Manulife Investment Management

Manulife Forest Management (NZ) Ltd

Forest Management Plan Public Summary

2022

Cover Picture: Tarawera Forest and Mount Putauaki, Kawerau, Bay of Plenty

This is a working document, and as such will be updated periodically as we continually evaluate, develop and refine our forest management plans and objectives.

Contents

1.0 Introduction

The use of wood in modern society can be seen everywhere. From furniture to construction, from packaging to tissue paper and newsprint – wood products play a vital and integral part in our lives. Wood from well-managed forests is a renewable resource that will meet society's economic, social and cultural needs without compromising the environment.

In New Zealand, the primary source of wood is from exotic plantation forests. Manulife Forest Management New Zealand Ltd (MFM (NZ) is one of New Zealand's largest plantation forest manager with forests located in the Northland, Central North Island and Bay of Plenty regions.

This document is intended to provide MFM (NZ) stakeholders with an overview of how we manage our forests and operations taking into account environmental, economic, social and cultural factors.

2.0 Overview of MFM (NZ)

2.1 Background

MFM (NZ) commenced operations in NZ in 2004 with the purchase of Tiaki Plantations Company forests. Formerly known as Hancock Forest Management (NZ) Ltd, the company was rebranded to Manulife Investment Management Forest Management (NZ) Limited (MFM (NZ)) in November 2021. Manulife has been our parent company since HFM NZ's establishment in New Zealand. This rebrand aligns Manulife's global reach and strong asset management business with Hancock's established forest management capabilities in New Zealand.

MFM (NZ) manages approximately 212,400 hectares of land in New Zealand on behalf of three forest investment entities:

- Tiaki Plantations Company
- Taumata Plantations Limited
- OTPP New Zealand Forest Investments Limited

2.2 Estate Description

Tiaki Plantations Company has been under the management of MFM (NZ) since 2004 when Tiaki Plantations Company purchased forests from Kiwi Forests Group. Tiaki Plantations Company's two largest forests are Tarawera and Matahina immediately to the south of Kawerau, with the balance of the estate comprising a number of smaller blocks in the Bay of Plenty, predominantly east of Rotorua. With the exception of one joint venture arrangement, the Tiaki forests are forestry rights for one rotation only. As the land is harvested, it is returned to the landowners who have various tenure arrangements for the next crop of trees.

Taumata Plantations Limited's forests were purchased from Carter Holt Harvey Forests in December 2006 and have been under the management of MFM (NZ) since that date.
Taumata's forests are all located in the North Island and include:

- Northern Region forests located from the mid north of the North Island down to Waipu Forest on the Brynderwyn Range. The forests are a combination of freehold and leasehold forests, including forest on land leased from Maori trusts and incorporations.
- Woodhill Forest west of Auckland located on land now owned by Ngäti Whätua o Kaipara after resolution of Treaty of Waitangi Claims in 2013. Taumata owns the current crop of trees on the land, with the land handed back to the landowner following harvest.
- Central Region is a cluster of forests in the Central North Island, the most significant of which is Kinleith Forest located in the South Waikato and Taupo Districts made up of a significant area of freehold land along with single rotation forestry rights, Crown lease and Maori lease blocks. The remainder of Central Region is made up of a range of smaller forests located in the King Country (predominantly Ruapehu and Waitomo Districts) and three smaller blocks located at Aotea and Aramiro. Forest tenure includes freehold, leasehold and forestry right blocks.
- Eastern Region comprises nine Maori lease blocks located along the Eastern Bay of Plenty coast from Opotiki to East Cape.

OTPP New Zealand Forest Investments Limited (OTPP) bought their forests in February 2004. The forests are made up entirely of leases and forestry rights with no freehold land. MFM (NZ) has been the investment manager for OTPP since 2006 covering Long Term planning, Sales, Marketing and Land/Agreement Management. MFM (NZ) was appointed Forest Manager of the forests in October 2018. The majority of the forests are located around the Central North Island area.

The areas of each of the forest entities managed by MFM (NZ) are provided in the following table.

Forest Owner	**Total Area (ha)**	**Productive Area (ha)**
Tiaki Plantations Company	16,855	15,060
Taumata Plantations Ltd	156,749	123,645
OTPP New Zealand Forest Investments Ltd	38,795	28,649
Total MFM (NZ)	**212,399**	**167,354**

The majority (98%) of the planted forest area managed by MFM (NZ) is established in radiata pine (*Pinus radiata*) with the remainder largely in Douglas-fir (*Pseudotsuga menziesii*) and *Eucalyptus* species.

The current annual harvest from the estate is approximately 4.8 million cubic metres of largely radiata pine.

MFM (NZ) also manages approximately 34,000 hectares of protected indigenous reserve areas within the forest estate.

2.3 MFM (NZ) Offices

MFM (NZ) has four offices which include:

- Head office in Tauranga

- Northern Area office located in Whangarei from which the Taumata Northern forests, including Woodhill Forest, are managed.
- Central Area office located in Tokoroa from which the Taumata Central forests are managed.
- Eastern Area office in Rotorua from which the OTPP, Tiaki and Taumata Eastern forests are managed.

Contact details for each of the MFM (NZ) offices and full maps of the MFM (NZ) managed estate can be found on our website www.mfm.nz.

Tarawera River, Tarawera Forest, Tiaki Plantations Company estate

2.4 Management Objectives

MFM (NZ)'s primary objective is to return value to the owners of the forests it manages through the development, management and harvesting of productive and high quality forests in a safe and sustainable manner.

MFM (NZ) seeks to achieve its objective through innovative business strategies, proactive management of natural and physical resources and building strong relationships with stakeholders.

MFM (NZ) has a strong commitment to managing the land the trees are growing on for our clients, stakeholders and surrounding communities to ensure the long-term sustainability of our forests under management.

MFM (NZ) actively manages its responsibilities in the areas of biodiversity, soil and waterways protection, reserve management, recreation and public access and protection of historically significant sites within the forest estate.

The following is a summary of the key objectives of MFM (NZ).

Forest Management Objectives

- Manage the forest estate as a renewable and sustainable resource.
- Practice silviculture consistent with best management practice and the maximisation of value to the forest owner.
- Monitor tree breeding to provide the most appropriate stock for the forests.
- Harvest trees as close as possible to the most economically effective age.
- Proactively manage risks to forest health such as fire, pests and disease.
- Create employment and contracting opportunities for members of local communities and lease partners, within the constraints of meeting other performance criteria.

Health and Safety Objectives

- Maintain a safe and healthy workplace free of injuries.
- Develop a workplace culture where health and safety of all people is an over-riding priority.
- Promote collective and individual responsibility for health and safety.
- Ensure that all staff and contractors are trained and competent to undertake their jobs safely.
- Manage the state in compliance with all health and safety regulations.

Stewardship Objectives

- Manage the estate in compliance with:
    - all relevant legislation, including the Resource Management Act 1991 and Heritage NZ Pouhere Taonga Act 2014.
    - the NZ Forest Accord (1991) and the Principles for Commercial Plantation Forest Management in NZ (1995).
    - the requirements of voluntary certification systems to which MFM (NZ) is certified (FSC ® (Forest Stewardship Council®) and NZS AS 4708).
- Identify and take into account environmental and social values when planning and undertaking operations to minimise negative impacts on the environment and the community.
- Identify and protect areas of significant ecological and scientific value within our managed forests and put in places processes to protect and enhance identified values.
- Manage our forests sustainably and minimise adverse effects of forest operations on soil and water values.
- Minimise impact of operations on archaeological and cultural sites.
- Minimise impact of operations on amenity values (visual, noise and air effects) and neighbouring properties.
- Manage and use herbicides responsibly and seek to minimise the use of herbicides in our operations as far as practical.
- Capture and learn from environmental incidents through incident reporting, investigation and sharing of learnings.

- Ensure staff and contractors receive appropriate training to comply with the law and the requirements of the company Environmental Management System (EMS).
- Monitor environmental outcomes and research new ways to minimise impacts of forestry operations on the environment, and maximise environmental benefits of forests.
- Recognise the recreational value of the forest estate to local communities and the general public and proactively manage public access taking into account the health and safety of people and environmental impacts.
- Identify areas within our estate that meet the definition of High Conservation Value (HCV), Significant Natural Areas (SNA's) and Significant Biodiversity Values, and manage these in accordance with relevant regulatory and certification requirements.
- Actively pursue initiatives to reduce greenhouse gas emissions from operations under our management.

2.5 FSC® (Forest Stewardship Council®) Certification

MFM (NZ)'s operations in New Zealand have been continuously certified by FSC since 2004 (*FSC Certificate Number SCS-FM/COC-00066P, License Code FSC-C013109).*

FSC is an independent not for profit organisation headquartered in Germany, founded to promote the responsible management of the world's forests. FSC certification is a means by which our investors, customers and other stakeholders can be confident that we are conducting our business legally responsibly and sustainably.

