Key Native Ecosystem Operational Plan for Akatarawa Forest

2024-2029

Contents

1. Purpose

The purpose of this five-year Key Native Ecosystem (KNE) Operational Plan for Akatarawa Forest KNE site is to:

- Identify the parties involved in preparing and delivering the operational plan
- Summarise the ecological values of the site and identify the threats to those values
- Outline the vision and objectives that guide management decision-making
- Describe the operational activities undertaken to improve ecological conditions (e.g., ecological weed control), who will undertake the activities and the allocated budgets

KNE operational plans are reviewed every five years to ensure the activities undertaken to protect and restore the KNE site are informed by experience and improved knowledge about the site.

This KNE operational plan is aligned to key policy documents that are outlined in Section 2.

2. Policy context

Under the Resource Management Act 1991 (RMA)[1] regional councils have responsibility for maintaining indigenous biodiversity, as well as protecting significant vegetation and habitats of threatened species.

Funding for the KNE programme is allocated under the Greater Wellington Long Term Plan (2021-2031)[2] and is managed in accordance with the Greater Wellington Biodiversity Strategy[3]. This sets a framework for how Greater Wellington protects and manages biodiversity in the Wellington region. Goal One of the Biodiversity Strategy - *Areas of high biodiversity value are protected or restored* - drives the delivery of the KNE programme.

Other important drivers for the KNE programme include the Natural Resources Plan[4], the Regional Pest Management Plan 2019-2039[5] and Toitū Te Whenua Parks Network Plan[6].

3. The Key Native Ecosystem programme

The KNE programme is a non-regulatory programme. The programme seeks to protect some of the best examples of original (pre-human) ecosystem types in the Wellington region. Greater Wellington has identified sites with the highest biodiversity values and prioritized them for management[7].

KNE sites are managed in accordance with five-year KNE operational plans prepared by Greater Wellington's Environment Restoration team. Greater Wellington works with landowners, mana whenua and other operational delivery providers to achieve mutually beneficial goals.

KNE sites can be located on private or publicly owned land. Any work undertaken on private land as part of this programme is at the discretion of landowners and their involvement in the programme is entirely voluntary. Involvement may just mean allowing work to be undertaken on that land. Land managed by the Department of Conservation (DOC) is generally excluded from this programme.

Sites are identified as of high biodiversity value for the purposes of the KNE programme by applying the four ecological significance criteria described below.

Representativeness	**Rarity/ distinctiveness**	**Diversity**	**Ecological context**
The extent to which ecosystems and habitats represent those that were once typical in the region but are no longer commonplace	Whether ecosystems contain Threatened/At Risk species, or species at their geographic limit, or whether rare or uncommon ecosystems are present	The levels of natural ecosystem diversity present, i.e., two or more original ecosystem types present	Whether the site provides important core habitat, has high species diversity, or includes an ecosystem identified as a national priority for protection

A site must be identified as ecologically significant using the above criteria and be considered "sustainable" for management to be considered for inclusion in the KNE programme. "Sustainable" for the purposes of the KNE programme is defined as: a site where the key ecological processes remain intact or continue to influence the site, and resilience of the ecosystem is likely under some realistic level of management.

4. Akatarawa Forest Key Native Ecosystem site

The Akatarawa Forest KNE site is a large area (12,400 ha) of mature and regenerating native forest located on hill country at the southern end of the Tararua Range between Upper Hutt and Paraparaumu (see Appendix 1, Map 1). It includes all the indigenous parts of the Akatarawa Forest (i.e., it excludes all the exotic plantations in the forest) and a private block on the eastern boundary of the KNE site that is contiguous with the Akatarawa Forest itself.

The KNE site contains a mosaic of indigenous forest, natural wetlands, and sub-alpine ecosystems. It includes the headwaters of the Whakatikei River, Akatarawa River West, and Maungakōtukutuku Stream. The KNE site is important regionally for its diversity of floral communities and it supports several threatened plants.

5. Parties involved

5.1. Landowners

Most of the land within the KNE site is owned by Greater Wellington and is managed primarily as a future water collection area by the Greater Wellington Eastern Parks team. As a future water collection area, the forest is primarily managed to ensure that the water resource remains stable, fresh, and clean. Secondary considerations are to protect native forest vegetation, manage production forestry, and offer a range of back-country recreational experiences (including motorised recreation)[8]. This KNE operational plan is consistent with the wider objectives and policies of Toitū Te Whenua.

Greater Wellington manages Akatarawa Forest under the Local Government Act 2002 and the Wellington Regional Water Board Act 1972. Akatarawa Forest is part of the regional parks network, and its management is guided by Toitū Te Whenua Parks Network Plan[9].

Thirty hectares of the KNE site are privately owned by a property development company (see Appendix 1, Map 2). It is likely that this section of land will be subdivided into several lots during the life of this plan.

5.2. Mana whenua partners

The Akatarawa Forest KNE site area is significant to Taranaki Whanui ki te Upoko o te Ika and Ngāti Toa Rangatira, who are mana whenua partners with Greater Wellington.

The area has been identified under the Natural Resources Plan for the Wellington Region (NRP)[10] as culturally important with reference to freshwater (wai Maori) recognising that these are areas where mana whenua lived and practiced māhinga kai, tauranga waka, kainga, and wāhi tapu (see Table 1 below).

The Statutory Acknowledgements from the Ngāti Toa Rangatira Claims Settlement Act 2014[11] and the Port Nicholson Block (Taranaki Whānui ki te Upoko o Te Ika) Claims Settlement Act 2009[12] provide further details of the associations that Ngāti Toa and Taranaki Whānui have with Te Awa Kairangi/Hutt River and its tributaries.

Greater Wellington is committed to identifying ways in which kaitiakitanga can be strengthened by exploring opportunities for mana whenua partners to participate in the development or delivery of KNE operational plans.

Table 1: Mana whenua sites of significance in the Akatarawa Forest KNE site.

Site of significance	Mana whenua values
Ngāti Toa Rangatira Te Awa Kairangi / Hutt River	Ngā Mahi a ngā Tūpuna; Te Mahi kai; Te Mana o te Wai; Te Mana o Te Tangata; Te Manawaroa o te Wai
Taranaki Whanui ki te Upoko o te Ika Te Awa Kairangi / Hutt River	Wāhi Mahara; Ngā Mahi a ngā Tūpuna; Te Mahi kai; Wāhi Whakarite; Te Mana o Te Tangata; Te Manawaroa o te Wai; Te Mana o te Wai; Wāhi Mahara; mahinga kai; Wāhi Tapu; pā

5.3. Operational delivery

Within Greater Wellington, the Environment Restoration, Eastern Parks, Pest Plant, and Pest Animal teams are responsible for delivering the Akatarawa Forest KNE operational plan.

- The Environment Restoration team leads the strategic planning, funding and coordination of biodiversity management activities, and advice within the KNE site
- The Pest Plant and Pest Animal teams coordinate and implement ecological weed and pest animal control measures at the KNE site with funding from the Environment Restoration team's KNE programme budget
- The Eastern Parks team primarily manages recreational access and maintains assets such as roads, tracks, and amenity areas within the KNE site. In addition, the Eastern Parks team supports ecological restoration work within the KNE site by funding and supporting volunteer groups undertaking ecological restoration work within the regional park. The Park Ranger is the primary contact for volunteers or contractors

5.4. Stakeholders

Kāpiti Coast District Council (KCDC) has an interest in the management of the KNE site because water supply for the township of Paekākāriki is sourced from within part of the site – the Wainui Stream catchment.

Motorised recreation is particularly popular in the KNE site. Greater Wellington works closely with the Akatarawa Recreational Access Committee and has a Memorandum of Understanding and a track assessment protocol which guide the pursuit of this activity and the relationship between the group and Greater Wellington.

Other recreational activities that are popular within the KNE site include mountain biking, walking, running, tramping, horse riding, four-wheel driving, quad biking, trail biking, hunting, fishing, and nature study.

Transpower New Zealand has several high-voltage AC transmission lines in the KNE site.

6. Ecological values

This section describes the various ecological components and attributes that make the KNE site important. These factors determine the site's value at a regional scale and how managing it contributes to the maintenance of regional biodiversity.

6.1. Ecological designations

Table 2, below, lists ecological designations at all or part of the Akatarawa Forest KNE site.

Table 2: Designations at the Akatarawa Forest KNE site.

Designation level	Type of designation
Regional	Parts of the KNE site are designated under Greater Wellington's Natural Resources Plan (NRP) as ecosystems and habitats with significant indigenous biodiversity values; • **Akatarawa River and all tributaries** High macroinvertebrate community health; migratory fish species with the conservation status of "At-Risk" and "Nationally Vulnerable" (Schedule F1) • **Whakatikei River and all tributaries above the Wainui Stream** High macroinvertebrate community health (Schedule F1) • **Whakatikei Headwater Swamp** Significant natural wetland (Schedule F3) • **Martin's River Wetland** Significant natural wetland (Schedule F3) • **Whakatikei Wetland** (also known as Drapers Flats) Significant natural wetland (Schedule F3)
District	Some parts of the KNE site have been identified within the Kapiti Coast District Plan 2021 (Schedule 4 – Outstanding natural features and landscapes)[13]. • **Upper Akatarawa Valley** • **Akatarawa, West Deep Creek, Plateau** • **Mt Maunganui** • **Mt Wainui summit**

6.2. Ecological significance

The Akatarawa Forest KNE site is of regional importance because:

- It contains highly **representative** ecosystems that were once typical or commonplace in the region
- It contains ecological features that are **rare or distinctive** in the region
- It contains high levels of ecosystem **diversity**, with several ecosystem types represented

- Its **ecological context** is valuable at the landscape scale as it contains a variety of inter-connected habitats, it is part of an ecological corridor, and provides core habitat for threatened indigenous bird species

Representativeness

The Singers and Rogers[14] classification of pre-human forest vegetation indicates the Akatarawa KNE site would have comprised several ecosystem types (See Appendix 1, Map 3). For three of these ecosystem types there is less than 30% of their original extent remaining in the Wellington Region, making them Threatened ecosystem types[15]. These are MF7 - tawa, kāmahi, podocarp forest with 22% of its original extent remaining; MF6 - kohekohe, tawa forest with 16% of its original extent remaining; and WF2 - tōtara, mataī, ribbonwood forest with 2% of its original extent remaining.

