

SUMMERHILL FOREST

Summerhill Charitable Trust and partners

FSC® Forest Management Plan

For the period 2020 / 2025



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1. Introduction

Principles and Criteria

Summerhill Charitable Trust and partners 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.

Summerhill Charitable Trust and partners are committed to the PF Olsen FSC Group Scheme that is implemented through the Group Scheme Member processes and associated documents as this provides the most efficient mechanism to obtain certification.

About this Plan

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

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

2. 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.

Legal ownership The forest is legally owned by the following entities (Table 1). The tenure is freehold.

Table 1: Legal ownership of the different properties that form Summerhill Forest

Name	Legal Reference 1	Legal Reference 2	Area (ha)
C. Blackley & Co Ltd	Section 41 Blk III	Te Tumu SD	0.01
Walton G; Blakely C	Lot 18	DP 306811	127.00
Blackley D L; Blackley C	Lot 1	DP 326997	1.47
C. Blackley & Co Ltd	Lot 2	DP 326997	43.37
C. Blackley & Co Ltd	Lot 3	DP 326997	0.83
C. Blackley & Co Ltd	Lot 5	DP 326997	6.79
C. Blackley & Co Ltd	Lot 1	DP 412251	0.26
C. Blackley & Co Ltd	Lot 2	DP 412251	35.75
C. Blackley & Co Ltd	Lot 3	DPS 64777	0.15
C. Blackley & Co Ltd	Lot 4	DPS 64777	79.87
C. Blackley & Co Ltd	Lot 5	DPS 64777	40.17
C. Blackley & Co Ltd	Lot 1	DPS 72289	1.04
C. Blackley & Co Ltd	Lot 1	DPS 85547	26.34
Blackley C; Wood P M	Lot 2	DPS 85547	39.61

Location and access Summerhill Forest is situated on the Papamoa Hills, 3 kilometres up Reid Road from the Welcome Bay Road turnoff. Various private metal roads off Reid road owned by Summerhill Charitable Trust and partners provide access to different parts of the farm for forestry and farming operations.

The property is 15km from the Port of Tauranga.

Topography

The topography of Summerhill Forest is rolling to steep hill country. 244 ha of the total 400 ha area is planted in pine and mixed specialty timber species, with the rest being used for grazing sheep and beef.

A combination of cable hauler and ground-based logging systems are likely to be used in Summerhill forests.

The property is situated on the Papamoa Hills overlooking the Western Bay of Plenty at an altitude of 150-200 metres above sea level. The Papamoa Hills are footed by fluvial terrace deposits from past tributaries, with modern stream deposits of sand, silt and gravel that stretch to the coastline.¹

All valleys on Summerhill show signs of natural springs with year-round flows. The farm is positioned on the apex of the Papamoa Hills and partially straddles both the Kopuaroa catchment which drains into the Kaituna River and Maungatawa catchment which drains into the Tauranga Harbour.

Soils

The soils are Te Puke Hill Soils and Otanewainuku Steepland soils, both of which exhibit loam clay over Rhyolitic rock. It is well drained with low to moderate drought vulnerability.

Surface erosion in the form of slips tend to occur on North & East facing slopes during severe NE weather events. Tree planting has been used to stabilise land and prevent slips on steep slopes.

Climate

Rainfall: The median annual rainfall is 1125-2050 mm/year. Heavy rainfall and thunderstorms are not uncommon.

Temperature: The median annual temperature is 15 degrees Celsius.

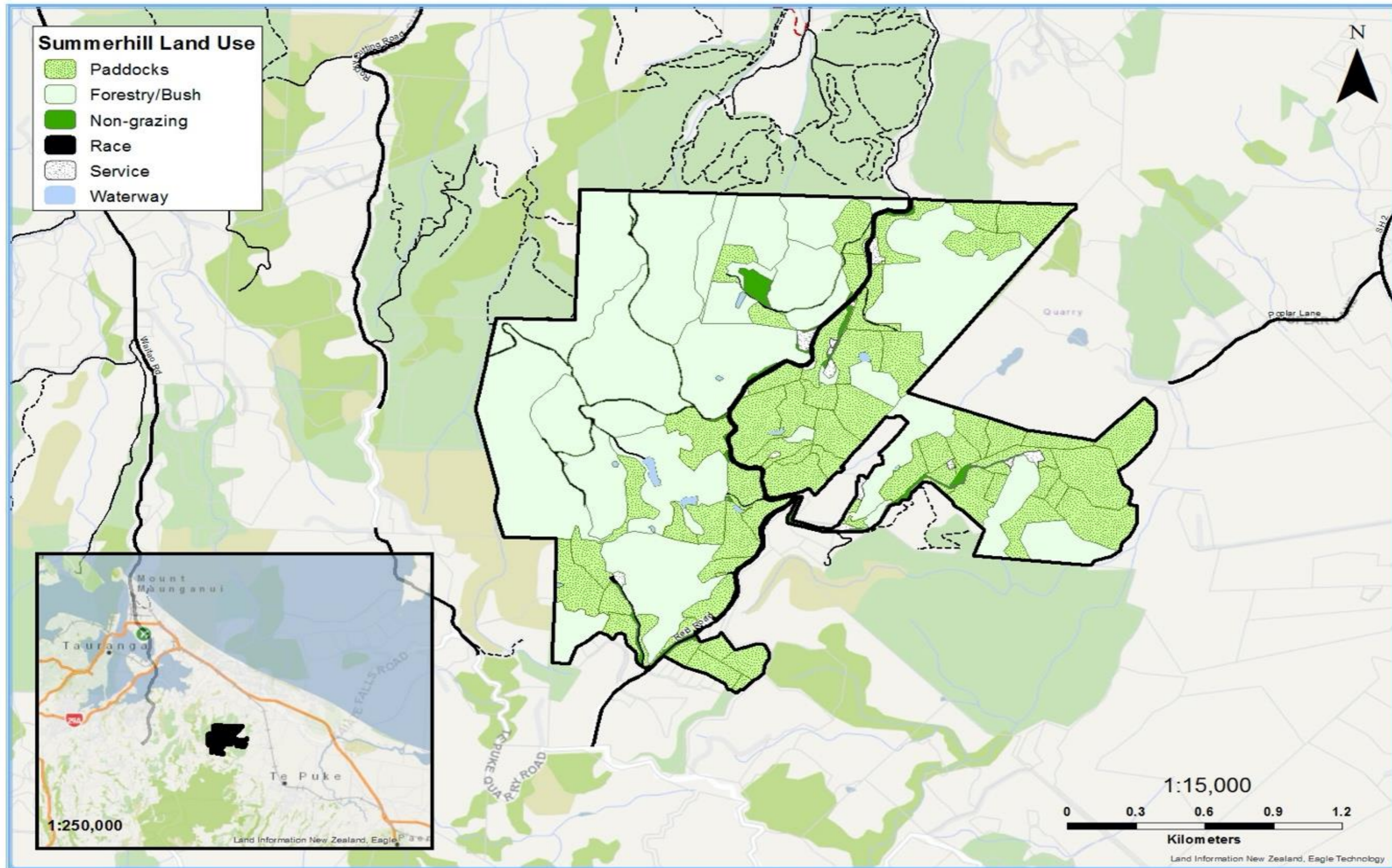
Wind: Summerhill Forest is highly exposed to westerly winds.

Ownership of Trees

Summerhill Forest is owned by the Summerhill Charitable Trust, C. Blackley & Co Ltd., D. Blackley Trust, G. Blackley No 1 Trust, and the Summerhill Charitable Trust and Partners.

¹ Papamoa Hills Regional Park Management Plan, Environment Bay of Plenty Regional Council

Map 1 – Forest Location Map



3. The Broader Landscape

Ecological landscape The NE boundary of Summerhill Forest borders the Papamoa Hills Regional Park. This park is home to a nationally significant Pa site and was the first Regional Park outside of Auckland and Wellington regions. It was opened to public access in 2004.

The Summerhill forests lie mostly within the Tauranga Ecological District, and part of the Otanewainuku Ecological District (Map 2). The Tauranga Ecological district is described as “Low coastal plains, sand dunes, swamps, straight beaches, large shallow harbour, extensive estuaries, low hills; varied geology including sedimentary and volcanic rocks; sunny; volcanic ash soils; alluvial and organic soils, sandy soils on dunes; originally forested; Polynesian clearance, landscape modification; formerly extensive flax swamps, fern, scrub, forest remnants in S; mangroves in harbour inlets; now mostly farmed, horticulture, exotic forest on Matakana I.”²

There are very limited protected areas within the Tauranga Ecological District, meaning that any native vegetation remnants are important and require prevention from further loss or damage.³

Table 2: Protective status of the ecological landscape

LENZ Level IV Class	A7.2	F6.1
Original (pre-Maori) percentage of ecosystem type in Ecological District within land title	346,272 ha	778,785 ha
Natural ecosystem area remaining	13,504.6 ha 3.9%	201,705.3 ha 25.9%
Proportion of remaining natural ecosystem under protection	1,931.2 ha 14.3%	109,526.0 ha 54.3%
Protection by certificate holder	6.0 ha 0.3%	25.5 ha 0.02%
Protected areas (% of management estate)	2%	11%
Protected areas (% of the aggregated Group Scheme management estate by Ecological District)	100%	

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 ED, inclusive of reservation of 5% of the productive area within large forests (> 1,000 ha)

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² <http://www.doc.govt.nz/upload/documents/science-and-technical/Ecoregions2.pdf>

³ <https://www.boprc.govt.nz/media/33700/Wildland-091118-TaurangaEcolDistPhase1.pdf>

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Table 3 illustrates the percentage of area protected within Brook, Maitai, Roding and Marsden Valley Forests, compared to the total forest property area. The total area of protected ecosystem reserves exceeds the minima required for certification.

Table 3: Protective status of the ecological landscape for Summerhill Forest Estate

Ecological District	Forest	Total Forest Area (ha)	Reserve Area (ha)	Reserve (%)	Meets FSC?	Reserve Shortfall (ha) equivalent
Tauranga	Summerhill	195.3	25.5	13%	Yes	Nil
Otanewainuku		16.5	6	36%	Yes	Nil
Totals		211.8	31.5	15%	Yes	Nil

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.

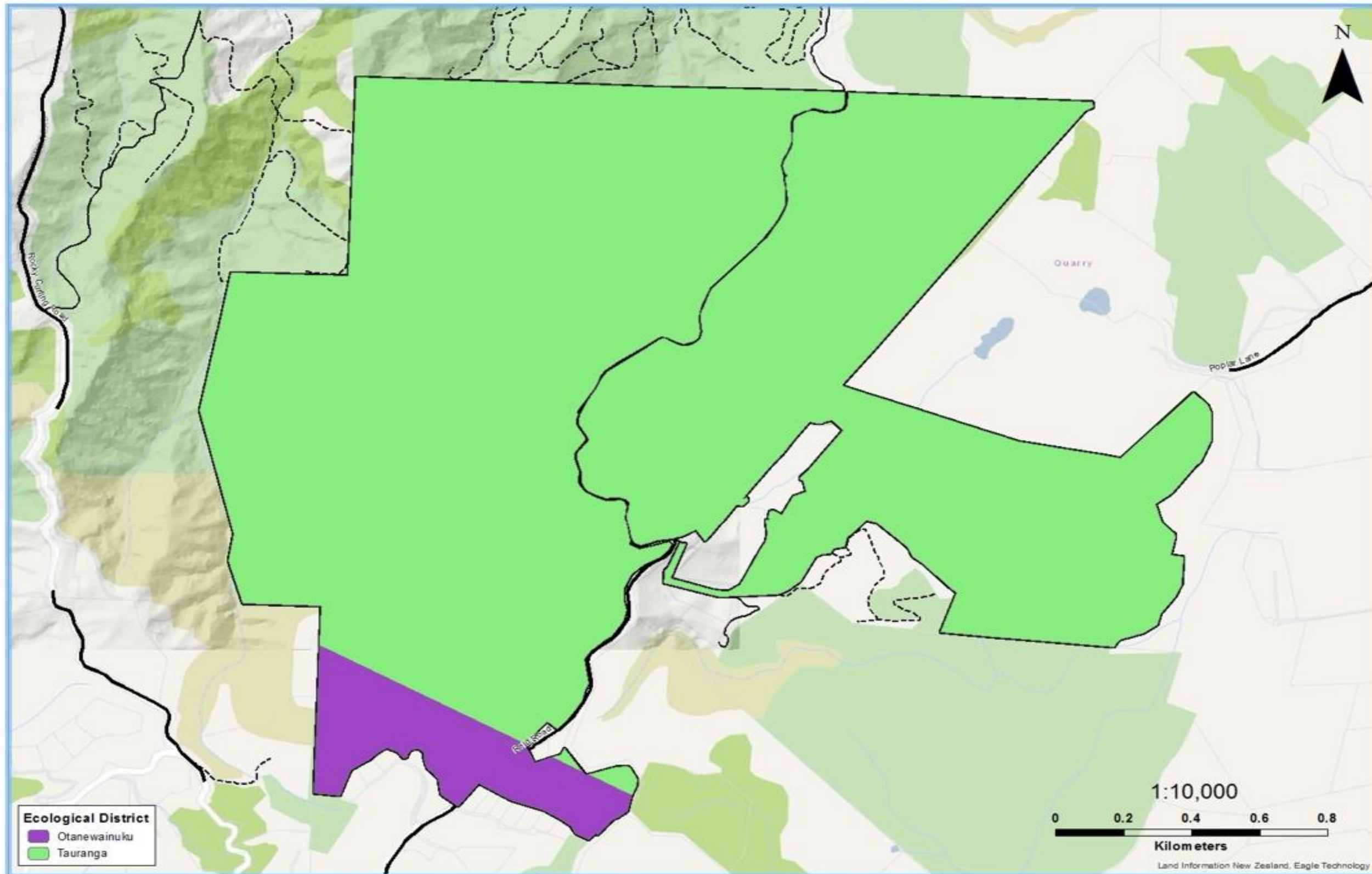
The TEC is therefore most appropriately applied to help identify places that are priorities for formal protection against clearance and/or incompatible land uses, and for ecological restoration to restore lost species, linkages and buffers.

Table 4 shows the threatened environments classifications as they pertain to Summerhill Forest (Map 4). The rarest threatened environments (< 10% indigenous cover left) make up 6 ha of Summerhill Forest, while the remaining area reflects much less threatened hill country forest ecosystems.

