

Key Native Ecosystem Operational Plan for Queen Elizabeth Park

2017-2020



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1. Purpose

The purpose of the three-year Key Native Ecosystem (KNE) Operational Plan for Queen Elizabeth Park (QEP) 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 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 QEP as a whole is guided by the Greater Wellington Parks Network Plan (PNP)³. This plan guides the recreational and amenity uses of QEP as well as identifying opportunities to protect biodiversity values.

Greater Wellington Biodiversity Strategy

The Greater Wellington Biodiversity Strategy⁴ (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 totally 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. Queen Elizabeth Park Key Native Ecosystem site

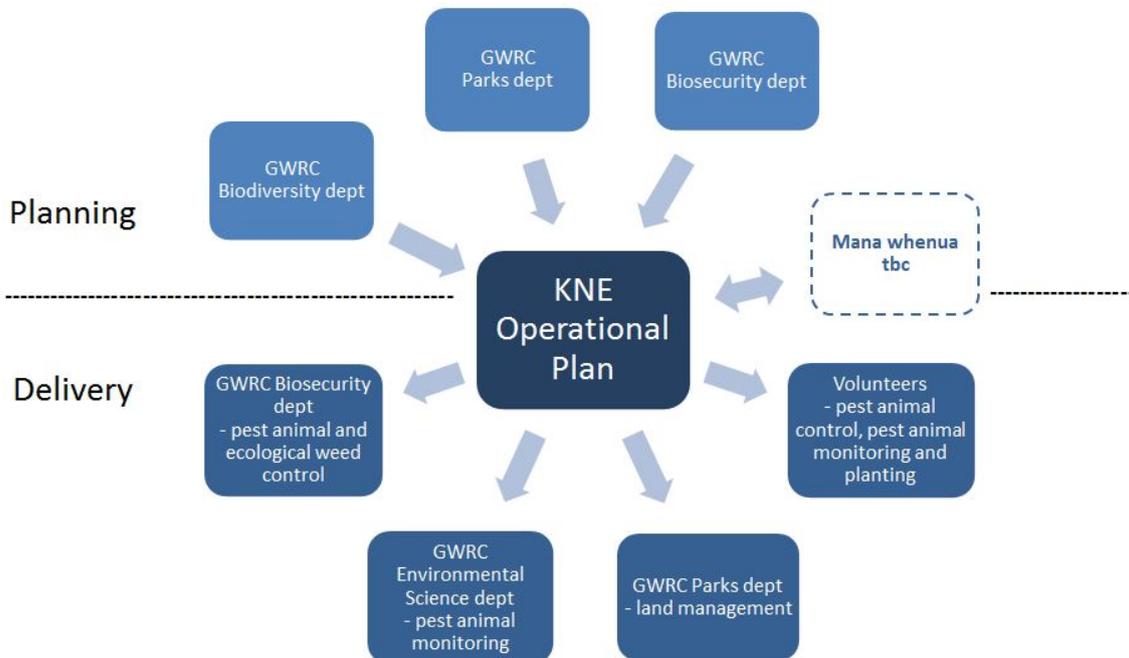
The Queen Elizabeth Park KNE site (167 ha), is located between Raumati South and Paekākāriki on the Kāpiti Coast within the Foxton Ecological District⁵ (see Appendix 1, Map 1).

The KNE site includes three broad ecosystem types: a large coastal dune system, several wetlands, and a coastal forest remnant. The KNE site is contained within the wider-Queen Elizabeth Park (QEP) that is designated as a Recreation Reserve under the Reserves Act 1977.

5. Parties involved

There are many organisations, groups and individuals that play important roles in the care for the KNE site (refer to Figure 1).

Figure 1: Overview of the people involved in the planning and delivery of the Queen Elizabeth Park KNE Operational Plan



Land Manager

QEP is a Recreation Reserve owned by the Crown. The Greater Wellington Parks department has the responsibility to manage the park under a Control and Management Agreement with DOC on behalf of the Crown.

Operational delivery

Within Greater Wellington, the Parks, Biodiversity, Biosecurity and Environmental Science departments are responsible for implementing the KNE Operational Plan. The Parks department manages all recreational infrastructure and access to QEP, the Biodiversity department co-ordinates biodiversity management activities and biodiversity advice within the KNE site, the Biosecurity department delivers pest control operations, and the Environmental Science department delivers pest animal monitoring.

Volunteers also play an important role and include Friends of QEP Trust, QEP Restoration Group, Raumati South Residents' Association, Friends of Paekākāriki Streams, local schools and corporate groups. The volunteer community has provided immeasurable assistance to Greater Wellington through fundraising and restoration activities such as growing and planting native plants, weeding around plantings and trapping pests. As a result, large areas of QEP, both within and outside the KNE site, have been re-vegetated by the community. Greater Wellington will continue to support these groups in the continuation of their current projects as well as the development of appropriate new initiatives that the groups may propose.

Mana whenua partners

Ngāti Toa Rangatira (Ngāti Toa) and Te Ātiawa ki Whakarongotai (TAKW) are Greater Wellington’s mana whenua partners in QEP. Greater Wellington is committed to identifying ways in which kaitiakitanga can be strengthened by 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 QEP has remained an important kainga of Ngāti Toa /Ngati Haumia. Ngāti Toa currently operates the Paekākāriki Camping Ground. The park is still used by members of Ngāti Toa for cultural purposes⁶.

Ngāti Toa considers it has a strong historical, cultural, and spiritual association with the area which comprises QEP. The park is located within a historic Ngāti Toa reserve and includes the two settlements of Wainui and Whareroa. The park is included in the northern end of the reserve established in 1847 for Ngāti Toa⁷.

Ngāti Toa considers QEP contains a number of significant Ngāti Toa wāhi tapu, including urupā and kainga. It is not uncommon for koiwi and taonga Maori to be discovered within the park. In 2006, the prow of an early waka was discovered and retrieved from the mouth of the Wainui stream. Ngāti Toa still maintains an urupā located near the Wainui stream⁸.

The PNRP identifies three sites of significance to Ngāti Toa within QEP which are relevant to the KNE site.

Table 1: Ngāti Toa Sites of significance in QEP relevant to the KNE site⁹

Sites of significance	Mana whenua values
Wainui Stream – Te Puka confluence	wai māori, wai ora, kai awa, rongoā, puna raranga, nohoanga, wāhi tūpuna, wāhi maumahara, ara hikoi
Wainui Stream – to QEP boundary	pā, wai māori, wai ora, kai awa, rongoā, puna raranga, mahinga mataitai, nohoanga, taunga ika, wāhi tūpuna, wāhi maumahara
Whareroa Stream	wāhi tapu, pā, urupā, tohu whenua, wāhi tūpuna, wāhi maumahara, wai ora, wai māori, rongoā, puna raranga, wāhi ahurea, kāinga, ara waka, tauranga waka

TAKW

TAKW’s relationship to QEP is recorded in the PNP and includes the recognition to enable TAKW to exercise their role as kaitiaki over sites of significance and in particular Whareroa pā site¹⁰.

TAKW consider, as mana whenua, their people hold kaitiaki rights and duties over the QEP including the KNE Site. Such rights and duties include (but are not limited to) the right to practice mahinga kai, the duty to sustainably harvest kai, and the duty to ensure the sustainable development of the environment.

TAKW consider their people descend from the environment and therefore, the rights and duties as mana whenua and kaitiaki are not simply moral obligations but are ingrained in iwi members as part of their whakapapa.

TAKW consider the forced imposition of colonisation on mana whenua has seen the restriction of mana whenua ability to practice kaitiakitanga and the associated degradation of the environment.

