

Key Native Ecosystem Operational Plan for Belmont-Speedy's

2018-2021



Contents

| | |
|--|-----------|
| 1. Purpose | 1 |
| 2. Policy Context | 1 |
| 3. The Key Native Ecosystem Programme | 2 |
| 4. Belmont-Speedy's Key Native Ecosystem site | 3 |
| 5. Parties involved | 3 |
| 6. Ecological values | 8 |
| 7. Threats to ecological values at the KNE site | 9 |
| 8. Objectives | 13 |
| 9. Operational activities | 13 |
| 10. Operational delivery schedule | 16 |
| 11. Funding contributions | 18 |
| Appendix 1: Site Maps | 19 |
| Appendix 2: Threatened species list | 24 |
| Appendix 3: Ecological weed species | 25 |
| References | 26 |

1. Purpose

The purpose of the three-year Key Native Ecosystem (KNE) Operational Plan for Belmont-Speedy's 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 Belmont Regional Park as a whole is guided by the Greater Wellington Parks Network Plan (PNP)³ and the Belmont Regional Park Sustainable Land Use Plan⁴.

These plans guide the recreational and amenity uses of Belmont Regional Park as well as identifying opportunities to protect biodiversity values.

Greater Wellington Biodiversity Strategy

The Greater Wellington Biodiversity Strategy⁵ (the 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. Belmont-Speedy’s Key Native Ecosystem site

Belmont-Speedy’s KNE site (158 hectares) contains remnant and regenerating lowland forest dominated by pukatea, tawa and rewarewa. It is situated on the western hills of the Hutt Valley between the suburbs of Belmont to the south-west and Kelson to the east in the Hutt City District (see Appendix 1, Map 1). Most of Belmont-Speedy’s KNE site lies within Belmont Regional Park which continues beyond the KNE site boundary to the north-west. The KNE site is one of five KNE sites which make up a string of forest fragments along the western Hutt hills.

Forty hectares of the KNE site are protected by Recreation Reserve with the status of Significant Natural Area (SNR) 49 in the Hutt City District Plan. The majority of other land parcels in the KNE site that are within the Regional Park are in the process of being gazetted as Recreational Reserve by the Hutt City Council.

5. Parties involved

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

5.1. Landowners

Most of the land within the KNE site is owned by the Hutt City Council, but managed by Greater Wellington as part of Belmont Regional Park under a powers and responsibility agreement⁶ (see Appendix 1, Map 2). The remaining two hectares is owned and managed by the Hutt City Council themselves.

There is no privately owned land included in the KNE site; however, some operational activities, ie, pest animal and ecological weed control, will be carried out on some adjoining private properties to provide greater protection to the KNE site (see Appendix 1, Map 5).

5.2. Operational delivery

Greater Wellington’s Biodiversity, Biosecurity and Parks departments are responsible for implementing the KNE operational plan. The Biodiversity department is the

overarching lead department for Greater Wellington on the coordination of biodiversity operational 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.

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 at Belmont-Speedy's. 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 area⁷.

Ngāti Toa claims an association with the 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 Toa⁸.

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 area⁹.

Table 1: Ngāti Toa sites of significance in Belmont-Speedy's KNE site

| 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 Awakairangi 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 Awakairangi are high in the Tararua Range. The stream and rivers lead down through Pakuratahi at the head of the Hutt Valley. Taranaki Whānui had interests at Pakuratahi as the trail linking Te Whanganui a Tara and the Wairarapa came through Pakuratahi and over the Rimutaka Range. Prior to the 1855 uplift Te Awakairangi was navigable by waka up to Pakuratahi 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 Marua), 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 Awakairangi 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 sites of significance in Belmont-Speedy’s KNE site

| Site of significance | Mana whenua values ¹⁴ |
|----------------------------|--|
| Te Awa Kairangi/Hutt River | <p>Ngā Mahi a ngā Tūpuna: 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: This river is still navigable by waka and supported 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: 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: 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: 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: 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: 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 Te Awa Kairangi/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 Hill Road Community Group is a stakeholder in the KNE site. This group undertakes revegetation planting, ecological weed control and track maintenance within the KNE site. The Belmont Regional Park Ranger works with the group to guide and align their activities with the objectives and vision of the Parks Network Plan and this plan.

A pā site known as Pareraho was rediscovered in the KNE site by the Hill Road Community Group. The group works with Heritage New Zealand to manage the site appropriately. The pā may be connected to the historic routes between Wellington and Porirua harbours for Ngāti Toa Rangātira and the many Taranaki iwi who have maintained mana whenua over land in the Hutt Valley¹⁵.

The Friends of Belmont Regional Park community group is a stakeholder in the KNE site. This group has an interest in ensuring the KNE site is protected but aren't actively involved in biodiversity management. Greater Wellington keeps the group informed of Park management activities.

The Greater Wellington Flood Protection department owns a debris arrester structure situated in Speedy's Stream at its lower end. The purpose of the structure is to capture debris flowing down the stream that could cause a blockage further downstream during heavy rainfall events. The Flood Protection department is responsible for managing the structure and for maintaining full channel capacity downstream of it to reduce the likelihood of flooding of State Highway 2 and local roads.

6. Ecological values

Ecological values are a way to describe indigenous biodiversity found at a site, and what makes it special. These ecological values can be various components or attributes of ecosystems that determine an area's importance for the maintenance of regional biodiversity. Examples of values are the provision of important habitat for a threatened species, or particularly intact remnant vegetation typical of the ecosystem type. The ecological values of a site are used to prioritise allocation of resources to manage KNE sites within the region.

Belmont-Speedy's KNE site contains remnant and regenerating lowland forest on hilly slopes and steep stream valleys. The KNE site is part of an ecological corridor stretching from the Tararua Range south to the hills of Wellington City, and west to the Porirua Harbour basin¹⁶. The KNE site is located in the Wellington Ecological District¹⁷.

Of note in recognising the ecological values at Belmont-Speedy's KNE site are the following:

Threatened environments: The Threatened Environment Classification system (LENZ)¹⁸ is a broad classification system which shows how much indigenous vegetation remains within land environments, how much is legally protected and how past vegetation loss and legal protection are distributed across New Zealand's landscape. Six threat categories cover New Zealand. Most of the KNE site falls within the At Risk category. There is 20-30% of the original cover of this indigenous vegetation type remaining in New Zealand¹⁹ (see Appendix 1, Map 3).