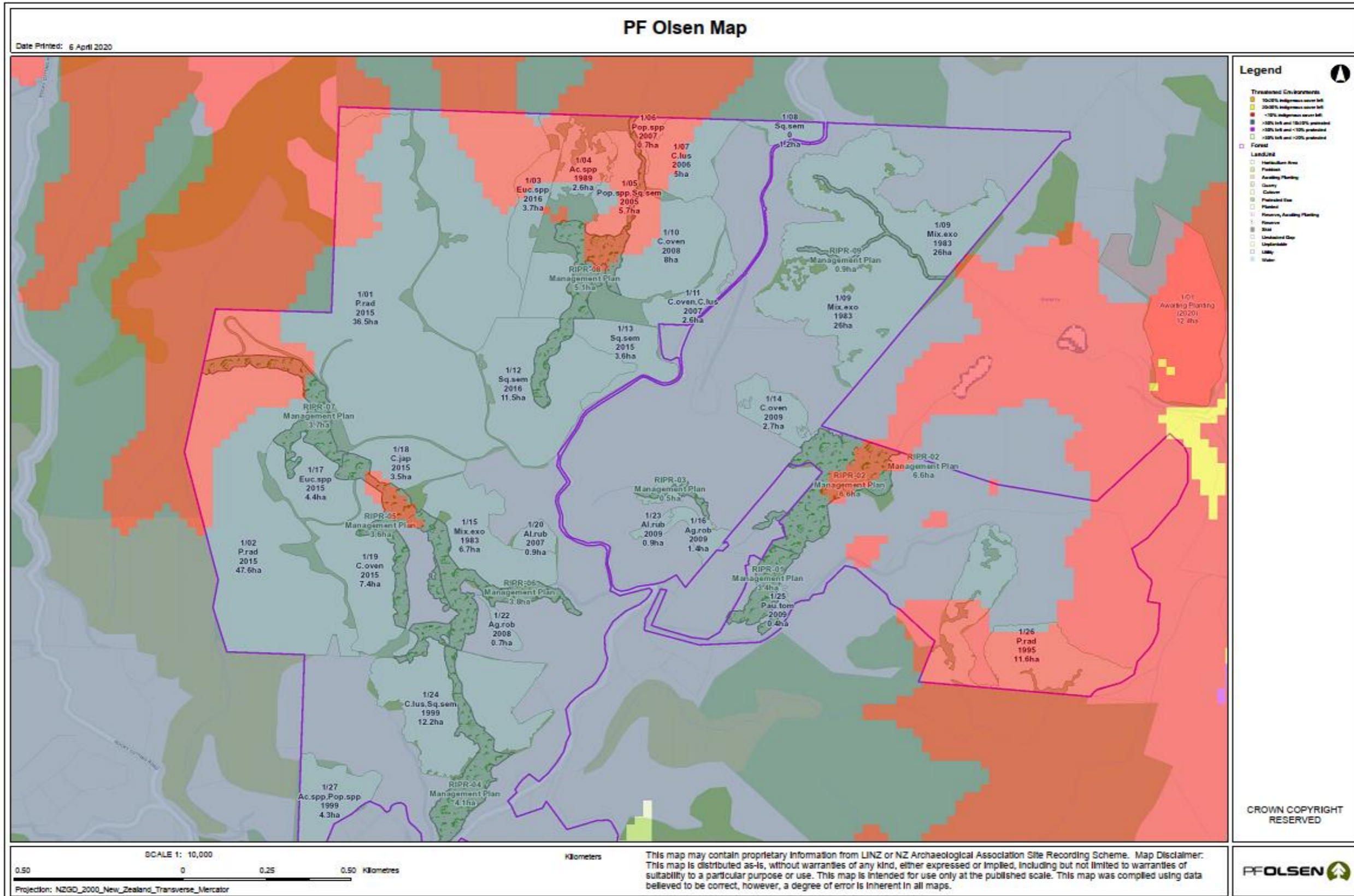
Table 4: Reserve areas by Threatened Environment Classification

Category	Area (ha)	Area (%)
< 10% Indigenous cover left	6.0	19%
>30% left 10-20% protected	25.5	81%
Total	31.5	100%

Map 2 – Summerhill Forest Ecological Districts



Map 3 – Threatened Environment Classifications



**Historic and
archaeological
sites**

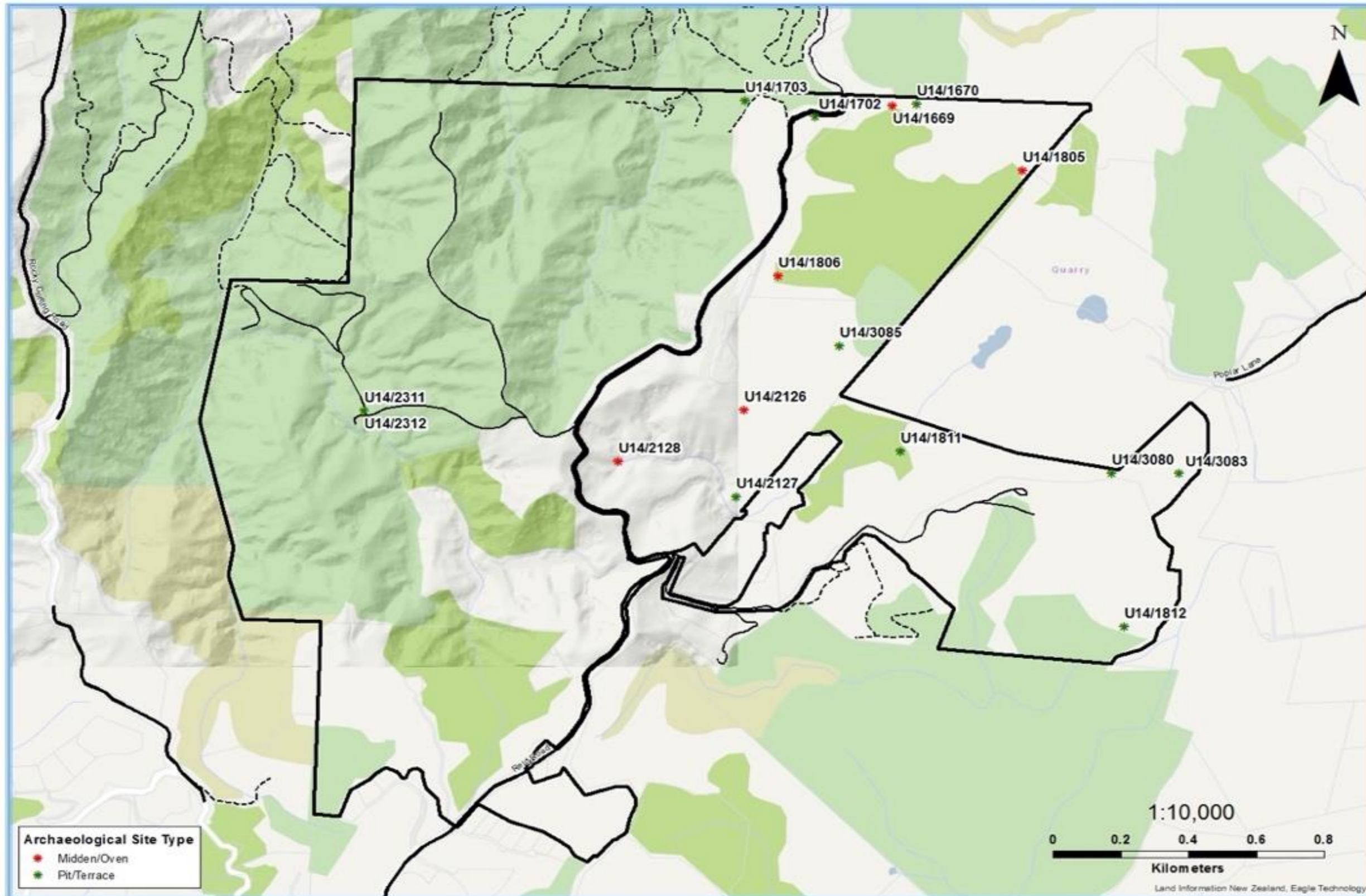
Records of known archaeological and historical places are maintained in the New Zealand Archaeological Association (NZAA) Site Recording Scheme published in the 'Archsite' database⁴. PF Olsen retains a license to this dataset and all recorded site information is reproduced in mapping for forestry operations. The Archaeological Site Probability model published by the Department of Conservation⁵ provides further guidance on the probability of pre-European archaeological evidence existing based on the geographical location of the forest and historical occupation of the local area.

Records from the 'Archsite' web resource have revealed 16 archaeological sites within Summerhill Forest. These are shown in map 3 below and include 11 pit/terraces and 5 midden/ovens, all of Maori origin.

⁴ <https://archsite.eaglegis.co.nz/NZAAPublic>

⁵ Arnold, G.; Newsome, P.; Heke, H. 2004: Predicting archaeological sites in New Zealand. *DOC Science Internal Series 180*. Department of Conservation, Wellington. 24 p.

Map 4 – Archaeological Sites



4. Socio-economic profile and adjacent land

Forest history

David & Cloie Blackley founded Summerhill Forest with the purchase of 170 ha in 1959. The surrounding farmland has been purchased over the past 60 years reaching a total area of 400 ha. The farm is predominantly used for sheep & cattle grazing and forestry.

David & Cloie's daughter, Gabrielle & husband Andrew Walton, started a joint venture on 40 ha of second rotation pine forest in 1990. In 2002, they purchased 127 ha of the farm and forest land.

Both generations have worked on diversifying Summerhill to include a variety of plantation species, improve the management of freshwater catchment systems, and opening the land to the public for recreational use. Their efforts were rewarded in 2011 by winning the New Zealand Farm Forester of the Year award. The award recognised outstanding farm forestry at Summerhill for a diversity of species and the care taken to cultivate them.

Current social profile

Summerhill Forest contributes positively to the social profile of the area.

The property is adjacent to the Papamoa Hills Regional park, providing access since the parks opening in 2004. In 2014, David & Cloie Blackley gifted 126 ha of the farm to Summerhill Charitable Trust for the purpose of recreation and education on a working farm and within its forests. The land has been unconditionally gifted, and all proceeds and donations are used by the trust to maintain and develop the land for the local community to enjoy. This includes permanent public access to the regional park, with carparking and toilet facilities available for visitors.

There are also extensive mountain bike and walking trails through Summerhill forests on both sides of Reid Road, including access to the neighbouring Papamoa Hills Regional Park. Today there are approximately 50,000 visitors to the farm each year.

During harvesting periods, visitors are directed away from trails affected by the harvest, usually to the opposite side of Reid Road. Trails impacted by harvesting are closed for safety precaution and visitors are notified at the carpark entrance. New trails are currently under construction on the Western side of Reid Road in anticipation of trail closures on the Eastern side for harvesting.

Trails are maintained by volunteers, largely organised by the Tauranga Mountain Bike Club.

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Events are regularly hosted by Summerhill Youth Leadership Academy, a unique leadership and life skills course for teenagers that is run for four months each year. Local community and recreational groups, such as the Tauranga Mountain Bike Club, organise weekly events at Summerhill during the summer months.

The Bay of Plenty region, in which Summerhill Forest falls, is the 5th most populated in New Zealand (Table 5).

Combining data from the Atlas of Deprivation (Ministry of Health) and average income from Statistics NZ, it is apparent that wealth varies widely across the large Bay of Plenty region. There is a high level of “professional” employment but also a higher than national average level of employment in primary industry and as at the time of the census data, a higher than national average level of unemployment. Notwithstanding the wider regional statistics, the immediate area around Summerhill forest has experienced rapid growth in both the population and economy in recent years.

Commercially, the forest adds just a very small incremental addition to the large mature industry in the region but also a disproportionately larger share of niche speciality timbers for high end timber uses in the local markets.

Table 5: Key statistics as summarised from 2018 Census⁶ data

Census Category	Bay of Plenty	New Zealand
Ethnicity: European	73.6%	70.2%
Ethnicity: Māori	29.1%	16.5%
Formal qualifications	79.7%	81.8%
Unemployment	4.5%	4.0%
Dominant occupation	Professionals	Professionals
Median income	\$29,100	\$31,800
Internet access	84.9%	76.8%
Home ownership	66.9%	64.6%
⁷Agriculture/forestry /fishing	10.2%	6.6%

⁶ <https://www.stats.govt.nz/tools/2018-census-place-summaries/>

⁷ <https://mbienz.shinyapps.io/RegionalFactsheets/> 2017

Associations with Tangata Whenua The land of Summerhill Forest is freehold, however the iwi associated with the seven pa sites located in the neighbouring Papamoa Hills Regional Park are Ngaiterangi, Ngati Pukenga (of Mataatua) and Waitaha A Hei (of Te Arawa).

Tenure & resource rights The land tenure is freehold. A search of the Maori Land Online website (<http://www.maorilandonline.govt.nz/gis/map/search.htm>) returned no results.

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

Table 6 lists the forest neighbours and their primary activities. A cadastral map ([Appendix 1](#)) shows adjacent property locations. Some or all of these parties should be consulted when operations are proposed in forest areas adjacent to their boundaries.

Table 6: Forest neighbours

Not Publicly Available

Regulatory Environment and Risk Management

5. The Regulatory Environment

Regulatory considerations

Forestry operations throughout New Zealand are undertaken within the context of a regulatory framework that aims to ensure wider economic, social and environmental goals are achieved for the populace as a whole.

Failure to meet regulatory requirements is a key business risk that must be managed. The following section summarise key regulatory requirements and risk management controls exercised over forestry operations in the forest.

Health and Safety at Work Act 2015

Leadership, a constant focus on health and safety, and the strong message that safety rates as the number one priority ahead of any other business driver are all highly important for PF Olsen management. The company also takes the following steps to ensure worker health and safety:

- Contractor selection process including emphasis on:
 - safety systems and track record;
 - worker skills and training; and
 - equipment type and standard.
 - Work planning.
 - Contractor induction.
 - Monitoring, including random and reasonable cause drug testing, safe work practices and PPE.
 - Incident investigation and reporting, including investing in software, training and processes development to enable good transparency on lag and lead indicators.
 - Regular reporting to and interaction with the Client on matters related to safety.
 - Regular (annual) review and update of the critical risks as identified in PF Olsen data sets and from Industry indicators. Such a review shall focus on incidents that have caused harm and/or loss, any known cause factors and mitigations and revised controls.
-

Resource Management Act

Within the framework of the RMA, there exist a number of functional instruments that are designed to manage the effects of all undertakings in or on land and water to ensure sustainable outcomes.

Key amongst those instruments are briefly described below:

National Environmental Standard for Plantation Forestry (NES-PF)

Coming into law on 1 May 2018, the NES-PF is a whole new rule hierarchy that applies the same rule set uniformly across most forestry operations in all parts of New Zealand. Operations will come under the legal force of this RMA instrument, though local Councils will retain the ability to regulate specific areas outside the NES-PF, e.g. Significant Natural Areas, Outstanding Landscapes, giving effect to the Coastal Policy Statement etc.