The PNRP identifies two sites of significance to TAKW within QEP which are relevant to the KNE site.

Table 2: TAKW Sites of significance in QEP relevant to the KNE site¹¹

Sites of significance	Mana whenua values
Whareroa Stream (lower)	waka, rongoā, wāhi tapu, pā (defence), urupā, papa kainga, whakatupu kai, wāhi tūpuna, mahi parekareka, raranga, mahinga kai (pā tuna), kai māori
Whareroa Stream mouth	wai ora, mahinga kai, wai māori, ara waka, kānga wai, pataka kai, papa kāinga, pā, wāhi tapu, urupā, rohenga

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 mahinga kai
- ensure people working in KNE sites understand the requirements of the Accidental Discovery Protocol
- endeavour to ensure that Ngāti Toa and TAKW values for the site are protected

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

Stakeholders

The Kāpiti Coast District Council (KCDC) is implementing its Coastal Strategy 2006¹², a 20-year framework to guide management of the Kāpiti coastline which recognises the coast as an important ecosystem. The QEP KNE Operational Plan is aligned with the broad guidelines set out in this strategy. There is the opportunity to work closely in the KNE site with KCDC in terms of restorative actions.

The farmer operating within QEP is considered a stakeholder as the farm adjoins the KNE site in many places. Other stakeholders who may be interested in the biodiversity management within the KNE site are park user groups, including the Kāpiti Pony Club, Kāpiti Model Aeromodellers Club, Kāpiti Stables, Paekākāriki Surf Lifesaving Club and Wellington Tramway Inc.

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.

Prior to human habitation the entire QEP was a matrix of complex ecosystem types. The foredunes were covered by complex communities of coastal grasses and shrubs. Duneland forest and scrub grew in the dunes landward of the dynamic foredunes. Stands of wetland podocarp forest, mānuka forest and sedgeland/rushland wetlands inhabited the dune slack areas (depressions between dunes). A wide range of native birds, lizards, and fish were originally part of these ecosystems. More information about the native plant and animal communities that originally occurred in the KNE site can be found in the Queen Elizabeth Park Resource Statement (2007)¹³.

Much of the original indigenous vegetation in the QEP has been lost due to human activities and the remaining indigenous ecosystems are threatened by human activities, ecological weeds and pest animals. However, the diversity of the habitats still present within the KNE site provides a valuable foundation from which to restore the types of ecosystems once common in the Foxton Ecological District.

QEP KNE site has been identified as a priority for management because of the high ecological values it possesses. These include:

- The largest unmodified dune ecosystem in the Wellington Region¹⁴, a remnant of now rare dune forest, and estuarine and coastal wetland habitats
- Threatened¹⁵ and rare (Naturally Uncommon)¹⁶ ecosystems, including ephemeral wetlands (Nationally Critical), active sand dunes (Nationally Endangered), stable sand dunes (Nationally Endangered), dune slacks (Nationally Endangered) and estuaries (Nationally Vulnerable)
- Land Environment New Zealand (LENZ) national environment classification has identified most of QEP (including most of the KNE site) as being in the top two threatened land environment categories; Acutely Threatened and Chronically Threatened (see Appendix 1, Map 2)
- Threatened species, including four species of native freshwater fish, six species of native birds, and two species of native plants (see Appendix 2)
- The KNE site's ecological context, being in close proximity to the Paekākāriki Escarpment KNE site and Mataihuka (Raumati Escarpment) Reserve. This allows for the mutually beneficial dispersal of seed and pollination of plants between sites. It is also likely that these sites, along with the nearby Waterfall Road KNE site, provide key stepping stones for native birds moving between Kāpiti Island and the Akatarawa Range

The operational activities described in the KNE Operational Plan relate to three different ecosystem types that are present in the KNE site. These are described below.

Foredunes and backdunes

The dune ecosystem includes dynamic foredune and stable foredune and backdune areas. The dynamic foredune environment is characterized by rapidly fluctuating temperatures and strong winds carrying abrasive sands and depositing salt spray on the dune faces. Native plants that naturally occur in foredunes have adapted to these conditions. Tough-leaved, sand-binding plants such as spinifex (*Spinifex sericeus*), pīngao (*Ficinia spiralis*), shore bindweed (*Calystegia soldanella*) and New Zealand ice-plant (*Disphyma australe* subsp. *australe*) once thrived in this environment. However today, much of the dynamic foredune is dominated by exotic weeds.

The rest of the foredunes and backdunes are more stable and, moving inland, are increasingly sheltered from the erosive force of the wind. These stable foredune dune areas would have originally been covered by scrub associations such as sand coprosma (*Coprosma acerosa*), sand daphne (*Pimelea villosa*) and tauhinau (*Ozothamnus leptophylla*), and changing to dry forest and coastal forest further inland. Present native vegetation is characterized by patches of low-statured bracken (*Pteridium esculentum*), knobby club rush (*Ficinia nodosa*), and pōhuehue (*Muehlenbeckia complexa*), amongst associations of taupata (*Coprosma repens*), māhoe (*Melicactus ramiflorus*) and kawakawa (*Macropiper excelsum*), with some ngaio (*Myoporum laetum*), kānuka (*Kunzea ericoides*), flax (*Phormium tenax*) and toe toe (*Cortaderia fulvida*). However, current vegetation is dominated by ecological weeds.

Wetlands

The wetland areas in the KNE site are not contiguous; they include the northern wetland (also known as Poplar Avenue or Raumati South wetland) and its associated ephemeral wetland, MacKay's wetland, Marines wetland and the estuaries of Whareroa and Wainui streams. The original wetlands in the area would have included a variety of wetland plant associations: mature stands of podocarp dominated wetland forest, mānuka/ coprosma/olearia scrub wetlands, ephemeral wetland turf communities, and sedgeland/rushland associations in the wettest areas.

The northern wetland is in a dune slack which was grazed in the past but is now fenced off and is regenerating in native plants. The native vegetation is dominated by the sedges *Isolepis prolifer* and *Carex virgata*, and *Juncus* and *Baumea* species. Mānuka (*Leptospermum scoparium*) and tangle fern (*Gleichenia dicarpa*) form close associations in the wetland. Planting around the ephemeral pond to the south started in 2003. Since 2010, the margins of the main wetland have been progressively planted with buffer species such as flax, toe toe, *Carex secta*, māhoe, taupata, ngaio, kānuka and kōhūhū (*Pittosporum tenuifolium*).

The MacKay's and dune swamp wetlands make up a complex of naturally wet areas and sites that have been excavated to create further wetland habitat. The nationally rare native grass *Amphibromus fluitans* has been recorded here as well as other uncommon species such as bamboo sedge (*Eleocharis sphacelata*), the watermeal *Wolffia australiana*, the buttercup *Ranunculus amphitrichus*, the milfoil *Myriophyllum pterocarpa* and other turf plants. A large amount of native planting has been carried out across the wetlands in this area since 2001 to restore and enlarge the wetland habitat and link the wetlands to the forest remnant.

The Marines wetland was created through the excavation of a large pond and then several small adjoining ponds between 2003 and 2005. Major planting of the pond edges and surrounding areas was undertaken mostly from 2003 to 2008. Although this is a re-created wetland, the plant community and shelter that has established now supports a wide array of wetland bird species including some important species such as dabchick, New Zealand shoveler and royal spoonbill. It is for this reason that this wetland has been included within the KNE site. For a comprehensive account of past planting activity within the KNE site see *Restoration and revegetation sites in Queen Elizabeth Park 2009*¹⁷.

