Meridian FFP Biodiversity Project: Litherland, Rapaki, and Makara M&P Sites



Consulting Report Series
July 2026

Meridian FFP Biodiversity Project: Litherland Site Scoping

PREPARED BY:

Ekos
PO Box 19, Christchurch 8140
New Zealand

NZBN 9429048527453



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1 INTRODUCTION

This report examines the option to upgrade the biodiversity monitoring and biodiversity conservation management interventions at this site to enable biodiversity reporting compatible with the Nature Based Performance Framework (NbP) and associated alignment with:

- The Dow Jones Best in Class Index.
- Taskforce for Nature-related Financial Disclosures (TNFD).
- Environmental Institute of Australia and New Zealand (EIANZ).

This assessment evaluates the site's current biodiversity values, landscape context, and ecological restoration trajectory, including the biodiversity benefits generated through Forever Forests Project activities. The report considers existing:

- Land management interventions compatible with biodiversity enhancement.
- Biodiversity habitat values.
- Land cover characteristics including adjacent ecosystems.
- Biodiversity monitoring.

It then presents options to upgrade activities to bring the measurement, reporting and verification of biodiversity benefits into line with NbP. This material will be updated to include FFP NbP data for this site where relevant.

The measurement, reporting and verification (MRV) framework for this assessment and recommended for biodiversity reporting is the MRV system of the Ekos BioCredita programme – a biodiversity MRV system developed by Ekos and in line with project-based MRV protocols in the international voluntary nature markets. The BioCredita MRV framework is based on the following architecture:

Report	Description	Purpose	Assurance	Timing
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Fundamental to the BioCredita MRV system is the need to compare biodiversity benefits in the Baseline Scenario (without the FFP project) and in the Project Scenario (with the FFP project).

This report comprises a draft Project Idea Note (PIN) and has the following structure:

- Project purpose.
- Description of project area.
- Problem, cause, and solution.
- Baseline Scenario.
- Project Scenario.
- Third-party verification.

2 PROJECT PURPOSE

The purpose of this biodiversity conservation project is to convert degraded grassland used for marginal pastoral farming to tall indigenous forest. The primary purpose is to restore habitat for

indigenous plant and animal species in the project area and contribute to the New Zealand Biodiversity Strategy and Action Plan (NBSAP) as well as Meridian Energy's corporate biodiversity reporting.

Litherland is a partnership site between Meridian Energy Limited and Mark Litherland. The objective at Litherland site is to maintain a permanent oak forest for carbon sequestration potential and production of oak products.

3 DESCRIPTION OF PROJECT AREA

3.1 Location

The Litherland project site (Figure 3.1) is located on the Mohaka River, Hawkes Bay. Litherland site occupies an area of 212 hectares on a mixture of high-relief hill country, rolling foothills and sheltered valleys. This site receives high annual rainfall and mild temperatures throughout the year.

Figure 3.1. Location of Litherland site.



3.2 Land Cover

Figure 3.2. Land cover database (LCDB) land classification of the Litherland site.

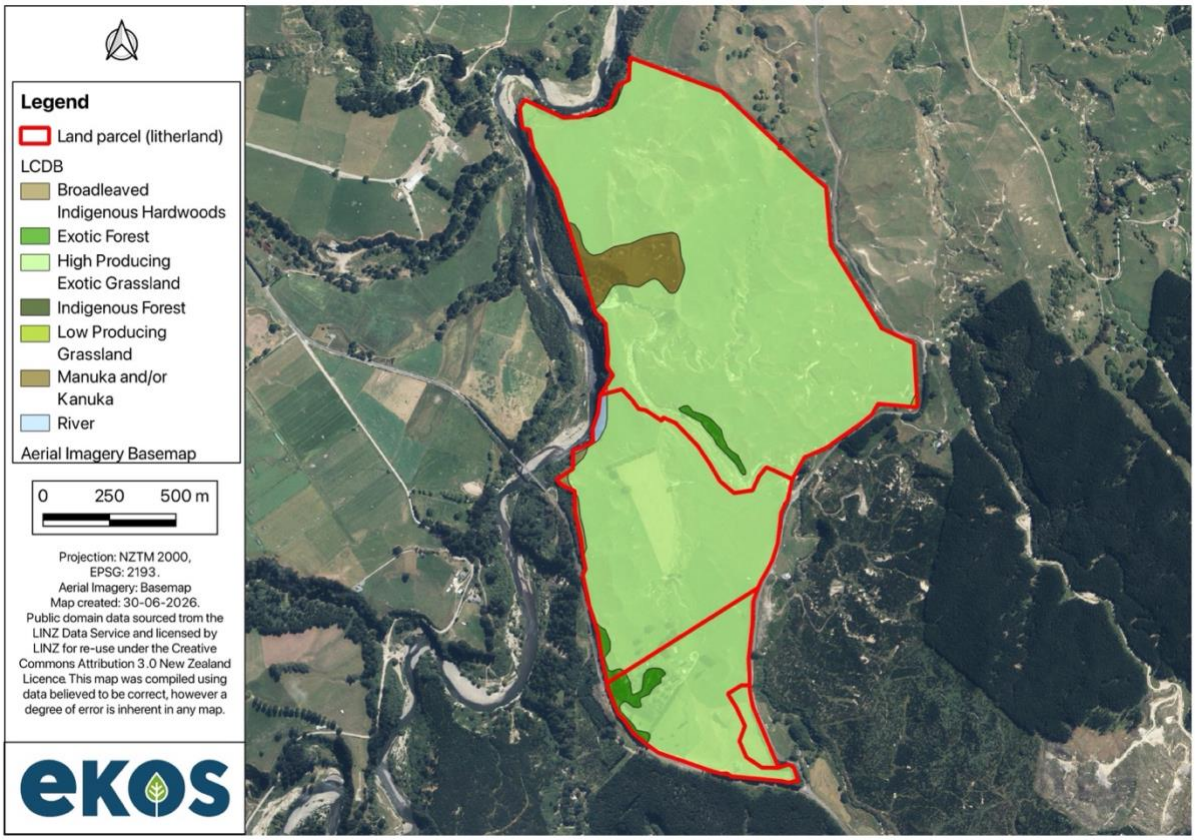


Figure 3.2 presents the Land Cover Database (LCDB) classifications recorded within the Litherland Site based on the most recent LCDB dataset (2023). The site is classified predominantly as high producing exotic grassland, with smaller areas of mānuka and/or kānuka shrubland and indigenous forest.

This classification reflects the land cover present at the time of LCDB mapping and indicates a landscape that was largely managed for pastoral production, with high producing exotic grassland occupying the vast majority of the site. The limited areas of mānuka and/or kānuka and indigenous forest are largely confined to small patches associated with steeper terrain, shelter vegetation, and margins adjoining the river corridor. The dominance of productive pasture is consistent with the site's historical use for agricultural purposes and reflects a relatively low level of woody vegetation cover across the property at the time of mapping.

The timing of this LCDB dataset coincides with the Baseline Scenario for the project (i.e., the biodiversity status of the project area used for project assessment purposes). However, portions of the site had already been established in oak forest during planting programmes undertaken in 2020 and 2021. These plantings are not reflected in the current LCDB classification, which continues to classify much of the site as high producing exotic grassland. Any vegetation establishment, restoration planting, or land cover changes that have occurred since the 2023 LCDB assessment may not be reflected in the current classification and should be considered when interpreting the site's present-day ecological values. LCDB categories determined at this site are shown in Table 3.2 below.

Table 3.2 Land cover classification of project site.

Land Cover Classification	2023 Area (ha)
River	0.74
Broadleaved Indigenous Hardwoods	0.72
Exotic Forest	3.63
High Producing Exotic Grassland	200.51
Low Producing Grassland	0.11
Indigenous Forest	0.22
Deciduous hardwoods	0.00
Manuka/Kanuka	6.92
Total area (ha)	**212.85**
Indigenous Forest area (ha)	**7.86**

3.3 Proximity to Critical Biodiversity

Surrounding land uses and land classification is relevant to a biodiversity assessment because it provides a context for the site in question. Such a context can include the availability of local seed sources for indigenous vegetation and local indigenous bird and other animal populations that could populate the site.

Figure 3.3. LCDB surrounding Litherland site.

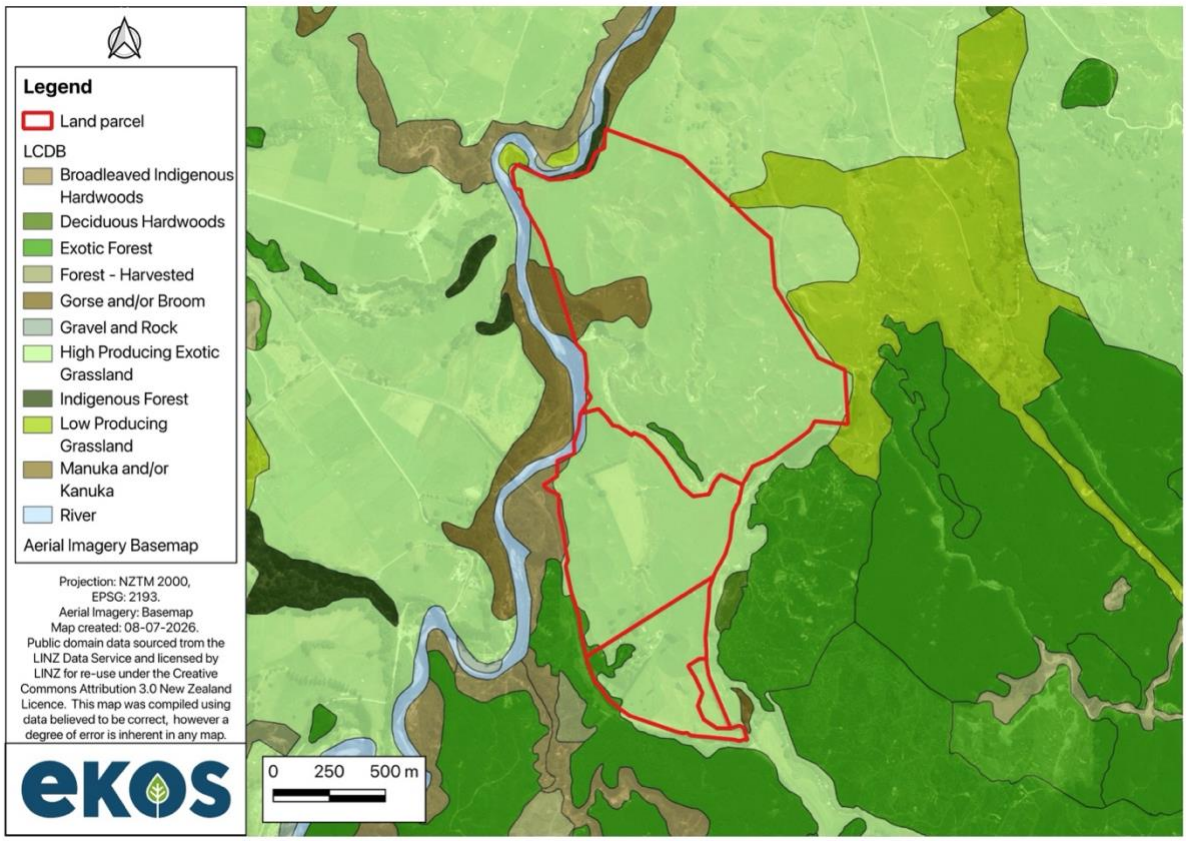


Figure 3.3 shows the LCDB classifications surrounding the Litherland Site. The dominant land cover classes are high producing exotic grassland, exotic forest, and low producing grassland.

The Litherland Site is situated within a predominantly pastoral and forested landscape characterised by extensive areas of high producing exotic grassland across the valley floor and large tracts of exotic forest occupying the surrounding hill country. Mānuka and/or kānuka shrubland, broadleaved indigenous hardwoods, and smaller areas of gorse and/or broom are distributed along river margins and throughout the surrounding area, indicating a range of successional stages and land management histories. The river corridor adjoining the western side of the site is associated with pockets of woody vegetation and shrubland that contribute to landscape diversity and ecological connectivity. The landscape exhibits a moderate to high degree of vegetation diversity, with productive grasslands concentrated across flatter valley-floor environments and indigenous forest dominating the steeper and less modified hill country.

Overall, the surrounding land use is characterised by a mixture of pastoral farmland, exotic forestry, regenerating woody vegetation, riparian habitats, and mature indigenous forest, creating a diverse rural landscape with strong ecological linkages between forested and riverine environments.

3.4 Protected Areas

The protected area status of the site (derived from the PAN-NZ and Fish Spawning Habitat Layer) is shown in Figure 3.4.

