Key Native Ecosystem Operational Plan for Belmont – Korokoro

2024-2029

Contents

1. Purpose

The purpose of this five-year Key Native Ecosystem (KNE) operational plan for Belmont - Korokoro 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 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.

The KNE programme funding is allocated for under The Greater Wellington Long Term Plan (2021-2031)[2] and is managed in accordance with The Greater Wellington Biodiversity Strategy[3] that 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 for the Wellington Region[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, (ie, 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. Belmont – Korokoro Key Native Ecosystem site

Belmont – Korokoro KNE site (1,045ha) is located at the southern end of the western Hutt hills; between the suburbs of Horokiwi to the west and Korokoro and Maungaraki to the east. Most of the KNE site lies within Belmont Regional Park, which is managed by Greater Wellington (see Appendix 1, Map 1). The KNE site contains most of the catchment of Te Korokoro o Te Mana/Korokoro Stream, which flows into Wellington Harbour. It also contains a small portion of the adjacent Belmont Stream catchment, which flows into the Hutt River.

The KNE site contains a large area of mature native forest including the largest remaining stand of rimu-rātā/tawa-kohekohe forest in the south-west of the Wellington region[8]. The rest of the KNE site is cloaked in young to well-advanced regenerating mixed broadleaf native forest.

The KNE site is one of five forested KNE sites located in the western Hutt hills which together provide habitat connectivity and support the dispersal of native species through the Hutt Valley.

5. Parties involved

There are several organisations and groups that play important roles in the care of the KNE site.

5.1. Landowners and land managers

Most of the KNE site is managed by Greater Wellington as part of Belmont Regional Park. The regional park section includes land owned by several organisations. The rest of the KNE site is owned mostly by private landowners and Hutt City Council. Following is a breakdown of the ownership and management of land within the KNE site (also see Appendix 1, Map 2).

- Belmont Regional Park (1,020ha): managed by Greater Wellington and consisting of land owned by:
  - Greater Wellington (440ha)
  - Hutt City Council (418ha)
  - Wellington City Council (104ha)
  - Department of Conservation (58ha)
- Eleven private landowners (12ha combined)
- Hutt City Council (12ha outside the regional park)
- Office of Treaty Settlements (1ha)

Management of Belmont Regional Park is guided by the Toitū Te Whenua Parks Network Plan[9] and the Belmont Regional Park Sustainable Land Use Plan[10]. These plans guide the recreational and amenity uses of the park as well as identify opportunities to protect biodiversity values. This KNE operational plan is consistent with the wider objectives and policies of these plans.

Various levels of legal protection are in place on land within the KNE site:

- scenic reserve: 201ha
- recreation reserve: 597ha
- local purpose reserve (Esplanade or Māori Significance): 3ha
- held for waterworks purposes: 200ha

Land not legally protected in the KNE site amounts to 44ha.

5.2. Operational delivery

Within Greater Wellington, five teams are responsible for delivering the Belmont – Korokoro 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 Plants and Pest Animals 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 Monitoring - Land, Ecosystems and Air team coordinates small mammal monitoring with funding from the Environment Restoration team's KNE programme budget
- The Western Parks team primarily manages recreational access and maintains assets such as roads, tracks and amenity areas within the KNE site. However, the Park Ranger also assists with overseeing volunteers undertaking ecological weed and pest animal control activities in the KNE site.

The Korokoro Environmental Group (KEG) undertakes predator trapping and the field work component of Greater Wellington's small mammal monitoring programme at the KNE site. The group has been undertaking monitoring since June 2009 and started servicing most of the predator traps in the KNE site in February 2023. KEG is working with Greater Wellington on plans to extend predator and possum control into the upper part of the KNE site where there is currently no control in place.

The Pareraho Forest Trust undertakes pest control mostly in the north-eastern part of the KNE site. The trust started this work in 2022.

A group of mostly Maungaraki residents undertake ecological weed control in the KNE site from time to time. This control work, which started in 2023, focuses mostly on controlling wild cherry trees in the Maungaraki area.

5.3. Mana whenua partners

The Belmont - Korokoro KNE site area is significant to Taranaki Whānui ke te Upoko o te Ika (Taranaki Whānui) and Ngāti Toa Rangatira (Ngāti Toa), who are mana whenua partners with Greater Wellington.

Te Korokoro o te mana/Korokoro Stream, an important feature of the KNE site, has been identified as culturally important in the Natural Resources Plan for the Wellington Region (NRP)[11]. Table 1 below lists the values that Te Korokoro o te mana/Korokoro Stream holds for Taranaki Whānui as listed in the NRP.

The Statutory Acknowledgements from the Port Nicholson Block (Taranaki Whānui ki te Upoko o Te Ika) Claims Settlement Act 2009[12] and the Ngāti Toa Rangatira Claims Settlement Act 2014[13] provide further details of the associations that Taranaki Whānui and Ngāti Toa 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: Taranaki Whānui sites of significance in Belmont – Korokoro KNE site[14]

Sites of significance	Mana whenua values
Te Korokoro o Te Mana /Korokoro Stream (Schedule B - Te Taonga Nui a Kiwa)	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

5.4. Stakeholders

Korokoro Environmental Group (KEG) is a local community group that advocates for and undertakes protection of natural areas in and around the suburb of Korokoro, including parts of the KNE site. KEG has advocated for better protection of Korokoro Valley and lobbied for greater funding and scope of biodiversity management activities undertaken in the KNE site. KEG undertakes pest control and small mammal monitoring in the KNE site and in the past has undertaken ecological weed control and native planting in the lower Korokoro Valley.

The Pareraho Forest Trust supports residents of Belmont and Kelson to care for nature locally, including through predator trapping. It is likely that this work is adding value to the management activities undertaken in the KNE site.

Friends of Belmont Regional Park advocates for positive environmental outcomes in Belmont Regional Park. This has included for the protection of the KNE site from development.

The Lower Hutt branch of Royal Forest and Bird Protection Society (Forest & Bird) has a strong interest in the KNE site and has identified it as a key site in the development of bush corridors for bird dispersal across the Wellington region. Forest & Bird's interest in the ecological health of Te Korokoro o Te Mana/Korokoro Stream initiated investigations into options for enhancing fish passage at the Woollen Mill Dam.

Belmont Area Mountain Bike Association (BAMBA) is the most active recreational group operating in the KNE site.

Greater Wellington manages a debris arrestor structure situated at the lower end of Te Korokoro o Te Mana/Korokoro Stream. Access to the debris arrestor must be kept clear of tall growing vegetation to allow easy access for removing caught debris. The structure captures debris flowing down the stream during heavy rainfall events that could otherwise cause blockages further downstream and lead to flooding of State Highway 2, local roads and industrial premises.

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 Belmont – Korokoro KNE site.

Table 2: Designations at the Belmont – Korokoro KNE site

Designation level	Type of designation
National	Parts of the Belmont – Korokoro KNE site are designated as Scenic Reserve and Recreation Reserve
Regional	Parts of the Belmont – Korokoro KNE site are designated under the Natural Resources Plan for the Wellington Region (NRP) as Ecosystems and Habitats with Significant Indigenous Biodiversity Values (Schedule F1)[15]: • River with Significant Indigenous Ecosystems – habitat for indigenous threatened/at risk fish species – Te Korokoro o Te Mana/the Korokoro Stream and all of its tributaries • River with Significant Indigenous Ecosystems – habitat for six or more migratory indigenous fish species – Te Korokoro o Te Mana/the Korokoro Stream and all of its tributaries
District	Part of the Belmont – Korokoro KNE site is designated as Significant Natural Resource in HCC's District Plan: • Korokoro Stream Bush Parts of the Belmont – Korokoro KNE site is designated as Conservation Covenant by the Department of Conservation: • Waitangirua Covenants
Other	Parts of the site are gazetted for Waterworks purposes

6.2. Ecological significance

The Belmont - Korokoro KNE site is considered to be 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 it provides core habitat for threatened indigenous bird, lizard and fish species.

Representativeness

The Singers and Rogers[16] classification of pre-human forest vegetation indicates that the KNE site would have originally comprised a mix of mainly kohekohe, tawa forest (MF6) and tawa, kāmahi, podocarp forest (MF7). Only 16% and 22% of the pre-human extent of these forest types respectively remain in the Wellington region, making them regionally At Risk ecosystem types[17]. There may have also been a small component of kāmahi, broadleaved, podocarp forest (MF8) at higher altitude (see Appendix 1, Map 3).

The existing ecosystems have been modified considerably from the original. They have experienced selective logging, clearances, and species extinction. However, the approximately 80-ha remnant of original forest in the KNE site maintains many elements and is still representative of the original forest types.

The Threatened Environment Classification system defines ecosystem and habitat threat categories nationally, based on percentage of indigenous cover remaining[18]. The system indicates that around 450ha of the KNE site, including part of the remnant of original forest, is on land environments that are classified as At Risk. This is because there is only 20-30% native vegetation remaining on these types of land in New Zealand[19] (see Appendix 1, Map 4).

Rarity/distinctiveness

Two plant, seven bird, two lizard and six freshwater fish 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 plant, bird and lizard species found within the KNE site are classified as regionally 'Threatened'. Appendices 2 and 3 contain lists of the nationally and regionally threatened species found in the KNE site.

Diversity

The KNE site contains a variety of habitat types incorporating areas of coastal, riverine and lowland forest habitats. Natural ecotones exist between these different types of habitat forming an uninterrupted ecological sequence from near sea level to 457m altitude at Belmont Trig. This variety of habitat types supports a wide diversity of species.

Ecological context

The KNE site is an important area in the landscape-level ecology of the Wellington - Porirua - Hutt Valley area. The KNE site is considered large enough to allow prolific breeding of indigenous forest bird species responsible for native seed dispersal and plant pollination[20]. It is connected by ecological corridors with other areas of forest habitat in all directions. The combination of these factors makes the site locally and regionally important for native bird breeding and dispersal.

6.3. Ecological features

Flora

The ecological makeup of the KNE site is underpinned by the remnant of original native forest which is situated roughly in the middle of the site. The dominant canopy trees in the remnant are tawa (*Beilschmedia tawa*), kohekohe (*Dysoxylum spectabile*), rewarewa (*Knightia excelsa*), hīnau (*Elaeocarpus dentatus*) and tītoki (*Alectryon excelsus*)[21]. Emergent canopy trees are present although they are less abundant than they would have originally been. These include rimu (*Dacrydium cupressinum*), miro (*Prumnopitys ferruginea*), kahikatea (*Dacrycarpus dacrydioides*), northern rātā (*Metrosideros robusta*) and pukatea (*Laurelia novae-zelandiae*). Large areas of regenerating bush at various stages of regeneration, including advanced regeneration in the gullies, enlarge the area of native vegetation and act as a buffer for the remnant forest.