Threatened species: The KNE site provides habitat for five threatened freshwater fish species and one threatened lizard species. Nationally threatened species are listed in Appendix 2.

The Singers and Rogers (2014)²⁰ classification of pre-human vegetation indicates the KNE site originally comprised two forest types; kohekohe-tawa forest (MF6) and tawa-kāmahi-podocarp forest (MF7). There is only about 15% and 22% of the original cover remaining respectively of these forest types, making them regionally Threatened and At Risk ecosystem types respectively²¹.

Remnants of original forest types can be found in the two steep stream valleys within the KNE site which flow down to the Te Awa Kairangi/Hutt River. These valleys have remained in lush native forest although it appears selective logging has occurred in the past as podocarp species that would have originally been present are now absent. These remnants are now dominated by pukatea (*Laurelia novae-zelandiae*), kaikōmako (*Pennantia corymbosa*), kāmahi (*Weinmannia racemosa*), rewarewa (*Knightia excelsa*), black maire (*Nestegis cunninghamii*), kohekohe (*Dysoxylum spectabile*), tītoki (*Alectryon excelsus*), and tawa (*Beilschmiedia tawa*). There are many broadleaf species beneath including māhoe (*Melicytus ramiflorus*), kōtukutuku (*Fuchsia excorticata*) and hīnau (*Elaeocarpus dentatus*) as well as large groves of mamaku tree ferns (*Cyathea medullaris*). Northern rātā (*Metrosideros robusta*) is also found in the forest as well as many lianes, vines and fern species²².

Native forest is regenerating on the more gentle upper slopes of the KNE site where the forest was once cleared for pasture. The regenerating forest contains hangehange (*Geniostoma rupestre*), fivefinger (*Pseudopanax arboreus*), kaikōmako, lemonwood

(*Pittosporum eugenioides*), mingimingi (*Leucopogon fasciculatus* and *Leptecophylla juniperina*), *Coprosma areolata* and various ferns²³.

Common forest bird species which are found in the KNE site include silvereye (*Zosterops lateralis*), fantail (*Rhipidura fuliginosa*), tūī (*Prosthemadera novaeseelandiae*) and kererū (*Hemiphaga novaeseelandiae*). Whitehead (*Mohoua albicilla*) have been observed nearby.

A single barking gecko (*Naultinus punctatus*) has been recorded in the KNE site²⁴, and Raukawa gecko (*Woodworthia maculata*) and northern grass skink (*Oligosoma polychroma*) have been recorded nearby²⁵ and are likely to be present within the KNE site.

Belmont Stream runs along the western boundary joining Speedy's Stream which runs along the eastern boundary (Kelson) before flowing into Te Awa Kairangi/Hutt River. There are records of longfin eel (*Anguilla dieffenbachii*), shortfin eel (*Anguilla australis*), giant kōkopu (*Galaxias argenteus*), banded kōkopu (*Galaxias fasciatus*), lamprey (*Geotria australis*), common bully (*Gobiomorphus cotidianus*), bluegill bully (*Gobiomorphus hubbsi*), redfin bully (*Gobiomorphus huttoni*), giant bully (*Gobiomorphus gobioides*) and kōura (*Paranephrops planifrons*) being present in these streams.²⁶

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

Throughout the KNE site introduced pest animals and ecological weeds are having a negative impact on the ecological values of the KNE site.

A large suite of climbing, woody and ground cover ecological weeds are present at the KNE site in varying densities and distribution. These are impacting the forest ecosystem by preventing natural regeneration, altering the forest structure and causing the forest canopy to collapse. Climbing asparagus (*Asparagus scandens*) and Darwin's barberry (*Berberis darwinii*) are widely distributed throughout the KNE site and growing abundantly in much of it. Holly (*Ilex aquifolium*) has been present in dense infestations which could regenerate and spread more widely and densely through the site. Other highly invasive species such as those listed in Table 3 are currently less widespread and dense in their growth. Some weed species are spreading into the KNE site from adjoining private properties.

The pest animals that could pose the greatest threats to the ecological values of the KNE site are possums (*Trichosurus vulpecula*), rats (*Rattus* spp.), stoats (*Mustela erminea*), domestic cats (*Felis catus*) and feral pigs (*Sus scrofa*). Populations of possums and rats are likely to be at low levels in the KNE site as a result of the existing control

programme. Numbers would readily increase though through reproduction and immigration if control was curtailed or not managed well.

Stoats which are known to prey on birds, bird eggs and invertebrates, are likely to be present in moderate numbers. Extensive urban housing adjacent to the KNE site means that domestic cats may also be impacting ecological values.

Feral pigs have been present and have frequently moved into the KNE site from adjoining farm land in the past. Further incursions are likely in the future. There is also a risk of stock breaching fence lines and entering the KNE site from the adjacent farming operation in Belmont Regional Park.

Land slips have caused breaks in the sewer pipes that run along the edge and inside the KNE site boundary in the past allowing sewage to leak in to the streams affecting water quality and in-stream health. Parts of the sewer pipe and the land supporting it still appear to be unstable in places posing the threat of further sewage discharge into the streams.

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 3 presents a summary of all known threats to the Belmont-Speedy's 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 3: Summary of all threats to ecological values present at the Belmont-Speedy's 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 species at this site include African club moss (<i>Selaginella kraussiana</i>), elaeagnus (<i>Elaeagnus x reflexa</i>), pampas (<i>Cortaderia selloana</i>), wild ginger (<i>Hedychium flavescens</i>), Mexican daisy (<i>Erigeron karvinskianus</i>), hydrangea (<i>Hydrangea macrophylla</i>), tradescantia (<i>Tradescantia fluminensis</i>), and tutsan (<i>Hypericum androsaemum</i>), (see full list in Appendix 3) | Entire KNE site |
| EW-2 | Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key species at this site include Darwin's barberry (<i>Berberis darwinii</i>), barberry (<i>Berberis glaucocarpa</i>), buddleia (<i>Buddleja davidii</i>), cotoneaster (<i>Cotoneaster serotinus</i>), cherry (<i>Prunus laurocerasus</i>), holly (<i>Ilex aquifolium</i>), karo (<i>Pittosporum crassifolium</i>) and pine (<i>Pinus radiata</i>), (see full list in Appendix 3) | Entire KNE site |