Figure 3.4 Protected Areas Network & Fish Spawning Habitat Map.

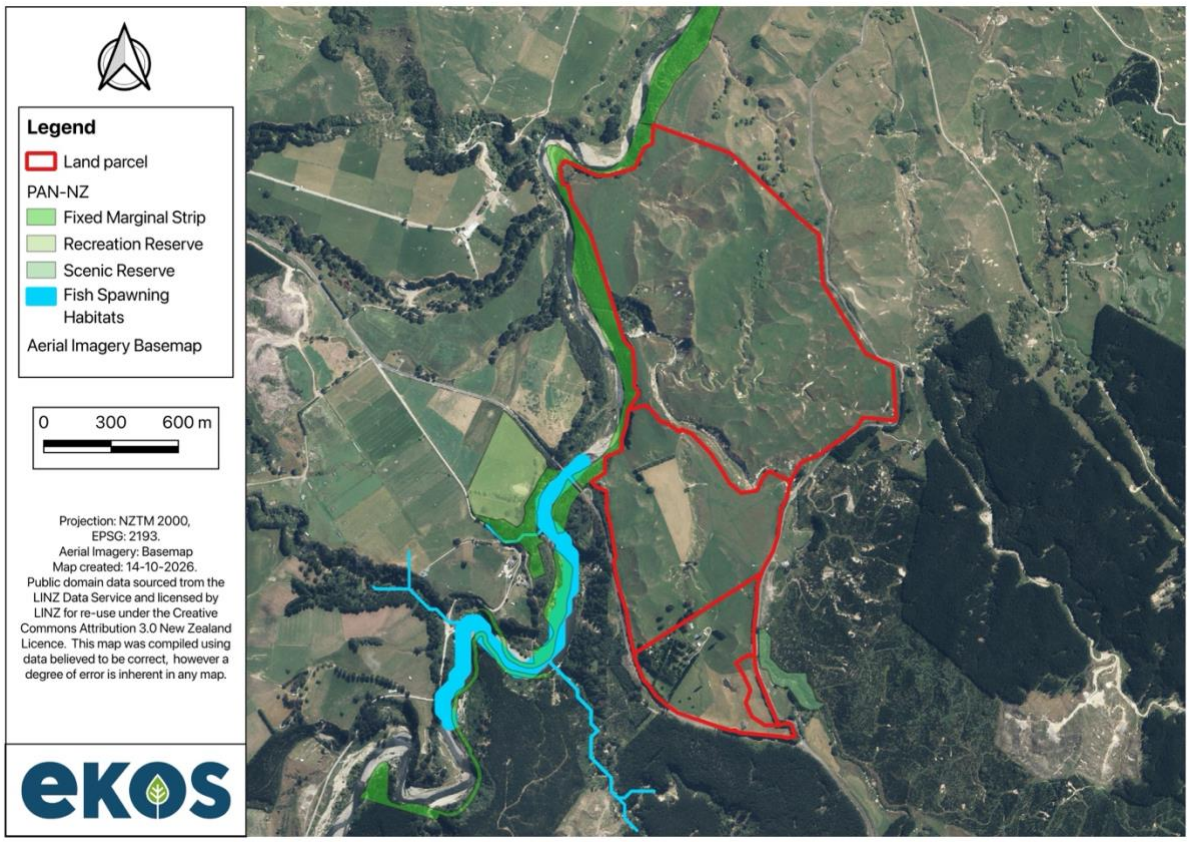


Figure 3.4 presents the Protected Areas Network (PAN-NZ) and Fish Spawning Habitat surrounding the Litherland Site. This demonstrates that there are areas of significant biodiversity within 2km of Litherland site. The site is adjoined by a number of protected areas, with Fixed Marginal Strips occurring along sections of the river corridor immediately west, north, and south of the property. Smaller protected areas, including Scenic Reserves and Recreation Reserves, are also present

in close proximity to the site, particularly along the river margins and within the surrounding landscape.

The close proximity of these protected areas indicates that the Litherland Site is situated within a broader network of protected freshwater and terrestrial environments. The Fixed Marginal Strips associated with the river corridor provide protected riparian habitats and contribute to ecological connectivity through the wider landscape. The presence of nearby Scenic and Recreation Reserves further enhances the conservation context of the area and increases the potential for linkages between habitats within the site and surrounding protected lands.

Overall, the protected areas surrounding the Litherland Site contribute to a landscape with existing conservation values and may enhance the site's potential to support landscape-scale biodiversity outcomes through improved connectivity with adjacent protected habitats

3.5 Existing Habitats

This site has the following existing habitats:

- Exotic grassland.
- Young native forest.
- Small areas of mature native forest.
- Gorse shrubland.
- Deciduous hardwoods.

Within these habitats, the following biodiversity features have been observed:

- Some sightings of native bird species (but no systematic native bird monitoring).
- Indigenous vegetation communities containing predominantly beech species.
- Insect and fungal life on the oak trees.

The presence of young native forest, small areas of mature native forest, exotic grassland, gorse shrubland, and deciduous hardwood habitats provides habitat for a range of indigenous flora and fauna and contributes to ecological processes such as natural regeneration and habitat connectivity. Existing biodiversity values include occasional sightings of native bird species, indigenous beech communities, and insect and fungal communities associated with mature oak trees. Biodiversity values are comparatively lower than at other FFP project sites due to the predominance of exotic oak plantation habitat and the limited extent of native forest. Nevertheless, targeted planting, pest and weed management, and protection of regenerating vegetation have the potential to enhance native ecosystem resilience and improve biodiversity outcomes at both the site and landscape scale.

4 PROBLEM, CAUSE, AND SOLUTION

According to the NZ-NBSAP since the arrival of humans, 79 species have become extinct primarily caused by predation by invasive species and the loss of habitat. Habitat loss has arisen from competing land uses that have converted land from high to low biodiversity.

This project seeks to contribute to solving this problem by planting a diverse oak forest plantation to encourage more biodiversity benefits including increased habitat area for flora and fauna, insects and fungal activity.

5 BASELINE SCENARIO

The baseline scenario is a scenario of what would occur without the FFP project at the same site and within the same project area. The baseline activity within the project area is a continuation of pastoral farming on low producing grassland, and consequent low biodiversity status of the grazing farm land.

An objective measure of the status of the site is a baseline survey that maps the project area and identifies ecosystem types within this area. A baseline survey was not undertaken prior to the establishment of the FFP project at this site. There is, however, information available to use for preliminary baseline scenario development:

- Ecosystem classification.
- Reference areas adjacent to the site (i.e., areas representing the baseline).
- Updated baseline survey.

5.1 Ecosystem Classification

There are three tiers in ecosystem classification mapping:

1. **Tier 1:** Global data systems (e.g., Global Ecosystem Atlas)
2. **Tier 2:** National data systems (e.g., a country-specific system such as the New Zealand Land Cover Database)
3. **Tier 3:** Local site-specific data systems such as drone imagery combined with ground truthing.

According to the Ekos methodological guidance for biodiversity monitoring (Appendix 1 in the Overview Report) projects shall use a combination of either Tier 1 and Tier 3; or Tier 2 and Tier 3 ecosystem classification. This project uses a Tier 2 approach for the Baseline Scenario given that a biodiversity baseline assessment has not yet been undertaken for this site.

While a Tier 3 ecosystem classification has not yet been undertaken in the Baseline Scenario it remains an option for a near-term upgrade in the biodiversity MRV protocol for this site. The dataset used for a Tier 2 ecosystem classification at this site is Land Cover Database (LCDB) system - a low resolution ecological classification system for terrestrial ecosystems nationwide. Figure 3.2 and Table 3.2 above show the baseline condition of the project area at this low resolution scale.

This classification reflects the land cover present at the time of LCDB mapping and indicates a landscape that was largely managed for pastoral production. The timing of this LCDB data set coincides with the Baseline Scenario for the project (i.e., biodiversity status of the project area prior to the biodiversity project interventions). Since the 2023 LCDB assessment, the FFP project has been implemented whereby much of the site has been planted in a mixture of exotic and native species, resulting in a land cover that differs substantially from the current LCDB classification.

5.2 Reference Area

As shown in Figure 3.3 above, the LCDB classification of land surrounding the project area shows areas of the same classification as that within the project area. This presents the opportunity for the use of a reference area for baseline analysis. Noteworthy is the fact that the baseline land management conditions currently prevail in the reference area.

6 PROJECT SCENARIO

There are two parts to a project scenario:

1. Project interventions.
2. Biodiversity monitoring showing the impact of project interventions.

6.1 Existing Project Scenario Interventions

The project scenario at this site involves the conversion of low producing grassland to permanent indigenous forest. Because the purpose of the project is to deliver a tall indigenous forest at this site, any exotic forest established in the short term will be transitioned into native forest overtime using a continuous cover forestry approach (i.e., harvest and replacement of exotic forest patches with indigenous forest patches).

6.1.1 Reforestation

The specific interventions to deliver this solution are summarised in Table 6.1.1.

Table 6.1.1. Forest establishment activities at Litherland.

Forest Establishment	Year	Remarks
Oak planting (manual)	2020/21	Widely spaced to support maximised growth of oak trees
Native planting (manual)	2021	Manual plantings by people

There are some areas of mature indigenous forest surrounding the property comprising a valuable seed source for:

- Natural native forest regeneration in between and complementary to tree species planted at the site.
- Re-population of the project area with indigenous animal species (e.g., birds, invertebrates, reptiles, amphibians).

6.1.2 Pest and Weed Control

The specific interventions to deliver this solution are summarised in Table 6.1.2.

Table 6.1.2. Pest and weed control activities at Litherland.

Biodiversity Management	Year	Remarks
Animal pest control	2024-	Implemented according to an ad hoc pest control plan
Weed control	2024-	Implemented according to an ad hoc weed control plan

Animal pest control is currently based on:

a. Pest monitoring:
   i. Informal and ad hoc animal pest monitoring through field observations,
   ii. Limited eDNA sampling of stream waters to test species presence and abundance in the catchment.

b. Control interventions:
    i. Trapping and shooting.

Animal pest monitoring has revealed the presence of:

- Hare
- Deer
- Possums
- Wallabies

Weed control at this site is currently based on:

a. Weed monitoring
    i. Permanent sample plot vegetation surveys in the context of the Field Measurement Approach (FMA) of the NZ ETS.
    ii. Field observations during annual site inspections.
b. Control interventions:
    i. Woody weed removal through felling.
    ii. Weed spraying.

6.1.3 Impact of Surrounding Lands

Lands and habitats surrounding the project area comprise source of:

- Seed for natural native forest regeneration in between and complementary to tree species planted at the site.
- Populations of indigenous animal species (e.g., birds, invertebrates, reptiles, amphibians) available to recolonise the project area.
- Populations of invasive pests and weeds in need of control inside the project area.

6.2 Existing Project Scenario Monitoring

This project already has an ad hoc biodiversity monitoring plan. This is sufficient for a forest carbon project but not sufficient for biodiversity monitoring required for the NbP Framework.

Existing project scenario monitoring comprises of:

1. Land cover comparison with baseline.
2. Forest inventory.
3. Pest and weed inventory.

6.2.1 Land Cover Comparison with Baseline

A low resolution comparison of the baseline and (proposed) project scenarios is provided by means of LCDB categories determined at this site as shown in Table 6.2.1 below.

Table 6.2.1. Baseline Scenario and Project Scenario LCDB classification and area in hectares representing the condition of the project area in 2023 (Baseline Scenario) in comparison with 2053 and 2083 (Project Scenario).

Land Cover Classification	Baseline 2023 Area (ha)	Project 2053 Area (ha)	Project 2083 Area (ha)
River	0.74	0.74	0.74
Broadleaved Indigenous Hardwoods	0.72	0.72	0.72
Exotic Forest	3.63	3.63	3.63
High Producing Exotic Grassland	200.51	146.91	146.91
Low Producing Grassland	0.11	0.11	0.11
Indigenous Forest	0.22	1.52	1.52
Deciduous hardwoods	0.00	52.30	52.30
Manuka/Kanuka	6.92	6.92	6.92
Total area (ha)	**212.85**	**212.85**	**212.85**
Indigenous Forest area (ha)	**7.86**	**9.16**	**9.16**

Higher resolution baseline and project surveys will provide higher resolution comparisons between the baseline and project scenarios in the project MRV.

