

Key Native Ecosystem Operational Plan for Kaitoke Regional Park

2017-2020



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1. Purpose

The purpose of the three-year Key Native Ecosystem (KNE) Operational Plan for Kaitoke Regional Park KNE site is to:

- Identify the parties involved
- Summarise the ecological values and identify the threats to those values
- Outline the objectives to improve ecological condition
- Describe operational activities (eg, ecological weed control) that will be undertaken, who will undertake the activities and the allocated budget

KNE Operational Plans are reviewed every three 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 below (in Section 2).

2. Policy Context

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

Plans and Strategies that guide the delivery of the KNE programme are:

Greater Wellington 10 Year Plan

The 10 Year Plan (2015-2025)² outlines the long term direction of the Greater Wellington Regional Council (Greater Wellington) and includes information on all our major projects, activities and programmes for the next 10 years and how they will be paid for. This document outlines that Greater Wellington will actively manage selected high value biodiversity sites. Most of this work is undertaken as part of the KNE programme.

Proposed Natural Resources Plan

The Proposed Natural Resources Plan (PNRP) provides the high level strategic framework which sets out how Greater Wellington, Mana whenua partners and the community work together and includes:

- Guiding Principles that underpin the overall management approach of the plan (eg, Kaitiakitanga)
- Sites with significant indigenous biodiversity values
- Sites of significance to mana whenua (refer Schedules B, C, Schedule D)

Parks Network Plan

Management of Kaitoke Regional Park as a whole is guided by the Greater Wellington Parks Network Plan (PNP)³. This plan guides the recreational and amenity uses of Kaitoke Regional Park as well as identifying opportunities to protect biodiversity values.

Greater Wellington Biodiversity Strategy

The Greater Wellington Biodiversity Strategy⁴ (Strategy) is an internal document that sets a framework that guides how Greater Wellington protects and manages biodiversity in the Wellington region to work towards the Vision.

Vision

Healthy ecosystems thrive in the Wellington region and provide habitat for native biodiversity

The Strategy provides a common focus across Greater Wellington's departments and guides activities relating to biodiversity. The Vision is underpinned by four operating principles and three strategic goals. Goal One drives the delivery of the KNE Programme.

Goal One

Areas of high biodiversity value are protected or restored

3. The Key Native Ecosystem Programme

The KNE Programme is a voluntary programme of work. There is no statutory obligation for Greater Wellington to do this work. Greater Wellington invites selected landowners to discuss whether they would like to be involved in the programme. When work is done on private land, it 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.

The programme seeks to protect some of the best examples of original (pre-human) ecosystem types in the Wellington region by managing, reducing, or removing threats to their ecological values. Sites with the highest biodiversity values have been identified and prioritised for management. 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 common place	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 in order 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.

KNE sites can be located on private or publicly owned land. However, land managed by the Department of Conservation (DOC) is generally excluded from this programme.

KNE sites are managed in accordance with three-year KNE plans prepared by the Greater Wellington’s Biodiversity department. Greater Wellington works with the landowners, mana whenua and other operational delivery providers to achieve mutually beneficial goals.

4. Kaitoke Regional Park Key Native Ecosystem site

The Kaitoke Regional Park KNE site (2,700 ha) is located in the southern foothills of the Tararua Range, approximately 7km north-east of Upper Hutt. It lies wholly within Kaitoke Regional Park (see Appendix 1, Map 1). It is comprised of a large area of rising hill country, steeply incised by the Hutt River and several of its tributaries, and areas of river terrace of the Hutt and Pākuratahi rivers at Te Mārua and Kaitoke.

The KNE site is contiguous with the Hutt Water Collection Area KNE site to the north-east and privately owned bush-clad land to the west. It is mostly covered in original or selectively-logged native forest. The steeper hill country, comprising most of the KNE site, is remote in nature with no vehicle access or maintained walking tracks. However, the more accessible parts of the KNE site are popular areas for picnicking, walking and tramping.

5. Parties involved

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

5.1. Landowner

All land in the KNE site is owned by Greater Wellington for the purposes of water supply, recreation and plantation forestry. The whole site is managed by Greater Wellington's Parks department as part of Kaitoke Regional Park and its management is guided by the Greater Wellington Parks Network Plan⁵ (PNP).

5.2. Operational delivery

Within Greater Wellington, the Biodiversity, Biosecurity and Parks departments are responsible for delivering the KNE operational plan. The Biodiversity department is the overarching lead department for Greater Wellington on the coordination of biodiversity management activities and advice within the KNE site. The Biosecurity department coordinates and carries out pest control activities. The Parks department manages recreational access and maintains assets such as the road, tracks and amenity areas within the KNE site.

5.3. Mana whenua partners

Ngāti Toa Rangatira (Ngāti Toa) and Taranaki Whānui ki Te Upoko o Te Ika a Maui (Taranaki Whānui) are Greater Wellington's mana whenua partners in Kaitoke Regional Park KNE site. Greater Wellington is committed to exploring opportunities on how mana whenua partners wish to be involved in the plan development or operational delivery of the KNE site.

Ngāti Toa

Ngāti Toa considers it has a strong historical connection with the Te Awa Kairangi (Hutt River) and its tributaries. They consider that the river is included within their extended rohe and it is an important symbol of their interests in the Harataunga area⁶.

Ngāti Toa claims an association with the Te Awa Kairangi from the time of their participation in the invasion of the Hutt Valley during 1819 and 1820. While they did not remain in the area after this invasion, Te Awa Kairangi continued to be important to them following their permanent migration and settlement in the lower North Island in the late 1820s and early 1830s. Ngāti Toa's relationship to the Hutt Valley and river was not one defined by concentrated settlement and physical presence. Rather, the iwi felt their claim to the land was based on their powerful leadership and the relationship they had with iwi residing in the Hutt Valley who had been placed there by Ngāti Toa in the 1830s. For some years these iwi in the Hutt Valley paid tribute of goods such as canoes, eels and birds to Ngāti Toa⁷.

Te Awa Kairangi was an important transport route, and small waka were used along the length of the river. The river was traditionally an area for gathering piharau, or the freshwater blind eel, as well as tuna (eel) from its tributaries. Harataunga also supported flax plantations, which were used by early Maori for trading with settlers.

The river was also of great importance as it was the largest source of freshwater in the area⁸.

Table 1: Ngāti Toa site of significance in Kaitoke Regional Park KNE site⁹

Site of significance	Mana whenua values ¹⁰
Te Awa Kairangi/Hutt River	<p>Ngā mahi a ngā Tūpuna:</p> <p>Ngāti Toa’s relationship with Te Awa Kairangi and Wainuiomata Rivers extends back to the Amiowhenua expedition from 1819 and Te Rauparaha’s initial invasion of the Hutt Valley. During that campaign the tauā (war party) marched around the western side of Te Whanganui-a-Tara, defeating the local iwi as they went. When they reached Te Awa Kairangi they constructed rafts which were used to aid them in their invasion of the Hutt Valley. Ngāti Toa’s traditional relationship with each river as important mahinga kai, ara waka, and source of natural resources reflected the wider influence and mana of Ngāti Toa throughout the whole of the Hutt Valley</p>
	<p>Te Mahi Kai:</p> <p>Te Awa Kairangi was once the largest source of fresh water in the district, and supported a diverse and abundant native fishery resource which was important to Ngāti Toa’s physical and cultural sustenance. In addition to sustaining a large variety of native fish populations, the river also provided access to forest birds, watercress, and numerous other food plants. Today, the lower reaches of the river in particular are in a state of extreme degradation due to the adverse effects of development within the Hutt Valley catchment over many decades. This has severely impacted on the ability to continue customary practices</p>
	<p>Te Mana o Te Tangata:</p> <p>Many iwi from around the region and from the top of the South Island are familiar with the life supporting capacity of this river and the wealth of freshwater foods and resources once harvested here</p>
	<p>Te Manawaroa o te Wai:</p> <p>Despite excessive land reclamations, modification, and environmental damage Te Awa Kairangi continues to support a variety of endemic wildlife; including endangered species. There is vast potential for environmental restoration and this is a primary objective for Ngāti Toa. Environmental issues continue to have a direct and significant impact on successive generations</p>
	<p>Te Mana o Te Wai:</p> <p>A defining feature of Ngāti Toa settlement in the Wellington area and integral to Ngāti Toa identity</p>

Taranaki Whānui

Taranaki Whānui considers that Te Awa Kairangi is the oldest name for the Hutt River attributed to the Polynesian explorer Kupe. It was also known as Heretaunga in a later period. The origins of the streams flowing to Te Awa Kairangi are high in the Tararua Range. The stream and rivers lead down through Pākuratahi at the head of the Hutt Valley. Taranaki Whānui had interests at Pākuratahi as the trail linking Te Whanganui a Tara and the Wairarapa came through Pākuratahi and over the Rimutaka Range. Prior to the 1855 uplift Te Awa Kairangi was navigable by waka up to Pākuratahi and the river was navigable by European ships almost to Whirinaki (Silverstream)¹¹.

Taranaki Whānui travelled in the Hutt Valley largely by waka. There were few trails through the heavy forest of the valley. Many Taranaki Whānui kainga and pā were close to the river including at Haukaretu (Māoribank), Whakataka Pā (which was across the bank from what is now Te Mārua), Mawaihakona (Wallaceville), Whirinaki, Motutawa Pā (Avalon), Maraenuku Pā (Boulcott), Paetutu Pā and at the mouth of the river, Hikoikoi Pā to the west and Waiwhetu Pā (Owhiti) to the east¹².

