

# Key Native Ecosystem Plan for Waitohu Coast and Wetlands

2017-2020



greater WELLINGTON  
REGIONAL COUNCIL  
Te Pane Matua Taiao





## Contents

<b>1. Key Native Ecosystem Programme</b>	<b>1</b>
<b>2. Waitohu Coast and Wetlands Key Native Ecosystem site</b>	<b>2</b>
<b>3. Parties involved</b>	<b>2</b>
<b>4. Ecological values</b>	<b>4</b>
<b>5. Key threats to ecological values at the site</b>	<b>7</b>
<b>6. Objectives</b>	<b>10</b>
<b>7. Operational activities</b>	<b>11</b>
<b>8. Operational delivery schedule</b>	<b>13</b>
<b>9. Funding summary</b>	<b>15</b>
Greater Wellington budget	15
Kāpiti Coast District Council budget	15
<b>Appendix 1: Site maps</b>	<b>16</b>
<b>Appendix 2: Threatened species list</b>	<b>20</b>
<b>Appendix 2a: Regionally threatened species list</b>	<b>22</b>
<b>Appendix 3: Planting plan</b>	<b>23</b>
<b>References</b>	<b>24</b>



## 1. Key Native Ecosystem Programme

The Wellington region’s native biodiversity has declined since people arrived and the ecosystems that support it face ongoing threats and pressures. 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).

Greater Wellington Regional Council’s (Greater Wellington) Biodiversity Strategy<sup>1</sup> sets a framework that guides how Greater Wellington protects and manages biodiversity in the Wellington region to work towards the vision below.

**Greater Wellington’s vision for biodiversity**  
 Healthy ecosystems thrive in the Wellington region and provide habitat for native biodiversity

The Strategy provides a common focus across the council’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 Key Native Ecosystem (KNE) Programme.

**Goal One**  
 Areas of high biodiversity value are protected or restored

The KNE Programme is a non-regulatory voluntary programme that 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 publically 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 operational plans prepared by Greater Wellington's Biodiversity department. Greater Wellington works with landowners, mana whenua and other operational delivery providers to achieve mutually beneficial goals.

## **2. Waitohu Coast and Wetlands Key Native Ecosystem site**

The Waitohu Coast and Wetlands KNE site (31ha) is located just north of Ōtaki Beach on the Kāpiti Coast (see Appendix 1, Map 1) and is within the Foxton Ecological District. The KNE site is part of a long belt of sand dunes that covers the coast from south Taranaki to Paekākāriki. Winds in the area are mainly west to north-west and 800-1,000 mm of annual rainfall is evenly distributed<sup>2</sup>. The Waitohu Stream mouth, including the estuarine wetlands, is of regional significance and is listed as an "Ecological Site of Importance" in the Kāpiti Coast District Plan<sup>3</sup>. The KNE site includes dune systems, several wetlands and the lower reaches and estuary of the Waitohu Stream.

## **3. Parties involved**

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

### **Landowners**

The KNE site includes land owned by Kāpiti Coast District Council (KCDC) and private landowners. Landowners on both sides of the stream bed have common law ownership rights that extend to the centre of the stream; however the Crown can override these rights. The scope of this three-year plan covers all the land owned by the Crown and KCDC as well as private land within the KNE site boundary (see Appendix 1, Map 2).

The Wootton family is active in protecting their wetland and have created new waterfowl habitat. Weeds in the wetland have been controlled for several years. The family holds a resource consent to create more open water and undertake planting adjacent to the existing wetland.

The Sims family is active in protecting the dunes on their property in partnership with KCDC and Greater Wellington. These dunes were fenced to prevent vehicle access, however, sand has since built up around the fence. Maintenance of the fence may be required in the near future. The foredunes have largely been re-vegetated with native sand-binding species.



In the lower reaches of the Waitohu Stream is an important whitebaiting site for the Winterburn whānau. Michael Winterburn maintains the fence on the edge of a small area of dune beside the stream as it flows out over the beach.