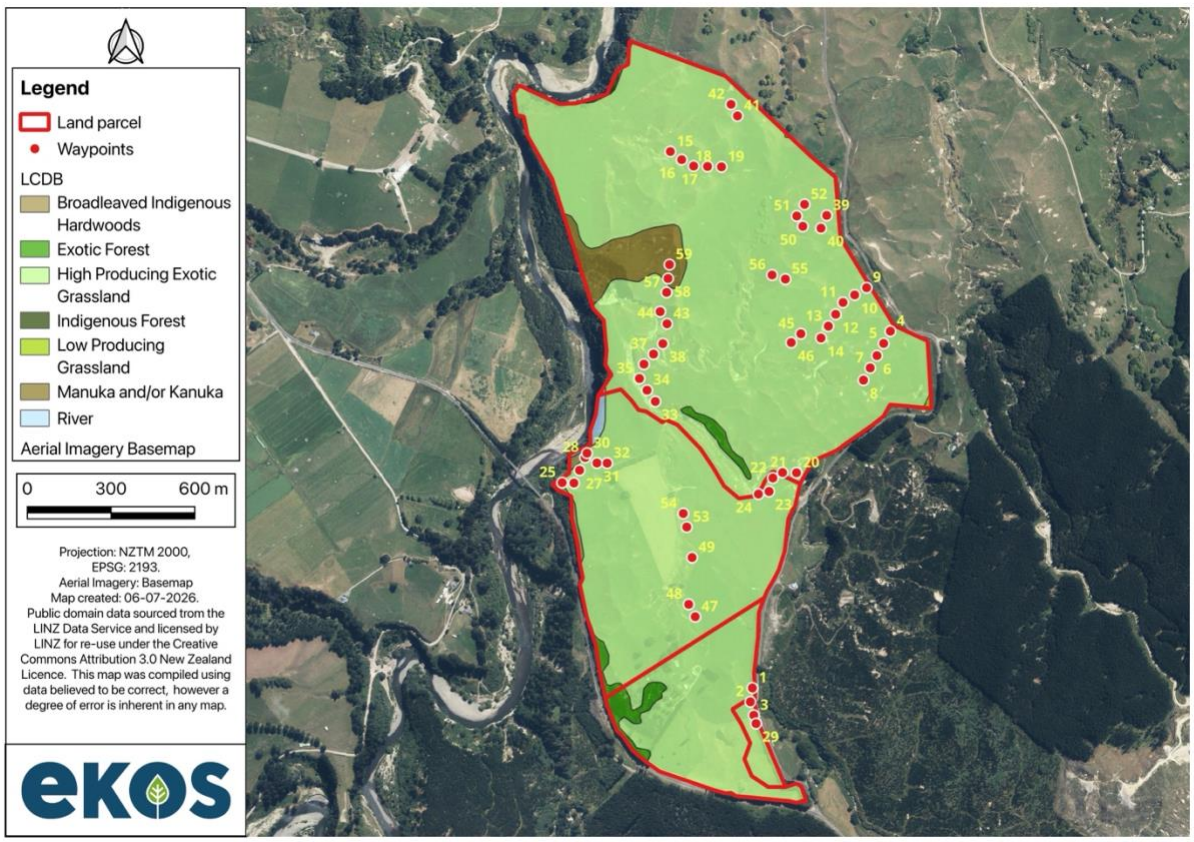
6.2.2 Forest Inventory

The existing plan for forest inventory will gather data based on the indicators shown in Table 6.2.2, and using waypoints shown in Figures 6.2.2 below.

Table 6.2.2 Site survey indicators and frequency.

Indicator	Current Method	Frequency
Vegetation		
Average stocking of target tree species	Sampling at 3m radius plots	Annually
Weed invasion	Sampling at 3m radius plots	Annually
Condition of vegetation	Sampling at 3m radius plots	Annually
Blanking required	Sampling at 3m radius plots	Annually
Invasive Animal Pest/Predators		
Invasive browsing damage	Sampling at 3m radius plots	Annually
Invasive animal pest numbers	NZ Auto Traps	Quarterly

Figure 6.2.2 Survey waypoints visited annually at Litherland site.



Forest inventory will also include the establishment and 5-yearly resampling of permanent sample plots (PSPs) as part of the requirements for NZ ETS registration. The location of these PSPs will be determined by the Ministry for Primary Industries. The vegetation data from these permanent sample plots will be used for biodiversity monitoring purposes. There is also an opportunity to enhance the data gathered in these PSPs to include biodiversity information for biodiversity monitoring purposes. There will be additional cost associated with adding additional survey effort to this existing NZ ETS

requirement, but this has not been budgeted at this time. The first expected PSP surveys are scheduled for 2029/30.

6.2.3 Pest Inventory

Invasive animal pest trap and kill numbers are recorded by the predator control contractor and reported quarterly. There is no pest trap location map for this site at current.

6.2.4 Biodiversity Monitoring Plan

Verification of non-additional biodiversity benefits at this site would require developing and implementing an upgraded biodiversity monitoring plan guided by the methodological guidance provided in Appendix 1 of the Overview report to this scoping study. This would need to include the development of a biodiversity monitoring plan that contained:

1. Baseline Survey.
2. Periodic Monitoring Surveys.

Baseline Survey

An upgraded baseline survey and associated cost estimate is presented in Section 5.3 above.

6.2.4.1 Periodic Monitoring Surveys

It is recommended that a minimum of four target groups in terrestrial environments be selected for ongoing beneficial change monitoring. The recommended metrics for periodic beneficial change monitoring are shown in Table 6.4.1.2a.

Table 6.4.1.2a. Recommended additional biodiversity monitoring data.

Indicator	Method	Frequency	Reason	Priority
eDNA	Wilderlab sample using 6 replicate kit	5-yearly	Captures distribution of species through time and space	High
Bird life	Forest Bird Slow Walk Transects	5-yearly	Captures species richness and relative abundance	High
Vegetation	Drone Imagery	5-yearly	Provides sub-metre resolution vegetation mapping, weed detection, canopy gap analysis and structural assessment within forest boundaries	High
Vegetation	20m x 20m permanent sample plot	5-yearly	Monitor long term changes in forests and improves ability to detect change in structure and composition of vegetation communities	High
Endangered species	Tbd	5-yearly	Captures management requirements for endangered species habitat and beneficial impact of such management	

7 NO NET LOSS & NET POSITIVE ASSESSMENT

A preliminary 'No Net Loss' (NNL) and 'Net Positive' (NP) assessment is provided in Table 8.1 below. A high-resolution NNL and NP assessment of the biodiversity status of this site will require a detailed baseline survey (recommended in Section 5.3) followed by project scenario monitoring surveys (recommended in Section 6.2.2).

Table 8.1 Initial No Net Loss (NNL) and Net Positive (NP) assessment.

Land Cover Classification	Baseline Area	Project NNL	Project NP	Remarks
River	0.74	✓	✓	Introduce riparian plantings
Broadleaved Indigenous Hardwoods	0.72	✓	✓	Enhance with pest and weed control
Exotic Forest	3.63	✓	✓	Convert to indigenous forest
High Producing Exotic Grassland	200.51	✓	✓	Convert to indigenous forest
Low Producing Grassland	0.11	✓	✓	Convert to indigenous forest
Indigenous Forest	0.22	✓	✓	Enhance with pest and weed control
Deciduous hardwoods	0.00	✓	✓	Enhance with pest and weed control
Manuka/Kanuka	6.92	✓	✓	Enhance with pest and weed control
Total area (ha)	**212.85**			

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2 PROJECT PURPOSE

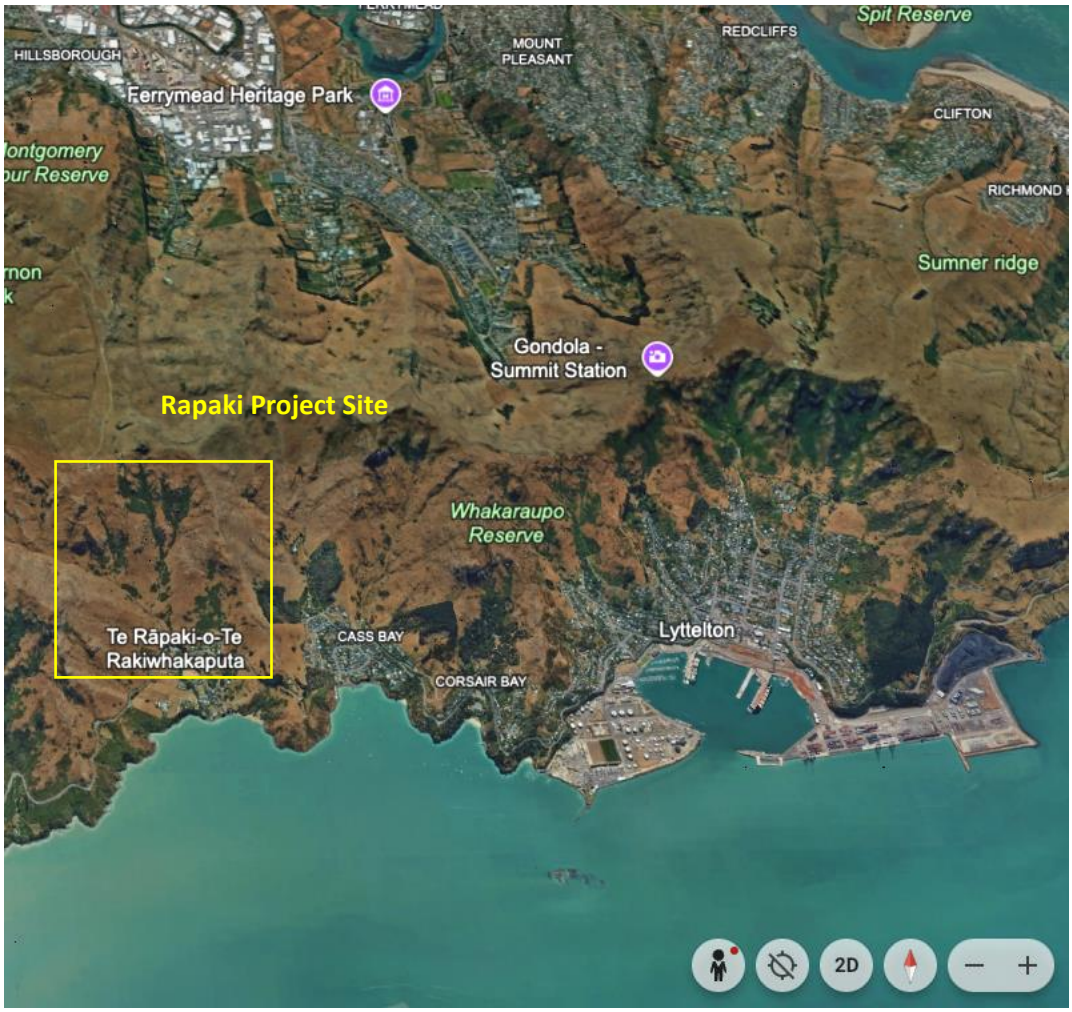
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3 DESCRIPTION OF PROJECT AREA

3.1 Location

The Rapaki project site (Figure 3.1) is located in Rapaki, Lyttleton, Christchurch. Rapaki site occupies an area of 173 hectares on predominantly steep terrain and rocky outcrops. This site receives moderate rainfall and mild temperatures throughout the year.

Figure 3.1. Location of Rapaki site.



3.2 Land Cover

Figure 3.2. Land cover database (LCDB) land classification of the Rapaki site.