Te Awa Kairangi linked the settlements as well as being a food supply for the pā and kainga along the river. Mahinga kai were found along the river such as Te Momi (Petone) which was a wetland that held abundant resources of birds, tuna and other food sources. The river ranged across the valley floor and changed course several times leaving rich garden sites. Waka were carved from forest trees felled for that purpose close to the river¹³.

Table 2: Taranaki Whānui site of significance in Kaitoke Regional Park KNE site¹⁴

Site of significance	Mana whenua values ¹⁵
Te Awa Kairangi/Hutt River	<p>Ngā Mahi a ngā Tūpuna:</p> <p>Te Awa Kairangi is the major river system for the valley of the Hutt. Its sources from the Tararua connect with the extensive stream systems that support this, the largest river in the takiwā of Te Ātiawa/Taranaki Whānui.</p>
	<p>Te Mahi Kai:</p> <p>This river is still navigable by waka and supports extensive wildlife of fish, birds, plants and resources that sustained many iwi over the centuries. The podocarp forest supported by this river was the home for teeming flocks of birds and evidence of this is written about extensively by early settlers especially Charles Heaphy, a surveyor with the New Zealand Company</p>
	<p>Wāhi Whakarite:</p> <p>Along this river sites were maintained for rituals and ceremonies relating to the everyday activities of the iwi</p>
	<p>Te Mana o te Tangata:</p> <p>This river and its tributaries are significant as many pā were built on its banks and sustained a full way of life for whanau and provided extensively for manuhiri on the occasions required</p>
	<p>Te Manawaroa o te Wai:</p> <p>This river has been highly modified by settlers and this continues today. The use of the river to dump sewage and waste and the narrowing of its channel and the extensive changes to the delta at the mouth have caused iwi to lose their relationship with this most significant river</p>
	<p>Te Mana o te Wai:</p> <p>Te Awa Kairangi has much lore and its name and connection for the iwi who lived and moved on from this area mean the cultural history is a large one</p>
	<p>Wāhi Mahara:</p> <p>Like all rivers in the Te Ātiawa/Taranaki Whānui takiwā, this river is the place for wānanga; of note are the pā sites, the swamps and their uses for weaving, dyes and the fisheries. The battles are all linked to the Te Ātiawa/Taranaki Whānui story</p>

Greater Wellington recognises the value and importance of working with mana whenua in their roles as kaitiaki in areas within the KNE site. The KNE operational plan activities will:

- make a small but valuable contribution to the overall expected PNRP outcomes including protecting native vegetation in the Hutt River catchment
- ensure people working in KNE sites understand the requirements of the Accidental Discovery Protocol
- endeavour to ensure that Ngāti Toa and Taranaki Whānui values for the site are protected

In addition, Greater Wellington will work on initiatives to achieve mutual benefit including the internship monitoring programme of the cultural health and wellbeing of KNE sites.

5.4. Stakeholders

The Wellington Botanical Society (WBS) and the Upper Hutt Branch of the Royal Forest and Bird Protection Society (UHF&B) are both stakeholders at the site. A combined effort from these groups has been instrumental in the protection and restoration of an important 1 ha remnant of lowland river terrace forest which lies within the KNE site at its southern tip. This forest remnant is known as Te Mārua Bush. Since 1991, WBS and UHF&B have carried out large amounts of weed control and rubbish removal, and have planted native trees on the edges of the remnant to bolster its resilience to the impacts of ecological weeds and extreme climatic events. Plantings have contributed to the substantial increase in the size of Te Mārua Bush from 0.6 ha in 1991 to 1 ha today, with a resultant increase in the area-to-edge ratio¹⁶.

UHF&B members have grown most of the native plants that have been used in the restoration of Te Mārua Bush. Plants have been propagated from seed collected from plants within or nearby the forest remnant, to ensure plant species and genetics are appropriate for the site. Members of WBS have provided expert botanical advice on forest health and the selection of species for planting.

Wellington Water has an interest in the KNE site as water supply infrastructure that they manage such as pipelines, treatment plants and water storage lakes, is located within or immediately adjacent to the 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 3, below, lists ecological designations at all or part of the Kaitoke Regional Park KNE site.

Table 3: Designations at the Kaitoke Regional Park KNE site

Designation level	Type of designation
Regional	<p>Parts of the KNE site are designated under Greater Wellington's proposed Natural Resources Plan as a:</p> <ul style="list-style-type: none"> • River with Significant Indigenous Ecosystems – habitat with high macroinvertebrate community health (Schedule F1): Te Awa Kairangi/Hutt River and all tributaries • River with Significant Indigenous Ecosystems – habitat for threatened and at risk fish species (Schedule F1): Te Awa Kairangi/Hutt River and all tributaries • River with Significant Indigenous Ecosystems – habitat for six or more migratory indigenous fish species (Schedule F1): Te Awa Kairangi/Hutt River
District	<p>Part of the KNE site has been designated within UHCC's District Plan¹⁷ for its high ecological, visual and/or landscape values:</p> <ul style="list-style-type: none"> • Southern Hills Overlay Area (Development or the removal of vegetation has the potential to significantly impact on the identified values)

6.2. Ecological significance

The Kaitoke Regional Park 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 within the KNE site boundary
- Its **ecological context** is valuable at the landscape scale as it contains a variety of inter-connected habitats and, provides core habitat for threatened indigenous plant and animal species within the KNE site

Representativeness

The Singers and Rogers (2014)¹⁸ classification of pre-human vegetation indicates that the KNE site contains three forest ecosystem types that are now considered regionally threatened, having less than 30% of the pre-human extent remaining in the region. They are: tōtara, mataī, ribbonwood forest (WF2); tawa, kāmahī, podocarp forest

(MF7); and hard beech forest (MF20) (see Appendix 1, Map 3). It is estimated that there is now only about 2.6%, 22.5% and 26% respectively of the pre-human extent of these forest types remaining in the Wellington Region¹⁹. Te Mārua Bush is a remnant example of WF2.

The Threatened Environment Classification system²⁰ indicates that parts of the Kaitoke Regional Park KNE site are classified as Acutely Threatened, Chronically Threatened or At Risk. There is less than 10%, 10-20% and 20-30% respectively of the original cover of these indigenous vegetation types remaining in New Zealand²¹. These areas of threatened environments within the KNE site are located on river terraces and valley floors, and include Te Mārua Bush (see Appendix 1, Map 2).

Rarity/distinctiveness

New Zealand's national threat classification system²² lists four plant, five bird, one lizard and five freshwater fish species that are present within the site as nationally Threatened or At Risk. Seven plant species present have also been listed as regionally threatened. Nationally Threatened species are listed in Appendix 2 and Regionally Threatened species in Appendix 3.

Diversity

The Kaitoke Regional Park KNE site comprises six different forest ecosystem types and one riverine ecosystem type²³. These ecosystem types are: black beech forest (MF5); hard beech forest (MF20); red beech, podocarp forest (CLF9); kāmahī, broadleaf, podocarp forest (MF8); tawa, kāmahī, podocarp forest (MF7); tōtara, mataī, ribbonwood forest (WF2); and hard tussock, scabweed, gravelfield/stonefield (BR1) (see Appendix 1, Map 3).

Ecological context

The Kaitoke Regional Park KNE site contains a large area of mature indigenous forest representative of the original Akatarawa-Hutt Valley vegetation types. The forest is contiguous with that of the Hutt Water Collection Area. The KNE site provides core breeding habitat for a large assemblage of forest bird species and is refuge for nationally and regionally threatened plant species. Also significant within the KNE site is the forest in Te Mārua Bush as it is one of the few remaining lowland forest remnants of mataī (*Prumnopitys taxifolia*), tōtara (*Podocarpus totara*) and black maire (*Nestegis cunninghamii*) forest in the Wellington Region.

6.3. Ecological features

The KNE site straddles two ecological districts. The river terraces at the southern extent of the KNE site at Te Mārua are within the Wellington ecological district while the rest of the KNE site is in the Tararua ecological district²⁴.

Habitats

The forest types that were present in the KNE site prior to human arrival still remain. However, the composition of the vegetation has been modified by selective logging and the impacts of pests. The vegetation as a whole is essentially podocarp/broadleaf/beech forest with a large component of beech. Hard beech (*Fuscopora truncata*) and black beech (*Fuscopora solandri*) are common on the

lowland hills. These are replaced by red beech (*Fuscopora fusca*) on damper more fertile sites, grading into silver beech (*Lophozonia menziesii*) at higher elevations.

There is a rich diversity in the podocarp/broad-leaved component of the forest in places. In the gorges and terraces of Te Awa Kairangi/Hutt River, mataī, northern rātā (*Metrosideros robusta*) and kahikatea (*Dacrydium dacrydioides*) emerge over a canopy of kāmahī (*Weinmannia racemosa*), hīnau (*Elaeocarpus dentatus*), miro (*Prumnopitys ferruginea*), tawa (*Beilschmiedia tawa*) and black and swamp maire (*Syzygium maire*), with many understory species present. In the Putaputa and Kororipo streams, the main tributaries of Te Awa Kairangi/Hutt River within the KNE site, northern rātā, rimu (*Dacrydium cupressinum*), miro and pukatea (*Laurelia novae-zealandiae*) mix with kāmahī, silver beech and red beech in a largely podocarp forest. Small areas of tawa-tītōki (*Beilschmiedia tawa-Alectryon excelsus*) forest are present in the KNE site near Benga Stream²⁵.