All forests certified by FSC must comply with an international set of rules called the 'Principles and Criteria'. The requirements of FSC cover the full range of forest management, including complying with the law, environmental requirements (water quality impacts, soils, biodiversity, chemical use etc.), social requirements (worker rights, indigenous people's rights, stakeholder and community benefits etc.), alternative benefits of the forest beyond core forest products, and sound and economically viable forest management practices.

FSC accredits auditors who undertake annual audits of FSC certified forestry operations to confirm compliance with FSC requirements. MFM (NZ) is currently audited by SCS Global Services.

For further information about FSC visit their website www.ic.fsc.org and nz.fsc.org
Copies of the audit report for our latest FSC audit can be found on the MFM (NZ) website www.mfm.nz under Environmental Stewardship.

2.6 PEFC (AS NZS 4708) Certification

PEFC (Programme for the Endorsement of Forest Certification) is another international forest certification system available to the forest sector. Under PEFC, countries develop forest management standards appropriate to the natural, social, physical and economic conditions of those countries with input from local stakeholders. If both the standard and the standard setting process is able to meet

the PEFC criteria, the standard may be endorsed by PEFC and therefore able to be recognised through a common internationally recognised branding system.

In New Zealand, Standards New Zealand oversaw a stakeholder managed process to adapt the Australian Forestry Standard to New Zealand. The resulting Standard, *AS NZS 4708 Sustainable Forest Management* was endorsed by PEFC in 2015.

MFM (NZ) became certified to NZS AS 4708 in 2017 (*Certificate Number SCS-NZS-001)*.

For further information about PEFC visit their website www.pefc.org and pefcnewzealand.org.nz

A copy of NZ Standard NZS AS 4708 and associated guidance material can be found on the Australian Forestry Standard website www.forestrystandard.org.au (search under the dropdown Tab 'standards' and select 'New Zealand Standard').

Copies of the audit report for our latest NZS AS 4708 audit can be found on the MFM (NZ) website www.mfm.nz under Environmental Stewardship.

2.7 External Agreements

As a member of the New Zealand Forest Owners Association, MFM (NZ) is bound by the requirements of the New Zealand Forest Accord (1991) and the Principles for Commercial Plantation Forest Management in New Zealand (1995).

The Forest Accord protects remaining indigenous forest remnants within the plantation forest that meet minimum size and quality criteria from clearance and conversion to plantation forest. All New Zealand Forest Accord vegetation in the MFM (NZ) managed estate is identified in the company Geographic Information System (GIS) and is protected.

The Principles for Commercial Plantation Forest Management in New Zealand are complementary to the New Zealand Forest Accord and cover a range of broader principles to promote environmental excellence in plantation forest management, and the protection, preservation and sustainable management of native forests.

3.0 Overview of Forest Operations

3.1 Silviculture

3.1.1 Introduction

Silviculture includes all practices related to the establishment, growth, composition, health and quality of a forest to meet specific objectives.

Production trees are intensively managed by MFM (NZ) to supply a range of wood products including clearwood for appearance uses and high density structural logs for use in construction. Intensive management involves best practise land preparation, planting of improved tree stocks and thinning (removing poor growth and/or form trees to leave a quality final crop).

The key drivers of the choice of silvicultural regime are:

- forecast of future log product demand and price
- costs
- site-related growth conditions
- the characteristics of the tree stocks available

The following sections provide a summary of the principle silvicultural activities practiced on the MFM (NZ) managed estate.

3.1.2 Land preparation and establishment

All harvested areas that are deemed suitable for replanting are planted within 12 to 18 months after harvesting (Some areas may not be replanted, and therefore retired from production due to environmental considerations such as creating setbacks from sensitive areas like streams). Prior to planting, sites are prepared to assist the seedling survival rate and promote early growth. This involves spraying of weed species, generally between January and April prior to planting, to remove competition for the plantation crop trees.

In some areas, mechanical land preparation is also undertaken to improve site conditions for tree growth. Soil cultivation and/or mounding machines improve aeration of the soil, allow better root penetration and reduce frost damage. Slash raking is also used in some areas to remove logging debris to improve access for planting.

Site specific decisions around the appropriate herbicide rates and if required, mechanical land preparation, are made using a combination of site information (e.g. weeds present, soils and productivity) and the knowledge of experienced and well trained forestry staff.

Land preparation is followed by manual tree planting, which is generally carried out between mid-May and September. The majority of the MFM (NZ) managed estate is replanted with radiata pine at an initial stocking of either 833 or 1100 stems per hectare depending on the region and forest location, while some relatively small areas are replanted with Douglas fir at 1111 stems per hectare.

3.1.3 Tending

Thinning of stands is undertaken by MFM (NZ), generally between six to nine years of age, to provide the optimum space for selected crop trees within the stand to grow to maximise their economic return. The aim is to thin out the smaller or poorer formed trees leaving the bigger, better formed trees to grow on. On flatter land, close to processing plants 'production thinning' may be carried out whereby the thinned stems are taken out of the stand and sold as pulp logs and sawlogs. More commonly where production thinning is impractical or uneconomic, thinning operations leave the thinned stems on the forest floor to decompose.

MFM (NZ) uses genetically improved radiata pine tree stocks in its annual planting program. Shown above is Clone '55' in Kinleith Forest (Taumata Plantations Estate) which was used in the original New Zealand radiata pine breeding selections.

3.1.4 Fertiliser application

The MFM (NZ) managed estate is comprised of a wide range of soil types. Some of these are low in nutrients required for growing trees and therefore fertilisation to correct deficiencies and enhance forest health may be needed. Foliar sampling and soil information determine the type and amount of fertiliser required. Fertiliser application rates are significantly lower than other productive land uses, such as pastoral agriculture, when compared over the full life cycle of a forest.

Fertiliser application is carried out in compliance with Regional Plan rules and the Code of Practice for Nutrient Management (2007) maintained by the New Zealand Fertiliser Manufacturers' Research Association.

3.1.5 Herbicide application

Herbicides are utilised for weed control prior to planting and in the first one to two years following planting to reduce competition and prevent crop mortality. Once the crop trees outgrow the weed and understory species, anywhere between one to three years of age, the trees are 'free to grow' and no further herbicide application is required until the start of the next growing cycle, some 25 years later.

Herbicide application is also required to control noxious weeds in accordance with the requirements of Regional Pest Management Strategies prepared by Regional Councils.

All herbicide spraying is carried out in accordance with New Zealand Standard *NZS 8409:2004 The Management of Agrichemicals* and applicable Regional and District Plan rules. The New Zealand standard ensures that where agrichemicals are handled or used, the practices followed are safe, responsible and effective, with minimal adverse impact on human and environmental health. It also requires that agrichemicals are tracked and usage recorded. The standard also includes a commitment to only use herbicides where there is an identified need and only after considering all other practicable alternatives.

When planning herbicide operations, the planner is required to identify areas which must be protected from herbicide over spraying such as significant native riparian vegetation, wetlands, watercourses, important indigenous habitat and neighbours' boundaries. To safely use herbicides in MFM (NZ) forests, education and training sessions are an essential part of company policy.

While it would be ideally desirable to eliminate herbicide use, the practical and economic realities are that some controlled herbicide use is currently unavoidable. For both environmental and economic reasons MFM (NZ) aims to use the minimum amount of herbicide required for it to undertake its management activities. The company actively seeks and researches ways to reduce the amount of herbicide it uses during its operations. This includes measures such as over sowing and spot spraying where practical (to remove the need for broadcast releasing of trees) and ongoing trials to reduce herbicide application rates to as low as possible while still maintaining effectiveness.

In 2006 MFM (NZ) was involved in the controlled release of the buddleia weevil *Cleopus japonicus*. The weevil larvae selectively consume the foliage of the weed

species *Buddleja davidii*, and since their initial release, have significantly reduced the need to use herbicide sprays to control the growth of buddleia in the Taumata Central estate.

Herbicides are applied to control weeds and reduce mortality and competition for crop trees. Shown above is the trial comparing standard weed control (left) and no weed control (right), over a three-month period, in a one year old radiata pine stand.

3.1.6 Forest Health

A forest health monitoring survey takes place each year to identify any health issues in the growing stands such as disease, pest damage or nutrient deficiencies. The most common disease affecting radiata pine is a fungal disease Dothistroma (*Dothistroma septosporum)* which causes needle cast in radiata pine and can severely slow tree growth. Dothistroma is most prevalent in the Central North Island, where the extent of Dothistroma infection, and therefore the requirement for spraying, is largely dependent on the previous spring and summer weather conditions (i.e. wet and warm conditions increase infection). Dothistroma is controlled using copper based products (cuprous oxide) similar to those used to control disease in home vegetable gardens.