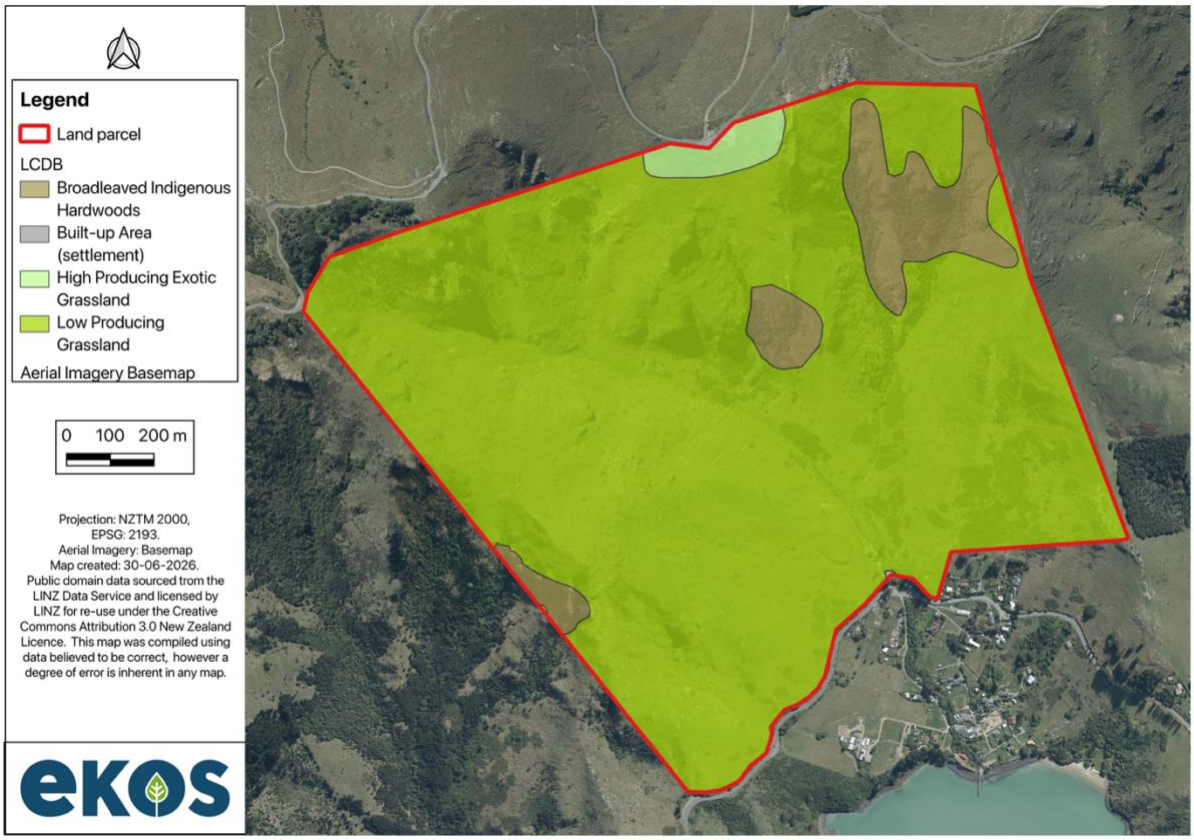


Figure 3.2 presents the Land Cover Database (LCDB) classifications recorded within the Rāpaki site based on the most recent LCDB dataset (2023). The site is classified predominantly as low producing grassland, which occupies the vast majority of the property. Smaller areas of broadleaved indigenous hardwoods are distributed in several discrete patches, with the largest areas occurring in the north-eastern portion of the property and smaller remnants located in the central and south-western sections. A small area of high producing exotic grassland is present along the northern margin of the site, while a very limited area of built-up area (settlement) occurs adjacent to the southern boundary near the Rāpaki settlement.

This classification reflects the land cover present at the time of LCDB mapping and indicates a landscape dominated by grazed or modified grassland, with scattered remnants of indigenous woody vegetation and very limited areas of more intensively managed grassland and settlement. The timing of this LCDB dataset coincides with the Baseline Scenario for the project (i.e., the biodiversity status of the project area prior to project interventions). Since the 2023 LCDB assessment, land management activities may have altered vegetation cover and habitat condition within the site, meaning that the current on-ground land cover may differ from the mapped LCDB classifications. Consequently, the LCDB should be considered a baseline representation of land cover rather than a definitive description of current site conditions.

Table 3.2 Land cover classification of project site.

Land Cover Classification	2023 Area (ha)
Broadleaved Indigenous Hardwoods	9.50
Forest – Harvested	12.31
Gorse and/or Broom	0.01
Indigenous Forest	1.87
Low Producing Grassland	253.71
Deciduous hardwoods	0.00
Total area (ha)	**277.40**
Indigenous Forest area (ha)	**11.37**

3.3 Proximity to Critical Biodiversity

Surrounding land uses and land classification is relevant to a biodiversity assessment because it provides a context for the site in question. Such a context can include the availability of local seed sources for indigenous vegetation and local indigenous bird and other animal populations that could populate the site.

Figure 3.3. LCDB surrounding Rapaki site.

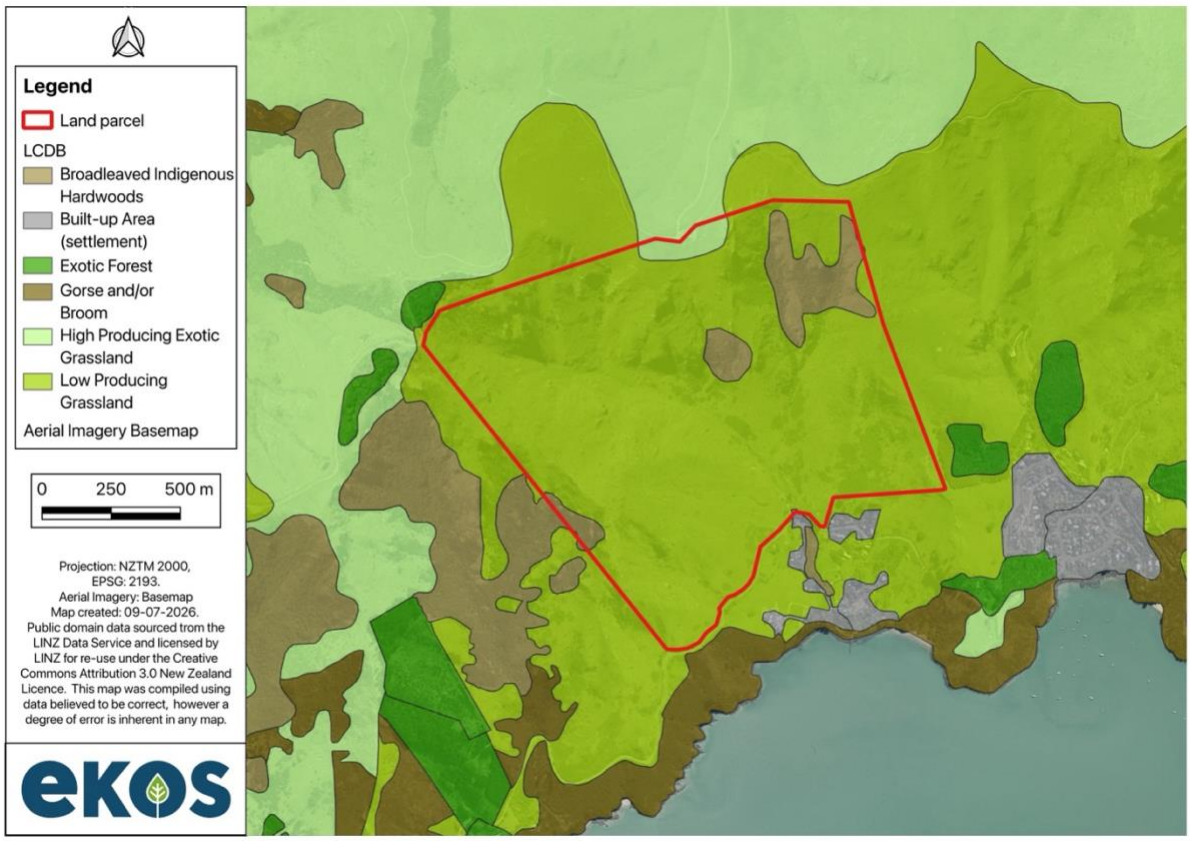


Figure 3.3 shows the LCDB classifications surrounding the Rāpaki site. The dominant land cover classes in the surrounding landscape are low producing grassland and high producing exotic grassland, with smaller areas of broadleaved indigenous hardwoods, exotic forest, gorse and/or broom, and built-up

area (settlement) occurring throughout the wider area. Extensive areas of low producing grassland extend across the hill country surrounding the site, while high producing exotic grassland is concentrated on more accessible land and valley floors. Patches of indigenous hardwood vegetation, plantation forestry, and scrub vegetation occur sporadically throughout the landscape, particularly along gullies, coastal margins, and steeper slopes.

The Rāpaki site is situated within a landscape characterised by a mixture of pastoral grasslands interspersed with indigenous woody vegetation and areas of regenerating scrub. Low producing grassland forms the predominant land cover throughout the surrounding area, reflecting the extensive grazing land that dominates the Port Hills environment. High producing exotic grassland occurs in larger blocks within the wider landscape and is associated with more intensively managed pastoral land. Broadleaved indigenous hardwoods occur in scattered patches across the surrounding hillsides and gullies, contributing to ecological connectivity between remnants of native vegetation. Areas of gorse and/or broom and exotic forest are also present throughout the wider landscape, representing a mixture of regenerating vegetation and plantation forestry associated with varying land management histories.

Overall, the surrounding land cover is characterised by a mixture of pastoral farmland, regenerating shrubland, plantation forestry, indigenous woody vegetation, and small areas of rural settlement. This combination of land cover types creates a landscape with a moderate to high degree of ecological and structural diversity, while remaining strongly influenced by pastoral land use across the wider Rāpaki catchment.

3.4 Protected Areas

The protected area status of the site (derived from the PAN-NZ and Fish Spawning Habitat Layer) is shown in Figure 3.4.

Figure 3.4 Protected Areas Network & Fish Spawning Habitat Map.

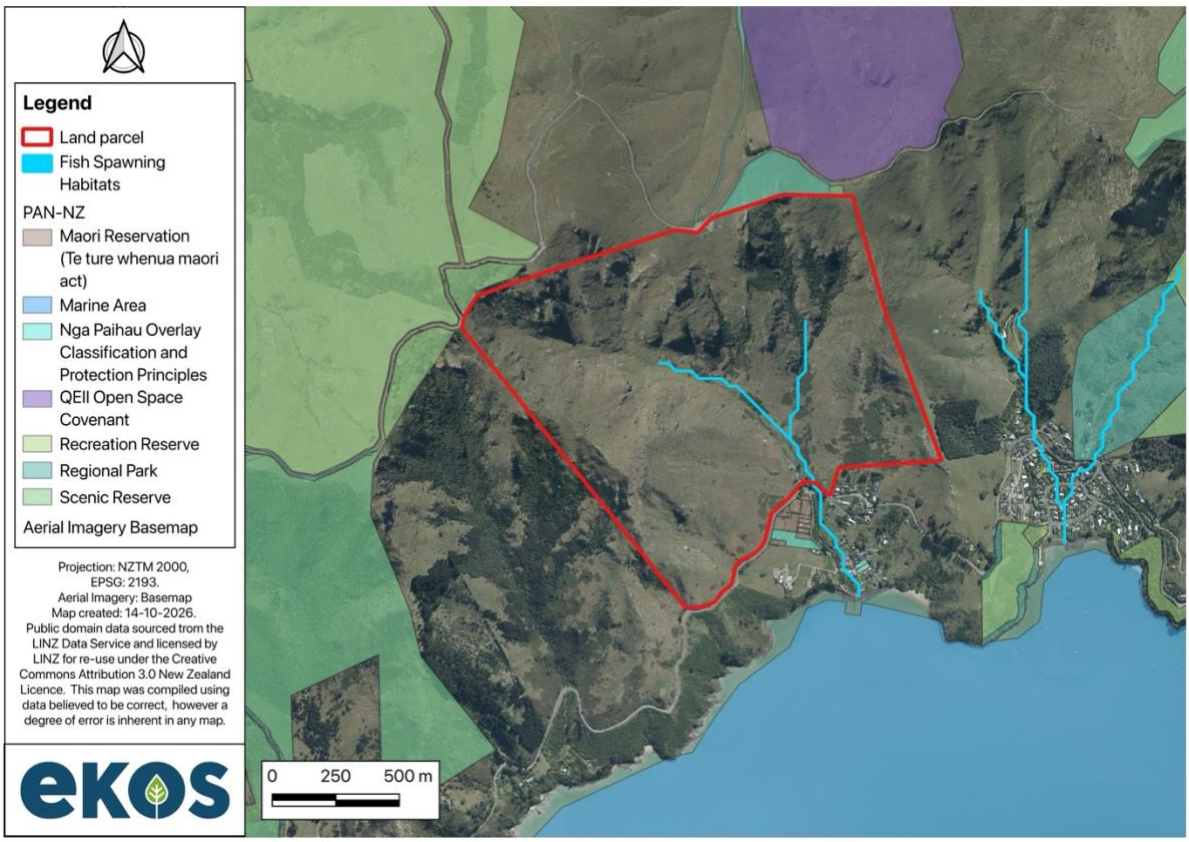


Figure 3.4 presents the Protected Areas Network (PAN-NZ) and Fish Spawning Habitat within and surrounding the Rāpaki site. This demonstrates that there are areas of significant biodiversity within the Rapaki site. The site is located within a landscape containing several protected area designations, with extensive areas of Recreation Reserve and Scenic Reserve occurring throughout the wider surrounding landscape. A QEII Open Space Covenant is present to the north-east of the site, while areas classified under the Ngā Paihau Overlay Classification and Protection Principles occur adjacent to the eastern side of the site and along parts of the coastal environment. Smaller areas of Regional Park, Māori Reservation (Te Ture Whenua Māori Act), and Marine Area occur within the wider landscape, particularly around the coastal margins and settled areas surrounding Rāpaki. These protected areas are embedded within a broader landscape of hill country grasslands, indigenous vegetation remnants, and coastal habitats.