The original vegetation on the river terraces at Kaitoke and Te Mārua is thought to have contained pockets of tōtara, mataī, kahikatea, rimu and northern rātā amongst broadleaf/beech forest with pukatea occurring in swampy sites²⁶. The only semblance of the original forest that remains is found in Te Mārua Bush. This is a closed-canopy secondary stand of mataī-tōtara forest, growing on an old alluvial terrace of Te Awa Kairangi/Hutt River. The soils of this site are exceptionally stony. Mataī-tōtara forest has not been recognised elsewhere in the Hutt catchment and is now a rare type of forest on a national scale. Although very small and secondary in origin, Te Mārua Bush is probably replicating the composition of the forest originally present on the site²⁷.

Species

Plants

Threatened plant species that are present within the old growth forest include red mistletoe (*Peraxilla tetrapetala*), scarlet mistletoe (*Peraxilla colensoi*) and Kirk's daisy (*Brachyglottis kirkii*). Orchid species are common in areas of regenerating beech and kāmahī.

Birds

Nineteen species of native bird have been recorded in the KNE site²⁸. The KNE site contains a large enough area of mature forest to support large breeding populations of all native forest bird species present in the region. Of particular note amongst species considered resident in the KNE site are the nationally threatened species New Zealand falcon (*Falco novaeseelandiae*), long-tailed cuckoo (*Eudynamys taitensis*), red-crowned parakeet (*Cyaronamphus novaeseelandiae*) and rifleman (*Acanthisitta chloris*). In addition, the KNE site also supports species such as yellow-crowned parakeet (*Cyaronamphus auriceps*), tomtit (*Petroica macrocephala*) and whitehead (*Mohoua albicilla*) that are now uncommon to the region, and provides feeding habitat for North Island kākā (*Nestor meridionalis*). A significant gathering of kererū (*Hemiphaga novaeseelandiae*) occurs in September every year in trees on the river terrace at Kaitoke. They gather here to feed on fresh willow and tree lupin foliage.

Reptiles

The ngahere gecko (*Mokopirirakau* “southern North Island”) is the only lizard species that has been recorded in the KNE site, but it is likely that barking gecko (*Naultinus punctatus*) as well as northern grass skink (*Oligosoma polychroma*) and ornate skink (*O. ornatum*) are also present, as these species have been recorded nearby in contiguous habitat.

Fish (inc Kōura/crayfish)

Native freshwater crayfish (kōura, *Paranephrops planifrons*) and eight species of native freshwater fish have been recorded in the KNE site. Five of these species are threatened (see Appendix 2). There are no barriers to fish passage within the KNE site. However, a large water intake weir on Te Awa Kairangi/Hutt River immediately beyond the boundary of the KNE site prevents the passage of many species further up the catchment.

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 threats to the ecological values at each KNE site.

7.1. Key threats

The most significant threats to the ecological values of Kaitoke Regional Park KNE site come from a range of ecological weeds, browsing and predatory pest animals, and the potential impacts of some management and recreational activities.

There is a suite of ecological weed species present that are of significant concern due to their highly invasive nature. They are mostly sparse and localized within the large forested areas, but some are present in dense infestations in outlying areas, particularly in paddock hedgerows in the Te Mārua area. A large suite of ecological weed species is present in and around Te Mārua Bush, with the potential to impact the integrity of this highly threatened forest type.

There are a number of pest animal species known to exist within the KNE site. The species considered to pose the greatest threat to the ecological values of the KNE site are rats (*Rattus* spp.), stoats (*Mustela erminea*), possums (*Trichosurus vulpecula*), feral goats (*Capra hircus*) and feral deer (*Cervus elaphus scoticus*).

Rats and stoats, thought to be present in moderate to high numbers within the KNE site, are likely to be having the greatest impact on ecological values of all pest animals present as there is currently very little targeted control of these species.

Possums are generally present in very low numbers due to regular aerial and ground control operations carried out in the past. If possum control is not ongoing it is likely that they will increase in numbers over time to levels that will significantly impact on forest health and regeneration. Some plant species that are present in the KNE site and preferred by possums as food are northern and southern rātā (*Metrosideros robusta*

and *M. umbellata*), tree fuchsia (*Fuchsia excorticata*) and mistletoes (*Ileostylus micranthus*, *Korthalsella lindsayi*, *Peraxilla colensoi* and *P. tetrapetala*).

Feral goats (*Capra hircus*) are present in moderate numbers and are inhibiting regeneration of the forest. They are most prevalent in the lower valleys.

While the key threats discussed in this section are recognised as the most significant, a number of other threats to the KNE site's values have also been identified. Table 4 presents a summary of all known threats to the Kaitoke Regional Park KNE site (including those discussed above), detailing which operational areas they affect, how each threat impacts on ecological values, and whether they will be addressed by operational activities.

Table 4: Summary of all threats to ecological values present at the Kaitoke Regional Park 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 weed species for control include wandering willie (<i>Tradescantia fluminensis</i>) and African club moss (<i>Selaginella kraussiana</i>), (see full list in Appendix 4)	A, B, C, D, E
EW-2	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include barberry (<i>Berberis glaucarpa</i>), hawthorn (<i>Crataegus monogyna</i>) and holly (<i>Ilex aquifolium</i>), (see full list in Appendix 4)	A, B, C, D, E
EW-3	Climbing weeds smother and displace native vegetation often causing canopy collapse, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include old man's beard (<i>Clematis vitalba</i>), Japanese honeysuckle (<i>Lonicera japonica</i>) and climbing asparagus (<i>Asparagus scandens</i>), (see full list in Appendix 4)	A, B, C, D, E
Pest animals		
PA-1	Possums (<i>Trichosurus vulpecula</i>) browse palatable canopy vegetation until it can no longer recover ^{29,30} . This destroys the forest's structure, diversity and function. Possums may also prey on native birds ³¹ and invertebrates	Entire KNE site
PA-2	Goats (<i>Capra hircus</i>) 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 ³² .	Entire KNE site
PA-3	Red deer (<i>Cervus elaphus</i>) browse the forest understory and can significantly change vegetation composition by preferential browsing and preventing regeneration ^{33,34,35}	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
PA-4*	Rats (<i>Rattus</i> 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 ^{36,37}	Entire KNE site
PA-5*	Mustelids (stoats ^{38,39} (<i>Mustela erminea</i>), ferrets ^{40,41} (<i>M. furo</i>) and weasels ^{42,43} (<i>M. nivalis</i>)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	Entire KNE site
PA-6*	Hedgehogs (<i>Erinaceus europaeus</i>) prey on native invertebrates ⁴⁴ , lizards ⁴⁵ and the eggs ⁴⁶ and chicks of ground-nesting birds ⁴⁷	Entire KNE site
PA-7*	House mice (<i>Mus musculus</i>) 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 ^{48,49}	Entire KNE site
PA-8*	Feral, stray, and domestic cats (<i>Felis catus</i>) prey on native birds ⁵⁰ , lizards ⁵¹ and invertebrates ⁵² , reducing native fauna breeding success and potentially causing local extinctions ⁵³	Entire KNE site
PA-9*	Rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus europaeus</i>) graze on palatable native vegetation and prevent natural regeneration in some environments ⁵⁴	Entire KNE site
PA-10*	Wasps (<i>Vespula</i> spp.) adversely impact native invertebrates and birds through predation and competition for food resources. They also affect nutrient cycles in beech forests ⁵⁵	Entire KNE site
PA-11*	Feral pigs (<i>Sus scrofa</i>) root up the soil and eat roots, invertebrates, seeds and native plants preventing forest regeneration ⁵⁶	Entire KNE site
PA-12*	Brown trout (<i>Salmo trutta</i>) and rainbow trout (<i>Oncorhynchus mykiss</i>) prey on native fish and compete with them for food resources ⁵⁷	Entire KNE site
PA-13*	Eastern rosella (<i>Platycercus eximius</i>) 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 ^{58,59}	Entire KNE site
PA-14*	Australasian magpies are known to modify the behaviour of native birds which could inhibit the ability of native birds to feed and breed freely	Forest margins
Human activities		
HA-1	Recreational use such as tramping and hunting, and commercial activities such as film-making can cause damage and disturbance of the native ecosystem. They are also likely to disturb native fauna and introduce ecological weeds	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
HA-2	Management activities such as track development, pest control and ecological monitoring can damage and destroy 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-3	Fire can be destructive to native flora and fauna and create conditions for pest plant invasion	Entire KNE site
HA-4	Illegal removal of plants such as orchids and tree ferns, and animals such as lizards can cause the local elimination of species	Entire KNE site
HA-5*	Gardenwaste dumping often leads to ecological weed invasions into natural areas. Common weed species introduced at this KNE site include montbretia (<i>Crocsmia x crocosmiiflora</i>), wild onion (<i>Allium veneale</i>) and wild strawberry (<i>Fragaria virginiana</i>)	C
HA-6*	Freshwater activities such as tubing, boating and fishing can introduce aquatic weed species to waterways	Te Awa Kairangi/ Hutt River
Other threats		
OT-1	Edge effects affect forest remnants by changing environmental conditions (eg, soil moisture or temperature levels), changing physical environment (eg, different plant assemblages compared to the interior) and changing species interactions (eg, increased predation by invasive species) ^{60,61}	C, D

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

The codes alongside each threat correspond to activities listed in the operational delivery schedule (Table 6), and are used to ensure that actions taken are targeted to specific threats. Maps of operational areas can be found in Appendix 1 (see Maps 4 and 5).

8. Objectives

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

The following objectives will guide the operational activities at the Kaitoke Regional Park KNE site.

1. To improve the structure* and function† of native plant communities
2. To improve the habitat for native birds
3. To raise community awareness of the ecological values of the KNE site
4. To engage the community in management of the KNE site

* The living and non-living physical features of an ecosystem. This includes the size, shape, complexity, condition and the diversity of species and habitats within the ecosystem.