| Threat code | Threat and impact on biodiversity in the KNE site | Operational area/location |
|--------------|--|---------------------------|
| EW-3 | Climbing weeds smother and displace native vegetation often causing canopy collapse, inhibit indigenous regeneration, and alter vegetation structure and composition. The key species at this site include climbing asparagus (<i>Asparagus scandens</i>), old man's beard (<i>Clematis vitalba</i>), ivy (<i>Hedera helix</i>), Japanese honeysuckle (<i>Lonicera japonica</i>), jasmine (<i>Jasminum polyanthum</i>), blue passionflower (<i>Passiflora caerulea</i>), banana passionfruit (<i>Passiflora mollissima</i>) and convolvulus (<i>Convolvulus arvensis</i>), (see full list in Appendix 3) | Entire KNE site |
| Pest animals | | |
| PA-1 | Possums (<i>Trichosurus vulpecula</i>) browse palatable canopy vegetation until it can no longer recover ^{27,28} . This destroys the forest's structure, diversity and function. Possums may also prey on native birds and invertebrates ²⁹ | Entire KNE site |
| PA-2 | 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 ^{30,31} | Entire KNE site |
| PA-3* | Mustelids (stoats ^{32,33} (<i>Mustela erminea</i>), ferrets ^{34,35} (<i>M. furo</i>) and weasels ^{36,37} (<i>M. nivalis</i>)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions | Entire KNE site |
| PA-4* | Hedgehogs (<i>Erinaceus europaeus</i>) prey on native invertebrates ³⁸ , lizards ³⁹ and the eggs ⁴⁰ and chicks of ground-nesting birds ⁴¹ | Entire KNE site |
| PA-5* | 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 ^{42,43} | Entire KNE site |
| PA-6* | Feral, stray and domestic cats (<i>Felis catus</i>) prey on native birds ⁴⁴ , lizards ⁴⁵ and invertebrates ⁴⁶ , reducing native fauna breeding success and potentially causing local extinctions ⁴⁷ | Entire KNE site |
| PA-7* | Rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus europaeus</i>) graze on palatable native vegetation and prevent natural regeneration in some environments ⁴⁸ . | Pasture boundaries |
| PA-8* | 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 ⁴⁹ | Entire KNE site |
| PA-9* | Feral pigs (<i>Sus scrofa</i>) root up the soil and eat roots, invertebrates, seeds and native plants preventing forest regeneration ⁵⁰ | Pasture boundaries |
| PA-10* | Brown trout (<i>Salmo trutta</i>) and rainbow trout (<i>Oncorhynchus mykiss</i>) prey on native fish and compete with them for food resources ⁵¹ | Main streams |

| Threat code | Threat and impact on biodiversity in the KNE site | Operational area/location |
|------------------|---|---|
| PA-11* | 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 ^{52,53} | Entire KNE site |
| Human activities | | |
| HA-1* | Garden waste dumping often leads to ecological weed invasions into natural areas. | Boundaries with adjacent private properties |
| HA-2 | Agricultural practices, particularly grazing livestock can result in pugged soils, grazed native vegetation inhibiting regeneration, wildlife disturbance and increased nutrient content of soils and watercourses ⁵⁴ | Adjacent farmland |
| HA-3 | Recreational use such as tramping and mountain biking can cause damage and disturbance of the native ecosystem. It is also likely to disturb native fauna and introduce ecological weeds | Regional Park entrance at Major Drive and informal tracks |
| HA-4 | 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-5* | Encroachment of residential gardens into the KNE site from urban areas causes habitat loss and introduces ecological weeds | Boundaries with adjacent private properties |
| HA-6* | 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, agricultural practices, road run-off, and storm and waste water entering the watercourse | Watercourses |

*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 4), and are used to ensure that actions taken are targeted to specific threats. A map of operational areas can be found in Appendix 1 (see Map 4).

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 Belmont-Speedy's KNE site.

1. **To improve the structure* and function† of native plant communities**
2. **To improve the habitat for native birds**

* 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 by responding to the threats outlined in Section 7. The broad approach is summarised below, and specific actions, with budget figures attached, are set out in the operational delivery schedule (Table 4).

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.

The main operational activities that are undertaken in the Belmont-Speedy's KNE site consist of ecological weed control and pest animal control.

9.1. Ecological weed control

An ecological weed survey carried out in 2008 and the expertise of Greater Wellington Biosecurity staff have been drawn on to determine the weed control priorities and operational areas for the Belmont-Speedy's KNE site. Ecological weed control is focused mostly on the stream valleys where the forest is most intact and therefore the ecological values are the greatest (operational area A; see Appendix 1, Map 4). Within this area ecological weed species listed as priority 1 species in Appendix 3 are controlled. These species are deemed a priority for control due to their potential to impact the native ecosystem present and their ability to spread rapidly. Priority is given to checking previously controlled infestations, then controlling easily accessible new infestations and large specimens that are producing large amounts of seed likely to be dispersing throughout the KNE site. Large seed producing ecological weeds observed on adjacent private properties may be controlled with landowners' permission to stop the spread of weed seeds in to operational area A.

Holly is controlled within operational area B on the upper slopes of the KNE site. Many mature holly trees have been controlled in this operational area in the past and work will continue in this area to slow the colonisation and dispersal of this species across

the site. Previously controlled plants are checked for regrowth and new saplings and seedlings are controlled.

Climbing asparagus and Darwin's barberry which are both present in large infestations, are beyond widespread control within the KNE site with the currently available resources and means. Control of these species is only carried out to remove large seed sources present within operational area A, or to remove infestations on the boundary of the KNE site which pose a threat of spreading into other nearby KNE sites. Other priority 2 species may be controlled in years beyond the term of this plan.

The Hill Road Community Group controls ecological weeds along walking tracks that they are reinstating or building, and maintaining (operational area C, and parts of operational area A). This work mostly targets blackberry (*Rubus fruticosus*), Himalayan honeysuckle (*Leycesteria Formosa*), Darwin's barberry, gorse, climbing asparagus and cherry. The Belmont Regional Park ranger supervises this work and Greater Wellington's Parks department supplies the herbicide used for poisoning the cut stumps of ecological weeds.