The Rāpaki site is situated within a landscape containing an established network of protected areas that contribute to the conservation of ecological, cultural, recreational, and landscape values. Extensive Recreation Reserve and Scenic Reserve areas occur throughout the surrounding Port Hills environment and provide large areas of protected open space and indigenous habitat. The QEII Open Space Covenant located to the north-east of the site contributes additional protection for indigenous ecosystems within the wider landscape, while the Ngā Paihau Overlay areas recognise and support the protection of significant cultural and environmental values associated with the local landscape. Coastal

protected areas, including Regional Park and Marine Area designations, further contribute to the diversity of protected environments surrounding the site and enhance connectivity between terrestrial and marine ecosystems.

Overall, the Rāpaki site is located within a landscape that contains a diverse network of protected areas encompassing recreational, scenic, cultural, and ecological values. The presence of multiple protected area designations throughout the wider environment contributes to landscape-scale ecological connectivity and supports the protection of indigenous biodiversity and natural character. As a result, the Rāpaki site occurs within a well-connected protected landscape and has the potential to contribute to broader biodiversity and ecological outcomes through its proximity to existing protected areas and indigenous habitat networks.

3.5 Existing Habitats

This site has the following existing habitats:

- Young native forest.
- Mature native forest.
- Grassland.
- Stream habitats.

Within these habitats, the following biodiversity features have been observed:

- Frequent sightings of native bird species, (but no systematic native bird monitoring).
- Indigenous vegetation communities containing ake ake, kānuka, mānuka, shining broadleaf, and various other species.
- Areas of natural regeneration, in particular in and around gorse and broom patches.

The presence of young and mature native forest, grassland, and stream habitats provides a diverse ecological mosaic that supports a range of indigenous flora and fauna and contributes to key ecological processes such as natural regeneration, habitat connectivity, and ecosystem resilience. Existing biodiversity values include frequent observations of native bird species, indigenous vegetation communities, and areas of natural regeneration associated with gorse and broom cover. These values present opportunities to maintain and enhance biodiversity outcomes across the site through the continuation of existing management activities, alongside targeted planting, pest and weed control, and the protection of regenerating vegetation. Collectively, these actions have the potential to strengthen the condition, extent, and resilience of native ecosystems at both the site and broader landscape scale.

4 PROBLEM, CAUSE, AND SOLUTION

According to the NZ-NBSAP since the arrival of humans, 79 species have become extinct primarily caused by predation by invasive species and the loss of habitat. Habitat loss has arisen from competing land uses that have converted land from high to low biodiversity. An example is the historic conversion of coastal indigenous forest in the project area to pastoral farming.

This project seeks to contribute to solving this problem by restoring lowland, coastal indigenous forest habitat. The proposed solution is the conversion of predominantly low producing grassland in the project area to tall indigenous forest.

5 BASELINE SCENARIO

The baseline scenario is a scenario of what would occur without the FFP project at the same site and within the same project area. The baseline activity within the project area is a continuation of pastoral farming on low producing grassland, and consequent low biodiversity status of the grazing farm land.

An objective measure of the status of the site is a baseline survey that maps the project area and identifies ecosystem types within this area. A baseline survey was not undertaken prior to the establishment of the FFP project at this site. There is, however, information available to use for preliminary baseline scenario development:

- Ecosystem classification.
- Reference areas adjacent to the site (i.e., areas representing the baseline).
- Updated baseline survey.

5.1 Ecosystem Classification

There are three tiers in ecosystem classification mapping:

1. **Tier 1:** Global data systems (e.g., Global Ecosystem Atlas)
2. **Tier 2:** National data systems (e.g., a country-specific system such as the New Zealand Land Cover Database)
3. **Tier 3:** Local site-specific data systems such as drone imagery combined with ground truthing.

According to the Ekos methodological guidance for biodiversity monitoring (Appendix 1 in the Overview Report) projects shall use a combination of either Tier 1 and Tier 3; or Tier 2 and Tier 3 ecosystem classification. This project uses a Tier 2 approach for the Baseline Scenario given that a biodiversity baseline assessment has not yet been undertaken for this site.

While a Tier 3 ecosystem classification has not yet been undertaken in the Baseline Scenario it remains an option for a near-term upgrade in the biodiversity MRV protocol for this site. The dataset used for a Tier 2 ecosystem classification at this site is Land Cover Database (LCDB) system - a low resolution ecological classification system for terrestrial ecosystems nationwide. Figure 3.2 and Table 3.2 above show the baseline condition of the project area at this low resolution scale.

This classification reflects the land cover present at the time of LCDB mapping and indicates a landscape that was largely managed for pastoral production. The timing of this LCDB data set approximately coincides with the Baseline Scenario for the project (i.e., biodiversity status of the project area prior to the biodiversity project interventions). Since the 2023 LCDB assessment, the FFP project has been implemented whereby much of the site has been planted in a mixture of exotic and native species, resulting in a land cover that differs substantially from the current LCDB classification.

5.2 Reference Area

As shown in Figure 3.3 above, the LCDB classification of land surrounding the project area shows areas of the same classification as that within the project area. This presents the opportunity for the use of a reference area for baseline analysis. Noteworthy is the fact that the baseline land management conditions currently prevail in the reference area.

6 PROJECT SCENARIO

There are two parts to a project scenario:

1. Project interventions.
2. Biodiversity monitoring showing the impact of project interventions.

6.1 Existing Project Scenario Interventions

The project scenario at this site involves the conversion of low producing grassland to permanent indigenous forest. Because the purpose of the project is to deliver a tall indigenous forest at this site, any exotic forest established in the short term will be transitioned into native forest overtime using a continuous cover forestry approach (i.e., harvest and replacement of exotic forest patches with indigenous forest patches).

6.1.1 Reforestation

The specific interventions to deliver this solution are summarised in Table 6.1.1.

Table 6.1.1. Forest establishment activities at Rapaki.

Forest Establishment	Year	Remarks
Natural Regeneration	Pre-existing	Managed to reduce invasives
Native planting (manual)	2022/23/24	Manual plantings by people

6.1.2 Pest and Weed Control

The specific interventions to deliver this solution are summarised in Table 6.1.2.

Table 6.1.2. Pest and weed control activities at Rapaki.

Biodiversity Management	Year	Remarks
Animal pest control	2024-	Implemented according to an ad hoc pest control plan
Weed control	2024-	Implemented according to an ad hoc weed control plan

Animal pest control is currently based on:

a. Pest monitoring:
    i. Informal and ad hoc animal pest monitoring through field observations,
    ii. Limited eDNA sampling of stream waters to test species presence and abundance in the catchment.
b. Control interventions:
    i. Trapping and shooting.

Animal pest monitoring has revealed the presence of:

- Hedgehogs
- Feral cats
- Sheep
- Hare
- Deer
- Possums
- Goats
- Rats
- Mice

Weed control at this site is currently based on:

a. Weed monitoring
    i. Permanent sample plot vegetation surveys in the context of the Field Measurement Approach (FMA) of the NZ ETS.
    ii. Field observations during annual site inspections.
b. Control interventions:
    i. Woody weed removal through felling.
    ii. Weed spraying.

6.1.3 Impact of Surrounding Lands

Lands and habitats surrounding the project area comprise source of:

- Seed for natural native forest regeneration in between and complementary to tree species planted at the site.
- Populations of indigenous animal species (e.g., birds, invertebrates, reptiles, amphibians) available to recolonise the project area.
- Populations of invasive pests and weeds in need of control inside the project area.

6.2 Existing Project Scenario Monitoring

This project already has an ad hoc biodiversity monitoring plan. This is sufficient for a forest carbon project but not sufficient for biodiversity monitoring required for the NbP Framework.

Existing project scenario monitoring comprises of:

1. Land cover comparison with baseline.
2. Forest inventory.
3. Pest and weed inventory.

6.2.1 Land Cover Comparison with Baseline

A low resolution comparison of the baseline and (proposed) project scenarios is provided by means of LCDB categories determined at this site as shown in Table 6.2.1 below.

Table 6.2.1. Baseline Scenario and Project Scenario LCDB classification and area in hectares representing the condition of the project area in 2023 (Baseline Scenario) in comparison with 2053 and 2083 (Project Scenario).

	Baseline 2023	Project 2053	Project 2083
Land Cover Classification	**Area (ha)**	**Area (ha)**	**Area (ha)**
Built-up Area	0.03	0.03	0.03
Low Producing Grassland	156.62	135.22	135.22
High Producing Exotic Grassland	2.80	2.80	2.80
Broadleaved Indigenous Hardwoods	13.45	34.85	34.85
Total area (ha)	**172.90**	**172.90**	**172.90**
Indigenous Forest area (ha)	**13.45**	**34.85**	**34.85**

Higher resolution baseline and project surveys will provide higher resolution comparisons between the baseline and project scenarios in the project MRV.

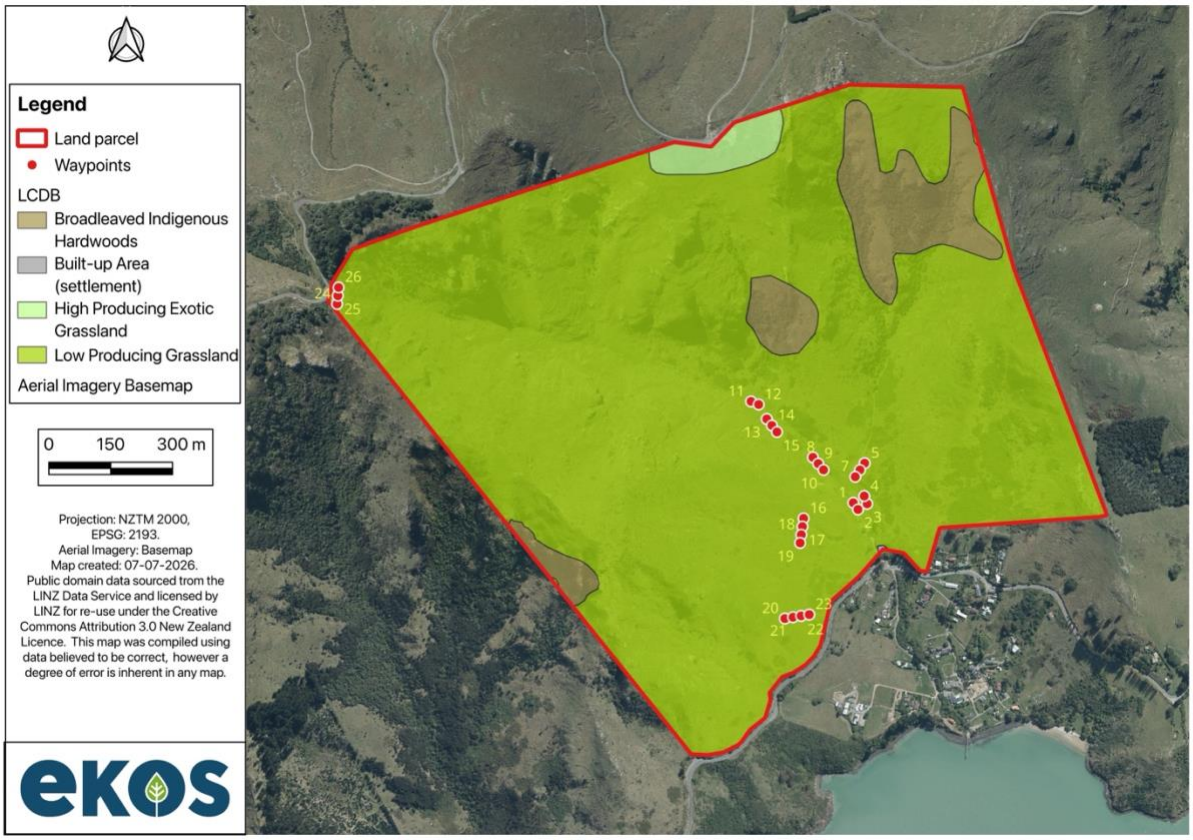
6.2.2 Forest Inventory

The existing plan for forest inventory will gather data based on the indicators shown in Table 6.2.2, and using waypoints shown in Figures 6.2.2 below.

Table 6.2.2. Site survey indicators and frequency.