The dominant species of these ecosystem types would have included tawa, kāmahi, podocarp, and kohekohe. Although the existing ecosystems are modified having experienced selective logging, hunting, and clearances, much of the KNE site is still representative of this original ecosystem types.

The Threatened Environment Classification system defines ecosystem and habitat threat categories nationally, based on percentage of indigenous cover remaining[16]. This system indicates that parts of the KNE site are classified as Acutely Threatened, Chronically Threatened, or At Risk (see Appendix 1, Map 4). There is less than 10%, 10-20% and 20-30% respectively of the original cover of these indigenous vegetation types remaining in New Zealand[17]. Areas that are identified as Acutely and Chronically Threatened are mostly located on river terraces. Areas identified as At Risk are located on lower slopes and low ridge lines.

Rarity/distinctiveness

Several naturally uncommon ecosystem types[18] are present within the KNE site. These include two ephemeral wetlands, an ecosystem type classified as Critically Endangered. Wetlands are also considered an uncommon habitat type in the Wellington Region with less than 3% remaining of their original extent[19].

Several plant, bird, fish, lizard, and invertebrate species found within the KNE site are classified as nationally 'Threatened' or 'At Risk' through New Zealand's national threat classification system. Similar numbers of species found within the KNE site are also classified as regionally 'Threatened'. Appendix 2, Table 6 and Appendix 3, Table 7 contain lists of the nationally and regionally threatened species found within the KNE site.

Diversity

The KNE site contains several forest types: kāmahi, broadleaved, podocarp forest (MF8); tawa, kāmahi, podocarp forest (MF7); hard beech forest (MF20); red beech, podocarp forest (CLF9); red beech, silver beech forest (CLF10); Hall's tōtara, pāhautea, kāmahi forest (CDF4); kohekohe, tawa forest (MF6); and tōtara, mataī, ribbonwood forest (WF2). In addition to the forested ecosystems present, wetland, riverine, fernland and subalpine habitats are present, adding to the habitat mosaic and diversity.

The resultant mosaic of old-growth forest, regenerating forest, shrublands, wetlands, rivers, fernlands, and subalpine habitats has created a variety of habitats and ecotones supporting a high diversity of flora and fauna.

Ecological context

The large size of the KNE site, its intact and highly diverse ecosystems, and its connectivity to the Tararua ranges means that it supports a wide variety of native birds.

6.3. Ecological features

The Akatarawa Forest KNE site is located within the Tararua Ecological District[20]. The KNE site is characterised by steep, dissected hill country (altitudinal range *c*.60-722 m asl), high rainfall (1,700-2,400 mm rainfall per annum in the valleys) and strong westerly winds. Several fault lines run through the site in a north-easterly direction. The underlying geology is greywacke, and the hilltops are remnants of an eroded peneplain which are now covered in a layer of loess.

Flora

The forests of the KNE site are dominated by tawa (*Beilschmiedia tawa*) with emergent rimu (*Dacrydium cupressinum*) and northern rātā (*Metrosideros robusta*) up to 400 m above sea level (asl); kamahi (*Weinmannia racemosa*) and hīnau (*Elaeocarpus dentatus*) up to 550 m asl; and kāmahi, Hall's tōtara (*Podocarpus totara*), and miro (*Prumnopitys ferruginea*) above 550 m asl. Hard beech (*Fuscospora truncata*) is present at some sites, usually on poorer soils or in association with rātā-rimu-hīnau-kāmahi forest[21]. The montane miro-kāmahi cloud forest and Hall's tōtara-kāmahi forest present in the site are regionally uncommon habitat types. Smaller areas of indigenous fernland, shrubland are also present, with subalpine vegetation noted above the treeline where bush tussock and *Astelia* spp. are present.

Within the Akatarawa Forest KNE site are New Zealand's two largest recorded northern rātā trees (*Metrosideros robusta*), both with trunk diameters of nearly 5 m and estimated to be at least 1,000 years old. Northern rātā is one of New Zealand's tallest flowering trees and it usually begins life as an epiphyte high in the forest canopy. Northern rātā trees are also very susceptible to possum damage, as they eat the leaves, buds, flowers, and young shoots of the tree and in some cases, can kill a mature rātā within two years. This is why pest control such as extensive trapping networks and 1080 operations are essential to protect these ancient trees.

Fauna

Birds

Targeted bird monitoring is not undertaken in the KNE site, however incidental sightings have noted twenty-one indigenous bird species in the KNE site. These include kārearea / New Zealand falcon (*Falco novaeseelandiae*); koekoeā / long tailed cuckoo (*Eudynamys taitensis*); titipounamu / rifleman (*Acanthisitta chloris*); kakariki / yellow crowned parakeet (*Cyanoramphus auriceps*); kawau / black shag (*Phalacrocorax carbo*); kererū / New Zealand pigeon (*Hemiphaga novaeseelandiae*); swamp harrier (*Circus approximans*); pipiwharauroa / shining cuckoo (*Chrysococcyx lucidus*); ruru / morepork (*Ninox novaeseelandiae*); kōtare / New Zealand kingfisher (*Todiramphus sanctus*);

riroriro / grey warbler (*Gerygone igata*); kawau paka / little shag (*Phalacrocorax melanoleucos*); korimako / bellbird (*Anthornis melanura*); Tūī (*Prosthemadera novaeseelandiae*); pōpokotea / whitehead (Mohoua albicilla); miromiro / tomtit (*Petroica macrocephala*).

Reptiles

Few studies of reptiles have been completed in the KNE site and no reptiles have been confirmed present. However, it is likely that ngahere gecko (*Mokopirirakau* 'southern North Island') is present as it has been recorded along the KNE boundaries [22].

Freshwater fish and invertebrates

Nine species of freshwater fish have been recorded in the KNE site. These include shortjaw kōkopu (*Galaxias postvectis*); kōaro / climbing galaxias (*Galaxias brevipinnis*); dwarf galaxias (*Galaxias divergens*); banded kokopu (*Galaxias fasciatus*); ōrea / longfin eel (*Anguilla dieffenbachia*); shortfin eel (*Anguilla australis*); bluegill bully (*Gobiomorphus hubbsi*); crans bully (*Gobiomorphus basalis*); redfin bully (*Gobiomorphus huttoni*).

One species of freshwater invertebrate has been recorded in the KNE site: koura / freshwater crayfish (*Paranephrops planifrons*).

Terrestrial invertebrates

No studies of invertebrates have been completed in the KNE site, but land snails; two *Charopidae* species have been identified within the KNE site, and common insects such as cicada and stick insects are known from incidental sightings.

7. Threats to ecological values at the KNE site

Ecological values can be threatened by human activities, and by introduced animals and plants that change ecosystem dynamics. The key to protecting and restoring biodiversity as part of the KNE programme is to manage key threats to the ecological values at each KNE site. Key threats to the Akatarawa Forest KNE site are discussed below and Appendix 4, Table 8 lists all known threats to the KNE site.

7.1. Key threats

Pest animals that could have the greatest potential impact on the ecological values of the Akatarawa Forest KNE site are possums (*Trichosurus vulpecula*), feral goats (*Capra hircus*), feral deer (*Cervus elaphus scoticus*), feral pigs (*Sus scofa*), stoats (*Mustela erminea*), and rats (*Rattus* spp.).

Pest plants that could have the greatest potential impact on the ecological values of Akatarawa Forest KNE site are old man's beard (*Clematis vitalba*), Japanese honeysuckle (*Lonicera japonica),* gorse *(Ulex europaeus),* tradescantia *(Tradescantia fluminensis),* and pine *(Pinus radiata).*

Some recreational and management activities have the potential to impact the ecological values of the KNE site. Recreational activities such as trail and quad bike riding and four-wheel driving are causing sedimentation and vegetation damage in some areas. Ecological weed's introduction and dispersal may also occur when weed seeds or fragments are temporarily lodged in the tyre treads and then released within the KNE site.

Activities associated with road and track management may impact native plant and animal communities if adequate levels of control are not placed upon them. Recreational and management activities also present the risks of fire, rubbish discharge, and pollution of soil and water through discharge of vehicle and machinery fluids. Harvesting operations of the commercial forests neighboring the KNE site also have the potential to impact the site if not carried out in an appropriate manner.

8. Vision and objectives

8.1. Vision

Protect, restore, and promote sustainable use of all native ecosystems, sustainably manage the future water collection area, and maintain native biodiversity in the KNE site.

8.2. Objectives

Objectives help to ensure that operational activities carried out are contributing to improvements in the ecological condition of the site.

The following objectives will guide the operational activities at the Akatarawa Forest KNE site.

1. ***Enhance the KNE site's natural wetland and main riverine ecosystems***
2. ***Protect the integrity of the indigenous forest and core forest areas***
3. ***Halt biodiversity loss and protect rare and threatened species***
4. ***Maintain and advocate for the values of the regionally uncommon ecosystem and habitat features within the KNE site***
5. ***Partner with Taranaki Whānui and Ngāti Toa Rangatira***

9. Operational activities

Operational activities are targeted to work towards the objectives listed in Section 8.2. The broad approach to operational activities is described briefly below, and specific actions, with budget figures attached, are set out in the operational delivery schedule in Section 11 (Table 3).

9.1. Ecological weed control

The aim of ecological weed control at the KNE site is to target specific weed infestations that are impacting the integrity of the native ecosystems. This includes protecting and restoring wetlands, reducing the distribution and density of ecological weeds along river terraces, and controlling ecological weed infestations affecting the integrity of the native canopy.