Fauna

Birds

Twenty-three species of native bird have been recorded at the KNE site. These include all but one of the native forest-bird species that have survived naturally in the Wellington region – titipounamu/rifleman (*Acanthisitta chloris*) are not present. Included are several species uncommon in many parts of the region, such as miromiro/tomtit (*Petroica macrocephala*), pōpokotea/whitehead (*Mohoua albicilla*), koekoeā/long-tailed cuckoo (*Rudynamys taitensis*), kārearea/New Zealand falcon (*Falco novaeseelandiae*), kākā (*Nestor meridionalis*) and both red and yellow-crowned kākāriki/parakeet (*Cyanoramphus novaezelandiae* and *C. auriceps*).

Reptiles

Six species of lizards have been observed either within the KNE site or within a few hundred metres of its boundary[22]. These are barking gecko (*Naultinus punctatus*), ngahere gecko (*Mokopirirakau* 'southern North Island'), raukawa gecko (*Woodworthia maculata*), northern grass skink (*Oligosoma polychroma*), ornate skink (*O. ornatum*) and glossy brown skink (*O. zelandicum*). Three of these species are classified as nationally At Risk and one species is classified as regionally At Risk (see Appendices 2 and 3).

Fish (including koura/crayfish)

The Korokoro Stream is recognised for its high native fish values. Eleven species of native fish have been recorded in the Korokoro catchment. These are: longfin eel (*Anguilla dieffenbachia*), shortfin eel (*A. australis*), giant kōkopu (*Galaxias argenteus*), banded kōkopu (*G. fasciatus*), dwarf galaxias (*G. diverdens*), kōaro (*G. brevipinnis*), īnanga (*G. maculatus*), common smelt (*Retropinna retropinna*), bluegill bully (*Gobiomorphus hubbsi*), redfin bully (*Gobiomorphus huttoni*) and common bully (*Gobiomorphus cotidianus*)[23]. Six of these species are classified as nationally At Risk species (see Appendix 2). Koura/freshwater crayfish (*Paranephrops planifrons*) have also been recorded in the KNE site.

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 Belmont – Korokoro KNE site are discussed below and all known threats to the KNE site are summarized in Appendix 4.

7.1. Key threats

Ecological weeds, pest animals and human activities all have the potential to impact the Belmont – Korokoro KNE site. The most significant threats come from a suite of ecological weed and pest animal species, grazing stock, barriers to fish passage, and the adverse effects of surrounding land use.

Numerous climbing, ground covering and woody weed species are present in the KNE site. Some are widespread across the KNE site and entrenched in some areas. Species posing the most significant threat to the native integrity of the KNE site are African club moss (*Selaginella kraussiana*), tradescantia (*Tradescantia fluminensis*) and old man's beard (*Clematis vitalba*). These species are all displacing native flora and preventing natural forest regeneration. Other species present that cause concern include Darwin's barberry (*Berberis darwinii*), barberry (*Berberis glaucocarpa*), cathedral bells (*Cobaea scandens*), ivy (*Hedra helix*) and Chilean rhubarb (*Gunnera tinctoria*). If left uncontrolled, ecological weeds will grow in density and distribution and will alter the forest structure and character over time.

Many pest animal species are present in the KNE site or just beyond its boundaries. The species that present the greatest threat if they weren't controlled are brush-tailed possum (*Trichosurus vulpecula*), rat (*Rattus* spp.), stoat (*Mustela erminea*), weasel (*M. nivalis*), hedgehog (*Erinaceus europaeus*), feral goat (*Capra hircus*) and feral deer (*Cervus elaphus* and *Dama dama*).

Grazing of stock beyond the boundary of the KNE site but still within the stream catchments could cause elevated levels of sediment run-off into the streams within the KNE site. This could lead to reduced water clarity and altered substrate composition, adversely impacting the stream ecology. Degraded fencing on some parts of the boundary of the KNE site occasionally allow farmed stock to gain access into the KNE site which leads to damage of the understory and inhibits regeneration of the native forest.

Two historic dams within Te Korokoro o Te Mana/Korokoro Stream are likely to restrict or totally prevent the passage of some native fish species. This reduces the amount of potential habitat available to these species and reduces the biotic diversity of the aquatic ecosystem above the dams. As the two dams are located in the lower reaches of the stream, a very large proportion of the catchment is rendered inaccessible to those species that can't negotiate the dams.

Providing recreational opportunities in the KNE site presents the risk of impacts on native biodiversity. Impacts could occur while creating recreational facilities such as new tracks, and while recreation is being undertaken. If these risks aren't

managed carefully, they could damage plant communities, cause sedimentation of streams, and introduce or spread ecological weeds. Biodiversity management activities such as pest animal control can also have similar impacts if not managed carefully. Protocols relating to biosecurity are outlined in Section 9.5.

8. Vision and objectives

8.1. Vision

The entire KNE site resembles the forest ecosystem that was originally present. It is regenerating and flourishing, and it is supporting increasingly diverse and successfully breeding populations of native birds, lizards, invertebrates, and fish. It provides core habitat and an anchor stone for the expansion of native bird species into the surrounding districts.

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 Belmont – Korokoro KNE site.

1. **Protect the core area of mature native forest**
2. **Improve the regeneration of the rest of the KNE site**
3. **Protect native fauna from predation**
4. **Prevent the loss or degradation of native habitat**
5. **Gather information to inform management decisions**
6. **Raise community awareness of the ecological values of the KNE site and support the local community to protect those values**

9. Operational activities

Operational activities are targeted to work towards the objectives above (Section 8). The broad approach to operational activities is described 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 main aim of ecological weed control at the KNE site is to protect the core area of mature native forest and improve native regeneration in surrounding areas of advanced regenerating forest. This means preventing an increase in the abundance of ecological weeds in the core area and keeping ecological weeds to low levels in surrounding areas. Control is primarily confined to operational area A (see Appendix 1, Map 5). However, some control is undertaken further afield within the KNE site to limit highly invasive ecological weeds from spreading into area A. The ecological weed species targeted are listed in Appendix 5.

Controlling ecological weeds throughout operational area A is difficult due to the large size and steep topography of the area. Therefore, spatial and quantitative data gathered from several past weed surveys at the site (see Appendix 1, Map 6) is used to focus control work to areas where infestations of the most invasive species are likely to be found. Operational staff utilise viewpoints and occasionally undertake helicopter searches during seasonal flowering periods to locate infestations of target species. Priority is made of controlling mature specimens producing large amounts of seed and checking the locations of previously controlled infestations to ensure these don't regenerate.

Tradescantia and African club moss are controlled within operational areas A and B to minimise the spread of these species into the understory of native forest. Currently this involves controlling only patches that are isolated from the large and entrenched infestations that line stream banks and walking tracks within the site. Once the isolated patches have been controlled, then progressive control of the large infestations, working from the top of the catchment down, might be undertaken.

While undertaking ecological weed control work, the bridle trails within the KNE site are monitored for incursions of ecological weeds. This is to address the risk of ecological weeds being introduced or spread by horses being ridden through the KNE site - seeds can be spread in horse hooves and droppings.

9.2. Pest animal control

The aim of pest animal control at the KNE site is to protect the core area of mature native forest, improve native regeneration throughout the KNE site, and protect native fauna such as native birds, lizards and invertebrates. This means controlling mammalian browsers that impact native forest health and regeneration, such as possums, rats, goats and deer, and controlling predators of native fauna, such as weasels, stoats and hedgehogs.

In operational area A (the middle and lower parts of the KNE site), possum control is undertaken by Greater Wellington staff or contractors by servicing a large network of bait stations (see Appendix 1, Map 5). A few bait stations positioned on HCC reserve and private land beyond the KNE boundary are used to slow the migration of possums into the southern section of the KNE site where it is quite narrow. While rats aren't targeted with this control, monitoring undertaken in the past showed that the rat population is kept very low as a result of rats taking toxic possum baits.

Also in operational area A, local volunteers under the umbrella of KEG undertake hedgehog and mustelid control through trapping. Traps were progressively installed alongside walking tracks and on some bait station lines in this area from 2017 to 2019. Volunteers started operating some of the traps from early 2019 and took over the rest from early 2023. All predator traps are now serviced monthly by the volunteer group. The results of small mammal monitoring undertaken in the KNE site will be monitored to see if this trapping can reduce the hedgehog population. Past monitoring has shown the hedgehogs population to be relatively large for a forest ecosystem – over 33% tracking tunnel index (TTI) continually between November 2011 and May 2014[24].

In operational area B (north-eastern part of the KNE site including Sweetacres Reserve), members of Pareraho Forest Trust undertake trapping targeting possums, rats, weasels and stoats. Traps are checked and re-baited on about a monthly basis and catch results are recorded in a TrapNZ project. The trust secured funding for the purchase of traps for this area from the Transpower Community Care Fund in 2020. The trust installed the traps in 2023.

The control of possums, mustelids and hedgehogs is being extended into the remaining unprotected part of the KNE site (operational area C) from 2024. A network of Flipping Timmy, BT200 and BT250 traps is being installed over two financial years (2023-24 and 2024-25). The control network is being designed so that most, if not all of the traps can be serviced by the same, but expanded group of volunteers that are servicing the traps in operational area A. Traps have been positioned on existing tracks and farm roads, along main valleys and some minor gullies and ridges. As the area is large, steep, and remote towards the northern extent, there may not be enough volunteers, or it might not be safe for volunteers to service the full network of traps. Contractors will be engaged to service those traps that volunteers aren't able to service. The trap locations shown on Map 5 in Appendix 1 doesn't include this new network because the installation hasn't been completed yet and changes to some trap locations are likely to occur for a period as volunteers establish practical routes.

OSPRI New Zealand Ltd undertook a possum control operation throughout operational area C in 2015 as part of its TB-free New Zealand programme. That operation reduced the possum population to very low levels (below 2% residual trap catch (RTC)) at the time. However, monitoring has shown that possum numbers have increased since and are now likely to be impacting native biodiversity in the KNE site.

Culling of feral goats and deer is undertaken across the KNE site annually, alternating between targeting goats and deer each year. The number of feral goats

in the KNE site is extremely low, with very few goats being found in the KNE site since 2011. This is the result of annual culling carried out by contracted hunters since 2001. Feral deer are present in low numbers on the edges of the KNE site.

Pest animal control will be undertaken to support the Recloaking Papatuanuku project described in Section 9.4. This control will aim to protect new plantings from browsing by rabbits, hares, possums, goats and deer. In time, pest control will be adapted to provide more comprehensive protection of the restored native ecosystems that will develop in these areas.

9.3. Monitoring

Monitoring of small mammal populations (rodents, mustelids and hedgehogs) is undertaken in the KNE site to gain information on the effectiveness of the pest animal control undertaken. This work is coordinated by Greater Wellington's Monitoring – Land Ecosystems and Air team and field work is completed with voluntary assistance from members of KEG. Rodent monitoring is completed every spring and summer, and mustelid and hedgehog monitoring is completed annually.

9.4. Revegetation

The aim of planned revegetation work at the KNE site is to restore native vegetation and eventually, whole native ecosystem function to the parts of the site that are currently grazed or were retired from grazing in the past and have not yet recruited a cover of native vegetation. This will improve the native biodiversity at the head of the catchment and protect heads of the waterways.