† The biological processes that occur in an ecosystem. This includes seed dispersal, natural regeneration and the provision of food and habitat for animals.

9. Operational activities

Operational activities are targeted to work towards the objectives above (Section 8) by responding to the threats outlined in Section 7. 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 (Table 6).

It is important to note that not all threats identified in Section 7 can be adequately addressed. This can be for a number of reasons including financial, legal, or capacity restrictions.

9.1. Ecological weed control

The aim of ecological weed control at Kaitoke Regional Park KNE is to reduce the density and slow the spread of ecological weeds.

Ecological weed management at the KNE site has been separated into five operational areas based on habitat type, weed burden and management approach (see Map 4, Appendix 1).

Operational Area A – front slopes of the main forest from Kaitoke to Te Mārua:

Focus on finding and controlling all ecological weeds in this area will be maintained in order to reduce the chance of weeds moving into the interior of the forest where the greatest biodiversity values lie. The area will be searched annually for ecological weeds through surveillance of historic infestation sites and locations likely to be prone to infestation. The pest plant control plan for Kaitoke Regional Park published in 2005⁶² and the associated survey data will be used to identify historic infestation sites. Additionally, observations from suitable advantage points will be made and reports of weed infestation from Greater Wellington staff and the public will be investigated. Some of the more invasive ecological weed species that have been present and controlled in the past include old man's beard, Japanese honeysuckle, climbing asparagus, convolvulus (*Calystegia silvatica*), wandering willie, African club moss, barberry, hawthorn, holly, willow (*Salix* spp.), sycamore (*Acer pseudoplatanus*) and hops (*Humulus lupulus*).

Highly invasive climbers such as old man's beard, Japanese honeysuckle and climbing asparagus will also be controlled in areas outlying the main forest (within areas of regenerating scrub and amenity areas). Less invasive species won't be controlled in such areas at this time.

Operational Area B – Te Awa Kairangi/Hutt River gorge:

The recent discovery of Chilean rhubarb (*Gunnera tinctoria*) in Te Awa Kairangi/Hutt River gorge down stream of Pākuratahi Forks has highlighted the risk that the Pākuratahi and Te Awa Kairangi/Hutt rivers pose as vectors of ecological weeds and the need to regularly survey the edges of Te Awa Kairangi/Hutt River where it passes through the KNE site, (edges of the Pākuratahi River are already surveyed as part of work in operational area A). Te Awa Kairangi/Hutt River gorge is being progressively surveyed over several years and all ecological weeds found are being controlled. Work started in 2016 and is expected to be completed in 2017-18. Once complete, follow up

surveys will be undertaken every few years with the next progressive survey scheduled to start outside the lifetime of this KNE plan in 2020-21.

Operational Area C – Te Mārua Bush:

Te Mārua Bush contains very high ecological values and is at great risk of ongoing infestation by ecological weeds due to its small size and location next to large weed seed sources. Therefore, ecological weed control undertaken in this area is comprehensive and sustained. A large range of ecological weeds are controlled on an ongoing basis. Control is undertaken by members of WBS and UHF&B during annual working-bees, and subsequently by the Greater Wellington Biosecurity department. Members of the WBS and UHF&B control as much of the weed infestations as they are able within their capacity and with the methods available to them (pulling and stump treating). Greater Wellington then follows up with searches and control of remaining plants. All weedy exotic plant species found in this operational area are controlled, including those listed in Appendix 4.

Operational Area D – Other forest remnants at Te Mārua:

As with Te Mārua Bush, the other three forest remnants at Te Mārua are also very vulnerable to infestation by ecological weeds due to their small size and location next to large seed sources. However, these remnants aren't of such high value as they don't contain the uncommon forest type that Te Mārua Bush does. Therefore, ecological weed control in these areas is undertaken at a coarser level and only every three years. A cursory sweep to control priority ecological weeds was undertaken in 2016-17. Another one will be undertaken in 2019-20.

Operational Area E – Te Mārua Pony Club lease area

Members of the Te Mārua Pony Club and Greater Wellington's Parks and Biosecurity departments have worked together during the past three years to remove a number of large weed trees that were located within stands of trees in the pony club lease area at Te Mārua. Many similar weed trees such as hollies, hawthorns and sycamores still remain. These large trees produce large amounts of seed which pose a threat to the nearby native forest remnants.

Work will continue to remove more of these trees where they are considered unnecessary for shelter or other amenity purposes. This will be carried out by the Parks Department.

9.2. Pest animal control

The primary aim of pest animal control currently undertaken in the Kaitoke Regional Park KNE site is to reduce the density of possums, goats and deer to levels that will allow the recovery of the forest canopy and regeneration of the forest floor to occur throughout the site. A secondary aim is to provide an added level of protection to a small area of the original podocarp-rātā forest by intensively controlling possums and rats in this area. These aims are currently achieved through a combination of aerial 1080 poison control, targeted ground-based trapping and poisoning, and hunting. Predator control, targeting rats and mustelids over this scale of site and terrain is very difficult to achieve and expensive. Therefore, no widespread targeted control of these high impact species is currently undertaken.

A possum population density of below 5% RTC (residual trap catch) is desirable for maintaining forest canopy cover. In the past this has been achieved throughout the KNE site by separate possum control operations undertaken by Greater Wellington and OSPRI. In the future, OSPRI will undertake possum control operations throughout the entire KNE site under their TBfree New Zealand programme. This programme is part of a national strategy aiming to eradicate bovine tuberculosis from New Zealand. As possums are the main vector of bovine tuberculosis, they are controlled in areas where the disease has been found in wildlife, or in cattle or deer herds. The Kaitoke Regional Park KNE site is within one such area.

Although the objectives of the TBfree programme are somewhat different to the biodiversity objectives of this KNE plan, the possum control carried out under the TBfree programme is expected to deliver positive biodiversity outcomes. Therefore, Greater Wellington doesn't plan to undertake possum control across the KNE site apart from in one small area (operational area F) as detailed below. OSPRI plan to undertake the next possum control operation at the site in 2021. The operation is likely to involve a combination of aerially-sown 1080 (sodium fluoroacetate) and ground-based trapping and poisoning.

Possum and rat populations are kept to very low levels in operational area F (see Appendix 1, Map 5) on an ongoing basis. Control in this area is undertaken by Greater Wellington Parks department staff by dispensing brodifacoum or a similar toxin from a network of bait stations. This provides a more sustained level of control than that of OSPRI's cyclic possum control operations.

Beyond operational area F, no targeted rat or mustelid (weasel, stoat and ferret) control will be undertaken in the KNE site as ground control over such a large and remote site is extremely difficult and expensive, and the alternative of frequent aerial operations isn't favoured by the community. However, monitoring at similar sites has shown that aerial 1080 operations used to target possums will also control these species to very low levels. This control is likely to be short-lived though, with populations returning to pre-control levels within 18 months⁶³. Native plants and animals may still benefit to some degree in the long term from these periods of reduced threat.

Feral goats will be culled annually to reduce population numbers to very low levels. Culling will utilise a combination of ground-based and aerial hunting methods to target areas most frequented by the species. Radio tracking collars attached to "Judas" goats may be used to find mobs of goats, which will then be culled. Twenty-seven days of ground-based hunting and two hours of aerial hunting are planned to be undertaken annually. Feral deer will also be targeted by helicopter hunting and will be culled when encountered in the course of ground hunting. Transportation of hunters to and from remote locations by helicopter will be used if required. An output target of no more than one goat or deer per eight hours of ground-based hunting, or five goats or deer per hour of helicopter hunting will be used for culling operations.

9.3. Revegetation

The aim of revegetation work at Kaitoke Regional Park KNE site is to increase the size of forest remnants and other bush fragments within the site, thereby improving their resilience to the effects of climatic conditions and ecological weeds. Some studies suggest that forest fragments less than 9 ha such as these are strongly influenced by edge patterns and processes⁶⁴. A further aim of revegetation work is to revegetate open areas left after weed trees have been removed.

Native trees will be planted on the edges of, and in areas adjacent to, the forest remnants and bush fragments in the south of the site, including Te Mārua Bush (see Appendix 1, Map 6). Additionally, where practicable, the remnants will be connected by planting vegetated corridors between them to provide avenues for native animals and plants to spread.

Planting at Te Mārua Bush (operational area C) will be arranged and carried out by members of WBS and UHF&B, and overseen by the Greater Wellington Parks department. All plants for Te Mārua Bush and adjacent areas will be grown by UHF&B from propagules sourced from Te Mārua Bush itself.

Planting around the other three forest remnants, nearby bush fragments and in open areas that weed trees have been removed from (operational area G) will be managed and funded by the Greater Wellington Parks department. Corporate volunteers and school groups will undertake the planting in this area. Only eco-sourced pioneer species that are proven to survive well at the site will be planted.

Below are the details of the revegetation work that will be undertaken in the Kaitoke Regional Park KNE site. Appendix 5 provides a plant list for revegetation.

Table 5: Summary of revegetation planting at the Kaitoke Regional Park KNE site

Operational area	Timing	Total number of plants	Management requirements
C	Winter of every year	50 – 100 per year	Weed control, releasing
G	Winter of every year	Up to 1,000 per year	Weed control, spot spraying, releasing

9.4. Park management

Greater Wellington undertakes biodiversity operational activities at the KNE site. This includes using best practice methods when undertaking ecological weed and pest animal control, and undertaking the following activities that help to protect the natural resources of the site.

