KAWAROA FOREST

TGH Natural Resources Ltd

FSC® Forest Management Plan

For the period March 2023 – March 2028

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Table of Contents

1. What is this Plan?

About this Plan

This **specific** forest management plan provides details about Kawaroa Forest.

It is to be used in conjunction with the **standard** forest management plan, which outlines the typical management applied to the Forest Stewardship Council® (FSC) Group Scheme estate forests.

Where Kawaroa Forest is managed in a different way than described in the standard forest management plan, this is detailed within this plan, which takes precedence.

Foundation Principle

Tainui Group Holdings (TGH) Natural Resources Ltd is committed to adopting the Forest Stewardship Council (FSC) Principles and meeting the FSC Criteria relevant to forest management.

TGH Natural Resources Ltd is committed to the PF Olsen FSC Group Scheme **NC-FM/COC-000190** processes and associated documents.

TGH Natural Resources Ltd seeks FSC certification, to ensure that their forests are managed in an environmentally appropriate, socially beneficial and economically viable manner and to obtain the best access opportunities to the local processing market which is seeking to source FSC® certified logs.

2. The Forest Land

Location and access

Kawaroa Forest is a 552.1 hectare forest on the northern side of Kawhia Harbour, in the Waikato region. The location of the forest is shown in Map 1.

Markets

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

Distances from forest to likely log markets

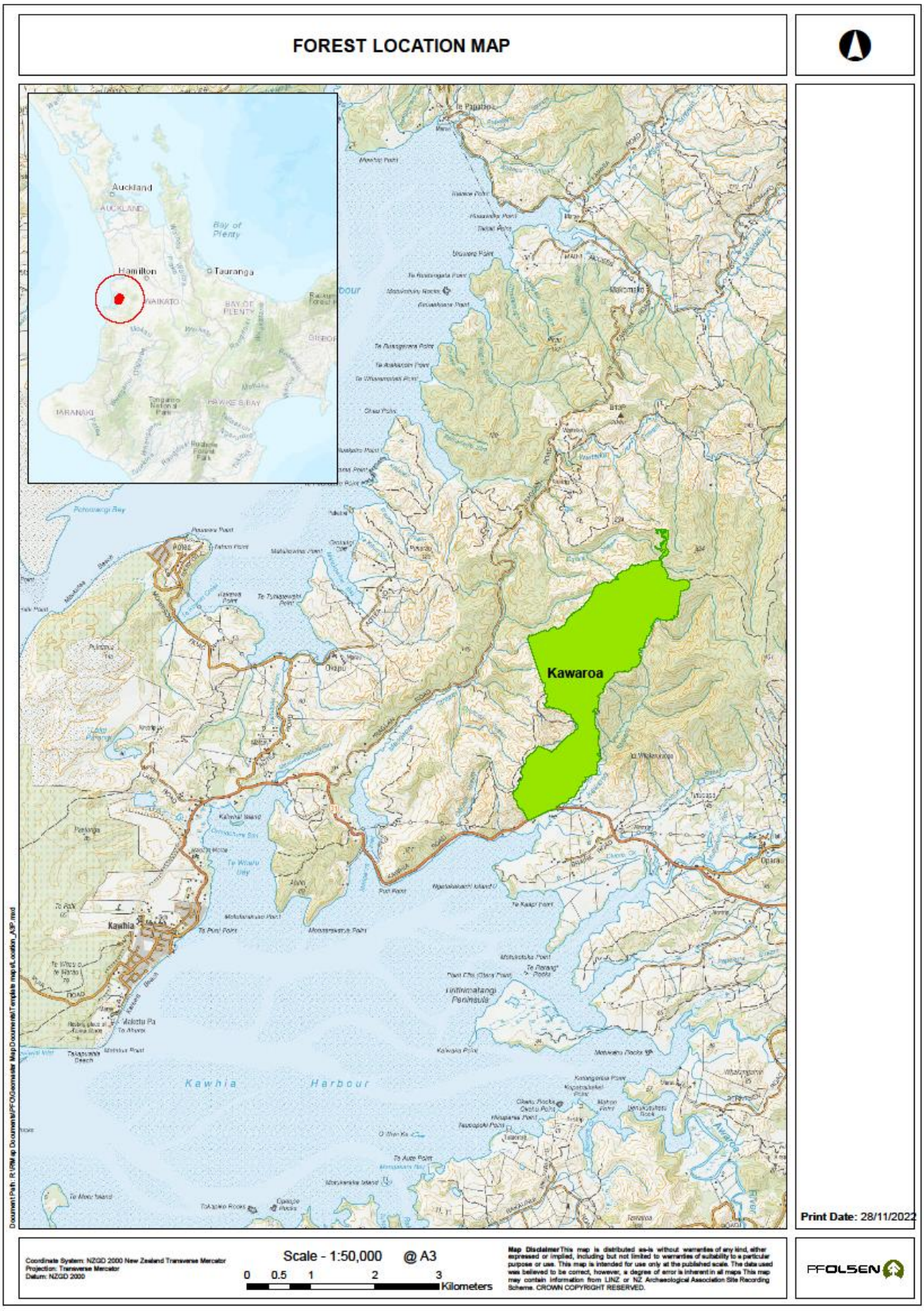
Potential Market or Export Port	Distance from Forest (km)	Log market
Te Kuiti	66	Domestic
Putararu	104	Domestic
Tokoroa	121	Domestic
Tauranga	165	Export
Auckland	194	Export

Topography

The topography consists of hill country.

- Kawaroa Forest is located on moderate to steeply dissected hill country boadly aligned along a S.SW to N.NE axis rising from near sea level to 225m above sea level.
- The topography dictates harvesting by cable based systems including tethered machine felling where appropriate. Access is from a road network originating from an existing but upgraded Kawaroa Road and track that runs along much of the ridgeline forming a spine through the middle of the forest.
- The geology underlying Kawaroa is Apotu Group siltstones with some sandstone and conglomerate present.

