

PF Olsen
FSC Group Scheme
Standard Forest Management Plan



PO Box 1127 | Rotorua 3040 | New Zealand
P: 64 7 921 1010 | F: 64 7 921 1020
E: info@pfolsen.com | www.pfolsen.com

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1. What is this Plan?

About this Plan

- This standard forest management plan provides a summary of the typical management of the PF Olsen FSC Group Scheme forest estate
 - It is to be used in conjunction with the **specific** forest management plan
 - If a forest is managed in a different way than described here, it will be detailed in the specific forest management plan
 - **Promapp** is a cloud-based process management software that houses PF Olsen’s business processes. Links to relevant processes are throughout this plan
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Foundation Principle

Resource members of the PF Olsen Group Scheme **NC-FM/COC-000190** are committed to the Forest Stewardship Council (FSC) Principles and Criteria relevant to forest management.

2. Regulations on Forestry

Regulatory considerations for forestry

Promapp: [Environmental Legislation & Resources](#)

- Forest operations throughout New Zealand are subject to a range of regulatory requirements detailed in the linked document above.
- Failure to meet regulatory requirements is a key business risk

The following section summarises key regulatory requirements.

Health and Safety at Work Act 2015

<https://www.worksafe.govt.nz/laws-and-regulations/acts/hswa/>

Health, safety and wellbeing are key priorities for PF Olsen.

Heritage New Zealand Pouhere Taonga Act 2014

<https://www.heritage.org.nz/about-us/heritage-new-zealand-pouhere-taonga-act>

It is the landowner's responsibility to identify historic sites on their land before undertaking any work which may disturb or destroy such sites. Refer to section 11 for details.

Emissions Trading Scheme

<https://www.mpi.govt.nz/forestry/forestry-in-the-emissions-trading-scheme/>

New Zealand's Kyoto commitments to reduce the the nation's carbon emissions and contribution to associated climate change are embodied in legislation – the Climate Change Response act). Forests in New Zealand are legislated under this Act.

Resource Management Act 1991

Within the RMA framework, everyone is responsible to manage the effects of activities in or on land and water to ensure sustainable outcomes. Some of these are briefly described below.

**National
Environmental
Standards for
Plantation
Forestry (NES-PF)**

<https://www.mpi.govt.nz/forestry/national-environmental-standards-plantation-forestry/>

The NES-PF is a suite of regulations applicable to most plantation forestry activities. The stringency of the rules relates to the erosion susceptibility of the land and the risks created by the forestry activity.

**Council RMA
Plans**

<https://www.lgnz.co.nz/local-government-in-nz/new-zealands-councils/>

Administered by councils, District and Regional Plans guide and regulate land use, water management, biodiversity and air quality.

- Rules must align and give effect to National Environmental Standards such as the NES-PF
 - However, councils can exercise greater stringency through their plans:
 - to give effect to an National Policy Statement
 - or to manage forestry in Outstanding Natural Landscapes or in other specific situations. In this case, the local planning rules must then be followed
-

3. How we manage commercial risk

Market access Group Scheme members seek to achieve and maintain Forest Stewardship Council (FSC®) certification to allow access to local domestic markets that either require or award a premium for, FSC® certified wood.

Log customer credit risk PF Olsen manages customer credit risk exposure and mitigation measures for both export and domestic log customers.

Infrastructure damage or service disruption Third-party infrastructure and utilities may be present within or adjacent to forest lands. This risk is managed by:

- Identification on maps and on the ground
- Early engagement with the utility owner at the planning stage
- Implementation of operations to plan, by suitably qualified personnel

Pests and diseases Pests and diseases are managed according to statutory obligations and best practices. The type and intensity of treatment (if any) is balanced with what is at risk. Refer to section 12 for details.

Fire Fire is always a risk to forests, potentially with risk increasing as the climate changes.

Fire risk is managed through:

- Restricting work hours or stopping work in periods of extreme fire risk
- Annual auditing and regular monitoring of contractors’ fire prevention and first response equipment before the fire season each year
- Maintenance of trained personnel and fire suppression equipment
- Protocols for pooling of resources as the first response to fires under the leadership of the relevant Fire and Emergency New Zealand (FENZ) organisation
- Management of public and recreational use when risks become high based on advice FENZ

Refer to section 11 for details.

4. How we manage environmental risk

Environmental risk framework

Environmental risk is managed by PF Olsen as the appointed property manager, through a cascade framework:

- i. High level ‘intent’ determined by the forest owner
- ii. PF Olsen’s environmental policies
- iii. Defined and documented processes in the Environmental Management System (EMS)
- iv. Monitoring and reporting

Promapp is a cloud-based process management software platform that contains PF Olsen’s business processes. Links to relevant processes are throughout this plan.

PF Olsen’s policies and the Group Scheme member’s business objectives are aligned.