The Hutt City Council manages other areas of native forest nearby under their Pest Tree Operational Plan⁵⁵ and Pest Plant Eradication Programme. They also undertake possum control in some reserves in the Western Hills. This management is likely to benefit biodiversity values in Belmont-Speedy's KNE site by reducing ecological weeds and pest animals in the wider landscape and therefore reducing infestation and immigration pressure on the KNE site.

9.2. Pest animal control

Possoms and rats have been controlled within the KNE site since 2004. A network of poison bait stations is used to dispense anticoagulant bait to maintain low population levels of these pests (see Appendix 1, Map 5). Biosecurity staff undertake this work, servicing the bait stations at three monthly intervals. Some bait stations in this operation are located on private properties outside the KNE site which help to buffer the KNE site from reinvasion.

During the first year of this plan, additional bait stations will be installed in easily accessible gullies in a part of the KNE site where stations are currently absent (see operational area D, Appendix 1, Map 5).

Similar pest animal control operations within adjoining and nearby KNE sites (Belmont-Korokoro, Kelson Bush and Belmont-Dry Creek) combine to reduce possum numbers across the landscape. OSPRI undertook a possum control operation on farmland surrounding the KNE site in 2015 as part of their TBfree New Zealand programme and are likely to carry out further possum control operations to achieve their bovine TB eradication targets. These operations reduce the likelihood of reinvasion of Belmont-Speedy's KNE site by possums.

Feral pigs have been controlled in the past by trapping, however current funding does not allow for further control by this means. Some occasional hunting has been carried out by recreational hunters under the control of the Greater Wellington Parks department which reduced the pig population to some degree at that time. If further incursions occur this method of control may be utilized again.

Current funding does not allow for the control of other pest animals such as stoats, hedgehogs and feral cats, although the current possum and rat control regime may have some effect on the numbers of stoats by causing secondary poisoning of them. If further funding becomes available a priority will be to install a network of predator traps to control these species.

9.3. Park management

The Greater Wellington Parks department undertakes management activities in the KNE site as part of management of Belmont Regional Park. The following management activities and procedures are undertaken to help support biodiversity management.

Greater Wellington Parks department maintains fences on the boundary of the KNE site through the Parks department's asset management programme. This minimises the likelihood of fences failing and allowing stock to access the KNE site.

Parks staff will continue to guide the Hill Road Community Group in their track maintenance activities to ensure that they don't negatively impact biodiversity values. Parks staff monitor mountain biking activity in the vicinity of the Park entrance at Major Drive with the aim of containing this activity to the existing area.

Greater Wellington operational staff follow procedures, which may include assessments of environmental effects, to identify and avoid damage to biodiversity values such as plant and animal communities. This limits risks to these values that could occur while carrying out the construction and maintenance of assets, ecological weed and pest animal control, and when permitting the use of the KNE site for recreational and commercial purposes.

Biosecurity guidelines⁵⁶ are followed by all Greater Wellington personnel when entering and working in the KNE site in order to avoid the introduction and spread of ecological weeds. Procedures involve checking for and removing seeds and plant fragments from clothing, equipment and vehicles before entering the site.

10. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for Belmont-Speedy's KNE site, and their timing and cost over the three-year period from 1 July 2018 to 30 June 2021. The budget for the 2019/20 and 2020/21 years are indicative only and subject to change. Maps showing ecological weed control operational areas and pest animal control infrastructure can be found in Appendix 1 (Maps 4 and 5).

Table 4: Three-year operational delivery schedule for Belmont-Speedy's KNE site

| Objective | Threat | Activity | Operational area | Delivery | Description/detail | Target | Timetable & Resourcing | | |
|-----------|----------------------|-------------------------|------------------|---|--|---|------------------------|----------|----------|
| | | | | | | | 2018/19 | 2019/20 | 2020/21 |
| 1 | EW-1 EW-2 EW-3 | Ecological weed control | A | Greater Wellington Biosecurity department | Control priority 1 weed species (see Appendix 3), checking previously controlled infestations, controlling easily accessible new infestations and large seed producing specimens | Reduce distribution and density of target species | \$8,400 | \$8,950 | \$8,950 |
| 1 | EW-2 | Ecological weed control | B | Greater Wellington Biosecurity department | Control holly, checking previously controlled plants, and controlling saplings and seedlings | Reduce distribution and density of holly | \$1,500 | \$1,500 | \$1,500 |
| 1 | EW-1 EW-2 EW-3 | Ecological weed control | A and C | Hill Road Community Group | Cut and treat ecological weeds along walking tracks | Reduce distribution and density of target species | \$100+ | \$100+ | \$100+ |
| 1, 2 | PA-1 PA-2 | Pest animal control | D | Greater Wellington Biosecurity department | Install bait stations in easily accessible gullies in an area where currently no stations are present, to control possums and rats in that area | Possums < 5% RTC* Rats < 10% TTI** | \$700 | Nil | Nil |
| 1, 2 | PA-1 PA-2 | Pest animal control | Whole KNE site | Greater Wellington Biosecurity department | Service bait stations every 3 months with anticoagulant bait to control possums and rats | Possums < 5% RTC* Rats < 10% TTI** | \$13,600 | \$13,750 | \$13,750 |

| Objective | Threat | Activity | Operational area | Delivery | Description/detail | Target | Timetable & Resourcing | | |
|--------------|------------------------|-----------------|------------------|-------------------------------------|---|---|------------------------|-----------------|-----------------|
| | | | | | | | 2018/19 | 2019/20 | 2020/21 |
| 1,2 | HA-2, HA-3, HA-4 | Park management | Whole KNE site | Greater Wellington Parks department | Maintain farm fences Monitor track maintenance and mountain biking activities Adhere to Greater Wellington best practice guidelines and policies aimed at protecting the natural environment while undertaking operational activities | Minimal impacts are imposed on biodiversity values by operational and recreational activities | †† | †† | †† |
| Total | | | | | | | \$24,300 | \$24,300 | \$24,300 |

† = Herbicide funded by Greater Wellington Parks department

†† = This cost varies annually and cannot be predicted at this time. Funded by Greater Wellington Parks department