Environmental care

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

Biosecurity guidelines⁶⁵ will be used by all Greater Wellington personnel when entering and working in the KNE site. These guidelines involve checking for and removing seeds and plant fragments from vehicles, equipment and clothing before entering the site.

Instructional information on how to avoid introducing ecological weeds and damage to ecological values will be included in the conditions contained in permits issued to private hunters, possum trappers and researchers entering the KNE site. Such information will also be provided to trampers when the opportunity arises.

Fire risk

To reduce the risk of uncontrolled fires occurring in the KNE site, the present policy of restricting open fires to the river bed will be continued. This policy is communicated to users through onsite signage, the park information brochure and the Parks Network Plan⁶⁶. Wilderness camping is permitted with cooking on gas cookers only.

Collection of native plants and animals

The collection of natural materials and research activities in the KNE site is managed by a permit system run by the Environmental Science department. However, illegal collection of native plants and animals has occurred occasionally in the Parks. This has included some species of native tree, which are valued for domestic uses such as fence building 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 will watch for this activity while carrying out normal duties within the Park.

9.5. Community engagement

The purpose of community engagement is to raise awareness of the KNE site's ecological values and involve the community in management activities to protect those values. Information about the site's ecological values will be conveyed to the public during Greater Wellington Great Outdoors Summer Events held at the site. Articles regarding the site's ecological values will also be published in social and local print media when opportunities arise.

10. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for the Kaitoke Regional Park KNE site, and their timing and cost over the three-year period from 1 July 2017 to 30 June 2020. The budget for the 2018/19 and 2019/20 years are indicative only and subject to change. Maps of operational areas can be found in Appendix 1 (see Maps 3 to 5).

Table 6: Three-year operational plan for the Kaitoke Regional Park KNE site

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
1, 2	EW-1, EW-2, EW-3	Ecological weed control	A	Greater Wellington Biodiversity department	Search for and control all priority 1 ecological weed species (listed in Appendix 4, Table 9) on the front slopes of the main forest and control highly invasive climbers in outlying areas	Reduced distribution and density of target species	\$3,500	\$6,400	\$4,000
1, 2	EW-1, EW-2, EW-3	Ecological weed control	B	Greater Wellington Biodiversity department	Progressively search the forest edges of Te Awa Kairangi/Hutt River gorge for ecological weeds and control all found	Reduced distribution and density of target species	\$3,500		
1, 2	EW-1, EW-2, EW-3	Ecological weed control	C	Greater Wellington Biodiversity department	Control all weedy exotic plant species in Te Mārua Bush including all those listed in Appendix 4, Table 9	Reduced distribution and density of target species	\$1,400	\$2,000	\$1,400
1, 2	EW-1, EW-2, EW-3	Ecological weed control	D	Greater Wellington Biodiversity department	Undertake a coarse search for ecological weeds in the forest remnants at Te Mārua (other than in Te Mārua Bush itself) and control all found	Reduced distribution and density of target species			\$3,000

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
1, 2	EW-1, EW-2, EW-3	Ecological weed control	E	Greater Wellington Parks department and Te Mārua Pony Club	Fell and remove large weed trees in and around the Te Mārua Pony Club lease area	Reduced distribution and density of target species	Staff time	Staff time	Staff time
1, 2	PA-1	Pest animal control	F	Greater Wellington Parks department Greater Wellington Biosecurity	Carry out possum and rat control on river terrace opposite the Pākuratahi Fork Provide bait	Maintain possum population to below 5% RTC* and rat population below 5% TTI**	\$300	\$300	\$300
1, 2	PA-1, PA-2	Pest animal control	Entire KNE site	Greater Wellington Biosecurity department	Control goats and deer, focussing on preferred habitats, using ground-based and aerial methods: 27 days ground hunting (goats), two hours aerial hunting (goats and deer)	Operational results average less than 1 goat per hunter-day	\$16,000	\$16,000	\$16,000
1, 2	OT-1	Revegetation	C	WBS, UHF&B and Greater Wellington Parks department	Plant edges and adjacent areas of Te Mārua Bush	Above 80% survival of plants	\$500	\$500	\$500
1, 2	OT-1	Revegetation	G	Greater Wellington Parks department	Plant edges and adjacent areas of forest remnants, nearby bush fragments and in areas that weed trees have been removed from at Te Mārua (other than around Te Mārua Bush itself)	Above 80% survival of plants	\$2,000+	\$2,000+	\$2,000+

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
1, 2	HA-1	Park Management	Entire KNE site	Greater Wellington Biodiversity, Environmental Science & Parks departments	Include instructional information on how to avoid introducing ecological weeds and damage to ecological values with all permits issued to hunters, trappers and researchers, and provide this information to trampers when opportunities arise	Information disseminated to all permit holders, and to trampers when possible	Staff time	Staff time	Staff time
1, 2	HA-2	Park Management	Entire KNE site	Greater Wellington Parks, Biodiversity, Biosecurity & Environmental Science departments	Ensure ecological weed biosecurity guidelines are adhered to while carrying out all management activities	Guidelines available and adhered to in all cases	Staff time	Staff time	Staff time
1, 2, 3	HA-1, HA-2	Park Management	Entire KNE site	Greater Wellington Parks department	Environmental impact assessment procedures are adhered to when carrying out construction and maintenance of assets, and when allowing potentially impacting use by others	Procedures available and adhered to in all cases	Staff time	Staff time	Staff time
1, 2, 3	HA-3	Park Management	Entire KNE site	Greater Wellington Parks department	Continue to communicate policy of no open fires being allowed in the KNE site through the park brochure and signage	No human induced wild fires occur	Staff time	Staff time	Staff time
1, 2, 3	HA-4	Park Management	Entire KNE site	Greater Wellington Parks department	The Park Ranger remains alert to illegal plant and animal collecting activities	No illegal collection occurs	Staff time	Staff time	Staff time

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
4, 5		Park Management	Entire KNE site	Greater Wellington Parks, Community Engagement and Biodiversity departments	Incorporate biodiversity information into community events and media	Increased community awareness of the values of the KNE site	Staff time	Staff time	Staff time
Total							\$27,200	\$27,200	\$27,200

*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

† = Funded by Greater Wellington Parks department

11. Funding contributions

11.1. Budget allocated by Greater Wellington

The budget for the 2018/19 and 2019/20 years are indicative only and subject to change.

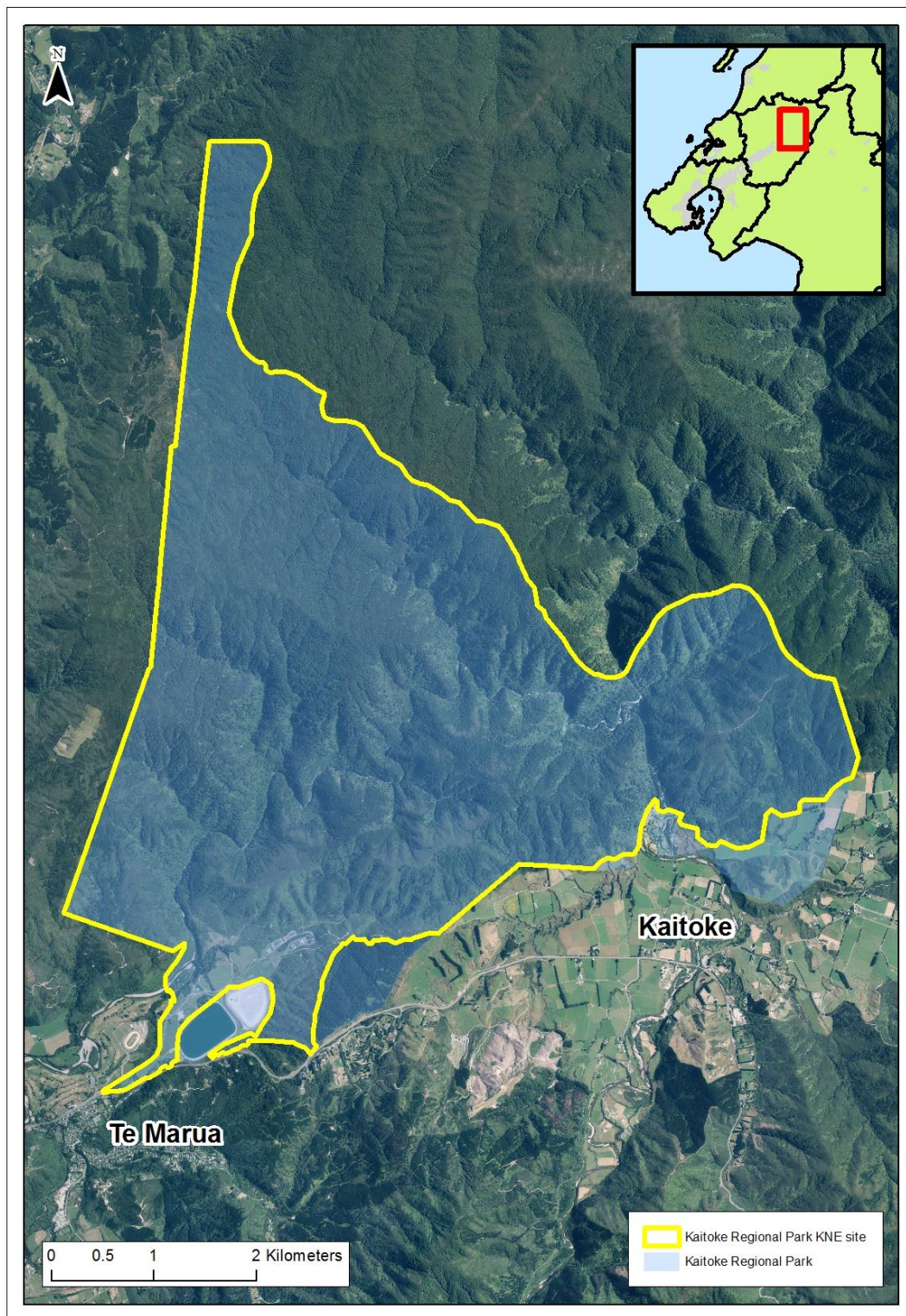
Table 7: Greater Wellington Biodiversity department allocated budget for the Kaitoke Regional Park KNE site