As significant natural wetlands, the Whakatikei Headwater swamp (operational area A), Martin's River wetland (operational area G), and Whakatikei wetland (operational area D) are priority ecosystems targeted for weed control on an annual basis (Appendix 1, Map 5). The Whakatikei River and the Akatarawa River West (the two main river systems within the KNE site) are also monitored as important habitat features. If sustained weed control is required along these river systems, this will be prioritised, as is already occurring within operational area C, a stretch of Akatarawa River West.

Other operational areas have been identified where specific weed incursion are known and have been controlled in the past (operational areas B, E and F). These historic weed control sites are mostly found at sites of human activity such as old house sites, mill, hut sites, transport routes, and on the edges of neighbouring plantation forestry. Control of the worst infestations of ecological weeds has been undertaken annually since 2001 and whilst weeds are now sparse, some species still prevail and require ongoing monitoring and control. The ecological weeds listed in Appendix 5, Table 9 will be controlled at historic locations within the KNE site (see ecological weed operational areas in Appendix 1, Map 5).

Surveillance will be undertaken throughout the KNE site during the course of other duties within the forest. When encountered or identified, weed incursions will be assessed and prioritised for control.

9.2. Pest animal control

The aim of pest animal control at the KNE site is to maintain the integrity of the overall forest cover and protect uncommon ecosystem types and habitat features from further degradation. To meet the objectives outlined in section 8.2, pest animal operations aim to reduce possum population throughout most of the KNE site, maintain feral goat population at low levels, and control any feral deer or pigs encountered during goat culling operations. Operations include:

Aerially sown 1080 operations

Possums are one of the main vectors of bovine tuberculosis and are a threat to native forests. For this reason, possums are controlled using aerially sown 1080 (*Sodium fluoroacetate*) throughout most of the KNE site (operational area H; see Appendix 1,

Map 6) and some surrounding plantation areas if feasible at the time and it would be expected to deliver positive biodiversity outcomes.

Past monitoring results have shown aerial 1080 operations are likely to be needed every five to seven years to maintain the overall possum population density below 5% residual trap catch (RTC). The last aerial possum control operation was carried out in 2021. Therefore, the next operation is scheduled to be undertaken and funded by Greater Wellington in 2026, dependant on monitoring of the possum population showing that control is required around that time. Monitoring will be undertaken in the same year prior to confirmation of the operation.

Project rātā – Sustained possum control

Aerial 1080 operations are currently the most cost-effective methodology of controlling possums, rats, and stoats over large areas. However, Greater Wellington is developing the "Project rātā – Sustained possum control", which aims to maintain the gains made following aerial 1080 operations keeping possums at low levels. The project will target multiple species across a 1,000-ha operational area in the Akatarawa Forest KNE site (see Appendix 1, Map 7). This will involve the use of a new trapping network and a monitoring regime for the 1,000-ha operational area to continually suppress target pest species to very low levels. The specific area has been chosen for the project as it is home to many northern rātā which are extremely susceptible to possum damage, including New Zealand's largest northern rātā 1000-year-old Karapoti rātā.

Planning of the project will be completed during the 2024/25 financial year and implementation started in the 2025/26 financial year to coincide with the aerial 1080 operation scheduled for winter 2026 (see Section 11, Table 3).

Poison bait stations

A network of poison bait stations in operational area I is serviced at three-monthly intervals to keep possums at low levels. Bait stations are used in this area because it is too close to residential areas for aerially sown 1080 to be used safely. It is likely that the poisoning regime being used will also control rats to low levels around the bait station sites, as has been shown by monitoring of rat populations at similar forest sites where similar regimes are being used.

A network of traps is operational adjacent to the Akatarawa KNE site, within Ian Flux's private land (see Appendix 1, Map 8). Greater Wellington funds Ian Flux for bait supplies through the KNE programme as this trapping network keeps possums and rats to low levels in the bush within this private land, minimising the number of possums and rats entering the Akatarawa KNE site. Ian Flux services the traps regularly.

Ungulate control

Feral goats are culled annually to keep populations suppressed to low levels, levels at which goats are considered to have a negligible impact on native plant regeneration. Culling operations target the areas of the KNE site that are most favoured by feral goats, while other less favourable areas are checked intermittently to ensure that any unanticipated population increases are managed.

Current resources don't allow for any targeted culling of feral deer or pigs to be undertaken. However, any feral deer or pigs encountered during goat culling operations are destroyed. Recreational hunting is allowed in the forest through permits.

9.3. Environmental protocols

To help protect the natural resources of the KNE site from the potential impacts of human activities, the following procedures are followed while managing the KNE site as part of overall park management.

Environmental care

Greater Wellington's operational staff follow procedures to identify and avoid damage to biodiversity values such as plant and animal communities. This limits risks to these values that could occur while carrying out the construction and maintenance of assets, and when permitting the use of the KNE site by other users. Procedures may include undertaking assessments of environmental effects of planned works.

Biosecurity guidelines[23] are used by all Greater Wellington personnel when entering and working in the KNE site. Following these guidelines reduces the risk of spreading ecological weeds and pathogens into and around the KNE site. These guidelines involve checking for and removing seeds and plant fragments from vehicles, equipment, and clothing before entering the site and ensuring construction material is free of weed material.

Instructional information on how to avoid introducing ecological weeds and damage to ecological values is included in the conditions contained in permits issued to visiting researchers and private hunters and is conveyed to other users whenever appropriate and possible.

Recreation and commercial use

The potential impacts on biodiversity values posed by recreational activities are managed through the implementation of Toitū Te Whenua Parks Network Plan[24] and a Memorandum of Understanding between Greater Wellington and the Akatarawa Recreational Access Committee[25]. These documents limit the recreational activities that are permitted within the KNE site to four-wheel driving, trail and quad bike riding, mountain biking, horse riding, hunting, fishing, and passive forms of recreation such as camping, picnicking, walking, and running, and control where each is allowed. These forms of recreation are not likely to impact on biodiversity values within the KNE site if they continue to be restricted to designated amenity areas and existing roads and tracks. Recreational activity could be explored for volunteer opportunities for restoration activities (e.g., predator control).

The potential impacts of commercial activities are managed through the Greater Wellington Parks concession process.

Research and the collection of natural materials

Research activities and the collection of native plants and animals in the KNE site is managed by a permit system run by the Monitoring – Land, Ecosystems and Air team. The system aims to prevent adverse impacts on native flora and fauna occurring because of these activities.

The illegal collection of native plants and animals has occurred occasionally in Regional Parks. This has included some native tree species (which are valued for domestic uses such as fence construction and for firewood), some species of orchid (which are sought after by collectors and traders), and may have also included lizards and invertebrates. The Park Ranger watches for this activity while carrying out normal duties within the park.

Fire risk

To reduce the risk of uncontrolled fires, open fires are not permitted in the KNE site. This policy is communicated to users through onsite signage, the park information brochure, and Toitū Te Whenua Parks Network Plan[26].

9.4. Fish passage prioritisation

There are many man-made structures in watercourses throughout the KNE site associated with the road, track, and drainage networks. Structures in watercourses can be barriers to native fish migration.

The Environment Restoration team will continue to work with the Eastern Parks team to prioritize and advise on fish passage barriers for removal or remediation, and comment on the design of new or replacement structures in accordance with the National fish passage guidelines[27].

9.5. Advocacy for the KNE site's values

The Akatarawa Forest has many stakeholders and user groups including recreational users and plantation forestry managers. It is important to recognise the needs of these user groups and work together for a holistic management of the site. Greater Wellington will continue to work with these groups and to advocate for the biodiversity values of the KNE site as highlighted in this KNE operational plan.

9.6. Surveillance of uncommon ecological features

Throughout the lifetime of this KNE operational plan a number of important habitat features and uncommon ecosystems will be monitored by the Environment Restoration team to ensure their continued health is maintained and advocated for. Examples of the important habitat features include the sub-alpine mounts (Mt Wainui and Mt Maunganui), fern land areas, other wetlands present (e.g., Gratton's and Valley View wetlands) and large northern rātā tree areas.

10. Future opportunities

10.1. Revegetation

Should opportunities arise for revegetation it is recommended that wetlands, rivers corridors and threatened forest ecosystem types should be prioritised. Only eco-sourced plants and those species appropriate to a specific site will be used in revegetation planting.

10.2 Ecological surveys

Relatively few ecological studies have been undertaken within the Akatarawa Forest ranges. There is great opportunity to understand more about the bat, snail, lizard, and bird communities within the KNE site, should the opportunity arise.

11. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for the Akatarawa Forest KNE site, and their timing and cost over the five-year period from 1 July 2024 to 30 June 2029. The budgets for the years 2025/26 to 2028/29 are indicative only and subject to change. Operational areas (see Appendix 1, Maps 5, 6, and 7) are also subject to change according to operational needs over the course of the operational plan.

Table 3: Five-year operational plan for the Akatarawa Forest KNE site.