The underpinning the structure of the NES-PF is a rule hierarchy linked to the erosion susceptibility of the lands upon which forestry operations are to be conducted.

Work commissioned by the Ministry of Primary Industries led to the creation of a national spatial map, the ‘Erosion Susceptibility Layer’ (ESC) that classifies all of New Zealand into a series of four classes of erosion susceptibility from low (green) to very high (red).

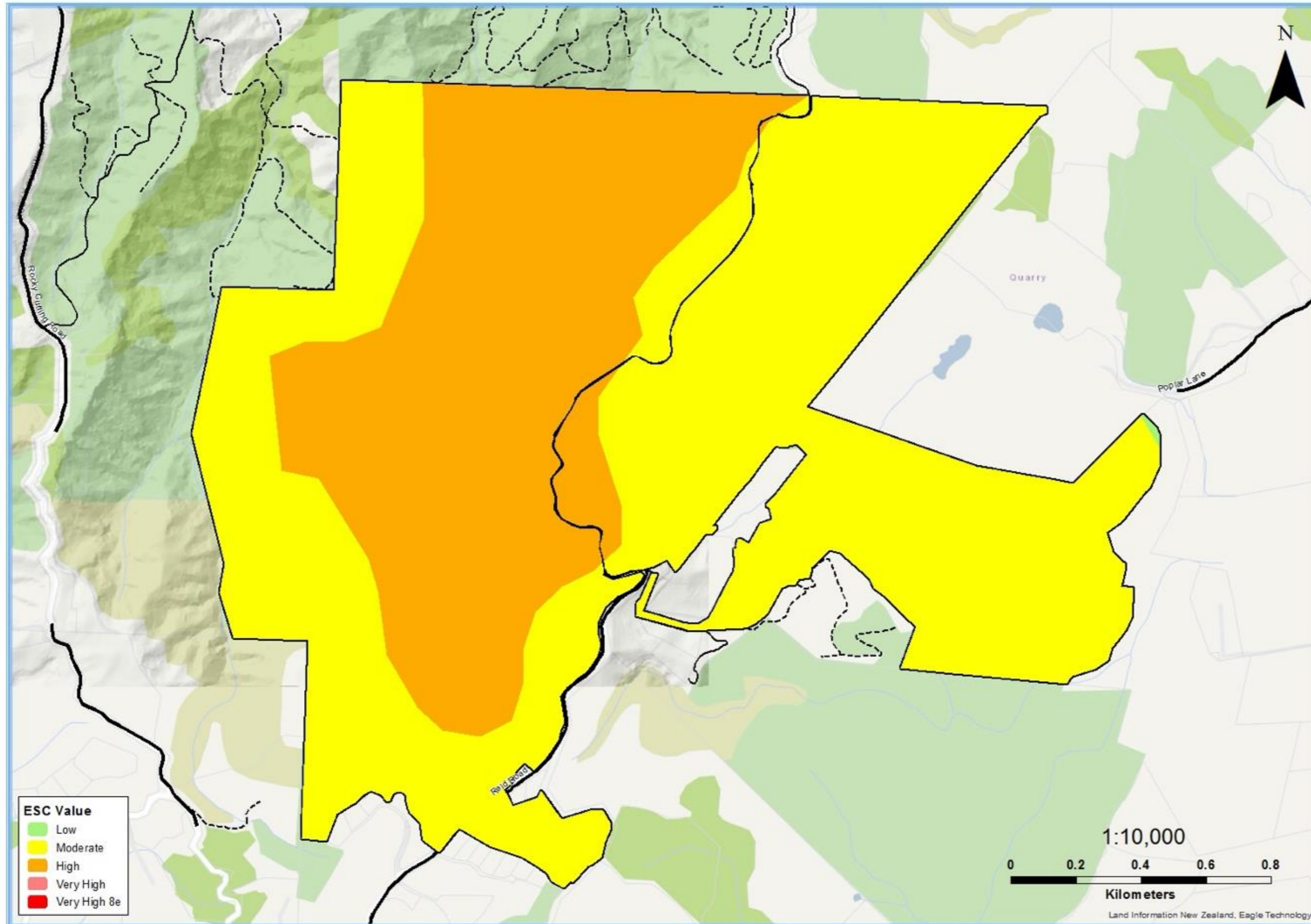
The stringency of the rules hierarchy, i.e. whether consents are needed and the degree to which Councils can apply discretion to the conditions attached to a consent, is then tied closely to the recognised erosion susceptibility of the lands involved and the risks created by the operations. In the case of Summerhill Forest, Table 7 below indicates the proportion of the forest by the respective ESC classes.

In broad terms, harvesting, roading (earthworks) and new afforestation operations will need consents in the red zone. Earthworks will need consents in orange, and in the green and yellow zones most operations will be permitted subject to conditions. The coverage of the erosion classes within the estate are illustrated in Map 5.

Table 7: ESC Classes (Erosion Risk) for Summerhill Forest

	Low	Moderate	High	Very High	Very High (8e)	Undefined
Area (ha)	-	107.3	104.3	-	-	-
Area (%)	-	51%	49%	-	-	-

Map 5 – National Environmental Standard Erosion Susceptibility Classes in Summerhill Forest



Council Plans

Implicit in the framework of the RMA is the role of Council District and Regional Plans which can cover matters of land use, water management biodiversity and air-quality either as separate planning documents or as integrated plans.

As they relate to forestry, local planning rules must align and or give effect to National Environmental Standards such as the NES-PF.

Notwithstanding the above, under the NES-PF, local Councils are able to exercise greater stringency over the NES-PF through their plans where that stringency is required to give effect to an NPS or in situations related to outstanding natural landscapes and other specific situations. The local planning rules must be followed in these situations.

The contact details for the relevant councils can be seen in [Appendix 2](#).

Table 8: Regional and District Councils under Summerhill Forest.

Regional Councils ⁸	District Councils ⁹
Bay of Plenty Regional Council	Western Bay of Plenty District Council

National Policy Statement and NES - freshwater

A National Policy Statement on Freshwater and an associated National Environmental Standard have been issued by the Ministry for the Environment, upgrading an existing NPS. Presently undergoing a period of evaluation in relation to public submissions, it is, at the time of writing, unclear to what extent the final law will impact forestry. As a general tenor, the wider industry submissions on this proposed legislation were that in most cases, provided that the industry codes were adhered to, the standards could be met.

National Policy Statement - Biodiversity

At this time of writing this proposed legislation is about to enter a phase of public consultation. The final form and impact upon forestry operations is unknown.

⁸ Regional Councils responsible for soil conservation and water and air quality issues

⁹ District Councils responsible for land use and biodiversity issues

Heritage New Zealand Pouhere Taonga Act 2014

Under the Heritage New Zealand Pouhere Taonga Act 2014 it is the landowner’s responsibility to identify any historic sites on their land prior to undertaking any work which may disturb or destroy such sites. Records of archaeological and historical places are maintained in the NZ Archaeological Association (NZAA) Site Recording Scheme <http://www.archsite.org.nz/>.

For the 16 sites recorded on the farm, protocols specified in PF Olsen’s EMP’s and any others specifically developed in conjunction with Heritage New Zealand (HNZ) and Iwi or other stakeholders must be observed. Where such circumstances require, an ‘Authority to Modify or Destroy’ will be sought from HNZ. Such authorities are similar in function to a resource consent and, if granted, normally come with conditions that must be met.

These responses may include, but are not limited to:

- Map and ground surveys to identify, mark and protect known heritage sites.
- Iwi consultation and surveys for unknown sites.
- Archaeological Authorities to modify sites if required.
- Accidental Discovery Protocols to stop work and engage experts if sites are discovered during operations.

The process to apply for authorities is documented in PF Olsen’s EMP’s. Note also, that Authorities to Modify an archaeological site may sometimes be required from the local District Council and sites of cultural significance are often included in schedules of places and sites of significance in District Plans. Update checks for any sites will be required before any harvesting or related earthworks commences.

Consents & authorities held

Summerhill Forest holds the following resource consents:

- ‘Place of Assembly’ Ref. No.2151 Western BOP District Council
- Dam Installation Ref No. 61366 Bay of Plenty Regional Council

A copy of these consents and conditions has been provided to PF Olsen for inclusion in its consents management database. There are no HNZ authorities currently that apply to Summerhill Forest.

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.

All of Summerhill’s pre-1990 forests are registered under the Emissions Trading Scheme, reference number FAP-25. Therefore, these forests are subject to the accrual of emissions credits and liabilities under that scheme.

**Other relevant
 legalisation**

There are numerous other statutes and regulations that impact on forest operations. Forest owners can be held liable for breaches of these Acts and may be held responsible for damage to third party property. Management processes seek to manage and minimise these risks.

Other relevant legislation is listed in [Appendix 3](#).

6. Commercial Risk Management

**Market access
 retention**

It is an essential focus of the Forest owners to ensure Summerhill Charitable Trust and partners retain credible access to its markets.

The forest owners are seeking to maintain independent third party environmental certification for their estate under Forest Stewardship Council certification (FSC) to assist in this process. PF Olsen Ltd acting under the instruction of the client will be responsible for assisting the Forest Owners to attain and retain certification through technical and administrative support in relation to the implementation of the systems required to maintain the necessary standards.

**Log customer
 credit risk**

Summerhill Charitable Trust and partners manage their own credit risk with the parties who form their client base.

**Infrastructure
 damage or
 service
 disruption**

Summerhill Forest currently has a couple of electricity lines that border or run through the property, but the existing internal track network is sufficient for administering these lines. If any infrastructure is installed at a future date, then the risks will be managed by:

- Identification of any utilities at planning stage (maps and on ground).
- Early engagement and planning with utility owner to minimise risks.
- Operational execution of agreed plans with parties specifically qualified for the tasks involved when working close to utilities.

**Pests and
 diseases**

Pests and diseases are managed according to any statutory obligations and best practices as identified by scientific research and past experience, with the type and intensity of treatment (if any) subject to what is at risk and the age of trees (see [Section 13](#)).

Fire

Fire is always a risk to forests. As this region of the North Island can be prone to drought periods over the summer the risk can become elevated and an increased frequency of these events is a possibility under climate change scenarios.

Fire risk is managed through:

1. Protocols to restrict work hours or to stop work in periods of extreme fire risk.
2. Regular monitoring of any operating contractors' fire prevention and first response equipment prior to fire season each year.
3. Management of public and recreational use when risks become high.

7. Environmental Risk Management

Environmental risk

Under an FSC Group Membership arrangement the Forest Owner will be expected to follow the intent of policies established as part of the wider FSC Group Scheme.

Those policies have been set by PPF Olsen Ltd as Group Manager as a means to set a framework for managing environmental risk. The framework runs through a cascade from high level 'intent' determined by the Forestry owner, through PF Olsen's own environmental policies, thence through defined and documented processes constituting an Environmental Management Process (EMP's), supported by monitoring and reporting. PF Olsen's policies and Summerhill Charitable Trust and partners' business objectives are considered to be well in alignment.

**Environmental
policy**

PF Olsen Limited is committed to:

- *Sustainable forest and land management.*
- *Promoting high environmental performance standards that recognise the input of the community in which we operate.*
- *Supporting an environment of continuous improvement in environmental performance.*
- *Obtaining and retaining independent 3rd party forest certification in conformance with the Principles and Criteria of the Forest Stewardship Council and / or the Programme for Endorsement of Forest Certification as specified by forest owning clients, or in any case ISO:14001 Environmental Management Systems.*

In order to achieve these commitments **PF Olsen** (and PF Olsen Certification Scheme Members) will undertake the following:

- Where applicable to a particular forest, comply with the presiding **Certification Standards** as set out in any agreements between the forest owners and PF Olsen.
- **Planning** of operations to avoid, mitigate or remedy degradation of **ecological, heritage** and **amenity** values.
- Compliance with all relevant **legislation** and where appropriate exceed environmental statutory requirements.
- **Training** for all employees and contractors to ensure an understanding of certification member's commitments to high standards of environmental performance, their responsibilities under the environmental legislation and to assist the implementation of sound environmental practices.
- **Monitoring** environmental and socio-economic research and international agreements that may improve PF Olsen environmental and certification performance.
- Regular environmental performance **audits** of operations.
- Support for environmental **research**.
- Undertake forest management in accordance with the principles and ethics of the **NZ Forest Accord** the **Principles for Commercial Plantation Forest Management in NZ**, and other relevant agreements, conventions and accords.
- Promotion of the prevention of **waste** and **pollution**; and efficient use of **energy**.
- Due regard for the well-being of the **community**.

Objectives, targets and monitoring

The Group Members’ objectives, targets and monitoring are categorised across 5 key aspects of the business:

1. Economic
2. Legal
3. Social
4. Health & safety
5. Environment

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

EMP framework

The Environmental Management Process (EMP’s) is an integrated set of cloud based, defined and documented policies, processes and activities that govern the physical implementation of forest management activities. These processes can be used to support the Group Member’s activities where appropriate. The EMP’s apply a systematic approach certified to ISO:14001 standards to ensure that prevention of adverse and harmful impacts is effective.

The framework is reviewed annually with the input of an Environmental Management Group (EMG).

Environmental Code of Practice

As a member of the New Zealand Farm Forestry Association that is in turn affiliated with the NZ Forest Owners Association, all operations carried out on the property should be undertaken in conformance to the NEW ZEALAND Forest Owners Association ‘New Zealand Environmental Code of Practice for Plantation Forestry’¹⁰. This publicly available document sets out guidelines that underpin the requirements for sound and practical environmental management.

Operations will also be following the Forest Practice Guides¹¹ published in support of the National Environmental Standard.

Forest Road Engineering Manual

On the same basis as for the Codes of Practice, 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, ‘New Zealand Forest Road Engineering Manual’, published 2020¹².

¹⁰ <https://www.nzfoa.org.nz/resources/file-libraries-resources/codes-of-practice/44-environmental-code-of-practice/file>

¹¹ <https://docs.nzfoa.org.nz/forest-practice-guides/>

¹² https://www.nzfoa.org.nz/images/NZ_Road_Engineering_Manual_Web_Feb_2020_compressed.pdf

Assessment of environmental risks

Environmental risks arising from forest operations are assessed and managed on a site-by-site basis prior to execution. The relative probability and magnitude of adverse effect attributable to any particular operation on any particular site is highly variable.

At a high level, ‘risks’ are presented as consuming services summarised for a typical plantation life cycle in [Appendix 5](#). As a broad assessment over all of the Summerhill forest estate, the **potential** for adverse impacts across the range of operations and forest sites is indicated in the Environmental Assessment matrix below, which summarises the identified risks across ‘key management aspects’.