### Operational delivery

The primary delivery agents within Greater Wellington are the Biodiversity department (management for biodiversity values, advice and overview), the Biosecurity department (pest control) and the Flood Protection department (flood protection works). The Flood Protection department is responsible for the management of the stream under the Soil Conservation and Rivers Control Act 1941. Flood protection works are carried out in the KNE site to manage flood and erosion risk to properties and manage the Waitohu Stream mouth alignment. The Biodiversity department works with the Flood Protection department to advance ecological outcomes and mitigate effects from operations. For example, Flood Protection staff follow a set of guidelines when cutting the stream mouth<sup>4</sup>.

KCDC works in partnership with Greater Wellington to restore the dunes on both the north and south sides of Waitohu Stream.

The Waitohu Stream and Dune Care Group Inc. (WSDCG) is an important management partner, critical to the successful implementation of parts of this plan. Since 2001 this group of volunteers has been working on ecological restoration on both private and public land in the area. They also host local schools at the dunes each year to plant dune species. In their early years the group worked on planting the margins of Waitohu Stream, as well as fencing and planting areas of the Wootton wetland with local wetland species. The group has achieved considerable success, not only in protecting existing values but also in re-establishing native dune species. WSDCG is now concentrating its efforts on the backdunes south of the stream mouth and assisting with planting riparian margins to improve the native fish habitat.

### Mana whenua partners

The Waitohu Coast and Wetlands KNE site is a site of significance for Ngā Hapū ō Ōtaki (Ngā Hapū) (see Table 1) and they are aware that their areas of interest are not located on Greater Wellington land. Greater Wellington will provide contact details of landowners to Ngā Hapū if they wish to consult directly with landowners about the values at the site.

**Table 1: Ngā Hapū ō Ōtaki sites of significance in the Waitohu Coast and Wetlands KNE site<sup>5</sup>**

Sites of significance	Mana whenua values
Waitohu Stream mouth	mahinga kai, ara waka, papa kāinga, kauhoe, raranga, tohu ahurea
Waitohu Stream – G-bung	mahinga kai, ara waka, puna raranga, wai ora, kauhoe, kaukau, ngā mahi parekareka i/ki te wai

## 4. Ecological values

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

The Waitohu Coast and Wetlands KNE site has several uninterrupted sequences of different ecosystem types (ecotones), ranging from wetlands and coastal dunes through the lower reaches and estuary of Waitohu Stream. Although the wetland and dune systems are highly modified by historic farming practices and development, they retain many components of their former flora and fauna. There are a number of threatened species that have been recorded in the KNE site. These are summarised in Appendix 2.

The wetlands in the lower valley are part of a network of waterways used by bird species, such as Australasian bittern (*Botaurus poiciloptilus*). Other sites in this network are Lake Waorongomai KNE site and Huritini Swamp in the north, Ngatotara wetland, O Te Pua/Paruāuku KNE site and Forest Lake wetlands to the east, and the Ōtaki River mouth KNE site and its associated wetlands to the south.

The foredunes, although once highly modified, are now largely restored to their natural vegetative cover and are a refuge for threatened species, such as sand daphne (*Pimelea* aff. *arenaria*), sand tussock (*Poa billardiarei*) and pīngao (*Ficinia spiralis*). Stable and active dunes are Nationally Endangered ecosystem types<sup>6</sup>.

There are four major areas with different ecological values in this KNE site. As threats and management requirements differ between them, each has been identified as a distinct operational area in this plan (see Appendix 1, Map 3). The geography and salt burden of each operational area determines the composition of plant communities. A brief description of each follows.

### Area A – Northern dunes

Prior to human settlement, this area would have mainly been a spinifex, pīngao grassland/sedgeland vegetated with spinifex (*Spinifex sericeus*), pīngao, sand coprosma (*Coprosma acerosa*) and sand daphne grading into semi-stable rear dunes<sup>7</sup>. The active dune areas are expanding to the west and south.

The flatter un-vegetated sand between the dunes and the lagoon provides nesting habitat for banded dotterels (*Charadrius bicinctus*), pied stilt (*Himantopus himantopus*) and variable oystercatchers (*Haematopus unicolor*). Much of this area is covered with driftwood, deposited during storm events and king tides. This offers some protection for nesting and roosting sites, as vehicle access is more difficult. Northern New Zealand dotterels (*Charadrius obscurus aquilonius*) have been recorded here occasionally and are likely to be juvenile birds that fly around the coast of New Zealand in their first year following fledging before finding a suitable breeding beach<sup>8</sup>. Flocks of South



Island pied oystercatcher (*Haematopus finschi*) feed in the area following their breeding season on the braided rivers of the South Island.