Indicator	Current Method	Frequency
Vegetation		
Average stocking of target tree species	Sampling at 3m radius plots	Annually
Weed invasion	Sampling at 3m radius plots	Annually
Condition of vegetation	Sampling at 3m radius plots	Annually
Blanking required	Sampling at 3m radius plots	Annually
Invasive Animal Pest/Predators		
Invasive browsing damage	Sampling at 3m radius plots	Annually
Invasive animal pest numbers	NZ Auto Traps	Quarterly

Figure 6.2.2 Survey waypoints visited annually at Rapaki site.



Forest inventory will also include the establishment and 5-yearly resampling of permanent sample plots (PSPs) as part of the requirements for NZ ETS registration. The location of these PSPs will be determined by the Ministry for Primary Industries. The vegetation data from these permanent sample plots will be used for biodiversity monitoring purposes. There is also an opportunity to enhance the data gathered in these PSPs to include biodiversity information for biodiversity monitoring purposes. There will be additional cost associated with adding additional survey effort to this existing NZ ETS requirement, but this has not been budgeted at this time. The first expected PSP surveys are scheduled for 2029/30.

6.2.3 Pest Inventory

Invasive animal pest trap and kill numbers are recorded by the predator control contractor and reported quarterly. There is no available trap location map for this site at current.

6.2.4 Biodiversity Monitoring Plan

Verification of non-additional biodiversity benefits at this site would require developing and implementing an upgraded biodiversity monitoring plan guided by the methodological guidance provided in Appendix 1 of the Overview report to this scoping study. This would need to include the development of a biodiversity monitoring plan that contained:

1. Baseline Survey.
2. Periodic Monitoring Surveys.

6.2.4.1 Baseline Survey

An upgraded baseline survey and associated cost estimate is presented in Section 5.3 above.

6.2.4.2 Periodic Monitoring Surveys

It is recommended that a minimum of four target groups in terrestrial environments be selected for ongoing beneficial change monitoring. The recommended metrics for periodic beneficial change monitoring are shown in Table 6.2.2.3a.

Table 6.2.2.3a. Recommended additional biodiversity monitoring data.

Indicator	Method	Frequency	Reason	Priority
eDNA	Wilderlab sample using 6 replicate kit	5-yearly	Captures distribution of species through time and space	High
Bird life	Forest Bird Slow Walk Transects	5-yearly	Captures species richness and relative abundance	High
Vegetation	Drone Imagery	5-yearly	Provides sub-metre resolution vegetation mapping, weed detection, canopy gap analysis and structural assessment within forest boundaries	High
Vegetation	20m x 20m permanent sample plot	5-yearly	Monitor long term changes in forests and improves ability to detect change in structure and composition of vegetation communities	High
Endangered species	Tbd	5-yearly	Captures management requirements for endangered species habitat and beneficial impact of such management	

7 NO NET LOSS & NET POSITIVE ASSESSMENT

A preliminary 'No Net Loss' (NNL) and 'Net Positive' (NP) assessment is provided in Table 8.1 below. A high-resolution NNL and NP assessment of the biodiversity status of this site will require a detailed baseline survey (recommended in Section 5.3) followed by project scenario monitoring surveys (recommended in Section 6.2.2).

Table 8.1 No Net Loss (NNL) and Net Positive (NP) potential.

Land Cover Classification	Baseline Area	Project NNL	Project NP	Remarks
Built-up Area	0.03	☑	☐	Status remains
Low Producing Grassland	156.62	☑	☑	Convert to indigenous forest
High Producing Exotic Grassland	2.80	☑	☑	Convert to indigenous forest
Broadleaved Indigenous Hardwoods	13.45	☑	☑	Enhance with pest and weed control
Total area (ha)	**172.90**			

Meridian FFP Biodiversity Project:
M&P Makara Site Scoping

PREPARED BY:

Ekos
PO Box 19, Christchurch 8140
New Zealand

NZBN 9429048527453



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1 INTRODUCTION

This report examines the option to upgrade the biodiversity monitoring and biodiversity conservation management interventions at this site to enable biodiversity reporting compatible with the Nature Based Performance Framework (NbP) and associated alignment with:

- The Dow Jones Best in Class Index.
- Taskforce for Nature-related Financial Disclosures (TNFD).
- Environmental Institute of Australia and New Zealand (EIANZ).

This assessment evaluates the site's current biodiversity values, landscape context, and ecological restoration trajectory, including the biodiversity benefits generated through Forever Forests Project activities. The report considers existing:

- Land management interventions compatible with biodiversity enhancement.
- Biodiversity habitat values.
- Land cover characteristics including adjacent ecosystems.
- Biodiversity monitoring.

It then presents options to upgrade activities to bring the measurement, reporting and verification of biodiversity benefits into line with NbP. This material will be updated to include FFP NbP data for this site where relevant.

The measurement, reporting and verification (MRV) framework for this assessment and recommended for biodiversity reporting is the MRV system of the Ekos BioCredita programme – a biodiversity MRV system developed by Ekos and in line with project-based MRV protocols in the international voluntary nature markets. The BioCredita MRV framework is based on the following architecture:

Report	Description	Purpose	Assurance	Timing
Project Idea Note (PIN)	Detailed project scoping document	Preliminary registration	Ekos	One-off
Project Description (PD)	Comprehensive management plan and business plan	Full registration	Third-party validator	One-off
Project Deliverables Reports	Evidence of delivery of project interventions	Issuance of biodiversity credits	Third-party verifier	Annual
Beneficial Change Reports	Evidence of biodiversity benefits caused by interventions	Issuance of biodiversity credits	Third-party verifier	Up to 5-yearly

Fundamental to the BioCredita MRV system is the need to compare biodiversity benefits in the Baseline Scenario (without the FFP project) and in the Project Scenario (with the FFP project).

This report comprises a draft Project Idea Note (PIN) and has the following structure:

- Project purpose.
- Description of project area.
- Problem, cause, and solution.
- Baseline Scenario.
- Project Scenario.
- Third-party verification.

2 PROJECT PURPOSE

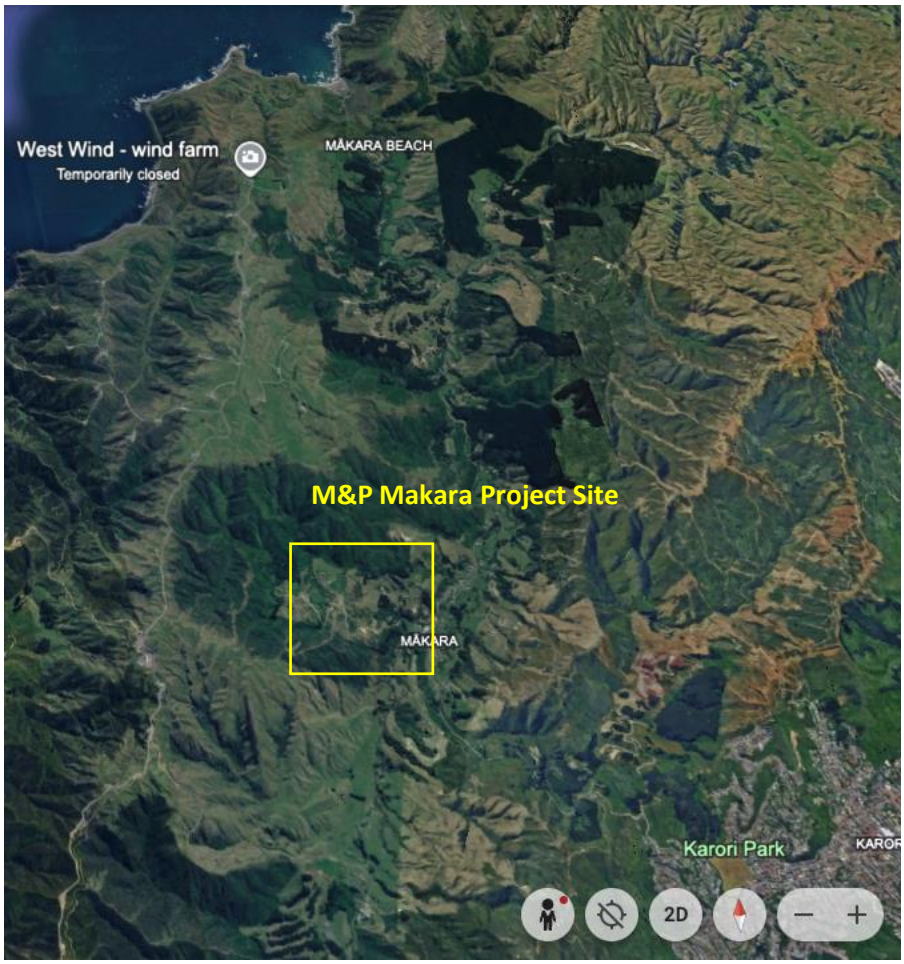
The purpose of this biodiversity conservation project is to convert degraded grassland used for marginal pastoral farming to tall indigenous forest. The primary purpose is to restore habitat for indigenous plant and animal species in the project area and contribute to the New Zealand Biodiversity Strategy and Action Plan (NBSAP) as well as Meridian Energy's corporate biodiversity reporting.

3 DESCRIPTION OF PROJECT AREA

3.1 Location

The M&P Makara project site (Figure 3.1) is located in Makara, Wellington. M&P Makara site occupies an area of 80 hectares on predominantly steep terrain. This site receives moderate rainfall and mild temperatures throughout the year.

Figure 3.1. Location of M&P Makara site.



3.2 Land Cover

Figure 3.2. Land cover database (LCDB) land classification of the M&P Makara site.

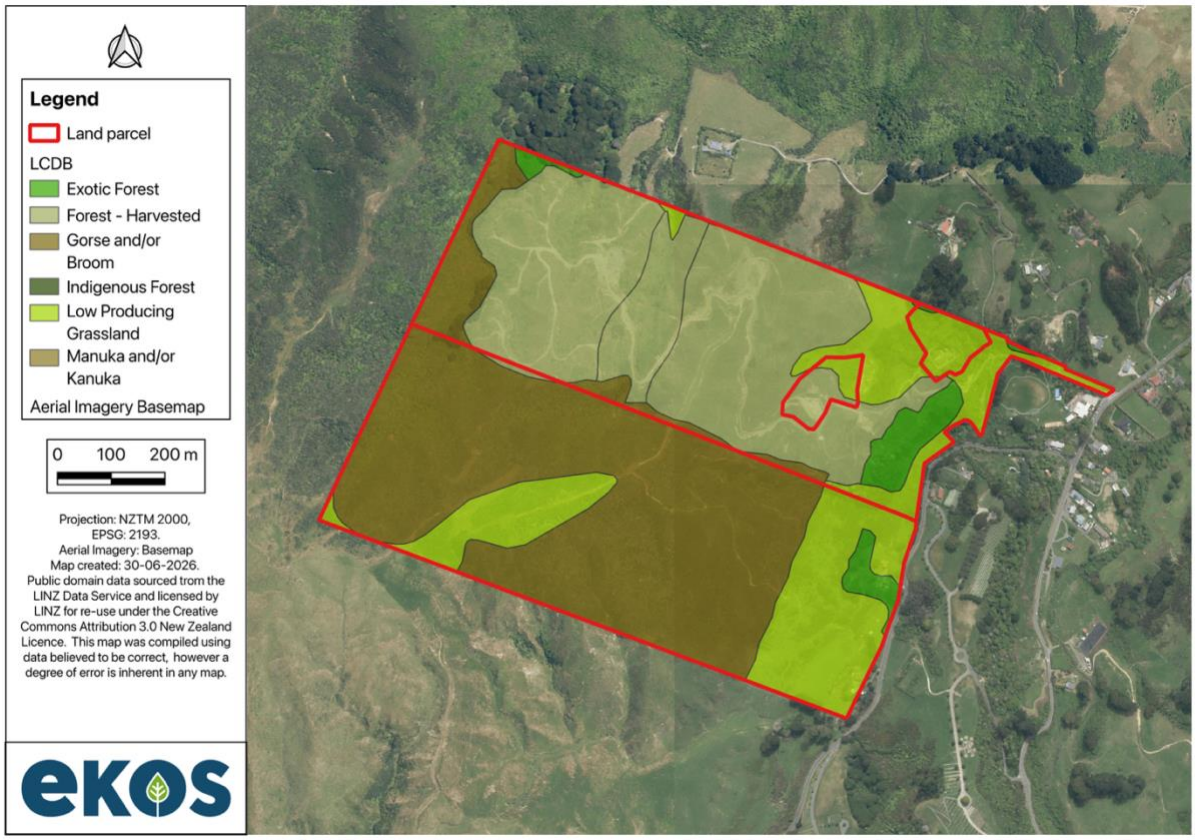


Figure 4.1 presents the Land Cover Database (LCDB) classifications recorded within the M&P Makara site based on the most recent LCDB dataset (2023). The site is classified predominantly as gorse and/or broom and low producing grassland, which together occupy the majority of the property. Smaller areas of manuka and/or kanuka occur across the central and northern portions of the site, while patches of exotic forest are present primarily along the eastern boundary and in the north-western corner.

