sites

Historical and Archaeological Sites

The *Heritage New Zealand Pouhere Taonga Act 2014* replaced the *Historic Places Act 1993* on 20 May 2014. Under the *Heritage New Zealand Pouhere Taonga Act* 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.

Where such circumstances exist, an “Authority to Modify or Destroy” will be sought from Heritage New Zealand Pouhere Taonga (HNZ). 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 Consents to modify an archaeological site may sometimes be required from the local District Council

Records of archaeological and historical places are maintained in the NZ Archaeological Association Site Recording Scheme run by the HNZ. These sites are often included in schedules of places and sites of significance in District plans along with sites of cultural significance.

There are no recorded sites present within or immediately adjacent to the boundaries of this property.

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 HNZ and Iwi or other stakeholders must be observed.

Consents & authorities held

There are no current resource consents or HPT authorities that apply to Mangapakeha Forest.

At the time of harvest planning any required consents will be obtained. There is no harvesting planned for the period of this management plan.

Proposed National Environmental Standard for Plantation Forestry

Likely to come into effect during the period which this plan covers is the Proposed National Environmental Standard for Plantation Forestry (NES-PF). If implemented, the NES-PF would replace councils' existing district and regional plan rules for managing plantation forestry. The benefit of this national standard is that it would provide a consistent approach across the country that is responsive to local environments. This should result in improved environmental outcomes and more efficient forest management.

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.

Mangapakeha Forest was established in exotic forest prior to 31st December 1989, therefore all planted areas are liable for a deforestation tax. The forest has been re-established following harvesting to extinguish the liability.

The entire forest area was registered with government under the previous forest owners name as pre-1990 forest land. As such the previous owners will received an allocation of emission credits.

The ETS is currently under review and the impact of this review is unknown.

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

Other relevant legislation in relation to the growing and harvesting of the tree crop are:

- Accident Compensation Act 2001 #49
- Animal Welfare Act 1999
- Biosecurity Act 1993
- Climate Change Response Act 2002
- Commercially relevant statutes
- Conservation Act 1997
- Crown Forest Assets Act 1989
- Fencing Act 1978
- Forests Act 1949
- Forests Amendment Act 1993 (Forests Act 1949)
- Forest and Rural Fires Act 1989
- Forestry Rights Registrations Act 1983
- Freshwater Fisheries Regulations 1983
- Hazardous Substances and New Organisms Act 1996
- Health and Safety at Work Act 2015
- Heritage New Zealand Pouhere Taonga Act 2014
- Injury Prevention, Rehabilitation and Compensation Act 2001
- New Zealand Coastal Policy Statement.
- New Zealand Forest Accord
- Noxious Plants Act 1978
- Pesticides Act 1979
- Protected Objects Act 1975
- Reserves Act 1977
- Resource Management Act 1991
- Soil Conservation and River Control Act 1971
- The Treaty of Waitangi Act 1975
- 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.

Forest Management

7. Forest Estate Description

Forest area The net stocked areas have been measured from a map produced by PF Olsen (Section 9- Forest Stands Map). Table 7 sets out the estimated net stocked areas of each stand.

Table 7: Area Statement

Gross area	Net Stocked Area (ha)	Area awaiting restocking	Protected Ecosystems (ha)	Unstocked / other
170.6	163.3	Nil	7.3	Nil

Current species The species grown at Mangapakeha Forest is *Pinus radiata* (radiata pine).

Re-establishment has been with high quality treestocks suitable for the site and market. It should be noted that 40 hectares of the current forest has been established from natural regeneration of radiata pine from seed left on site following removal of the previous crop. In 2003 and 2009 two re-establishment has been generated for second rotation. Table 8 summarises the treestocks used for establishment.

Table 8: Treestock Seedlot information

Stand	Treestock
MPHA-0001-06	Seedlot 01/04, GF 25
MPHA-0001-07	This is a regeneration managed stand
MPHA-0001-08	Seedlot 07/209, 07/205, 07/202

Productivity indices

Site index and 300 index are measures of productivity of a site in terms of height growth and timber stock on unit area of radiata pine. The parameter used for site index is the mean height in metres of the largest 100 trees per hectare at age 20 years. Equations exist to predict this height given a measured height at any age. The 300 index is a measure of productivity of a site based on stem volume growth (mean annual increment) of 300 stems per hectare.