Map 1 – Location Map Kawaroa Forest



Soils

Soils are predominantly Brown / Yellow Brown, originating from the underlying weathered parent material.

- Detailed soils mapping for this area is not currently available from the S-Map database. However, adjacent mapped areas and extensions of similar topography suggest the dominant soils will be 'Brown Soils' or 'Yellow Brown' soils, moderately well drained with moderate to low available moisture in the profile which is also moderately deep at between 45-100 cm to hard base layers.
- These soils are generally not prone to summer drought nor winter waterlogging and combined with depth are good for tree growth and generally compatible with the type of harvesting operations expected, without seasonal constraints.

Climate

- The Kawhia region experiences an 'oceanic' type climate strongly influenced by westerly airstreams.
- The forest area has warm humid summers and mild winters.
- The average rainfall is about 1400-2000 mm in the upper elevations dropping to 334 mm at the coast. Kawaroa being slightly elevated and inland will be above the coastal level.
- The mean annual daytime temperature is around 18 degrees Celsius.

Legal ownership

The legal description of the forest land is:
SA 31D/931. 1/1, Lot 2 Deposited Plan South Auckland.

The land tenure is freehold vested in Pootatau Te Wherowhero with a Forestry Right vested in THG Natural Resources Ltd.

3. The Ecological Landscape

Ecological District

Kawaroa Forest is located within the Kawhia Ecological District (ED), in the Tainui Ecological Region.

- Kawhia ED represents a complex landscape of eroded basalt and andesite volcanic cones surrounded by rolling and broken hill country draining to drowned river valley harbours.
- The commercial forest is bounded to the east by two large patches of indigenous forest being mixed lowland podocap hardwood and kanuka dominant respectively. Semi-intensive drystock pastoral farmland with patches of reverting indigenous vegetation in gully systems and some faces is on land to the west of the forest.
- The predominant landcover in the ED is pastoral grassland with most mixed podocarp hardwoods concentrated on the lower flanks of the volcanic cones and windshorn montane vegetation on the upper flanks. There is no forest connectivity between Kawaroa Forest and the large protected aeas of the Pirongia Forest Park on and around the volcanic cones.
- The ED is recognised as having the most northern limit of semi-continuous NI Brown Kiwi. NZ Falcon are quite likely in the area and within the forest and there is a possibility, given the coastal setting of the southern end of the forest, for partial utilisation of the plantation forest habitat by fernbirds and some shore birds. Surveys have been undertaken to confirm or otherwise the presence of 'threatened' species.
- Galaxid species and longfin/shortfin eel are likely inhabitants of the Kawaroa steam running parallel to the eastern boundary of the forest as well as in some tributaries within the forest.

FSC requirement: Ecological District

As the area of reserves within the forest property boundary is more than 5% by forest, and more than 10% within the Kawhia ED within the PF Olsen Group Scheme, there is not a reserve shortfall.

Reserve areas in Kawaroa Forest by Ecological District

Ecological District	Total Forest Area (ha)	Reserve Area (ha)	Reserve %	Meets FSC?	Reserve Shortfall (ha)
Kawhia	552.1	154.1	28%	Yes	0

Threatened Environments Classification

The reserve areas in Kawaroa Forest are witihin well represented and protected categories within the NZ Threatened Environments Classification.

Protective status of the ecological landscape

Threatened Environment Classification	Area (ha)
< 10% remaining	-
10 – 20% remaining	-
20 – 30% remaining	-
>30% remaining & <10% protected	-
>30% remaining & 10 – 20% protected	76.8
>30% remaining & >20% protected	77.3
Total Area (ha)	**154.1**

4. Cultural and Social Aspects

Forest history

The land and forest form part of the Treaty Settlement for the Waikato Tainui.

Historic and archaeological sites

The 'Archsite' web resource does not record any known historic sites within Kawaroa Forest. There are four recorded sites within 1 km of the forest boundary. Very high densities have been identified beyond 1.5 km to the coastline.

Accidental discovery protocols will apply should any physical evidence be discovered during operations (also see Section 'Consents & authorities held').

Close liaison with Tainui representatives will be needed for guidance in respect of any other matters cultural heritage, places and values that need to be considered and provided for during operations.

Current social profile

Immediately surrounding Kawaroa Forest, the predominant land use is extensive drystock pastoral farming and a large area of indigenous hill country forest, isolated from the Pirongia Forest Park 11 km away. There are other large plantation forests in coastal locations by the Kawhia and Aotea estuaries.

The community of Kawhia serves both the rural community, fishing and holiday/recreational businesses.

Kawaroa Forest is within the Ōtorohanga District. As a whole, 2019[1] statistics indicate approximately 80% of the population were of working age (68% national), 70% were non-urban dwelling (17% national) and 30% of the population identified as Maori. Median income was $86,000/yr ($92,000 national).

In the district, the annual GDP contribution from forestry, mining and fishing was estimated at $24.4 million, and from agriculture $165 million.

By the very nature of its ownership structure, Kawaroa Forest represents a specific economic investment by Tainui for the wider benefit of its people. The intent being that direct physical operations enable employment opportunities for tribal affiliated members and financial returns provide economic strength and returns to the wider Tainui members.

Association with Tangata Whenua

PF Olsen manages TGH Natural Resources Ltd's forestry assets. PF Olsen reports to TGH enabling direct oversight of the operational progress and outcomes within the forest by Iwi representatives. TGH sought a forest management partner who would uphold principles of kaitiaki, taiao and support social procurement initiatives enabling contractors to support and train rangitahi to work on their own whenua.

There is also a Land Management Committee whose role involves facilitation of annual planning on the whenua, incorporating the principles of mana whenua consultation, taiao considerations and protection of waahi tapu and waterway protection. PF Olsen will provide a representative on this committee.