The level of potential risk has been evaluated in the matrix as high ‘H’, medium ‘M’ or low ‘L’, or not applicable ‘NA’ and is thus indicative of the level of care that might need to be applied to ensure the potential for adverse effects is minimised (Table 9).

Table 9: Risk assessment for key aspects involved in forest management activities

Forestry Operational Activities	Environmental Values / Issues matrix												
	Erosion & Sediment Control	Water Quality	Soil Conservation & Quality	Air Quality	Aquatic Life	Native Wildlife	Native Vegetation	Historical & Cultural Values	Landscape & Visual Values	Neighbours	Public Utilities	Recreation Values	Threatened Species
Harvesting	H	H	H	NA	L	L	H	H	L	H	L	L	H
Earthworks	H	H	H	NA	L	L	L	H	L	L	L	L	L
Slash Management	L	L	L	NA	L	L	L	NA	L	L	L	L	L
Stream Crossings	H	H	L	NA	H	L	L	NA	NA	L	L	H	NA
Mechanical Land Preparation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	L
Burning	L	L	L	H	L	L	L	NA	H	H	L	H	L
Planting	NA	NA	NA	NA	NA	L	L	H	L	L	L	L	L
Tending	NA	L	NA	NA	L	L	L	NA	L	L	L	L	L
Fertiliser Application	NA	H	NA	L	H	L	L	L	NA	L	L	L	M
Agrichemical Use	NA	H	L	L	H	L	H	L	L	H	L	H	H
Oil & Fuel Management	NA	H	L	NA	H	L	L	L	NA	L	NA	L	L
Waste Management	NA	L	NA	L	L	L	L	L	L	L	NA	L	L
Forest Protection	NA	L	NA	L	L	L	L	L	L	L	NA	L	NA

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 Summerhill Forest are:

- Pesticides
 - Herbicides: for commercial and ecological weeds;
 - Fungicides: for forest fungal disease control; and
 - Vertebrate or Invertebrate Toxins: used for control of pest mammals (e.g. hares and possum or wasps).
- Fuels and oils
- Fire retardants: (only ever used if there is a fire)
- Surfactants: to increase herbicide efficacy

Transportation, storage and labelling of these hazardous materials must all comply with the provisions of legislative controls under the Environmental Protection Agency (EPA) and the NZS 8409:2004 Management of Agrichemicals code of practice.

During actual usage, the highest risks are associated with chemical trespass or bulk fuel spillages. These risks are managed by:

- Neighbour consultation over planned spray operations.
- Careful planning and timing of any aerial operations having regard to wind and spray drift.
- Unsprayed buffer strips on neighbour boundaries and 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.
- Moving contractors into the use of double skinned bulk fuel storage tanks as the preferred method of containment for all larger capacity tanks.
- Tracking of all active ingredient usage within the estate.

Risk management includes active involvement in and review of technologies and research into alternative methods for the control of weeds, pests and diseases where these are effective and efficient.

Fuel use is directly related to the machinery used in forestry operations and the market locations. Using modern efficient machine technology is still the primary area where efficiency gains can be made. There is a steady programme to transfer chain bar oils to vegetable based low toxicity oils.

Highly chemicals

FSC applies a risk-based approach to rules around the use of Chemical pesticides. The framework defining this approach is documented in new policies released by FSC in 2019¹³. Chemicals are classified according to an FSC Hazard rating. The rating then requires differing levels of actions by managers to enable their use under regionally prescribed situations. The hazardous rankings run from ‘Prohibited, to ‘Highly Restricted’ to ‘Restricted’ and finally those with no particular FSC obligations.

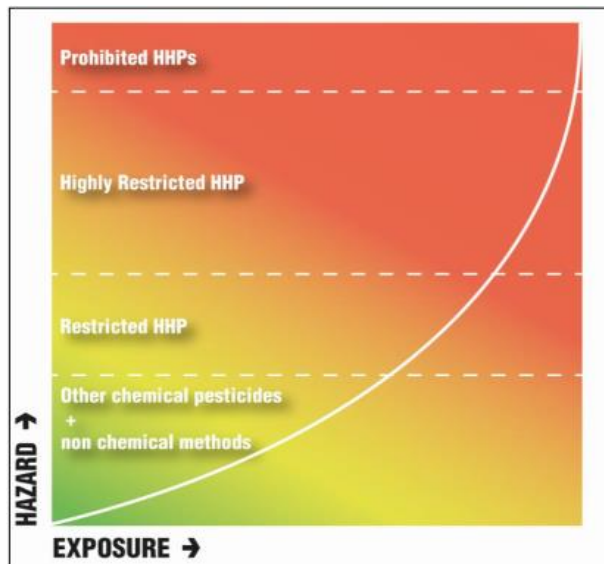


Figure 1: FSC Hazardous Risk Management approach

Of the chemical pesticides used or potentially used in Summerhill forest estate, none fall into the Prohibited or Highly restricted categories. Those that fall into the Restricted category are listed in Table 9 below.

Most of the Restricted pesticides are vertebrate poisons and insecticides that if used, would be targeted at specific pest problems, such as wasps or high possum or pest predator numbers. In the latter case such use is only likely in conjunction with a wider coordinated application aimed at achieving positive biodiversity outcomes.

Within the herbicides and fungicides, usage is expected at between 1-2 and 2-4 times per radiata rotation respectively.

All the classes of formulations used are registered and legally approved for in use New Zealand by the NZ Environmental Protection Agency, subject to various controls, and for the purposes to which they are applied as listed below.

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¹³ FSC Pesticides Policy FSC-POL-30-001 V3-0 <https://www.fsc.org/en/document-centre/documents/resource/208>

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All the classes of formulations used are registered and legally approved for in use New Zealand by the NZ Environmental Protection Agency, subject to various controls, and for the purposes to which they are applied as listed below.

Table 10: FSC Highly Hazardous chemicals used or potentially used in Summerhill Forest

Active ingredient	Purpose	FSC Hazard	Common usage
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			
Fipronil	Insecticide (wasps)	Restricted	Localised wasp control
Pindone	Vertebrate pesticide	Restricted	Rabbit and hare control
Potassium cyanide	Vertebrate pesticide	Restricted	Vertebrate pest control, ground-based possum control & Wallabies

The Managed Plantation Estate

8. Commercial Planation Estate

Productive Capacity strategy

Forest management is carried out to ensure the productive capacity of the Summerhill Forest is not compromised. This encompasses multiple aspects that include:

- [Pests and weeds and forest health](#): can reduce productivity
- [Inventory](#): to feed 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.

Forest area

The net stocked areas have been measured from a map produced by PF Olsen (Table 11, Figure 2).

Table 11: Summerhill Forest Area (ha)

Gross area	Net Stocked Area	Reserves
243.5	211.8	31.7

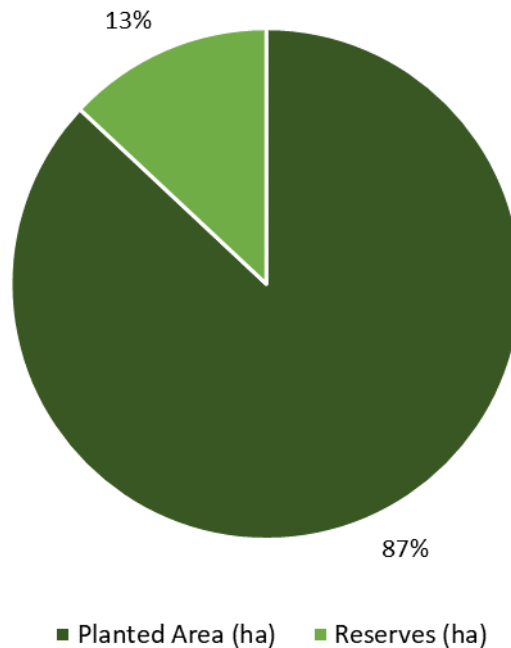


Figure 2: Summerhill Forest Area (ha)

Current species There are a range of species grown in Summerhill Forest (Table 12). These species have been chosen to best meet the management objectives set out above, given the characteristics of the forest land.

The property also contains several trial plantings managed by Scion, grown for genetic, silviculture and harvest research purposes.

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

Table 12: Species

Stand ID	Species	Year Planted	Area (ha)
1	P. radiata	2015	36.5
2	P. radiata	2015	47.6
3	Eucalyptus species	2016	3.7
4	Acacia species	1989	2.6
5	Poplar species	2005	5.7
6	Poplar species	2007	0.7
7	Mixed Cypresses	2008	5
8	Sequoia sempervirens	2016	1.2
9	Mixed exotics	1983	26
10	Cupressus ovensii	2008	8
11	Cupressus ovensii	2007	2.6
12	Sequoia sempervirens	2016	11.5
13	Sequoia sempervirens	2015	3.6
14	Cupressus ovensii	2009	2.7
15	Mixed exotics	1983	6.7
16	Agathis robusta	2009	1.4
17	Eucalyptus species	2015	4.4
18	Cryptomeria japonica	2015	3.5
19	Cupressus ovensii	2015	7.4
20	Alnus rubra	2007	0.9
22	Agathis robusta	2008	0.7
23	Alnus rubra	2009	0.9
24	Cupressus lusitanica	1999	12.2
25	Paulownia tomentosa	2009	0.4
26	P. radiata	1995	11.6
27	Acacia species	1999	4.3
Total Stocked Area (ha)			211.8
Area Awaiting Restocking (ha)			0.0
Reserve Area (ha)			31.7
Gross area (ha)			243.5

Species mix

The species mix of Summerhill Forest is Figure 3 below.

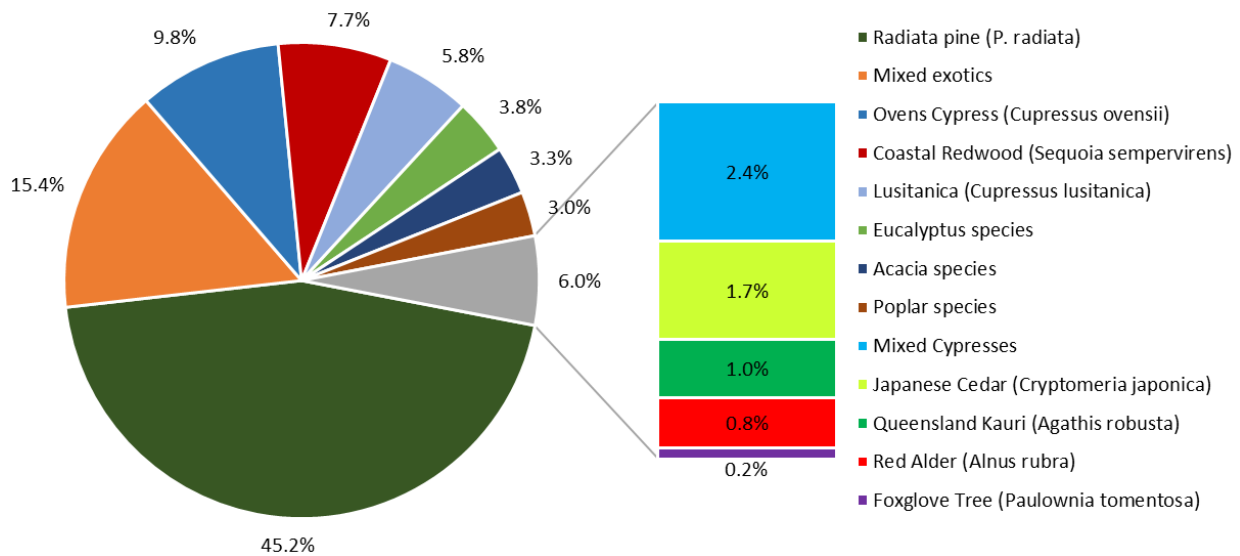


Figure 3: Species Mix by Area of Summerhill Forest

Productivity indices Site index is a 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. Equations exist to predict this height given a measured height at any age.

The 300 index is another measure of productivity of a site based on stem volume growth (mean annual increment) of 300 stems per hectare.

The site index for Summerhill Forest is between 32.5 - 37.5m, while the 300 index is 32.5 - 37.5m³/ha/year.

Productivity of a site in terms of *S. sempervirens* (redwood) can also be measured by site index, which is defined as mean top height at breast height of redwood at age 40 years. The 400 index is also used, measuring site productivity based on basal area at breast height of redwood age 40 years and a stocking of 400 stems per hectare.

The redwood site index for Summerhill Forest is 40 - 50m, and the 400 index is 35 - 45m³/ha/year.

For the other species such as the cypresses or Tasmanian blackwood, growth data comparisons are less able to be reliably made. However, site conditions are very favourable for these species and trial sites will provide excellent data.

Current crop status

Due to the nature of the block at Summerhill, a crop status table is not appropriate due to the high number of different species present.

9. Commercial Crop Establishment and Silvicultural Operations

Introduction

The choice of species is the most important issue in plantation forestry. The species must be suitable for the site and meet the objectives of Summerhill Charitable Trust and partners. Also important is to ensure that the planting material is of good quality.

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

Forest management goals

Summerhill Forest’s owners are committed to ensure that the forest will be 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.
- Ensure that historic sites are identified and protected.
- Ensure that other forest values and products are identified, protected and where possible enhanced.
- Ensure that the forest estate’s contribution to 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.
- Meet all statutory requirements and comply with forest industry best practice.
- Provide recreational opportunities where practical.
- Act as a good corporate citizen and neighbour; and
- Ensure all forest management practices are consistent with the principles of the Forest Stewardship Council and NZS AS:4708:2014

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These goals are further detailed in 'PF Olsen Key Aspects - Objectives, Targets and Monitoring' ([Appendix 6](#)), which the Group Member, Summerhill forest, will be broadly following as appropriate to the nature and scale of their operation.

Crop species

The main species grown at Summerhill Forest is *P. radiata*, with approximately 88 ha of 3rd rotation plantation pine ranging in age from 3 – 5 years at 2019. The species is planted on the steeper hill country at a stocking of 800 stems per hectare, and serviced with existing forestry road access and skid sites. Previous harvests used a combination of hauler and ground-based operations.

The two other main crop species at Summerhill Forest are; *S.sempervirons* (total of 16.3 ha) and *C. lusitanica & Ovensii* (total of 16.1 ha).

S.sempervirons (*coast redwood*) when intensively managed will produce high value, decorative, above ground durable, panelling, cladding, decking, roof shingles, window joinery and outdoor furniture componentry.

C. lusitanica and *C. ovensii* when intensively managed produce a number of different log types suitable for various processing options. High value pruned butt logs will be used for knot free decorative timber. Unpruned logs can be used for structural timber. *C. lusitanica* has the added advantage that its heartwood which is moderately durable, can be used in above ground contact situations without needing to be treated

J. nigra is one of the world's premier wood species. It has high value end use applications for appearance grade timber, rifle stocks, furniture and turnery.