Site index for this stand is 26.38 m on average, and ranges between 24.34 m and 31.24 m. The 300 index is 28.82 m³/ha/year on average, and it ranges between 26.69 and 31.55 m³/ha/year. The forest is at the medium to low end of site productivity in the general area for forest site.

Current crop status

Measurement data from the most recent inventory has been summarised in Table 9 to give the status of the current crop.

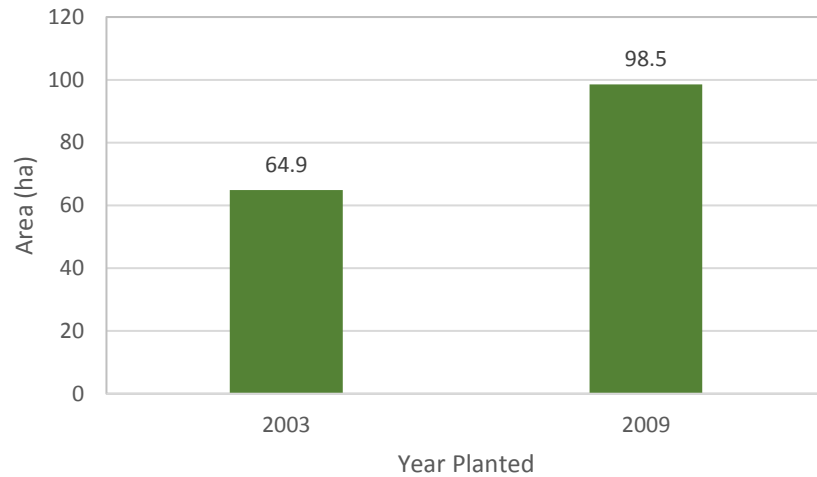
Table 9: Current Crop Status

Stand	Year planted	NSA (ha)	Total stocking (sph)	BA (m ² /ha)	MTH (m)	Mean DBH (cm)	Pruned stocking (sph)	Pruned height (m)
1.06	2003	24.7	328					
1.07	2003	40.2	1000					
1.08	2009	98.5	1009					

Age class distribution

Figure 1 illustrates the current age class distribution of Mangapakeha Forest.

Figure 1: Age-class Distribution of Mangapakeha Forest



8. 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

Mangapakeha Forest contains 7.3 ha of reserve areas comprising 5.0 ha of riparian remnant Manuka/Kanuka ecosystems and 2.3 ha of open semi-wetland /depleted grassland.

The wetland zones were purposely not re-established following the first harvesting operation while the remnant Manuka/Kanuka areas had not been successfully established in trees during the first rotation. These areas were protected during, and retained following the first harvesting operation.

The reserve areas are detailed in Table 10.

Table 10: Reserve Areas at Mangapakeha Forest

Forest	GeoUnit	Area (ha)	Protective Status	Protective Function	HSV Status	Description of Forest Type	LENZ Remaining (%)	LENZ Protected (%)	Ranking	Protection Category
Mangapakeha	MPHA-SECF-01	3.4	NZ Forest Accord	Terrestrial Ecosystem	No Status	Manuka/kanuka/BroadleavedHW	49	30.9	512	Limited
Mangapakeha	MPHA-SECF-02	1.6	NZ Forest Accord	Terrestrial Ecosystem	No Status	Manuka/kanuka/BroadleavedHW	49	30.9	256	Passive
Mangapakeha	MPHA-WETL-01	2.3	Management Plan	Wetland Ecosystem	No Status	Adventive and exotic weeds & grasses	49	30.9	1024	Limited

Riparian reserve

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.

Table 11 summarises the stream categories within the Meringa Station forest.

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Table 11: Riparian Reserve Categories

Category Code	Category Name	Total Length (km)
VMDH	Very small mod dry hard	0.36
VLDH	Very small low dry hard	0.24
SLDH	Small low dry hard	1.11
Total reserve length (km)		1.72

Rare and threatened species

To date no threatened species have been located at Mangapakeha Forest.

Any future sightings of rare species will be recorded and maintained in the FIPS rare species database.