The annual health survey identifies any significant outbreaks of Dothistroma and this is used to develop the annual spray programme. Significant amounts of research have been carried out to ensure that the lowest possible effective level of fungicide is used to control this disease. Even though risk is low, application is planned to ensure that drift is minimised and records are kept and audited to ensure that practices can be improved.

The fungal disease Dothistroma is the most common disease affecting radiata pine in the MFM (NZ) managed estate. Shown above is a stand affected by Dothistroma (left) and condition after spraying with copper fungicide (right).

3.1.7 Animal Pest Control

Animal pests pose a threat to commercial forest plantations, to significant indigenous reserve areas within the forest and to indigenous species living in the forest. Animal pests can have an immediate and long term detrimental effect on these areas.

In addition to the need to carry out control to protect the forest, Regional Pest Management Strategies contain rules which require the control of some animal pest species. Animal pests that can require control in the plantation forest include possum, rabbit, rats, mustelids, hare, wild goat and dama wallaby.

The main animal pest in the forest estate is the introduced possum, which can attack the growing tips of trees causing stem malformation and dieback. Possums are also a major pest to neighbours along the forest boundaries, as they can carry tuberculosis (Tb) to livestock. Rabbits, hares and goats can also be a pest in the first five years after planting, as they can eat the tops of young trees and in the case of goats, strip the bark.

MFM (NZ) pest control operations are carried out by certified professional pest control organisations. These organisations work within the guidelines of the current pest management strategy to manage animal pests and co-ordinate with complementary organisations such as the Regional Councils, Department of Conservation, the Animal Health Board and other forestry organisations. The optimum method of animal pest control is determined following a review of relevant factors such as the level of damage occurring, the current animal population, the risk of re-infestation, the possible environmental and health effects of the control, and the benefits of the control. OSPRI also carries out possum control on MFM (NZ) forests in some areas, as part of the national TB vector control programme.

Damage to radiata pine (left and centre) caused by possum (right)

3.1.8 Fire Protection

Management of rural fires now comes under the jurisdiction of Fire and Emergency New Zealand (FENZ).

MFM (NZ) managed forests lie within a number of FENZ administrative Regions and Districts, and a number of MFM staff are Approved Persons serving official roles under the jurisdiction of the Fire and Emergency New Zealand Act 2017. MFM (NZ) and our contractors own an extensive array of firefighting equipment, including fire engines. Staff and contractors are trained and are available to respond to any wildfire emergency which threatens the estate or adjoining land.

MFM (NZ) staff and contractors have assisted with control of major fires both within New Zealand, and in Australia, Canada and United States of America.

Fire-fighting equipment at a controlled burn. Now a rare practice, but historically used for site preparation and as an opportunity for fire training.

3.2 Harvest Operations

3.2.1 Harvest Planning

A comprehensive planning process determines how and when to harvest the wood resource in the estate. Planning for harvesting of the forest is developed from a long term (up to 80 years) forest estate model which is then refined down to a more detailed five-year plan, and then translated into annual harvest plans. This process involves balancing a range of factors such as predicted forest growth, customer requirements (grade and volume), harvesting capacity, access, third party ownership requirements, clear fall catchment limits and other environmental constraints.

MFM (NZ) aims to harvest its estate as close as possible to the optimum tree age for each stand.

MFM (NZ)'s managed estate has a relatively even age class distribution although within each region there are significant variations. This means that the total harvest levels can be relatively stable over time, but there will be regional fluctuations in harvesting activity. However, the ability to alter the harvest to respond to market demand fluctuations does exist.

Areas of older growth exotic species and minor species do have some value in terms of forest biodiversity and are subject to separate classification in planning and management processes to ensure their genetic, scientific, historic, landscape and aesthetic values are taken into consideration. Other minor species generally occur as small areas surrounded by younger radiata pine age classes. This makes these areas effectively inaccessible until the surrounding crops are harvested. Consequently, small areas of other species will continue to contribute to the biodiversity of the forest for years to come.

MFM (NZ) managed harvesting operations

All harvesting and engineering and forestry operations carried out in MFM (NZ) managed forests must have a harvest plan or work prescription in place. Harvest planning is carried out by experienced harvest planners who consider all possible options for access and harvesting of the block to arrive at the optimal solution. Key factors that are considered in harvest planning are:

- Health and Safety – the method that is the most appropriate for the topography and nature of land so that the potential for injury is minimised
- Environment – the method creates the least impact on the environment
- Financial – the method is the most practical and cost effective for the area taking safety and environmental considerations into account.

A key aspect of harvest planning is identification of all environmental risks of the operation, and specifying controls to manage those risks and to ensure compliance with all legal, certification and company requirements including resource consent conditions and permitted activity rules.

3.2.2 Harvesting

MFM (NZ) is committed to adopting harvesting techniques and technology that minimise the impact on the environment and reduce the risk of accidents and injuries.

Harvest operations in Houpoto Forest, Taumata Plantations Limited estate

Harvesting is undertaken by two key methodologies:

- Ground-based harvesting: Carried out on easier terrain (generally <25 degrees) trees are felled and extracted by machine to a processing area. In ground-based terrain, all falling is now carried out with mechanical harvesters to minimise the risk of injury during the falling operation. Only a very small proportion of ground based country is manually felled where an area is practically inaccessible to machinery. The stems are typically transported to the processing area by skidders or forwarders, and in some instances by shovel logging.

- Cable harvesting: Carried out on steeper country (generally >25 degrees) fallen stems are extracted through the use of a hauler (either swing yarder or tower) with trees attached by strops to a cable and dragged to a processing area. In the past falling on cable country was almost universally carried out manually by chainsaw. The advent of tethered harvesting, with falling machines operating on steeper slopes tethered by steel cable to a winch system has significantly extended the range of falling machines onto steeper country. In MFM (NZ) operations around 80% of cable terrain is now mechanically felled with the remainder still manually felled due to practical constraints to accessing areas with a falling machine.

The current harvested volume from the MFM (NZ) managed estate is approximately 4.8 million tonnes per annum.

4.0 Health and Safety

4.1 Introduction

At MFM (NZ) our goal is that everyone goes home safe – every day. We believe in a culture where the health and safety of all people is an over-riding priority. Work should only be done if it can be done safely.

A copy of the MFM (NZ) Health and Safety Policy is attached in Appendix I.

4.2 MFM (NZ) Health and Safety Strategy

MFM (NZ) has developed key strategies to achieve our health and safety objectives. These are summarised below:

Leadership

Leadership is the single most important element of our strategy. Active, visible and consistent leadership is critical to our achieving world class safety results. Leaders include not just the MFM (NZ) Board and senior management but also front line leaders and employees who step up to lead.

We will lead by example and work to instil a culture where safety is consistently seen as the highest priority in our business.

A key role of leaders is to enable the shift to an employee driven culture where every employee has ownership of safety processes and activities within their work area. Leaders provide the time, tools, resources, coaching and support necessary for employees to successfully lead the activities for which they have taken ownership.

Employee engagement is seen as a cornerstone to achieving an outstanding safety culture. Our goal is to create a workplace where everyone working in our operations is fully engaged and empowered to do their part to achieve a safe workplace and where safety is seen as the collective responsibility of all of our people.

Key initiatives include:

- Targeted ongoing leadership training programmes and mentoring to improve the standard of health and safety leadership at all levels of the organization.
- Effective Health and Safety committees at each level of the organization with meaningful contractor input to drive continuous improvement and innovation in H&S Management.
- Positive engagement and two-way communication with staff, contractors and their employees to develop a strong safety culture and achieve continuous improvement.
- Maintenance of a Drug and Alcohol free workplace.
- Ensuring Health and Safety is a key measure when engaging and managing staff and contractors, and measuring their performance.
- Recognition of excellence in Health and Safety Performance.
- Monitoring of H&S culture via a periodic H&S culture survey to monitor any changes and areas of key focus to improve.

Basics done well

We believe 'doing the basics well' is a key foundation for achieving our Health and Safety goals. It is our aim to have strong, effective and practical systems that are well understood and adhered to, meet or exceed regulatory requirements and focus on the things that make a difference to keep people safe.

We will ensure that staff and contractors are well trained and have the appropriate skills and tools to support them to make the right decisions on the job, every time.

Key strategies to support these goals include:

- Maintaining clear and fit for purpose policies, systems, procedures and work rules that align with regulatory requirements and are regularly reviewed and updated where required.
- Periodic external review of our systems to benchmark our processes and drive continuous improvement.
- Provision of training to ensure staff, contractors and all workers understand the requirements of their roles and are fully prepared for the work they undertake.
- A strong focus on identifying and managing risk through robust hazard identification and management processes.
- Regular and comprehensive auditing and monitoring to ensure compliance with company systems and legal requirements.
- Accident and incident reporting, investigation and monitoring to ensure key learning's and trends are understood and disseminated to focus effort on those areas that will make a difference and drive continuous improvement.
- Having a clear set of non-negotiable 'life-saving rules' that all employees (staff and contractors) are made aware of with clear consequences for breaches.