*RTC = Residual trap catch. The control regime has been created 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 created to control rats to this level but monitoring will not be undertaken. Experience in the use of this control method indicates this target will be met

11. Funding contributions

11.1. Budget allocated by Greater Wellington

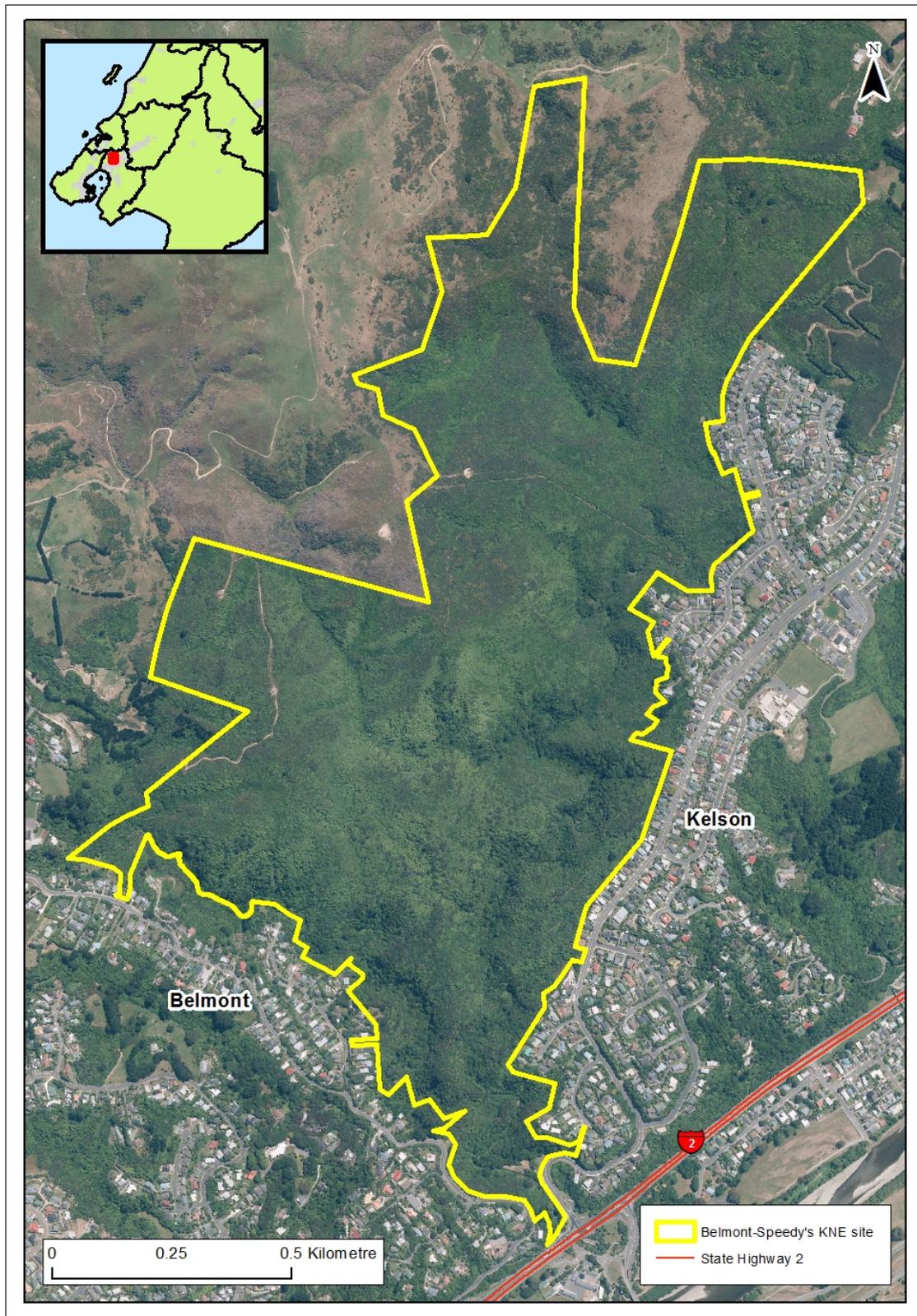
The budget for the 2019/20 and 2020/21 years are indicative only and subject to change.