Environmental policies

Promapp: [Environmental Policies](#)

Objectives, targets and monitoring

Promapp: [Objectives Targets Monitoring Diagram](#)

In managing a forest estate on behalf of its owner, PF Olsen sets objectives, targets and monitoring across five key aspects of the business:

1. Economic
2. Legal
3. Social & cultural
4. Health, Safety & Wellbeing
5. Environment

A systematic management approach ensures these objectives and targets remain the cornerstone of PF Olsen’s business, backstopped by monitoring processes that form a regular review of practices.

Environmental Management System (EMS)

Promapp: [Monitoring the Environmental Management System](#)

- Defined and documented policies, processes and activities
- Governs the implementation of forest management activities
- Systematic approach certified to the ISO:14001 standard
- Ensures effective mechanisms to manage potential adverse or harmful impacts from operations
- Reviewed annually with the input of an Environmental Management Group (EMG)

Environmental Code of Practice

PF Olsen is a member of the New Zealand Forest Owners Association. All operations carried out on the property are undertaken in conformance to the New Zealand Forest Owners Association 'New Zealand Environmental Code of Practice for Plantation Forestry'¹.

Operations will also follow the relevant Forest Practice Guides² published in support of the NES-PF.

Forest Road Engineering Manual

All roading and engineering techniques used within the forest will be in general accordance with industry best practice as outlined in the New Zealand Forest Owners Association publication, 'New Zealand Forest Road Engineering Manual', published 2020³.

Assessment of environmental effects

Promapp: [Complete Assessment of Environmental Effects](#)

Promapp: [Significant Aspects poster](#)

Environmental risks from forest operations are assessed and managed on a site-by-site basis. The probability and magnitude of adverse effects from a particular operation on a particular site is highly variable.

At a high level, 'risks' are presented as consuming services summarised for a typical plantation life cycle in the Significant Aspects above.

¹ <https://www.nzfoa.org.nz/resources/file-libraries-resources/codes-of-practice/44-environmental-code-of-practice/file>

² <https://docs.nzfoa.org.nz/forest-practice-guides/>

³ https://www.nzfoa.org.nz/images/NZ_Road_Engineering_Manual_Web_Feb_2020_compressed.pdf

5. How we manage hazardous substances

What are hazardous substances?

Hazardous substances are any substances that may cause adverse environmental impacts and/or injury or health problems if handled or used incorrectly. These include:

- Agrichemicals
 - Herbicides for plantation and ecological weeds
 - Fungicides for forest fungal disease control
 - Vertebrate or invertebrate toxins: used for control of pest mammals, e.g. possums, wasps
 - Fuels and oils
 - Fire retardants – only ever used if there is a fire
 - Surfactants, that increase herbicide efficacy
-

How do we reduce the risk of hazardous substances?

Promapp: [Conduct a HSNO Audit](#)

Promapp: [Manage Chemical Storage](#)

Transport, storage and labelling of hazardous materials must comply with Environmental Protection Agency (EPA) legislation and the NZS 8409:2021 Management of Agrichemicals.

During application, chemical trespass and spill risks are managed by:

- Neighbour consultation about planned spray operations
 - Careful planning and timing of aerial operations, with regard to wind and spray drift
 - Unsprayed buffer strips on neighbour boundaries, riparian or other protected reserves
 - GPS flight path control and records
 - Monitoring and recording of weather conditions during the operation, including using smoke bombs and photos/video
 - The use of double skinned bulk fuel storage tanks for larger capacity tanks
 - Tracking active ingredient usage against target weeds within the estate
 - Active involvement in and review of technologies
 - Research into alternative methods for the control of pests and diseases
 - Fuel: use modern, efficient machine technology
-

FSC® Hazardous Chemicals

FSC applies a risk-based approach to rules for the use of chemicals⁴. Chemicals are classified according to an FSC® Hazard rating. The rating then requires differing levels of control on use.

Of the chemical pesticides used or potentially used in the Group Scheme estate, none fall into the Prohibited or Highly restricted categories. Those that fall into the Restricted category are listed in Table 1 below.

Most of the Restricted pesticides are vertebrate poisons and insecticides targeted at specific pest problems, such as wasps or pest predators or high possum numbers.

Herbicides and fungicides are expected to be used between 1-2 and 2-4 times per rotation respectively. All the formulations are registered and legally approved for use in New Zealand by the Environmental Protection Agency, subject to various controls, and for the purposes to which they are applied as listed below.