Drive for Innovation

We will continually look for ways we can do things better to enhance the safety of our people through both iterative and step change improvements in work practices and systems, year on year. In doing so our goal is to act strategically and always focus on the things that we believe will make the greatest improvement, recognizing this will change over time as solutions for key issues are found and implemented effectively.

We will achieve this through:

- Focusing on the highest risks faced in our operations with the ultimate goal of elimination of manual tasks with a high potential for serious harm or fatality.
- As goals are achieved, undertaking periodic review of operations to identify new priorities.
- Always challenging the status quo and looking for innovative solutions to problems.

Key strategies to achieve these goals include:

- A strategic drive to use technology and/or changed work practices to address the highest risk tasks and minimise worker exposure to hazards that could cause serious harm or fatality.
- Regular periodic review of safety statistics and outcomes of incident investigations to identify those areas of highest priority.

- Use of focus groups (such as Subcommittees of the Peak HSE Committee) made up of staff and contractor representatives to tackle and develop solutions for identified priority issues.

Some safety initiatives that MFM (NZ) has activity implemented in recent times are the mechanisation of tree falling using tethered falling machines on steep slopes, the use of GPS monitoring and forward and rear facing cameras in log trucks to monitor driver performance and fatigue levels, and fatigue monitoring and prevention initiatives

5.0 Environmental Stewardship

5.1 Introduction

MFM (NZ) is committed to maintaining a high standard of environmental stewardship when managing our forests and activities and ensuring the long-term sustainability of our operations.

Environmental effects are a key consideration when planning and managing our operations, second only to ensuring operations are undertaken safely.

The MFM (NZ) Environmental Policy is attached in Appendix I. The following sections provide more information about the key aspects of MFM (NZ)'s environmental stewardship programmes.

5.2 The Environment and Forestry Activities

Forestry activities encompassing silvicultural and harvesting operations can have both beneficial and adverse impacts on the environment depending on the quality of environmental and operational planning and management. Well managed forests can:

- enhance water quality;
- stabilise and conserve soil;
- provide a buffer against flood flows during storms;
- shade waterways keeping water cool for enhanced fish and macro-invertebrate life;
- provide habitat for rare, threatened and endangered native species;
- sequester carbon to combat climate change, and
- provide recreational, economic and social benefits to the community

On the other hand, poorly managed forestry activities can have harmful impacts. MFM (NZ) aims to identify the potential negative impacts that our activities may have and to implement environmental safeguards to prevent or to minimise the negative impact from its operations.

MFM (NZ) implements a range of measures at each stage of its forestry operations to prevent or minimise the adverse impacts of its forestry activities on the environment. The company audits and reviews its safeguard mechanisms regularly to ensure that its systems continue protecting the natural and physical resource base effectively.

MFM (NZ)'s Environmental Management System (EMS) is the primary tool used for ensuring that company operations meet the highest environmental standards. The EMS details processes to be followed from initial planning through to completion of operations. It also sets out auditing, monitoring and review procedures which help to ensure continuous improvement of environmental performance.

The EMS sets out clearly the company's obligations, and those of its contractors, to protect identified environmental values in the areas in which we operate. This may include areas such as waterways and wetlands, indigenous reserves, neighbours'

boundaries, conservation areas, historic and cultural sites and high value landscapes. Specific procedures, including monitoring the impact of operations, are followed to ensure protection of these areas.

Any forest establishment work (including herbicide application), earthworks and harvesting operations that have the potential to impact on areas of high ecological value are identified as high risk. Work in such areas is carefully planned, mapped and prescribed. Specific environmental protection requirements are provided for operators to follow. Operators undergo training and receive specific in-situ advice to ensure they understand the importance of these issues.

Contractors must follow the prescription plan and monitor their operations on a day-to-day basis to ensure that such sites are being safeguarded. Ensuring that reserve and sensitive areas (e.g. adjacent native bush, wetlands and streams) are not damaged is a focus.

The EMS is designed to ensure that the company follows all the regulatory requirements and meets agreed industry standards.

5.3 Planning of Operations

At the beginning of the planning phase of harvesting, establishment and earthworks operations, it is determined whether a resource consent under the Resource Management Act or an Authority under the Heritage NZ Pouhere Taonga Act is required. MFM (NZ) undertakes consultation with all those parties who may be affected by the operation. Where a consent is required, an application, which includes an assessment of the actual and potential effects of the proposed activity, is submitted to the local authority. The application also provides details of the measures to be used to prevent or minimise adverse effects.

All operations on the MFM (NZ) managed estate must have a Work Prescription in place before work commences (for harvesting operations this is called a Harvest Plan). Through the planning phase the planner inspects the site and gathers information on all of the site characteristics and constraints to confirm or supplement recorded information held in the GIS. Taking into account environment, safety, economic and practicality considerations the planner develops the optimum methodology for carrying out the particular operation. This plan is then documented in the work prescription and includes a map of the site and instructions for completing the job. Any site specific environmental constraints are documented in the Work Prescription and where applicable, identified on the Work Prescription map. Each operation is assigned an environmental risk rating (high, medium or low) based on the characteristics of the site. This alerts the contractor of the relative risk level of the particular job, and is also used by MFM (NZ) to prioritise the frequency of operational and post-operation audits.

Prior to commencing operations, hazard identification is undertaken on site with the contractor to ensure all safety and environmental hazards are clearly identified with controls in place.

Contractors are required to comply with the Work Prescription as well as with any applicable resource consent conditions. Compliance is monitored by MFM (NZ) operational staff during and on completion of operations.

5.4 Protection of Threatened Species

MFM (NZ) is committed to managing our forests to maintain a diversity of indigenous flora and fauna species. Of particular importance are rare, threatened and endangered species living within the estate.

MFM (NZ) has undertaken a review to identify all rare, threatened and endangered species either confirmed or suspected to be present in the estate. Management Plans are progressively developed for all species confirmed to be present, focusing initially on those areas where harvesting is imminent. Management plans are prepared with input from Department of Conservation (DOC) and other recognised technical specialists.

Any permanent habitat for rare, threatened and endangered species is recorded in the GIS mapping layer as an ecological restriction. This is taken into account during planning of operations to ensure compliance with the Management Plans.

NZ bush falcon in cutover

In conjunction with other forestry companies MFM (NZ) has supported two threatened species projects researching the NZ bush falcon and long-tailed bat in plantation forests (refer section 6). In both cases the research is aimed at gaining a better understanding of how those species use plantation forest habitats and developing management recommendations to further enhance their success.

Waituhi Forest Blue Duck Project

Waituhi Forest is located east of Taumarunui and bounds onto Pureora Forest Park to the north. For some years staff had been aware that blue duck (whio) were present along the riparian margins of the Pungapunga Stream that runs through the block from Department of Conservation (DOC) land. A survey in 2009 confirmed four breeding pairs were using the stretch within Waituhi Forest up to the DOC boundary.

Blue duck are endemic to New Zealand and listed as a threatened species ('nationally vulnerable') with an estimated 2,000 to 3,000 birds remaining, of which it is estimated around 640 pairs live in the North Island. Blue duck live in clean, fast flowing bouldery rivers and streams located within forested catchments. They establish exclusive territories and strong pair bonds, with a breeding pair occupying the same stretch of river year after year.

As with many of New Zealand's indigenous birds, blue duck are heavily predated by introduced mammals, in particular, stoats. To protect the population, MFM (NZ) with support from Horizons Regional Council, DOC and Genesis Energy established a trapping network over a 5km reach of the Pungapunga stream in 2011.

It is hoped that with trapping of predators we will enhance the breeding success of the small population to increase numbers both within Waituhi Forest and the adjacent Pureora Forest Park. Each year MFM (NZ)'s trapping contractor undertakes a population survey to confirm numbers and rearing success, with our best year to date being the summer of 2014/2015 when twelve chicks were successfully reared.

Adult blue duck on the Pungapunga stream, Waituhi forest

Whatoro Kiwi Recovery Project

Manulife Forest Management Kiwi Recovery Projects

Kiwi were once widespread on mainland NZ but have been greatly reduced by predation, in particular by dogs, cats and mustelids (stoats, ferrets and weasels). Although adult kiwi are relatively robust, kiwi chicks are very vulnerable to predation and typically, only 5% of chicks survive their first year in the absence of predator control.

Northland as a region has the highest remaining population of North Island Brown Kiwi. Approximately 30% of the Taumata Plantation Ltd (TPL) Northern forests contain kiwi which make use of both the native reserves and plantation forest for habitat. MFM (NZ) staff are involved with Northland Kiwi Recovery Groups actively managing programmes for kiwi recovery.

