

Key Native Ecosystem Operational Plan for Belmont – Dry Creek

2023-2028



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1. Purpose

The purpose of this five-year Key Native Ecosystem (KNE) Operational Plan for Belmont – Dry Creek KNE site is to:

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

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

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

2. Policy context

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

Funding for the KNE programme is allocated under the Greater Wellington Long Term Plan (2021-2031)² and is managed in accordance with the Greater Wellington Biodiversity Strategy³. This sets a framework for how Greater Wellington protects and manages biodiversity in the Wellington region. Goal One of the Biodiversity Strategy - *Areas of high biodiversity value are protected or restored* - drives the delivery of the KNE programme.

Other important drivers for the KNE programme include the Natural Resources Plan⁴, the Regional Pest Management Plan 2019-2039⁵ and Toitū Te Whenua Parks Network Plan⁶.

3. The Key Native Ecosystem programme

The KNE programme is a non-regulatory programme. The programme seeks to protect some of the best examples of original (pre-human) ecosystem types in the Wellington region. Greater Wellington has identified sites with the highest biodiversity values and prioritized them for management⁷.

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

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

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

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

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

4. Belmont - Dry Creek Key Native Ecosystem site

Belmont-Dry Creek KNE site (613 ha) is located in rolling and steep hill country on the south-western slopes of the Hutt Valley. The KNE site is bordered by State Highway 2 to the east and State Highway 58 to the north (see Appendix 1, Map 1).

The KNE site contains a 22 ha remnant of lowland podocarp forest and a large surrounding area of regenerating mixed broadleaf and mānuka bush. The KNE site is one of five KNE sites which make up a band of native forest along the western hills of the Hutt Valley. It is considered important for landscape connectivity and native forest bird dispersal.

Most of the KNE site (563 ha) lies within Belmont Regional Park and comprises what is commonly known as the Dry Creek Block of the regional park. This area is protected as Recreation Reserve and includes parts of four areas identified as Significant Natural Resources in the Lower Hutt City District Plan^{8,9}. The remaining 50 ha area of the KNE site is on privately-owned land adjacent to the regional park.

5. Parties involved

5.1. Landowners

Most of the Belmont Regional Park section of the KNE site (515 ha) is owned by Greater Wellington, while one land parcel of 48 ha is owned by the Crown. Greater Wellington is appointed to control and manage this land parcel as part of the regional park.

The remaining 50-ha area of the KNE site is privately owned by M.W. and S.V. Judd. This area is situated on the edge of their sheep and beef farm (see Appendix 1, Map 2).

5.2. Operational delivery

Within Greater Wellington, four teams are responsible for delivering the Belmont - Dry Creek KNE operational plan.

- The Environment Restoration team leads the strategic planning, funding and coordination of biodiversity management activities and advice within the KNE site
- The Pest Plants and Pest Animals teams coordinate and implement ecological weed and pest animal control measures at the KNE site with funding from the Environment Restoration team's KNE programme budget
- The Western Parks team primarily manages recreational access and maintains assets such as roads, tracks and amenity areas within the regional park, but also helps with facilitating delivery of the KNE operational plan.

5.3. Mana whenua partners

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

Te Awa Kairangi/Hutt River, a tributary of which is an important feature of the KNE site, has been identified as culturally important in the Natural Resources Plan for the Wellington Region (NRP)¹⁰. Table 1 below lists the values that Te Awa Kairangi/Hutt River hold for mana whenua as listed in the NRP.

The Statutory Acknowledgements from the Ngāti Toa Rangatira Claims Settlement Act 2014¹¹ and the Port Nicholson Block (Taranaki Whānui ki te Upoko o te Ika) Claims Settlement Act 2009¹² provide further details of the associations that Ngāti Toa and Taranaki Whānui have with Te Awa Kairangi/Hutt River and its tributaries.

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

Table 1: Mana whenua sites of significance in Belmont - Dry Creek KNE site¹³

Sites of significance	Mana whenua values
For Ngāti Toa Rangatira: Te Awa Kairangi/Hutt River (Schedule B - Te Taonga Nui a Kiwa)	Ngā Mahi a ngā Tūpuna, Te Mahi Kai, Te Mana o Te Tangata Te Manawaroa o te Wai, Te Mana o Te Wai
For Taranaki Whānui ki te Upoko o te Ika: Te Awa Kairangi/Hutt River (Schedule B - Te Taonga Nui a Kiwa)	Ngā Mahi a ngā Tūpuna, Te Mahi Kai, Wāhi Whakarite Te Mana o te Tangata, Te Manawaroa o Te Wai Te Mana o Te Wai, Wāhi Mahara

5.4. Stakeholders

Friends of Belmont Regional Park are a community group with a strong interest in preserving and restoring Belmont Regional Park. The group has an interest in biodiversity management activities that Greater Wellington undertakes in the KNE site.

6. Ecological values

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

6.1. Ecological designations

Table 2 below, lists ecological designations in the Belmont - Dry Creek KNE site.

Table 2: Designations at the Belmont - Dry Creek KNE site

Designation level	Type of designation
Regional	The streams in the KNE site are designated under Greater Wellington's Natural Resources Plan as having high macroinvertebrate community health ¹⁴
District	Parts of the KNE site are designated as Significant Natural Resource (SNR) Sites in the Lower Hutt City District Plan: <ul style="list-style-type: none"> - parts of SNRs 1, 3, 17 & 18
Other	Most of the KNE site is gazetted as Recreation Reserve

6.2. Ecological significance

The Belmont - Dry Creek KNE site is considered to be of regional importance because:

- It contains highly **representative** ecosystems that were once typical or commonplace in the region;
- It contains ecological features that are **rare or distinctive** in the region;
- It contains high levels of ecosystem **diversity**, with several ecosystem types represented;
- Its **ecological context** is valuable at the landscape scale as it contains a variety of inter-connected habitats, it is part of an ecological corridor and it provides core habitat for threatened indigenous bird, lizard and fish species.

Representativeness

The Singers and Rogers¹⁵ classification of pre-human forest vegetation indicates the KNE site would likely have contained mostly tawa-kāmahi-podocarp forest (MF7). Only about 22% of the original extent of this forest type remains in the Wellington Region, making it a regionally At Risk ecosystem type¹⁶.

The existing ecosystems have been modified considerably from the original. They have experienced selective logging, forest clearances, and species extinction. However, an area of about 75 ha of mature forest in the main valley in the middle of the KNE site maintains many elements and is still representative of the original ecosystem.

The Threatened Environment Classification system defines ecosystem and habitat threat categories nationally, based on percentage of indigenous cover remaining¹⁷. The system indicates that about 365 ha of the KNE site are classified as either Acutely

Threatened or At Risk because there is less than 10% and only 10-20% native vegetation remaining on these types of land respectively in New Zealand¹⁸. Acutely Threatened environments in the KNE site are found mostly on hill tops and plateaus, while At Risk environments are found mostly on valley floors and lower slopes (see Appendix 1, Map 3).