Table 1: FSC Highly hazardous chemicals used or potentially used within the PF Olsen Group Scheme estate

Active ingredient	Purpose	FSC Hazard	Common usage
Boric Acid	Fertilizer	Restricted	Component of micro-nutrient fertilization
Copper based products	Fungicide	Restricted	Needle cast control
Glyphosate	Herbicide	Restricted	Establishment weed control/pest weed control
Haloxypop-methyl	Herbicide	Restricted	Establishment weed control/pest weed control
Picloram	Herbicide	Restricted	Establishment weed control/pest weed control
Animal and insect pest control			
Brodifacoum	Vertebrate pesticide	Restricted	Ground-based vertebrate pest control
Carbaryl	Insecticide (wasps)	Restricted	Localised wasp control
Cholecalciferol	Vertebrate pesticide	Restricted	Ground-based / Vertebrate pest control
Fipronil	Insecticide (wasps)	Restricted	Localised wasp control
Pindone	Vertebrate pesticide	Restricted	Rabbit and hare control
Sodium Monofluoroacetate (1080)	Vertebrate pesticide	Restricted	Vertebrate pest control / extensive aerial possum control
Sodium cyanide	Vertebrate pesticide	Restricted	Vertebrate pest control, ground-based possum control

⁴ FSC Pesticides Policy FSC-POL-30-001 V3-0 <https://www.fsc.org/en/document-centre/documents/resource/208>

6. Productivity

Productive capacity strategy

Forest management ensures the productive capacity of the forests is not compromised. This includes:

- Monitoring and control of pests and weeds and forest health
 - Inventory – inputs into growth estimation, a core step in timing silviculture and formulating the cutting strategy
 - Silviculture - to enhance the value of the resource
 - Harvesting - achieving a successful harvest in terms of the forest owner's health and safety, environmental and commercial objectives
-

Productivity indices

Site index is used to measure of productivity of a site in terms of height growth of radiata pine. The parameter used is the mean height in metres of the largest 100 trees per hectare at age 20 years. Models 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 MAI) of 300 stems per hectare.

7. Crop Establishment and Silviculture

Why is establishment and silviculture important?

Forest operations are implemented to ensure a good quality crop and maximum growth. These operations include:

- Land preparation
 - Establishment
 - Species choice is paramount. It must be suitable for the site and meet the objectives of the forest owner
 - It's also important to ensure that the planting material is of good quality
 - Weed control
 - Pest and disease control
 - Fire protection
 - Pruning and thinning
 - General property asset maintenance
-

Forest management goals

Promapp: [Objectives Targets Monitoring Diagram](#)

Forest owners are committed to ensure that 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 'fit for purpose' log production
- Ensure that the productivity of the land does not decline
- Ensure that environmental values are identified and maintained, including the protection of the water supply catchments
- Ensure that historic sites are identified and appropriately managed
- Ensure that other forest values and products are identified, protected and where possible enhanced
- Ensure that the forest estate's contribution to the carbon cycles is maintained or enhanced
- Harvest the trees as close as possible to their economic optimum age and achieve the best possible financial returns to the owners
- Replant following harvesting where agreements require

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- Meet all statutory requirements and forest industry best practice
- Act as a good corporate citizen and neighbour
- Ensure all forest management practices are consistent with the principles of the Forest Stewardship Council

These goals are further detailed in 'PF Olsen Key Aspects - Objectives, Targets and Monitoring'.

Crop species

The dominant crop species in the Group Scheme estate is radiata pine. Radiata pine can 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 appearance grade timber
- The unpruned logs can be used for structural timber, for veneer or feedstock for finger jointing
- Small logs and those with defects and excessive knots can be used for pulp and paper, MDF and other reconstituted wood products

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

Pinus radiata is the main focus for 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.

Re-establishment considerations

Promapp: [Plan Operation NZ](#)
Promapp: [Afforestation Checklist and AEE](#)

Prior to re-establishment of the tree crop, a review will be conducted to identify and incorporate:

- Boundary changes
- Species choice
- Riparian and reserve protection

which would provide better outcomes for the plantation forest and the environment.

Wilding spread

Promapp: [Calculating wilding pine spread - Manual](#)

Promapp: [Wilding Calculator Template](#)

As part of the requirement of the NES-PF, any change in species must be evaluated using the 'wilding spread calculator'⁵ to ensure that the threshold for spread will not be exceeded.

Re-establishment methods

Promapp: [Manage Planting Operation](#)

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

The typical re-establishment regime will take place after harvest and may involve:

- Crushing or line raking harvesting debris/waste to enable planting access
 - Spot mounding in frost-prone sites
 - Line ripping of compacted skid sites
 - Aerial desiccation spraying of weeds (including naturally regenerated pine seedlings)
 - Spot spraying of limited sensitive areas where aerial spraying may not be appropriate
 - Planting with genetically improved radiata seedlings
 - Fertilising sites (were required) at planting by individual tablets placed in a slit with each tree
 - Spot releasing or aerial releasing where necessary to eliminate competition from weeds
 - Replanting will follow harvesting as it occurs, with only minor deviation for seasonal or operational logistical reasons and boundary rationalisation. This is important for maintaining the soil stabilisation function of the forest.
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⁵ <https://www.mpi.govt.nz/growing-and-harvesting/forestry/national-environmental-standards-for-plantation-forestry/wilding-tree-risk-calculator/>

Tree nutrition

Promapp: [Undertake Foliar Sampling](#)

Foliar samples are taken if nutrient deficiency symptoms are observed or expected. Fertiliser will only be applied if the health and the growth of the trees are significantly affected, or where economic analysis demonstrates a benefit.