A. australis is an iconic native timber that has high value end use applications for appearance grade timber, furniture and turning.

The balance of alternative species at Summerhill forest such as the poplars, Eucalypts, Blackwood and others will all have the likely end use as a high value decorative timber for veneer, furniture, panelling or flooring. All the species were chosen because they were the most suitable for achieving Summerhill Charitable Trust and partners' objectives.

Pre-establishment considerations

Prior to re-establishment of the tree crop, a review will be conducted to identify appropriateness of future forest/stand boundaries in relation to expected operations, potential native fauna and flora or other use objectives. Overall, a plantation crop is likely to confer beneficial habitat buffering rather than cause adverse effects.

Unwanted pine spread Re-establishment programmes will include a spread risk assessment using the Wilding Spread Risk Calculator, as required under the NES-PF if there is any species change, to inform decisions about replant boundaries and monitoring or other control strategies if required. There is no intention to plant or replant in other species with known high spread risk.

Re-Establishment It is proposed that some harvesting of special purpose species will take place during the period of this management plan. Re-establishment will aim to use high quality tree stocks suitable for the site and market. These will be investigated at time of establishment.

Tending **Specialist Species:** The tending regime executed at Summerhill Forest for all the non-radiata species will involve an intensive pruned regime, consisting of frequent short lifts to ensure a small diameter over stubs is achieved, and therefore a small defect core. After pruning thinning to waste and possibly some further form pruning may be required.

A. melanoxylon stands require regular form pruning of branches greater than 30mm to ensure a single dominant leader. *C. lusitanica* stands have received sail pruning to minimise windthrow risk in these stands.

Table 13 presents target pruned heights for each of the main species grown at Summerhill forest. In this instance, a final stocking has not been included due to the large variety of species and objectives.

Table 13: Specialist Species silviculture

Species	Target Pruned Height (m)	Tending Comments
<i>A. melanoxylon</i>	5 – 6	Currently in harvest
<i>A. melanoxylon</i>	4	Nurse crop of pine removed at year 12
<i>A. australis</i>		SCION trial plot, second lift variable heights
<i>A. robusta</i>		SCION trial plot, first lift variable heights
<i>A. rubra</i>	5 – 6	Second rotation planting after pine
<i>C. lusitanica</i>	6	Currently in harvest
<i>C. lusitanica</i>	6 – 6.5	4 lifts, 2 thins
<i>C. lusitanica</i>	6 – 6.5	SCION seed trial, 3 lifts 2 thins
<i>C. leylandii</i>	4.5-5	Second rotation planting after pine; 2 lifts, 1 thin
<i>C. ovensii</i>	6-6.5	Second rotation after pine
<i>E. regnans</i>	6+	Currently in harvest
<i>G. robusta</i>	4 – 6	2 lifts
<i>J. nigra</i>	4 – 6	Specimen trees
<i>Paulownia</i>	4 – 5	Mixed varieties: x <i>P. tomentosa</i> , x <i>P. fortunei</i> , x <i>P. fargesii</i>
<i>Poplar 'Eridano'</i>	6	Currently in harvest

<i>Poplar 'Kawa'</i>	3 – 4	Second rotation after pine, 2 lifts, 1 thin
<i>P. radiata</i>		
<i>S. sempervirens</i>	3	Second rotation after pine, 2 lifts, 1 thin
<i>S. sempervirens</i>	6	Second rotation after pine, 3 lifts, 1 thin

Radiata: For the radiata forests, the intended management regime to be applied will be both a 'pruned regime' of two 3m lifts & 1 thinning for pine on moderate terrain and 'structural regime' for Steeper terrain, involving a thinning by age 12-15yrs but no pruning.

Tree nutrition

The soils in Summerhill 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 micro-nutrients. The most common nutrient deficiencies are likely to be:

- **Magnesium** – Magnesium deficiency is associated with the phenomenon known as mid crown yellowing where the middle of the tree crown turns a yellow colour. Heavily pruned trees and some seedlots are more predisposed to the deficiency than others.
- **Boron** – Boron deficient trees can suffer dieback from the terminal buds and this symptom is closely associated with moisture stress and drought. Trees growing on the drier East Coast of both Islands and on the pumice soils of the Central North Island can be prone to boron deficiency though this has not proven to be an issue at Summerhill.

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

Site productivity and tree nutrition are actively researched components of industry research programmes in which PF Olsen is an active stakeholder representing its client base, while all harvesting entities (including Summerhill) are a financial contributor to the industry research programmes through the Forest Research Levy Fund.

10. Harvesting Strategy and Operations

Harvesting strategy Radiata: There is no harvesting of radiata planned over the period of this plan owing to the young age of the stands.

Specialist Species: Summerhill uses a selective harvesting approach for its specialty timber species. Trees are individually pre-selected to harvest once they reach age and size (DBH) within the optimum economic age range (Table 13), where volume growth and quality are offset by mounting holding costs. Harvesting and milling can be done in consultation with buyers/end users giving the opportunity for end-users to pre-select specific trees. Summerhill encourages traceability for their specialty timbers.

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, fulfilment of client orders and the requirements of any resource consents, if required, will determine the actual harvest time. Preferably, harvesting will take place during drier months between November and April to minimise damage to the land from the machinery working within these stands.

Harvests are typically managed by a small ground-based team of 2-3 workers operating chainsaws and a digger to fell and move logs to the nearest skid site. Skid sites are established on flat land with good access to Reid Road for logging trucks and/or portable sawmill access.

It is an operational requirement for the harvesting team to ensure logs are stacked safely on the skid site and it is cleaned up after they have finished. A firewood contractor follows the harvesting operations to complete the clean-up. Depending on harvest location, the local mountain bike club is invited to reinstate trails and establish new trails through the remaining trees.

Table 13: Approximate harvesting ages

Species	Harvest Age (years)
<i>A. melanoxylon</i>	35 - 40
<i>C. lusitanica</i>	30 - 35
<i>E. fastigata</i>	30 - 40
<i>C. ovensii</i>	30 - 35
<i>J. nigra</i>	50 - 60
Kauri, Totara	80 - 120
Rimu, Kahikatea	120+

Planning and preparing for harvest

Radiata: Forward planning is essential when considering harvesting activities involving large stands and high productivity machinery as would be employed in radiata harvesting. 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. No pre-planning for harvest is anticipated for the radiata over the period of this plan.

Specialist species: Harvest planning for the removal of individual stems and small groups of trees is conducted at a very different scale to that of clearfell radiata.

Overall scale of operation reduces the risk exposure to poor environmental outcomes significantly. In this situation pre-planning will focus on any tracking required to access the required trees, felling patterns to minimise damage to retained crop, extraction routes and logistics and especially in Summerhill, managing recreational users and associated assets, public safety and protection of any archaeological features.

A simplified paper-based version of a detailed harvest planning system used by PF Olsen can be used by Summerhill’s managers. Planning will be guided through 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 for harvest.

Harvesting operations will be undertaken by contractor and supervised by Summerhill employees.

Infrastructure

Summerhill forest, as an estate mostly into a second or third rotation is already serviced by most of the infrastructure it will need for harvesting. No major infrastructural investment is anticipated within the term of this plan.

Any roading and (mainly) tracking infrastructure work proposed for the areas to be harvested in the first year are detailed in the Annual Cutting Plan.

Forest infrastructure includes roads, tracks, landings, bridges and culverts. Design specifications for these are outlined in the Forest Owners Association [Forest Engineering Manual](#) and also the [Forest Practice Guidelines](#) supporting the NES regulations. Once established, these require maintenance and Summerhill will maintain a register of any infrastructure such as culverts and their associated inspections and maintenance that could pose an environmental or safety risk.

**Contractor
management**

As the Principal PCBU, Summerhill Forests should, prior to engaging a new contractor, or reengaging any that has not been working in the forests for some time, review the contractor's safety systems, safety record, systems of work organisation and equipment including check to ensure that any such parties are suitably qualified for the tasks they are employed to undertake.

Upon appointment, all contractor's crews should undergo a comprehensive safety and environmental induction that should be recorded.

Summerhill staff and / or contractors may wish to avail themselves of any training courses organised by PF Olsen Ltd, for its own contractors and staff if relevant and at their own cost. Such courses can include first aid and NZQA unit standards or other relevant training.

Summerhill as the land manager, will also ensure and hold records of regular monitoring of and visits to their operations in terms of safety and environmental matters.

WorkSafe may undertake audits on an unannounced basis from time to time.

11. Forest Inventory, Mapping and Forest Records

Inventory

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

- Pre-assessment: for silviculture 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.
 - Pre-harvest inventory is scheduled for radiata stands around age 24, to collect measurement data on the crop. This is used for harvest planning, marketing and revenue estimation.
 - For the specialist species involving removal of very small areas or a few stems, post-harvest measurement of volume "scaling" will be all that is required. New technologies may see some of this information gathered and analysed using remote sensing in the future.
-

Mapping and stand records

All mapping of Summerhill Forest is in digital format and is constantly updated in a Geographic Information System (GIS). The GIS and forest information system can spatially record a large array of forest data, from stand and legal boundaries, to reserves, rivers, roads, infrastructure, topography, soils, environmental constraints, stand operational and cost histories and productivity and post-harvest yield information.

Accurate mapping assists operational budgeting & planning, silvicultural payments, calculation of future revenue/tree crop value, protected ecosystems management, infrastructure location, and harvest planning. They also provide a means of 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.

Non-commercial Estate Management & Protection

12. Protected Forests, Habitats, Ecosystems and Species

Introduction

Indigenous biodiversity management in or associated with exotic forests is a normal component of everyday forest management. Environmental certification systems place obligations upon the forest manager to be aware of and, where required, enact procedures to assist with the maintenance and protection of important biodiversity where they are able.

Exotic forests can and do provide a level of biodiversity, though this is often enhanced by natural forest ecosystem remnants embedded within the plantation matrix and are an important contributor to the total of the productive landscape’s biodiversity. However, rare and threatened species can also be found associated with exotic forests and may require special attention for management.

Protected ecosystems

Summerhill Forest reserve areas are predominantly replanted native areas, of which, all 31.7 ha is defined as being restored riparian reserves (Table 14). These were planted at the client’s expense, with some financial support from the Bay of Plenty Regional Council. The forest will not be returned to its original native state as non-familiar indigenous species have been included in the planting e.g. Horopito. However, these areas will still eventually be fully functional as a corridor to any avian, reptile or mammalian species that might be present.

While the forest types are in a national sense neither rare nor threatened, they do represent a local presence in a lowland landscape where much of the tall forest cover has been almost totally removed. To this end the stands are being protected accordingly with additional buffering from planted indigenous and exotic stands. The protected ecosystems are shown on the [Forest Stands Map](#).

Table 14: Protected ecosystems and reserve areas

GeoUnit	Area (ha)	Protective Status	Protective Function	HSV Status	Forest Type	Protection Category
SMHL-RIPR-01	3.4	Management Plan	Riparian Ecosystem	No Status	Leptospermum, coprosma, flax & wetland	Special
SMHL-RIPR-02	6.6					
SMHL-RIPR-04	4.1				Manuka, kanuka & broadleaved hardwoods	Limited
SMHL-RIPR-09	0.9					
SMHL-RIPR-03	0.5					
SMHL-RIPR-05	3.6					
SMHL-RIPR-06	3.8					
SMHL-RIPR-07	3.7					
SMHL-RIPR-08	5.1					

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All protected ecosystems are recorded and ranked on the basis of ecological criteria reflecting the stands representativeness, rarity of species, size and connectivity, function and landscape values. Relative value in terms of the ‘ecological landscape’ ([Section 4](#)) also informs that process.

Actions are prioritised according to the ‘Protection Category’ status allocated to the areas from the assessments and classifications undertaken (Table 15). The management implications pertinent to each status are summarised in the table below. Prioritisation of work effort will also be based on the principle of ensuring successful and maintainable outcomes at limited scales as a priority over wide scale but marginally beneficial outcomes.

Table 15: Protected Ecosystems Management Categories

Protection Category	Primary Management Objective	Activity Level	Monitoring
Passive	<ul style="list-style-type: none"> Minimise non-essential damage maintain area 	<ul style="list-style-type: none"> Fire protection 	<ul style="list-style-type: none"> Area- with adjacent stand assessments
	<ul style="list-style-type: none"> Observe RPMS obligations 	<ul style="list-style-type: none"> 3rd party arrangements re: pests Apply RPMS 	<ul style="list-style-type: none"> Pests- to meet RPMS General forest health survey
Limited	<ul style="list-style-type: none"> Protect from non-essential damage Maintain area Maintain function (where practical) 	<ul style="list-style-type: none"> Fire protection 	<ul style="list-style-type: none"> Sample forest condition monitoring
	<ul style="list-style-type: none"> Observe RPMS obligations 	<ul style="list-style-type: none"> 3rd party arrangements re: pests Apply RPMS Associated maintenance pest control 	<ul style="list-style-type: none"> Low level pest monitoring where relevant Sample related fauna if relevant
Full	<ul style="list-style-type: none"> Protect from all controllable damage Maintain area and function 	<ul style="list-style-type: none"> Fire protection 	<ul style="list-style-type: none"> Area monitoring
	<ul style="list-style-type: none"> Improve quality 	<ul style="list-style-type: none"> Specific management 	<ul style="list-style-type: none"> Forest condition monitoring
	<ul style="list-style-type: none"> Observe RPMS obligations 	<ul style="list-style-type: none"> Targeted pest control 3rd party arrangements re: pests 	<ul style="list-style-type: none"> Pest monitoring where relevant Related fauna monitoring if relevant
Special	<ul style="list-style-type: none"> Restoration if practical 	As above, plus: <ul style="list-style-type: none"> Fencing Covenanting Co-management agreements Funding where practical 	As above, plus <ul style="list-style-type: none"> As defined in any restoration agreement

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Table 16 details the areas in each protection category within Summerhill Forest, categorised by protective function.

Table 16: Protected ecosystems management categories by function and area

Protective Function	Protective Category			
	Passive	Limited	Full	Special
Riparian Ecosystem	-	21.7	-	10.0
Total Area (ha)	0.0	21.7	0.0	10.0

Management and riparian setbacks

A standardised GIS-based stream classification system based on NIWA’s River Environment Classification (REC) has been used to develop a rationale for defining riparian management with a set of rules in the EMS that apply to operations occurring near the riparian corresponding with each stream category. 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.