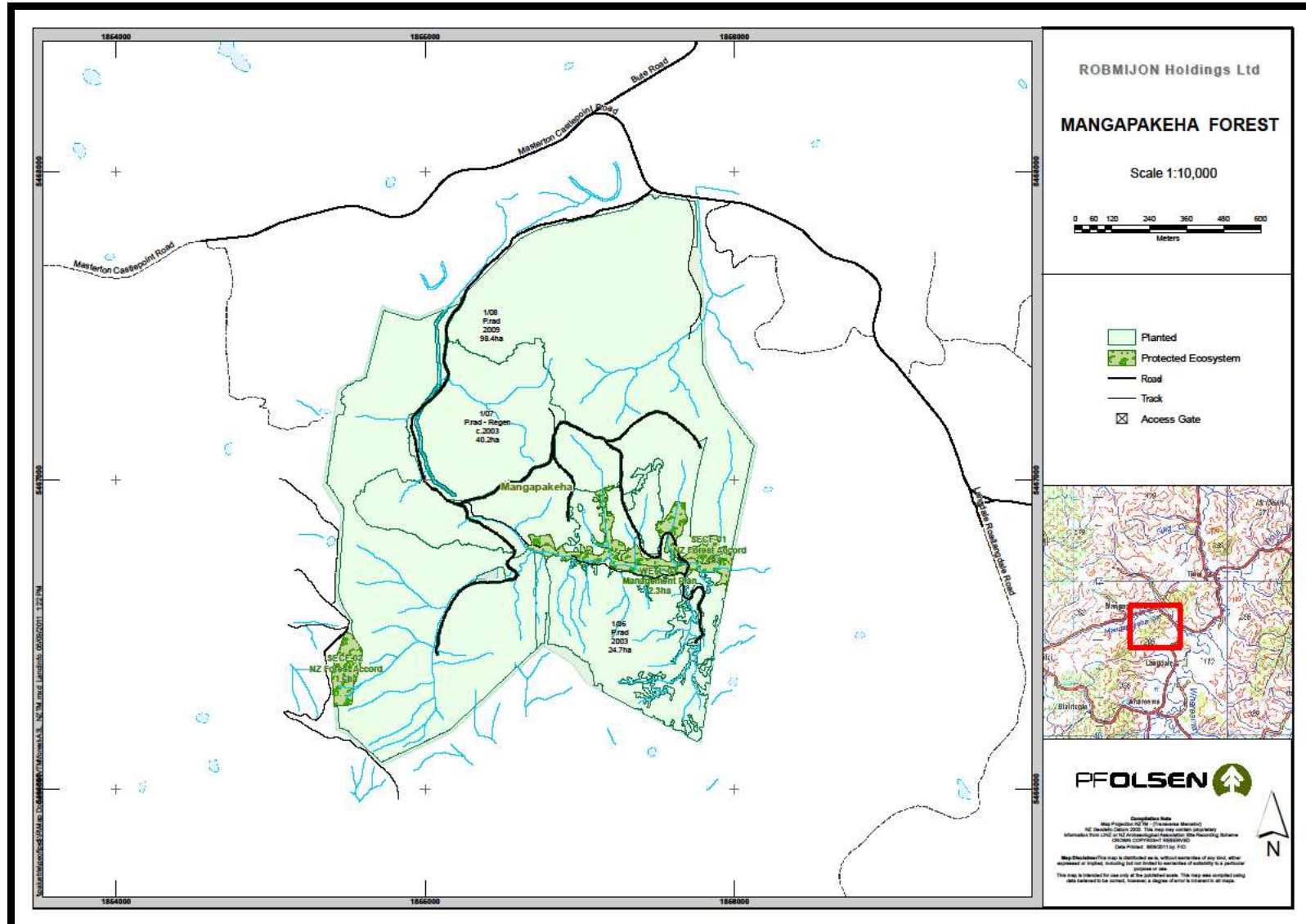
CITES species

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/>.

Map 3: Forest Stands Map



9. Non-Timber Forest Products and Other Special Values

Introduction

Forest plantations may also provide for non-timber forest products 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.

Forests can also provide many other special values, which are also provided for and managed through the forest management plan.

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.

Table 12 below rates the relative positivity and negativity of the more common social and environmental products produced by Meringa Station forest relative to the most likely alternative primary production system, pastoral dry stock farming.

Table 12: 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											✓
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 currently no non-timber products being produced or developed in Mangapakeha Forest.

Other special values

No special values have also been identified in Mangapakeha Forest.

Recreational usage

Forest management, contractor and owner access is by security key only.

The forest will continue to be open to the general public for legitimate use subject to entry by permit though at this point due to the relatively young age of the crop and the very small and unspecialised reserves the forest receives little recreational nor hunting use.