The estuaries of the Whareroa and Wainui streams are amongst a small number of estuaries along the Kāpiti Coast that are in relatively good condition. Land use practices in the catchment of Whareroa Stream are affecting the water quality in it, while Wainui Stream has a mostly forested catchment and therefore better water quality, and supports better freshwater fish populations. These estuaries and streams provide habitat for various native fish species including giant kōkopu (*Galaxias argenteus*), inanga (*G. maculatus*) and longfin eel (*Anguilla dieffenbachia*).

Forest remnant

The remnant forest is an example of the coastal broadleaf/podocarp forest type that was once widespread in the Foxton Ecological District. The Singers and Rogers (2014)¹⁸ classification of pre-human vegetation indicates that this forest was once characterised by tōtara, mātai, broadleaf forest (WF6). This remnant is one of only two remaining examples of this forest type on the Kapiti Coast¹⁹. Although the site has been strongly impacted by human activities and invaded by exotic species this remnant is still dominated by mature kahikatea (*Dacrycarpus dacrydioides*) and pukatea (*Laurelia novae-zelandiae*). Fewer numbers of the other canopy species swamp maire (*Syzygium maire*), mataī (*Prumnopitys taxifolia*) and tawa (*Beilschmedia tawa*) are also present at the site. Understorey species include māhoe, kānuka, kawakawa and kaikōmako (*Pennantia corymbosa*).

7. Key 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.

Key threats

Ecological weeds, pest animals and human activities are all impacting or have the potential to impact Queen Elizabeth Park KNE site. The most significant threats come from a large suite of ecological weed species and predatory and browsing pest animals.

Ecological weeds are present throughout the KNE site and will out-compete native species for space if allowed to. Many introduced plant species thrive and multiply very successfully in the coastal environment. They continuously threaten to tip the balance of the native ecosystem towards further degradation and away from recovery. Infestations of some species such as boneseed (*Chrysanthemoides monilifera*), pampas (*Cortaderia selloana*), boxthorn (*Lycium ferocissimum*), boobialla (*Myoporum insulare*) and karo (*Pittosporum crassifolium*) were far denser before intensive control of these species commenced in 2003. However, other species such as blackberry (*Rubus fruticosus*) and marram grass (*Ammophila arenaria*) are still widespread and very dense across large areas. These have caused significant habitat modification.

Mustelids (weasels (*Mustela nivalis*), stoats (*M. erminea*) and ferrets (*M. furo*)), rats (*Rattus norvegicus* and *R. rattus*), hedgehogs (*Erinaceus europaeus*), possums (*Trichosurus vulpecula*) and feral cats are all present within the KNE site and are likely to be preying on native birds, lizards and invertebrates, inhibiting the recovery of these fauna. Domestic cats and dogs also pose a threat to native animals. Some native species such as little penguin (*Eudyptula minor*) are at particular risk from uncontrolled dogs.

Rabbits (*Oryctolagus cuniculus cuniculus*), possums and rats are impacting native plant regeneration and hampering the efforts of the community to revegetate areas of the KNE site. Rabbits are present throughout most of the dune system and feed on native seedlings and plants that have been planted to supplement natural regeneration. Possums and rats are present in lower numbers but their browsing of native foliage, flowers and fruits is also likely to be impacting regeneration in this sensitive environment.

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 QEP 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 Queen Elizabeth Park KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location in KNE site
Ecological weeds		
EW-1	Ground covering ecological weeds smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species at this site include: pampas (<i>Cortaderia selloana</i>), tradescantia (<i>Tradescantia fluminensis</i>), blackberry (<i>Rubus fruticosus</i>), marram grass (<i>Ammophila arenaria</i>), ice-plant (<i>Carpobrotus edulis</i>) and arum lily (<i>Zantedeschia aethiopica</i>)**	Whole KNE site
EW-2	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species at this site include: boneseed (<i>Chrysanthemoides monilifera</i>), brush wattle (<i>Paraserianthes lophanta</i>), boobialla, evergreen buckthorn (<i>Rhamnus alaternus</i>), karo (<i>Pittosporum crassifolium</i>), sweet cherry (<i>Prunus avium</i>) and elderberry (<i>Sambucus nigra</i>)**	Whole 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 weed species at this site include: Cape ivy (<i>Senecio angulatus</i>), German ivy (<i>Senecio mikanioides</i>) Japanese honeysuckle (<i>Lonicera japonica</i>), climbing dock (<i>Rumex sagittatus</i>) and convolvulus (<i>Convolvulus arvensis</i>)**	Whole KNE site
EW-4	Aquatic weeds out-compete native aquatic species and choke watercourses. The key weed species at this site is beggar's ticks (<i>Bidens frondosa</i>)	D, E
Pest animals		
PĀ-1	Possums (<i>Trichosurus vulpecula</i>) browse palatable canopy vegetation until it can no longer recover ^{20,21} . This destroys the forest's structure, diversity and function. Possums may also prey on native birds and invertebrates ²²	Whole KNE site
PĀ-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 ^{23,24}	Whole KNE site
PĀ-3	Mustelids (stoats ^{25,26} (<i>Mustela erminea</i>), ferrets* ^{27,28} (<i>M. furo</i>) and weasels ^{29,30} (<i>M. nivalis</i>)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	Whole KNE site
PĀ-4	Hedgehogs (<i>Erinaceus europaeus</i>) prey on native invertebrates ³¹ , lizards ³² and the eggs ³³ and chicks of ground-nesting birds ³⁴	Whole KNE site
PĀ-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 ^{35,36}	Whole KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location in KNE site
PĀ-6*	Feral, stray and domestic cats (<i>Felis catus</i>) prey on native birds ³⁷ , lizards ³⁸ and invertebrates ³⁹ , reducing native fauna breeding success and potentially causing local extinctions ⁴⁰	Whole KNE site
PĀ-7	Rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus europaeus</i>) graze on palatable native vegetation and prevent natural regeneration in some environments ⁴¹ . Rabbits are particularly damaging in sand dune environments where they graze native binding plants and restoration plantings. In drier times hares especially, will penetrate into wetland forest areas browsing and reducing regenerating native seedlings	Whole KNE site
PĀ-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 ⁴²	Whole KNE site
PĀ-9*	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 ^{43,44}	Whole KNE site
Human activities		
HA-1	Recreational use such as walking, mountain biking and horse riding can cause damage and disturbance of the native ecosystem. It is also likely to disturb native fauna and introduce ecological weeds	Whole KNE site
HA-2	Dogs (<i>Canis lupus familiaris</i>), if uncontrolled can disturb or kill nesting birds and chicks, and lizards within the KNE site, particularly in close proximity to walking tracks ⁴⁵ . Dogs may cause erosion by tracking through sand dunes and digging at rabbit burrow entrances	Whole KNE site
HA-3	Agricultural practices, particularly grazing livestock can result in pugging soils and increasing nutrient content of soils and watercourses ⁴⁶	Waterways in the KNE site
Other threats		
OT-1	Storm surges and sea level rise can lead to habitat loss via dune erosion and collapse. Populations of threatened plant species can be lost in the process	Foredunes
OT-2	Edge effects affect forest remnants by changing environmental conditions (eg, soil moisture or temperature levels), changing physical environment (eg, different plant assemblages compared to the interior) and changing species interactions (eg, increased predation by invasive species) ^{47,48}	Forest remnant

*Threats marked with an asterisk are not addressed by actions in the Operational Delivery Schedule

**A full list of the ecological weed species present in the KNE site can be found in the pest plant control plan for Queen Elizabeth Park prepared in 2011⁴⁹

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 3).

8. 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 Queen Elizabeth Park 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 aimed at achieving the objectives above (Section 8) by responding to the threats outlined in Section 7. The broad approach to operational activities is described 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.