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2024/25	2025/26	2026/27	2027/28	2028/29
1	**Ecological weed control** Annual weed control in priority wetlands and river corridors	A, C, D, G	Wetlands within the KNE sites are protected and restored, and ecological weed distribution and density along river terraces is reduced	GW Pest Plants Team	$12,490	$12,490	$12,490	$12,490	$12,490
2	**Ecological weed control** Monitoring historic weed control sites and control where necessary	B, E, F	Eecological weed infestations are identified and controlled to increase native plant regeneration	GW Pest Plants Team	$12,490	$12,490	$12,490	$12,490	$12,490
2	**Pest animal control** Monitoring prior 1080 operation	H	Monitoring completed and reported to inform if 2025/26 1080 operation will be required	GW		$20,800			
2, 3	**Pest animal control** Control possums using aerial 1080	H	Possums kept to low numbers to protect the indigenous canopy cover (< 5% RTC* or equivalent BMI**)	GW		$581,100			

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2024/25	2025/26	2026/27	2027/28	2028/29
2	**Pest animal control** Monitoring post 1080 operation	H	Monitoring completed and reported to inform future management	GW			$21,400		
2	**Pest animal control** Continually suppress target species using a trapping network	P	Maintain the gains made following 1080 operations to keep pest numbers low for Rata protection	GW Pest Animals Team	$0	$110,074	$112,492	57,487	58,690
2	**Pest animal control** Control possums and rats by quarterly servicing of ground-based poison bait stations	I	Protect the indigenous canopy cover keeping possums and rats to low numbers to reduce risk from 1080 operations close to Totara Park	GW Pest Animals Team	$10,310	$10,310	$10,310	$10,310	$10,310
2, 3	**Pest animal control** Control possums and rats within private property adjacent to the Akatarawa KNE site	Private land	Protect the indigenous canopy cover keeping possums and rats to low numbers and reduce their migration into the KNE site	Private landowner	$1,000	$1,000	$1,000	$1,000	$1,000
2	**Pest animal control** Control feral goats and any feral deer or pigs encountered	H, I, J	Forest understorey and sub-canopy continues to regenerate naturally	GW Pest Animals Team	$38,560	$38,560	$38,560	$38,560	$38,560
3	**Environmental protocols** Biosecurity guidelines are followed by all GWRC operational staff and contractors when entering the KNE site	Throughout the KNE site	Minimise the potential impact of human activities on the natural resources of the KNE site	All operational staff accessing the KNE site	Staff time	Staff time	Staff time	Staff time	Staff time

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2024/25	2025/26	2026/27	2027/28	2028/29
3	**Fish passage prioritisation** Prioritise and advise on fish passage barriers for removal or remediation	Throughout the KNE site	Improve native fish migration in watercourses throughout the KNE site	GW	Staff time	Staff time	Staff time	Staff time	Staff time
4, 5	**Advocacy for the KNE site's values** Work together with stakeholders in the management of the KNE site	Throughout the KNE site	Advocate for the biodiversity values of the KNE site	GW Stakeholders	Staff time	Staff time	Staff time	Staff time	Staff time
4	**Surveillance of uncommon ecological features** Monitoring of important habitat features and uncommon ecosystems	Throughout the KNE site	Maintain and protect important habitat features and uncommon ecosystems	GW	Staff time	Staff time	Staff time	Staff time	Staff time
				Total	**$74,850**	**$786,824**	**$208,742**	**$132,337**	**$133,540**

*RTC = Residual Trap Catch (an index of population level gained through monitoring using leg-hold traps).
**BMI = Bite Mark Index (an index of population level gained through monitoring using chew-cards).

12. Funding contributions

12.1. Budgets allocated by Greater Wellington's 2021-31 Long Term Plan

The budgets for the years 2025/26 to 2028/29 are indicative only and subject to change.

Table 4: Long Term Plan 2021-31 allocated budget for the Akatarawa Forest KNE site.

Management activity	Timetable and resourcing				
	2024/25	2025/26	2026/27	2027/28	2028/29
Pest animal control Monitoring pre and post 1080 operation	$0	$20,800	$21,400	$0	$0
Pest animal control Akatarawa Forest Project Rātā	$0	$110,074	$112,492	57,487	58,690
Pest animal control 1080 operation	$0	$581,100	$0	$0	$0
Total	**$0**	**$711,974**	**$133,892**	**$57,487**	**$58,690**

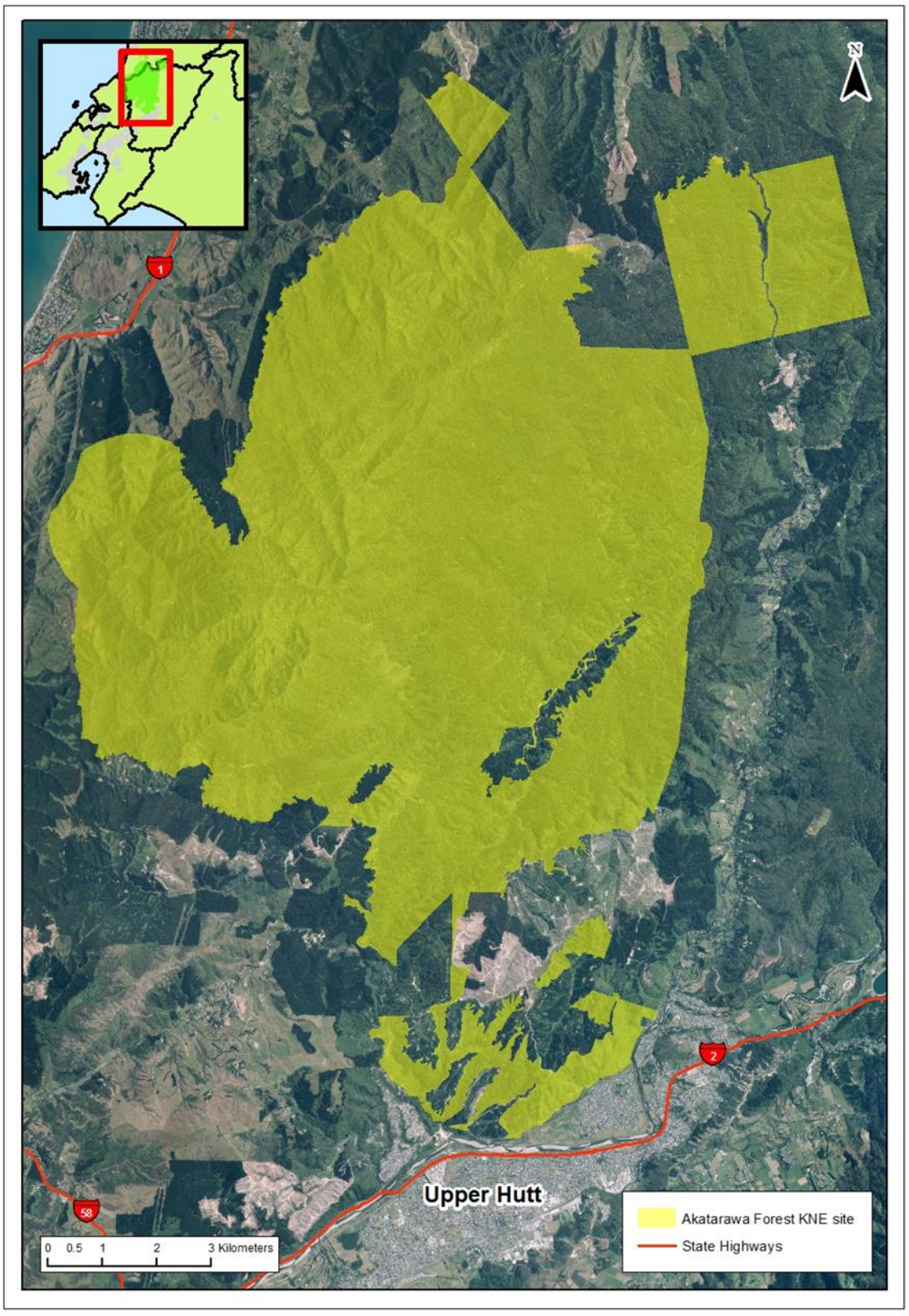
12.2. Budgets allocated by Greater Wellington's Environment Restoration Department

The budgets for the years 2025/26 to 2028/29 are indicative only and subject to change.

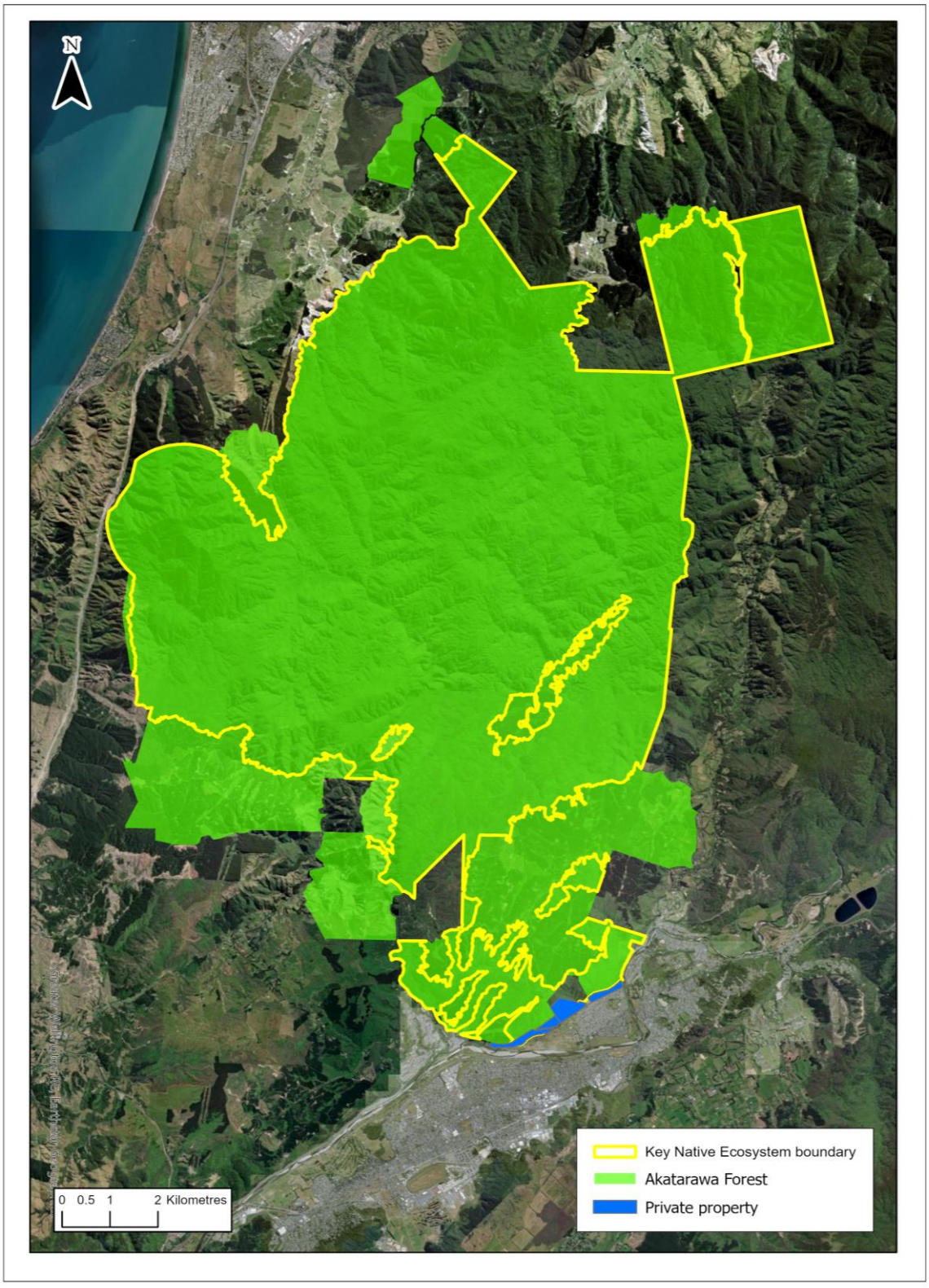
Table 5: Greater Wellington allocated budget for the Akatarawa Forest KNE site.