Table 5: Greater Wellington allocated budget for Belmont-Speedy's KNE site

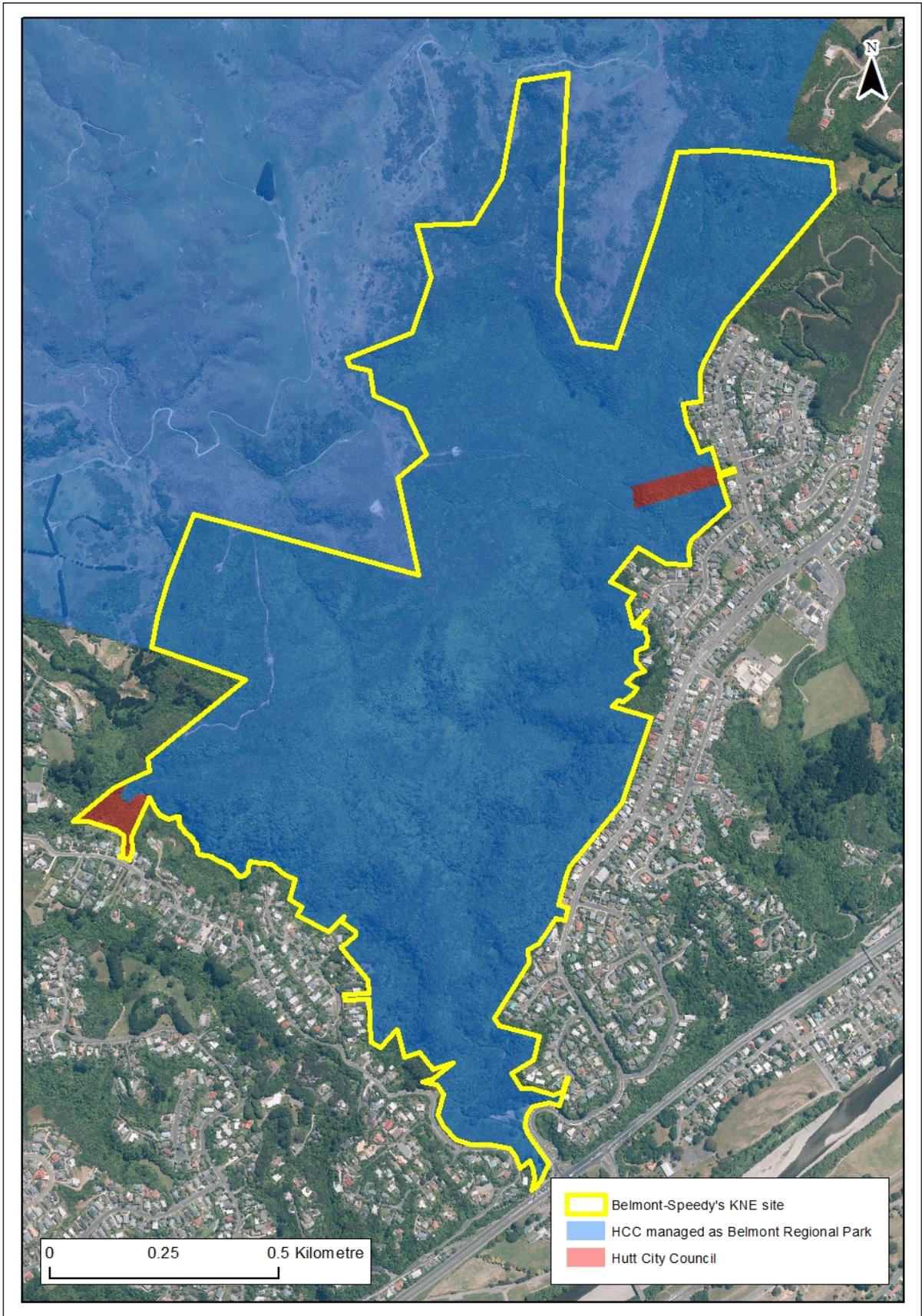
| Management activity | Timetable and resourcing | | |
|-------------------------|--------------------------|------------------|------------------|
| | 2018/19 | 2019/20 | 2020/21 |
| Ecological weed control | \$10,000* | \$10,550* | \$10,550* |
| Pest animal control | \$14,300 | \$13,750 | \$13,750 |
| Total | \$24,300* | \$24,300* | \$24,300* |