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[1] https://webrear.mbie.govt.nz/theme/gdp-by-industry/map/barchart/2019/otorohanga/agriculture?accessedvia=waikato&left-transform=regionalPercentage&left-zoom=1&right-transform=absolute

Tenure & resource rights

The Kawaroa Forest Cutting Right is owned by TGH Natural Resources Ltd, which is itself a 100% owned subsidiary of Tainui Group Holdings Ltd which is owned by the Waikato Raupatu Lands Trust through its trustee Te Whakakakitenga o Waikato Inc., an investment arm of the Waikato Tainui Iwi. The underlying land is held in an Iwi Trust (see Forest History).

There is a coastal hapu collective seeking mandate over the lands in an area near to but exclusive of the forest area[2]. The collective includes hapu associated with Waikato-Tainui and Maniapoto.

The forest area itself does not currently include any Wahi Tapu areas as notified by that collective.

Neighbours

Adjacent land parcels are being used for extensive pastoral agriculture or small scale lifestyle/agriculture or to the east, are largely or completely indigenous forest cover.

Parties should be consulted when operations are proposed in areas adjacent to their boundaries including cross boundary liaison with Tainui's adjacent farm operations.

[2] https://waikatomaps.waikatoregion.govt.nz/Viewer/?map=ad99a09be104440ea676cca7cdce3b2a

5. Regulations

National Environmental Standard for Plantation Forestry (NES-PF)

The National Environmental Standards for Plantation Forestry are a Resource Management Act regulation. They have replaced most council rules except where the councils may have more stringent rules in accordance with the regulations. The NES-PF applies to forests of greater than 1 hectare, established for commercial reasons and will be harvested.

The regulations are generally based on the Erosion Susceptibility Classification (ESC) of the underlying land. The following table shows the proportion of each forest ESC.

The forests are located on generally low erosion risk land. The majority of the forest activities will be permitted subject to meeting the NES-PF regulations.

No areas of the forest are within, although near, the 'Coastal Marine Area' on the southern boundary of the forest. As Kawaroa Road discharges to and the Kawaroa Stream flows into Kawhia Harbour, managing sediment will be important.

Productive plantation area (ha) within the NES-PF ESC Class

Low	Moderate	Total
114.5	284.3	398.8

Council & Tainui RMA Plans

Kawaroa Forest is within the Ōtorohanga District and the Waikato Region.

Both the Ōtorohanga District Council and the Waikato Regional Council have there own planning documents and associated rules, developed through public process. The Waikato Regional Council plans do not have rules for forestry that are more stringent than the NES-PF.

Under the 2014 Ōtorohanga District Plan:

- Kawaroa is zoned 'Rural'.
- The adjacent indigenous forest on the eastern boundary (some of which falls within the property parcel of Kawaoa Forest) is zoned as Landscape High Amenity Value (LHAV) (Coastal) Mangaora, Mangahanga & Moerangi Natural Areas.
- District Wide rules, section 1.7 states: *Relationship of Rules to Regulations Gazetted under National Environmental Standards:*

  Any activity expressly provided for by regulations gazetted under any National Environmental Standard shall not, unless the regulation states otherwise, be subject to the standards or rules set out in Sections 3 – 24 of the Land Use Chapter of this plan.

Under the Waikato Regional Plan:

- Agrichemical spraying must compy with rules 6.2.4.8 & 6.2.4.9.
- The Waikato Regional Plan maps contain:
  - Karst landforms identified along the south western edge of the Kawhia harbour, however none are adjacent to or under the forest.
  - Two freshwater ecosystems – lakes or wetlands within a tributary stream near, but not within, the south western end of the forest[3].
  - A Biodiversity 'Special Area' wetland adjacent to the true left mid catchment of the Kawaroa Stream external to the forest[4].
  - Streams draining from the northern most section of the reserved indigenous forest are classed as 'Natural State', while Kawaroa Stream and a tributary on the south eastern boundary are classed as 'Priority 1 stock exclusion'.
  - Kawaroa Forest falls within the Waikato's West Coast Catchment Management Zone.

[3] https://waikatoregion.maps.arcgis.com/apps/webappviewer/index.html?id=cd512953486b430c8b0a18ee50c5467a
[4] https://waikatomaps.waikatoregion.govt.nz/Viewer/?map=49a72640c5474484b156d453144044a3

	If any resource consents are required for operations, consideration will need to be given to the Waikato Tainui Environmental Management Plan - Tai Tumu Tai Pari Tai Ao[5]. The requirements for consultation are described in Section 5.5.7.1 of the plan. TGH will be able to provide further specific guidance through the Land Management Commitee.
Consents & authorities held	There are no resource consents or Archaeological Authorities held relevant to Kawaroa Forest . However, a general Archaeological Authority will be obtained due to the proximity of recorded and the potential for discovering archaeological sites within the forest.
Emissions Trading Scheme	Kawaroa Forest titles include Climate Change Response Act notices for Post-1989 and Pre-1990 forest land. The client has assumed responsibility for managing their own ETS obligations, however any harvesting and replanting must be managed in counsultation with TGH Natural Resources Limited to ensure compliance with the ETS. Assistance from PF Olsen may be required in preparing forest emissions returns.

[5] https://waikatotainui.com/wp-content/uploads/2022/08/Waikato-Tainui-Environmental-Plan-2013.pdf

6. How we manage environmental risk

Assessment of environmental risks

The potential for adverse impacts across the range of forest operations and forest sites is indicated in the Environmental Assessment matrix below.

- At risk are the environmental values
- The level of potential risk is rated high 'H', medium 'M' or low 'L', or not applicable 'NA' (blank)
- These ratings indicate the level of care required to minimise the potential for adverse effects, which translate into performance standards in prescriptions.