Ecological weed control

The pest plant control plan for Queen Elizabeth Park⁵⁰ developed in 2011 will be used to help guide ecological weed control within the KNE site. This plan lists the large suite of ecological weed species present in the KNE site and describes the level of threat, distribution and abundance of each species.

In recent years varying degrees of success have been achieved with ecological weed control efforts. The control of ivy species at the southern end of the KNE site and blackberry around the northern wetland has been successful, as has the control of a range of woody species through the dune system. Large dense infestations of Cape and German ivy have been reduced to a few scattered plants.

However, the control of some species such as boneseed and brush wattle hasn't kept pace with their regeneration, despite a concerted effort being applied to control. Consequently densities of these species are increasing throughout much of the dune system. It is evident that a previous change from sweeping through half the dune system each year to sweeping only a third of the dune system each year has proved inadequate. The extended period between control events that this has resulted in has allowed regenerating weed plants to mature and produce seeds prior to being controlled in the following sweep. This is resulting in increasing amounts of seed being produced and allowed to germinate and mature each year.

In an attempt to slow the regeneration of woody weed species through the dune system, a new approach to control will be trialled during the second two years of this plan (2018-19 and 2019-20). This approach will be to undertake searches for woody weeds across the whole of the dune system every year, but at a coarse level. The aim will be to find and control all maturing plants before they set seed, rather than searching for every last seedling. It is not known whether this approach will be effective in halting or even slowing the regeneration of ecological weeds through the dune system so an assessment of the effectiveness of the approach will be undertaken after two years and management may be adapted again at that time.

The control of climbing and ground cover species such as Cape ivy, German ivy and tradescantia will continue within the dune system. The approach to this work will be to maintain low levels of these ecological weeds in areas where they have previously been controlled (Appendix 1, map 3, operational area C) and progressively move control in to new areas (operational areas A and B).

The control of ecological weeds such as blackberry, Japanese honeysuckle and beggar's ticks present in and around the northern wetland (operational area D) will also continue. As the northern wetland has been scheduled as a regionally significant wetland in the Proposed Natural Resources Plan, the protection of this area from ecological weeds is considered a priority. The control of beggar's ticks within the Marines wetland (operational area E), an area that has been added to the KNE site, will also be continued.

Pest animal control

The control of weasels, stoats, hedgehogs, rats and possums has continued to be successfully undertaken in recent years. A volunteer member of the Friends of Queen Elizabeth Park Trust, has undertaken this work since 2008. The control regime aims to protect native birds, lizards and invertebrates and allow them to successfully reproduce.

Most of the pest animal control is achieved through the regular checking and re-baiting of traps located throughout the KNE site and in areas of QEP buffering the KNE site (see Appendix 1, Map 4). Traps used are DOC200, Good Nature A24, and Timms traps. Several of the DOC200 and all of the Good Nature traps were provided by the Kapiti Biodiversity Project (see separate section below). Additionally, two bait stations are located within the forest remnant to control rats and possums in that area. The Greater Wellington Biodiversity department funds the bait for all traps and bait stations. The Biodiversity department also fund an annual safety audit of the trap and bait station network to ensure that the traps and bait station are operating and being operated in a safe manner. The Biosecurity department undertakes the safety audit by inspecting about a third of the traps/bait stations each year (see Appendix 1, Map 4).

Rabbit control will be undertaken to reduce damage by rabbits to native plants planted as part of revegetation efforts, and to reduce their browsing of native seedlings in areas of regenerating bush. Biodiversity and Parks staff identify particular areas of concern and control is undertaken by the Biosecurity department. Control may involve night shooting, burrow fumigating, trapping, or a combination of these control methods.

Small mammal monitoring

Monitoring of populations of rats and mice is undertaken in the dune system to improve current understanding of pest animal dynamics in coastal environments and to inform management decisions. The monitoring field work is undertaken by the same volunteer who undertakes the pest animal control. The Greater Wellington Environmental Science department analyses and reports on the data. Monitoring is funded by the Biodiversity department and is undertaken at three-monthly intervals.

Revegetation

Revegetation with coastal forest, wetland and dune plant species is an important part of biodiversity management at KNE site. This is because there are large parts where recovery of native ecosystems will be very slow without active revegetation, due to them being heavily degraded in the past through farming practices and weed infestation. The objectives of carrying out active revegetation at the KNE site are to:

- Connect native ecosystems by restoring native vegetation to areas recently retired from grazing or/and inundated with weeds
- Establish buffer zones of native vegetation adjacent to streams and wetlands to add ecosystem complexity and protection from weed incursion
- Add diversity of species and structure to earlier plantings
- Protect dunes against the erosive effects of storms and sea-level rise

The Greater Wellington Parks department, in consultation with the Queen Elizabeth Park Restoration Group, will fund and undertake most of the revegetation within the KNE site. The Parks department will lead the planning of this work while the Biodiversity department will provide advice on planting and may assist in the development of restoration plans. The variable conditions of areas within the KNE site present challenges for plant survival so adaptive management in regards to species selection and planting methodology will be used. Trials to test a range of planting methods have been undertaken in several dune areas that have been retired from farming. It is hoped that these trials will lead to a more efficient method of planting than is currently used. All plants used in revegetation works will be eco-sourced from the Foxton ecological district.

The main areas that revegetation will be undertaken are shown in Appendix 1, Map 5. They are:

Forest remnant – dune swamp - MacKay's wetland

Revegetation work has been undertaken within this patchy corridor of native ecosystems since 1999. This area will continue to be a focus of planting efforts during the term of this plan with the intention of connecting ecosystems and building resilience to previous plantings. Areas of recently retired pasture between the areas of more intact native ecosystems will be planted and blanketing on the edges and within previously planted areas will be undertaken.

Northern wetland

Revegetation at the northern wetland has been underway for many years, much of it made possible through fundraising and a high level of support from the Raumati South Residents' Association. The aim of the revegetation at this site is to return native coastal forest to the slopes surrounding the wetland to enhance the wetland ecosystem and buffer it against weed incursion. Planting will be undertaken during the term of this plan to fill gaps within the existing planted area. Further planting to extend the buffer area will be undertaken in the longer term. The revegetation plan for northern wetland which was produced in 2009⁵¹ will continue to be used to guide the progression of revegetation in this area.

Te Ara Whareroa

Planting of the margins of Te Ara Whareroa Trail which runs the length of QEP skirting the KNE site in several places, will be continued. This planting will make Te Ara Whareroa more attractive to users, while also bolstering native back dune vegetation.

Whareroa Stream

Planting will be undertaken following weed removal in a substantially degraded area beside the Whareroa Stream where it enters the back dune. This area is currently inundated with blackberry and willows.

Successional planting

Most of the restoration planting that has been undertaken within the KNE site, and in other parts of Queen Elizabeth Park, has been pioneer planting – planting using only species that are likely to survive well in the exposed, nutrient poor and grass dominated conditions present in restoration sites. Consequently the range of species growing in past and present restoration sites is limited and often poorly represents what a natural plant community would resemble. To increase the diversity of species within restoration sites, additional planting will be undertaken using successional species. These are species that are integral to a fully functioning ecosystem, often forest canopy species, but are not usually planted early on in revegetation efforts as they generally require sheltered conditions which sites don't provide until initial plantings have matured somewhat. The QEP Restoration Committee will lead this work.

Foredunes

Areas of the foredune will be planted with sand-binding plants to assist the natural process of dune re-building thereby increasing the dunes' resilience to the erosive effects of storms and sea-level rise. Planting will be undertaken with native dune species, in particular spinifex and pīngao, which will capture wind-blown sand to form stable, low profiled dunes. Dunes of this nature are more resilient to high tides and storms than the current vertically faced dunes⁵².