Management activity	Timetable and resourcing		
	2017/18	2018/19	2019/20
Ecological weed control	\$8,400	\$8,400	\$8,400
Pest animal control	\$16,300	\$16,300	\$16,300
Revegetation	\$500	\$500	\$500
Total	\$25,200	\$25,200	\$25,200

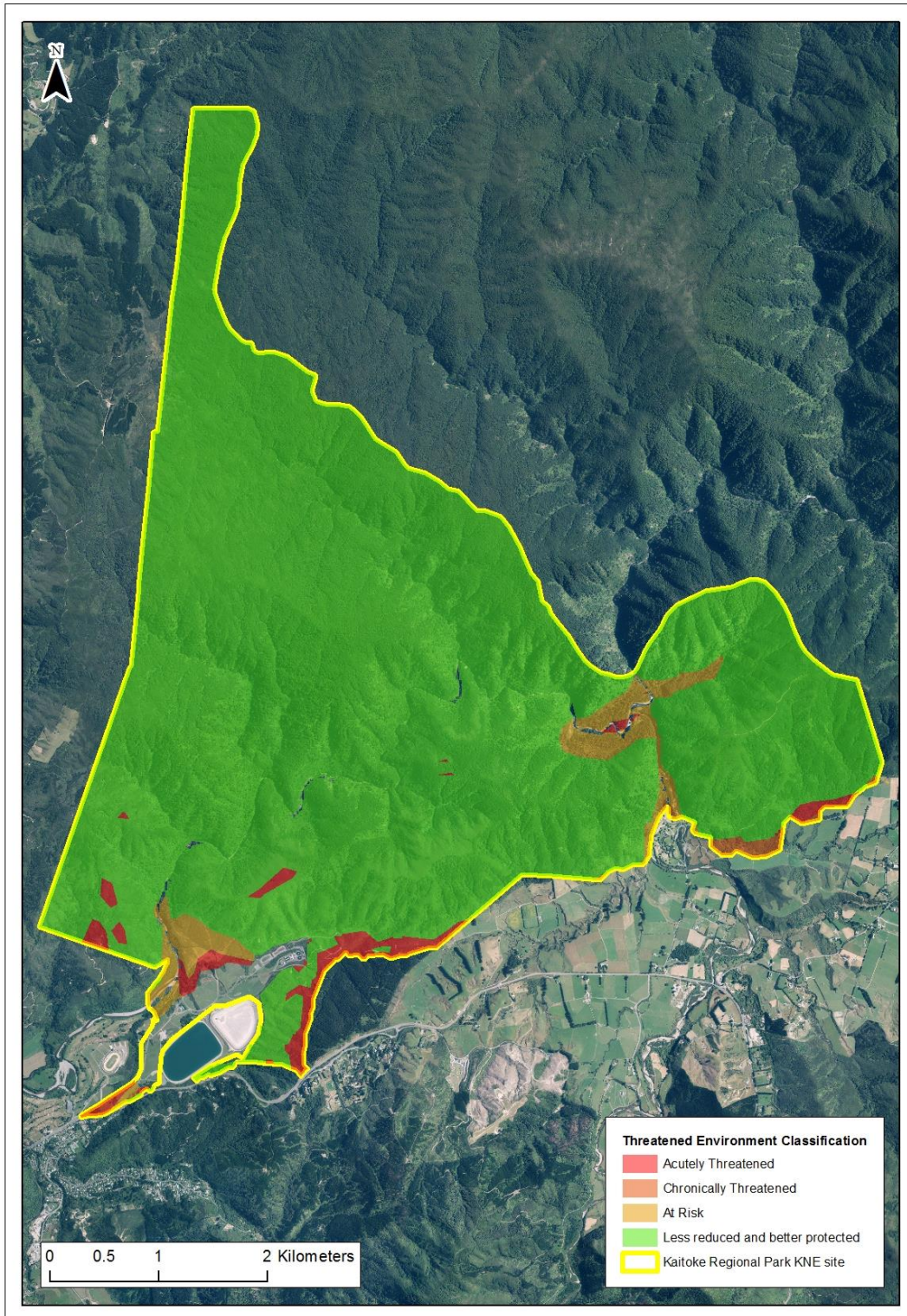
Table 8: Greater Wellington Parks department allocated budget for the Kaitoke Regional Park KNE site

Management activity	Timetable and resourcing		
	2017/18	2018/19	2019/20
Ecological weed control	Staff time	Staff time	Staff time
Revegetation	\$2,000	\$2,000	\$2,000
Total	\$2,000	\$2,000	\$2,000