Management activity	Timetable and resourcing				
	2024/25	2025/26	2026/27	2027/28	2028/29
Ecological weed control	$24,980	$24,980	$24,980	$24,980	$24,980
Pest animal control	$49,870	$49,870	$49,870	$49,870	$49,870
Total	**$74,850**	**$74,850**	**$74,850**	**$74,850**	**$74,850**

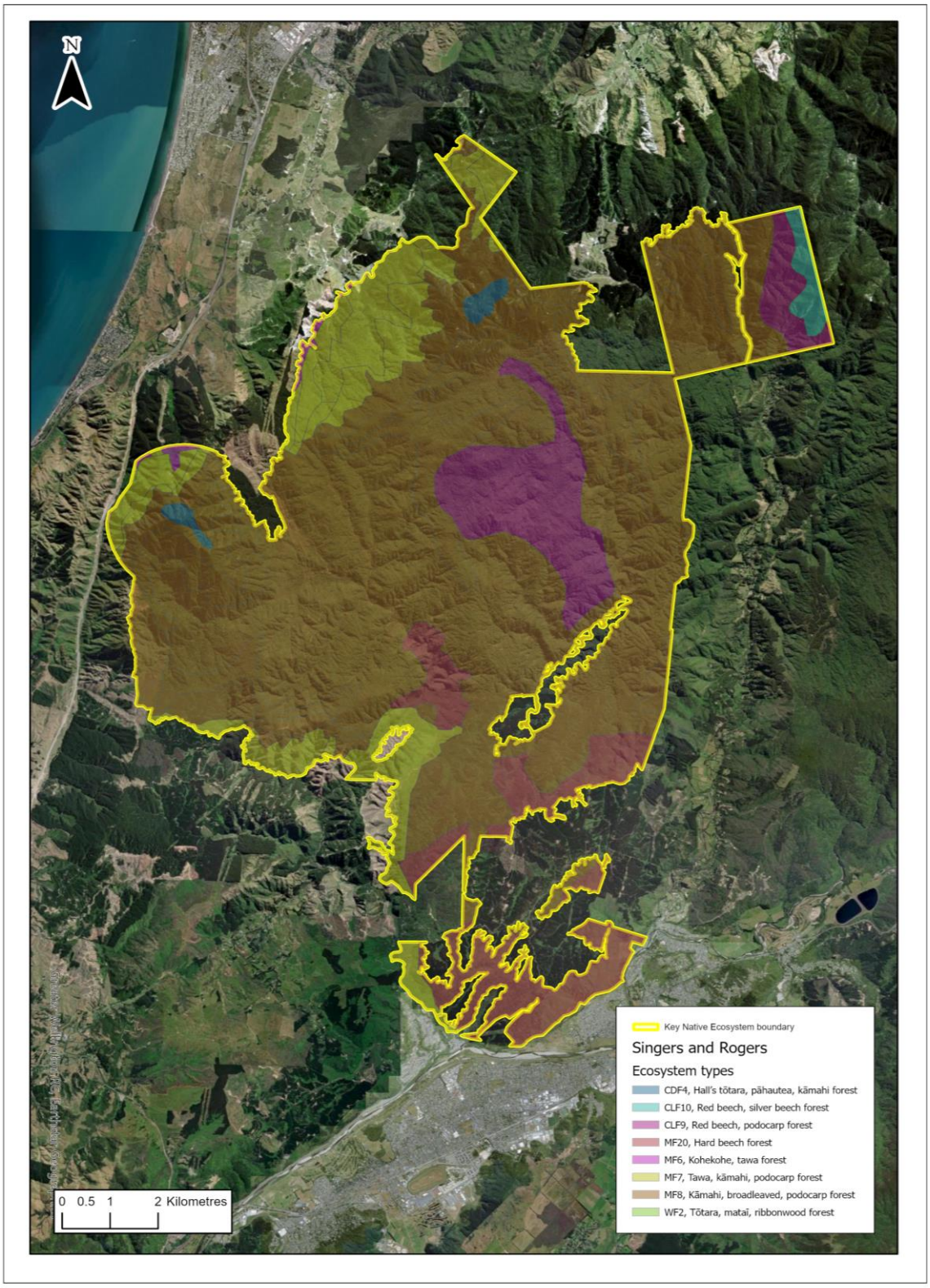
Appendix 1: Akatarawa Forest KNE site maps



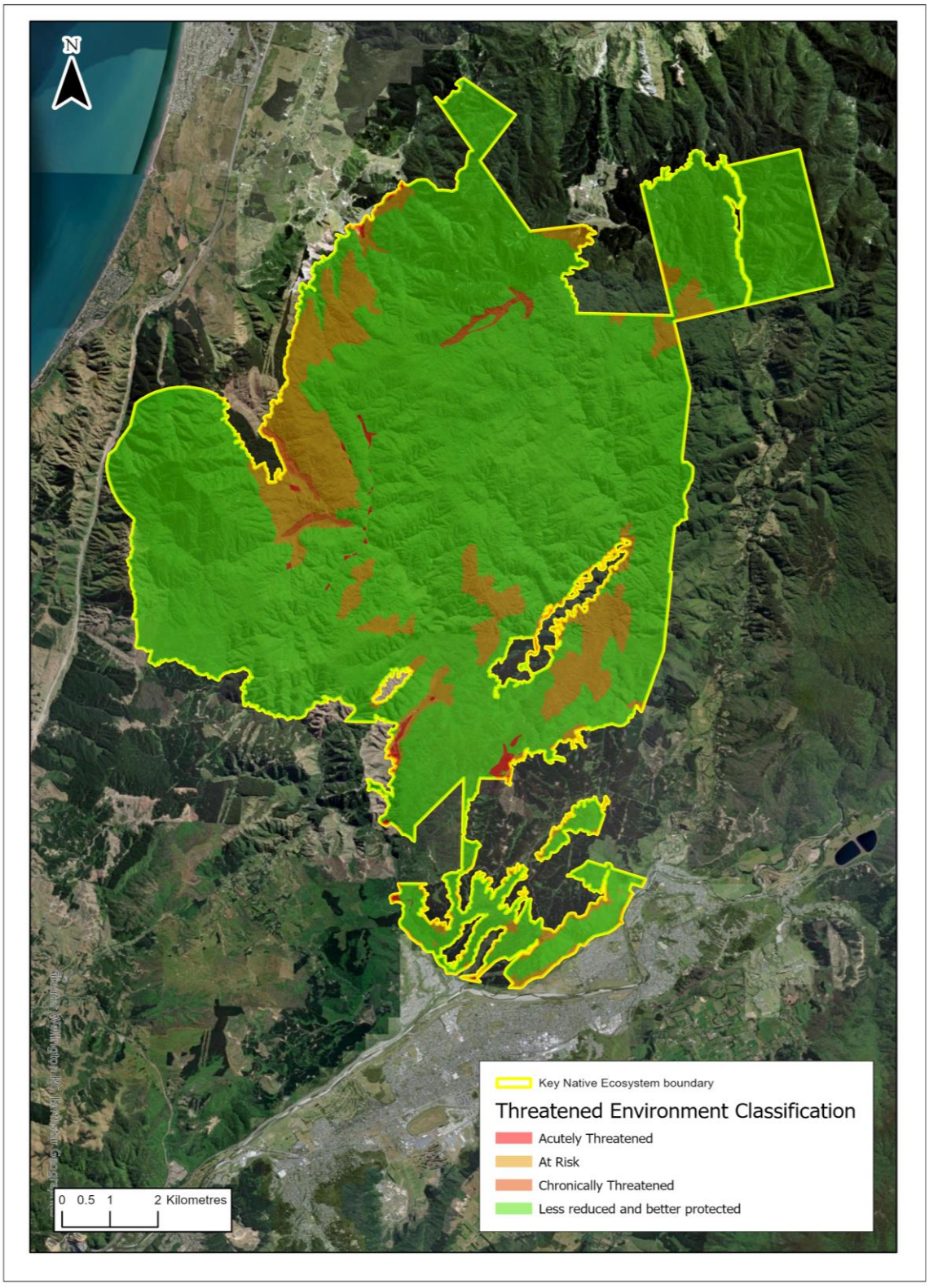
Map 1: The Akatarawa Forest KNE site boundary.