Planting will be undertaken following recommendations in the Restoration Plan for QEP Dunes, prepared in 2010⁵³. Planting will only be undertaken in stretches of the foredune where the front face is less than about one metre high. Some mechanical reshaping of the front edge of the dune may be undertaken prior to planting to lower

the profile of the front edge. Planting will be preceded by the control of exotic weeds that won't assist the natural recovery process, such as marram and ice plant.

Planting of areas of the foredunes has been undertaken in the past with some success – many plants grew well and the foredunes in planted areas accreted. However, most of the recovered areas were washed away during unusually damaging storms in 2015. It is accepted that this could occur again to future plantings and that damaging weather events may occur more often in the future due to climate change. However, it is currently considered that the benefits to be gained from further planting make the activity worthwhile.

Park management

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

Greater Wellington will fence off all the Category 1 and 2 streams within QEP as defined in the PNRP to exclude stock by the end of June 2018. Wherever possible/practicable new fencing will provide a 10m buffer between the fence-line and the stream.

To deter dog walkers from allowing their dogs to roam off-track through areas of the dune system Greater Wellington will install instructional signs at strategic locations. Dogs that roam through the dunes can cause erosion through their pursuit of rabbits. Rabbits on their own cause a degree of erosion, however, dogs pursuing them exacerbate the problem by excessive tracking and digging at rabbit burrow entrances. Dogs allowed to roam through the dunes may also attack and kill nesting penguins.

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

Kapiti Coast Biodiversity Project

In 2015 the Friends of Queen Elizabeth Park Trust combined with the Guardians of Whareroa Farm and Ngā Uruora Kapiti Project to seek funding from the Ministry for the Environment to undertake a three-year landscape scale biodiversity conservation project. The aims of the project are to reduce predators and improve habitat for birds, lizards, wētā, dune plants and fresh water fish. They were successful in gaining substantial funding and the project has undertaken a number of activities that have augmented biodiversity outcomes within the KNE site. These have comprised six project activity streams:

- Native birds – protecting little penguins through installing nesting boxes and community education, and monitoring forest bird numbers
- Native wētā – exploring the presence of wētā within the project areas

- Native lizards – exploring the presence and monitoring population trends of native skinks and gecko within the project areas, and
- Native dune plant species – increasing the abundance of threatened native dune plants within Queen Elizabeth Park
- Stream shading – trialling the ability of various plant species to provide shading to streams within Queen Elizabeth Park, therefore improving fresh water fish habitat
- Pest animal control – bolstering the level of pest animal control within and between the three individual project areas to support the above activities

Current funding for the project comes to an end in March 2018 and at this stage any future works are dependent on additional funding. A bid has been prepared and submitted to the Ministry for the Environment for additional funding. Until the outcome of this is known no plans for the continuation or development of project streams are in place.

10. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for Queen Elizabeth Park KNE site, and their timing and cost over the three-year period from 1 July 2017 to 30 June 2020. The budget for the 2018/19 and 2019/20 years are indicative only. A map showing operational areas can be found in Appendix 1 (Map 3).

Table 4: Three-year operational delivery schedule for Queen Elizabeth Park KNE site

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
1, 2	EW-1 EW-2	Ecological weed control	A	Greater Wellington Biosecurity department	Control woody and ground cover ecological weeds through an intensive search	Reduction in distribution and abundance of ecological weeds	\$28,000		
1, 2	EW-1 EW-2	Ecological weed control	A, B, C (whole dune system)	Greater Wellington Biosecurity department	Control woody ecological weeds through coarse searches	Reduction in distribution and abundance of ecological weeds		\$28,000	\$28,000
1, 2	EW-3	Ecological weed control	A, B, C (whole dune system)	Greater Wellington Biosecurity department	Control climbing and ground-covering ecological weeds – maintaining control in previously controlled areas (operational area C) and progressively expanding control in to new areas (operational area A and then B)	Reduction in distribution and abundance of ecological weeds	\$3,500	\$3,500	\$3,500
1	EW-4	Ecological weed control	D (northern wetland)	Greater Wellington Biosecurity department	Control beggar's ticks	Reduction in distribution and abundance of ecological weeds	\$500	\$500	\$500

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
1	EW-4	Ecological weed control	E (Marines wetland)	Greater Wellington Parks department	Control beggar's ticks	Reduction in distribution and abundance of ecological weeds	\$2,000+	\$2,000+	\$2,000+
1, 2	PĀ-1 PĀ-2 PĀ-3 PĀ-4	Pest animal control	Whole KNE site	Friends of Queen Elizabeth Park	Check and re-bait all traps at monthly intervals and all bait stations at three monthly intervals to control possums, rats, mustelids and hedgehogs Greater Wellington provide bait	Possums <5% RTC* Rats <10% TTI** Mustelids <2% TTI**	\$1,000	\$1,000	\$1,000
1, 2	PĀ-1 PĀ-2 PĀ-3 PĀ-4	Pest animal control	F, G, H	Greater Wellington Biosecurity department	Undertake a safety audit of the pest animal control network, checking a third of the traps/bait stations each year	Audit completed	\$1,000	\$1,000	\$1,000
1, 2	PĀ-7	Pest animal control	A, B	Greater Wellington Biosecurity department	Control rabbits where they are likely to impact native plantings or natural seedling regeneration	Control undertaken	\$2,500	\$2,500	\$2,500
1, 2	PĀ-2 PĀ-5	Monitoring	A, B, C (whole dune system)	Greater Wellington Environmental Science department	Monitor rat and mouse populations using tracking tunnels	Complete scheduled monitoring	\$3,800	\$3,800	\$3,800
1, 2		Revegetation	D (northern wetland)	Greater Wellington Biosecurity & Biodiversity departments	Maintain plantings by release spraying (years 1 & 3) and plant native pioneer plants in gaps within previously planted areas (year 2)	90% success rate of planted species after 1 year	\$500	\$2,000	\$500

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
1, 2		Revegetation	D (northern wetland)	Greater Wellington Biosecurity department	Maintain plantings by controlling blackberry, cherry, Japanese honeysuckle and other ecological weeds	Reduction in distribution and abundance of ecological weeds	\$3,000	\$1,500	\$1,500
1, 2	OT-1	Revegetation	Fore-dune	Greater Wellington Biodiversity, Biosecurity & Parks departments	Plant sand binding plants in low sections of fore-dune, preceded by spraying of marram and mechanical re-shaping of the front edge of the dune	90% success rate of planted species after 1 year	\$2,500	\$2,500	\$4,000
1, 2	OT-2	Revegetation	Whole KNE site	Greater Wellington Parks department & Queen Elizabeth Park restoration group	Plant native pioneer plants at sites that have little native vegetation cover and plant successional plants within existing revegetation sites	90% success rate of planted species after 1 year	Funded by Greater Wellington Parks ‡	Funded by Greater Wellington Parks ‡	Funded by Greater Wellington Parks ‡
1, 2	HA-2	Park management	A, B, C	Greater Wellington Parks and Biodiversity departments	Install signs at strategic locations requesting dog owners to prevent their dogs from roaming through dunes	Reduction of erosion and risk to penguins caused by roaming dogs	Nil	Nil	Nil
1, 2	HA-1	Park management	Whole KNE site	Greater Wellington Parks department	Follow environmental impact assessment procedures when carrying out construction and maintenance of assets, and when allowing potentially impacting activities to be undertaken by others	Procedures are available and adhered to in all cases	Nil	Nil	Nil