The guidance also includes minimum set-backs upon establishment or reestablishment of forest after harvest where riparian setbacks had not existed before which are aligned with the NES-PF. Notwithstanding these minima, FSC standards yet to come into play at the time of writing, will set a 10m minimum setback on all ‘within forest’ streams in the estate.

The stream categories within the Summerhill Forest are summarised in Table 17. The total length of waterways within the forest is 3.76 kilometres.

Table 17: Length of stream by REC class

REC Class	Length (m)	Length (km)
<i>Medium, moderate, wet, soft</i>	18.9	0.02
<i>Small, low, wet, soft</i>	3,155.9	3.16
<i>Small, moderate, wet, soft</i>	387.9	0.39
<i>Very small, low, wet, soft</i>	194.2	0.19
Total	3,757.0	3.76

**Rare /
threatened and
other species**

Summerhill Forest is directly adjacent to Papamoa Hills Regional Park, and approximately 1.5 km from Ottawa Scenic Reserve (which in turn is adjacent to Oropi Forest). With its diverse range of exotic and native plantings, including riparian reserves, Summerhill Forest helps to provide habitat for a range of native flora and fauna both at a local level and within a wider landscape context. Stock are excluded from all reserve areas.

Summerhill managers will have access to PF Olsen’s use of the iNaturalist, ‘Biodiversity in Plantations’ application in which records of any species sighted can be recorded. To date there have been no recorded sightings of rare and/or threatened species, either within the plantations and indigenous reserves; any such observations will be recorded in iNaturalist going forwards.

Overtime these databases have enabled the build-up of a spatial distribution picture of species within different geographical locations across the whole NZ plantation estate. Locally important sightings, if any, will be reported to the Department of Conservation or other relevant parties.

A listing of key species of interest is provided to contractors and management, along with the login details for [iNaturalist](#).

Avifauna & Bats

While the local lists¹⁴ of bird species found in the general Western Bay of Plenty area are large ([Appendix 4](#)), many of those species’ habitats are shore, sea, estuarine and riverbed focussed. Of the much-reduced number of potential forest birds, many of the more common species listed can be expected to be regularly within or transient through the plantation forest. Apart from NZ falcon, other rare species are unlikely though a check will be made for Bats

Primary management actions in relation to avifauna are:

- Adherence to industry protocols developed for management of NZ falcon, bats (including a survey for presence) and shortly, lizards.
- Inclusion of threatened species sightings into the PF Olsen sightings database, and subsequently into the NZ Forest Owners iNaturalist – Biodiversity in Plantations Project¹⁵,
- Minimising damage to natural forest areas and any small wetlands and scrublands during harvest and reforestation, particularly any gully systems that already form natural corridors through the larger plantation areas,
- Promotion of the development of improved riparian corridors after harvest,

Continued on next page...

¹⁴ <https://ebird.org/newzealand/barchart?byr=1900&eyr=2020&bmo=1&emo=12&r=NZ-BOP-022>

¹⁵ <https://www.inaturalist.org/projects/biodiversity-in-plantations>

...continued

- Co-operation with neighbouring landowners undertaking vertebrate pest control within the wider area.
-

Fish

PF Olsen uses the Freshwater Environments of New Zealand (FWENZ) models to inform the potential for threatened fish species that may be present in streams affected by operations and if necessary, any response to such a presence. The Fish Spawning Indicator published by NIWA to accompany the NES-PF is also used, particularly for works over/in stream beds.

Within the small streams of the Summerhill forest, the modelling suggests there is a 70% or greater probability of the threatened longfin eel being present in these streams due particularly to the proximity to the sea. No other threatened native species are indicated.

Primary management actions in relation to fish and water quality in general are:

- Ensuring free fish passage along the extent of streams,
 - Sound design and construction of any new stream crossings,
 - Timing of in bed crossing construction to avoid peak spawning period,
 - Minimising damage to streamside riparian environments,
 - Identification of, and avoidance and/or buffering of waterbodies during aerial spraying for replanting and *Dothistroma* control or aerial fertilisation if ever required,
 - Protection of any wetlands identified within the plantation matrix.
-

CITES species

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

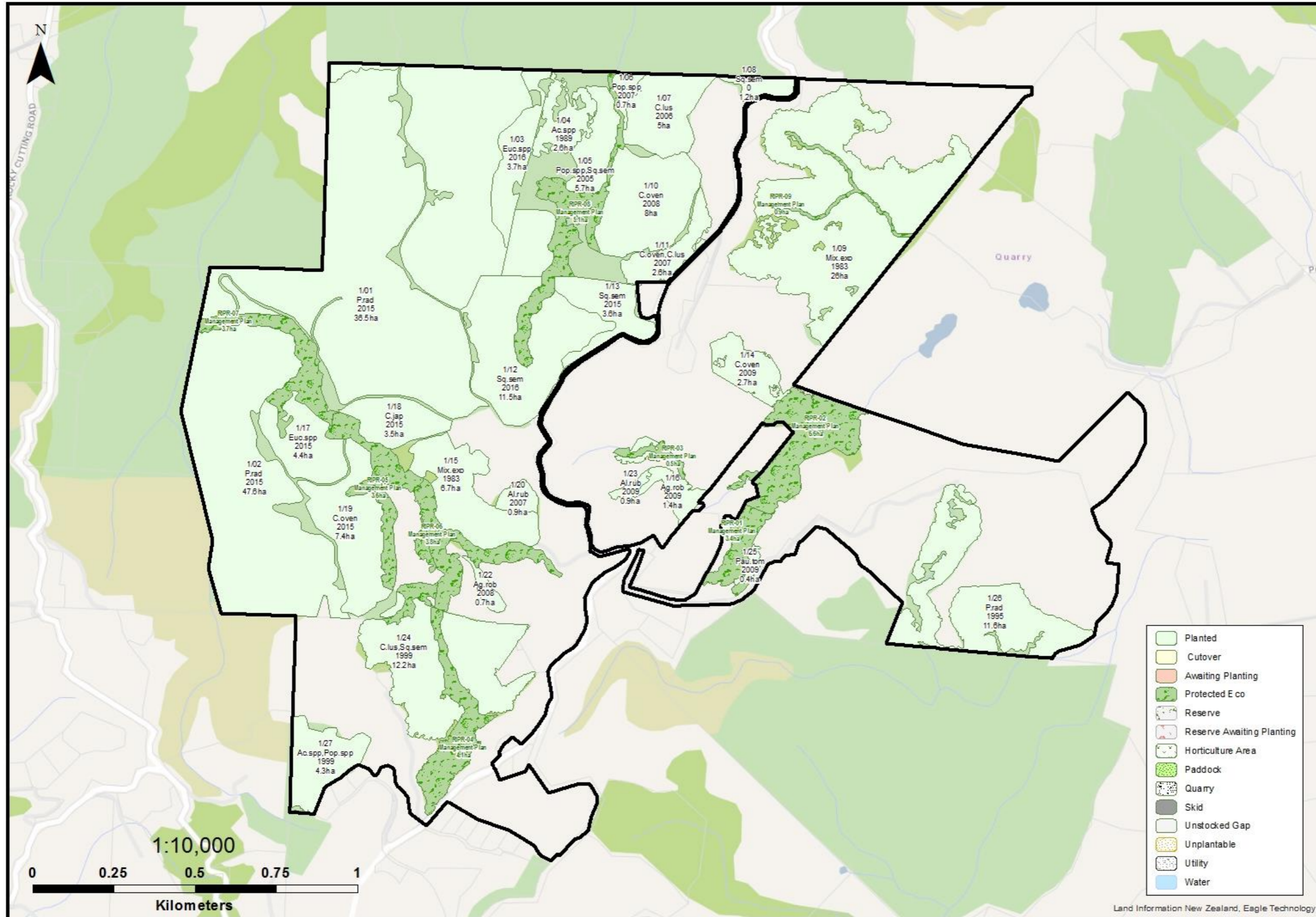
Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species in the wild, and it accords varying degrees of protection to more than 34,000 species of animals and plants.

The full list of New Zealand CITES listed species are available on the [Department of Conservation's website](#).

High Conservation Value Forests

To date, no High Conservation Value Forests have been identified.

Map 6 – Forest Stands Map



Land Information New Zealand, Eagle Technology

13. Property Management and Protection

Statutory pest obligations

Pest management within Summerhill Forest is subject to statutory obligations under the Regional Pest Management Strategy administered by the Bay of Plenty Regional Council.

The strategy applies to both pest plants and animals and categorises them, in terms of management objectives. The categories, objectives and landowner obligations are summarised the Regional Pest Management Plan. These plans are [maintained online](#) by the relevant Regional Council.

Plant Pests

The overall objective in managing plant and animal pests is to:

- Meet statutory obligations under the Regional Pest Management Strategy,
- Reduce their direct impacts on both plantations and indigenous biodiversity values,
- Ensure that any impacts on neighbouring properties are promptly dealt with,
- Monitor the abundance and distribution of these species within Summerhill Forest.

The major plant species potentially threatening production values within the forest can be seen in [Appendix 7](#).

Pest control

Introduced possums and wallabies are current threats to Summerhill forests. Possums attack the growing tips of both plantation and native trees, causing stem malformation and die back. Possums are also a threat to neighbouring property owners who are farmers as they can carry and spread tuberculosis to domestic stock.

Ongoing pest control through use of trapping is carried out by a contractor and the farm manager and has shown to be successful in keeping the populations low.

Diseases, which can affect the forest trees and adjacent native vegetation, are monitored throughout the year by the forest manager. If any concerns are noted, then assistance (identification/ testing /analysis) is sought from the Forest Research CRI-Scion. Most diseases cause little damage and do not require control. The exception is *Dothistroma*, a fungus which attacks pine needles. Cypress Canker is also a threat to Cyresses, especially Macrocarpa.

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Dothistroma infection is controlled using a copper-based fungicide, but only when the infection reaches a critical level. It can also be controlled through silviculture by timely thinning and pruning operations, which increases air movement and lowers humidity levels.

Cypress canker is being managed in the long term by use of less susceptible species such as *C. ovensij*, while for current crops, timing and hygiene around pruning are the only practical measures.

These operations are put into place in Summerhill Forest to improve forest health and minimise risk of infection. Mixing species also assists in reducing the widespread effects of tree diseases.

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 and rural fire control organisation.
2. A close link with the relevant fire authorities, and an understanding of equipment and trained manpower requirements.
3. Active prevention measures which include restrictions on allowable access, fire prevention signage, publicity when fire danger prevails, access to adequate water sources, and if required constructing and maintaining firebreaks.
4. Effective fire reporting communications systems, mapping, and fire plan alert procedures.
5. Good forest management that recognises the influence of terrain, roading network and accessibility, and fuel build-up from silvicultural practice that will influence fire prevention and control measures.

Fire authority responsibilities

The legal responsibility for fighting forest fires lies with the respective territorial land authorities where the forest is situated. In the case of Summerhill Forest, rural fire within the Western Bay of Plenty is managed by Fire and Emergency New Zealand (FENZ). Summerhill is part of the Reid Road/Rocky-Cutting Road Forest Fire Management Group.

In the event of a fire that 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. If a fire starts outside the forested area and moves into the forest, those costs remain covered under the fund, however in both cases loss of crop value due to fire will be a matter for the forest owners crop insurance if any.

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If in the event a fire, either internally or external to the forest boundaries was caused by negligence or identifiable criminal acts, the cost recovery might be attempted by FENZ.

Public liability insurance

Not Publicly Available.

Crop insurance

Not Publicly Available.

Other Benefits from the Forest

14. Recreation, Forest Products and Other Special Values

Introduction

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

Environmental and social cost-benefit analysis

Forests can deliver numerous social and environmental products 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 & services produced. A high-level generalised analysis of provisioning and consuming services related to forest management is shown in [Appendix 4](#).

Table 18. 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							HP				MR
Erosion/soil loss				HP							MR
Water quality				HP							MR
Riparian shading					HP					MR	
Water quantity					MR			HP			
Carbon sequestration				HP							MR
Native wildlife habitat			HP							MR	
Threatened fauna				HP					MR		
Native fish				HP						✓	
Air quality							HP				MR
Native reserve protection										✓	
Landscape/visual			HP						MR		
Recreation				HP						MR	
Commercial forest use										✓	
Firewood											HP
Local employment							MR				HP

NOTE: 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, both in relation to a 'clearfell rotational forestry scenario'. Where selection harvesting is practiced in relation to the special species at Summerhill, the assessments will closely align with those denoted 'MR'.

Recreational usage

Summerhill Forest receives and provides for significant recreational demand from the wider public. In the past mountain biking, walking and infrastructure access were all activities authorised and recorded. Most of the usage is accounted for by mountain biking and walking. More information on the various trails can be found on the [Summerhill website](#).

The forest will continue to be open for legitimate use subject to permission from the landowner. Usage statistics will be notified to PF Olsen once a year as part of the FSC Group Scheme public disclosures.

Non-timber forest products

There are no non-timber products for certified, commercial production currently being produced or developed in Summerhill Forest.

Other special values

The following special values have also been identified in Summerhill Forest:

- Research – SCION manage several trial plantings grown for genetic, silviculture and harvest research purposes.
 - Youth leadership academy¹⁶ - The Summerhill Youth Leadership Academy is a unique leadership and life skills course for Year 12 and 13 students. Over the course's duration 'life skills training' is presented by various guest speakers, covering topics like values, smart choices, budgeting, team-building, first aid, CV writing and interview skills, business enterprise, public speaking and the value of community work and helping underprivileged families overseas.
-

Public access roads & tracks

Access to Summerhill's recreational assets is via two main access points, those being through the east and west entry points on Reid Road, the former one of which has a carpark and toilets. Signage boards located at the entrance points provide information on the history of the property, common and/or current hazards (e.g. lambing activities), and track information. Members of the public are expected to obey all signage that they encounter on the property and to abide by the intent of the Outdoor Access Code¹⁷.

There are no publicly accessible roads within Summerhill Forest.

¹⁶ <https://www.summerhilltrails.co.nz/youth-academy>

¹⁷ <http://www.walkingaccess.govt.nz/walkways-and-access/outdoor-access-code>

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 Summerhill Charitable Trust and partners as and when required and are also, where appropriate, made publicly available as part of the FSC disclosures through the PF Olsen webpage.

Values monitored

Management inspections are undertaken regularly. The forest monitoring framework that would generally be applied to Summerhill Forest is shown below. The monitoring may not include all of these elements.