Revegetation in these areas will be undertaken and funded as part of Greater Wellington's Recloaking Papatuanuku project. A guidance document has been developed for this project called He Aratohu Whakahaumanu Papa – Regional Parks Restoration Guide[25]. Retirement of areas currently being grazed, and planting will be undertaken progressively over the next two to three years. Map 7 in Appendix 1 shows the areas that will be retired and planted. Initial planting will be with robust pioneer species and will be followed up with in-fill planting where required and the planting of enrichment species. A plant species list for this revegetation can be found within the Recloaking Papatuanuku project planning documents. All plants will be eco-sourced from the Wellington Ecological District.

9.5. 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 regional 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 the 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[26] are used by all operational staff 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. The 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 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[27]. This plan limits the recreational activities that are permitted within the KNE site to mountain biking, horse riding and low impact forms of recreation such as walking, running and picnicking. These forms of recreation are not likely to impact biodiversity values within the KNE site if they continue to be restricted to existing roads and tracks and designated amenity areas. 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. This system prevents adverse effects on native flora and fauna occurring as a result of these activities.

The illegal collection of native plants has occurred occasionally in Regional Parks. This has included: native timber which is valued for domestic uses such as fence construction and firewood; and some species of orchid which are sought after by collectors and traders. The Park Ranger monitors for these illegal activities while carrying out normal duties within the park.

Fire risk

To reduce the risk of uncontrolled fires, all forms of open fires are prohibited in the KNE site. This policy is communicated to users through onsite signage, the park information brochure and Toitū Te Whenua Parks Network Plan[28].

9.6. Community engagement

The purpose of Greater Wellington engaging with the community about the KNE site is to raise awareness of its ecological values and involve the community in the protection of those values. To raise awareness of the KNE site's values, interesting environmental stories regarding the KNE site are disseminated through social or print media when they arise. These may include observations such as of uncommon native bird species or exceptional flowering or fruiting of native plants.

Greater Wellington works with the Korokoro Environmental Group (KEG), Pareraho Forest Trust and individual volunteers on undertaking operational activities at the KNE site. Working with the community not only allows more activities to be accomplished but also builds support and advocacy for biodiversity protection work.

10. Future opportunities

10.1. Revegetation

There is opportunity for further revegetation work to be undertaken in the KNE site. Currently revegetation funding is limited to that described in Section 9.4. However, if further funding for revegetation becomes available, the main aim will be to restore degraded areas of the lower Te Korokoro o Te Mana/Korokoro Stream valley. Many sections of the stream valley are currently vegetated with exotic grasses and weeds only, and would benefit from the planting of native trees, shrubs and sedges.

Edges of the stream could be planted to provide shading for the stream and riparian habitat, and open areas of the stream terrace could be planted to provide valley floor habitat and connect the regenerating bush on each side of the valley.

Appendix 1, Map 8 shows the area where planting could take place and Appendix 6 provides a list of plant species appropriate for revegetation in this area. All plants would be eco-sourced from the Wellington Ecological District.

10.2. Fish passage

It is likely that the two dams located in Te Korokoro o Te Mana/Korokoro Stream present barriers to the passage of some native fish species. Although surveys undertaken in the past indicate this, there have been no surveys done in recent years and not since a fish ladder aimed at improving fish passage was installed adjacent to the spillway of the Mill Workers Dam in 2016. It would be of interest and value in any future decision-making regarding remediation of fish passage, to gain up to date information about the species composition above and below each dam. It would also be beneficial to those species found to be still confined by one or other dam, to create some form of passage for them over the dams. Coordinating and sourcing funding for either of these activities are projects that a volunteer group or organisation may be interested in undertaking. Any proposed alteration or attachment to either dam would need to consider the heritage values of the dams.

10.3. Lizard translocation

Greater Wellington is currently developing a policy for the translocation of native fauna to land it owns or manages. This includes KNE sites in regional parks and water collection areas. Once a translocation policy is in place Greater Wellington will be able to consider proposals to translocate native fauna, including lizards, into the Belmont – Korokoro KNE site. Greater Wellington has received several requests in the past to translocate native lizards to land it manages (usually regional parks). All proposals have been the result of salvages of skinks from land destined for developments such as housing, industrial and roading projects.

11. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for the Belmont – Korokoro KNE site, and their annual costs. The budget is subject to change for years 2025/26 to 2028/29. Operational areas (see Appendix 1, Map 5) are also subject to change according to operational needs over the course of the operational plan.

Table 3: Five-year operational plan for the Belmont – Korokoro KNE site

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Annual resourcing
1, 2, 4	Ecological weed control Control ecological weeds prioritising species listed in Appendix 5: • Search from tracks, routes and other viewpoints, • Use helicopters or drones when deemed efficient, • Utilise seasonal flowering periods to identify plants	A	The abundance of exotic species in the remnant forest has not increased	Greater Wellington Pest Plants team	$20,510 (combined allocation for all ecological weed control)
1, 2, 4	Ecological weed control Check locations of previously controlled ecological weed infestations and control all target ecological weeds present	A	Previously controlled infestations have not regenerated	Greater Wellington Pest Plants team	
1, 2, 4	Ecological weed control Control isolated infestations of tradescantia and African club moss. Then as resources allow control main infestations working from the top of the catchment, down	A, B	The impact of the target species on forest under-story regeneration has reduced	Greater Wellington Pest Plants team	
1, 2, 3, 4	Pest animal control Control possums through three monthly bait station and trap servicing	A	Possums are having low impacts on native flora and fauna health. Populations are below 5% RTC*	Greater Wellington Pest Animals team	$41,220

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Annual resourcing
1, 2, 3, 4	Pest animal control Maintain bait station lines by cutting back vegetation	A	Bait station lines are of a standard that allows them to be reasonably easy and safe for operators to traverse	Greater Wellington Pest Animals team	$2,240
3	Pest animal control Control mustelids and hedgehogs through regular trap servicing	A	Mustelids and hedgehogs are having low impacts on native fauna. Mustelid populations are below 2% TTI and hedgehog populations have reduced	Korokoro Environmental Group and Greater Wellington Pest Animals team	$2,900 (combined allocation for bait supplies and an annual H&S audit for these two activities)
1, 2, 3, 4	Pest animal control Control possums, rats, mustelids and hedgehogs through regular trap servicing	B	Target species are having low impacts on native flora and fauna health. Populations are below 5% RTC for possums, 5% TTI for rats and 2% TTI for mustelids, and hedgehog populations have reduced	Pareraho Forest Trust	
1, 2, 3, 4	Pest animal control Complete the installation of a multi-species control network and establish regular servicing	C	The impacts of possums, mustelids and hedgehogs on flora and fauna has been reduce	Greater Wellington Pest Animals team and Korokoro Environmental Group	$20,000 (allocated for 2024/25, allocations for future years to be confirmed)
1, 2, 4	Pest animal control Control feral goats and deer by ground-based hunting, alternating control of each species annually, starting with deer in 2024/25	A, B, C	No impact on biodiversity values from feral goats and deer. The are no feral goats or deer resident in the KNE site	Greater Wellington Pest Animals team	$1,680

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Annual resourcing
5	Pest animal monitoring Monitor small mammal populations (rats, hedgehogs and mustelids) to gauge the effectiveness of control. Complete rat monitoring every six months and complete hedgehog and mustelid monitoring annually	A	Results inform pest animal control decision making	Greater Wellington Monitoring – Land, Ecosystems and Air team	$6,830
2	Revegetation Plant areas of open grassland and recently retired paddocks at the top of the catchment with appropriate native species. Control browsing pest animals to protect plantings	D	Most of the upper catchment has a native vegetation cover	Greater Wellington Environment Projects team	Funding cannot be confirmed at this time – funded by Recloaking Papatuanuku project
4	Environmental protocols Adhere to Greater Wellington best practice guidelines and policies aimed at protecting the natural environment while undertaking operational activities and managing recreational and commercial activities in the KNE site, including: • assessment of environmental effects procedures, • pest plant biosecurity guidelines, • research and natural material collection permitting system, • fire ban policy	Whole KNE site	Biodiversity values aren't impacted by operational, recreational, research or commercial activities	Greater Wellington Eastern Parks, Parks Maintenance, Environment Restoration, Pest Plants and Pest Animals teams	Nil (only staff time required)
6	Community engagement Disseminate interesting biodiversity stories regarding the KNE site through social and print media when they arise	Whole KNE site	Increased community awareness of KNE site values	Greater Wellington Environment Restoration team	Nil (only staff time required)

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Annual resourcing
6	Community engagement Effectively support volunteers participating in KNE operational activities	Whole KNE site	Volunteers are well supported, feel valued and continue to participate	Greater Wellington Environment Restoration, LAE Monitoring and Western Parks teams	Nil (only staff time required)
Total					**$95,380**

*RTC = Residual Trap Catch. The control regime has been designed to control possums to this level but monitoring will not be undertaken. Experience in the use of this control method indicates this target will be met

**TTI = Tracking Tunnel Index. The control regime has been designed to control rats/mustelids to this level but monitoring will not be undertaken. Experience in the use of this control method indicates this target will be met

12. Funding contributions

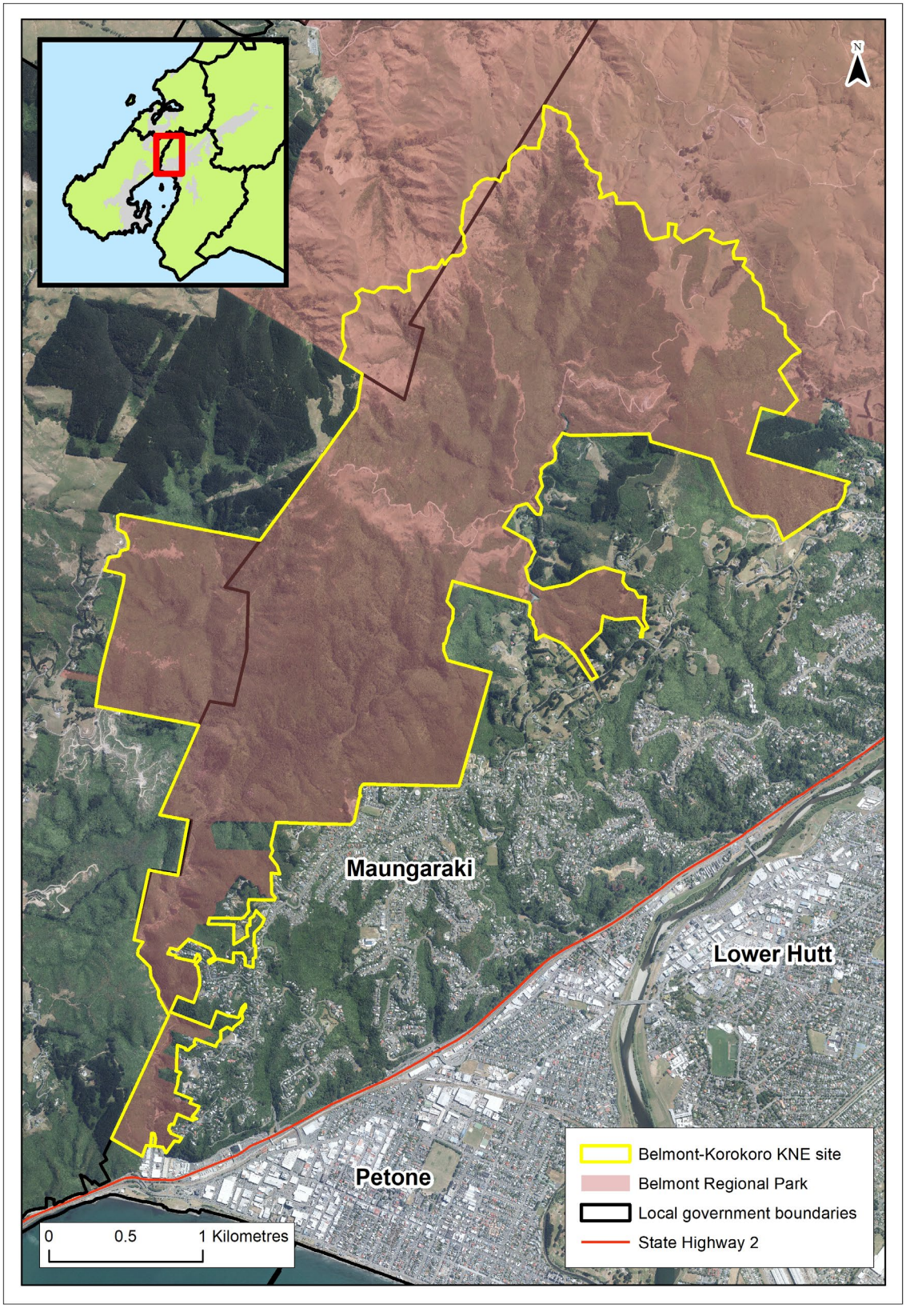
12.1. Budget allocated by Greater Wellington