Environmental assessment of effects

Values and Risks Forestry Operational Activities	Environmental values											
	Erosion & Sediment	Water Quality	Soil Conservation & Quality	Air Quality	Aquatic Life	Indigenous Fauna & Threatened Species	Indigenous Vegetation	Historic & Cultural Values	Landscape & Visual Values	Neighbours	Public Utilities	Recreational Values
Harvesting	H	M	H		M	H	M	M	L	M	M	M
Earthworks	H	H	H		M	M	L	H	L	L	L	L
Slash Management	H	H	H		H	L	L		L	L	H	L
Stream Crossings	M	M	M		L		L			L		
Mechanical Land Preparation	L	M	L		L	L	L	H	L			
Burning	M	M	M	H	L	H	M	L	H	H	L	H
Planting	L		L			L	L	M	L	L	L	
Tending		L								L	L	
Fertiliser Application		H		L	H					L	L	L
Agrichemical Use	L	H		H	H	M	M			H	H	H
Oil & Fuel Management		H	L		H		L			L	L	
Waste Management		L			L		L	L	L	L		L
Forest Protection		L			L	L	L			L		L

Infrastructure damage or service disruption	There are no identified infrastructure utilities within the forest boundary. There are private buildings within 45-150 m of the south eastern forest boundary, separated from the forest by Kawhia Road (public). Those buildings are very close to the Kawaroa Stream and another small un-named stream. Consideration of these buildings and the Kawhia Road bridge over the Kawaroa Stream is needed in relation to slash management and any river crossing points in tributaries of the Kawaroa Sream. See Regulation 43 of the NES-PF.
Pests and diseases	The Waikato Regional Pest Management Plan (RPMP) 2022-2023 includes a number of pest species that are or may be present in the forest[6]. RPMP Status - Eradiction Objective: *Over the duration of the Plan, reduce the level of infestation of the weeds and animal pests within the Waikato Region to zero density to prevent adverse effects and impacts as identified.* Evergreen buckthorn Mile -a-minute Varigated thistle Rook RPMP Status - Progressive Containment Objective: *Over the duration of the Plan, contain and where practicable progressively reduce the geographic distribution or extent of the weeds within the Waikato Region to pre-2022 levels to reduce further adverse effects and impacts as identified.* Chocolate Vine Climbing Spindlebery Lantana Old man's beard All wilding conifers

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[6] https://www.waikatoregion.govt.nz/assets/WRC/WRC-2019/RPMP/RPMP-2022.pdf

...continued

RPMP Status - Sustained Control

Objective: *Over the duration of the Plan, sustainably control the weeds within the Waikato Region to ensure that land free of or being cleared of weeds does not become infested to prevent adverse effects and impacts.*

Banana passionfuit
Broom
Gorse (*Present-confirmed by survey*)
Pampas (*Present-confirmed by survey*)
Ragwort
Nodding thistle
Tutsan
Wild ginger
Wooly nightshade

Objective:

Brushtailed possum: *to control possum within priority control areas*
Feral rabbit: *control to level 4 or below on the Modified McLean Rabbit infestation scale 2012.*

None of the weed species identified as present in Kawaroa Forest were considered an ecological threat to the indigenous reserve areas[7], but will be subject to periodic control along boundaries, during replanting preparation and roadside maintenance. Another weed species 'Mexican daisy' was aslo confirmed as present.

Within the indigenous vegetation, the Wildlands ecological survey identified herbivory pressure from goats as being the primary pest animal adversely impacting these forest areas. (See Appendix 4 for management activities)

Fire

Kawaroa Forest is within the Fire and Emergency NZ (FENZ) Waikato Central Zone[8]. The plan references the thresholds for fire restriction levels and the coordination of forestry risk management responses between forest owners/managers and FENZ.

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[7] Natural Area Survey and Assessment of High Conservation Value Areas of Kawaroa Forest. Contract Report 6602. Wildlands 2022.

[8] https://fireandemergency.nz/assets/Documents/fire-plan/Waikato-Fire-Plan-2021-2024-approved.pdf

7. Commercial Plantation Estate

Forest area

The net stocked areas have been measured from mapping produced by PF Olsen.

Forest area

Forest	Total Forest Area (ha)	Net-stocked area (ha)	Cutover (ha)	Reserves (ha)
Kawaroa[9]	552.1	332.1	65.9	154.1

Current crop

Kawaroa Forest is predominantly radiata pine, planted in 1996-97. At that time, Radiata pine was selected as it was the most commercially viable species. Just under 12 ha is planted in *Cupressus lusitanica*.

Radiata pine will remain the dominant species to be utilised for resocking after harvest as it remains the most commercially viable species for NZ conditions at present.

Productivity indices

Site index is used to measure of productivity of a site in terms of height growth of radiata pine. The parameter used is the mean height in metres of the largest 100 trees per hectare at age 20 years. Models predict this height given a measured height at any age.

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

Productivity indices

Forest	Site Index (m)	300 Index (m^3)
Kawaroa	30-35	27.5 - 32

Tree nutrition

The soils are not generally deficient in nutrients for healthy tree growth.

[9] Note: the areas of stocked, cutover awaiting replanting and reserves do not add to the Gross forest (property) area due to the areas of open grassland, roads and skids

Tending

Kawaroa Forest has has been tended as a clearwood, pruned forest, with both the radiata and cypress pruned and thinned mostly between 2004 & 2005.

The intention by the owners is that the future silvicultural regime will be reviewed following replanting to ensure it remains appropriate to maximising commercial returns and other objectives.

8. Harvesting Strategy

Harvesting strategy

By agreement with the forest owner, the strategy for harvesting Kawaroa Forest is to maintain one full time crew, which has associations with the Tainui iwi, more or less uniformly through to the completion of the harvest.

Clearfell age will be between 25 & 26 years for radiata pine with approximately 31% of the harvested wood volume expected to go to local domestic processors. Very small quantities of *Cupressus lusitanica* will be harvested during roadline salvage. Otherwise these areas are too young for harvest.

The planned harvest for radiata beyond the end of 2022 is listed below:

Annual harvest (ha)	2023	2024	2025	2026	2027
47 ha by Dec 2022	137	122	42	-	-

Infrastructure

A partial layout of road and access infrastructure in Kawaroa Forest exists and by the end of 2022 a total of 3 km of existing road will have been upgraded with a further 2.5 km and 9 landings and 2 pads anticipated to have been constructed.