MFM (NZ) manage four kiwi recovery projects, based in Whatoro, Waipunga, Gammons and Whanui Forests in Northland. Whatoro Forest is located in an area with naturally high kiwi populations and was selected as a priority due to its location between two Department of Conservation (DOC) forests actively managed for kiwi (Trounson and Kaihu Forest Parks). MFM (NZ) joined forces with the Northland Regional Council (NRC), DOC and neighbours to develop a Community Pest Control Area (CPCA) over approximately 2,500ha. NRC provided financial support initially to set up and run the project, with MFM (NZ) and the neighbours now responsible for longer term management.

Gammons Forest predator control programme was commenced in 2017 and based on populations surveys, kiwi appear to be thriving. Whanui and Waipunga Forest programmes have been established more recently, with Waipunga being added this year.

Other community led kiwi recovery projects that MFM (NZ) is involved in include Kiwi Coast, Taheke Landcare Trust, Marunui Kiwi Recovery Projects, Piroa-Brynderwyns Landcare and Ngawha predator control operations. These projects are a great way to support local kiwi recovery initiatives by extending the area of protected habitat, and also creates connections with local communities. These projects all contribute to a network of protected habitat helping to halt the decline of kiwi in the wild in Northland.

Forest workers are provided training on recognising kiwi sign and what action to take should they encounter birds. MFM (NZ) have made a long-term commitment of predator control in forests containing kiwi through our own work and providing support to neighbouring community projects.

5.5 Indigenous Reserves Management

5.5.1 General

MFM (NZ) manages approximately 34,000 hectares of indigenous vegetation remnants located within its estate boundaries. The majority of these reserves were in place and reserved at the time of establishment of the plantation forests but, over time, the reserve area has expanded as areas are identified that are not suitable for productive use and are retired from production.

All reserve land is identified in the company GIS mapping system and managed as permanent reserve. Ecological assessments of all reserve areas have been undertaken by independent ecologists (Wildland Consultants) utilising a range of information including:

- Mapping information and aerial photography to identify the location of reserves and site boundaries
- Any previous ecological reports for sites in the forest such as DOC Protected Natural Area Programme (PNAP) or threatened species reports
- Site surveys by qualified ecologists to record vegetation and habitat types and relevant observations of flora and fauna
- At some sites bird recordings were used to confirm presence of indigenous bird species (e.g. kiwi, spotless crake, fernbird)

Survey reports were produced for each region detailing for each individual site:

- A description of flora and fauna values present within the reserve based on previous reports and field visit observations, including any threatened species observed or previously recorded;
- Ecological significance ranking: Each individual site was assessed and given a ranking using Ecological Districts, bioclimatic zones and landform units as the framework. Each site was evaluated against available information about the particular Ecological District using information from the NZ Land Cover Database (2001 and 2004) and relevant DOC PNAP reports for the district. The ecological significance assessment was based on standardised criteria including representativeness, diversity and pattern, naturalness, size and shape, rarity and special features, buffering and connectivity, and viability. Using a standard process, sites were assigned a ranking from Category 1 (largest, highest quality or particular rare ecosystems) down to Category 5 (generally relatively small sites dominated by exotic species). The ecological significance ranking is used as a guide for prioritising site management; and
- Management recommendations for each site where applicable.

All reserve sites are recorded in the MFM (NZ) GIS mapping system with summary information, including the unique site number, which can then be used to access more detailed information in the ecological assessment reports.

MFM (NZ) has an Indigenous Reserves Management Plan and from this an annual programme of reserve restoration work is developed. The ecological assessments form the basis for establishing priorities along with other guidance from the Ministry for the Environment (MfE), regional councils and community interests in particular areas. In a number of instances, MFM (NZ) has partnered with local organisations and the DOC in reserve restoration projects.

5.5.2 Reserves Restoration Projects

The following are some of the key reserve enhancement projects on MFM (NZ) managed lands.

Wetland Enhancement Projects in Central and Eastern regions

Wetlands were once widespread across much of lowland NZ, but their extent has been greatly reduced through draining for farmland. In the Waikato region it is estimated that less than 5% of the original wetland remains. In plantation forests land drainage is uncommon and therefore wetlands tend to be over-represented in comparison with adjacent farmland.

All areas of wetland ecosystem in MFM (NZ) forests have been identified in the company GIS and mapped as reserve, and many of the larger wetlands have also been identified as Significant Natural Areas under District Plans. While the original extent of the wetland vegetation remains, a lot of the wetland areas in our Central and Eastern region forests have been invaded by introduced weed species, in particular Grey Willow.

Willow control being undertaken in the Opareiti wetland in Kinleith Forest.

Following the harvest of plantation trees surrounding wetlands, MFM (NZ) staff review replant boundaries and where necessary the boundary is setback further from the wetland to create a protective buffer.

MFM (NZ) commenced a wetland restoration programme in 2007 and each year we complete more pest plant control. Most recently our efforts have been directed at spraying willow to eradicate it from wetlands in our King Country and Kinleith forests.

Dactylanthus taylorii (Kinleith Forest)

Dactylanthus is a rare plant that is New Zealand's only fully parasitic flowering plant, growing largely underground with the plant growing from a stem attached to the root of a host tree. In response to Dactylanthus, the host's roots mould into the shape of a fluted wooden rose giving the plant its common name of 'wood rose'.

Dactylanthus are also unusual in that they are pollinated primarily by very rare short-tailed bats, along with mice and wasps. The host trees are very site specific, occurring only on the margins of podocarp forest in the regenerating shrub/hardwood areas containing mahoe, lemonwood, kohuhu, five finger and lancewood.

Dactylanthus was identified in a reserve in Taumata's Kinleith Forest near Tokoroa. Dactylanthus is vulnerable to damage by browsing animals, in particular pigs. With assistance from DOC, protective cages have been installed over the identified plant locations and the population is monitored annually.

Flower of the rare underground plant Dactylanthus Taylorii

5.5.3 Management of 'High Conservation Value' Areas

Under the FSC Principles and Criteria, certified forestry companies are required to identify reserves within the forest estate that meet the FSC definition of High Conservation Value (HCV) and develop management plans, as required, to maintain or enhance the high conservation value attributes that define such forests.

Under the FSC Principles and Criteria, HCV's are defined as those reserves that possess one or more of the following attributes:

- ***HCV1:*** *Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia).*
- ***HCV2:*** *Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.*
- ***HCV3:*** *Forest areas that are in, or contain rare, threatened or endangered ecosystems.*
- ***HCV4:*** *Forest areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control).*
- ***HCV5:*** *Forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health).*
- ***HCV6:*** *Forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).*

Note: Reference to regionally in this instance refers to a global region, not a region within New Zealand, i.e.: sites must be at least nationally significant to meet HCVF criteria 1 and 2.

MFM (NZ) has undertaken an assessment of the entire estate using a range of data and information sources. The following is a summary of assessment process used to identify qualifying sites under each of the criteria:

- **HCVF 1-3:** To identify sites of ecological or environmental significance (HCVF 1-3) the ecological assessment reports described in section 4.6 were used as the base information, with the ecological ranking used as an initial guide of potential HCVF sites. Wildland Consultants undertook an initial assessment of reserves on the MFM (NZ) managed estate to identify potential HCVF sites. All sites within the estate with an ecological significance ranking of Category 1 or 2 were evaluated under the HCVF definition, and recommendations were made in relation to potential HCVF sites.

  Consultation was then undertaken with DOC and Regional Council biodiversity specialists for each forest region, to review Wildland's findings and provide further input and opinion based on their specialist knowledge.

  In most cases, Regional Council staff utilised assessments of reserve areas carried out by their Councils to identify sites in their region that met Section 6(c) of the Resource Management Act (areas of significant indigenous vegetation and significant habitats of indigenous fauna). Regional Councils have developed criteria for identifying Section 6(c) sites in their region which in most cases is documented in their Regional Policy Statement. Most Councils have commenced identification and mapping of those sites that meet the criteria in their region. Where the Regional Council process had identified a site as nationally significant through this process, this generally corresponded to the site being classified as meeting either HCVF criteria 1 or 2.

DOC staff also provided advice on the ecosystem values of reserve areas under consideration, and also advised on the significance of known populations of threatened species within the MFM (NZ) managed estate (HCVF 1). A number of known populations of threatened species within the estate were identified by MFM (NZ) as potential HCVF (whio, kiwi, dactylanthus, *Pittosporum turnerrii* and weka). DOC staff were able to identify which sites were considered to be 'nationally significant concentrations' based on their own threatened species management plans and survey information.

Through this process of consultation, a number of sites were identified that consulted parties agreed met one or more of the HCVF criteria 1-3, and these sites have been included in the HCVF list.

- **HCV 4:** An initial assessment of sites that potentially meet HCVF 4 was undertaken by former Hancock Forest Management Environmental Planner Robin Black (a geologist and former Regional Council soil conservator). Consultation was also undertaken with Regional Council staff. It was concluded that there were no areas that meet this criteria.

- **HCV 5:** It was concluded that in a NZ context with publicly funded health and social welfare systems, there are no communities dependant on forests for their fundamental needs (subsistence or health) and therefore no forests were identified under HCVF 5.