The budget is subject to change.

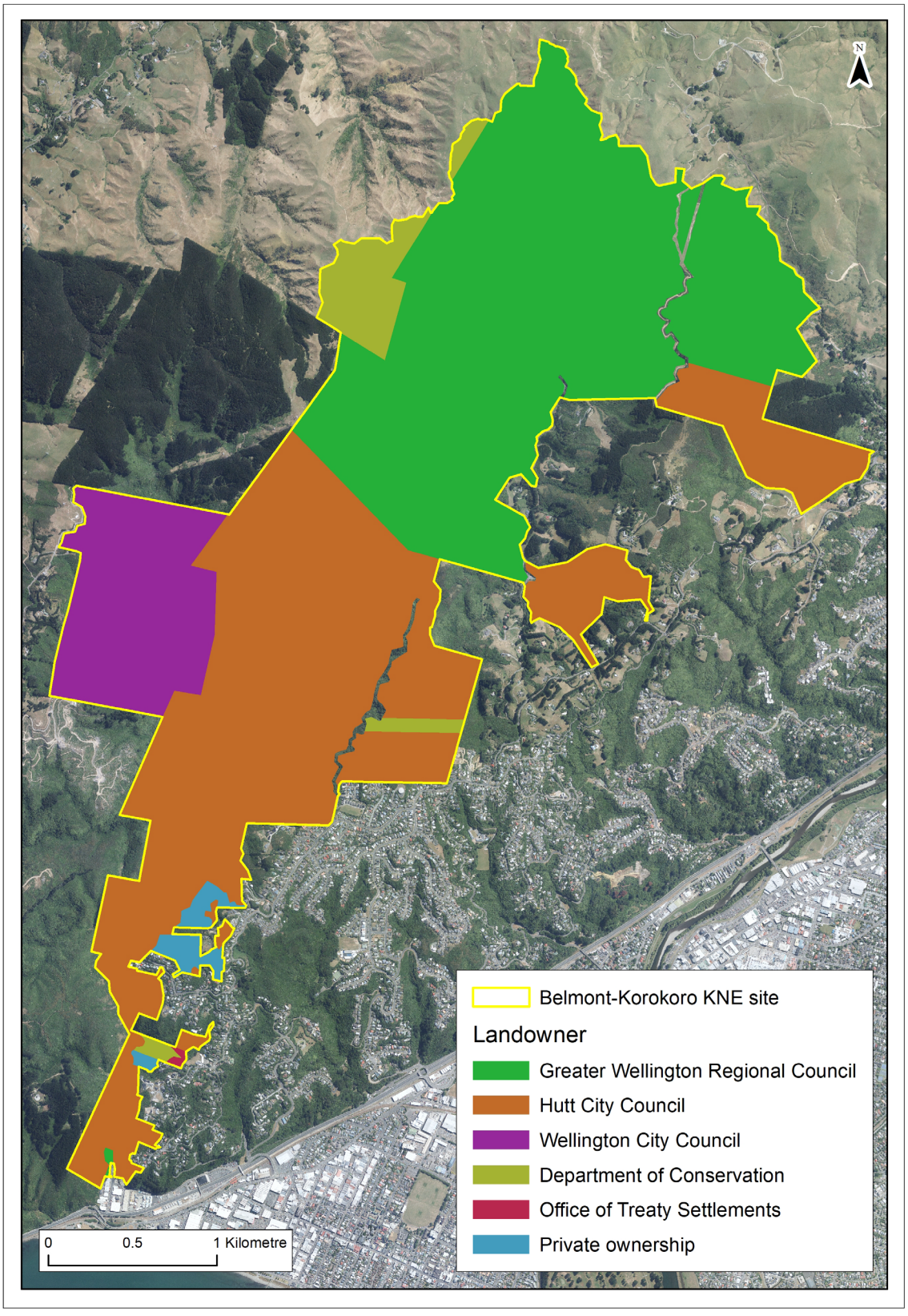
Table 4: Greater Wellington allocated budget for the Belmont - Korokoro KNE site

Management activity	Annual resourcing
Ecological weed control	$20,510
Pest animal control	$68,040
Monitoring	$6,830
Total	**$95,380**

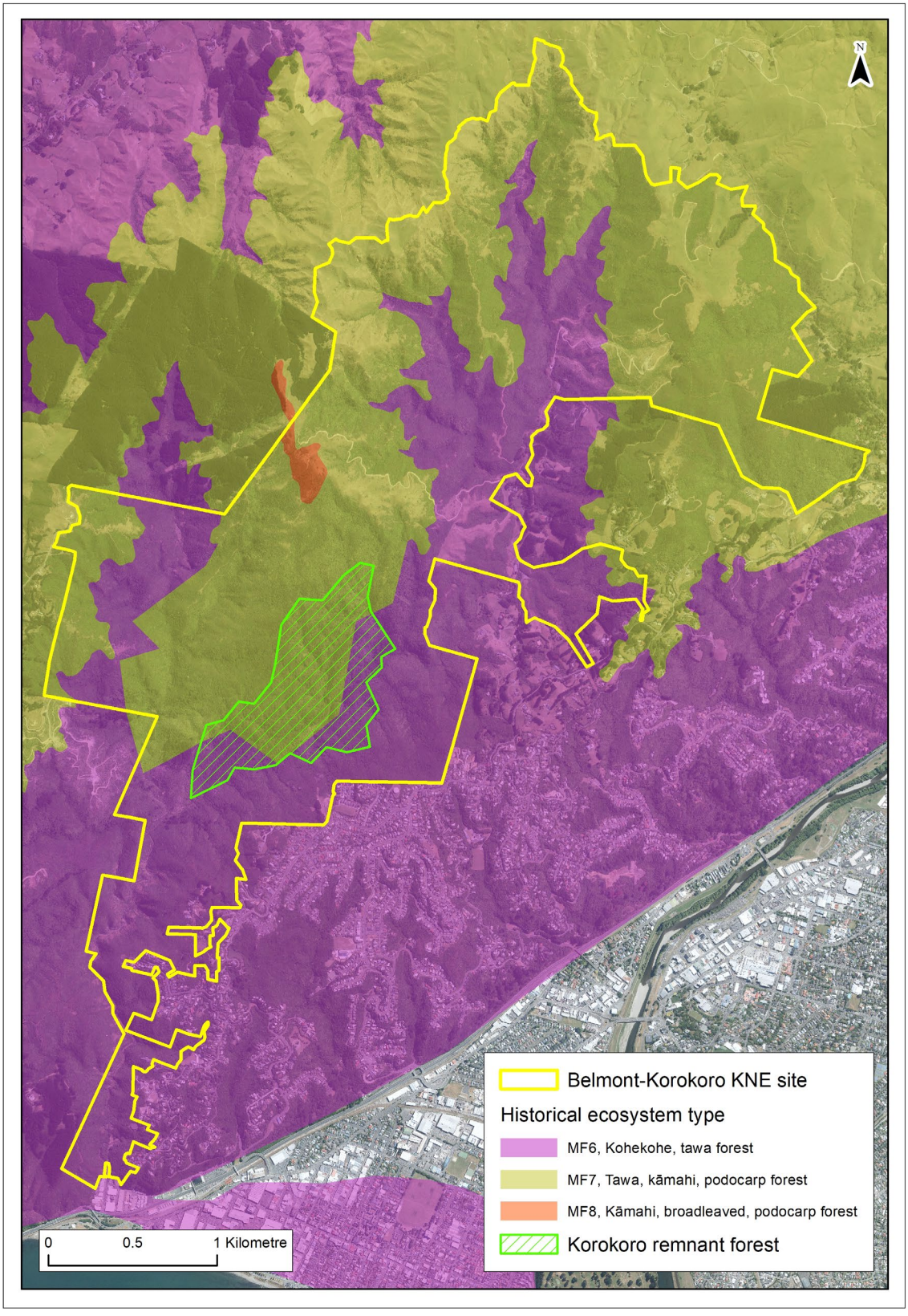
Appendix 1: Belmont - Korokoro KNE site maps