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
1, 2		Kapiti Coast Biodiversity Project	Whole KNE site	Friends of Queen Elizabeth Park Trust	Monitor forest birds and penguin nesting boxes Monitor weta hotels Monitor planted threatened plants	Monitoring undertaken and reported	Funded by MfE grant ‡	Funded by MfE grant ‡	Funded by MfE grant ‡
Totals							\$48,300	\$48,300	\$48,300

* 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 and mustelids to these levels but monitoring will not be undertaken. Experience in the use of this control method indicates these targets will be met

† Funded by Greater Wellington Parks department

‡ The resources required for this activity cannot be defined at this time

11. Funding contributions

Budget allocated by Greater Wellington

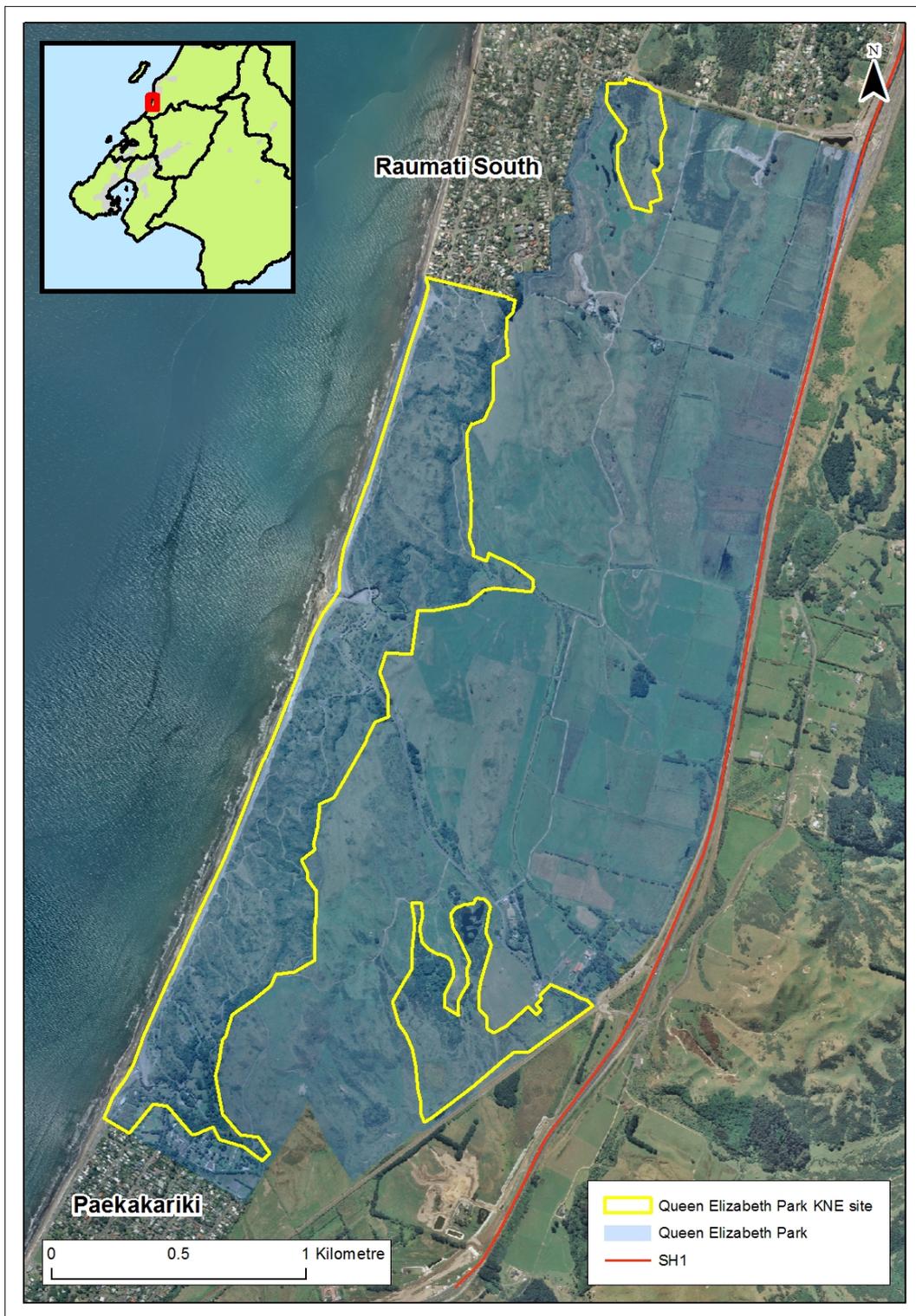
The budget for the 2018/19 and 2019/20 years are indicative only and subject to change.

Table 5: Greater Wellington allocated budget for Queen Elizabeth Park KNE site

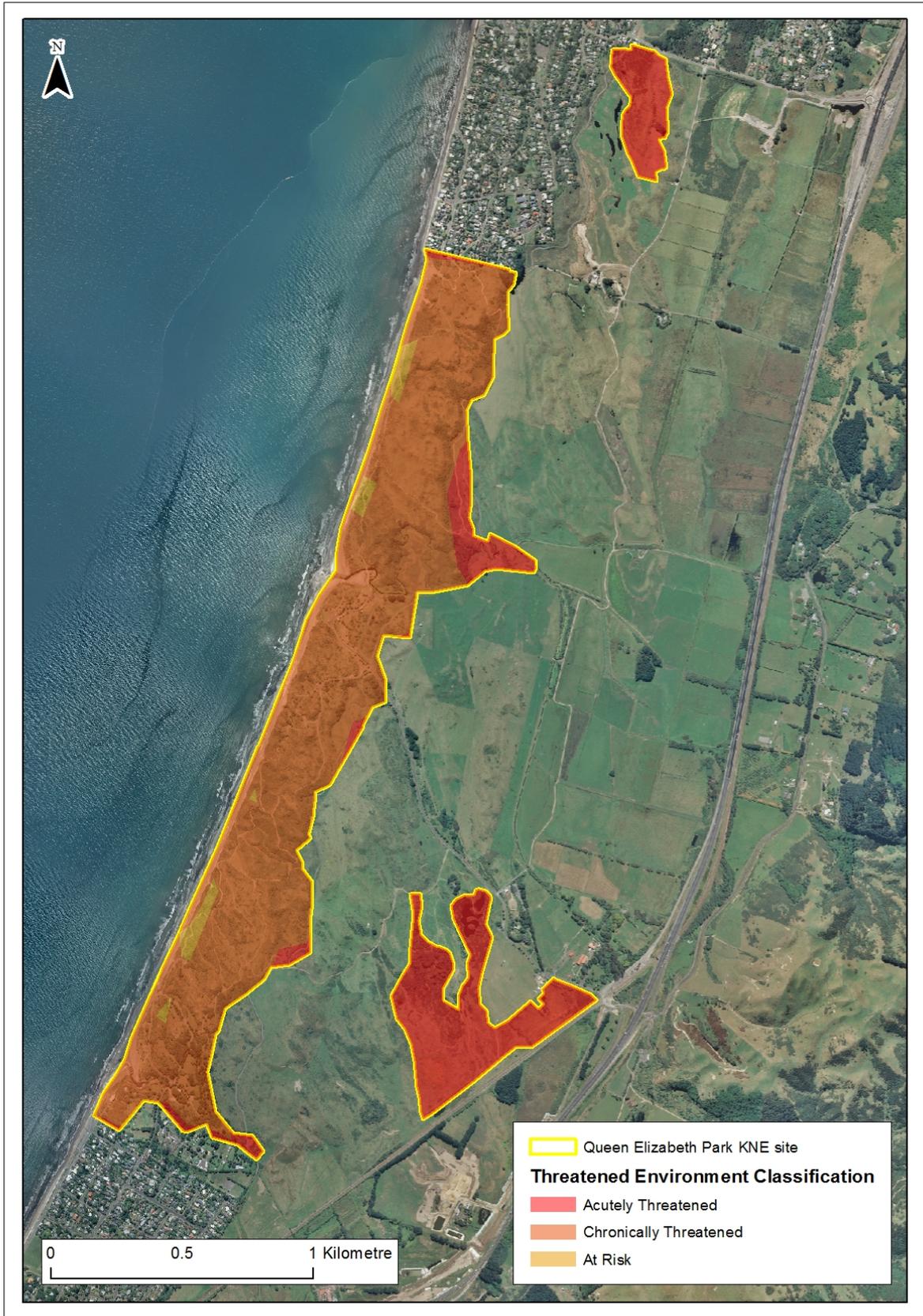
Operational activity	Timetable and resourcing		
	2017/18	2018/19	2019/2020
Pest plant control	\$34,000†	\$34,000†	\$34,000†
Pest animal control	\$4,500	\$4,500	\$4,500
Revegetation	\$6,000	\$6,000	\$6,000
Monitoring	\$3,800	\$3,800	\$3,800
Total	\$48,300	\$48,300	\$48,300