The forward work programme for road engineering planned to service the total forest harvest is:

Year	2023	2024	2025	2026	2027
Road upgrade (km)	-	-	-	-	-
New road (km)	2.95	1.65	-	-	-
Landings	9	6	-	-	-
Pads	1	-	-	-	-

9. Indigenous Biodiversity

Protected ecosystems

Within the property boundary two indigenous vegetation areas, totalling 140 ha, were identified plus small areas of exotic herbfield and grassland on the flood paths adjacent to Kawaroa Stream and other tributaries.

	Vegetation group	Description	Threatened Environment Classification	Ecological ranking
1	(Rimu), (Halls totara)/tawa – rewarewa-kohekohe-(pukatea).	Highly diverse lowland tall forest.	Approx. half area classed as "underprotected" half as "less reduced and better protected".	Larger area contiguous with large external block of well developed forest. PF Olsen FSC Group Scheme protection class 'Full'.
2	Kanuka forest.	Kanuka dominant canopy with broadleaf shrub hardwoods and tree ferns.	Classed as "less reduced and better protected".	Small, fragmented areas, mainly kanuka & shrublands, modified through past landuse and browsing pests. PF Olsen FSC Group Scheme protection class 'Limited'.
3	Other herbfields & grasslands.	Exotic riparian herbfields & grasslands.		NA – Some potential for restoration/enhancement.

Of the reserve areas, 74% is the 'Full' protection class under the Group Scheme. This means that specific efforts are made to avoid damage from plantation forestry operations, and that where practical, the forests ecology is enhanced, e.g.through pest control (See Appendix 4 for the ecological management activities for the reserve areas).

Protected ecosystem & reserve areas by protection category

Forest	Full	Limited	Other Reserve	Total (ha)
Kawaroa	114.6	25.2	14.3	154.1
	74%	16%	9%	100%

As a large area of 'Full' protection forest is contiguous with and a smaller part of a Council designated 'Landscape High Amenity Value' area, effective pest control will be very dependant upon whether joint cross boundary effort can be arranged. As the 'Full' protection forest area is an external boundary to the plantation forest, protecting it from damage will be achieved by normal good forestry practice.

Threatened species

The ecological survey by Wildlands Ltd[10] identified a number of threatened flora and key fauna that are, or potentially could be, within the boundaries of Kawaroa Forest.

Mānuka and kānuka are also listed as threatened but this is a precautionary response to the threat of myrtle rust, not because of any rarity in the species. Conversely myrtle rust was observed on ramarama and care should be taken to avoid any areas containing this plant.

No rare or threatened birds were located in Kawaroa Forest at the time of the survey, however other records from the area suggest they could be present. The Kawau tūī/Little Black Shag, Kawaupaka/Little Shag and Māpunga/Black Shag could use trees along the southern end of the forest close to the Kawhia estuary and or the lower Kawaroa Stream. It is likely that kārearea/NZ falcon will also inhabit the forest, with the likelihood increasing as harvesting progresses (providing more favourable hunting and breeding habitat).

Ecological management activities for the reserve areas are summarised in Appendix 4. Appendix 3 lists other bird species recorded in the NZ ornothorlogical Society database[11] from the immediate vicinity of the forest at Kawhia inlet. While seabirds are close-by, to the south edge of the forest, they are unlikely to make more than transient use of the forest. Other common birds can be expected within the forest on a regular basis.

Overview of flora and fauna in Kawaroa Forest

	Species	Status
Flora	Aka	Threatened -Nationally Vulnerable
	White rātā/Metrosiderous diffusa	Threatened -Nationally Vulnerable
	Rātā	Threatened -Nationally Vulnerable
	Ramarama	Threatened -Nationally Critical
Fauna	Mātātā /Fernbird	At risk -Declining
	Pūweto/Spotless crake	At risk -Declining
	Kawau tūī/Little Black Shag	Natually uncommon
	Kārearea/NZ falcon	Nationally vulnerable

iNaturalist[12] (Biodiversity in Plantations) will be used to record sightings of important indigenous fauna or flora discovered in the forest.

[10] Natural Area Survey and Assessment of High Conservation Value Areas of Kawaroa Forest. Contract Report 6602. Wildlands 2022.
[11] https://ebird.org/newzealand/hotspot/L4404916
[12] https://www.inaturalist.org/projects/biodiversity-in-plantations

A number of lizard species have been located in forest and scrubland areas in the broad vicinity of Kawaroa Forest and may be present within Kawaroa Forest. As most have 'At risk - declining' status, particular care should be taken to avoid physical damage to planation forest/ shrubland interface margins.

The species that may be present are listed below. Ecological management activities for these potential species are summarised in Appendix 4.

Herpetofauna potentially within Kawaroa Forest

Species	Threat Status	Habitat
Forest gecko	At risk - Declining	Indigenous forest and shrublands
Elegant gecko	At risk - Declining	Indigenous forest and shrublands
Pacific gecko	Not threatened	Indigenous forest and shrublands
Copper skink	At risk - Declining	Indigenous and plantation
Hochstetter's frog	At risk - Declining	Upper stream reaches and seeps in undisturbed catchments

Bats have been recorded in the vicinity of Kawaroa Forest. Pekapeka/Long-tailed Bats (*Chalinolobus tuberculatus*; Threatened–Nationally Critical). Kawaroa Forest is within 13 km of a cluster of Long-tailed Bat records located on the eastern side of Pirongia Forest Park. Central Lesser Short-tailed Bats (*Mystacina tuberculata rhyacobi*; At Risk-Declining) are also present within 8.5-12 km of the forest. Based on the available habitat and known records of long-tailed bats, it is likely that long-tailed bats use Kawaroa Forest for foraging and roosting.

Stream protection and riparian setbacks

Within Kawaroa Forest there are a number of streams some of which drain westward to the Mangaora Stream and some eastward into the Kawaroa Stream. Both of these streams flow into the Kawhia estuary.

The combined length of these streams within the forest is a little over 4 km. They fall into the Rivers Environments Classification (REC) categories as listed below, with the recommended minimum riparian setbacks from each bank and the FSC required setbacks.