Rarity/distinctiveness

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

Diversity

The KNE site contains several ecosystem types: mature native forest; regenerating native forest of various ages, including scrub and shrublands; and several stream systems.

Ecological context

The diversity of ecosystems provides a variety of food resources that support increasing bird populations in this part of the region. The KNE site is part of an ecological connection or 'corridor' stretching from the Tararua Range in the north to Wellington City in the south along the western flank of the Hutt valley and Wellington Harbour. This corridor allows native bird species to spread through this part of the region (see Appendix 1, Map 4).

6.3. Ecological features

Belmont-Dry Creek KNE site contains a small remnant of lowland broadleaf forest and a large surrounding area of regenerating broadleaf forest and mānuka scrubland located in steep stream valleys and rolling hill country. The KNE site is located in the Wellington Ecological District¹⁹.

Flora

The KNE site now consists of remnant and regenerating broadleaf forest found on the valley floors and lower slopes of the main valley system and regenerating mānuka scrubland found on the surrounding higher rolling hill country. The remnant forest contains pukatea (*Laurelia novae-zelandiae*), mataī (*Prumnopitys taxifolia*) and kahikatea (*Dacrycarpus dacrydioides*) emerging over a tawa (*Beilschmiedia tawa*) canopy. Kōwhai (*Sophora microphylla*), kōtukutuku (*Fuchsia excorticata*) and tītoki (*Alectryon excelsus* subsp. *excelsus*) are also present. Hard beech (*Fuscospora truncata*) and black beech (*Fuscospora solandri*) are present on shallow soils of the ridge crests and spurs in the main valley, and miro (*Prumnopitys ferruginea*) are common in the valleys in the west of the KNE site. The KNE site is the southern limit for beech in the western Hutt hills^{20,21}.

The regenerating forest located on slopes and plateaus surrounding the main valleys have been naturally regenerating for between 20 and 50 years following retirement

from farming. Plant species of special interest due to them being locally rare are narrow leaved māhoe (*Melicytus lanceolatus*) and raukawa (*Raukaua edgerleyi*)²².

Fauna

Birds

Seventeen species of native bird are found in the KNE site. These include whitehead (*Mohoua albicilla*), bellbird (*Anthornis melanura*), tūī (*Prothemadera novaeseelandiae*), kererū (*Hemiphaga novaeseelandiae*), grey warbler (*Gerygone igata*), silvereye (*Zosterops lateralis*), fantail (*Rhipidura fuliginosa*), kingfisher (*Todiramphus sanctus*), Australasian harrier, (*Circus approximans*) and black shag (*Phalacrocorax carbo*). Of particular interest is the presence of at least one breeding pair of bush falcon (*Falco novaeseelandiae*) and occasional sightings of tomtit (*Petroica macrocephala*), presumably having dispersed from Keith George Memorial Park KNE site where they are more plentiful²³.

Reptiles

Ngahere gecko (*Mokopirirakau* 'southern North Island') and barking gecko (*Naultinus punctatus*) have been recorded in the KNE site²⁴. Northern grass skink (*Oligosoma polychroma*) has been recorded in the adjacent Belmont Quarry²⁵ and the species is likely to be present within the KNE site.

Fish

Longfin eel (*Anguilla dieffenbachii*), shortfin eel (*Anguilla australis*), giant kōkopu (*Galaxias argenteus*), banded kōkopu (*Galaxias fasciatus*), redfin bully (*Gobiomorphus huttoni*) and common bully (*Gobiomorphus cotidianus*) have been recorded in the KNE site within the last 12 years²⁶. There are older records of inanga (*Galaxias maculatus*) being present²⁷.

7. Threats to ecological values at the KNE site

Ecological values can be threatened by human activities, and by introduced animals and plants that change ecosystem dynamics. The key to protecting and restoring biodiversity as part of the KNE programme is to manage key threats to the ecological values at each KNE site. Appendix 4 presents a summary of all known threats to the Belmont - Dry Creek KNE site.

7.1. Key threats

The most significant threats to the ecological values at Belmont-Dry Creek KNE site come from ecological weeds and pest animals. Ecological weeds vary in density and distribution across the site. Dense infestations of mainly woody weed species are mostly confined to one area of the KNE site; operational area A (see Appendix 1, Map 5). While a range of woody, climbing and ground covering weed species are distributed widely at much lower densities throughout the rest of the KNE site.

A few individual plants of the ecological weed species climbing asparagus (*Asparagus scandens*) have been found in the KNE site. This is a very invasive and difficult to control species that could quickly become widespread and impact the native flora. The species could readily spread into the KNE site from nearby areas where large infestations are present including the Kelson Bush and Belmont Speedy's KNE sites.

If left uncontrolled, ecological weeds would become increasingly dominant in the forest, and could inhibit natural native plant regeneration and cause native canopy plants to collapse.

Populations of possums (*Trichosurus vulpecula*), rats (*Rattus* spp.), weasels (*Mustela nivalis*) and stoats (*Mustela erminea*) are likely to be at low levels in the KNE site due to the existing control measures (trapping and poisoning). Numbers of these species would readily increase through reproduction and immigration if control was curtailed or not managed well.

Feral goats (*Capra hircus*) have frequently moved into the KNE site from adjoining farmland in the past, and further incursions are possible. Following several years of control operations, there are currently no feral goats present within the KNE site, apart from one "Judas" goat (a goat fitted with a tracking collar which is retained in the KNE site to assist in the location of other goats that move into the KNE site).

Feral red and fallow deer (*Cervus elaphus* and *Dama dama*) and stray sheep (*Ovis aries*) are present in very low numbers. The numbers of feral deer have been reduced significantly in the last few years, but some remain. Sheep turn up in the KNE site from time to time.

8. Vision and objectives

8.1. Vision

The Belmont-Dry Creek KNE site comprises a healthy and dynamic forest ecosystem resembling the original ecological community found here. Native plant communities are flourishing, and native wildlife is prolific.

8.2. Objectives

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

The following objectives will guide the operational activities at the Belmont - Dry Creek KNE site.

- 1. Protect the native ecosystem integrity and improve the condition and regeneration of the mature native forest.***
- 2. Improve the native dominance of the regenerating native bush.***
- 3. Protect native birds and lizards from predation by exotic species.***

9. Operational activities

Operational activities are targeted to work towards the objectives listed above (Section 8). The broad approach to operational activities is described briefly below, and specific actions, with budget figures attached, are set out in the operational delivery schedule in Section 10 (Table 3).

The broad approach to managing biodiversity values within the KNE site is to control the most threatening ecological weeds and pest animals to sufficiently low levels to maintain the native integrity of the remnant forest, enable effective regeneration and succession of the surrounding native bush and to support viable populations of native bird species. Some human activities that could have an impact on biodiversity values are also managed.

Available resources don't allow for all ecological weeds and pest animals to be controlled. However, the level of management that is carried out will allow progress towards the above objectives.