Site productivity and tree nutrition are the subject of industry research programmes. PF Olsen is an active stakeholder of this. All harvesting entities are financial contributors through the Forest Research Levy Fund.

8. Harvesting Strategy and Contractors

Harvesting strategy

Promapp: [Harvesting Specific](#)

Promapp: [Complete Assessment of Environmental Effects](#)

The typical harvesting strategy for the Group Scheme is to harvest the forest as close as practically possible to the optimum economic age. This is the age where the growth in volume and improvement in quality is offset by the accumulated interest costs to maintain the forest for another year. The optimum rotation length for radiata pine is expected to be within 25 to 30 years (possibly less for framing or unpruned stands).

Other factors in this assessment are the:

- Actual growth of the tree crop
- Market for the wood at the time of the harvest
- Outlook for the near future
- Logistics such as the availability of suitable harvest contractors and the requirements of resource consents

Forward planning is essential when considering harvesting activities. Planning generally commences up to two years before harvesting to enable roading infrastructure to be developed and any resource consents, archaeological surveys, etc. to be undertaken. This reduces potential delays to the commencement of harvesting, which can be costly and disruptive in relation to market supply chains and contractors.

The harvest planning process is an I.T-based harvest planning system requiring 120+ planning issues to be addressed. From this, an Assessment of Environmental Effects (AEE) and the operational prescription is populated for the specific operation.

Forest infrastructure

Forest infrastructure includes roads, tracks, landings, bridges and culverts. Design specifications are aligned with those of the NZ Forest Road Engineering Manual 2020, and associated Forest Practice Guidelines.

1. Typically, infrastructure within an early to mid-rotation age 'greenfields' forest is limited to access for a 4WD vehicle.
2. During harvest planning, upgrades of existing infrastructure and planning for new infrastructure will be identified and scheduled. The type of infrastructure designed and constructed is influenced by topography, harvest duration and intensity of use.

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3. Once established, infrastructure requires maintenance.

The PF Olsen Asset Hazard Register is a GIS-linked database of forest assets that includes bridges, culverts and crossings under resource consent. This provides the framework for a record of the asset attributes, and their associated maintenance schedule, some of which are required under consent conditions.

Contractor training & management Promapp: [Induction and Training \(Environmental\) - staff & contractors](#)
 Promapp: [Conduct a Contractor Monitoring Audit](#)
 Promapp: [Conduct a Contractor System Audit](#)

Before engaging a new contractor, a comprehensive assessment is made of their:

- Safety systems and record
- Work organisation and equipment

Where topography and terrain allows, mechanised felling, extraction and processing is a mandatory requirement.

PF Olsen, as the Property Manager, must be satisfied with this review, regardless of the tendered price.

All new contractor crews undergo safety and environmental inductions. Crew members are contractually required to hold relevant NZQA qualifications or to be 'under formal training' for those qualifications.

The formal NZQA qualifications are supplemented periodically by internal training courses, including environmental topics. At least one day of dedicated environmental training is held each year for operational staff and contractors.

All harvesting, engineering and silviculture contractors are subject to:

- 6 monthly contractor monitoring audits
 - Regular random drug testing
 - A full safety systems audit review every year
 - Full crew re-induction every 5 years
 - Weekly crew visits
 - Monthly or fortnightly (according to risk) Key Performance Indicator (KPI) assessments, which identify any required corrective actions
 - WorkSafe undertakes audits on an unannounced basis from time to time
-

9. Forest Inventory, Mapping and Records

Why do we do inventory?

Forest growth and development is monitored through forest inventory. Forest inventories are required at different times and for different reasons throughout the life of the rotation:

- Pre-assessment
- Quality control
- Mid-rotation
- Pre-harvest inventory

New technologies may introduce remote sensing to gather and analyse this information.

Pre-assessment inventory

Promapp: [Conduct a Pre-Assessment for Tending Operations](#)

Pre-assessment is the collection of stand parameters before a tending operation. It allows for:

- The calculation of contract rate for tending
- A final check on the validity of the regime and timing of operations, i.e. DOS targets can be achieved, or crop height is sufficient for the pruning lift scheduled

Sampling intensity is low, but does provide good quality information on the work content involved in each tending operation and sets a base price for negotiation.

Quality control inventory

Promapp: [Manage inventory /assessment in Geomaster](#)

Quality control is carried out during and after a tending operation. The aim is to collect data to:

- Monitor a contractor's performance and correct this if necessary, with minimum delay
- Provide reliable estimates of the crop state
- Use as input for growth modelling
- Estimate timing of the next tending operation

PF Olsen's process management system details the procedures to follow for pre-assessment and quality control plotting.

Mid-rotation inventory

Mid-rotation inventory is carried out to collect stand data for inputs for growth modelling. Mid-rotation inventory is scheduled for between 11 and 15 years of age.