Between 1st January 2011 and 31st December 2015 no access or hunting permits were issued.

10. Environmental Risk Management

Assessment of environmental risks

Several areas of typical forest management have been identified as posing a possible environmental risk within Mangapakeha Forest. The Environmental Assessment Matrix in Table 13 summarises the identified risks for Mangapakeha 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.

Table 13: Environmental Risk Assessment Form

<u>Forestry Operational Activities</u>	ENVIRONMENTAL VALUES/ISSUES											
	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	H	H	H	NA	H	L	L	NA	L	H	L	L
Earthworks	H	H	H	NA	H	L	L	NA	L	L	L	L
Slash Management	L	L	L	NA	H	L	L	NA	L	L	L	L
Stream Crossings	H	H	L	NA	H	L	L	NA	NA	NA	NA	NA
Mechanical Land Preparation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Burning	L	L	L	H	L	L	L	NA	H	H	L	H
Planting	NA	NA	NA	NA	NA	NA	L	NA	L	L	L	NA
Tending	NA	NA	NA	NA	NA	NA	NA	NA	NA	L	L	NA
Fertiliser Application	NA	H	NA	L	H	NA	NA	NA	NA	L	L	L
Agrichemical Use	NA	H	L	L	H	L	H	NA	L	H	H	H
Oil & Fuel Management	NA	H	L	NA	H	NA	L	NA	NA	H	L	NA
Waste Management	NA	L	NA	NA	L	NA	NA	NA	NA	L	NA	NA
Forest Protection	NA	L	NA	NA	L	L	L	NA	NA	L	NA	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 Test 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 chemical

There are five agrichemicals that have been classified 'highly hazardous (HH)' by FSC that are used in forestry and conservation operations within PF Olsen certified forests. All these five have only recently been added to FSC's HH list. Special derogations to continue usage of these chemicals, subject to conditions, are being applied for by PF Olsen in conjunction with the wider NZ certified industry. These chemical pesticides are listed in Table 14 below.

The 'derogation' process is run according to specific policies put in place by FSC, including extensive canvassing of stakeholder views. This part of the process has been completed as at September 2015 and formal derogation applications will be lodged with certifying bodies by December 2015.

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Two other highly hazardous vertebrate pesticides, sodium cyanide and 1080 are occasionally used in parts of the FSC Group estate. Such use is undertaken under the statutory controls exercised by the Animal Health Board who apply directly to FSC for temporary derogations if and when needed. Historically these have not been used at Meringa.

At the same time as the five new chemicals were added to the HH list two commonly used forest establishment herbicides, terbuthylazine and hexazinone were removed from the list. Derogations are no longer required for them.

Table 14: Highly Hazardous Chemicals Used by PF Olsen

Active ingredient	Purpose	Common usage
Copper based products	Fungicide	Needle cast control
Picloram	Herbicide	Establishment weed control
Carbaryl	Insecticide	Localised wasp control
Colecalciferol	Vertebrate pesticide	Localised possum control
Pindone	Vertebrate pesticide	Rabbit and Hare control
Use subject to AHB emergency provisions only		
Sodium cyanide	Vertebrate pesticide	Animal Health Board only, ground based possum control
Sodium Monofluoroacetate (1080)	Vertebrate pesticide	Animal Health Board only, extensive aerial possum control

All chemical use is tracked in PF Olsen’s FIP’s chemical active ingredient tracking system.

11. Commercial Crop Establishment and Silvicultural Operations

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.

Crop species

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 finger jointing. 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.

Other species

Alternative species may be considered at the time of re-establishment.

Establishment

There is no establishment planned at Mangapakeha Forest during the period of this management plan.

**Pre-
establishment
forest flora and
fauna**

Prior to any 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

Adjustments in planting may be required to accommodate improved environmental outcomes in the subsequent rotation, including the extension of an existing wildlife corridor or riparian area by increasing setbacks at the time of crop replanting.

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

Tending

The tending regime executed at Mangapakeha Forest is a mixed clearwood and framing regime, depending on the stand characteristics. Tending is underway and there are both pruning and waste thinning operations required in future years. Table 15 shows how the final crops in each stand are anticipated.