*Includes \$100 funded by Greater Wellington Parks department

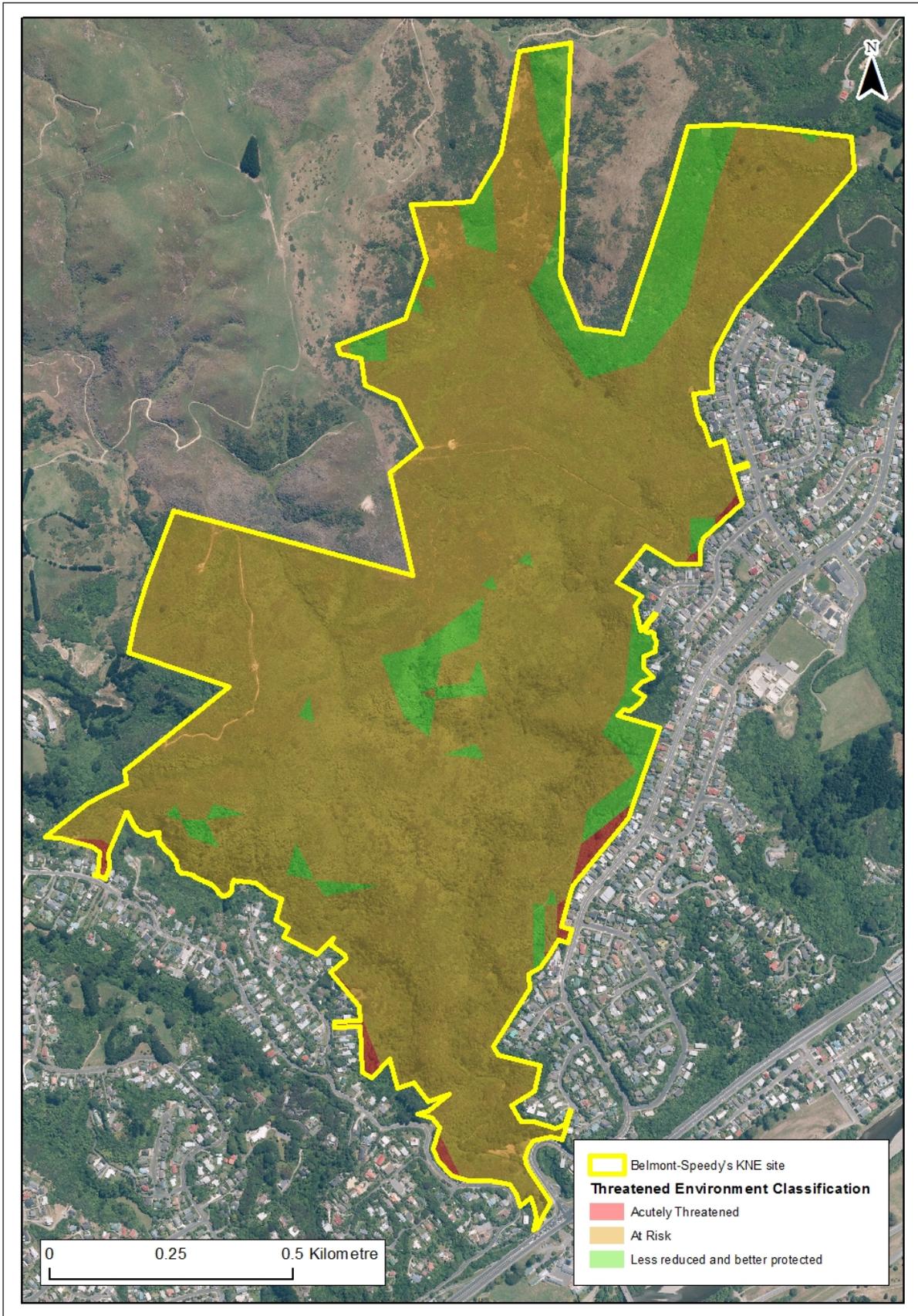
Appendix 1: Site Maps



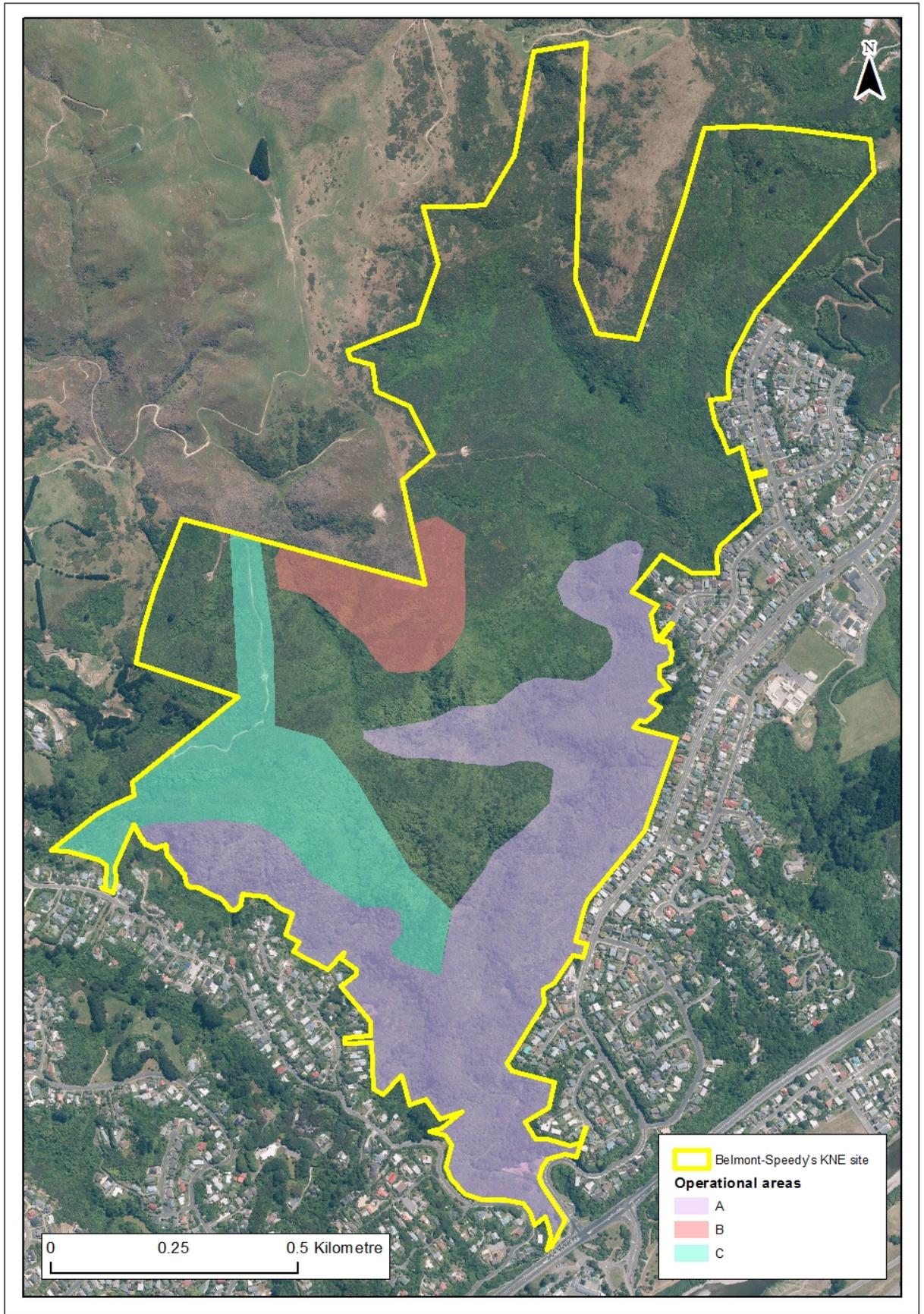
Map 1: Belmont-Speedy's KNE site boundary



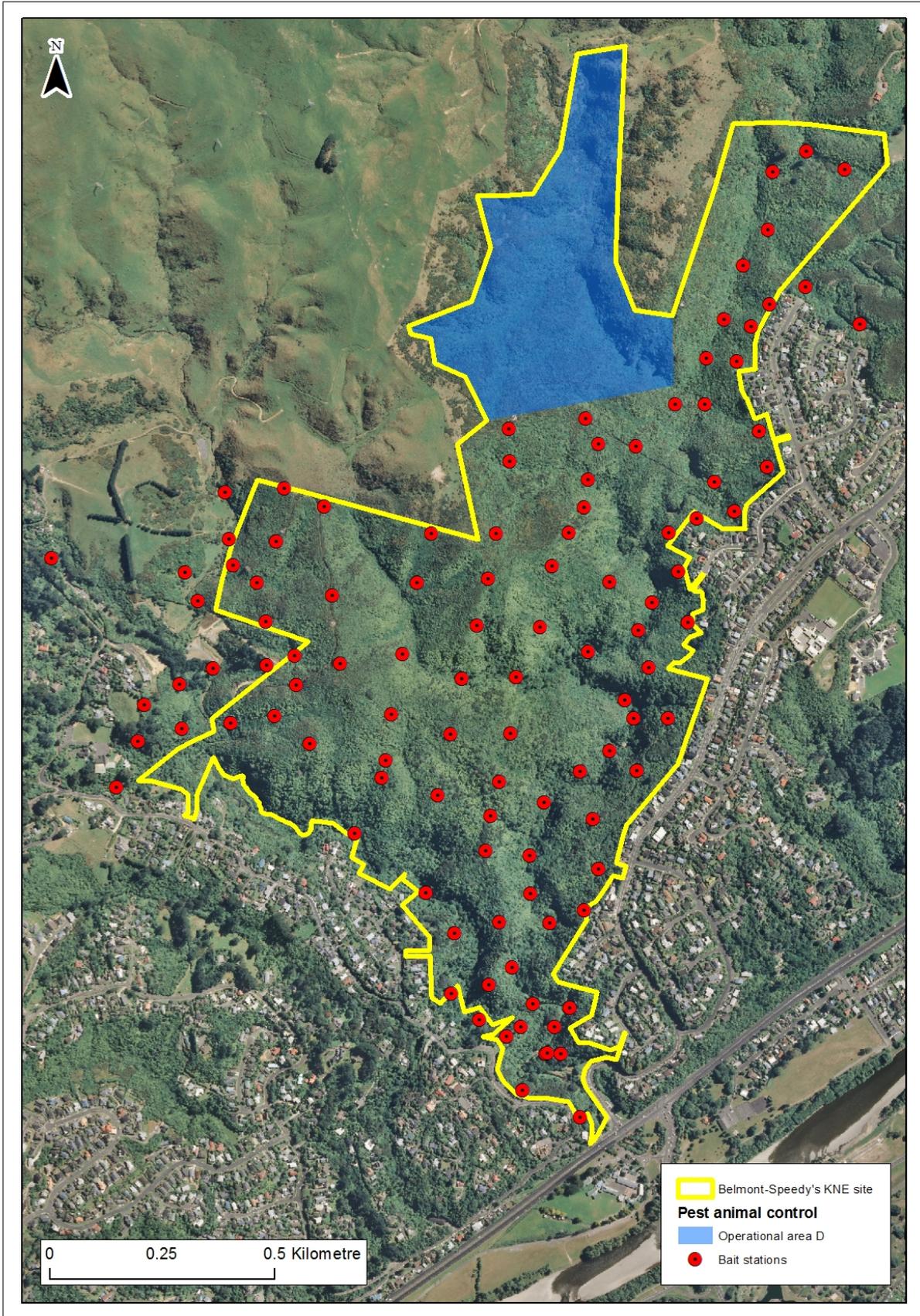
Map 2: Belmont-Speedy's KNE site land ownership