Sampling intensity is targeted to achieve 10% confidence limits on basal area on a stand-by-stand basis. Smaller stands may be aggregated into crop types to achieve this.

Pre-harvest inventory

Pre-harvest inventory is carried out to obtain estimates of recoverable volume by log grade. This information can be used to develop marketing and harvesting strategies. Pre-harvest inventories will be undertaken when stands are five years or less from harvesting.

Sampling intensity is targeted to achieve 10% confidence limits on basal area on a stand-by-stand basis. Smaller stands may be aggregated into crop types to achieve this as in mid-crop inventory. The use of LiDAR is increasingly able to replace plot-based inventory systems.

Mapping and stand records

Promapp: [Land Information Mapping Standards](#)

All mapping of the Group Scheme forests is in digital format. It is constantly updated in a Geographic Information System (GIS). The GIS and forest information system spatially records a large array of forest data, including:

- Stand and legal boundaries
- Reserves
- Rivers
- Roads
- Infrastructure
- Topography and soils
- Environmental values
- Stand operational and cost histories
- Productivity
- Post-harvest yield

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Accurate mapping assists:

- Operational budgeting and planning
 - Silvicultural payments
 - Calculation of future revenue/tree crop value
 - Protected ecosystems management
 - Infrastructure location
 - Harvest planning
 - Measuring the performance of a Forest Manager. In a management audit, forest records can be verified against the status of the tree crop and unit costs derived for each operation.
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10. Indigenous Biodiversity

What about indigenous biodiversity?

Consideration of indigenous biodiversity in/around plantation forests is an integral part of forest management. Environmental certification systems place obligations upon the forest manager to:

- Be mindful of indigenous biodiversity
- Assist with the maintenance and protection of significant biodiversity values
- Undertake restoration, in specific cases where they are able

Plantation forests provide for biodiversity. It is often enhanced by natural forest ecosystem remnants embedded within the plantation matrix. In combination, these can be an important contributor to the total of the productive landscape's biodiversity.

Threatened species can also be present in plantation forests and may require special management.

Protection categories

Promapp: [Manage Protected Ecosystems](#)

PF Olsen's EMS guides ecological management targets and actions. The first step is to accurately map the indigenous vegetation within the plantation area. The protected ecosystems are recorded and ranked based on basic ecological criteria reflecting the:

- representativeness
- rarity of species
- size and connectivity
- function
- landscape values

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Table 2: Protected Ecosystems Protection Categories

Protection Category	Primary Management Objective	Implemented by...	Monitoring
Passive	Minimise non-essential damage, maintain the area	Fire protection	Area - with adjacent stand assessments
	Observe the Regional Pest Management Plan obligations	3rd party arrangements regarding pests, and applying the Regional Pest Management Plan	Pests - to meet Regional Pest Management Plan General forest health survey
Limited	Protect from non-essential damage, maintain area, maintain function (where practical)	Fire protection	Sample forest condition monitoring
	Observe the Regional Pest Management Plan obligations	3rd party arrangements regarding pests and applying the Regional Pest Management Plan . Associated maintenance pest control	Low level pest monitoring where relevant Sample related fauna if relevant
	Protect from all controllable damage, maintain area & function	Fire protection	Area monitoring
	Improve quality	Specific management	Forest condition monitoring
	Observe the Regional Pest Management Plan obligations	Targeted pest control, 3rd party arrangements regarding pests	Pest monitoring where relevant Related fauna monitoring if relevant
Special	Restoration if practical	As above, plus fencing, covenanting, co-management agreements & funding (where practical)	As above, plus as defined in any restoration agreement

Ecological Districts

Under the FSC® National Standard for Plantation Forest Management in New Zealand revised in 2013, an area of reserves equivalent to 10% of the productive area should be reserved within each Ecological District, plus reservation of 5% of the productive area within large forests (> 1,000 ha).

This requirement is checked for each new addition to the Group Scheme. Any shortfalls are addressed in the specific forest management plan.

Threatened Environments Classification

The Manaaki Whenua Landcare ‘Threatened Environments Classification’ (TEC) is a spatial tool that provides information on the quantity and status of current indigenous vegetation cover relative to its pre-human extent.

It shows:

- the remaining extent
- its legal protection status
- the spatial distribution in New Zealand’s landscape

The TEC uses indigenous vegetation cover as a surrogate for indigenous biodiversity (*including 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 helps to identify areas that are priorities for formal protection against clearance and/or incompatible land uses, and for ecological restoration to restore lost species, linkages and buffers.

Threatened species

Promapp: [Manage Rare and Threatened Species](#)

Promapp: [Manage Rare and Threatened Species sightings and records](#)

Plantation forests and their intertwined areas of indigenous vegetation provide habitat for important New Zealand fauna including threatened species.

Records of species sightings and locations are collected using the iNaturalist App project Biodiversity in Plantations⁶. This app records sightings of indigenous species into a spatial dataset from which long-term data can be extracted for reporting. These records can be made available to conservation authorities.