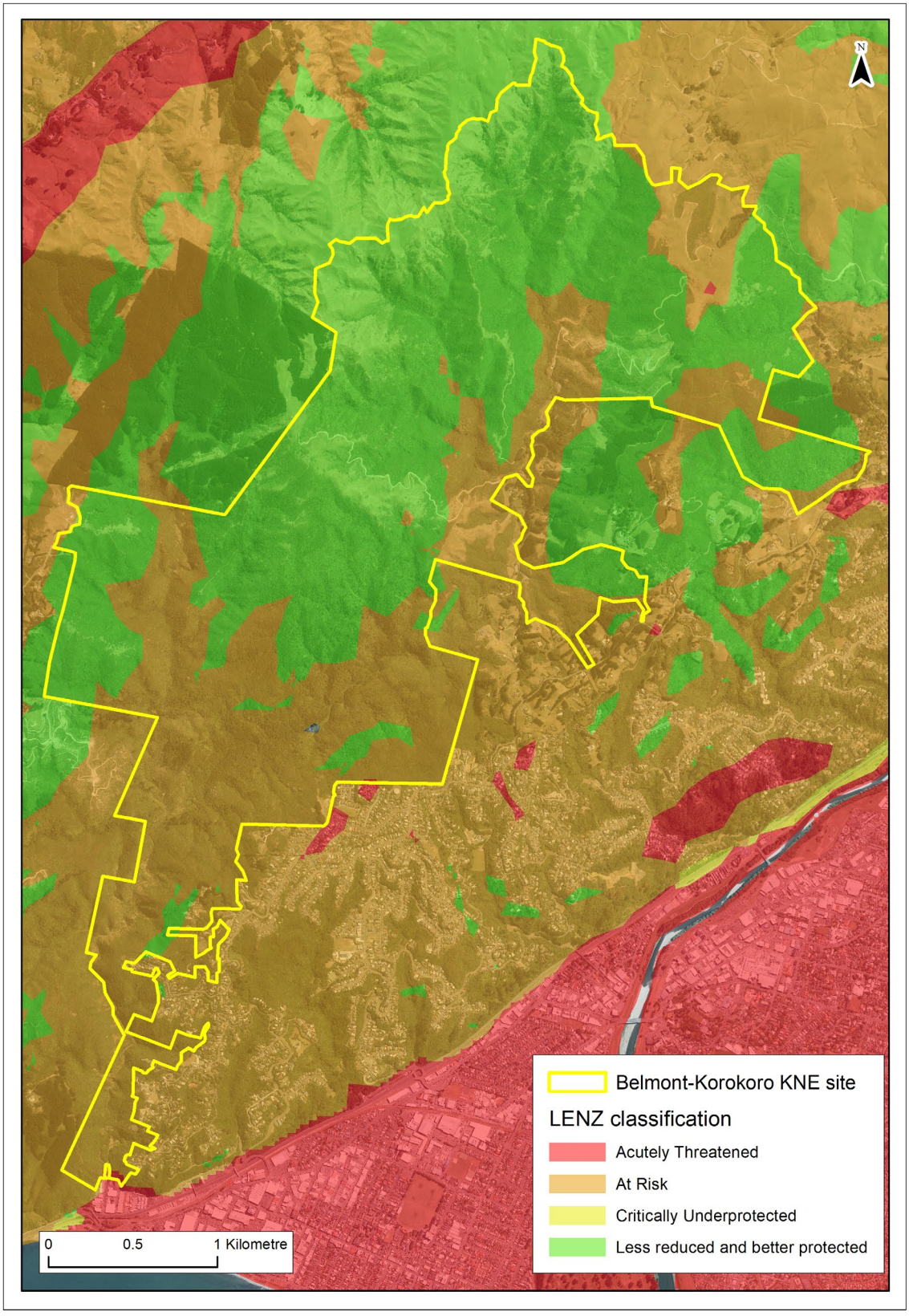
Map 1: The Belmont – Korokoro KNE site and Belmont Regional Park boundaries



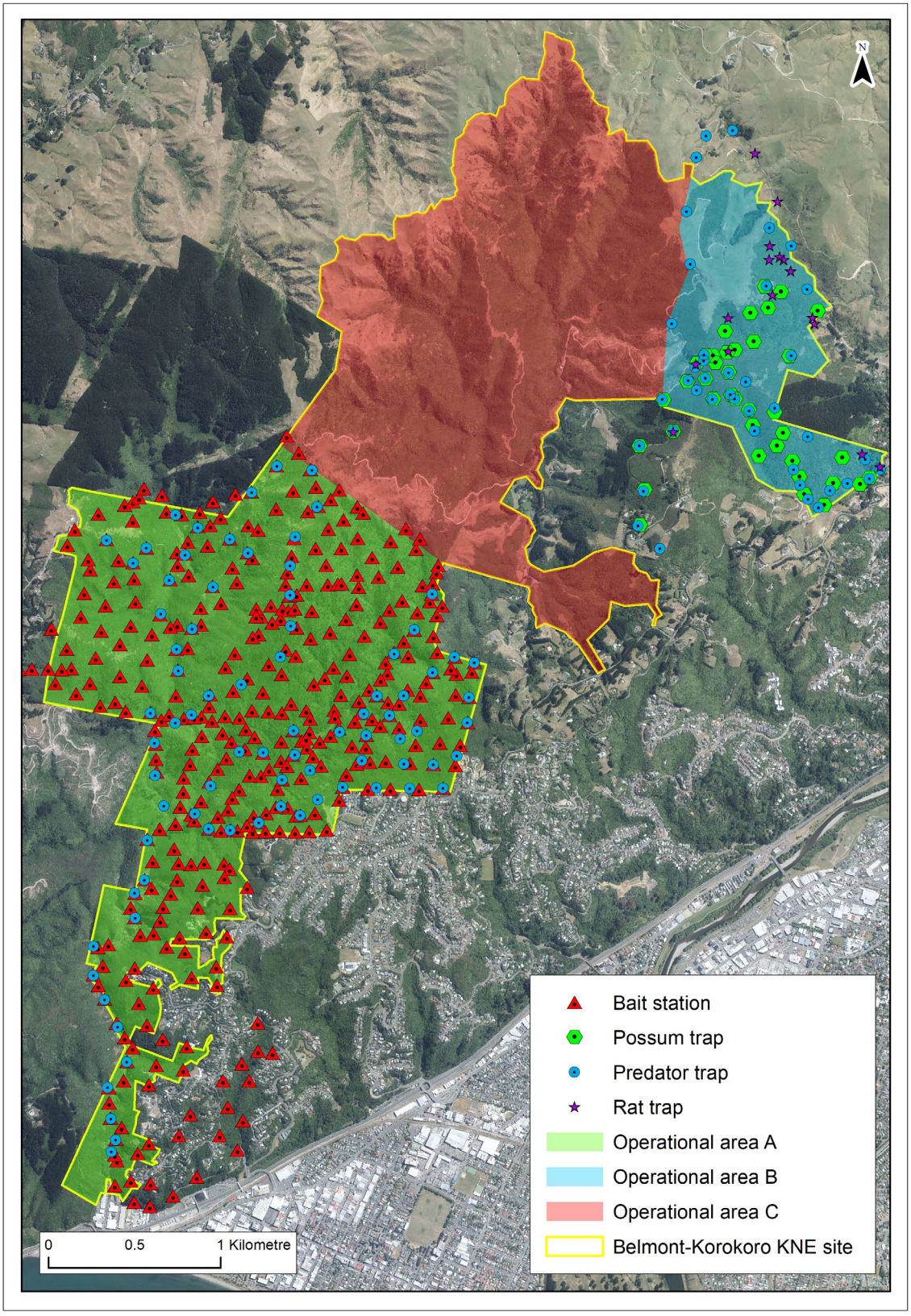
Map 2: Landowners in the Belmont – Korokoro KNE site. See Map 1 for the Belmont Regional Park component of the KNE site



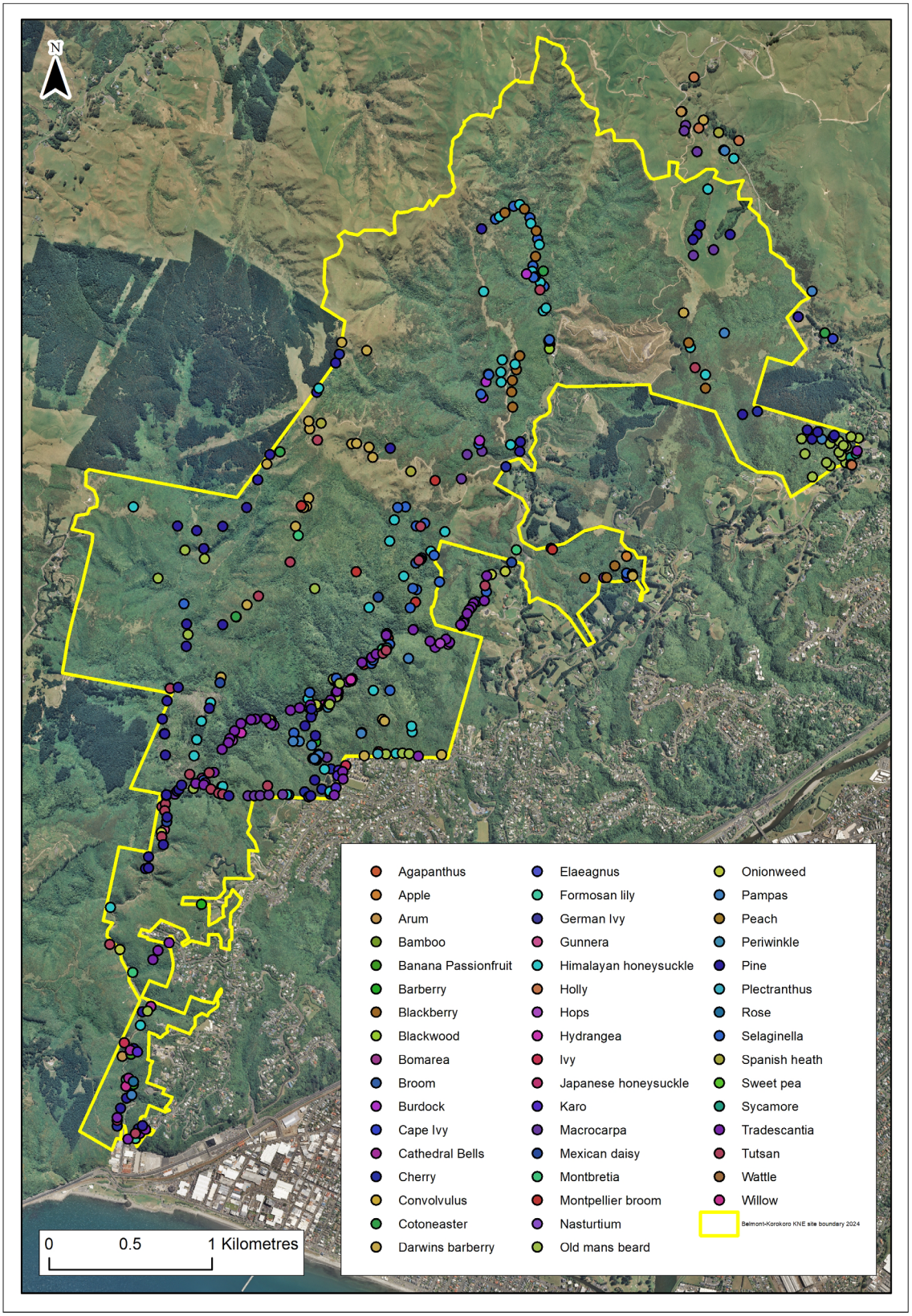
Map 3: Singers and Rogers classification of pre-human forest types and the area of remnant original forest in the Belmont – Korokoro KNE site