This classification reflects the land cover present at the time of LCDB mapping and indicates a landscape dominated by regenerating shrubland and modified grassland, with smaller areas of plantation forestry and indigenous woody vegetation. The timing of this LCDB dataset coincides with the Baseline Scenario for the project (i.e., the biodiversity status of the project area prior to project interventions). Since the 2023 LCDB assessment, land management activities may have altered vegetation cover and habitat condition within the site, meaning that the current on-ground land cover may differ from the mapped LCDB classifications. Consequently, the LCDB should be considered a baseline representation of land cover rather than a definitive description of current site conditions.

Table 3.2 Land cover classification of project site.

Land Cover Classification	2023 Area (ha)
Low Producing Grassland	17.00
Forest Harvested	27.03
Exotic Forest	2.81
Gorse/Broom	33.29
Indigenous Forest	0.01
Total area (ha)	**80.14**
Indigenous Forest area (ha)	**0.01**

3.3 Proximity to Critical Biodiversity

Surrounding land uses and land classification is relevant to a biodiversity assessment because it provides a context for the site in question. Such a context can include the availability of local seed sources for indigenous vegetation and local indigenous bird and other animal populations that could populate the site.

Figure 3.3. LCDB surrounding M&P Makara site.

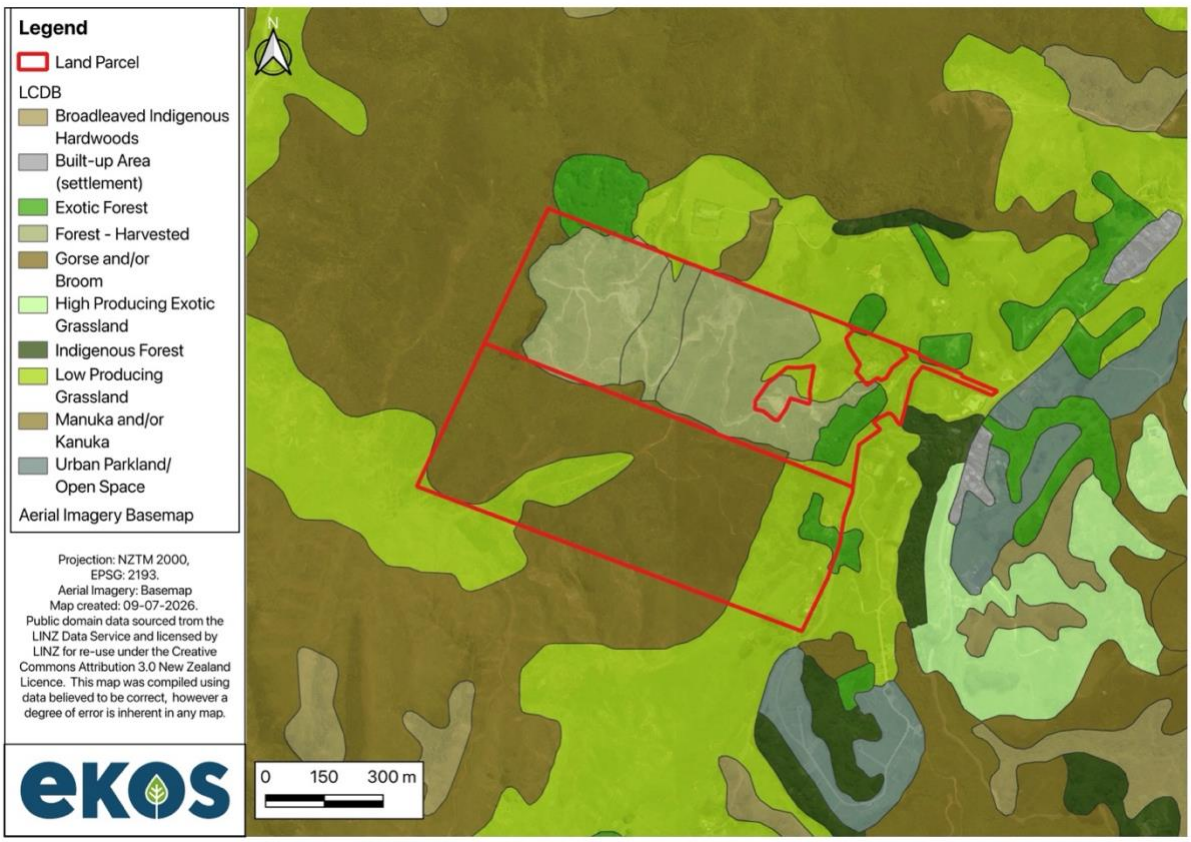


Figure 3.3 shows the LCDB classifications surrounding the M&P Makara site. The dominant land cover classes in the surrounding landscape are gorse and/or broom, low producing grassland, and high producing exotic grassland, with smaller areas of indigenous forest, exotic forest, mānuka and/or

kānuka, urban parkland/open space, and isolated built-up areas (settlement) occurring throughout the wider area. Extensive areas of gorse and/or broom surround much of the site, while low producing and high producing grassland occur in larger blocks across the surrounding landscape.

The M&P Makara site is situated within a landscape characterised by a mixture of pastoral grasslands, regenerating shrubland, and woody vegetation. Gorse and/or broom forms the predominant land cover throughout much of the surrounding area, while low producing and high producing grassland reflect the pastoral land uses present throughout the Makara catchment. Areas of indigenous forest, exotic forest, and mānuka and/or kānuka occur in scattered patches, particularly to the east and south-east, contributing to habitat diversity and ecological connectivity.

Overall, the surrounding land cover is characterised by a mixture of regenerating shrubland, pastoral grassland, plantation forestry, and indigenous woody vegetation. This combination of land-cover types creates a landscape with a moderate degree of ecological and structural diversity while reflecting the mixed pastoral and regenerating nature of the wider Makara landscape.

3.4 Protected Areas

The protected area status of the site (derived from the PAN-NZ and Fish Spawning Habitat Layer) is shown in Figure 3.4.

Figure 3.4 Protected Areas Network Map & Fish Spawning Habitat Layer.

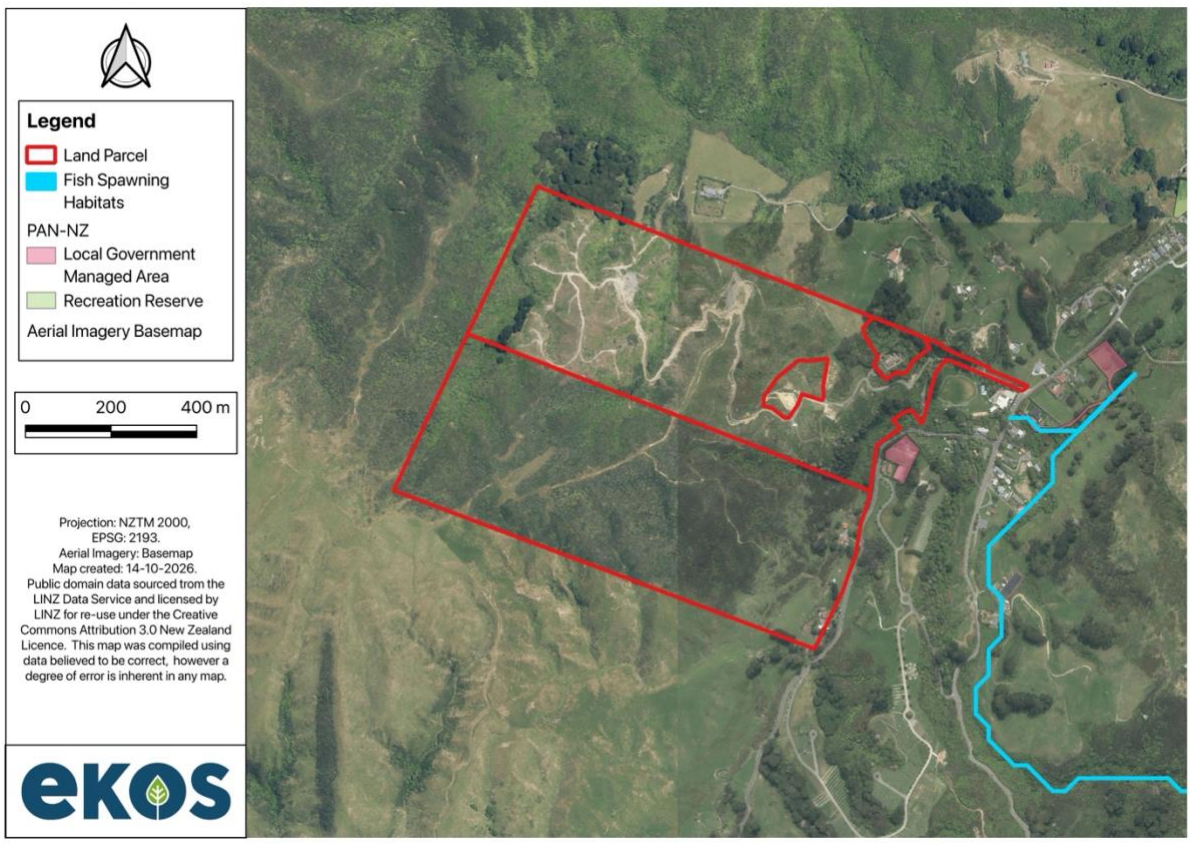


Figure 3.4 presents the Protected Areas Network (PAN-NZ) and Fish Spawning Habitat surrounding the M&P Makara site. This demonstrates that there is significant areas of biodiversity within 2km of the site. The site does not contain any mapped protected areas within its boundaries. However, a Recreation Reserve occurs immediately north of the site, while several small Local Government

Managed Areas are present within the wider surrounding landscape, particularly around the nearby settlement and developed areas to the east and south-east of the property. These protected areas occur within a broader landscape of pastoral grassland, regenerating shrubland, and indigenous vegetation.

The M&P Makara site is situated within a landscape containing a limited but established network of protected areas. The Recreation Reserve adjoining the northern boundary contributes protected open space and recreational values, while the Local Government Managed Areas provide additional protection and management of environmental and community values within the wider Makara area. Although protected areas are not extensive in the immediate vicinity of the site, they contribute to the maintenance of ecological and landscape values across the surrounding environment.

Overall, the M&P Makara site occurs within a landscape containing a small network of protected lands associated with recreational and local government management objectives. These protected areas contribute to ecological connectivity and the protection of landscape values within the wider Makara catchment and provide links to surrounding indigenous vegetation and habitat features.

3.5 Existing Habitats

This site has the following existing habitats:

- Young native forest.
- Mature native forest.
- Mature exotic forest.
- Grassland.
- Stream habitats.

Within these habitats, the following biodiversity features have been observed:

- Frequent sightings of native bird species, (but no systematic native bird monitoring).
- Indigenous vegetation communities containing various species.
- Areas of natural regeneration, in particular amongst gorse patches.

The presence of young and mature native forest, mature exotic forest, grassland, and stream habitats provides habitat for a range of indigenous flora and fauna and supports important ecological processes such as natural regeneration, habitat connectivity, and ecosystem resilience. Existing biodiversity values include frequent sightings of native bird species, indigenous vegetation communities comprising a variety of native species, and areas of natural regeneration occurring among gorse patches. These biodiversity features present opportunities to support the continuation of activities on the FFP project site while enhancing the extent and condition of native ecosystems through targeted planting, pest and weed management, and the protection of regenerating vegetation. Collectively, these activities have the potential to strengthen biodiversity outcomes and improve the resilience of ecological values at both the site and wider landscape scale.

4 PROBLEM, CAUSE, AND SOLUTION

According to the NZ-NBSAP since the arrival of humans, 79 species have become extinct primarily caused by predation by invasive species and the loss of habitat. Habitat loss has arisen from competing land uses that have converted land from high to low biodiversity.

This project seeks to contribute to solving this problem by restoring previously exotic harvested land and replacing it with native forest, as well as fostering natural regeneration under gorse canopies. The proposed solution is the conversion of clear-felled land to native forest and enhance existing native regeneration through more intensive pest and weed control management.

5 BASELINE SCENARIO

The baseline scenario is a scenario of what would occur without the FFP project at the same site and within the same project area. The baseline activity within the project area is a continuation of production forest and pastoral farming on low producing grassland, and consequent low biodiversity status of the forest floor and grazing farm land.