Primary management actions include:

- Adherence to industry protocols for the management of threatened species, e.g. NZ Falcon Management Guide - Plantation Forestry⁷.
- A list of key species is held by all contractors and operational staff and how to report sightings using the App is part of their training.

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⁶ <https://inaturalist.nz/projects/biodiversity-in-plantations>

⁷ Falcon: <https://go.promapp.com/pfolsen/Documents/Minimode/Permalink?crypto=GpQDQzJNsfpld30mDb64yR> change to FOA website

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- Minimising damage to indigenous forest areas during harvest and reforestation.
- Sound design and construction of any new stream crossings.
- Promotion of the development of improved riparian corridors after harvest.
- Use of the NES-PF Fish Spawning Indicator as a management tool⁸ to avoid operations involving works over or in the beds of streams during spawning periods and at all times maintain good sediment controls around earthworks.
- Identification of, and avoidance and/or buffering of waterbodies, including wetlands during aerial spraying for replanting and *Dothistroma* control or aerial fertilisation operations.

Stream protection and riparian setbacks

A standardised GIS-based stream classification system has been developed based on NIWA’s River Environment Classification (REC)⁹. Categorisation of each stream reach is based on the physical characteristics of the particular reach:

- underlying geology
- streambed slope
- climate
- reach order

Each stream category has associated riparian management rules in the EMS that apply to operations occurring near the riparian.

The guidance also includes minimum setbacks for establishment or re-establishment of a forest where riparian setbacks had not existed before, which are aligned with the NES-PF.

Fish

The NES-PF Fish Spawning Indicator and NIWA Freshwater Fish Database (NFFD) and Freshwater Environments of New Zealand (FWENZ) models have been used to assess the potential for threatened fish species presence in streams affected by operations, and if necessary, any response to such a presence.

⁸ Published by NIWA to support the regulations of the NES-PF

⁹ REC V2 specifically modified by NIWA to include widths (V.small 0-0.75m, small 0.75-1.5m, medium 1.5-3.0m, large >3.0m).

CITES species

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

It aims to ensure that international trade 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 is available in the EMS, or [online](#).

11. Cultural and Social Aspects

Archaeological and historic sites

Promapp: [Archaeological Management in Forestry](#)

Records of known archaeological and historic places are maintained in the New Zealand Archaeological Association (NZAA) Site Recording Scheme published in the Archsite database¹⁰.

PF Olsen holds a license to this dataset and all recorded site information is reproduced in mapping for forest operations.

The Archaeological Site Probability model published by the Department of Conservation¹¹ shows the probability of pre-European archaeological evidence based on:

1. the geographical location of the forest
 2. the historic occupation of the local area
-

Stakeholder engagement and Social Impact Assessments

Promapp: [Manage Certification and Other Stakeholder Engagement](#)

Promapp: [Manage and Resolve Disputes GM-PROC-08](#)

Promapp: [Complete Social Impact Assessment](#)

A Social Impact Assessment (SIA) may be required when a community or group of individuals might be impacted by:

- a change in operational procedure
 - a change in operational intensity
 - where many of the potentially affected parties have little direct representation in decision processes
-

Neighbours

Neighbours to forest boundaries may have a special interest in the management of the forest.

- Forest operations can positively or negatively impact their quality of life or business
- Inappropriately managed operations can create health, safety, environmental and biosecurity hazards for neighbours

Neighbours are considered stakeholders with a potential interest in the management of the forests.

¹⁰ <https://archsite.eaglelegis.co.nz/NZAAPublic>

¹¹ Arnold, G.; Newsome, P.; Heke, H. 2004: Predicting archaeological sites in New Zealand. *DOC Science Internal Series 180*. Department of Conservation, Wellington. 24 p.

12. Property Protection: Pests, Fire and Insurance

Plant pests

Promapp: [Integrated Pest Management](#)

Promapp: [Identify Noxious Pest Plants for Control NZ](#)

Plant pest control within the forest is required to:

- Manage commercial pests specific to plantation forest health
- Meet Regional Pest Management Plan requirements

Chemical herbicides are the usual tool for dealing with establishment weeds or ecological pest plants. Refer to Section 5 for hazardous substances.

Herbicides are used to desiccate most harvested areas before re-establishment. Application is usually by aerial spraying, but occasionally by spot spraying in sensitive areas and where grasses are the main problem rather than woody weeds. Re-established trees are also released with another chemical application where necessary, during the first one to two years after establishment.

Pest weed control, where required, can include aerial applications, or ground-based manual cut and swab or similar techniques dependent upon the site and weed species.

Animal pests

Possums are the predominant animal pest in forests. They attack the growing tips of both plantation and indigenous species, causing stem malformation and die back. They are also a nationally significant ecological pest, killing indigenous birds and their eggs.

Deer, goats and pigs are less commercially significant but are problematic for indigenous ecosystems.

Stoats, weasels, rats and mice have no commercial impact but are a significant ecological threat to all indigenous ecosystems.