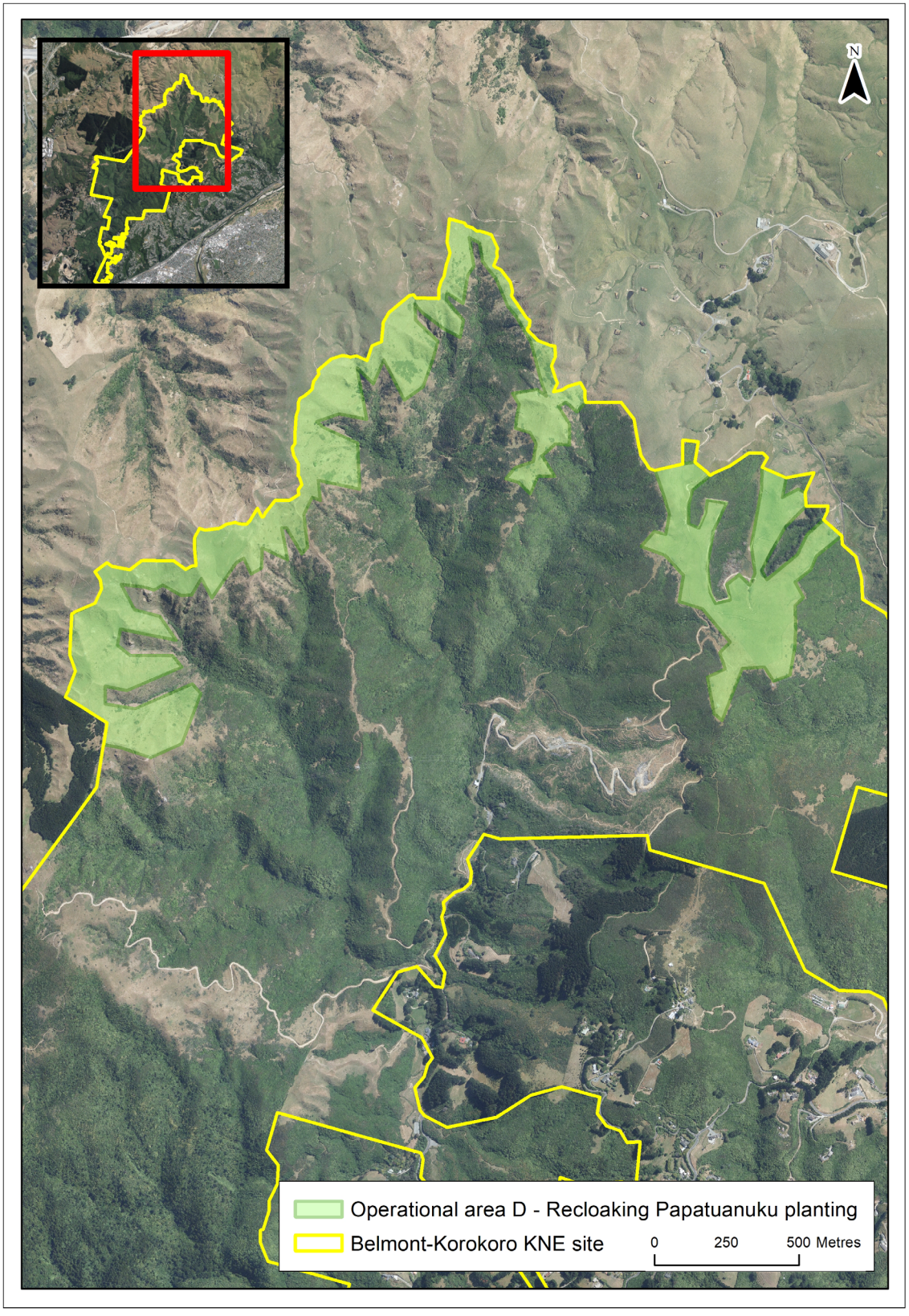
Map 4: Land Environment New Zealand threat classifications for the Belmont – Korokoro KNE site



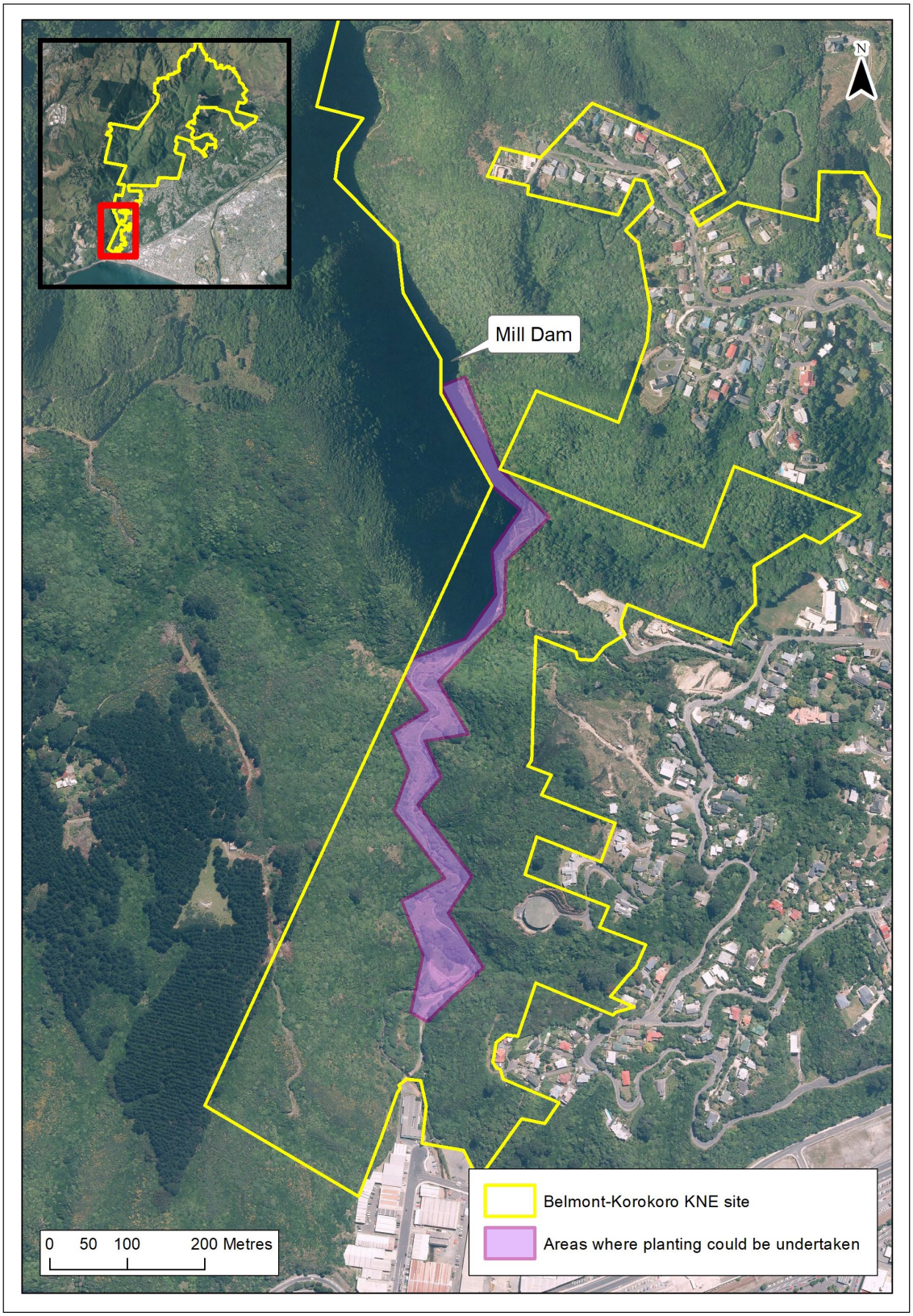
Map 5: Operational areas and pest animal control in the Belmont – Korokoro KNE site. A new pest animal control trap network in the process of being established in operational area C is not shown.



Map 6: Locations of ecological weed species historically recorded in the Belmont – Korokoro KNE site. This map was created using data collected during an ecological weed survey undertaken in 2013, the last time the top third of the site was included in a survey. The map provides an indication of the diversity and distribution of ecological weeds at the KNE site. Appendix 4 lists those species that will be controlled during the term of this plan.



Map 7: Areas where planting will be undertaken as part of Greater Wellington's Recloaking Papatuanuku project



Map 8: Area where further revegetation could be undertaken in the Belmont – Korokoro KNE site if funding for this becomes available

Appendix 2: Nationally threatened species list

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

The New Zealand Threat Classification System (NZTCS) lists species according to their threat of extinction. The status of each species group (plants, reptiles, etc) is assessed over a five-year cycle[29]. Species are regarded as Threatened if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable[30]. 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 Belmont - Korokoro KNE site

Scientific name	Common name	National threat status	Observation
Plants(vascular)[31]			
Brachyglottis kirkii var. *kirkii*	Kohurangi/Kirk's tree daisy	Threatened – Nationally Vulnerable	Pat Enright, pers comm 2014
Pterostylis foliata	Grassland greenhood	At Risk – Naturally Uncommon	Pat Enright, pers comm 2014
Birds[32]			
Eudynamys taitensis	Koekoeā/long-tailed cuckoo	Threatened – Nationally Vulnerable	NZ eBird Database (accessed 2024)
Falco novaeseelandiae	Kārearea/bush falcon	Threatened – Nationally Vulnerable	NZ eBird Database (accessed 2024)
Anas chlorotis	Pāteke/brown teal	Threatened – Nationally Increasing	NZ eBird Database (accessed 2024)
Anthus novaeseelandiae	Pīhoihoi/New Zealand pipit	At Risk – Declining	NZ eBird Database (accessed 2024)
Cyanoramphus auriceps	Kākāriki/yellow crowned parakeet	At Risk – Declining	NZ eBird Database (accessed 2024)
Nestor meridionalis	North Island kākā	At Risk – Recovering	NZ eBird Database (accessed 2024)
Cyanoramphus novaezelandiae	Kākāriki/red crowned parakeet	At Risk – Relict	NZ eBird Database (accessed 2024)
Reptiles[33]			
Mokopirirakau southern North Island	Ngahere gecko	At Risk – Declining	DOC Herpetofauna Database
Naultinus punctatus	Barking gecko	At Risk – Declining	DOC Herpetofauna Database

Scientific name	Common name	National threat status	Observation
Freshwater fish[34]			
Anguilla dieffenbachii	Longfin eel	At Risk – Declining	NZ Freshwater Fish Database (accessed 2021)
Galaxis argenteus	Giant kōkopu	At Risk – Declining	NZ Freshwater Fish Database (accessed 2021)
Galaxias brevipinnis	Kōaro	At Risk – Declining	NZ Freshwater Fish Database (accessed 2021)
Galaxias divergens	Dwarf galaxias	At Risk – Declining	NZ Freshwater Fish Database (accessed 2021)
Galaxias maculatus	Īnanga	At Risk – Declining	NZ Freshwater Fish Database (accessed 2021)
Gobiomorphus hubbsi	Bluegill bully	At Risk – Declining	NZ Freshwater Fish Database (accessed 2021)

Appendix 3: Regionally threatened species list

The following table lists regionally threatened species that have been recorded in the Belmont - Korokoro 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, (eg, 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 and At Risk species recorded in the Belmont – Korokoro KNE site