9.1. Ecological weed control

The aim of ecological weed control at the KNE site is to protect the vegetation composition of the forest remnant from being altered by colonising ecological weeds and to improve the native dominance of the surrounding native bush as it continues to regenerate.

Good progress has been made on reducing the ecological weed burden at the site over the last several years. Control measures have mostly been focused on a large weed-nucleus area where dense infestations of invasive woody and climbing weed species have been concentrated (operational area A; see Appendix 1, Map 5). This work has stopped the gradual expansion of this heavily infested area and will have reduced the amount of weed seeds being produced and made available for dispersal by birds and wind into the more important parts of the KNE site.

A methodical approach is taken as this work continues. This involves a balance of undertaking initial control in new sections of the areas and return sweeps of previously controlled sections to control re-infestations. The very steep terrain in this area makes the work difficult and slow.

The most common ecological weed species found in this area are barberry (*Berberis glaucocarpa*), buddleia (*Buddleja davidii*), cotoneaster (*Cotoneaster spp.*), Darwin's barberry (*Berberis darwinii*), hawthorn (*Crataegus monogyna*) and old man's beard (*Clematis vitalba*).

A lesser amount of control work is undertaken within the rest of the KNE site: the forest remnant and surrounding regenerating native bush. Control work alternates between the northern and southern halves of this area each year (see operational areas B and C in Appendix 1, Map 5). This work targets maturing ecological weeds in these areas to prevent them seeding and therefore fuelling an increase in exotic dominance. Control is undertaken by scanning the bush from vantage points on roads and tracks, taking advantage of flowering and leaf colour change periods to identify target species, and controlling all the weeds found.

The species that are most concerning and therefore controlled in these areas are holly (*Ilex aquifolium*), Japanese honeysuckle (*Lonicera japonica*), pampas (*Cortaderia jubata*), tutsan (*Hypericum androsaemum*), and those mentioned above for operational area A. The focus of control work in the western half of operational area C is reducing the density of holly which is very prevalent in this area.

A priority is made of controlling climbing asparagus whenever it is found in any part of the KNE site. Climbing asparagus is currently uncommon in the site but would have a significant impact on the native vegetation if it was allowed to establish.

A full list of the ecological weed species that have been prioritized for control in the KNE site can be found in Appendix 5.

9.2. Pest animal control

The aim of pest animal control at the KNE site is to reduce browsing and predation by pest animals to improve the condition and native dominance of the plant communities present, to protect the food resources they provide, and to protect native birds and lizards.

Possoms and rats are controlled throughout the KNE site through a programme of poisoning and trapping which commenced in 2007. In the regional park portion of the KNE site, both possums and rats are controlled by dispensing toxic anticoagulant baits from a network of bait stations. Within the private land, only possums are controlled through trapping using Timms traps (see Appendix 1, Map 6).

Mustelid control is undertaken across the KNE site through a network of DOC 200 style traps put in place in 2018. This network and its ongoing servicing were funded from 2018 to 2022 by the quarrying company GBC Winstone as a requirement of a legal agreement providing mitigation for environmental impacts at Belmont Quarry, which is located adjacent to the KNE site. In 2022-23, Greater Wellington took over funding the ongoing servicing of the network through the KNE programme.

Monitoring at comparable sites has shown that the above control regimes are likely to result in low levels of possums, rats and mustelids. Pest animal control operations in adjacent and nearby KNE sites (Keith George Memorial Park, Kelson Bush and Belmont-Speedy's) will help to reduce numbers of these pest animals across the landscape which will reduce the likelihood of reinvasion of these species into Belmont-Dry Creek KNE site.

Control of feral goats, deer and pigs, and stray sheep is undertaken to keep the KNE site as free of these animals as possible. Feral goat control began in 2004 to reduce the browsing of seedlings which was limiting native regeneration. As no goats have been found in the KNE site since February 2012, control operations have now been reduced to every second year. In the alternate years, feral deer control is undertaken. The frequency of feral deer observations in the KNE site increased abruptly several years ago. Control has reduced numbers significantly and it is thought that those that remain range over a large part of Belmont Regional Park. Control aims to eradicate deer in the KNE site and is undertaken in conjunction with control work being undertaken in other parts of the regional park, including the adjacent Belmont-Speedys KNE site. Control of

feral pigs and stray sheep is undertaken when significant sign of these species is observed, and funding for the activity can be made available.

Control of mice, hedgehogs and cats is not currently undertaken. However, limited control of these species may be occurring through secondary poisoning or access to the bait stations and traps meant for other species.

9.3. Environmental protocols

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

Environmental care

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

Biosecurity guidelines²⁸ are 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 and ensuring construction material is free of weed material. Following these guidelines reduces the risk of spreading ecological weeds and pathogens into and around the KNE site.

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

Recreation and commercial use

The potential impacts on biodiversity values posed by recreational activities are managed through the implementation of Toitū Te Whenua Parks Network Plan²⁹. This plan limits the recreational activities that are permitted within the KNE site to mountain biking, horse riding and passive forms of recreation such as camping, picnicking, walking and running. These forms of recreation are not likely to impact biodiversity values within the KNE site if they continue to be restricted to designated amenity areas and existing roads and tracks. The potential impacts of commercial activities are managed through the Greater Wellington Parks concession process.

Research and the collection of natural materials

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

The illegal collection of native plants and animals has occurred occasionally in Regional Parks. This activity can include the harvesting of native tree for domestic uses such as for firewood and fence construction, and the collection of orchids, lizards and

invertebrates by collectors and traders. The Park Ranger watches for this activity while carrying out normal duties within the park.

Fire risk

To reduce the risk of uncontrolled fires, open fires are not permitted at the camping ground or anywhere else in the KNE site. This policy is communicated to users through onsite signage, the regional park information brochure and Toitū Te Whenua Parks Network Plan³⁰.

10. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for the Belmont - Dry Creek KNE site, and their timing and cost over the five-year period from 1 July 2023 to 30 June 2028. The budgets for years 2024/25 to 2027/28 are indicative only and subject to change. Operational areas (see Appendix 1, Map 5) are also subject to change according to operational needs over the course of the operational plan.