- **HCV 6:** Identification of forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance) falling under HCVF 6 has been an ongoing process. A review of recorded cultural and historic sites within the forests was undertaken by MFM (NZ) staff and consultation initiated with relevant tangata whenua representatives to obtain their views. Through this process a number of HCVF have been confirmed in Kinleith forest, due to the significant presence of cultural values.

The HCV assessment process is ongoing as more information comes to light and understanding of the HCV criteria in the NZ context develops. The HCV list is reviewed and updated each year in consultation with stakeholders where relevant.

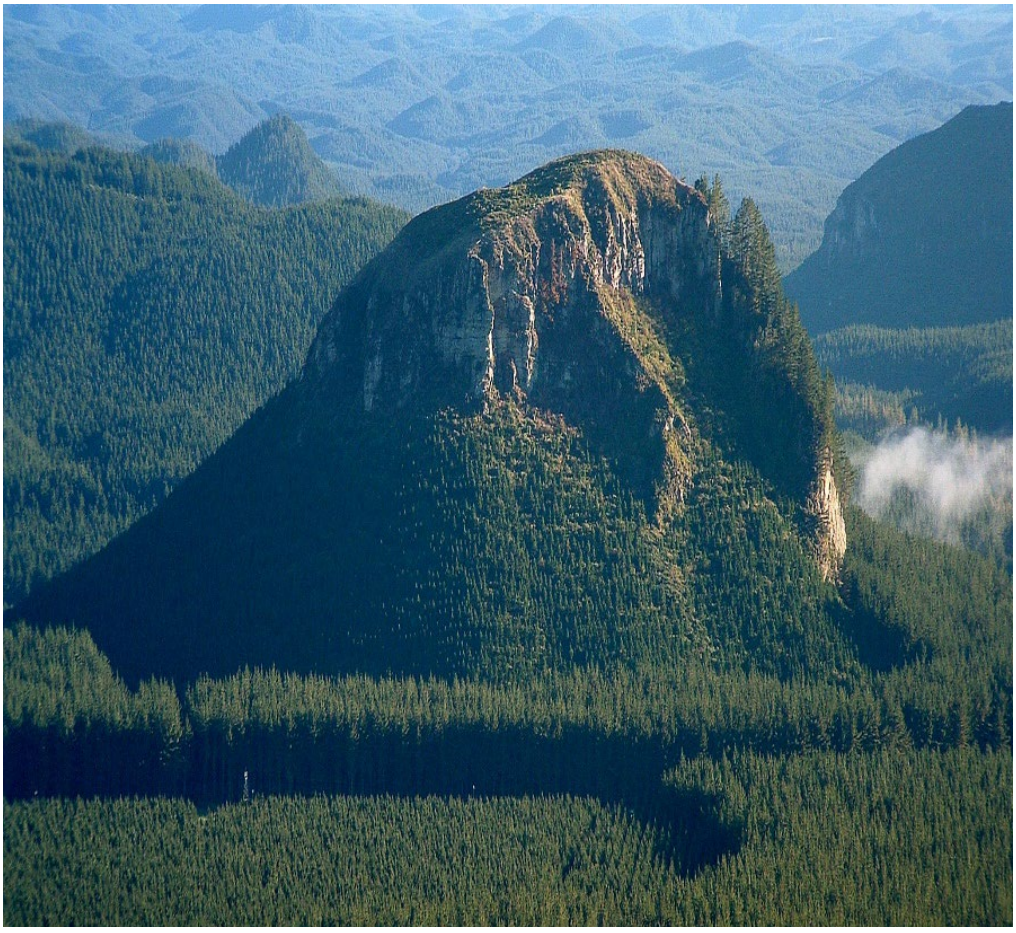
A list of the current HCV sites identified on the MFM (NZ) managed estate is attached as Appendix II.

As required by FSC, MFM (NZ) has developed management plans for those areas identified as HCV and is progressively implementing these, in consultation with landowners in the case of lease and joint venture forests. Each area is inspected annually to monitor the condition of the particular values identified as HCV, to assess the effectiveness of any management actions undertaken and to determine the need for any further active management. A brief summary of key management actions for each site is provided in Appendix II. Full management plans are available on request.

5.6 Historic Sites Management

A number of the forests managed by MFM (NZ) contain significant numbers of historic sites and waahi tapu as a result of early human occupation. Unrecorded sites are also regularly found during the course of harvesting.

Historic sites are vulnerable to damage when undertaking earthworks and harvesting. MFM (NZ) has a Historic Places Management Procedure, which specifies the procedures that must be followed when working around archaeological sites, either known or discovered during the course of the operation.



Pohaturoa, near Atiamuri in Kinleith Forest. The maunga is of cultural importance to the Raukawa, Te Arawa and Tuwharetoa people. Due to past occupation the maunga has numerous archaeological features (house sites and kumara pits). The site has been identified as an HCV area for cultural reasons.

All known sites are recorded in GIS and taken into account in planning of operations. No operations are undertaken which could potentially damage or modify an archaeological site without the necessary authority from Heritage New Zealand Pouhere Taonga. Once the authority is obtained this becomes part of the Work Prescription of the operation to ensure conditions of the Authority are complied with.

When a notable site is identified during an operation, the procedure requires all work to cease within 30m of the site and the site is visited by an archaeologist and, in the case of Maori sites, local tangata whenua representatives. If the feature is confirmed as an archaeological site, an operational plan is developed with input

from the archaeologist and iwi representatives and, if necessary, an authority is sought from Heritage New Zealand Pouhere Taonga.

In areas of forest with a high likelihood of new sites being discovered, all staff and contractors are provided training on identification of archaeological site features and procedures that must be followed in the field. As a result of this training and the systems we have in place, a considerable number of sites that have not been previously recorded have been identified and protected in the course of routine forestry operations.

5.7 Environmental Incident Management

While MFM (NZ) strives for excellence in the performance of its forestry activities it is inevitable that incidents will occur on occasions. When the company becomes aware an incident has occurred, it acts promptly to minimise and remedy adverse impacts on the environment. All incidents are required to be reported and significant incidents are investigated to ensure staff and contractors learn from the experience and management processes are reviewed and revised to avoid repeat incidents.

5.8 Climate Change

MFM (NZ) and our clients recognise that climate change is one of the most serious environmental challenges facing the planet. Plantation forests very effectively sequester large volumes of carbon dioxide as they grow, which is in then locked up in the wood for the period of time the forests are growing and even after harvest while the wood remains in use.

MFM (NZ) monitors the carbon emissions and sequestration from our operations and clients forests each year. Currently our client's forests store approx. 98 million tonnes of CO_{2e} (carbon dioxide equivalent). To put that in perspective, NZ's total annual emissions in 2019 were 82.3 million tonnes of CO_{2e}.

Wood products are unquestionably a responsible choice for combatting climate change as compared to any of their higher carbon alternatives. Wood fibre is also increasingly being used in NZ as an alternative fuel source to replace fossil fuels, particularly in industrial situations such as to replace coal in boilers.

Despite the clear benefit of forests and wood, our harvesting and log transport operations do involve a large amount of heavy machinery powered by fossil fuel. In 2020 MFM (NZ)'s operations including transport and shipping, emitted an estimated 181,000 tonnes of CO_{2e}. MFM (NZ) and our clients are committed to reducing emissions from our operations through process improvement and introduction of equipment powered by lower carbon fuel sources. Working with our contractors we are pursuing initiatives in this space.

6.0 The Community

6.1 Stakeholder Engagement

Through our management of large areas of forest land, MFM (NZ) is an integral part of the communities in which it operates, and as a significant business and employer, contributes to the sustainable development of these communities. Community relations are an important focus for the company and MFM (NZ) is committed to being ethically and socially responsible.

MFM (NZ) strives to actively engage with stakeholders in the many communities in which we operate, and particularly those directly or indirectly affected by our operations. Prior to commencing harvesting in a new area, MFM (NZ) engages with representatives of the local community to keep them informed of plans and develop mitigation strategies for identified concerns. Typically, this includes forest neighbours, residents of any rural access roads affected by logging traffic and tangata whenua.

Students at Kuratau School learn about safety around logging trucks from MFM (NZ) trucking contractor Garry Stewart of Aztec Transport Ltd, as part of MFM's 'Share the Road' log truck safety programme run in conjunction with rural schools

Maori are key stakeholders both as tangata whenua and also in the case of Maori lease hold forests, as business partners and the forest landowners. Tangata whenua are actively involved in providing input to forest management decisions, particularly where it relates to environmental impacts and maintenance of biodiversity and ecological values. Tangata whenua are also actively involved in the management of operations around historic sites, and long term management of the sites themselves.