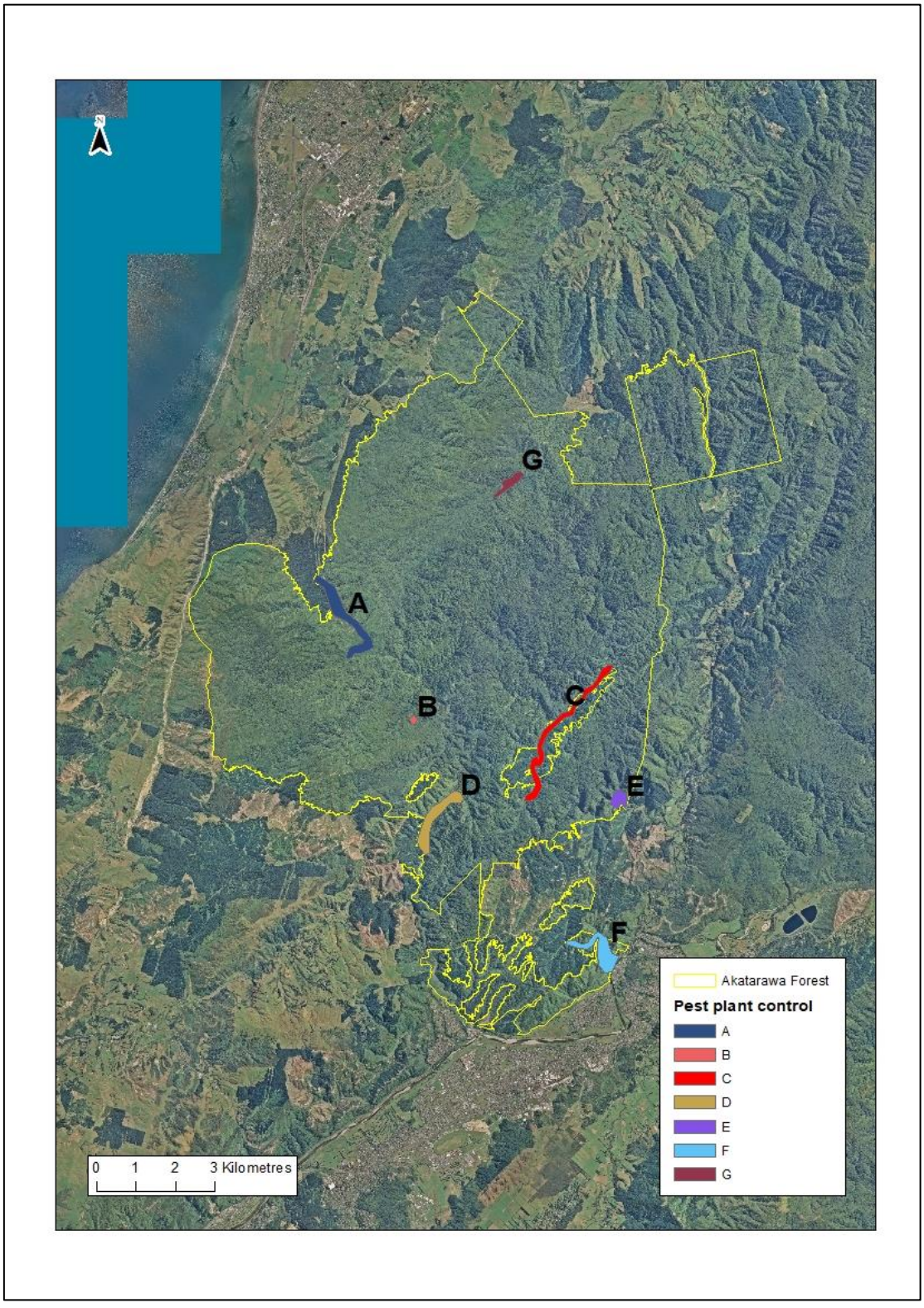
Map 2: Land ownership for the Akatarawa Forest KNE site.



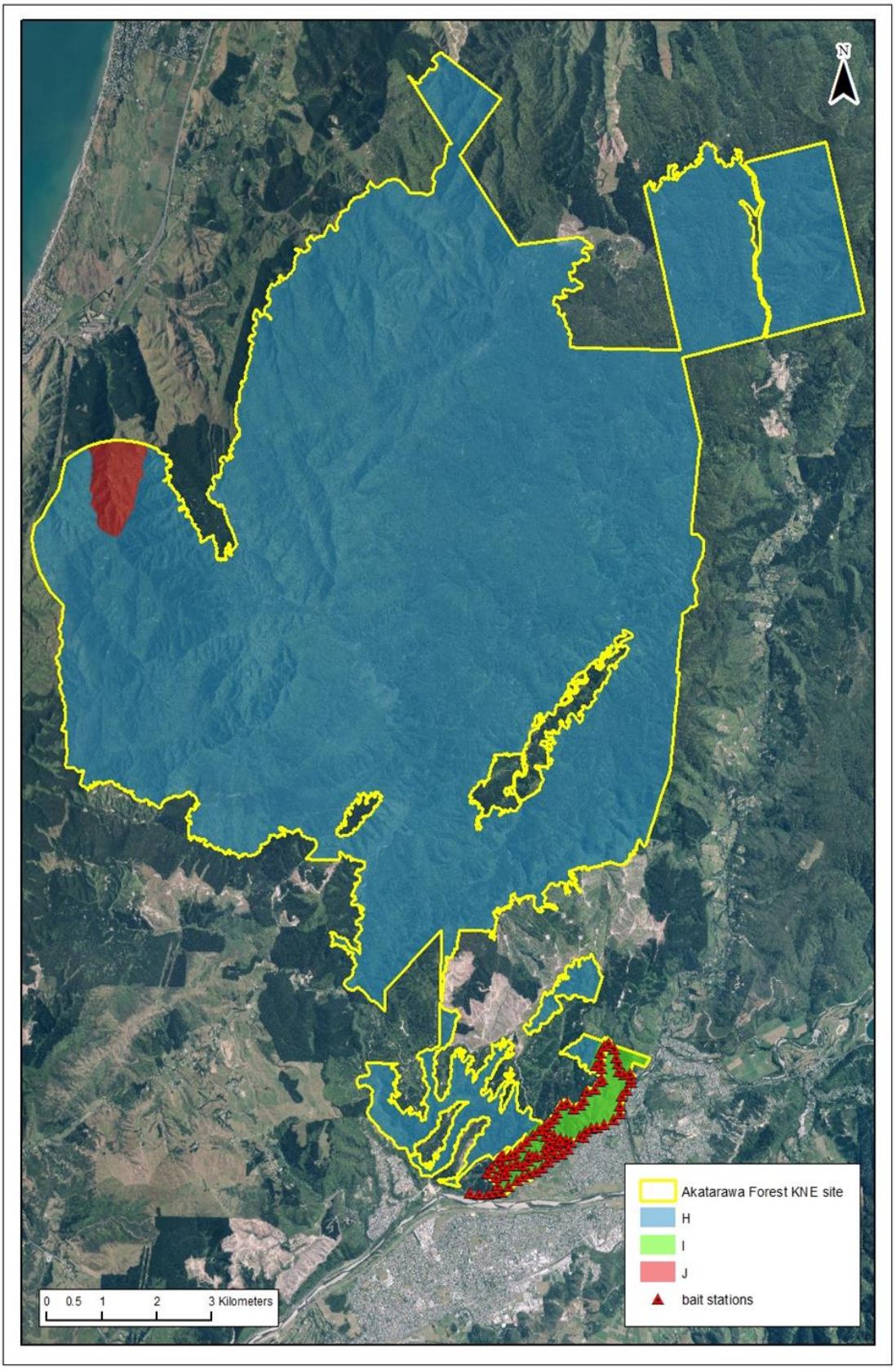
Map 3: Singers and Rogers classification of pre-human forest vegetation types for the Akatarawa Forest KNE site (WF2 is not visible on the map due to its small size).



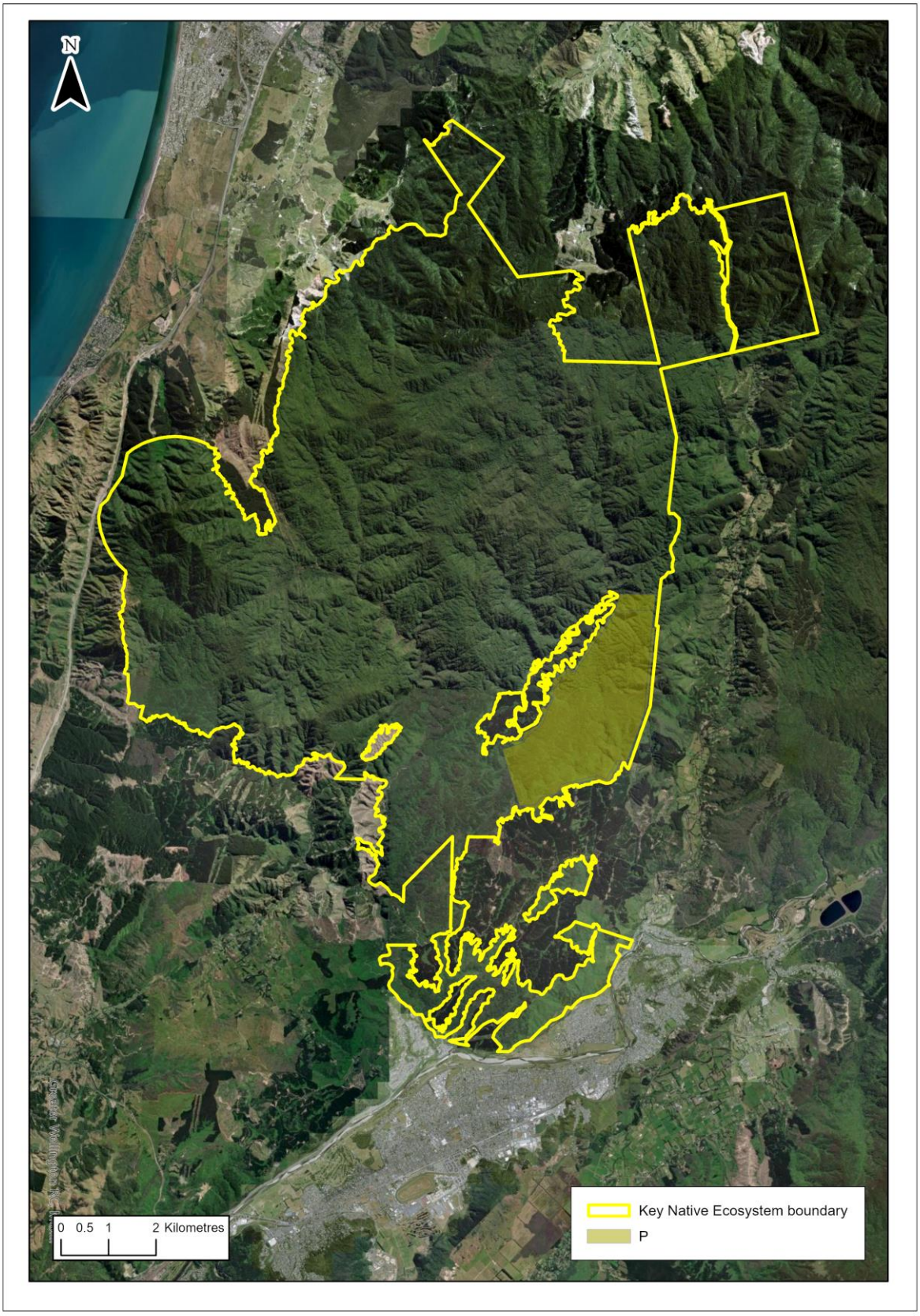
Map 4: Land Environment New Zealand threat classifications for the Akatarawa Forest KNE site.