† \$2,000 funded by Greater Wellington Parks department

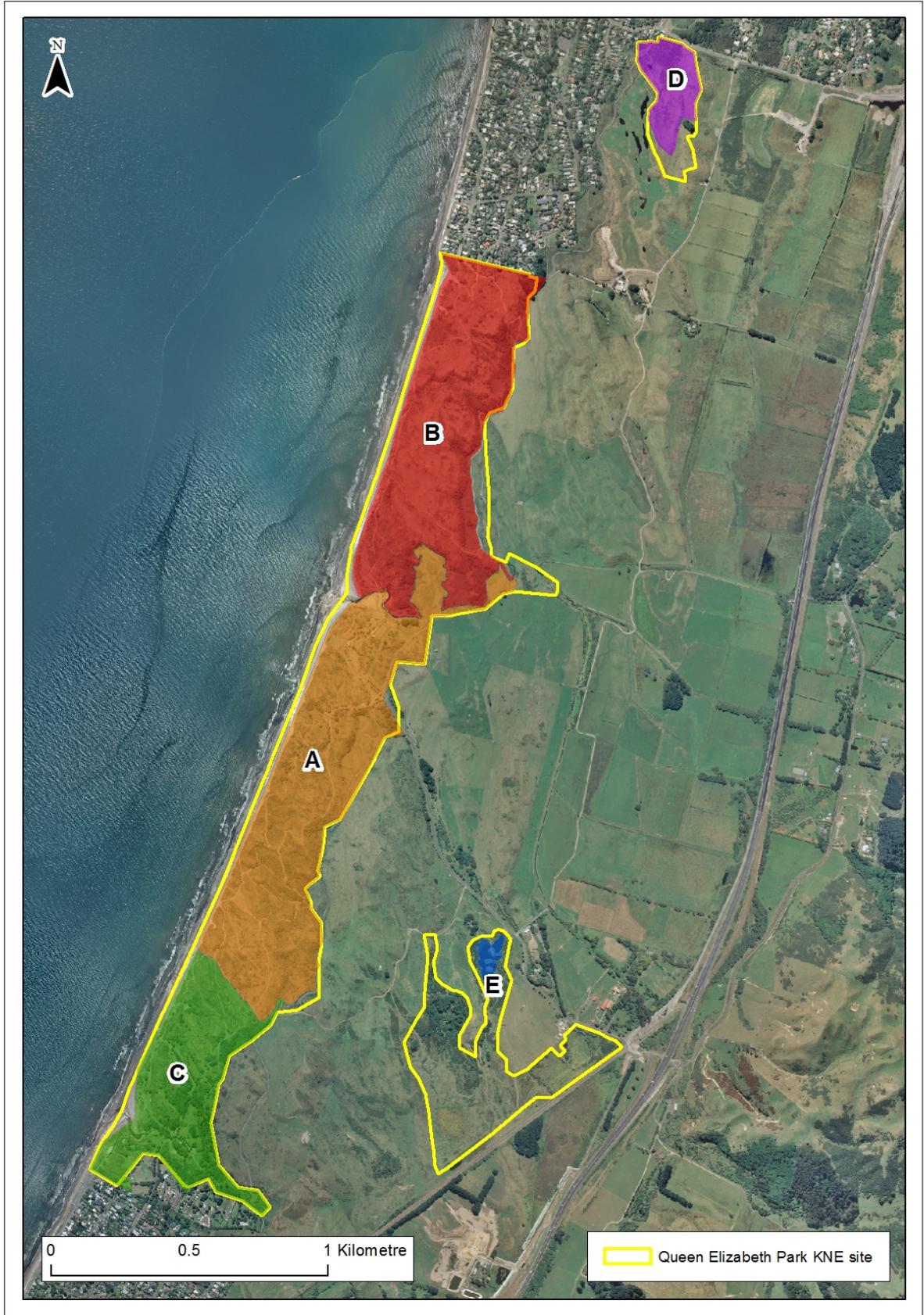
Appendix 1: Site maps



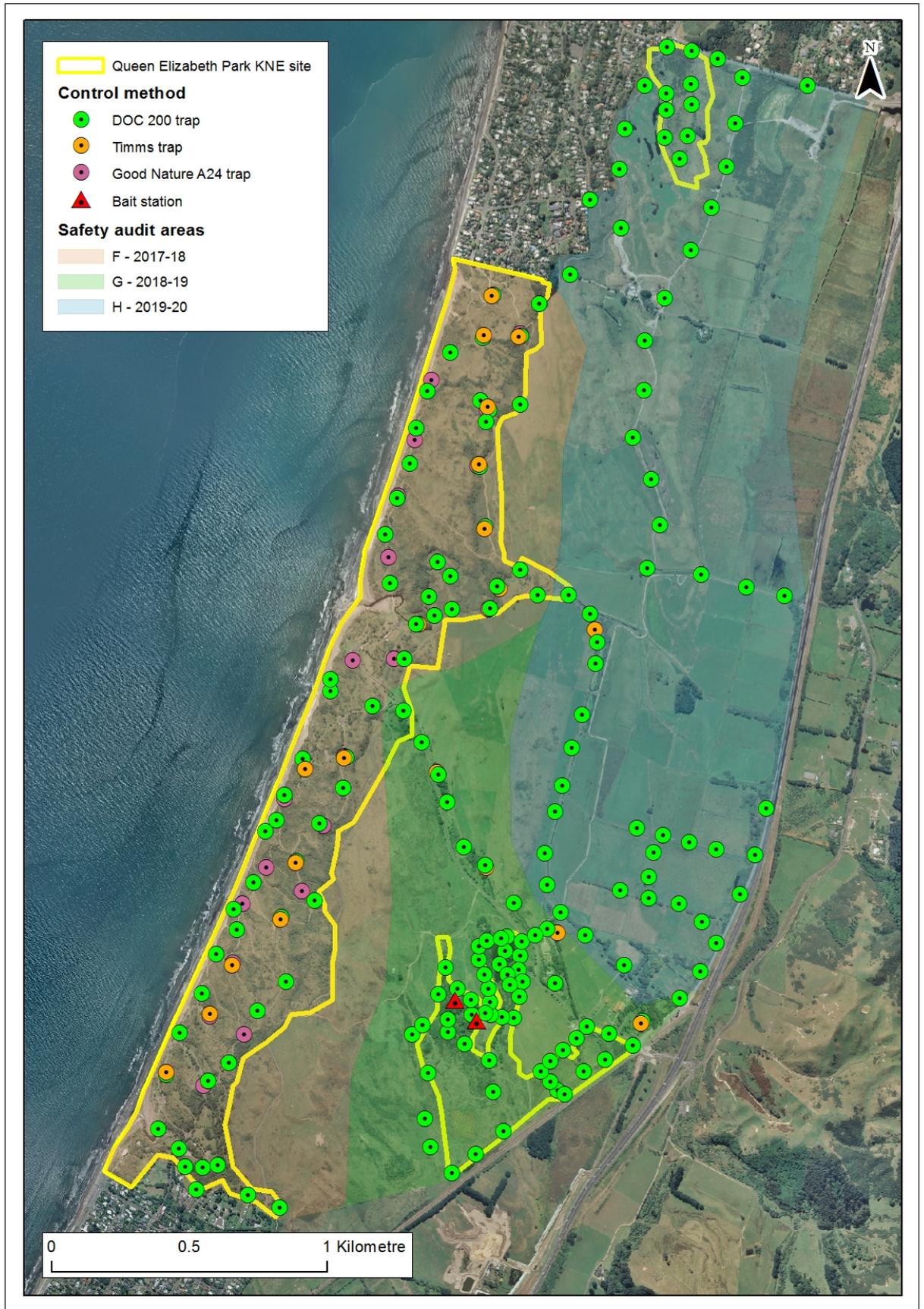
Map 1: Queen Elizabeth Park KNE site and wider-Queen Elizabeth Park boundaries