Table 19: Environmental process monitoring framework

Monitored Element	Components	Data Source	Data Medium	Reporting / Website Frequency
Chemical Usage	- A.I Usage	- Summerhill management	- <u>Form/forest information system</u>	- On Demand - Annual
Consultation Activity	- Complaints - Other Interactions	- Summerhill management	- <u>Form</u> - <u>Meeting Minutes</u>	- Annual - Annual
Environmental Incidents	- Incident Number - Categories	- Operational Supervisors	- <u>Form/forest information system</u>	- On Demand - Annual
Environmental Goals	- All	- Environmental Management Group	- Meeting Minutes	- Annual
Environmental Training	- Courses - Numbers - Names	- Summerhill management	- <u>Form/forest information system</u> NZQA	- Annual - Individual
Flora & Fauna	- Species & Status - Frequencies - New Finds	- Operational Supervisors - Public - Crews	- <u>Form</u> - <u>iNaturalist</u>	- On Demand - 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

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Monitored Element	Components	Data Source	Data Medium	Reporting / Website Frequency
Forest Growth	- PSP Protocols - Periodic Inventory	- Contractors - Scion trials	- Volume Reconciliation	- Periodic-annual - Not on web
Forest Health	- Disease & health	- NFH Surveillance Program ¹⁸	- Document	- Periodic-Annual - Not on web
FSC Membership	- Block - Location - Name	- Certifying Body	- Certificate	- On Demand - Annual
Health & Safety Statistics	- LTI / MTI / TIFR - Accidents & Incidents - Initiatives	- Operational Supervisors	- <u>Form/forest information system</u>	- Monthly - Annual
High Conservation Value Forests	- NA	- NA	- NA	- NA
Internal Audit CAR Activity	- Frequency * - Category	- Auditors(ees) - Operational Supervisors	- <u>Form/forest information system</u>	- Annual
Log Production	- Total Logs - FSC Certification	- Log dockets at harvest	- Woodtrack	- On Demand - Annual
Operational Monitoring	- Audit Trends - Cause Analysis	- Summerhill management	- <u>Form/forest information system</u>	- Monthly - Annual
Pests	- RTC / RTI - Kill Returns - Other	- Summerhill management - Contractors	- Various	- Annual - Where Relevant
Protected Ecosystem Condition	- Condition Trends - Photopoint Monitoring	- Summerhill management	- Spreadsheet	- Annual if restoration initiated
Recreational & Non-Timber	- Permits Issued	- Summerhill management	- <u>Form/forest information system</u>	- Annual
Resource Consents	- Number - Compliance	- Summerhill management	- <u>Form/forest information system</u>	- When obtained - Annual
Social Survey	- Demographics, - Values - Work Conditions	- Contractors	- Survey form	- 3 yearly
Stream Monitoring	- Clarity +/- other specific	- Summerhill management - Contractors	- Various	- Operational

¹⁸ Forest health inspections are undertaken annually, by an independent specialist forest health assessor, through the NZ Forest Owners Association forest health scheme.

Other monitoring Budget versus expenditure is a matter for the Summerhill Charitable Trust and partners. This information is not made public but may be requested by the appointed external auditors of the Group Scheme as evidence of action or intentions in respect of meeting FSC Principles and Criteria and the NZ Standard.

16. Future Planning

Introduction

This plan pertains to the management of Summerhill 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 materially adversely affect the environment. Such changes, if any are recorded in [Section 17](#) Any changes, which are contrary to the policies contained in this management plan, will require a full review of this plan. The next review date for this plan is June 2025.

Operation plans

Short term tactical planning is accomplished through development of annual operations plans in conjunction with detailed budgeting. These plans are prepared in accordance with this Management Plan. Harvesting operations are also planned on a block by block basis because of the level of detail required. These operations plans and associated budgets are subject to approval by Summerhill Charitable Trust and partners at the beginning of each financial year.

Summerhill Charitable Trust and partners give equal importance to the pastoral farming, forestry and recreation. Each sector must continue to compliment the other; there are many opportunities and overlapping issues that exist when all three operate at once.

Managing peri-urban forests and farmland presents its own challenges which Summerhill will continue to address with each successive council and the growing local community.

Summerhill recreational trails will continue to grow and develop as community groups invest in its improvement. By offering public access and recreational opportunities Summerhill hopes to unite urban and rural communities well into the future.

Stakeholder consultation

Consultation with key stakeholders has been enabled as part of the development of this plan which will be publicly available on the PF Olsen Certification website. Feedback from stakeholders (and others as they become apparent) is monitored, including actions undertaken to resolve disputes and issues and may inform changes in operational practice or future plan reviews.

17. Register of Plan Change and Review

Introduction

This plan pertains to the management of Summerhill Forest and will be reviewed on an annual basis. This section documents specific changes made during each review.

Date	Section / Page	Change
Mar 2023	HCV/Monitoring	Update information

Appendix 1 – Neighbour Location Map

Appendix 2 – Contact details for Regional and District Councils with jurisdiction over Summerhill Forest

Entity	Phone	Email	Website
Bay of Plenty Regional Council	0800 884 880	info@boprc.govt.nz	https://www.boprc.govt.nz
Western Bay of Plenty District Council	0800 926 723	Customer.Service@westernbay.govt.nz	https://www.westernbay.govt.nz

Appendix 3 - Other Relevant Legislation

Commercially Relevant Statutes & Regulations

- Accident Compensation Act 2001 #49
- Animal Welfare Act 1999
- Biosecurity Act 1993
- Climate Change Response Act 2002
- Conservation Act 1987
- Crown Forest Assets Act 1989
- Fire and Emergency New Zealand Act 2017
- Forestry Rights Registrations Act 1983
- Forests Act 1949
- 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
- Protected Objects Act 1975
- Reserves Act 1977
- Resource Management Act 1991 regulations
- Soil Conservation and Rivers Control Act 1941
- The Treaty of Waitangi Act 1975
- Trespass Act 1980
- Wildlife Act 1953

Relevant regulations to the above legislation also apply as well as various industry Accords, Codes of Practice as listed below:

- New Zealand Forest Accord
- Principles of Commercial Plantation Forest Management
- New Zealand Environmental Forestry Code of Practice
- New Zealand Code of Practice for the Management of Agrichemical
- Climate Change Accord
- NZ Log Transport Safety Accord
- Eliminating Illegal Forest Products in New Zealand
- MoU Federated Farmers and Forest Owners Association and Farm Forestry Association
- New Zealand Forest Road Engineering Manual
- Forest Practice Guide

Appendix 4 – Possible Bird Species

▼ **Date Range:**

Jan-Dec, 1900-2020

Western Bay of Plenty District

Updated ~19 hr(s) ago.

145 species (+14 other taxa)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
North Island Brown Kiwi												
Graylag Goose												
Graylag Goose (Domestic type)												
Canada Goose												
Black Swan												
Paradise Shelduck												
Muscovy Duck												
Muscovy Duck (Domestic type)												
Australian Shoveler												
Pacific Black Duck												
Mallard												
Mallard (Domestic type)												
Muscovy Duck x Mallard (hybrid)												
Mallard x Pacific Black Duck (hybrid)												
Gray Teal												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chestnut Teal												
Brown Teal												
dabbling duck sp.												
New Zealand Scaup												
California Quail												
Indian Peafowl												
Brown Quail												
Golden Pheasant												
Ring-necked Pheasant												
Wild Turkey												
New Zealand Grebe												
Rock Pigeon												
African Collared-Dove												
Spotted Dove												
New Zealand Pigeon												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Greater Sand-Plover												
Double-banded Plover												
Black-fronted Dotterel												
Wrybill												
Whimbrel												
Little Curlew												
Far Eastern Curlew												
Bar-tailed Godwit												
Black-tailed Godwit												
Hudsonian Godwit												
Ruddy Turnstone												
Great Knot												
Red Knot												
Sharp-tailed Sandpiper												
Curlew Sandpiper												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Long-tailed Koel												
Shining Bronze-Cuckoo												
Buff-banded Rail												
Eurasian Coot												
Australasian Swamphen												
Spotless Crake												
Pied Stilt												
Pied x Black Stilt (hybrid)												
South Island Oystercatcher												
Variable Oystercatcher												
American Golden-Plover												
Pacific Golden-Plover												
Masked Lapwing												
Red-breasted Dotterel												
Lesser Sand-Plover												

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Red-necked Stint			█	█	█	█	█	█				█	█	█
Sanderling			█							█				
Pectoral Sandpiper			█	█	█	█	█							█
peep sp.			█				█							
Terek Sandpiper														█
Red Phalarope								█						
Common Sandpiper						█								
Gray-tailed Tattler			█	█	█	█	█	█	█			█	█	
Marsh Sandpiper			█	█	█	█	█	█					█	█
Brown Skua								█						
skua sp.										█				
Pomarine Jaeger			█											
Parasitic Jaeger			█	█		█	█							█
jaeger sp.													█	
Black-billed Gull			█	█	█	█	█	█	█	█	█	█	█	█

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Silver Gull			█	█	█	█	█	█	█	█	█	█	█	█
Kelp Gull			█	█	█	█	█	█	█	█	█	█	█	█
Little Tern			█	█	█	█	█	█					█	█
Australian Fairy Tern													█	█
Caspian Tern			█	█	█	█	█	█	█	█	█	█	█	█
White-winged Tern			█		█	█	█					█	█	█
Black-fronted Tern			█	█	█	█	█	█	█	█	█	█	█	█
White-fronted Tern			█	█	█	█	█	█	█	█	█	█	█	█
Common Tern			█	█								█	█	
Arctic Tern							█					█	█	
Great Crested Tern					█									
Little Penguin			█	█	█		█			█		█	█	█
White-capped Albatross							█			█		█	█	
Black-browed Albatross										█				
Wandering Albatross										█				

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Eurasian Blackbird (<i>Turdus merula</i>)			█	█	█	█	█	█	█	█	█	█	█	█
Dunnock (<i>Prunella modularis</i>)			█	█	█	█	█	█	█	█	█	█	█	█
House Sparrow (<i>Passer domesticus</i>)			█	█	█	█	█	█	█	█	█	█	█	█
Australasian Pipit (<i>Anthus novaeseelandiae</i>)			█	█		█	█	█						█
Common Chaffinch (<i>Fringilla coelebs</i>)			█	█	█	█	█	█	█	█	█	█	█	█
European Greenfinch (<i>Chloris chloris</i>)			█	█	█	█	█	█	█	█	█	█	█	█
Lesser Redpoll (<i>Acanthis cabaret</i>)			█	█			█	█	█	█	█	█	█	█
European Goldfinch (<i>Carduelis carduelis</i>)			█	█	█	█	█	█	█	█	█	█	█	█
Yellowhammer (<i>Emberiza citrinella</i>)			█	█	█	█	█	█	█	█	█	█	█	█

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
White-faced Storm-Petrel													
New Zealand Storm-Petrel													
Northern Giant-Petrel													
Gray-faced Petrel													
Cook's Petrel													
Cookkilaria petrel sp.													
Blue Petrel													
Fairy Prion													
Parkinson's Petrel													
Flesh-footed Shearwater													
Great Shearwater													
Buller's Shearwater													
Sooty Shearwater													
Fluttering Shearwater													
Little Shearwater													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
shearwater sp. (Procellariidae sp. (shearwater sp.))												
Common Diving-Petrel (Pelecanoides urinatrix)												
Australasian Gannet (Morus serrator)												
Little Pied Cormorant (Microcarbo melanoleucos)												
Great Cormorant (Phalacrocorax carbo)												
Little Black Cormorant (Phalacrocorax sulcirostris)												
Pied Cormorant (Phalacrocorax varius)												
cormorant sp. (Phalacrocoracidae sp.)												
Australasian Bittern (Botaurus poiciloptilus)												
Great Egret (Ardea alba)												
Ardea sp. (Ardea sp.)												
White-faced Heron (Egretta novaehollandiae)												
Pacific Reef-Heron (Egretta sacra)												
Cattle Egret (Bubulcus ibis)												
Glossy Ibis (Plegadis falcinellus)												

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Australian Ibis (<i>Threskiornis molucca</i>)	 						—						
Royal Spoonbill (<i>Platalea regia</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Swamp Harrier (<i>Circus approximans</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Morepork (<i>Ninox novaeseelandiae</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Sacred Kingfisher (<i>Todiramphus sanctus</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
New Zealand Falcon (<i>Falco novaeseelandiae</i>)	 			■	■		■			■			
New Zealand Kaka (<i>Nestor meridionalis</i>)	 	■				■	■	■	■	■	■	■	
Sulphur-crested Cockatoo (<i>Cacatua galerita</i>)	 									■			
Yellow-crowned Parakeet (<i>Cyanoramphus auriceps</i>)	 						■						
Malherbe's Parakeet (<i>Cyanoramphus malherbi</i>)	 					■							
Eastern Rosella (<i>Platycercus eximius</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Rifleman (<i>Acanthisitta chloris</i>)	 			■	■	■				■		■	■
Tui (<i>Prosthemadera novaeseelandiae</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
New Zealand Bellbird (<i>Anthornis melanura</i>)	 	■	■	■	■	■	■			■	■	■	■
Gray Gerygone (<i>Gerygone iaata</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Whitehead (<i>Mohoua albicilla</i>)	 	■	■	■	■	■					■	■	
Australian Magpie (<i>Gymnorhina tibicen</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
New Zealand Fantail (<i>Rhipidura fuliginosa</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Rook (<i>Corvus frugilegus</i>)	 				■								
North Island Kokako (<i>Callaeas wilsoni</i>)	 	■	■	■	■	■							■
North Island Robin (<i>Petroica longipes</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Tomtit (<i>Petroica macrocephala</i>)	 	■	■	■	■	■	■			■	■	■	■
Eurasian Skylark (<i>Alauda arvensis</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
New Zealand Fernbird (<i>Poodytes punctatus</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Welcome Swallow (<i>Hirundo neoxena</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Red-vented Bulbul (<i>Pycnonotus cafer</i>)	 					■							
Silvereye (<i>Zosterops lateralis</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
European Starling (<i>Sturnus vulgaris</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Common Myna (<i>Acridotheres tristis</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■
Song Thrush (<i>Turdus philomelos</i>)	 	■	■	■	■	■	■	■	■	■	■	■	■