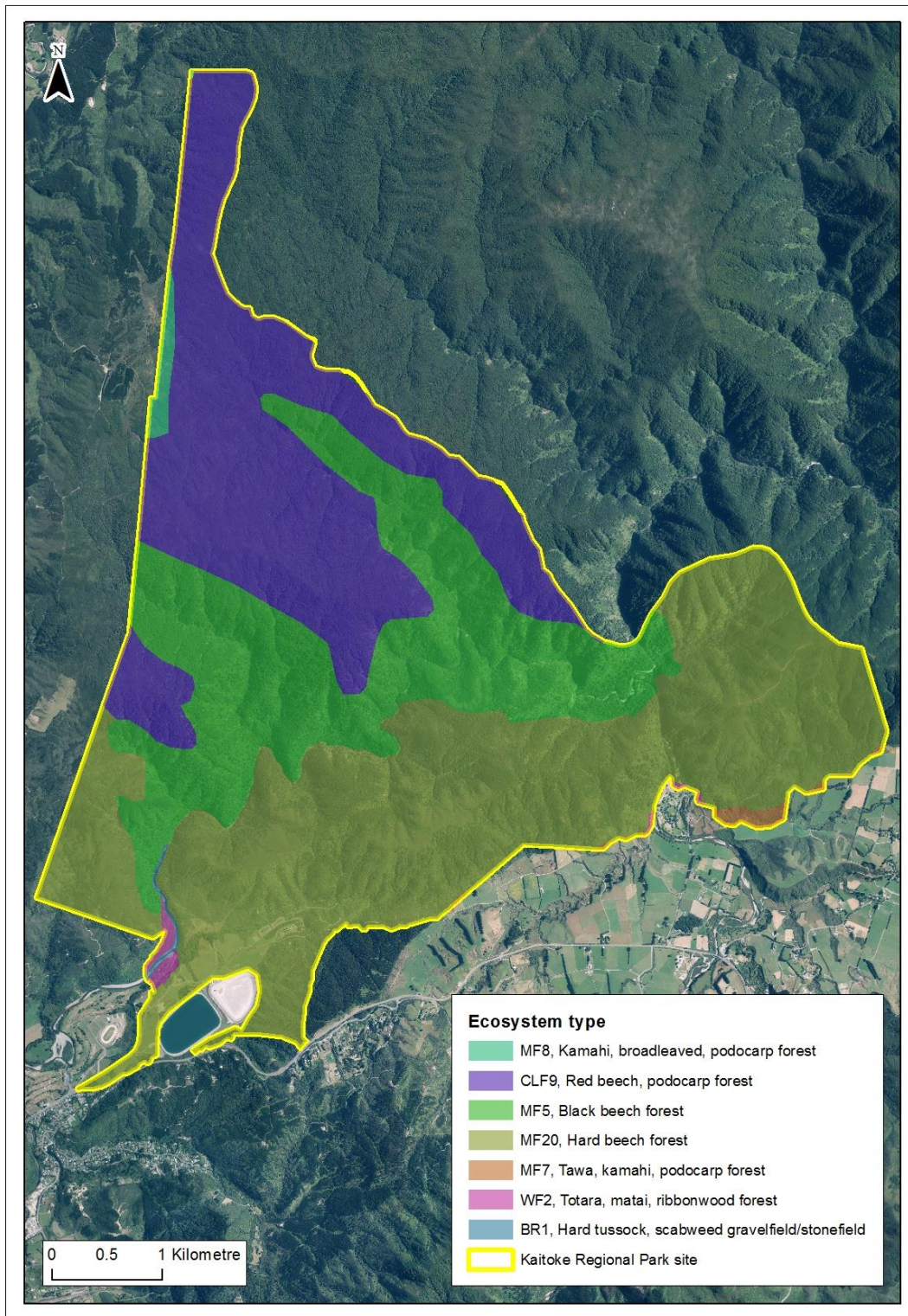
Appendix 1: Site maps



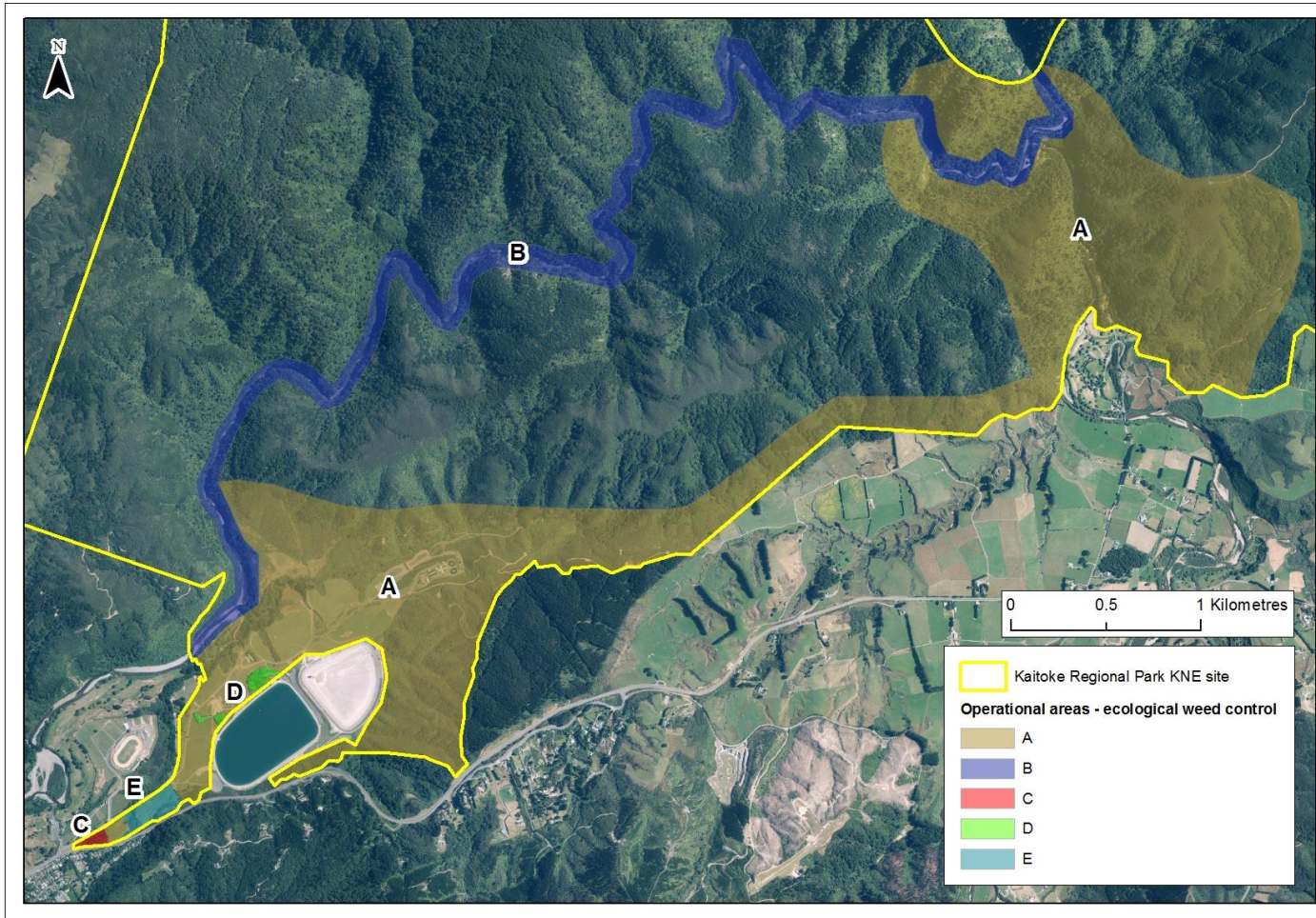
Map 1: Boundaries of the Kaitoke Regional Park KNE site and Kaitoke Regional Park



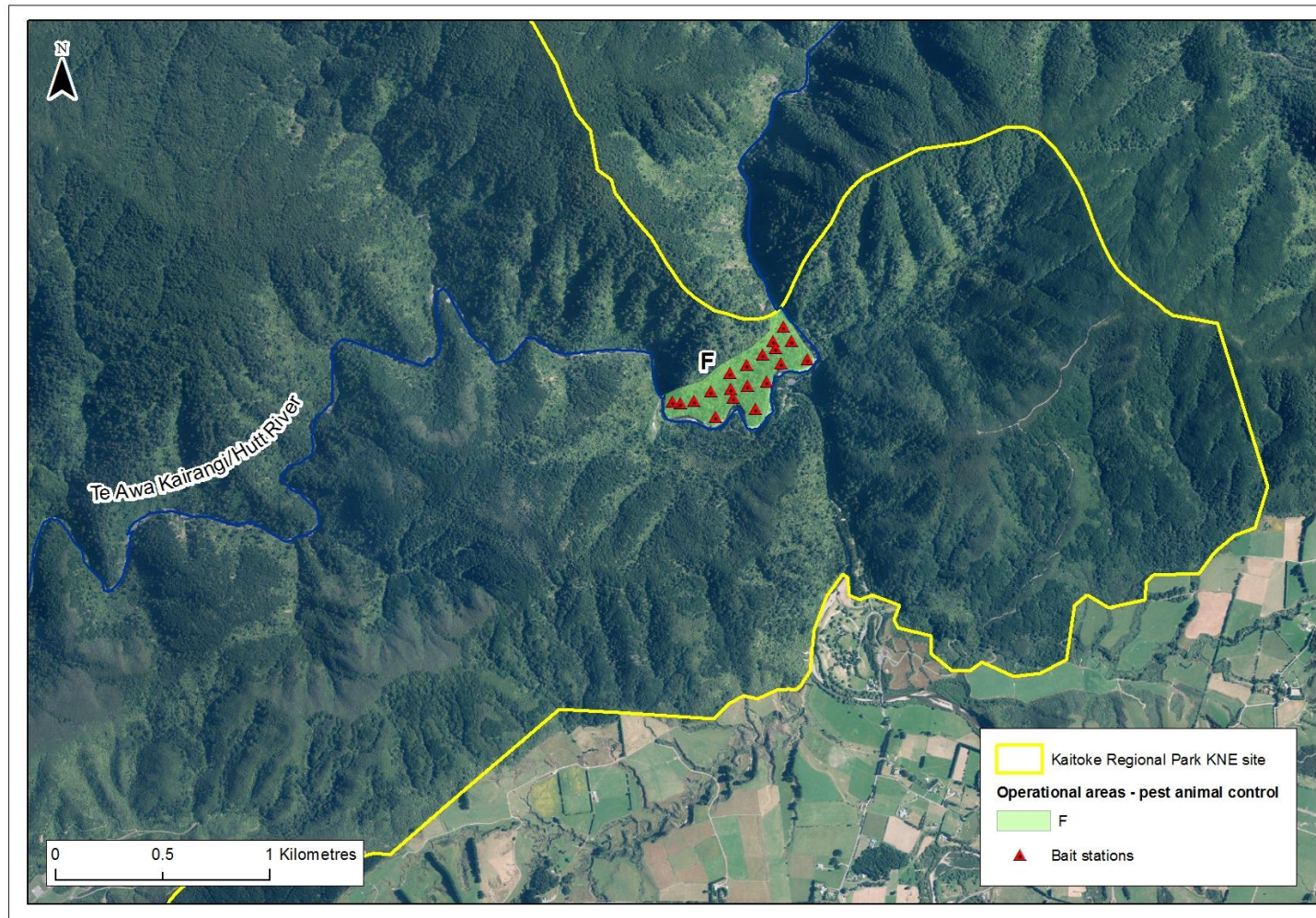
Map 2: Land Environment New Zealand threat classifications for the Kaitoke Regional Park KNE site



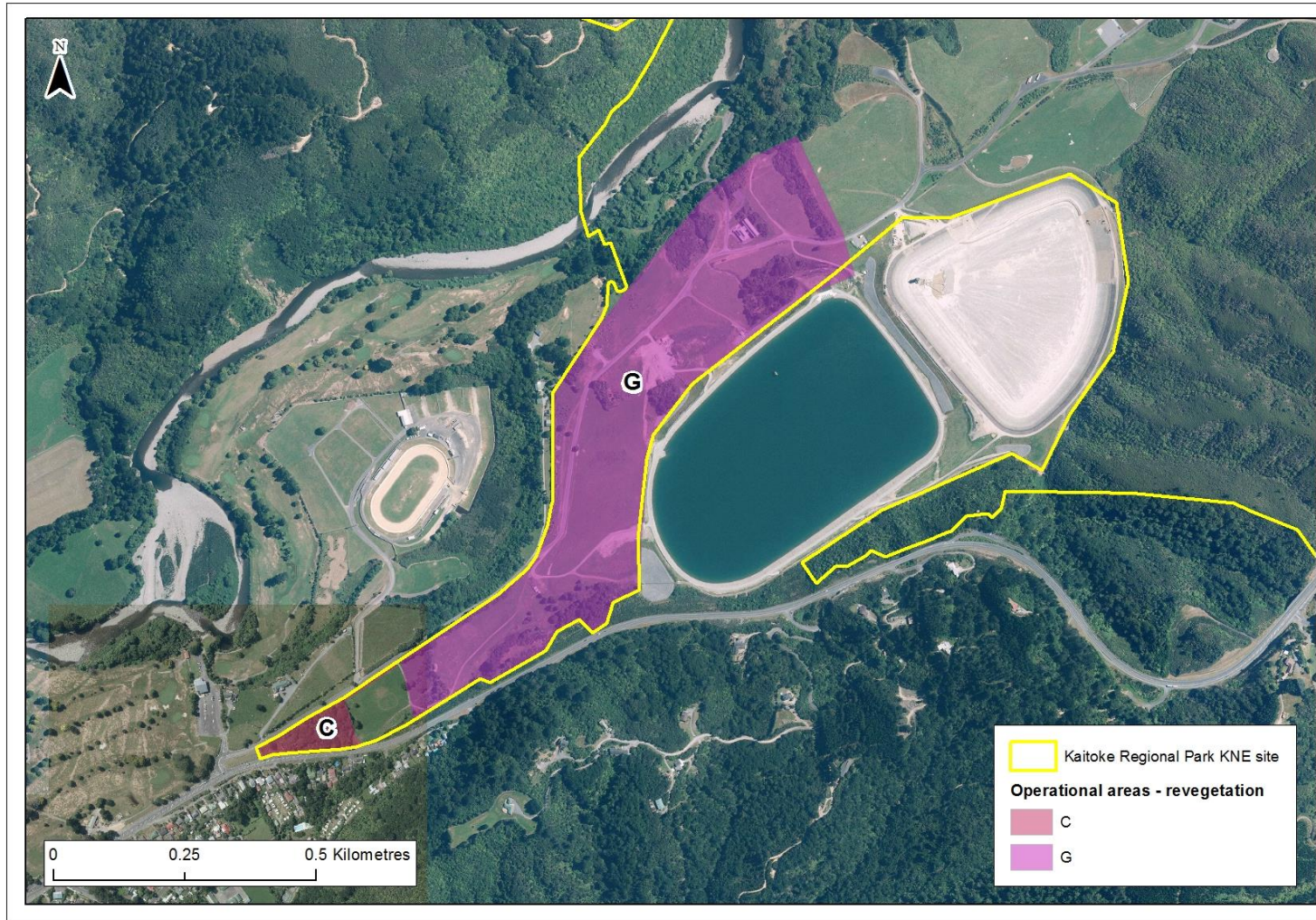
Map 3: Singers and Rogers (2014) ecosystem types for the Kaitoke Regional Park KNE site