Raukawa Totara Legacy Project

In 2014 Raukawa Charitable Trust raised with Hancock Forest Management their aspiration to establish a resource of plantation grown Totara in the South Waikato for future cultural use by the Raukawa people. The directors of Taumata Plantations Ltd were supportive of the idea and HFM NZ staff worked with Raukawa to identify potential areas for Totara planting. An area of land near the location of the old Te Whetu village within Kinleith was chosen as a suitable site. Known to Raukawa as 'Taranaki', the area had in the past been grazed and was overgrown with blackberry.

The physical work commenced with the clearance of weed species from the area. In August 2015, HFM NZ and Raukawa gathered together, along with many friends and supporters to undertake the first planting on the site. Much like radiata pine, the form of a Totara tree is influenced by its stocking rate and surrounding vegetation. The advice from indigenous tree specialists at Scion was to co-plant the Totara with other native species, to encourage the Totara trees to grow straight and tall. The first planting at the site was therefore the planting of manuka and pittosporum to form the nursery crop.

Totara seed was collected by Raukawa staff from suitable local trees and grown into seedlings in the Scion nursery. In September 2018, the Totara seedlings were ready to be planted and phase two of the project began. Representatives from Raukawa Charitable Trust and HFM NZ were once again joined by many volunteers from supporting organisations.

Longer term, it is hoped that the project will provide a sustainable source of Totara for uses such as waka building, carving and marae restoration. The Totara Legacy Project is certainly one of MFM (NZ)'s longest term stewardship projects, with Totara likely to take 80 years to be ready for harvest. In the shorter term, it is hoped the area will become a special area to be enjoyed by all who visit. The area has been marked by the erection of a 'Po' by Raukawa Charitable Trust, and the installation of a time capsule with information and messages to future generations, to be opened at the time of harvest.

Planting in full swing at the Raukawa Totara Legacy Project site, August 2015

MFM (NZ) has developed a Social Impact Assessment (SIA) Procedure to recognise and manage decisions that may have significant impact on the local community. Key staff receive training in SIA techniques.

MFM (NZ) runs a stakeholder forum in the Central Area attended by a range of stakeholders, aimed at keeping communities informed about our activities and creating a forum for exchange of information and concerns. Consultation in Northland is carried out at the community level where meetings are scheduled when activities occur or change.

MFM (NZ) issues a stakeholder newsletter sent out to stakeholders on our database, which is available on request.

6.2 Socio-Economic Conditions

MFM (NZ) has offices in Tauranga, Rotorua, Whangarei and Tokoroa and our contracted workforce is spread through a number of smaller communities in the vicinity of the forests that we manage. The forest estate that MFM (NZ) manages is located in areas of rural New Zealand where there have at times been high levels of unemployment relative to the rest of New Zealand, due partly to the limited range of jobs available in small communities. The economies of these communities are often heavily dependent on forestry or forestry related industries.

The largest town centre in the locality of the Central North Island region forests, Rotorua, also has a strong tourist base, which is enhanced by the plantation forests and their recreational opportunities.

6.3 Employment

Forest management requires educated and well-trained employees, who understand not just their technical roles, but also the impact of those roles on the community and the environment.

MFM (NZ) directly employs approximately 100 staff. In addition, MFM (NZ) clients engage a significant number of contractors who undertake a range of forest management activities from mensuration and forest protection through to engineering and harvesting. MFM (NZ) has also contracted two local organisations to provide logistics and sales and marketing services. Many of these organisations also contract to other forest managers in the area and are major employers, particularly in the Central North Island.

Future employment creation was a major driver for many of the Maori trusts and incorporations who are our lease partners, and in some cases employment provisions are contained within the lease documents. MFM (NZ) strives to employ contractors with local connections and many of our contractors and their employees affiliate to the local iwi and the land on which they are working.

Staff and contractors receive various levels of training on an on-going basis and are encouraged to continuously improve their performance through performance based reward and remuneration systems. MFM (NZ) has an active role in initiating training courses to assist young people into the industry in a number of regions, through support for industry training programmes and coordination with local high schools

6.4 Recreation

MFM (NZ) forests are used for a wide range of recreational activities, including walking, running, mountain biking, motor-cross, horse riding, pig hunting, deer stalking, quad bike riding, orienteering, and a range of other activities. In many cases, the forest is a major recreation resource for local communities.

Woodhill Forest in particular is a major recreation resource for the Auckland Region due to its location less than 45 minutes from Auckland City. Woodhill receives hundreds of thousands of visitors every year, and has a number of permanent businesses operating recreation activities within the forest.

Access to our forests is, in most locations, managed through a system of access permits. The challenge for MFM (NZ) is to enable reasonable recreational access to the forest, while also ensuring protection of environmental and ecological values, and the safety of both recreational users and MFM (NZ) staff and contractors.

Lease and joint venture forests are generally not open to the public, and access is in most cases managed by the landowners.

MFM (NZ) has made a commitment to cater for recreation in its forests, provided that the recreational activities are compatible with commercial, environmental and safety objectives.

Cougar Mountain Bike Park located in Kinleith Forest, Tokoroa.

Woodhill Tree Adventures high ropes course in Woodhill Forest, Auckland

7.0 Monitoring

7.1 General

MFM (NZ) conducts a comprehensive monitoring programme to aid understanding of the impact of its activities on the environment and the impact of the environment on its ability to grow the best trees. This understanding leads to the development of strategies to ensure the company continues to manage its activities in a sustainable way.

A summary of key results is available in our monitoring report on our website.

7.2 Operations Monitoring

MFM (NZ) regularly conducts internal environmental audits to confirm operations have been carried out in accordance with work prescriptions and regulatory requirements, and to identify any corrective actions required.

In addition, MFM (NZ) staff undertake bi-annual Environmental Systems Audits with contractors operating in our estate to ensure they are complying with our Environmental Management Systems and company procedures.

Regional Councils also conduct regular compliance monitoring of operations undertaken under resource consents or the National Environmental Standards for Plantation Forestry permitted activity rules.

7.3 Biodiversity Monitoring

MFM (NZ) conducts a range of surveys across the estate to monitor both impacts of forestry operations on indigenous fauna and to monitor the health and changes to populations. The monitoring programme is gradually being extended as Management Plans are developed but currently includes:

- Monitoring of native fisheries in selected streams across the estate. Previously this was undertaken using electric fishing, however recently MFM (NZ) changed to using eDNA which enables information on species presence to be monitored through DNA analysis of water samples. Monitoring is generally commenced prior to harvesting and repeated during and post-harvest to monitor any changes in fish populations as a result of harvesting.
- Periodic monitoring of rare, threatened and endangered species populations to monitor changes in populations and over time the effectiveness of Management Plans. Current threatened species monitoring in MFM (NZ) forests includes:
    - Kiwi populations in Northland and Bay of Plenty Forests
    - Bat monitoring in a selection of forests each summer
    - Blue duck in Waituhi forest in the King Country
    - Hochstetters frog distribution in Eastern Bay of Plenty forests
- Annual monitoring of HCVF sites to monitor the health of particular values resulting in HCVF status.
- Bird population surveys and animal pest surveys in selected reserve areas where active restoration is underway.

Staff and contractors are encouraged to report sightings of rare, threatened and endangered species, such as NZ falcon, weka and kiwi. This data is recorded in an MFM (NZ) sightings database. Where appropriate the data is entered into national databases such as the Raptor Association database.

MFM (NZ) and other agencies, including Regional Councils, monitor plant and animal pest species within and adjacent to the estate. This includes some limited monitoring of the impact of pests on indigenous vegetation within the forest and also outside the forest in selected sites.

A Hochstetter Frog in a stream in Waikawa Forest showing both their very small size (the pine needle gives a sense of scale) and their excellent camouflage ability.

7.4 Forest Growth and Dynamics

Forest growth is monitored through a combination of permanent sample plots and regular forest inventory.

Permanent sample plots are established early in the life of a crop, across a wide range of different sites and under different management conditions. They are carefully remeasured at regular intervals, usually annually, until age 10, and then every second year until harvest. Measurements from permanent sample plots provide an accurate picture of long-term growth trends. This data is used to develop growth models applicable to the forest resource and to validate their performance.

Plot measurement and maintenance is managed internally, but the data is processed and maintained on the Scion Permanent Sample Plot System.

Forest inventory is undertaken at regular intervals during the life of a crop. Trees are measured in temporary sample points. The first formal assessment is at about age 10. Up to three further assessments may be carried out, culminating in pre-harvest inventory. These measurements form the basis of the yield tables used to model the likely harvest volume available from the forest estate.

7.5 Sustainability Monitoring

Implementation of processes for monitoring sustainability within the plantation estate is based around a series of permanent sample plots, on representative soil types, which will be maintained over successive rotations.

These plots are being used as sites to monitor:

- Tree and stand growth rates.
- Soil disturbance levels at harvest.
- Soil properties.
- Understorey vegetation.
- Forest health.
- Nutrient content of tree foliage.

7.6 Research Projects

MFM (NZ) is involved with or contributing to a number of research projects to improve understanding of the effects of plantation forestry.