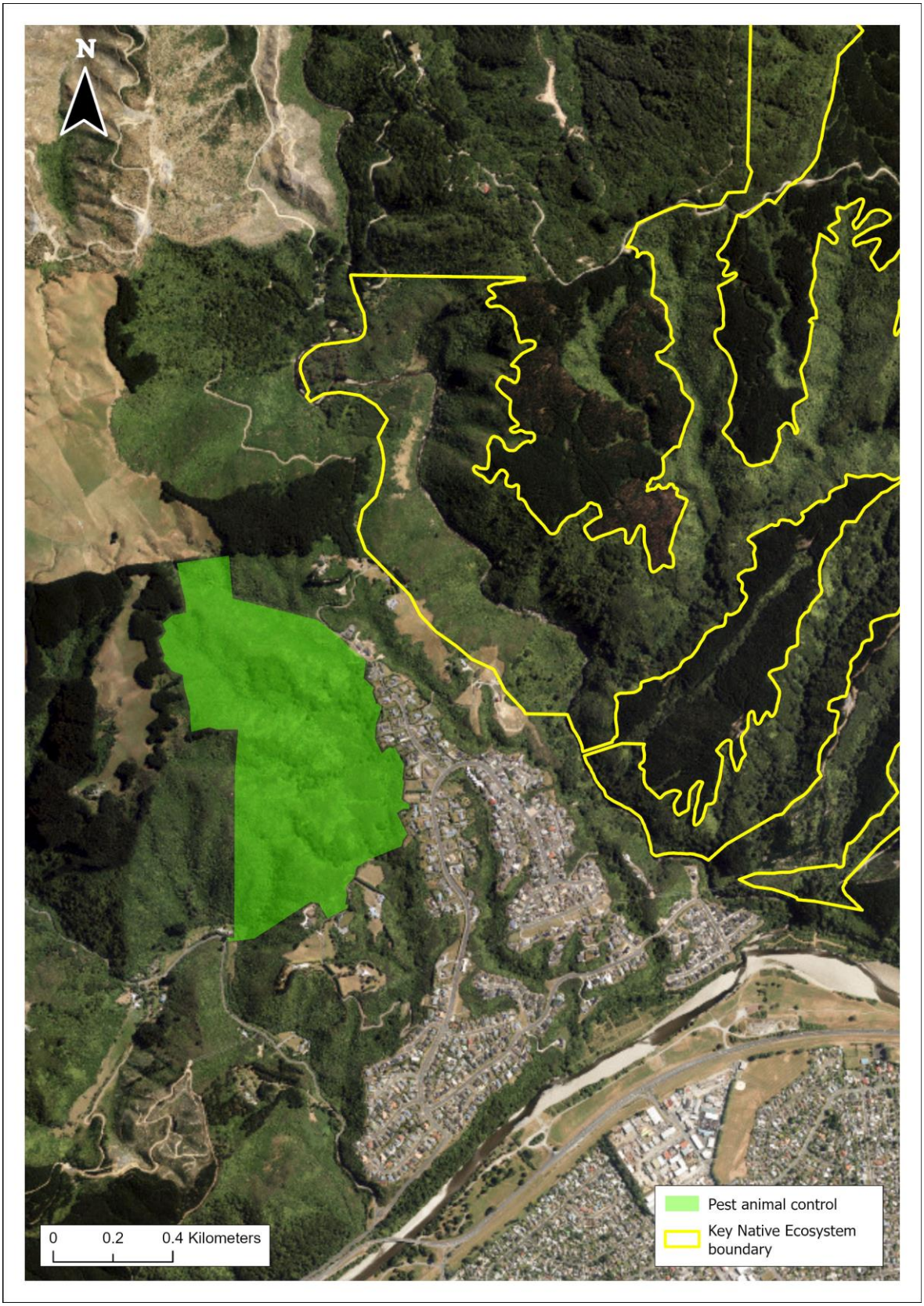
Map 5: Ecological weed control operational areas in the Akatarawa Forest KNE site.



Map 6: Pest animal control in the Akatarawa Forest KNE site.



Map 7: Project rātā – Sustained pest animal control in the Akatarawa Forest KNE site.



Map 8: Pest animal control within Ian Flux's private land.

Appendix 2: Nationally threatened species list

The following table lists Threatened and At-Risk species that are resident in, or regular visitors to, the Akatarawa Forest KNE site.

The New Zealand Threat Classification System lists species according to their threat of extinction. The status of each species group (e.g., plants, reptiles) is assessed over a five-year cycle[28]. Species are regarded as Threatened if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable[29]. They are regarded as At Risk if they are classified as Declining, Recovering, Relict, or Naturally Uncommon.

Table 6: Nationally threatened and At Risk species at the Akatarawa Forest KNE site.

Scientific name	Common name	Threat status	Observation
Plants(vascular)[30]			
Dactylanthus taylorii	Dactylanthus, woodrose	Threatened-Nationally Vulnerable	GW 2008
Polyphlebium colensoi	Bristle fern	At Risk-Naturally Uncommon	GWRC 2011 (as *Trichomanes colensoi*)
Hymenophyllum australe	Filmy fern	At Risk-Naturally Uncommon	GWRC 2011 (as *Hymenophyllum atrovirens*)
Brachyglottis kirkii var. kirkii	Kirk's daisy	At Risk-Declining	GWRC 2008, GWRC 2011
Leptinella tenella		At Risk-Declining	DOC 2013
Mazus novaezeelandiae subsp. novaezeelandiae	Dwarf musk	At Risk-Declining	GWRC 2008
Peraxilla colensoi	Scarlet mistletoe	At Risk-Declining	GWRC 2008
Peraxilla tetrapetala	Red mistletoe	At Risk-Declining	GWRC 2008
Streblus banksii	Large-leaved milk tree, turepo	At Risk-Relict	GWRC 2008
Anthosachne multiflora subsp. multiflora		Data Deficient	DOC 2013 (as *Elymus multiflorus*)
Birds[31]			
Phalacrocorax carbo novaehollandiae	Black shag	At Risk - Relict	DOC 2021
Acanthisitta chloris granti	Rifleman	At Risk – Declining	DOC 2021
Cyanoramphus auriceps	Yellow Crowned Parakeet	At Risk – Declining	DOC 2021
Falco novaeseelandiae	New Zealand Falcon	Threatened - Vulnerable	DOC 2021

Scientific name	Common name	Threat status	Observation
E*udynamys taitensis*	Long Tailed Cuckoo	Threatened - Vulnerable	DOC 2021
Freshwater fish[32]			
Galaxias postvectis	Shortjaw kokopu	Threatened - Vulnerable	
Anguilla dieffenbachii	Longfin eel	At Risk – Declining	NIWA 2014
Galaxias brevipinnis	Koaro	At Risk – Declining	NIWA 2014
Galaxias divergens	Dwarf galaxias	At Risk – Declining	NIWA 2014
Gobiomorphus hubbsi	Bluegill bully	At Risk – Declining	NIWA 2014

Appendix 3: Regionally threatened plant species list

The following table lists regionally threatened species that have been recorded in the Akatarawa Forest KNE site.

A methodology to create regional threat lists was developed by a collaborative group comprising representatives from DOC, regional councils, and a local authority. The resulting regional threat listing methodology leverages off the NZTCS, but applies a species population threshold adjusted to the regional land area under consideration (relative to the national land area) for species that are not nationally threatened. The assigned regional threat status cannot be lower than that of the national threat status, but can be higher, (e.g., a Nationally Vulnerable species could be assessed as being Regionally Critical). Other assessments made in the regional threat listing process include identifying populations that are national strongholds and the use of regional qualifiers, such as natural or historic range limits.

Table 7: Regionally threatened species recorded in the Akatarawa Forest KNE site.