Table 3: Five-year operational plan for the Belmont - Dry Creek KNE site

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2023/24	2024/25	2025/26	2026/27	2027/28
1	<u>Ecological weed control</u> Control woody and climbing ecological weeds listed in Appendix 5.	A	The distribution and density of ecological weeds has reduced significantly. The spread of ecological weeds into other parts of the KNE site has reduced.	Greater Wellington Pest Plants team	\$6,800	\$6,800	\$6,800	\$6,800	\$6,800
1	<u>Ecological weed control</u> Control all ecological weeds listed in Appendix 5.	B	The distribution and density of ecological weeds has not increased. The native composition of the forest and regenerating bush is not declining.	Greater Wellington Pest Plants team	\$5,518		\$5,518		\$5,518
1	<u>Ecological weed control</u> Control all ecological weeds listed in Appendix 5.	C	The distribution and density of ecological weeds has not increased. The native composition of the forest and regenerating bush is not declining.	Greater Wellington Pest Plants team		\$5,518		\$5,518	

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2023/24	2024/25	2025/26	2026/27	2027/28
1,2	<u>Pest animal control</u> Service bait stations, Timms traps and predator traps at three monthly intervals to control possums, rats and mustelids.	Entire KNE site	Browsing and predatory pest animals are constantly suppressed to low levels (i.e. possums: < 5% RTC* rats: < 10% TTI** mustelids: < 5% TTI**). Native plant and animal species have more protection and resources.	Greater Wellington Pest Animals team	\$25,790	\$25,790	\$25,790	\$25,790	\$25,790
1,2	<u>Pest animal control</u> Maintain pest control access lines.	Entire KNE site	Satisfactory access to all pest control devices is maintained.	Greater Wellington Pest Animals team	\$3,264	\$3,264	\$3,264	\$3,264	\$3,264
1,2	<u>Pest animal control</u> Control feral goats and deer in alternating years by ground hunting: 3 days hunting.	Entire KNE site	Ungulates are suppressed to low levels (i.e. operational results average less than 1 animal per hunter-day). Native plant species have more protection.	Greater Wellington Pest Animals team	\$1,632 (goats)	\$1,632 (deer)	\$1,632 (goats)	\$1,632 (deer)	\$1,632 (goats)
1,2	<u>Pest animal control</u> Control feral pigs and stray sheep if significant sign is observed	Entire KNE site	Ungulates are suppressed to low levels (i.e. operational results average less than 1 animal per hunter-day). Native plant species have more protection.	Greater Wellington Pest Animals team	†	†	†	†	†

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2023/24	2024/25	2025/26	2026/27	2027/28
1,2	<p><u>Environmental protocols</u> Environmental protocols: Adhere to Greater Wellington best practice guidelines and policies aimed at protecting the natural environment while undertaking operational activities and managing recreational and commercial activities in the KNE site, including:</p> <ul style="list-style-type: none"> assessment of environmental effects procedures, pest plant biosecurity guidelines, research and natural material collection permitting system, fire ban policy. 	Entire KNE site	Biodiversity values aren't impacted by operational, recreational or commercial activities.	Greater Wellington Eastern Parks, Parks Maintenance, Environmental Restoration, Pest Plants and Pest Animals teams	++	++	++	++	++
Total					\$43,004	\$43,004	\$43,004	\$43,004	\$43,004

*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.

† = This activity is infrequent and not usually required annually. Allocating funding will be addressed when required.

++ = No cost to KNE programme – staff time required is charged to other programmes.

11. Funding contributions

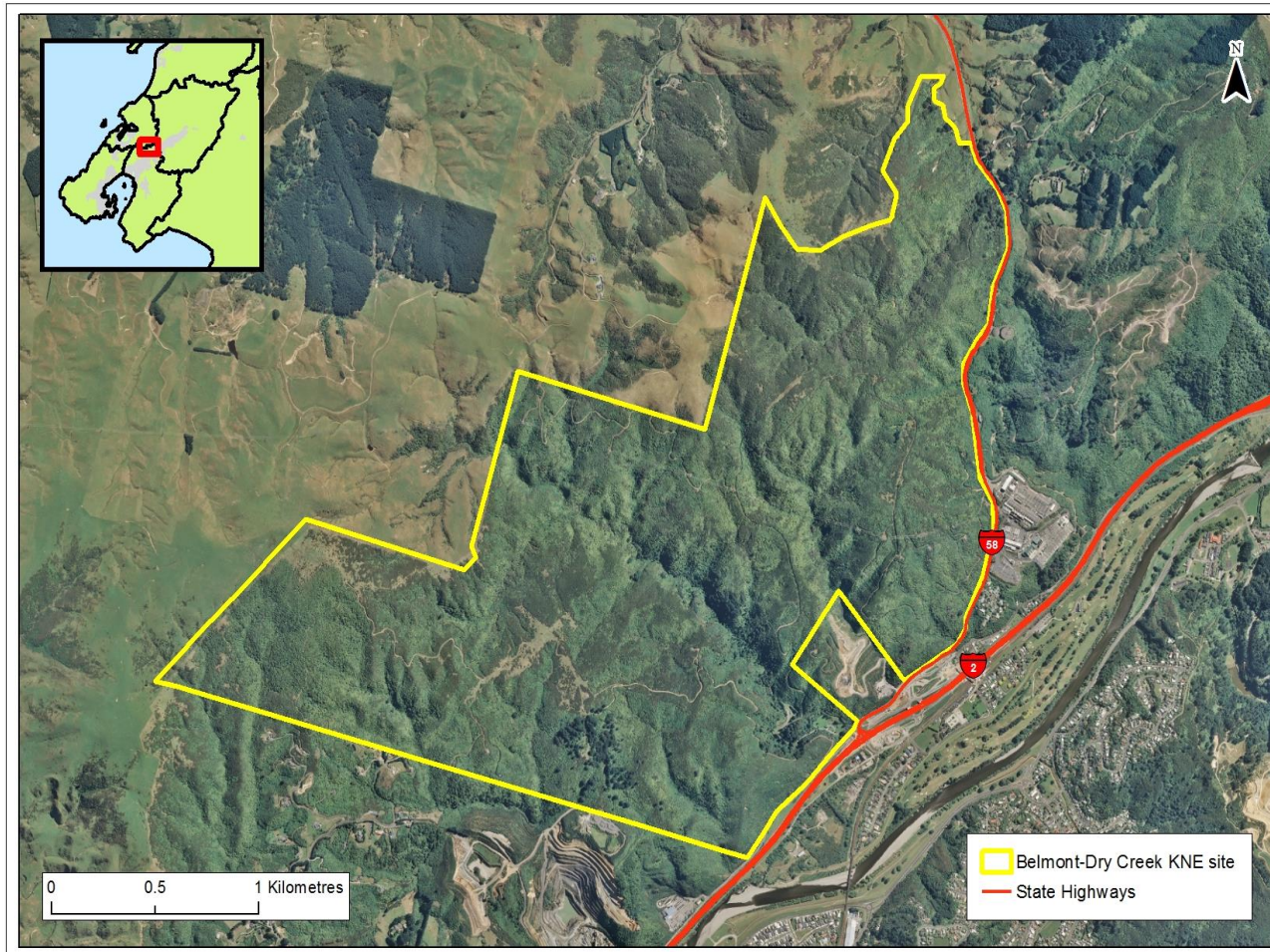
11.1. Budget allocated by Greater Wellington

The budget is subject to change.