Rabbits and hares can be a problem at the time of plantation establishment.

Control of commercially impacting animal pests, where required will generally involve ground-based methods, to prevent impacts on planted species.

Insects and fungal disorders

Diseases can affect plantation forests and indigenous vegetation. Monitoring for diseases is constant 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 that attacks pine needles.

This fungus is controlled using an aerially applied copper-based fungicide spray. It's only applied when the infection reaches a critical level, usually in the first 10 years. Between 1 and 4 applications may be needed.

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

Preventing fires

Fire is a potential threat to plantation and indigenous forests. Although the risk level will fluctuate season to season, there may be a trend for a rise in hazard levels due to climate change. This increases the need for awareness, readiness, and the avoidance of complacency.

Fire risk and impact can be minimised by:

- Having an effective fire plan and rural fire control organisation
 - Maintaining a close link with the relevant fire authorities
 - Understanding equipment and trained personnel requirements
 - Effective fire reporting communications systems, mapping and fire plan alert procedures
 - Active prevention measures include:
 - (a) restrictions on access
 - (b) fire prevention signage
 - (c) publicity when fire danger increases
 - (d) access to adequate fire fighting water sources
 - (e) constructing/maintaining firebreaks
 - (f) site-specific adjustments to silvicultural practice or timing of operations
-

Fire: who's responsible?

Fire and Emergency New Zealand (FENZ) has the legal responsibility for fighting forest fires.

1. If a fire **starts within the forest**, FENZ is responsible for attending and providing the resources to extinguish the fire. Costs are borne through a general insurance levy that supports a rural firefighting fund.
2. If a fire **starts outside the forest** and moves into the forest, those costs remain covered under the fund.

In either case, loss of crop value due to fire is worn by the forest owner. Many forest owners hold crop insurance. If a fire was caused by negligence or identifiable criminal acts, cost recovery might be attempted by FENZ.

There is a liaison with FENZ in terms of developing the 'fire plan', and good communication about potential risks and fire danger ratings.

Crop insurance

Promapp: [Add Client to Group Insurance Scheme](#)

Many Group Scheme members maintain crop insurance cover for fire under a PF Olsen managed crop insurance scheme. This is reviewed regularly.

Public liability insurance

PF Olsen Ltd maintains full public liability insurance, as well as PF Olsen's contractors. This would include cover in the case of fire spreading from the forest onto adjoining land, where the parties could be liable for costs of any damage to the adjoining property. Many Group Scheme members also hold this insurance.

13. Other Special Values: Everything but the timber

Environmental and social cost-benefit analysis Promapp: [Significant Aspects poster](#)

Forests deliver many social and environmental products and services, 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 *relative* to the most likely alternative primary production system, pastoral dry stock farming. A high-level generalised analysis of provisioning and consuming services related to forest management is shown in Significant Aspects above.

Table 3: Environmental and social cost-benefit analysis of key non-timber products & services

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

NOTE: where the ratings differ throughout a rotation, ‘MR’ is used to indicate the mid-rotation (growing) stage of the forest, and ‘H’ refers to harvest or post-harvest.

Non-timber forest products

There are no FSC certified non-timber forest products¹² arising from the PF Olsen Group Scheme member estate. However, there is a range of non-forest activities accommodated in the estate that provide significant value to the wider community, such as sports events, hunting and apiary sites. These are likely to continue and potentially increase subject to appropriate agreements and management of conflicts.

¹² In FSC standards, the reference to non-timber forest products is a reference to such products that are able to carry the FSC label. It is not a reference to the presence or absence of other co-products from the forest areas that do not seek to carry the FSC label.

14. What do we monitor?

Values monitored

Inspections are regularly undertaken to ensure the management objectives are being achieved. The direct forest monitoring framework implemented and applicable to the Group Scheme estate forests is shown below.

Table 4: Environmental process monitoring framework

Monitored Element	Components	Data Source	Data medium	Reporting Website Frequency
Chemical Usage	A.I Usage Area Overuse	Operational Supervisors	FIPS Form	On Demand Annual
Client Satisfaction	Post-operation client survey	Clients	Survey Form	Post-operational Annual
Consultation Activity	Complaints Other Interactions	Operational Supervisors Planners	Form Meeting minutes	Annual Annual
Environmental Incidents	Incident Number Categories	Operational Supervisors	Assura	On Demand Annual
Environmental Goals	All	Environmental Management Group	Meeting Minutes	Annual
Environmental Training	Courses Numbers Names	Staff	FIPS NZQA	Annual Individual
Flora & Fauna	Species & status Frequency New Finds	Operational Supervisors Public Crews Eco Surveys	FIPS iNaturalist-Biodiversity in plantations	On Demand Annual
Forest Estate Structure	Area: Plantation & Protected Ecosystem Age-class Species Forest Type Protection Status	Management Plans Stand Records	Geomaster Stand Records	On Demand Annual
Forest Growth	PSP Protocols Periodic Inventory	Contractors	Volume Reconciliations Estate model	Periodic-annual Not on web
Forest Health	Disease & health	NFH Surveillance Program ¹³	Document	Periodic-Annual Not on web
FSC Membership	Block Location Name	Certifying Body	Certificate	On Demand Annual
Health, Safety & Wellbeing Statistics	LTI / MTI / TIFR Accidents & Incidents Initiatives	Operational Supervisors	Assura	Monthly Annual

Continued on next page...