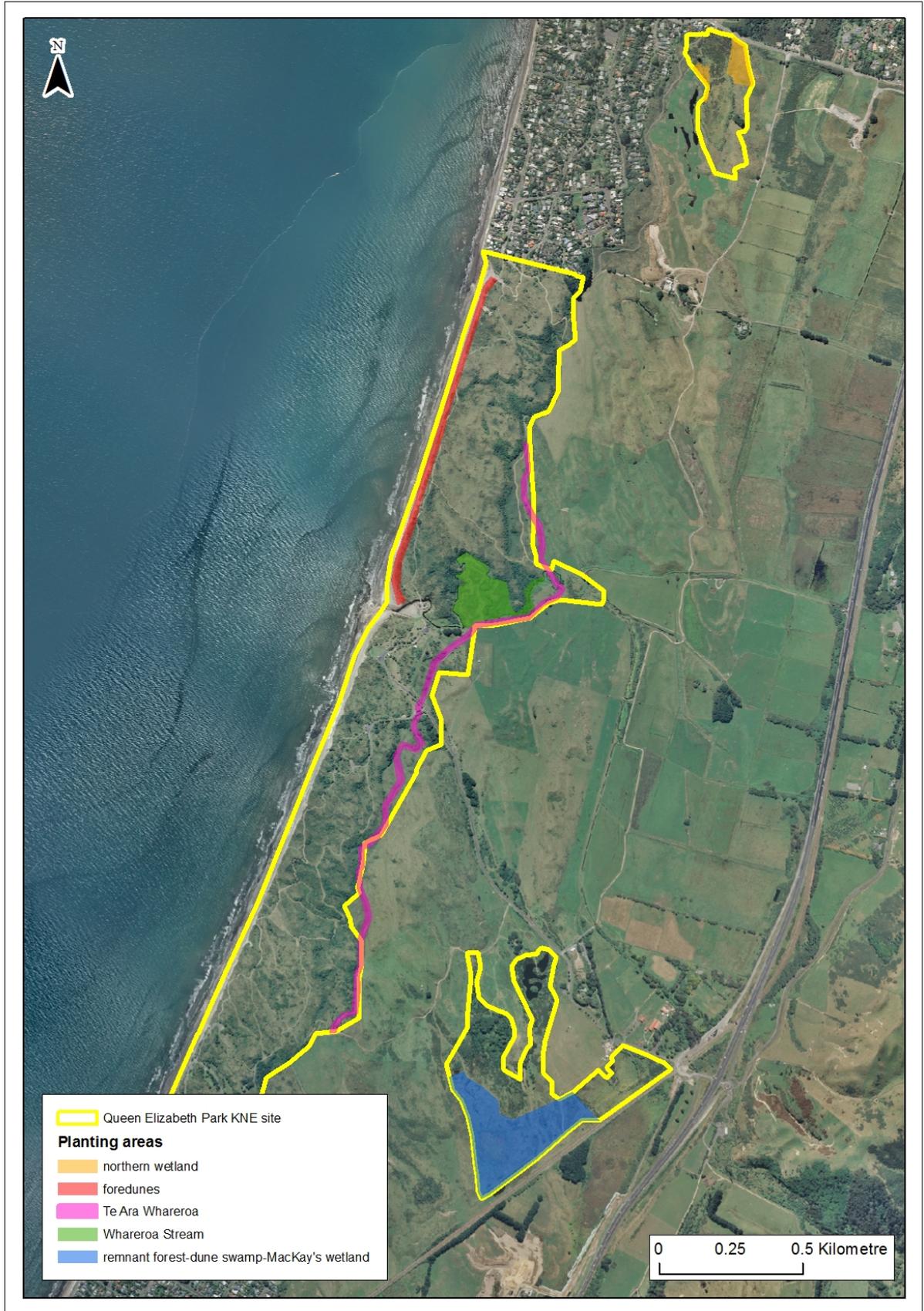
Map 2: Threatened environments in Queen Elizabeth Park KNE site



Map 3: Operational areas for ecological weed control in Queen Elizabeth Park KNE site



Map 4: Pest animal control in Queen Elizabeth Park KNE site



Map 5: Revegetation in Queen Elizabeth Park KNE site

Appendix 2: Nationally threatened species list

The New Zealand Threat Classification System lists species according to their threat of extinction. The status of each species group (plants, reptiles, etc) is assessed over a five-year cycle⁵⁴. 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 Queen Elizabeth Park KNE site.

Table 6: Threatened species at Queen Elizabeth Park KNE site

Scientific name	Common name	Threat status	Source
Plants (vascular) ⁵⁵			
<i>Amphibromus fluitans</i>	Water brome	Threatened – Nationally Endangered	Greater Wellington 2007 ⁵⁶
<i>Coprosma acerosa</i>	Sand coprosma	At Risk – Declining	Greater Wellington 2007
Birds ⁵⁷			
<i>Anthus novaeseelandiae</i>	New Zealand pipit	At Risk – Declining	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Haematopus unicolor</i>	Variable oystercatcher	At Risk – Recovering	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Hydropogon caspia</i>	Caspian tern	Threatened – Nationally Vulnerable	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Larus novaehollandiae</i>	Red-billed gull	Threatened – Nationally Vulnerable	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Phalacrocorax carbo</i>	Black shag	At Risk – Naturally Uncommon	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
<i>Sterna striata</i>	White-fronted tern	At Risk – Declining	http://ebird.org/content/newzealand/ (accessed 22/01/2014)
Freshwater fish ⁵⁸			
<i>Anguilla dieffenbachia</i>	Longfin eel	At Risk – Declining	Greater Wellington 2007
<i>Cheimarrichthys fosteri</i>	Torrentfish	At Risk – Declining	Greater Wellington 2007
<i>Galaxias argenteus</i>	Giant kōkopu	At Risk – Declining	Greater Wellington 2007
<i>Gobiomorphus huttoni</i>	Redfin bully	At Risk – Declining	Greater Wellington 2007

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