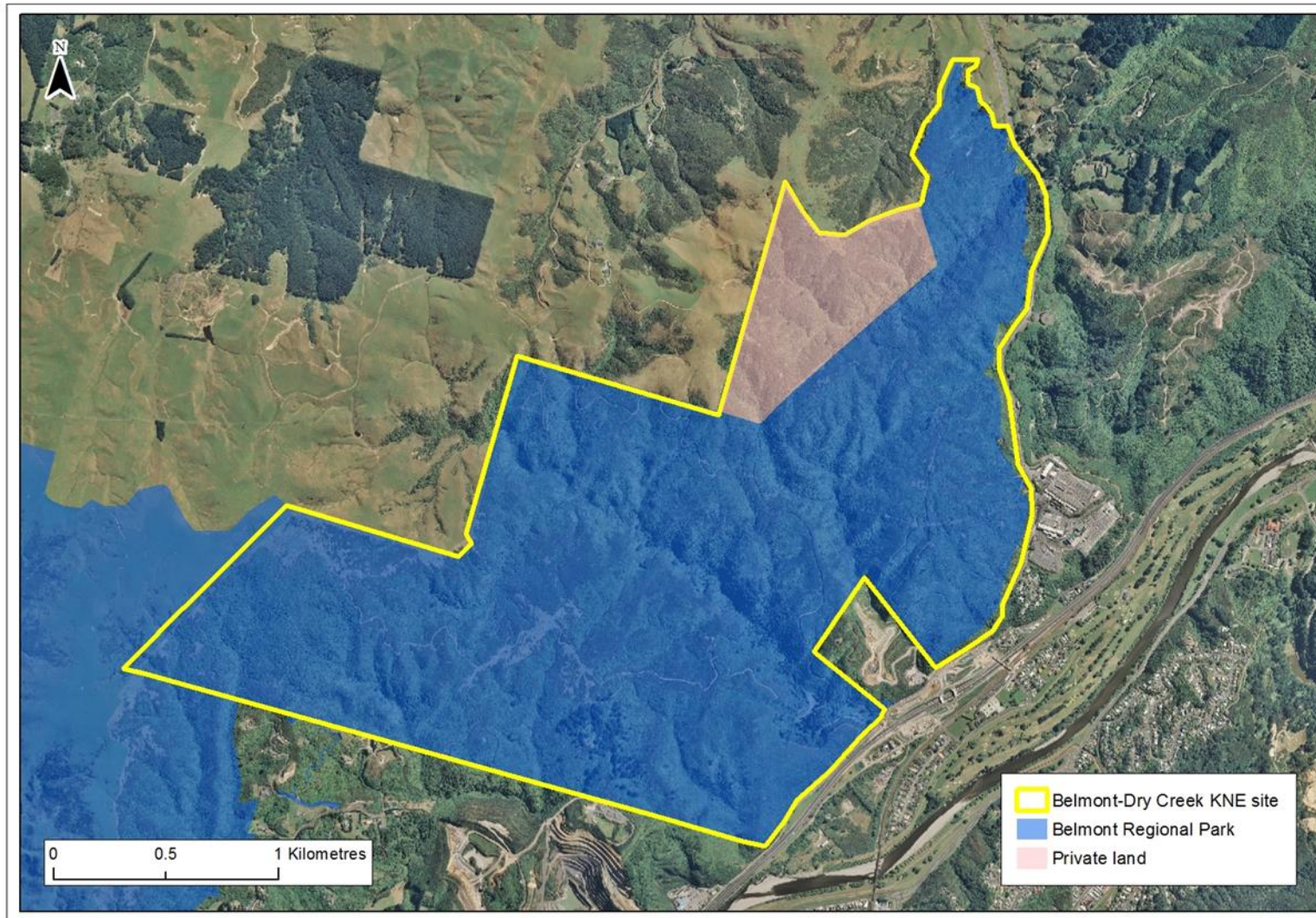
Table 4: Greater Wellington allocated budget for the Belmont - Dry Creek KNE site

Management activity	Annual resourcing
Ecological weed control	\$12,318
Pest animal control	\$30,686
Total	\$43,004

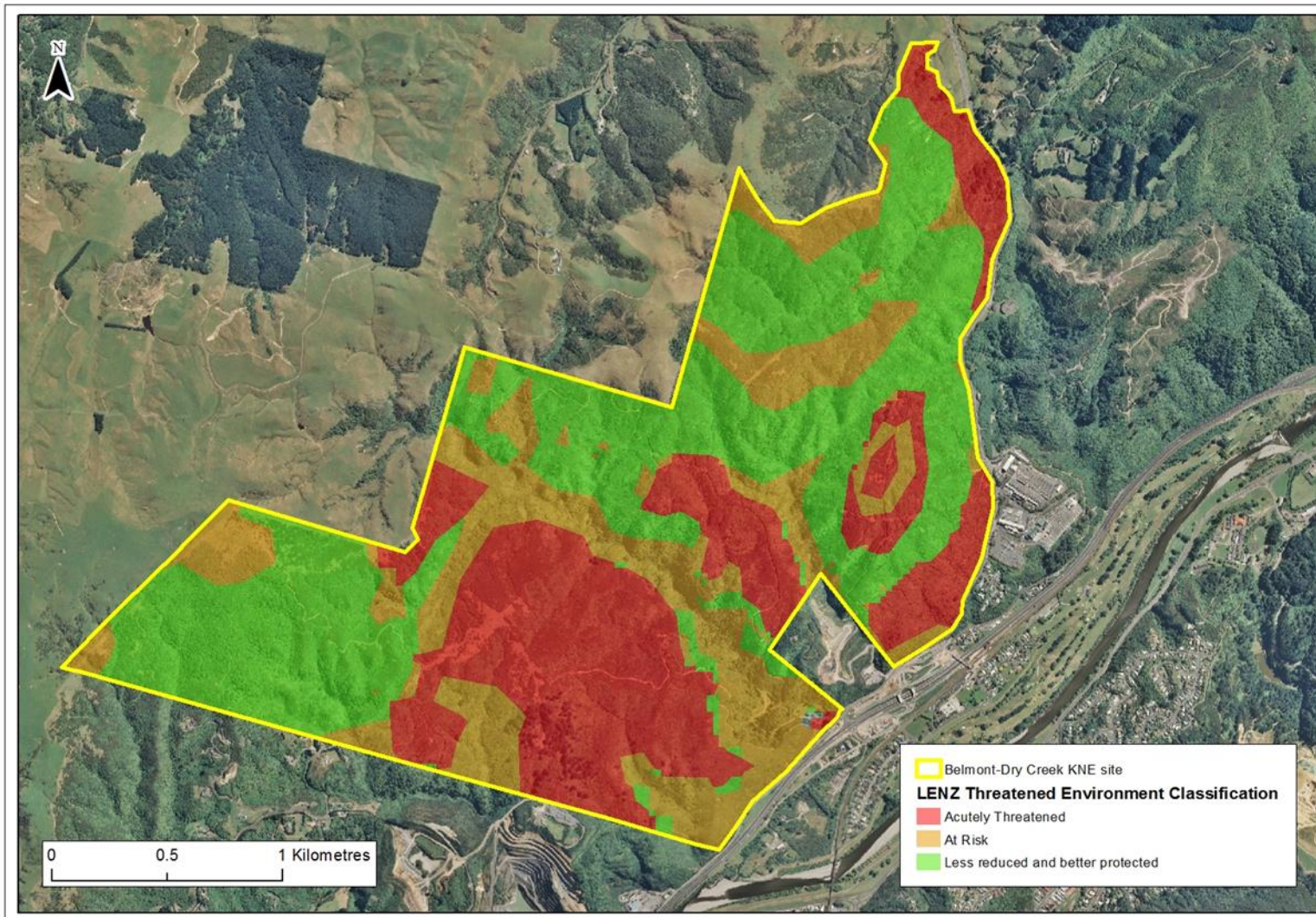
Appendix 1: Belmont - Dry Creek KNE site maps