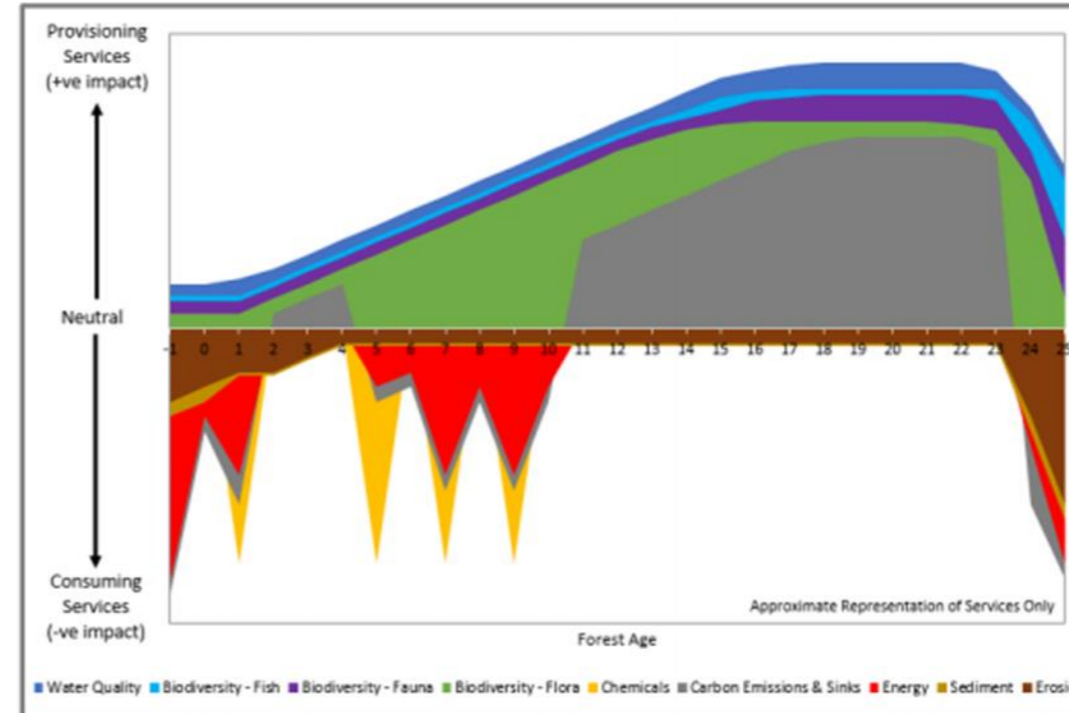
Appendix 5 - Significant Aspects of a Plantation Forest Life Cycle

SIGNIFICANT ASPECTS OF A PLANTATION FOREST LIFE CYCLE

Provisioning and Consuming Services

Provisioning Services (+ves)

- Biodiversity — Fauna:** plantation forests are home to a wide range of native and endemic species, including kiwi, New Zealand falcon, fernbird, weka, kokako, geckos, skinks, frogs, and short- and long-tailed bats.
- Biodiversity — Fish:** streams provide habitat for a range of native fish species, including Giant and Banded Kokopu, Long-finned Eel, Koura and whitebait species.
- Biodiversity — Flora:** plantation forests host a variety of native plants. Pioneering plants (ferns, coprosmas, manuka etc.) eventually form the sub-canopy layer under the production species. In addition riparian zones, wetlands, native reserves and other natural areas add a native flora component to the overall forest matrix. These are often protected under Regional/District Council plans, the NZ Forest Accord, management agreements, or as part of forest certification schemes.
- Carbon sinks:** trees absorb carbon dioxide from the atmosphere and convert it into oxygen. Trees store the absorbed carbon, even after they are harvested.
- Water quality:** once canopy closure is achieved the in-stream temperature stabilises. Riparian zones and the plantation trees stabilise the land, reducing and removing excess nutrient loads. This in turn provides a better quality of habitat for fish and freshwater insects.
- Clean air**
- Employment,** especially at the time of harvest, both within the forest and ancillary services such as transport and processing
- Recreation opportunities** such as hunting, walking, mountain biking, hunting, orienteering, horse riding, motor sport events,



Aspect	Provisioning / Consuming Services	Frequency	Impact Level	Control Level	Time of Impact	Control Methods
Biodiversity	Fauna	Low	Variable	Medium	Land prep, roadworks & harvesting	Protection, BEP's, buffer zones, timing of operations, monitoring, species management plans
	Fish	Low	Variable	Partial	Land prep, roadworks & harvesting	Protection, BEP's, buffer zones, timing of operations, monitoring, species management plans, fish passage
	Flora	Low	Variable	Partial	Harvesting	Protection, BEP's, buffer zones, timing of operations, monitoring, species management plans, weed control, remedial/enhancement planting
Ecosystem Health	Pests & Weeds	High	Variable	Medium	Ongoing	Control based on identification of weed/pest and associated threat. Chemical (aerial or ground-based), mechanical, biocontrol, trapping, species/management selection. Research into non-chemical alternatives
	Carbon Emissions & Sinks	Oscillating	Medium	Low	Land prep, silviculture, spraying, roading & harvesting	Use of bio oils and lubricants, try to minimise machine movements, replanting new crop after harvest
	Chemicals	Infrequent	High	High	Land prep & ages 5-10 years	Research into amounts used and chemical types, limit spray drift
	Energy	Medium	Low	Low	Any operation involving machinery	Invest in / research energy efficient machinery and technology
Soil & Water	Erosion	Intermittent	High	High	Until canopy closure (-1 to 5 years), extreme weather events, harvesting	Hydroseeding, mulching, BEP's, appropriate earthwork engineering, check sites after weather events, replanting new crop after harvest
	Sediment	Continuous but Low	Medium	High	Until canopy closure (-1 to 5 years), extreme weather events, harvesting	Use of sediment control traps, appropriate earthwork engineering, check sites after weather events, replanting of new crop after harvest
	Water Quality	Low	Variable	High	Extreme weather events, harvesting	Use of sediment control traps, appropriate earthwork engineering, buffer/riparian zones, protection of wetlands, remedial planting, replanting new crop after harvest
Social	Recreation	Medium	Variable	Medium	Variable, dependent on forest and location	Access provided through forest permit system to ensure user and operational safety. Permits allow monitoring of forest usage and hunting kill returns
	Employment	High	Variable	High	Ongoing, peak at harvest/replant	Seek to provide continuity of employment for high performing contractors, provide training opportunities to engage and retain a professional and capable workforce

Consuming Services (-ves)

- Carbon Emissions:** heavy machinery and chainsaws during land prep, thinning and harvesting operations (fuel/oil use)
- Chemicals:** *Dothistroma* control and weed control
- Energy:** energy is released during any forestry operation involving machinery
- Erosion:** caused by harvesting, roading and land prep operations, plus extreme adverse weather events
- Sediment:** caused by harvesting, roading and land prep operations, plus extreme adverse weather events



Appendix 6 – PF Olsen Significant Aspects: Objectives, Targets and Monitoring

PF Olsen Significant Aspects - Objectives, Targets and Monitoring															
(within the organisational context)															
Economic				Legal			Social & Cultural			Health & Safety			Environment		
Objectives															
Commercial viability Valuable forest asset Sustainable resource supply Sustainable work				Compliance with the letter Compliance with the intent			Retain our Licence to Operate Respect for our stakeholders, & rights of indigenous people Good employer Accountable in the community			Home safe every day Drug and alcohol free work Culture of care Safest forestry company			Protect biodiversity Protect water Minimise erosion Responsible chemical use		
Targets															
<ul style="list-style-type: none"> Appropriate R.O.L Maintain and enhance value Log grade outturn value maximised Sustained product flows and employment Appropriate land use 				<ul style="list-style-type: none"> Zero non-compliance <ul style="list-style-type: none"> RMA Heritage New Zealand Act Worksafe Financial Employment Professional & transparent Valid & fair contracts — all staff and contractors Taxes / payment, and royalties paid 			<ul style="list-style-type: none"> External complaints < 3% of incidents Zero unauthorised damage to cultural sites Customer rankings rising Recognition of transparency and respect in dealings with Tangata Whenua Workforce trained and engaged Communication to community Contractor / staff training 			<ul style="list-style-type: none"> Crew visit increase, year on year LTIFR = 3, TIFR = 7 Drug free, D&A testing 100% 100% Safetree signup Safe Start-up HPI > 90% close-out by due date 100% inducted 			<ul style="list-style-type: none"> Crew performances > 91—92 % Non Compliance = 0, Marginality <1% Skid check / Post op tail <5% Zero unauthorised damage to cultural /archaeological sites Zero unauthorised damage to key terrestrial ecosystems Rare Fauna BPG's applied Setbacks on all streams Chemical A.I usage Protect enhance key ecosystems (where applicable) Carbon sequestration 100 % inducted 		
Factor	Frequency	Mode	Factor	Frequency	Mode	Factor	Frequency	Mode	Factor	Frequency	Mode	Factor	Frequency	Mode	
R.O.L against investment model	Annual	Woodstock	Regulatory Authority / Worksafe inspections	Monthly	Noggin incidents	Environmental incidents	Ad hoc	Noggin	Safety Incident Management - Statistics & closeout of HPI	Continually	Noggin	Operational Environmental Audits	Monthly	FIPS	
Estate valuation	Annual	Financial	Resource consents	Monthly / Annual	FIPS	Consultation: Pre-certification & post-operation	As required	FIPS / Meetings	Sentinel (near miss)	Monthly	Noggin	Skid checks	Quarterly	FIPS	
Product flows	Annual	Woodtrack	Archaeological Post-Op AEE's	Monthly	Noggin incidents	Customer survey	Annual	Form	Safety system audits	Rolling Quarters	Noggin	Environmental Incident Management	Ad hoc	Noggin	
Plantation area / species / reserve trends	5 yearly	FIPS report / GIS	Enforcement Actions	Ad hoc	Noggin incidents	Complaints — meeting minutes	Ad hoc	Noggin + Notes	D & A testing	Random	External	Rare Species Sightings Database	Ad hoc	FIPS / NatureWatch	
Log quality audits	Continually	Noggin	Incidents—all forms	Continually	Noggin incidents	Social survey	3 yearly	Form	Safetree	Annual		Harvest Planning Checklist	Ad hoc	FIPS	
Client reporting	Monthly	Written	Master contracts	Continually	FIPS	Staff survey	Annual	Survey Monkey	Safe Start-ups	Actual	FIPS	Chemical A.I. Tracking & Weed Matching: review & research	Annual	FIPS	
Independent accounting audit	Annual	Written	Accounts	Continually	FIPS	NorthTec gap analysis, NZQA & other training	Annual	Cloud database	Safety Champs Meetings	Bi-monthly	Written	Vegetation / Photopoint monitoring (where applicable)	Annual, Tri-Annual	Document	
Forest growth — PSP's, periodic inventory, ISO-9001	Periodic / Annual	FIPS	Formal reporting			1 full day / year environmental advocate training, including cultural awareness	Annual	FIPS training	Central Safety Committee	Bi-monthly	Written	Water quality	Various	Operational / BOPRC	
Forest health	Periodic / Annual	NFH surveillance program	Manager / Client	Monthly	Written	Formal reporting SMT	Quarterly	Power Point	Formal Reporting	Monthly	Written	Regional Branch Compliance	Tri-Annual	FIPS + written	
TQM — CAR system	Continually	Noggin	SMT	Quarterly	Power Point	Recreational Permits	Annual	FIPS	Board	Quarterly	Written	Carbon Sequestration	5 yearly	Estate model	
ISO internal audits (sample)	Annual	Noggin	Company meeting	Annual	Power Point	TQM — CAR system	Continually	Noggin	Company Meeting	Annual	Power Point	EMG Meeting	Annual	Written	
			Independent accounting audit	Annual	Written	ISO internal audits (sample)	Annual	Noggin	Induction Records	As required + 5 yearly	FIPS	Formal Reporting			
			TQM — CAR system	Continually	Noggin				TQM — CAR system	Continually	Noggin	Manager / Client	Quarterly	Written	
			ISO internal audits (sample)	Annual	Noggin				ISO internal audits (sample)	Annual	Noggin	SMT	Quarterly	Power Point	
												Board	Quarterly	Written	
												Company Meeting	Annual	Power Point	
												Induction Records	As required + 5 yearly	FIPS	
												TQM — CAR system	Continually	Noggin	
												ISO internal audits (sample)	Annual	Noggin	

TQM & Roving Quality Managers

Executive Management Team

Appendix 7 – Bay of Plenty Regional Pest Management

Plant species to be managed under the Bay of Plenty Regional Pest Management Plan

Pest Plant	Production Threat	Environmental Threat	Public Threat
Exclusion Pest Plants			
Alligator weed	✓	✓	✓
Australian droplet tunicate	✓	✓	
Batwinged passionflower		✓	
Chilean flame creeper		✓	
Chilean needle grass	✓	✓	
Darwin’s barberry	✓	✓	
Egeria		✓	
Elodea		✓	
Field horsetail	✓	✓	
Hornwort	✓	✓	
Italian buckthorn		✓	
Lagarosiphon	✓	✓	
Water poppy		✓	
Eradication Pest Plants			
Alligator weed	✓	✓	
Coast tea tree		✓	
Creeping gloxinia		✓	
Hornwort	✓	✓	
Horse nettle	✓	✓	✓
Kudzu vine		✓	
Lantana		✓	✓
Nassella tussock	✓		
Noogoora bur	✓		✓
Purple loosestrife	✓	✓	✓
Sagittaria	✓	✓	✓
Senegal tea	✓	✓	✓
Spartina		✓	
Stout bamboo grass		✓	✓
White edged nightshade		✓	✓
Progressive Containment Pest Plants			
African Feather Grass	✓	✓	
Alligator weed	✓	✓	
Apple of sodom	✓	✓	✓
Asiatic knotweed		✓	
Boneseed		✓	
Climbing spindle berry		✓	
Darwin’s barberry	✓	✓	
Egeria		✓	
Hornwort	✓	✓	

Pest Plant	Production Threat	Environmental Threat	Public Threat
Italian buckthorn		✓	
Lagarosiphon	✓	✓	
Lantana		✓	✓
Lodgepole pine	✓	✓	✓
Old man's beard		✓	
Spiny emex	✓		
Variegated thistle	✓		
Wild kiwifruit	✓	✓	
Woolly nightshade	✓	✓	✓
Yellow flag iris	✓	✓	
Sustained Control Pest Plants			
Blackberry	✓		✓
Climbing spindle berry		✓	
Elodea		✓	
Gorse	✓	✓	✓
Lantana		✓	✓
Old man's beard		✓	
Ragwort	✓		
Wild ginger		✓	
Hedychium flavescens		✓	
Wilding conifers (excluding Lodgepole pine)	✓	✓	✓
Wild kiwifruit	✓	✓	
Woolly nightshade	✓	✓	✓

Animal species to be managed under the Bay of Plenty Regional Pest Management Plan

Animal	Production Threat	Environmental Threat	Public Threat
Australian droplet tunicate	✓	✓	
Catfish (Brown bullhead catfish)		✓	✓
Pyura	✓	✓	
Feral goat	✓	✓	
Koi carp		✓	✓
Perch		✓	
Rooks	✓		
Asian paddle crab	✓	✓	✓
Clubbed tunicate	✓	✓	✓
Mediterranean fanworm	✓	✓	
Rudd		✓	
Tench		✓	
Wallaby	✓	✓	