In conjunction with other forest managers, MFM (NZ) contributed to a project to better understand the use of the plantation forest by NZ Long-tailed Bats[1]. Based in Kinleith Forest near Tokoroa, the study involved capturing and tracking bats in the forest to confirm their roost locations and movement patterns. The study revealed, for the first time, the unexpected finding that bats were roosting and breeding in the plantation forest.

MFM (NZ) supported a similar project investigating the use of plantation forests by New Zealand bush falcon that took place on the Kaingaroa Timberlands estate[2]. Recommendations from that project are now being implemented through falcon guidelines developed by Wingspan Birds of Prey Trust for the forest industry. The industry has supported ongoing research in Kaingaroa and more recently forests in Dunedin, to continue to develop our understanding of falcon use of forests and how best to protect them.

MFM (NZ) has also provided assistance for a PhD research project analysing the impact of woody debris, based in Houpoto Forest in the Eastern Bay of Plenty. The study was aimed at understanding the effects (both positive and negative) of harvesting debris in a small coastal stream. The study is now complete and the thesis is available through the University of Waikato website. [3].

MFM (NZ)'s clients contribute funding to research benefitting plantation forestry through the Forest Growers Levy, introduced in 2014. MFM (NZ) also contributes to a specific body of work funded by a grouping of FSC certified forestry companies in New Zealand to progress herbicide research with the goal of reducing herbicide use over time and/or transitioning to more benign formulations.

[1] Ecology of NZ Long-tailed bat (*Chalinolobus tuberculatus*) in exotic plantation forest, Borkin K.M. 2010, University of Auckland
[2] The Ecological Requirements of the NZ Bush Falcon (*Falco novaeseelandiae*) in plantation forestry, Seaton, R. 2007, Massey University
[3] The physical and biological function of woody debris in New Zealand's forested streams, Baillie, B. R; 2011, University of Waikato

Fitting a tracking device to the NZ Bush Falcon as part of a PhD study, Kaingaroa Forest.

APPENDIX I: Health & Safety and Environmental Policies

Manulife Investment Management

HEALTH, SAFETY and WELLBEING POLICY

Our goal is that everyone goes home safe every day

We believe

- That all fatalities and injuries are preventable
- In a culture where the health, safety and wellbeing of all people is the over-riding priority
- That excellence in health, safety and wellbeing is crucial to the long-term success of our businesses
- The behaviour of leaders influences safety culture
- Work should not be started if it is unsafe to do so and anyone can and should stop an unsafe act

Our Commitment is to

- Ensure that health and safety is the key performance measure and a core value of our company
- Instill a "Just Culture" where employees and contractors are fully engaged and where health and safety is seen as a collective responsibility
- Continually look for ways we can improve health, safety and wellbeing in the workplace
- Ensure that all workers in our workplace are either trained, deemed competent, or are under training and supervision for the tasks they are performing
- Work together with our employees, contractors and their staff, as appropriate, in the pursuit for safer workplaces
- Encourage employees and contractors to extend their commitment to safety and good health beyond the workplace and into their everyday lives
- Comply with relevant health and safety laws, regulations and industry codes of practices and strive for continuous improvement
- Focus on innovations that will eliminate the highest risks where reasonably practicable

Employees and Contractors shall share the responsibility and must

- Complete a risk assessment before work is undertaken
- Promptly report incidents, unsafe practices and conditions
- Comply with procedures, training, instructions and the Manulife Investment Management Forest Management (NZ) Limited lifesaving rules

It is only through the collective commitment to good safety outcomes that we will meet our goal that everyone goes home safe every day.

Chris Barnes
General Manager
4 April 2022

Manulife Investment Management

Environmental Policy

Our Commitment	Manulife Forest Management (NZ) Limited (MFM (NZ)) is committed to the responsible stewardship of land under our management. It is our goal to deliver value to our investor clients, while protecting the future productivity of the land and ensuring that over time the environmental, cultural and community values of the lands we manage are maintained or enhanced. We are also committed to paying our part in addressing climate change, through pursuing opportunities to reduce greenhouse gas emissions from our operations and managing our client's estate to meet their net zero commitments.
Legal and other requirements	We will operate our business so that we meet or exceed all statutory environmental requirements, relevant Codes of Practice, industry best practice guidelines and agreements as described in the company EMS.
Treaty of Waitangi	We will conduct our business in accordance with principles of the Treaty of Waitangi that are relevant to our operations, as articulated through legislation.
Third party certification	We will maintain third party certification and conduct our operations in accordance with the requirements of the organisations and standards to which we are certified (FSC®, PEFC and AS NZS 4708).
Resources	We will allocate sufficient resources to ensure the responsible stewardship of the forests under our management, and to further develop knowledge of plantation forestry through involvement in industry trials and research.
Training and development	We are committed to training and developing our staff and contractors to ensure that all individuals working on behalf of Manulife Forest Management (NZ) Ltd are competent in meeting the company's environmental requirements.
Systems and practices	We will develop and implement best practice systems and management practices to ensure a systematic approach to forest management and the maintenance and enhancement of the soil, water, biodiversity, cultural, landscape amenity and community values of our forests.
Stakeholder Engagement	We will proactively engage with stakeholders and interested parties so as to ensure consideration of their views in forest management planning, promote constructive community relationships and increase awareness and understanding of our operations.
Continuous Improvement	We will undertake regular reviews of our forest management systems in light of new information, to strive for continuous improvement in our operations and forest stewardship outcomes.

Christopher Barnes
General Manager
4 April 2022

APPENDIX II: Identified HCV Areas in the MFM (NZ) Managed Estate

Site	Forest	HCVF criteria met	Key Management Plan Actions[1]
Pokapoka Stream Wetland	Waiomio	HCV 3: Largest wetland in the MFM (NZ) Northern Estate. PNA (Protected Natural Areas Programme) level 1 site in Tangihua Ecological District (PNA P06-76). Confirmed by Dept of Conservation and Wildlands as a site of national significance.	Review replanting boundary for 2nd rotation replanting. Poison standing pines within wetland margin.
Cook Road Forest	Whatoro	HCV 1: Confirmed by Dept of Conservation as being part of a nationally significant kiwi population in Central Northland, linking Trounson Park to Kaihu Forest park.	Develop animal pest control programme in conjunction with neighbouring properties (with potential assistance from NRC and DOC kauri Coast). Call count monitoring.
Lake Road lake and wetland	Kinleith	HCV3 One of only three natural wetlands in the Tokoroa Ecological District. Confirmed by Waikato Regional Council ecologist to be nationally significant under the Waikato Regional Council Criteria for determining significant indigenous vegetation and significant habitats of indigenous fauna (Waikato Regional Policy Statement).	Continue animal pest control programme. Bird survey Review and control plant pests as required.
Pohaturoa	Kinleith	HCV6: Important historic and cultural site for Raukawa, Tuwharetoa and Te Arawa. Proposed for registration under the Historic Places Act.	Removal of exotic crop carried out in 2000. Annual aerial review of wildling regeneration until site revegetates. Carry out manual removal or aerial spot spray as applicable. Consult with Ngati Raukawa annually.
Houpoto Swamp	Houpoto	HCV1: Recommended Area for Protection. Mapped as part of national wetland study by Landcare Research. Listed by Bay of Plenty Regional Council in their High Value Ecological Sites list (HVES 119), and identified in the list as a site of national significance (Site SVHZ-181).	Initial plant pest control completed targeting willow and pampas. Currently consulting with landowners (Houpoto Te Pua Lands Trust) regarding future management requirements.

Site	Forest	HCVF criteria met	Key Management Plan Actions[1]
			Carry out plant pest control as required.
Te Ranginui Wetland	Orete	HCV3: Rare kahikatea swamp on Holocene land slide.	Plant pest control underway targeting willow and wilding pines. Wetland boundary extended following harvest of the surrounding pine forest.
Tokerau Wetland	Tokerau A11 Forest	HCV3- rare or threatened ecosystem. Wetland ecosystem, Kahikatea/swampland	Work with landowners to achieve stock exclusion. Plant pest control.
Tuhoe Wetlands (4 in total)	Tuhoe Forest	HCV3- rare or threatened ecosystem. Wetland Ecosystem, Leptospermum/coprosma.	Work in with landowners and BOPRC to undertake plant pest control and exclude horse access to wetland.
Tikitere geothermal reserves (5 in total)	Tikitere	HCV3- rare or threatened ecosystem. Rare species, geothermal system.	Wilding pine removal. Annual Monitoring
Tikitere wetland	Tikitere	HCV3- rare or threatened ecosystem.	Annual monitoring

Notes:

1. Management Plans for individual sites are available to interested parties on request from MFM (NZ)
2. Further sites have been identified as potential or proposed HCVF sites pending further discussion with Department of Conservation, Regional Councils and landowners. These will be added to the list as confirmed.