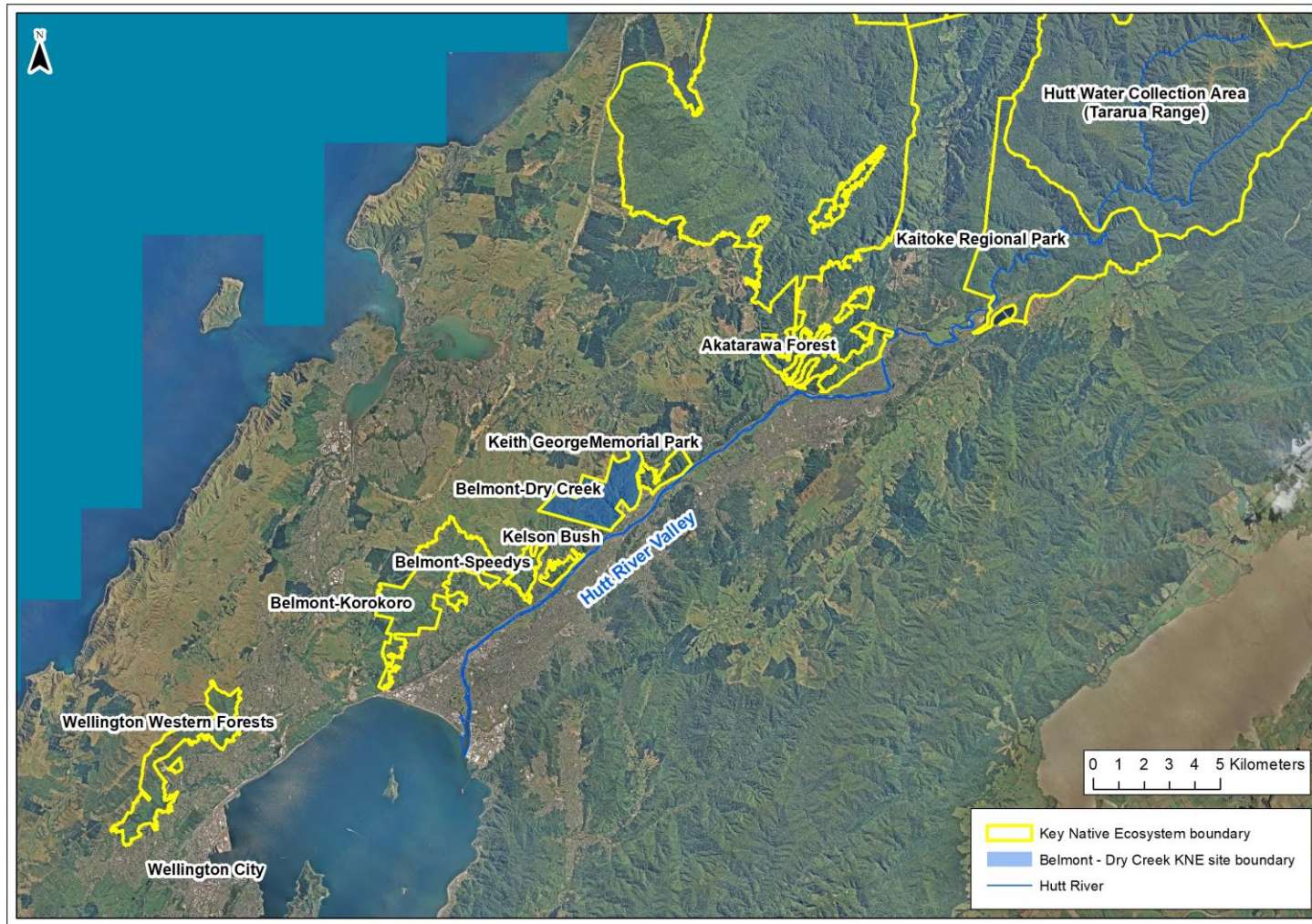
Map 1: The Belmont - Dry Creek KNE site boundary



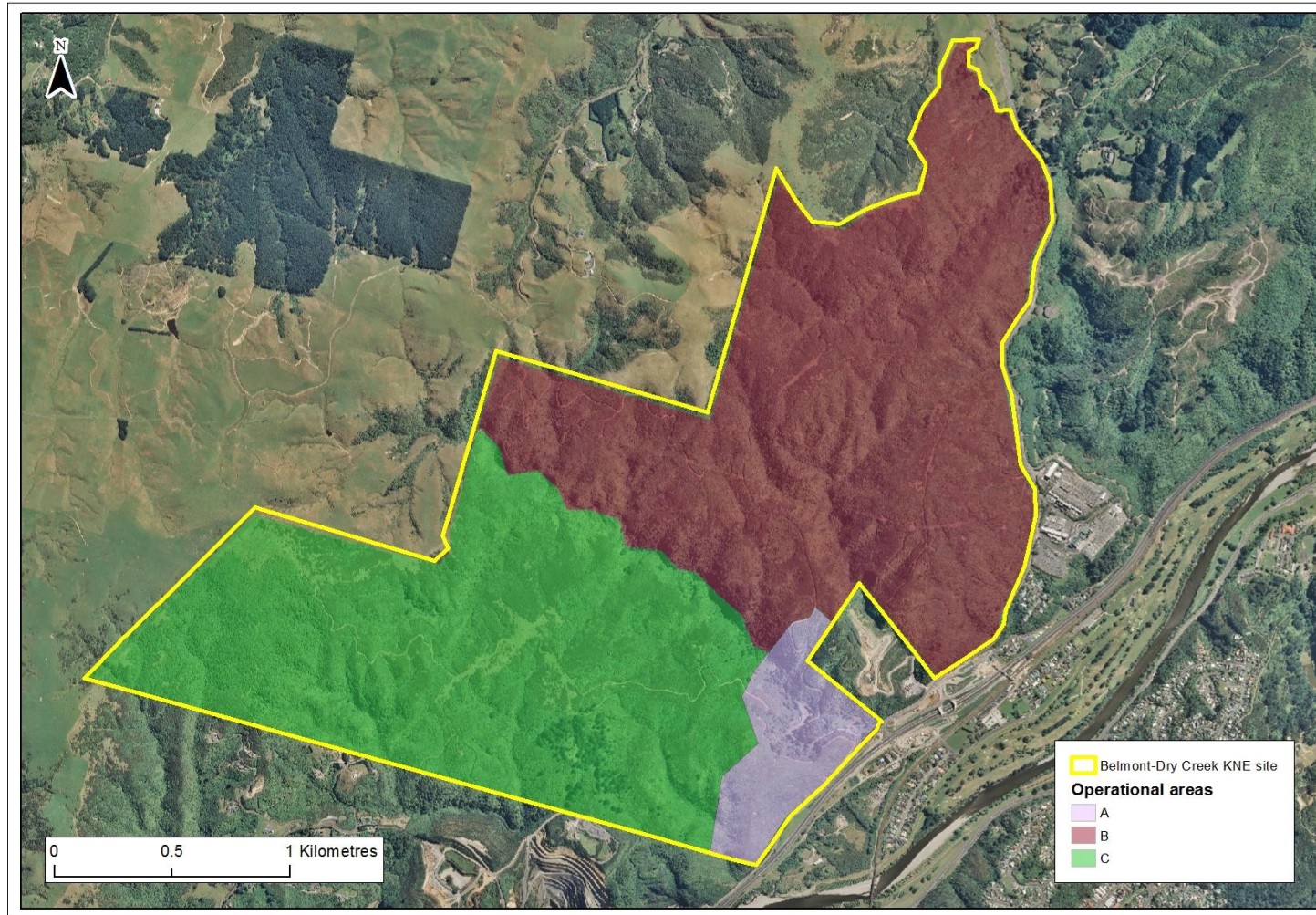
Map 2: Land ownership and management in the Belmont - Dry Creek KNE site