Table 15: Future tending of each crop stand

Stand	Year Established	Final Stocking	Pruned Stocking	Pruned Height
1.06	2003	350		
1.07	2003	450		
1.08	2009	450		

Tree nutrition

The soils in Mangapakeha 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:

- **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 crowns turn 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. Fertiliser will only be applied if the health and the growth of the trees are significantly affected.

12. Forest Inventory, Mapping and Forest Records

Inventory

Forest growth and development is monitored through regular 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 developed procedures for each of the following four types of inventory to be applied on Meringa Station Forest:

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

Mapping

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

The digital data is currently retained, processed and managed on the PF Olsen 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 again around two years prior to harvesting to assist with harvest planning

Forest records

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.

Mangapakeha forest estate records are currently maintained on PF Olsen’s own stand record system. These record systems allow for retrieval of information, production of reports and statistics and provide a comprehensive audit trail

13. Harvesting Strategy and Operations

Harvesting strategy

The harvesting strategy for radiata pine employed at Mangapakeha Forest is to harvest the tended forest stands as close to their 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 from 25 to 30 years. Stands where minimal tending has been completed may be harvested earlier, particularly when relevant markets are favourable.

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.

There is no harvesting planned for Mangapakeha Forest for the duration of this management plan.

Getting harvest ready

Forward planning is essential when considering harvesting activities. Harvest planning should ideally commence two 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.

14. Property Management and Protection

Statutory pest obligations

Pest management within Test Forest is subject to statutory obligations under the Regional Pest Management Strategy administered by the Greater Wellington Regional Council (March 2009).

The Strategy applies to both pest plants and animals and categorises them in terms of management objectives. Table 16 summarises the categories and landowner obligations.

Table 16: Statutory Pest Regulations

Pest Category	Plant Pest Objectives	Animal Pest Objectives
Regional Surveillance	Confirming the presence and managing or controlling if it has present.	To monitor the presence or to minimize impact of animal pests in the Wellington region.
Total control	For pest that is already distributing in small scale, controlling through service delivery	For pest that is already distributing in small scale, controlling through service delivery
Containment	Set up containment area and control pest escaping from the area	Set up containment area and control pest escaping from the area
Suppression	Reduce density and spreading speed of pest plant	Reduce density and spreading speed of pest animal
Site-lead / Boundary control	Minimize the adverse impacts of pest by prevent the spread of pest within the region	Manage population of pest to minimise the adverse impact.
Forest Landowner Obligations		
GWRC state land owner’s obligation of pest control by species. The full list of landowner obligations for plant and animal pest species are provided in Part Two GWRC Pest Management Strategy .		

Animal Pest control

The main animal pests in Mangapakeha Forest are the introduced possum and feral deer.

Possum 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.

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Other pests include rabbits and hares at the time of establishment and wandering stock early in the rotation when the trees bark is still soft and palatable.

Animal pests in Mangapakeha 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 with in the forest area and on neighbouring land, where required.

Disease control

Diseases, which can affect the forest trees and adjacent native vegetation, are monitored throughout the year 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 though silviculture by timely thinning and pruning operations, which increases air movement and lowers humidity levels.

Protected ecosystems, reserves and species

The reserve areas of Mangapakeha Forest are currently not fenced from stock. The forest owners have no intention to actively graze stock within the forest boundaries. The forest boundaries will require to be maintained in stock proof order at all times as hill grazing land lies to the west, south and east boundaries of the property.

At present the indigenous vegetation remnants in the estate are relatively small individually, fragmented and heavily modified from past farming. As such, the condition of these stands count against their ecological significance albeit they are currently representative of depleted systems in the local sub-regional context.

Despite this, these areas do cumulatively add and are directly associated with riparian and semi wetland systems. As such they have value and overtime, the protected ecosystems will regenerate naturally to, a good quality wetland and ecotonal forest margin. The primary management actions are to be:

- Weed and pine regeneration control.
- Monitoring.

**Ecological
equivalence**

In Mangapakeha Forest total area of reserves is 7.3 ha. At 4.4%, this area does not meet the FSC required condition of 10 % of productive forest area by Ecological District (Eastern Wairarapa ED) to be in set-asides. A shortfall of 9 hectares.

Taking account of the only other Group Scheme Forest in the adjacent Wairarapa Plains ED, the combined Group Scheme set-aside totals reach 8.3%, still short by 3.3ha.