Map 4: Operational areas for ecological weed control in the Kaitoke Regional Park KNE site



Map 5: Pest animal control in the Kaitoke Regional Park KNE site



Map 6: Revegetation areas in the Kaitoke Regional Park KNE site

Appendix 2: Nationally threatened species list

The New Zealand Threat Classification System lists species according to their threat of extinction. The status of each species group (plants, reptiles, etc.) is assessed over a five-year cycle⁶⁷. Species are regarded as Threatened if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable. They are regarded as At Risk if they are classified as Declining, Recovering, Relict or Naturally Uncommon. The following table lists Threatened and At Risk species that are resident in, or regular visitors to, the Kaitoke Regional Park KNE site.

Table 9: Threatened and At Risk species at the Kaitoke Regional Park KNE site

Scientific name	Common name	Threat status	Source
Plants(vascular) ⁶⁸ (lichens) ⁶⁹ (bryophytes) ⁷⁰			
<i>Brachyglottis kirkii</i> var. <i>kirkii</i>	Kirk's daisy	At Risk – Declining	Greater Wellington 2007 ⁷¹
<i>Peraxilla colensoi</i>	Scarlet mistletoe	At Risk – Declining	Greater Wellington 2007
<i>Peraxilla tetrapetala</i>	Red mistletoe	At Risk – Declining	Greater Wellington 2007
<i>Plumatochilus tasmanica</i>	Greenhood orchid	Threatened – Nationally Vulnerable	Greater Wellington 2007
Birds ⁷²			
<i>Acanthisitta chloris</i>	Rifleman	At Risk – Declining	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Cyanoramphus novaeseelandiae</i>	Red-crowned parakeet	At Risk – Relict	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Eudynamis taitensis</i>	Long-tailed cuckoo	At Risk – Naturally Uncommon	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Falco novaeseelandiae</i>	New Zealand falcon	Threatened – Nationally Vulnerable	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Phalacrocorax carbo</i>	Black shag	At Risk – Naturally Uncommon	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
Reptiles ⁷³			
<i>Mokopirirakau</i> “southern North Island”	Ngahere gecko	At Risk – Declining	Greater Wellington Reptile distribution database (accessed 2014)
Freshwater fish ⁷⁴			
<i>Anguilla dieffenbachii</i>	Longfin eel	At Risk – Declining	Greater Wellington 2007
<i>Galaxias brevipinnis</i>	Kōaro	At Risk – Declining	Greater Wellington 2007

Scientific name	Common name	Threat status	Source
<i>Galaxias divergens</i>	Dwarf galaxias	At Risk – Declining	Greater Wellington 2007
<i>Gobiomorphus hubbsi</i>	Bluegill bully	At Risk – Declining	Greater Wellington 2007
<i>Gobiomorphus huttoni</i>	Redfin bully	At Risk – Declining	Greater Wellington 2007

Appendix 3: Regionally threatened plant species list

The following table lists regionally threatened species that have been recorded in the Kaitoke Regional Park KNE site. Native plant species have been identified in the Plant Conservation Strategy, Wellington Conservancy 2004-2010⁷⁵.

Table 10: Regionally threatened plant species recorded in the Kaitoke Regional Park KNE site

Scientific name	Common name	Threat status	Source
Plants			
<i>Brachyglottis kirkii</i> var. <i>kirkii</i>	Kohurangi/Kirk's daisy	Declining	Greater Wellington 2008 ⁷⁶
<i>Cyathea cunninghamii</i>	Punui/gully tree fern	Sparse	Greater Wellington 2008
<i>Ileostylus micranthus</i>	Pirinoa/small-flowered mistletoe	Gradual decline	Greater Wellington 2008
<i>Korthalsella lindsayi</i>	Dwarf mistletoe	Sparse	Greater Wellington 2008
<i>Peraxilla tetrapetala</i>	Pirirangi/red mistletoe	Critical	Greater Wellington 2008
<i>Pittosporum cornifolium</i>	Tawhirikaro/perching kohukohu	Sparse	Greater Wellington 2008
<i>Raukaua edgerleyi</i>	Raukaua/raukawa	Sparse	Greater Wellington 2008

Appendix 4: Ecological weed species

The following table lists key ecological weed species that have been recorded in the Kaitoke Regional Park KNE site.

Table 11: Ecological weed species recorded in the Kaitoke Regional Park KNE site

Scientific name	Common name	Priority	Weed type
<i>Acer pseudoplatanus</i>	Sycamore	1	Woody
<i>Allium vineale</i>	Wild onion	2	Ground cover
<i>Alstroemeria ligtu</i>	Peruvian lily	2	Ground cover
<i>Asparagus scandens</i>	Climbing asparagus	1	Climber
<i>Banksia integrifolia</i>	Banksia	1	Woody
<i>Berberis glaucarpa</i>	Barberry	1	Woody
<i>Calystegia silvatica</i>	Convolvulus	2	Climber
<i>Clematis vitalba</i>	Old man's beard	1	Climber
<i>Cotoneaster glaucophyllus</i>	Cotoneaster	1	Woody
<i>Crataegus monogyna</i>	Hawthorn	1	Woody
<i>Crocsmia x crocosmiiflora</i>	Montbretia	2	Ground cover
<i>Cytisus scoparius</i>	Broom	2	Woody
<i>Fragaria virginiana</i>	Wild strawberry	2	Ground cover
<i>Gunnera tinctoria</i>	Chilean rhubarb	1	Ground cover
<i>Hedera helix</i>	English ivy	1	Climber
<i>Hoheria populea*</i>	Lacebark	1	Woody
<i>Ilex aquifolium</i>	Holly	1	Woody
<i>Iris foetidissima</i>	Stinking iris	2	Ground cover
<i>Leycesteria formosa</i>	Himalayan honeysuckle	2	Woody
<i>Lonicera japonica</i>	Japanese honeysuckle	1	Climber
<i>Pittosporum crassifolium*</i>	Karo	1	Woody
<i>Prunus</i> spp.	Cherry	1	Woody
<i>Ranunculus ficaria</i>	Celandine	2	Ground cover
<i>Rose</i> spp.	Briar rose	2	Climber
<i>Rubus fruticosus</i>	Blackberry	2	Ground cover
<i>Salix</i> spp.	Willow	1	Woody
<i>Selaginella kraussiana</i>	African club moss	1	Ground cover
<i>Solanum diflorum</i>	Jerusalem cherry	1	Woody
<i>Solanum nigrum</i>	Black nightshade	2	Ground cover
<i>Teline monspessullana</i>	Montpellier broom	2	Woody

Scientific name	Common name	Priority	Weed type
<i>Tradescantia fluminensis</i>	Wandering willie	1	Ground cover
<i>Ulex europaeus</i>	Gorse	2	Woody
<i>Zantedeschia aethiopica</i>	Arum lily	2	Ground cover

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

Appendix 5: Revegetation plant list

Plants from the following table will be used in revegetation planting as per Section 7.3.

Table 12: Revegetation plant list for use within the Kaitoke Regional Park KNE site

Scientific name	Common name	Operational area
<i>Cordyline australis</i>	cabbage tree	C*and G
<i>Coprosma robusta</i>	karamū	C*and G
<i>Dacrycarpus dacrydioides</i>	kahikatea	C*and G
<i>Hebe stricta</i> var. <i>stricta</i>	koromiko	C*and G
<i>Kunzea ericoides</i>	kānuka	C*and G
<i>Leptospermum scorparium</i>	mānuka	G only
<i>Phormium tenax</i>	harakeke/flax	G only
<i>Pittosporum eugenoides</i>	tarata/lemonwood	C*and G
<i>Podocarpus totara</i>	tōtara	C*and G
<i>Prumnopitys taxifolia</i>	mataī	C*and G
<i>Pseudopanax arboreus</i>	five-finger	C*and G

*only plants grown from propagules sourced from Te Mārua Bush will be planted in operational area C

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