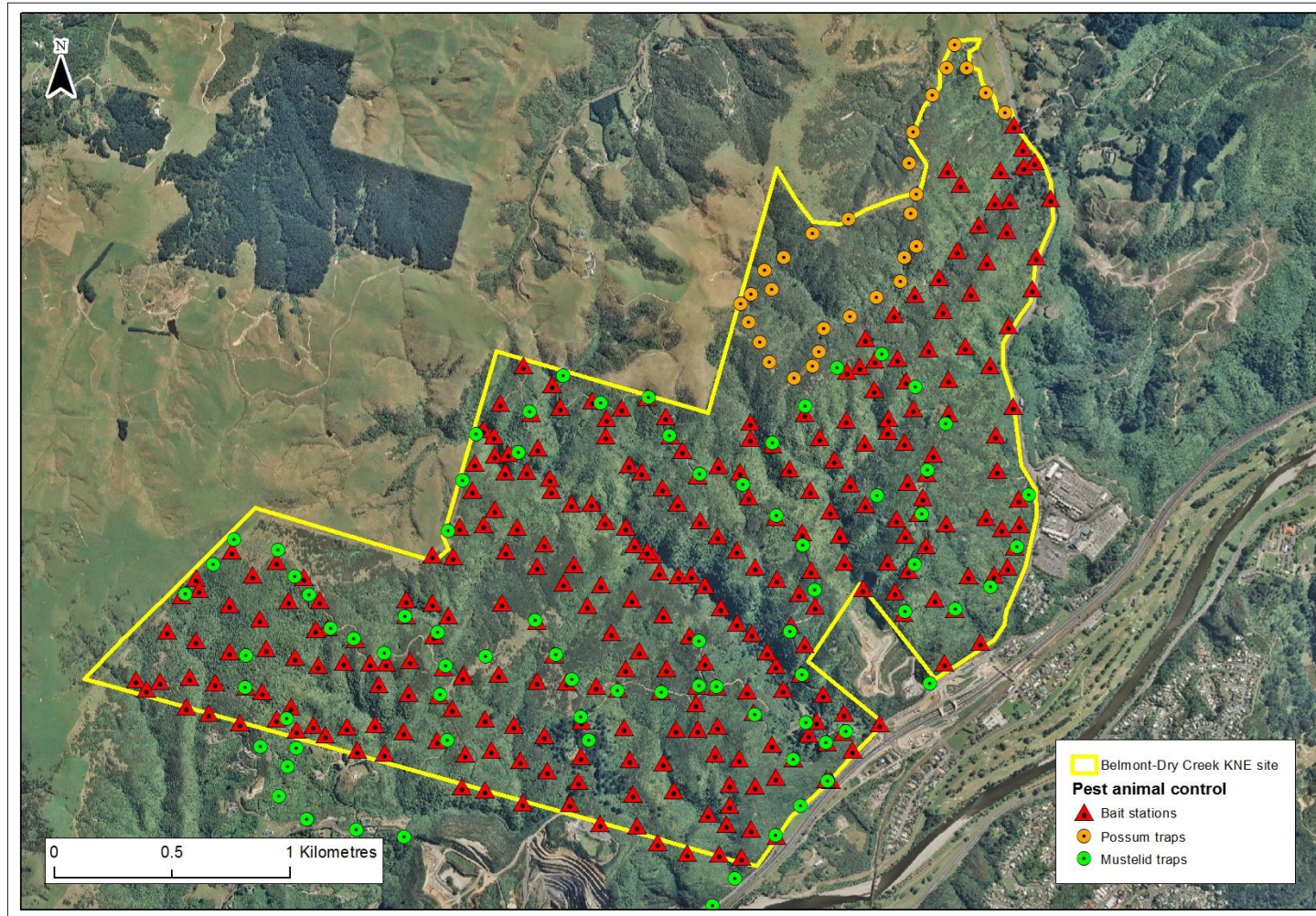
Map 3: Forest cover classifications for the Belmont - Dry Creek KNE site



Map 4: The Key Native Ecosystem sites that contribute to the ecological corridor on the western side of the Hutt valley and Wellington harbour. The Belmont – Dry Creek Key Native Ecosystem site is shaded in blue.



Map 5: Ecological weed control operational areas in the Belmont - Dry Creek KNE site



Map 6: Pest animal control in the Belmont - Dry Creek KNE site

Appendix 2: Nationally threatened species list

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

The New Zealand Threat Classification System (NZTCS) lists species according to their threat of extinction. The status of each species group (plants, reptiles, etc) is assessed over a five-year cycle³¹. Species are regarded as Threatened if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable³². They are regarded as At Risk if they are classified as Declining, Recovering, Relict or Naturally Uncommon.

Table 6: Nationally Threatened and At Risk species at the Belmont - Dry Creek KNE site

Scientific name	Common name	National threat status	Observation
Birds ³³			
<i>Falco novaeseelandiae</i>	Kārearea/bush falcon	Threatened – Nationally Vulnerable	NZ eBird database 2021
<i>Phalacrocorax carbo</i>	Kawau/black shag	At risk - Relict	NZ eBird Database 2021
Reptiles ³⁴			
<i>Mokopirirakau</i> 'southern North Island'	Ngahere gecko	At Risk – Declining	DOC Herpetofauna Database
<i>Nautinus punctatus</i>	Barking gecko	At Risk – Declining	DOC Herpetofauna Database
Freshwater fish ³⁵			
<i>Anguilla dieffenbachii</i>	Longfin eel	At Risk – Declining	NZ Freshwater Fish Database 2021
<i>Galaxias argenteus</i>	Giant kōkopu	At Risk – Declining	NZ Freshwater Fish Database 2021

Appendix 3: Regionally threatened species list

The following table lists regionally threatened species that have been recorded in the Belmont - Dry Creek KNE site.