To make up this shortfall in Mangapakeha, over the period of the last plan a small catchment infiltration area of 0.53ha that was heavily modified and of little current ecological value was identified as suitable candidate for restorative actions. If achieved over time this new wetland would become linked through the current riparian corridors to the presently identified wetland area, creating a well formed catchment protection system.

Under the FSC NZ Standard shortfalls in reserve area can be made up by an 'ecological equivalence' investment into other protected ecosystems within the estate, or in other parts of the estate in other Ecological Districts or in other party's lands within the Ecological District. The 'ecological equivalence' value has been benchmarked and calculated against the average annual spend by the Department of Conservation as per their 2013 annual report. To address the shortfall would amount to just over \$100/annum. Such amounts have been spent and will continue to be spent on improving the habitat quality of the identified additional area.

**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, 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.
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.

**Forest
management
requirements**

The following forest management practices may be employed to assist fire prevention measures:

1. Maintain the existing harvest road access network as the need arises.
2. Maintain existing firebreaks and develop others as the need arises.
3. Time silvicultural operations to minimise the potential of fuel build-up and for better control of work activity.
4. Have forest areas grazed where fuel build-up can be reduced.
5. Endeavour to control access, and limit only to legitimate land users. Promote public awareness through appropriate signage.
6. Develop a “fire plan” that encompasses prevention, detection and control procedures.

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 Mangapakeha Forest the Rural Fire Authority (RFA) is the Wairarapa Rural Fire District (WRFD).

In the event of a fire that starts within the forest, the WRFD 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 WRFD has recourse to the Rural Fire Fighting Fund to compensate for firefighting costs.

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

Fire insurance

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. ROBMIJON Holding Ltd should liaise with the forest manager at the time of fire insurance renewals and if necessary instruct the forest manager to keep premiums paid up.

Crop insurance renewal fall annually in May.

Public liability insurance

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

Forest access

The main access to the forest from Castlepoint Road is shared with Greater Wellington Regional Council who own and manage a neighbouring property from which poplar poles are currently produced.

Maintenance requirements and associated costs for this shared access should be agreed to annually with the split being according to user.

15. 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 ROBMIJON Holdings Ltd 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. Table 16 demonstrates the full monitoring framework as it will be implemented and applicable to Mangapakeha Forest.

Table 16: The Environmental Process Monitoring Framework

Monitored Element	Include √	Components	Data Source	Data medium	Reporting / Website frequency
Chemical usage	√	A.I usage / Area overuse	Operations Supervisors	FIPS Form	On demand / annual
Consultation Activity	√	Complaints	Operations Planners Supervisors	Form	Annual / annual
Environmental Incidents	√	Incident number / categories	Operations Supervisors	FIPS Form	On demand / annual
Flora & Fauna	√	Species & Status frequencies / new finds.	Crews Operations Public Supervisors	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	√	periodic inventory. ISO9001	Contractors	Inventory schedule	Periodic-annual – not on web
Forest Health	√	Disease & health	National Forest Surveillance Program ⁴	Document	Periodic-annual – not on web

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⁴ Forest health inspections are undertaken annually, by either Vigil or Forest Dynamics, 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 Dockets	Woodtrack	On demand / annual
Operational monitoring	√	Audit trends / Cause analysis	Operations Supervisors	FIPS Form	Monthly / annual
Pests	X	RTC, kill returns or other	Contractors Supervisors		Annual where relevant
Protected Ecosystem Condition	√	Condition trends	Contractors Supervisors	Photopoint	Tri-annual
High Conservation Value forests	NA	Condition trends / photopoint monitoring	Contractors Supervisors		Bi-annual if restoration initiated
Recreational & non-timber	√	Permits issued	Farm Manager	FIPS Form	Annual / annual
Resource consents	NA	Number / Compliance	Operations Planners	FIPS	6 monthly / annual
Stream Monitoring	NA	Clarity +/- other specific	Contractors Supervisors	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	3-yearly/annual

Financial

Budget versus expenditure is monitored through the PF Olsen FIPS system and presented to ROBMIJON Holdings Ltd in the annual report and workplan. 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.

In addition there is a full social survey of the contractor work force every three years.

16. Future Planning

Introduction

This plan pertains to the management of Mangapakeha 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: January 2021.

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

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 ROBMIJON Holdings Ltd at the beginning of each financial year.

The ROBMIJON Holdings Ltd financial year is 1st Jan to 31st Dec.

Appendix 1: Neighbours Location Map