Map 3: Land Environment New Zealand threat classification map for the Belmont-Speedy's KNE site



Map 4: Ecological weed control operational areas in Belmont-Speedy's KNE site



Map 5: Pest animal control in Belmont-Speedy's KNE site

Appendix 2: 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 cycle⁵⁷. 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 Belmont-Speedy's KNE site.

Table 6: Threatened species at Belmont-Speedy's KNE site

| Scientific name | Common name | Threat status | Source |
|-------------------------------|----------------|---------------------|---|
| Reptiles ⁵⁸ | | | |
| <i>Naultinus punctatus</i> | Barking gecko | At Risk – Declining | Reille, B. 2015 ⁵⁹ |
| Freshwater fish ⁶⁰ | | | |
| <i>Anguilla dieffenbachii</i> | Longfin eel | At Risk – Declining | NIWA 2015 ⁶¹ |
| <i>Galaxias argenteus</i> | Giant kōkopu | At Risk – Declining | NIWA 2015 |
| <i>Geotria australis</i> | Lamprey | At Risk – Declining | Greater Wellington Regional Council, 2007 ⁶² |
| <i>Gobiomorphus hubbsi</i> | Bluegill bully | At Risk – Declining | NIWA 2015 |
| <i>Gobiomorphus huttoni</i> | Redfin bully | At Risk – Declining | NIWA 2015 |

Appendix 3: Ecological weed species

Ecological weed species recorded in Belmont-Speedy's KNE site are listed in order of priority for control. Species have been prioritised for control according to their weediness and the practicality of control⁶³.

Table 7: Ecological weed species recorded in Belmont-Speedy's KNE site

| Scientific Name | Common name | Weed tier | Priority |
|---|--------------------------------|--------------|----------|
| <i>Acer pseudoplatanus</i> | Sycamore | woody | 1 |
| <i>Berberis glaucocarpa</i> | Barberry | woody | 1 |
| <i>Buddleja davidii</i> | Buddleia | woody | 1 |
| <i>Clematis vitalba</i> | Old man's beard | climber | 1 |
| <i>Cortaderia selloana</i> | Pampas | ground cover | 1 |
| <i>Cotoneaster glaucophylla</i> | Cotoneaster | woody | 1 |
| <i>Crataegus monogyna</i> | Hawthorn | woody | 1 |
| <i>Dendrobenthamia capitata</i> | Strawberry dogwood | woody | 1 |
| <i>Elaeagnus x reflexa</i> | Elaeagnus | climber | 1 |
| <i>Hedera helix</i> subsp. <i>helix</i> | Ivy | climber | 1 |
| <i>Hedychium gardnerianum</i> | wild ginger | ground cover | 1 |
| <i>Hydrangea macrophylla</i> | Hydrangea | ground cover | 1 |
| <i>Hypericum androsaemum</i> | Tutsan | ground cover | 1 |
| <i>Ilex aquifolium</i> | Holly | woody | 1 |
| <i>Jasminum polyanthum</i> | Jasmine | climber | 1 |
| <i>Lonicera japonica</i> | Japanese honeysuckle | climber | 1 |
| <i>Passiflora caerulea</i> | Blue passionflower | climber | 1 |
| <i>Passiflora tripartita</i> var. <i>mollissima</i> | Banana passionfruit | climber | 1 |
| <i>Pinus radiata</i> | Radiata pine | woody | 1 |
| <i>Pittosporum crassifolium</i> | Karo | woody | 1 |
| <i>Prunus</i> spp. | Cherry, plum | woody | 1 |
| <i>Selaginella kraussiana</i> | African clubmoss, selaginella | ground cover | 1 |
| <i>Agapanthus praecox</i> | Agapanthus | ground cover | 2 |
| <i>Asparagus scandens</i> | Climbing asparagus | climber | 2 |
| <i>Berberis darwinii</i> | Darwin's barberry | woody | 2 |
| <i>Crocsmia x crocosmiiflora</i> | Montbretia | ground cover | 2 |
| <i>Cupressus macrocarpa</i> | Macrocarpa | woody | 2 |
| <i>Cytisus scoparius</i> | Broom | woody | 2 |
| <i>Erica lusitanica</i> | Spanish heath | ground cover | 2 |
| <i>Erigeron karvinskianus</i> | Mexican daisy | ground cover | 2 |
| <i>Genista monspessulana</i> | Montpellier broom | woody | 2 |
| <i>Leycesteria formosa</i> | Himalayan honeysuckle | woody | 2 |
| <i>Tradescantia fluminensis</i> | Tradescantia, wandering Willie | ground cover | 2 |

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