Scientific name	Common name	Regional threat status	Observation
Plants[35]			
Acaena juvenca	Bidibid	At Risk – Naturally Uncommon	Enright P. pers comm 2014
Brachyglottis kirkii var *kirkii*	Kirk's tree daisy	Threatened – Endangered	Enright P. pers comm 2014
Trichomanes colensoi	Bristle fern	Threatened – Critical	Enright P. pers comm 2014
Pterostylis foliata	Grassland greenhood	At Risk - Naturally Uncommon	Enright P. pers comm 2014
Birds[36]			
Anas chlorotis	Brown teal/pāteke	Threatened – Regionally Critical	NZ eBird Database (accessed 2024)
Falco novaeseelandiae	Bush falcon/kārearea	Threatened – Regionally Critical	NZ eBird Database (accessed 2024)
Cyanoramphus auriceps	Yellow crowned parakeet/kākāriki	Threatened – Regionally Endangered	NZ eBird Database (accessed 2024)
Anthus novaeseelandiae	New Zealand pipit/pīhoihoi	Threatened – Regionally Vulnerable	NZ eBird Database (accessed 2024)
Cyanoramphus novaezelandiae	Red crowned parakeet/kākāriki	At Risk – Regionally Recovering	NZ eBird Database (accessed 2024)
Nestor meridionalis	Kākā	At Risk – Regionally Recovering	NZ eBird Database (accessed 2024)
Hemiphaga novaeseelandiae	New Zealand pigeon/kererū	At Risk – Regionally Recovering	NZ eBird Database (accessed 2024)

Scientific name	Common name	Regional threat status	Observation
Eudynamys taitensis	Long-tailed cuckoo/koekoeā	At Risk – Regionally Naturally Uncommon	NZ eBird Database (accessed 2024)
Reptiles[37]			
Naultinus punctatus	Barking gecko	Threatened – Regionally Vulnerable	DOC Herpetofauna Database
Mokopirirakau 'southern North Island'	Ngahere gecko	At Risk – Regionally Declining	DOC Herpetofauna Database
Oligosoma ornatum	Ornate skink	At Risk – Regionally Declining	GWRC 2010[38]
Oligosoma zelandicum	Glossy brown skink	At Risk – Regionally Declining	GWRC 2010
Freshwater fish[39]			
Galaxias argenteus	Giant kōkopu	Regionally Vulnerable	NZ Freshwater Fish Database 2021
Anuilla diffenbachii	Longfin eel	Regionally Declining	NZ Freshwater Fish Database 2021
Galaxias brevipinnis	Kōaro	Regionally Declining	NZ Freshwater Fish Database 2021
Galaxias divergens	Dwarf galaxias	Regionally Declining	NZ Freshwater Fish Database 2021
Galaxias maculatus	Īnanga	Regionally Declining	NZ Freshwater Fish Database 2021
Gobiomorphus hubbsi	Bluegill bully	Regionally Declining	NZ Freshwater Fish Database 2021
Retropinna retropinna	Common smelt	Regionally Declining	NZ Freshwater Fish Database 2021

Appendix 4: Threat table

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

Table 8: Threats to the Belmont – Korokoro 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 (*Tradescantia fluminensis*), African club moss (*Selaginella kraussiana*) and periwinkle (*Vinca major*), (see full list in Appendix 5)	Entire KNE site
EW-2	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key woody ecological weed species include Darwin's barberry (*Berberis darwinii*), barberry (*Berberis glaucocarpa*) and wild cherry (*Prunus* spp.), (see full list in Appendix 5)	Entire KNE site
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 (*Clematis vitalba*), cathedral bells (*Cobaea scandens*), ivy (*Hedra helix*), and Japanese honeysuckle (*Lonicera japonica*), (see full list in Appendix 5)	Entire KNE site
EW-4	Aquatic weeds out-compete native aquatic species and choke watercourses. The key aquatic ecological weed species are *Lagarosiphon major* and Chilean rhubarb (*Gunnera tinctoria*)	Te Korokoro o Te Mana/Korokoro Stream
Pest animals		
PA-1	Brush-tailed possums (*Trichosurus vulpecula*) browse palatable canopy vegetation until it can no longer recover[40,41]. This destroys the forest's structure, diversity and function. Possums may also prey on native birds and invertebrates[42]	Entire KNE site
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[43,44]	Entire KNE site
PA-3	Mustelids (stoats[45,46] (*Mustela erminea*), ferrets[47,48] (*M. furo*) and weasels[49,50] (*M. nivalis*)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
PA-4	Hedgehogs (*Erinaceus europaeus*) prey on native invertebrates[51], lizards[52] and the eggs[53] and chicks of ground-nesting birds[54]	Entire KNE site
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[55,56]	Entire KNE site
PA-6*	Pest and domestic cats (*Felis catus*) prey on native birds[57], lizards[58] and invertebrates[59], reducing native fauna breeding success and potentially causing local extinctions[60]	Entire KNE site
PA-7*	Rabbits (*Oryctolagus cuniculus*) and hares (*Lepus europaeus*) graze on palatable native vegetation and prevent natural regeneration in some environments[61]	Forest margins
PA-8*	Wasps (*Vespula* spp.) adversely impact native invertebrates and birds through predation and competition for food resources. They also affect nutrient cycles in beech forests[62]	Entire KNE site
PA-9	Feral 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[63,64,65]	Northern margins
PA-10	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[66]	Entire KNE site
PA-11*	Brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) prey on native fish and compete with them for food resources[67]	Streams
PA-12*	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[68,69]	Entire KNE site
PA-13*	Australasian magpie (*Gymnorhina tibicen*) are a known nest predator of native bird species and are known to modify the behaviour of native birds which could inhibit the ability of native birds to feed and breed[70,71]	Bush margins
Human activities		
HA-1	Garden waste dumping often leads to ecological weed invasions into natural areas. Common ecological weed species introduced at this KNE site include hydrangea (*Hydrangea macrophylla*) and plectranthus (*Plectranthus* spp.)	Boundaries of residential properties

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
HA- 2	Agricultural practices, particularly grazing livestock can result in pugging soils and increasing nutrient content of soils and watercourses[72]	Grazed areas of the KNE site and downstream of these
HA-3	Recreational uses such as tramping, mountain biking and horse riding can cause damage and disturbance to the native ecosystem. It is also likely to disturb native fauna and introduce ecological weeds	Entire KNE site
HA - 4	Management activities such as track development, pest control and ecological monitoring can damage indigenous vegetation, and cause the accidental introduction of weed species through the carriage of seeds and plant fragments on machinery, equipment and clothing	Entire KNE site
HA- 5*	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	Adjacent plantations on the western and eastern boundaries
HA- 6*	Barriers to native fish passage are present in streams within the KNE site preventing migrating fish from completing their life cycle	Two dams located in Te Korokoro o Te Mana/Korokoro Stream
HA- 7*	Poor water quality affects a range of species in the streams. 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	All streams affected by adjacent land uses

*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 are most often targeted during control work in the Belmont - Korokoro KNE site. These are some of the ecological weed species that have been recorded in the KNE site during surveys for ecological weeds and during other operational activities.

The distribution and density of individual species is recorded. Three levels of distribution (localised, 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 Belmont - Korokoro KNE site

Scientific name	Common name	Level of distribution	Management aim
Acer pseudoplatanus	Sycamore	Patchy and sparse	Eradication
Arundinaria spp.	Bamboo	Localised and abundant	Eradication
Buddleja davidii	Buddleia	Patchy and sparse	Suppression
Clematis vitalba	Old man's beard	Patchy and abundant	Suppression
Cobaea scandens	Cathedral bells	Patchy and abundant	Eradication
*Corynocarpus laevigatus**	Karaka	Widespread and abundant	Surveillance
Cortaderia selloana	Pampas	Patchy and sparse	Eradication
Cotoneaster glaucocarpa	Cotoneaster	Patchy and sparse	Suppression
Crataegus monogyna	Hawthorn	Patchy and sparse	Suppression
Eleagnus x *reflexa*	Elaeagnus	Localised and abundant	Eradication
Erica lusitanica	Spanish heath	Patchy and abundant	Suppression
Gunnera tinctoria	Chilean rhubarb	Localised and sparse	Eradication
Hedera helix	Ivy	Patchy and abundant	Suppression
Humulus lupulus	Hops	Localised and sparse	Eradication
Hydrangea macrophylla	Hydrangea	Localised and sparse	Eradication
Lonicera japonica	Japanese honeysuckle	Patchy and abundant	Suppression
Paraserianthes lophantha	Brush wattle	Patchy and abundant	Suppression
Passiflora spp.	Banana passionfruit	Patchy and abundant	Suppression
Pinus radiata	Pine	Localised and sparse	Eradication
*Pittosporum crassifolium**	Karo	Widespread and abundant	Suppression
Prunus spp.	Plum and cherry	Widespread and abundant	Suppression
Sambucus nigra	Elder	Patchy and sparse	Eradication

Scientific name	Common name	Level of distribution	Management aim
Selaginella kraussiana	African club moss	Widespread and dense	Suppression
Tradescantia fluminensis	Tradescantia	Widespread and dense	Suppression
Vinca major	Periwinkle	Patchy and abundant	Suppression

* Denotes a New Zealand native plant that is not local to the KNE site

Appendix 6: Revegetation plant list

Plants from the following table will be used in any revegetation planting as per Section 10.1.

Table 10: Revegetation plant list for use within the Belmont - Korokoro KNE site

Scientific name	Common name
Pioneer species	
Aristotelia serrata	Wineberry
Austroderia fulvida	Toetoe
Carex geminata	Rautahi
Carex virgata	Pukio
Cordyline australis	Cabbage tree
Coprosma propinqua	Mingimingi
Coprosma robusta	Karamū
Griselinia littoralis	Broadleaf
Kunzea robusta	Kānuka
Leptospermum scoparium	Mānuka
Melicope ternata	Whārangi
Melicytus lanceolatus	Narrow-leaved māhoe
Melicytus ramiflorus	Māhoe
Myrsine australis	Red māpou
Olearia paniculata	Akiraho
Phormium tenax	Harakeke
Pittosporum eugenioides	Lemonwood
Pittosporum tenuifolium	Kōhūhū
Veronica stricta	Koromiko
Climax species (plant once protective cover of pioneer species is established)	
Alectryon excelsus	Tītoki
Beilschmedia tawa	Tawa
Dacrycarpus dacrydioides	Kahikatea
Elaeocarpus dentatus	Hīnau
Laurelia novae-zelandiae	Pukatea
Metrosideros robusta	Northern rātā
Plagianthus regius	Lowland ribbonwood