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

Table 7: Regionally threatened species recorded in the Belmont - Dry Creek KNE site

Scientific name	Common name	Regional threat status	Observation
Plants (vascular) ³⁶			
<i>Raukaua edgerleyi</i>	Raukawa	Naturally Uncommon	Greater Wellington 2007 ³⁷
Birds ³⁸			
<i>Hemiphaga novaeseelandiae</i>	Kererū/New Zealand pigeon	Recovering	NZ eBird database 2021
<i>Falco novaeseelandiae</i>	Kārearea/bush falcon	Critical	NZ eBird database 2021
<i>Phalacrocorax carbo</i>	Kawau/black shag	Critical	NZ eBird database 2021
Lizards ³⁹			
Mokopirirakau 'southern North Island'	Ngahere gecko	Declining	DOC Herpetofauna Database
<i>Naultinus punctatus</i>	Barking Gecko	Vulnerable	DOC Herpetofauna Database
Freshwater fish ⁴⁰			
<i>Anguilla dieffenbachii</i>	Longfin eel	Declining	NZ Freshwater Fish Database 2021
<i>Galaxias argenteus</i>	Giant kōkopu	Vulnerable	NZ Freshwater Fish Database 2021

Appendix 4: Threat table

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

Table 8: Threats to the Belmont - Dry Creek KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
Ecological weeds		
EW-1	Ground covering ecological weeds smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key ground covering ecological weed species include pampas (<i>Cortaderia selloana</i>) and tradescantia (<i>Tradescantia fluminensis</i>) (see full list in Appendix 5).	Entire KNE site
EW-2	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key woody ecological weed species include barberry (<i>Berberis glaucocarpa</i>), buddleia (<i>Buddleja davidii</i>), hawthorn (<i>Crataegus monogyna</i>) and holly (<i>Ilex aquifolium</i>) (see full list in Appendix 5).	Entire KNE site
EW-3	Climbing weeds smother and displace native vegetation often causing canopy collapse, inhibit indigenous regeneration, and alter vegetation structure and composition. Key climbing ecological weed species include climbing asparagus (<i>Asparagus scandens</i>), German ivy (<i>Delairea odorata</i>) and old man's beard (<i>Clematis vitalba</i>) (see full list in Appendix 5).	Entire KNE site
Pest animals		
PA-1	Possums (<i>Trichosurus vulpecula</i>) browse palatable canopy vegetation until it can no longer recover ^{41,42} . This destroys the forest's structure, diversity and function. Possums may also prey on native birds and invertebrates ⁴³ .	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 ^{44,45} .	Entire KNE site
PA-3	Mustelids (stoats ^{46,47} (<i>Mustela erminea</i>), ferrets ^{48,49} (<i>M. furo</i>) and weasels ^{50,51} (<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	Goat (<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 ⁵² .	Entire KNE site
PA-5	Red deer (<i>Cervus elaphus</i>) and fallow deer (<i>Dama dama</i>) browse the forest understory and can significantly change vegetation composition by preferential browsing and preventing regeneration ^{53,54,55} .	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
PA-6	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-7	Stray sheep (<i>Ovis aries</i>) graze native vegetation inhibiting regeneration and increase nutrient content of soils and watercourses ⁵⁷ .	Entire KNE site
PA-8*	Hedgehogs (<i>Erinaceus europaeus</i>) prey on native invertebrates ⁵⁸ , lizards ⁵⁹ and the eggs ⁶⁰ and chicks of ground-nesting birds ⁶¹ .	Entire KNE site
PA-9*	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 ^{62,63} .	Entire KNE site
PA-10*	Pest and domestic cats (<i>Felis catus</i>) prey on native birds ⁶⁴ , lizards ⁶⁵ and invertebrates ⁶⁶ , reducing native fauna breeding success and potentially causing local extinctions ⁶⁷ .	Entire KNE site
PA-11*	Rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus europaeus</i>) graze on palatable native vegetation and prevent natural regeneration in some environments ⁶⁸ .	Entire KNE site
PA-12*	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 ⁶⁹ .	Entire KNE site
PA-13*	Brown trout (<i>Salmo trutta</i>) and rainbow trout (<i>Oncorhynchus mykiss</i>) prey on native fish and compete with them for food resources ⁷⁰ .	Main streams
PA-14*	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 ^{71,72} .	Entire KNE site
PA-15*	Australasian magpie (<i>Gymnorhina tibicen</i>) are a known nest predator of native bird species and are known to modify the behaviour of native birds which could inhibit the ability of native birds to feed and breed ^{73,74} .	Forest edges
Human activities		
HA-1	Recreational activities such as tramping, mountain biking and horse riding can cause damage and disturbance of the native ecosystem, disturb native fauna and introduce ecological weeds.	All tracks and roads
HA-2	Management activities such as track development and pest control 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

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

Appendix 5: Ecological weed species

The following table lists key ecological weed species that have been recorded in the Belmont - Dry Creek KNE site.

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

Table 9: Ecological weed species recorded in the Belmont - Dry Creek KNE site

Scientific name	Common name	Level of distribution	Management aim
<i>Asparagus scandens</i>	Climbing asparagus	Localised-sparse	Eradication and exclusion
<i>Berberis darwinii</i>	Darwin's barberry	Patchy-abundant	Suppression
<i>Berberis glaucocarpa</i>	Barberry	Patchy-abundant	Suppression
<i>Buddleja davidii</i>	Buddleia	Patchy-abundant	Suppression
<i>Clematis vitalba</i>	Old man's beard	Localised-sparse	Suppression
<i>Cortaderia selloana</i>	Pampas	Localised-sparse	Suppression
<i>Cotoneaster</i> spp.	Cotoneaster	Patchy-abundant	Suppression
<i>Crataegus monogyna</i>	Hawthorn	Patchy-abundant	Suppression
<i>Erica lucitanica</i>	Spanish heath	Widespread-dense	Suppression
<i>Hypericum androsaemum</i>	Tutsan	Patchy-sparse	Suppression
<i>Ilex aquafolium</i>	Holly	Patchy-abundant	Suppression
<i>Lonicera japonica</i>	Japanese honeysuckle	Localised-sparse	Suppression
<i>Metrosideros excelsa</i> *	Pohutukawa	Localised-sparse	Suppression
<i>Paraserianthes lophantha</i>	Brush wattle	Patchy-abundant	Suppression
<i>Pinus radiata</i>	Pine	Localised-sparse	Suppression
<i>Pittosporum crassifolium</i> *	Karo	Patchy-abundant	Suppression
<i>Senecio mikanioides</i>	German ivy	Localised-sparse	Suppression
<i>Tradescantia fluminensis</i>	Tradescantia	Patchy-dense	Suppression

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

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