Scientific name	Common name	Threat status	Observation
Plants (vascular)[33]			
Abrodictyum elongatum	Bristle fern	Regionally critical	GW 2011 (as *Trichomanes elongatum*)
Abrodictyum strictum	Erect bristle fern	Data Deficient	GWRC 2011 (as *Trichomanes strictum*)
Adiantum diaphanum	Tuberous maidenhair	Data Deficient	GWRC 2008
Adiantum fulvum	Maidenhair	Sparse	GWRC 2008, 2011
Adiantum viridescens	Maidenhair	Sparse	GWRC 2008, 2011
Botrychium biforme	Parsley fern	Gradual Decline	DOC 2013
Notogrammitis pseudociliata	Strapfern	Data Deficient	GWRC 2011 (as Grammitis pseudociliata)
Pittosporum cornifolium	Perching kohuhu	Sparse	GWRC 2008
Raukaua edgerleyi	Raukawa	Sparse	GWRC 2008
Birds[34]			
Acanthisitta chloris	Rifleman	At Risk – Declining	Crisp 2020
Cyanoramphus auriceps	Yellow Crowned Parakeet	Endangered	Crisp 2020
Eudynamys taitensis	Long Tailed Cuckoo	At Risk – Naturally Uncommon	Crisp 2020
Falco novaeseelandiae	New Zealand Falcon	Regionally critical	Crisp 2020
Hemiphaga novaeseelandiae	New Zealand Pigeon	At Risk – Recovering	Crisp 2020

Scientific name	Common name	Threat status	Observation
Phalacrocorax carbo	Black Shag	Regionally critical	Crisp 2020
Phalacrocorax melanoleucos	Little Shag	Vulnerable	Crisp 2020

Appendix 4: Threat table

Appendix 4 presents a summary of all known threats to the Akatarawa Forest KNE site including those discussed in section 7.

Table 8: Threats to the Akatarawa Forest KNE site.

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
Ecological weeds		
EW-1	Ground covering ecological weeds smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key ground covering ecological weed species for control include tradescantia, African club moss, and aluminum plant (see full list in Appendix 5).	C, G
EW-2	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key woody ecological weed species include radiata pine, buddleia, and holly (see full list in Appendix 5).	A, B, C, D, E, F, G
EW-3	Climbing weeds smother and displace native vegetation often causing canopy collapse, inhibit indigenous regeneration, and alter vegetation structure and composition. Key climbing ecological weed species include old man's beard, Japanese honeysuckle, and hops (see full list in Appendix 5).	A, C, D, F
EW-4	Aquatic weeds out-compete native aquatic species and choke watercourses (see full list in Appendix 5).	A, C, D
Pest animals		
PA-1	Possums (*Trichosurus vulpecula*) browse palatable canopy vegetation until it can no longer recover[35,36]. This destroys the forest's structure, diversity and function. Possums may also prey on native birds and invertebrates[37].	H, I, J
PA-2	Rats (*Rattus* spp.) browse native fruit, seeds and vegetation. They compete with native fauna for food and can reduce forest regeneration. They also prey on invertebrates, lizards and native birds[38,39] .	Entire KNE site
PA-3	Mustelids (stoats[40,41] (*Mustela erminea*), ferrets[42,43] (*M. furo*) and weasels[44,45] (*M. nivalis*)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions.	Entire KNE site
PA-4	Hedgehogs (*Erinaceus europaeus*) prey on native invertebrates[46], lizards[47] and the eggs[48] and chicks of ground-nesting birds[49] .	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
PA-5*	House mice (*Mus musculus)* browse native fruit, seeds and vegetation, and prey on invertebrates. They compete with native fauna for food and can reduce forest regeneration. They also prey on invertebrates, lizards and small eggs and nestlings[50,51].	Entire KNE site
PA-5*	Pest and domestic cats (*Felis catus*) prey on native birds[52], lizards[53] and invertebrates[54], reducing native fauna breeding success and potentially causing local extinctions[55].	Forest edges
PA-6	Rabbits (*Oryctolagus cuniculus*) and hares (*Lepus europaeus*) graze on palatable native vegetation and prevent natural regeneration in some environments[56].	Forest edges
PA-7	Wasps (*Vespula* spp.) adversely impact native invertebrates and birds through predation and competition for food resources. They also affect nutrient cycles in beech forests[57].	Entire KNE site
PA-	Red deer (*Cervus elaphus*) and fallow deer (*Dama dama*) browse the forest understory and can significantly change vegetation composition by preferential browsing and preventing regeneration[58,59,60].	Entire KNE site
PA-	Feral pigs (*Sus scrofa*) root up the soil and eat roots, invertebrates, seeds, and native plants preventing forest regeneration[61].	Entire KNE site
PA-	Goats (*Capra hircus*) browsing affects the composition and biomass of native vegetation in the understory tiers of forest habitats, preventing regeneration of the most palatable understory species and reducing species diversity[62].	Entire KNE site
PA-*	Brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) prey on native fish and compete with them for food resources[63].	Akatarawa river
PA-*	Eastern rosella (*Platycercus eximius*) parakeets are known to out-compete native red-crowned parakeets for nest-sites and are a vector of avian diseases. The continued presence of eastern rosella in the KNE site could limit the ability of red crowned parakeets to establish functional populations[64,65].	Forest edges
PA-	Australasian magpie (*Gymnorhina tibicen*) is a known nest predator of native bird species and are known to modify the behavior of native birds which could inhibit the ability of native birds to feed and breed[6667].	Forest edges
Human activities		
HA-1	Garden waste dumping often leads to ecological weed invasions into natural areas. Common weed species introduced at this KNE site include Tradescantia and Japanese honeysuckle.	Forest edges

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
HA-	Agricultural practices, particularly grazing livestock, can result in pugged soils, grazed native vegetation inhibiting regeneration, wildlife disturbance and increased nutrient content of soils and watercourses[68].	Forest edges
HA-	Recreational use such as tramping, mountain biking and horse riding can damage and disturb the native ecosystem. It is also likely to disturb native fauna and introduce ecological weeds.	Roads and tracks within the KNE site
HA-	Plantation forestry on adjoining land parcels to the KNE site has the potential to cause habitat loss or degradation, disturb native wildlife, damage boundary fencing and increase sediment load in watercourses via surface run-off during harvesting operations.	Entire KNE site
HA-	Encroachment of residential gardens into the KNE site from urban areas causes habitat loss and introduces ecological weeds.	Forest edges
HA-	Barriers to native fish passage are present in streams within the KNE site preventing migrating fish from completing their life-cycle.	N/A
HA-	Land use activities that alter the local hydrology, such as development schemes and sub-divisions can affect the water levels that sustain wetland ecosystems.	Forest edges
HA-	Poor water quality affects a range of species in the estuary and stream. High nutrient levels and contaminants within watercourses are often caused by upstream land management practices and pollution events including development practices, forestry and agricultural practices, road run-off and storm water entering the watercourse, and sceptic tank leakages.	Entire KNE site
HA-	Dogs (*Canis lupus familiaris*), if uncontrolled or unleashed can disturb or kill nesting birds and chicks, and lizards within the KNE site, particularly near walking tracks[69].	Forest edges
HA-	Freshwater activities such as boating, fishing, white baiting and duck shooting can introduce aquatic weed species to waterways.	N/A
HA-	Recreational vehicles such as 4WDs and motorbikes can cause disturbance of the native ecosystem.	Roads and tracks within the KNE site
Other threats		
OT-1	Small forest remnants are affected by environmental impacts on their edges such as changing environmental conditions (e.g., soil moisture or temperature levels), changing physical environment (e.g., different plant assemblages compared to the interior) and changing species interactions (e.g., increased predation by invasive species)[70,71].	Forest edges

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
OT-	A lack of legal protection can leave a site at risk of future development or destruction and resources invested in the site may be wasted. Part of this KNE site is private property and uncovenanted, having no protection status.	Entire KNE site

*Threats marked with an asterisk are not addressed by actions in the operational delivery schedule

Appendix 5: Ecological weed species

The following table lists key ecological weed species that have been recorded in the Akatarawa Forest KNE site.

The distribution and density of individual species within [each operational area] is recorded. Three levels of distribution (localized, patchy, and widespread) and density (sparse, abundant, and dense) are used to describe these aspects of infestations of each species.

Table 9: Ecological weed species recorded in the Akatarawa Forest KNE site.

Scientific name	Common name	Management aim
Acer pseudoplatanus	Sycamore	Suppression
Alnus glutinosa	Alder	Surveillance
Aponogeton distachyos	Cape ponweed	Surveillance
Berberis darwinii	Darwin's barberry	Suppression
Berberis glaucocarpa	Barberry	Suppression
Buddleia davidii	Buddleia	Suppression
Cestrum elegans	Red cestrum	Surveillance
Clematis vitalba	Old man's beard	Suppression
Cortaderia selloana	Pampas	Suppression
Cotoneaster spp.	Cotoneaster	Suppression
Crocosmia × crocosmiiflora	Montbretia	Suppression
Cornus capitata	Strawberry dogwood	Surveillance
Fraxinus excelsior	Narrow leaved ash	Surveillance
Humulus lupulus var. *lupulus*	Hops	Eradication
Hydrangea macrophylla	Hydrangea	Surveillance
Hypericum androsaemum	Tutsan	Surveillance
Ilex aquifolium	Holly	Suppression
Lamium galeobdolon	Aluminium plant	Surveillance
Lathyrus latifolius	Everlasting pea	No management
Lonicera japonica	Japanese honeysuckle	Suppression
Pinus radiata	Radiata pine	Progressive containment
Salix fragilis	Crack willow	Surveillance
Selaginella kraussiana	African club moss	Suppression
Tradescantia fluminensis	Tradescantia	Suppression
Ulex europaeus	Gorse	Suppression
Chamaecyparis lawsoniana	Lawson's cypress	Surveillance

Scientific name	Common name	Management aim
Pseudotsuga menziesii	Douglas fir	Suppression
Thuja plicata	Western red cedar	Surveillance
Allium triquestrum	Onion weed	Surveillance
Arctium minus	Burdock	Surveillance
Calystegia sepium	Pink bindweed	Surveillance
Camellia sp.	Camellia	No management
Conium maculatum	Hemlock	Surveillance
Cytisus scoparius	Broom	No management
Kerria japonica	Japanese kerria	Surveillance
Foeniculum vulgare	Fennel	Surveillance
Leycestearia formosa	Himalayan honeysuckle	Suppression
Lupinus arboreus	Tree Lupin	Surveillance
Phytolacca octandra	Inkweed	Surveillance
Rubus fruticosus	Blackberry	Suppression
Teline monspessulana	Montpellier broom	Surveillance

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