References

[1] New Zealand legislation. 1991. Resource Management Act 1991.
[2] Greater Wellington Regional Council. Greater Wellington Regional Council Long Term Plan Ko Te Pae Tawhiti: 2021 – 2031.
[3] Greater Wellington Regional Council. 2016. Greater Wellington Regional Council Biodiversity Strategy. http://www.gw.govt.nz/assets/council-publications/Biodiversity-Strategy-2016.pdf
[4] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023.
[5] Greater Wellington Regional Council. 2019. Greater Wellington Regional Pest Management Plan 2019–2039. GW/BIO-G-2019/74
[6] Greater Wellington Regional Council. 2020. Toitū Te Whenua Parks Network Plan 2020-2030.
[7] Crisp P, Govella S, Crouch L. 2016. Identification and prioritisation of high value terrestrial biodiversity sites for selection within the Key Native Ecosystems Programme in the Wellington region. Greater Wellington Regional Council, GW/ESCI-T-16/93.
[8] Greater Wellington Regional Council. 2007. Belmont Regional Park Resource Statement.
[9] Greater Wellington Regional Council. 2020. Toitū Te Whenua Parks Network Plan 2020-2030.
[10] P A Handford & Associates Ltd. 2011. Belmont Regional Park Sustainable Land Use Plan.
[11] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023.
[12] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023. Schedule D1, P.418.
[13] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023. Schedule D2, P.435.
[14] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023. Schedule B. P.393.
[15] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023. P.489.
[16] Singers NJD, Rogers GM. 2014. A classification of New Zealand's terrestrial ecosystems. Science for Conservation No. 325. Department of Conservation, Wellington. 87p.
[17] Singers N, Crisp P, Spearpoint O. 2018. Forest ecosystems of the Wellington region.
[18] Walker S, Cieraad E, Barringer J. 2015. The Threatened Environment Classification for New Zealand 2012: a guide for users. Landcare Research.
[19] Cieraad E, Walker S, Price R, Barringer J. 2015. An updated assessment of indigenous cover remaining and legal protection in New Zealand's land environments. New Zealand Journal of Ecology 39 (2): 309-315.
[20] Nikki McArthur, pers comm, 2015.
[21] Greater Wellington Regional Council. 2007. Belmont Regional Park Resource Statement.
[22] Romijn R. 2010. Lizard Fauna of Wellington's Regional Parks. Greater Wellington Regional Council.
[23] New Zealand Freshwater Fish Database, accessed 2021.
[24] GWRC, Small mammal monitoring report for Key Native Ecosystem sites, February 2016.
[25] Groundtruth and PLaCE Consultants. 2023. He Aratohu Whakahaumanu Papa – Regional Parks Restoration Guide. A report for Greater Wellington.
[26] National Pest Control Agencies. 2013. Keep it Clean. Machinery hygiene guidelines & logbook to prevent the spread of pests and weeds.
[27] Greater Wellington Regional Council. 2020. Toitū Te Whenua Parks Network Plan 2020-2030
[28] Greater Wellington Regional Council. 2020. Toitū Te Whenua Parks Network Plan 2020-2030
[29] Townsend AJ, de Lange PJ, Duffy CAJ, Miskelly CM, Molloy J, Norton DA. 2008. New Zealand Threat Classification System manual. Department of Conservation, Wellington. 36 p.
[30] Rolfe J, Makan T, Tait A. 2021. Supplement to the New Zealand Threat Classification System manual 2008: new qualifiers and amendments to qualifier definitions, 2021. Department of Conservation, Wellington.

[31] de Lange PJ, Rolfe JR, Barkla JW, Courtney SP, Champion PD, Perrie LR, Beadel SM, Ford KA, Breitwieser I, Schonberger, I, Hindmarsh-Walls R, Heenan PB, Ladley K. 2018. Conservation status of New Zealand indigenous vascular plants, 2017. New Zealand Threat Classification Series 22. Department of Conservation, Wellington.
[32] Robertson HA, Baird KA, Elliot GP, Hitchmough RA, McArthur NJ, Makan TD, Miskelly CM, O'Donnell CFJ, Sagar PM, Scofield RP, Taylor GA, Michel P. 2021. Conservation status of birds in Aotearoa New Zealand, 2021. New Zealand Threat Classification Series 36. Department of Conservation, Wellington.
[33] Hitchmough R, Barr B, Knox C, Lettink M, Monks JM, Patterson GB, Reardon JT, Tocher M, Van Winkel D, Rolfe J, Michel P. 2021. Conservation status of New Zealand reptiles, 2021. New Zealand Threat Classification Series 35. Department of Conservation, Wellington.
[34] Dunn NR, Allibone RM, Closs GP, Crow SK, David BO, Goodman JM, Griffiths M, Jack CD, Ling N, Waters JM, Rolfe JR. 2018. Conservation status of New Zealand freshwater fishes, 2017. New Zealand Threat Classification Series 24. Department of Conservation, Wellington.
[35] Crisp P. 2020. Conservation status of indigenous vascular plant species in the Wellington region. 2020. Greater Wellington Regional Council.
[36] Crisp P, 2020. Conservation status of native bird species in the Wellington region. Greater Wellington Region Council.
[37] Crisp P, Hitchmough R, Newman D, Adams L, Lennon O, Woolley C, Hulme-Moir A, Bell T, Herbert S, Spearpoint O, Nelson N. 2023. Conservation status of indigenous reptile species in the Wellington region. Greater Wellington Region Council.
[38]Romijn R. 2010. Lizard Fauna of Wellington's Regional Parks. Greater Wellington Regional Council.
[39] Crisp, P, Perrie A, Morar, S. 2022. Conservation status of indigenous freshwater fish in the Wellington region. Greater Wellington Regional Council. GW/ESCI-T-22/02.
[40] Pekelharing CJ, Parkes JP, Barker RJ. 1998. Possum (*Trichosurus vulpecula*) densities and impacts on fuchsia (*Fuchsia excorticata*) in South Westland, New Zealand. New Zealand Journal of Ecology 22(2): 197–203.
[41] Nugent G, Sweetapple P, Coleman J, Suisted P. 2000. Possum feeding patterns. Dietary tactics of a reluctant folivore. In: Montague TL ed. The brushtail possum: Biology, impact and management of an introduced marsupial. Lincoln, Manaaki Whenua Press. Pp. 10–19.
[42] Sweetapple PJ, Fraser KW, Knightbridge PI. 2004. Diet and impacts of brushtail possum populations across the invasion front in South Westland, New Zealand. New Zealand Journal of Ecology 28(1): 19–33.
[43] Daniel MJ. 1973. Seasonal diet of the ship rat (*Rattus r. rattus*) in lowland forest in New Zealand. Proceedings of the New Zealand Ecological Society 20: 21–30.
[44] Innes JG. 2005. Ship rat. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 187–203.
[45] Murphy E, Maddigan F, Edwards B, Clapperton K. 2008. Diet of stoats at Okarito Kiwi Sanctuary, South Westland, New Zealand. New Zealand Journal of Ecology 32(1): 41–45.
[46] King CM and Murphy EC. 2005. Stoat. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 261–287.
[47] Ragg JR. 1998. Intraspecific and seasonal differences in the diet of feral ferrets (*Mustela furo*) in a pastoral habitat, east Otago, New Zealand. New Zealand Journal of Ecology 22(2): 113–119.
[48] Clapperton BK, Byron A. 2005. Feral ferret. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 294–307.
[49] King CM. 2005. Weasel. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 287–294.
[50] King CM, Flux M, Innes JG, Fitzgerald BM. 1996. Population biology of small mammals in Pureora Forest Park: 1. Carnivores (*Mustela erminea, M.furo, M.nivalis* and *Felis catus*). New Zealand Journal of Ecology 20(2): 241–251.
[51] Jones C, Sanders MD. 2005. European hedgehog. In: King CM ed. The handbook of New Zealand mammals. 2nd edition. Melbourne, Oxford University Press. Pp. 81–94.
[52] Spitzen-van der Sluijs AM, Spitzen J, Houston D, Stumpel AHP. 2009. Skink predation by hedgehogs at Macraes Flat, Otago, New Zealand. New Zealand Journal of Ecology 33(2): 205–207.
[53] Jones C, Moss K, Sanders M. 2005. Diet of hedgehogs (*Erinaceus europaeus*) in the upper Waitaki Basin, New Zealand. Implications for conservation. New Zealand Journal of Ecology 29(1): 29–35.

[54] Jones C, Sanders MD. 2005. European hedgehog. In: King CM ed. The handbook of New Zealand mammals. 2nd edition. Melbourne, Oxford University Press. Pp. 81–94.
[55] Ruscoe WA, Murphy EC. 2005. House mouse. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 204–221.
[56] Newman DG. 1994. Effect of a mouse *Mus musculus* eradication programme and habitat change on lizard populations on Mana Island, New Zealand, with special reference to McGregor's skink, *Cyclodina macgregori.* New Zealand Journal of Ecology 21: 443–456.
[57] King CM, Flux M, Innes JG, Fitzgerald BM. 1996. Population biology of small mammals in Pureora Forest Park: 1. Carnivores (*Mustela erminea, M.furo, M.nivalis* and *Felis catus*). New Zealand Journal of Ecology 20(2): 241–251.
[58] Reardon JT, Whitmore N, Holmes KM, Judd LM, Hutcheon AD, Norbury G, Mackenzie DI. 2012. Predator control allows critically endangered lizards to recover on mainland New Zealand. New Zealand Journal of Ecology 36(2): 141–150.
[59] King CM, Flux M, Innes JG, Fitzgerald BM. 1996. Population biology of small mammals in Pureora Forest Park: 1. Carnivores (*Mustela erminea, M.furo, M.nivalis* and *Felis catus*). New Zealand Journal of Ecology 20(2): 241–251.
[60] Gillies C, Fitzgerald BM. 2005. Feral cat. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 308–326.
[61] Norbury G, Flux JEC. 2005. Brown hare. in: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 151–158.
[62] Beggs JR. 2001. The ecological consequences of social wasps (Vespula spp.) invading an ecosystem that has an abundant carbohydrate resource. Biological Conservation 99: 17–28.
[63] Stewart GH, Wardle JA and Burrows LE. 1987. Forest understory changes after reduction in deer numbers, Northern Fiordland, New Zealand. New Zealand Journal of Ecology 10: 35–42.
[64] Nugent G, Fraser W. 2005. Red deer. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 401–419.
[65] Nugent G, Asher G. 2005. Fallow deer. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 447–459.
[66] Parkes. JP. 2005. Feral goat. In: King CM ed. The handbook of New Zealand mammals. Oxford University Press. Pp. 374–391.
[67] McIntosh AR, McHugh PA, Dunn NR, Goodman JM, Howard SW, Jellyman PG, O'Brien LK, Nystrom P, Woodford DJ. 2010. The impact of trout on galaxiid fishes in New Zealand. New Zealand Journal of Ecology 34(1): 195–206.
[68] Wright D, Clout M 2001. The eastern rosella (Platycercus eximius) in New Zealand. DOC Science Internal Series 18.
[69] Galbraith JA. 2013. Eastern rosella. In Miskelly, C.M. (ed.) New Zealand Birds Online. www.nzbirdsonline.org.nz
[70] Morgan JD, Waas R, Innes J. 2006. The relative importance of Australian magpies *(Gymnorhina tibicen)* as nest predators of rural birds in New Zealand, New Zealand Journal of Zoology, 33:1, 17-29.
[71] Morgan D, Waas J, Innes J. 2006. Do territorial and non-breeding Australasian Magpies (*Gymnorhina tibicen*) influence the local movements of rural birds in New Zealand? IBIS International Journal of Avian Science, Volume 148, Issue 2.
[72] Smale MC, Dodd MB, Burns BR, Power IL. 2008. Long-term impacts of grazing on indigenous forest remnants on North Island hill county, New Zealand. New Zealand Journal of Ecology 32(1): 57–66.

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