An objective measure of the status of the site is a baseline survey that maps the project area and identifies ecosystem types within this area. A baseline survey was not undertaken prior to the establishment of the FFP project at this site. There is, however, information available to use for preliminary baseline scenario development:

- Ecosystem classification.
- Reference areas adjacent to the site (i.e., areas representing the baseline).
- Updated baseline survey.

5.1 Ecosystem Classification

There are three tiers in ecosystem classification mapping:

1. **Tier 1:** Global data systems (e.g., Global Ecosystem Atlas)
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According to the Ekos methodological guidance for biodiversity monitoring (Appendix 1 in the Overview Report) projects shall use a combination of either Tier 1 and Tier 3; or Tier 2 and Tier 3 ecosystem classification. This project uses a Tier 2 approach for the Baseline Scenario given that a biodiversity baseline assessment has not yet been undertaken for this site.

While a Tier 3 ecosystem classification has not yet been undertaken in the Baseline Scenario it remains an option for a near-term upgrade in the biodiversity MRV protocol for this site. The dataset used for a Tier 2 ecosystem classification at this site is Land Cover Database (LCDB) system - a low resolution ecological classification system for terrestrial ecosystems nationwide. Figure 3.2 and Table 3.2 above show the baseline condition of the project area at this low resolution scale.

This classification reflects the land cover present at the time of LCDB mapping and indicates a landscape that was largely managed for pastoral production. The timing of this LCDB data set approximately coincides with the Baseline Scenario for the project (i.e., biodiversity status of the project area prior to the biodiversity project interventions). Since the 2023 LCDB assessment, the FFP project has been implemented whereby much of the site has been planted in a mixture of exotic and native species, resulting in a land cover that differs substantially from the current LCDB classification.

5.2 Reference Area

As shown in Figure 3.3 above, the LCDB classification of land surrounding the project area shows areas of the same classification as that within the project area. This presents the opportunity for the use of a reference area for baseline analysis. Noteworthy is the fact that the baseline land management conditions currently prevail in the reference area.

6 PROJECT SCENARIO

There are two parts to a project scenario:

1. Project interventions.
2. Biodiversity monitoring showing the impact of project interventions.

6.1 Existing Project Scenario Interventions

The project scenario at this site involves the conversion of low producing grassland to permanent indigenous forest. Because the purpose of the project is to deliver a tall indigenous forest at this site, any exotic forest established in the short term will be transitioned into native forest overtime using a continuous cover forestry approach (i.e., harvest and replacement of exotic forest patches with indigenous forest patches).

6.1.1 Reforestation

The specific interventions to deliver this solution are summarised in Table 6.1.1.

Table 6.1.1. Forest establishment activities at M&P Makara.

Forest Establishment	Year	Remarks
Natural Regeneration	Pre-existing	Managed to reduce invasives
Native planting (manual)	2021/22	Manual plantings by people

6.1.2 Pest and Weed Control

The specific interventions to deliver this solution are summarised in Table 6.1.2.

Table 6.1.2. Pest and weed control activities at M&P Makara site.

Biodiversity Management	Year	Remarks
Animal pest control	2024-	Implemented according to an ad hoc pest control plan
Weed control	2024-	Implemented according to an ad hoc weed control plan

Animal pest control is currently based on:

a. Pest monitoring:
    i. Informal and ad hoc animal pest monitoring through field observations,

ii. Limited eDNA sampling of stream waters to test species presence and abundance in the catchment.

b. Control interventions:
   i. Trapping and shooting.

Animal pest monitoring has revealed the presence of:

- Hare
- Deer
- Possums
- Stoats
- Pigs
- Rats
- Mice

Weed control at this site is currently based on:

a. Weed monitoring
   i. Permanent sample plot vegetation surveys in the context of the Field Measurement Approach (FMA) of the NZ ETS.
   ii. Field observations during annual site inspections.
b. Control interventions:
   i. Woody weed removal through felling.
   ii. Weed spraying.

6.1.3 Impact of Surrounding Lands

Lands and habitats surrounding the project area comprise source of:

- Seed for natural native forest regeneration in between and complementary to tree species planted at the site.
- Populations of indigenous animal species (e.g., birds, invertebrates, reptiles, amphibians) available to recolonise the project area.
- Populations of invasive pests and weeds in need of control inside the project area.

6.2 Existing Project Scenario Monitoring

This project already has an ad hoc biodiversity monitoring plan. This is sufficient for a forest carbon project but not sufficient for biodiversity monitoring required for the NbP Framework.

Existing project scenario monitoring comprises of:

1. Land cover comparison with baseline.
2. Forest inventory.
3. Pest and weed inventory.

6.2.1 Land Cover Comparison with Baseline

A low resolution comparison of the baseline and (proposed) project scenarios is provided by means of LCDB categories determined at this site as shown in Table 6.2.1 below.

Table 6.2.1. Baseline Scenario and Project Scenario LCDB classification and area in hectares representing the condition of the project area in 2023 (Baseline Scenario) in comparison with 2053 and 2083 (Project Scenario).

Land Cover Classification	Baseline 2023 Area (ha)	Project 2053 Area (ha)	Project 2083 Area (ha)
Low Producing Grassland	17.00	17.00	17.00
Forest Harvested	27.03	8.03	8.03
Exotic Forest	2.81	2.81	2.81
Gorse/Broom	33.29	22.99	22.99
Indigenous Forest	0.01	29.31	29.31
Total area (ha)	**80.14**	**80.14**	**80.14**
Indigenous Forest area (ha)	**0.01**	**29.31**	**29.31**

Higher resolution baseline and project surveys will provide higher resolution comparisons between the baseline and project scenarios in the project MRV.

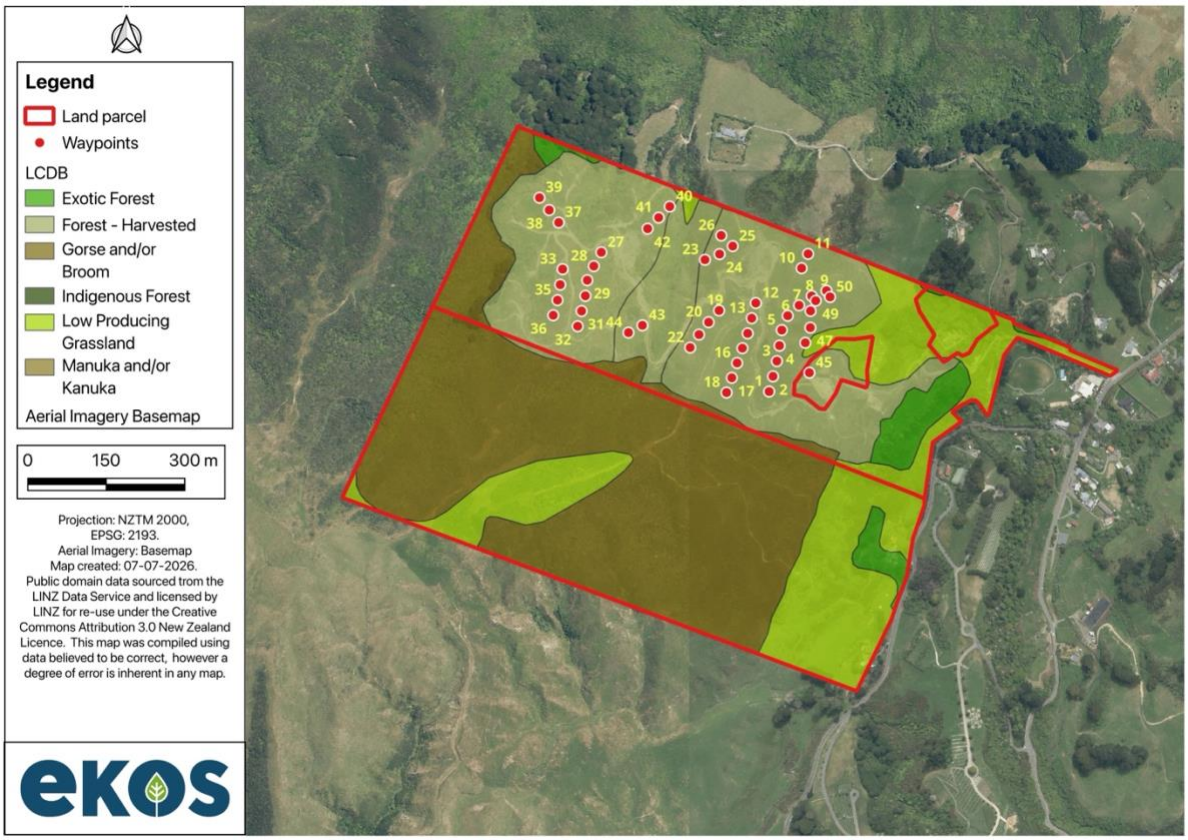
6.2.2 Forest Inventory

The existing plan for forest inventory will gather data based on the indicators shown in Table 6.2.2, and using waypoints shown in Figures 6.2.2 below.

Table 6.2.2 Site survey indicators and frequency.

Indicator	Current Method	Frequency
Vegetation		
Average stocking of target tree species	Sampling at 3m radius plots	Annually
Weed invasion	Sampling at 3m radius plots	Annually
Condition of vegetation	Sampling at 3m radius plots	Annually
Blanking required	Sampling at 3m radius plots	Annually
Invasive Animal Pest/Predators		
Invasive browsing damage	Sampling at 3m radius plots	Annually
Invasive animal pest numbers	NZ Auto Traps	Quarterly

Figure 6.2.2. Survey waypoints visited annually at M&P Makara site.



Forest inventory will also include the establishment and 5-yearly resampling of permanent sample plots (PSPs) as part of the requirements for NZ ETS registration. The location of these PSPs will be determined by the Ministry for Primary Industries. The vegetation data from these permanent sample plots will be used for biodiversity monitoring purposes. There is also an opportunity to enhance the data gathered in these PSPs to include biodiversity information for biodiversity monitoring purposes. There will be additional cost associated with adding additional survey effort to this existing NZ ETS requirement, but this has not been budgeted at this time. The first expected PSP surveys are scheduled for 2029/30.

6.2.3 Pest Inventory

Invasive animal pest trap and kill numbers are recorded by the predator control contractor and reported quarterly. A map of trap locations at this site is not currently available.

6.2.4 Biodiversity Monitoring Plan

Verification of non-additional biodiversity benefits at this site would require developing and implementing an upgraded biodiversity monitoring plan guided by the methodological guidance provided in Appendix 1 of the Overview report to this scoping study. This would need to include the development of a biodiversity monitoring plan that contained:

1. Baseline Survey.
2. Periodic Monitoring Surveys.

6.2.4.1 Baseline Survey

An upgraded baseline survey and associated cost estimate is presented in Section 5.3 above.

6.2.4.2 Periodic Monitoring Surveys

It is recommended that a minimum of four target groups in terrestrial environments be selected for ongoing beneficial change monitoring. The recommended metrics for periodic beneficial change monitoring are shown in Table 6.2.2.3a.

Table 6.2.2.3a. Recommended additional biodiversity monitoring data.

Indicator	Method	Frequency	Reason	Priority
eDNA	Wilderlab sample using 6 replicate kit	5-yearly	Captures distribution of species through time and space	High
Bird life	Forest Bird Slow Walk Transects	5-yearly	Captures species richness and relative abundance	High
Vegetation	Drone Imagery	5-yearly	Provides sub-metre resolution vegetation mapping, weed detection, canopy gap analysis and structural assessment within forest boundaries	High
Vegetation	20m x 20m permanent sample plot	5-yearly	Monitor long term changes in forests and improves ability to detect change in structure and composition of vegetation communities	High
Endangered species	Tbd	5-yearly	Captures management requirements for endangered species habitat and beneficial impact of such management	High

7 NO NET LOSS & NET POSITIVE ASSESSMENT

A preliminary 'No Net Loss' (NNL) and 'Net Positive' (NP) assessment is provided in Table 8.1 below. A high-resolution NNL and NP assessment of the biodiversity status of this site will require a detailed baseline survey (recommended in Section 5.3) followed by project scenario monitoring surveys (recommended in Section 6.2.2).

Table 8.1 No Net Loss (NNL) and Net Positive (NP) potential.

No Net Loss and Net Positive Potential

Land Cover Classification	Baseline Area	Project NNL	Project NP	Remarks
Low Producing Grassland	17.00	✓	✓	Convert to indigenous forest
Forest Harvested	27.03	✓	✓	Convert to indigenous forest
Exotic Forest	2.81	✓	✓	Convert to indigenous forest
Gorse/Broom	33.29	✓	✓	Convert to indigenous forest
Indigenous Forest	0.01	✓	✓	Enhance with pest and weed control
Total area (ha)	**80.14**			