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Stream class	Width	Length	Minimum setback	FSC setback
Very small	0–0.75 m	0.01 km	5 m	10 m
Small	0.75–1.5 m	3.06 km	5 m	10 m
Medium	1.5– 3.0 m	0.94 km	5 m	10 m

Most of the moderate sized streams are low gradient streams running over relatively hard geology while 60% of the small streams are moderate gradient headwater streams.

A small stream near Gully Road provides opportunities for redesigned / improved riparian protection.

Tailored stream setbacks are needed to maintain high water quality and meet wider enhancement and restoration objectives, including establishment of small wetlands. This is based on the:

- streams flowing into Kawhia harbour,
- clay soils that are naturally prone to permanent colloidal suspension of fine sediments
- low gradient passage of the streams through deep wet soils in the valley floors.

In addition to meeting, at a minimum, the required FSC setbacks, specific plans for each catchment including post harvesting replanting planning will need be developed in conjunction with Tainui representatives, (See summary - Appendix 4).

Fish

Fish species likely to be within the forests have been identified from the NES-PF Fish Spawning Indicator tool[13] and Freshwater Environments New Zealand. Further information from the Wildlands ecological survey added to the list of fish species and aquatic invertebrates that may be present in the streams.

Key ecological management activities are outlined in Appendix 4.

Species	Probability	Group	Spawning
Redfin Bully	62%	'A ' diadromous	01/08 – 31/10
Longfin eel	high	'A ' diadromous	NA
Shortfin eel	high		
Common bully	high		
Banded Kokopu	moderate		
Short-jawed kokopu	moderate		
Koaro	moderate		
Inanga	moderate		
Common smelt	moderate		
Freshwater shrimp	moderate		
Koura	moderate		

High Conservation Value (HCV) Forests

The Natural Area survey conducted by Wildlands Consultants Ltd found no reserves met the HCVF criteria.

[13] https://www.mpi.govt.nz/forestry/national-environmental-standards-plantation-forestry/fish-spawning-indicator/

10. Other Special Values: Everything but the timber

Recreational use

Any access provided for public use is a matter of discretion for TGH and the Land Management Committee.

The forest may be used for recreation and hunting by Iwi members subject to safety requirements and conditions specified by TGH and the Land Management Committee. TGH require applicants seeking access for hunting or other matters to submit an application and undergo an induction process[14]. The application will then be referred to the Land Management Committee who will approve/decline the application subject to further approval /liaison protocols with PF Olsen as the site manager.

Following the intent of the Outdoor Access Code[15], published by Herenga ā Nuku - Outdoor Access Commission, and any signage / barriers in place within the forest, is expected behaviour.

Closures will also apply during times of high fire risk, any *force majeure* state and during forestry operations.

Any approved access is subsequently managed through the PF Olsen forest access permit system.

Public access roads

There are no formed or unformed public roads, easements or esplanade reserves (marginal strips) within or adjacent to the property boundary. Refer to the Herenga ā Nuku - Outdoor Access Commission website[16].

Other special values

There are currently no other ancillary commercial or non-commercial use within the forest. Granting of any such requests would be a matter for TGH Ltd and, if agreed through their Land Management Committee, subject to the liaison and permitting process described for recreational usage and any other legal use Agreements as may be required by either TGH Ltd or PF Olsen (within a safety and fire management context).

[14] Embedded within "Systemsafe 365"

[15] https://www.walkingaccess.govt.nz/assets/Publication/Files/Outdoor-Access-Code/0fcf4d2e5b/Outdoor-Access-Code.pdf

[16] https://maps.walkingaccess.govt.nz/Viewer/?map=b1d1e76a6c754d11b3f3fd9dfce1eb12

Non-Timber Forest Products

There are no FSC certified non-timber forest products[17] from Kawaroa Forest.

11. Future Planning

Plan changes & reviews

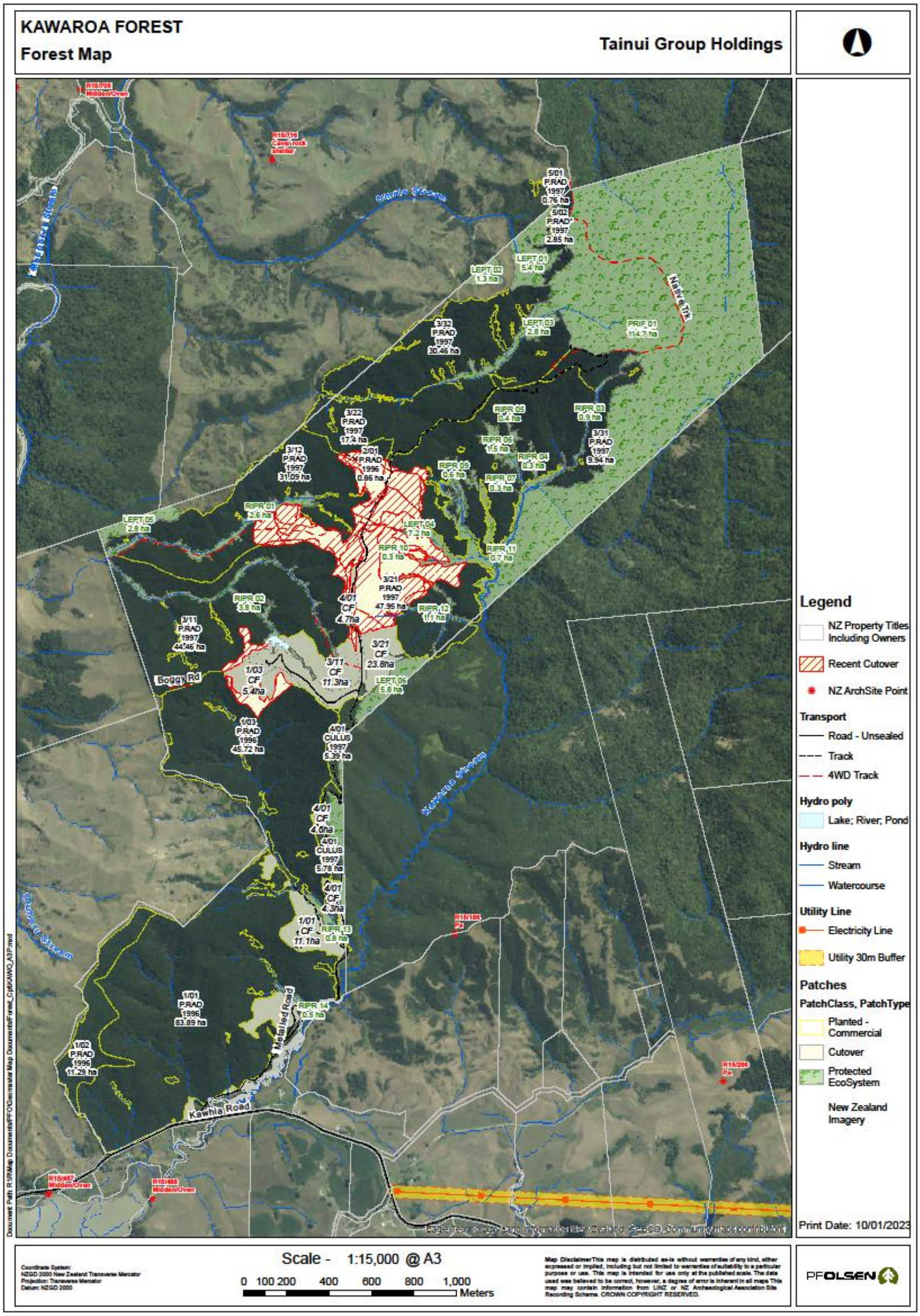
The next major review date for this plan is March 2028.