¹³ Forest health inspections are undertaken annually, by an independent specialist forest health assessor, through the NZ Forest Owners Association forest health scheme.

...continued

Monitored Element	Components	Data Source	Data medium	Reporting Website Frequency
High Conservation Value Forests	Condition Trends Photopoint Monitoring	Contractors Supervisors	Drone, photos Spreadsheet	Annual
Internal Audit CAR Activity	Frequency * Category	Auditors(ees) Operational Supervisors	Assura	Annual
Log Production	Total Logs FSC Certification	Log dockets at harvest	Woodtrack	On Demand Annual
Operational Monitoring	Audit Trends Cause Analysis	Operational Supervisors	Assura	Monthly Annual
Pests	RTC / RTI Kill Returns Other	Contractors Supervisors Permittees	TrapNZ FIPS Various	Annual Where Relevant
Protected Ecosystem Condition	Condition trends Photopoint monitoring	Contractors Supervisors	Spreadsheet	Bi-annual if restoration initiated
Recreational & Non-Timber	Permits Issued	Branch Offices Forest Security	FIPS	Annual
Resource Consents	Number Compliance	Operational Planners	FIPS	Monthly Annual
Social Survey	Demographics Values Work conditions	Contractors	Survey form	3 yearly
Stream Monitoring	Clarity +/- other specific Full NOF MCI RAPID	Supervisors Contractors	Various	Operational Annual

Other monitoring Other standards are monitored but are not publicly available, including:

- log manufacturing quality
 - safety performance
 - financial and budget performance
 - stakeholder feedback
 - client satisfaction surveys
-

15. Industry Participation and Research

NZFOA and FGLT Group Scheme members support industry initiatives and gain access to research via:

- PF Olsen being a member of the New Zealand Forest Owners Association Inc. (NZFOA) <http://www.nzfoa.org.nz/>
 - PF Olsen representation on the NZFOA working committees
 - Payment of a commodity levy at harvest to the Forest Growers' Levy Trust (FGLT) <http://fglt.org.nz/>
-

FGLT Research Approximately 50% of the funds raised by FGLT are allocated to forestry research projects. This is usually supplemented by New Zealand Government contestable research funds. NZFOA is contracted to undertake the work.

Application of the research is via:

1. Knowledge gained in workshops and used by contractors, commercial providers and PF Olsen staff
 2. The deployment of better genetics
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FISC The Forest Industry Safety Council (FISC) was established in 2016 following an independent review of safety in the plantation forest industry. FISC is a forum for the exchange of safety improvement initiatives, and the development of resources for forest managers and contractors. These resources are primarily delivered via the Safetree website <http://safetree.nz/>. FISC is financed jointly by FGLT and the government, primarily the Accident Compensation Corporation (ACC).

PF Olsen's continued support of FISC in the form of senior staff involvement in the Operational Advisory Group and Technical Action Group committees ensure Group Scheme member's interests are considered, and outcomes are understood and applied.

**Additional
representation**

PF Olsen is (or has recently been) active in a number of organisations/processes that bring benefit to the Group Scheme members include:

- Wood Council of New Zealand (Woodco)
 - Regional Wood Councils
 - Business Leaders' Health and Safety Forum
 - New Zealand Forest Nursery Growers' Association
 - Forest Health and Biosecurity Committee
 - NZ Forest Owners Association – Transport, Environment and Safety committees
 - Log Transport Safety Council
 - New Zealand Institute of Forestry Inc.
 - New Zealand International Business Forum
 - New Zealand China Council
 - Various organisations dealing with freshwater quality regulations
 - Te Uru Rakau – Forest Service and MPI review of the National Environmental Standard for Plantation Forestry
 - MFE freshwater and biodiversity legislation
 - Council planning matters
-

16. Future Planning

Operation plans Short term tactical planning is through annual operations plans in conjunction with detailed budgeting. These plans are prepared in accordance with this Management Plan. Harvesting operations are planned on a block-by-block basis due to the level of detail required.

These operational plans and associated budgets are subject to approval by the forest owners at the beginning of each financial year.

Stakeholder consultation Consultation with key stakeholders has been undertaken during the development of this plan. Feedback from stakeholders is monitored, including actions undertaken to resolve disputes and issues. Results may create changes in operational practice or plan reviews.

Plan change and review **The next major review date for this plan is April 2026**

Minor revisions may be made at any time. Any material changes made will be documented below.

Change	Date	Section/Page
Minor editing and data updates	21/4/22	various