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

Change	Date	Section/Page

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

Appendix 1: Forest Map



Appendix 2: Forest Neighbours

Not Publicly Available

Appendix 3: Bird Species possible within or around Kawaroa Forest

57 Checklists | 12 Atlasers | **60 Species**

Species observed

SPECIES	LOCATION	DATE
Pied Stilt	Morrison/Aotea Rds	11 Aug 2022
South Island Oystercatcher	Morrison/Aotea Rds	11 Aug 2022
Kelp Gull	Morrison/Aotea Rds	11 Aug 2022
White-faced Heron	Morrison/Aotea Rds	11 Aug 2022
New Zealand Fantail	Morrison/Aotea Rds	11 Aug 2022
Welcome Swallow	Morrison/Aotea Rds	11 Aug 2022
Silvereye	Morrison/Aotea Rds	11 Aug 2022
Common Chaffinch	Morrison/Aotea Rds	11 Aug 2022
Graylag Goose	5416 Kawhia Rd	11 Aug 2022
Canada Goose	5416 Kawhia Rd	11 Aug 2022
Black Swan	5416 Kawhia Rd	11 Aug 2022
Australasian Swamphen	5416 Kawhia Rd	11 Aug 2022
Masked Lapwing	5416 Kawhia Rd	11 Aug 2022
Tui	5416 Kawhia Rd	11 Aug 2022
European Starling	5416 Kawhia Rd	11 Aug 2022
Common Myna	5416 Kawhia Rd	11 Aug 2022
Song Thrush	5416 Kawhia Rd	11 Aug 2022
Eurasian Blackbird	5416 Kawhia Rd	11 Aug 2022
House Sparrow	5416 Kawhia Rd	11 Aug 2022

11/17/22, 2:09 PM AO68 - New Zealand Bird Atlas

SPECIES	LOCATION	DATE
European Goldfinch	5416 Kawhia Rd	11 Aug 2022
Yellowhammer	5416 Kawhia Rd	11 Aug 2022
Sacred Kingfisher	5225 Kawhia Rd	11 Aug 2022
Swamp Harrier	260 Aotea Road, Kawhia, Waikato, NZ (-38.031, 174.841)	1 May 2022
Variable Oystercatcher	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	30 Apr 2022
Double-banded Plover	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	30 Apr 2022
Bar-tailed Godwit	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	30 Apr 2022
Caspian Tern	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	30 Apr 2022
Little Pied Cormorant	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	30 Apr 2022
Pacific Reef-Heron	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	30 Apr 2022
Royal Spoonbill	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	30 Apr 2022
White-fronted Tern	Aotea - Tahuri Point	30 Apr 2022
Gray Gerygone	Aotea Harbour - Okapu	30 Apr 2022
Mallard	Aotea Harbour--Te Kowiwi Creek	30 Apr 2022
Ring-necked Pheasant	Aotea Harbour--Te Kowiwi Creek	30 Apr 2022
Australasian Bittern	Aotea Harbour--Te Kowiwi Creek	30 Apr 2022
Eastern Rosella	Aotea Harbour--Te Kowiwi Creek	30 Apr 2022
California Quail	Aotea Township	30 Apr 2022
Morepork	Aotea Township	30 Apr 2022
New Zealand Grebe	Kawhia - Lake Parangi	29 Apr 2022
Great Cormorant	Kawhia - Lake Parangi	29 Apr 2022
European Greenfinch	Kawhia--Ghost Lake	29 Apr 2022
Indian Peafowl	Auto selected	28 Apr 2022
Wild Turkey	Auto selected	28 Apr 2022
New Zealand Pigeon	Auto selected	28 Apr 2022
Paradise Shelduck	Auto selected	28 Apr 2022
Pied x Black Stilt (hybrid)	Aotea Harbour--Makomako Inlet	28 Apr 2022

11/17/22, 2:09 PM AO68 - New Zealand Bird Atlas

SPECIES	LOCATION	DATE
Pied Cormorant	Aotea Harbour--Makomako Inlet	28 Apr 2022
Silver Gull	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	27 Apr 2022
Australasian Gannet	Aotea village waterfront	27 Apr 2022
Australian Magpie	Aotea village waterfront	27 Apr 2022
Mallard x Pacific Black Duck (hybrid)	Kawhia--Ghost Lake	7 Nov 2021
New Zealand Scaup	Kawhia--Ghost Lake	7 Nov 2021
Shining Bronze-Cuckoo	Morrison Road, Kawhia, Waikato, NZ (-38.024, 174.839)	7 Nov 2021
New Zealand Falcon	Morrison Road, Kawhia, Waikato, NZ (-38.024, 174.839)	7 Nov 2021
New Zealand Fernbird	Morrison Road, Kawhia, Waikato, NZ (-38.024, 174.839)	7 Nov 2021
Australasian Shoveler	Kawhia--Ghost Lake	24 Apr 2021
Eurasian Skylark	Kawhia--Ghost Lake	24 Apr 2021
Spotless Crake	Kawhia Rd. @-38.043893, 174.830205	23 Apr 2021
Gray Teal	Kawhia--Ghost Lake	18 Apr 2021
Eurasian Coot	Lake rd	2 Mar 2021
Pacific Black Duck	NZ-Waikato-Kawhia-Lake Road (-38.042, 174.821)	11 Oct 2020
Little Tern	Aotea Harbour--Waitetuna Bay/Morrisons Shellbank	23 Feb 2020

Note: Yellow highlights indicate sighting locations closest to Kawaroa Forest.

Appendix 4: Schedule of Ecological Management

Review Date:

Timing	Objective	Target	Activity	Action detail	Date completed
Immediate and on-going	**Indigenous Forest ecosystem health** Protected Area 1 & plantation	Reduce animal grazing/damage 1 - goat 2 – possum	Liaise and if possible integrate ground control or aerial control with adjacent 3rd parties.	As indigenous areas are connected to much larger neighbouring indigenous forest, effective suppression/reduction of goats at landscape level will only be successful if control is more widely integrated with the Regional Council/Department of Conservation. The priority is to meet with 3rd parties to arrange an integrated management approach for goats and possum. If this cannot be achieved, then focus on internal forest boundaries with localised temporary pest suppression. Record Kill returns, RTC (possum) and RTI (rat) in PF Olsen database.	
2023 – then repeat 3 yearly	**Indigenous Forest condition monitoring**	Major forest area Protected Area 1. Any restoration areas	Drone monitoring	Drone flyovers to undertake repeat (approximate same time of year and day) pre-programmed strip or point imagery monitoring to facilitate long term trend evaluation of indigenous forest or restoration area condition. Inform management response if required.	
2023 and new crews as required	**Threatened Flora Identification & protection** (See Rare & threatened species section)	Protect within the plantation & margins	Train crews Provide identification resources	Include photos of species in rare species ID posters and train (during inductions) crews to be alert for presence of threatened species and to avoid damage within operational areas. Record any sightings in iNaturalist database.	

Date due	Objective	Target	Activity	Action detail	Date completed
2023 – then repeat 5 yearly	**Fish & Frogs** Confirm presence of threatened species	fish / Hochtsetter's frog presence	eDNA tests.	Undertake eDNA water testing in 2 Kawaroa Forest streams to establish aquatic / amphibious / riparian terrestrial rare species presence. Record any sightings in the iNaturalist database. If threatened species are discovered, review existing harvest riparian management methods in consultation with Tainui representatives and ecological advice if required. Ensure minimal to no in-stream disturbance during spawning period for redfin bully or others if identified.	
Nov-Mar 2023-24	**Bats** Confirm species presence	Bats	Deploy bat boxes.	Deploy bat detection boxes along the two wider stream valleys in Kawaroa Forest (2 on a Mangaora tributary and 3 on Kawaroa Stream/tributaries) prior to harvesting to determine presence or otherwise of bats. Record any sightings in the iNaturalist database. If bats are discovered, apply forestry bat management protocols and review existing harvest sequence in consultation with Tainui representatives and ecological advice if required.	
Ongoing	**Birds** Protect if present	Kawau tūī/Little Black Shag Kawaupaka/Little Shag Māpunga/Black Shag kārearea/NZ falcon	Sighted / discovered	Record any sightings in the iNaturalist database. Report sightings to Tainui representatives. Apply relevant forest management protocols (e.g. NZ Falcon Management Guide – Plantation Forestry)	

Date due	Objective	Target	Activity	Action detail	Date completed
Ongoing	**Birds** Protect if present	Kawau tūī/Little Black Shag Kawaupaka/Little Shag Māpunga/Black Shag kārearea/NZ falcon	Sighted / discovered	Avoid damage to clearly utilised roost / perch trees and in consultation with Tainui implement measures to protect. Record any sightings in the iNaturalist database. Report sightings to Tainui representatives.	
Nov-Mar 2023-24	**Lizards** Confirm Species presence	Lizards	Specific survey ahead of harvest in the plantation/ indigenous shrubland interface	Undertake an ecological survey in the summer ahead of harvest. Record any sightings in the iNaturalist database. If any lizards are discovered, review the existing harvest sequence and practical pest protection or relocation option in consultation with Tainui representatives and ecological advice.	
2024 and ongoing as agreed	**Riparian Ecosystem/ water quality**	Selected wet valley floor infills – mainly areas consisting of depleted and long grass vegetation	Indigenous vegetation infill planting and riparian setback expansion	Develop post-harvest site management plans in consultation with Tainui representatives to identify areas that could be enhanced with supplementary planting of indigenous species and widened riparian setbacks.	
Annually 2023, 2024 & 2025 - then 4 yearly	**Riparian Ecosystem/ water quality**	Selected wet valley floor infills – mainly areas consisting of depleted and long grass vegetation	Monitoring	Monitor by way of photo points the treated / planted sites for weed control and regeneration.	

Date due	Objective	Target	Activity	Action detail	Date completed
2023 progressive	**Streams**	water quality	Plan and implement	Develop and implement in consultation with Tainui representatives, specific added initiatives sought to protect in-stream water quality and the receiving waters of Kawhia estuary.	