The lagoon between the dunes and stream mouth provides an important shallow feeding area for banded dotterel, pied stilt, Caspian terns (*Hydroprogne caspia*), white-fronted tern (*Sterna striata striata*) and royal spoonbill (*Platalea regia*). Black swans (*Cygnus atratus*) visit the lagoon occasionally. Sand build-up at the mouth of the stream increases the area of open water of the lagoon, which is refreshed by king tides, however water levels slowly reduce and can eventually disappear over the dry summer months.

Most of the dunes have, until recently, been vegetated with exotic marram grass (*Ammophila arenaria*) but are now planted with spinifex and some pīngao. Behind the fringe of active dunes is a large stable area of dune that supports backdune species such as sand daphne, speckled sedge (*Carex testacea*), sand coprosma, swamp flax (*Phormium tenax*) and toetoe (*Austroderia toetoe*). Further back is a damp sand plain, which retains moisture considerably longer than the dunes. The sand in this area is stable and subject to occasional flooding if the stream mouth moves north. The vegetation is comprised of low growing herbs and pasture grasses. Spinifex, although still present, is sparse due to lack of fresh sand.

Close to the stream and north of the small estuary is a dune deflation hollow - a low-lying area formed behind an active foredune - which is occasionally inundated by northern movement of the lower stream or during storms combined with king tides.

### Area B – Southern dunes

As with the northern dunes, prior to human settlement, the southern dunes would have been an active spinifex and pīngao duneland<sup>9</sup>. Marram grass was planted to stabilise the sand following removal of the native species by grazing and fire, but over the past 12 years, these dunes have been restored with native spinifex and pīngao. Sand rapidly accumulates here, and in some areas the spinifex is unable to keep above the sand. The dunes have been expanding to the west, however they are periodically washed away when the Waitohu Stream mouth moves south.

This part of the dune system stretches from the coast over 300 m inland, making it one of the deepest dune systems on the Kāpiti Coast. It is one of the few remaining dune systems in the region that has naturally occurring populations of sand daphne, speckled sedge and sand coprosma. Closer to the stream is a line of very high marram dunes with a series of high peaks. These dunes contain the largest known population of sand daphne on the Kāpiti Coast. Once widespread around New Zealand, it is now restricted to four main areas of the country. This population is one of only a few that naturally regenerates in the lower North Island<sup>10</sup>.

Banded dotterel nest in the open areas behind the foredunes. A small area of wetland species, including oioi (*Apodasmia similis*), swamp flax, toetoe and wīwī (*Ficinia nodosa*) are found in a depression beside the river.

### Area C – Lower Waitohu Stream and estuary

Prior to human settlement, the catchment of the KNE site would have been forested, large vegetated wetlands would have occupied the lowlands and the river mouth

would have been free to move north and south in response to rainfall in the catchment and coastal influences. Around 1950, the Mangapouri Stream was diverted from the Ōtaki River catchment into Waitohu Stream, increasing flows into the latter<sup>11</sup>.

Along the lower reaches of the stream, the vegetation would have comprised of oioi/ restiad/ rushland/ reedland with taller species gradually occurring upstream where the saline influence lessens. Original vegetation types of the estuary would have comprised of searush (*Juncus kraussii* var. *australiensis*), oioi, glasswort (*Sarcocornia quinqueflora* subsp. *quinqueflora*) and sea primrose (*Samolus repens* var. *repens*) herbfield/rushland<sup>12</sup>. The stream course has varied since human settlement and this has been well documented<sup>13</sup>.

The stream has submerged macrophyte beds, logs and woody debris, as well as some bankside vegetation, all of which provide excellent habitat diversity for native fish and macroinvertebrate species<sup>14</sup>. This area is influenced by tides for approximately one kilometre upstream and is spawning habitat for inanga<sup>15</sup> and a small estuary is present behind the dunes on the northern side<sup>16</sup>.

Vegetation around the estuary is dominated by three square (*Schoenoplectus pungens*) and sand sedge (*Carex pumila*). Coastal turf - communities of tightly interlaced ground-hugging herbs, grasses and sedges - are found on slightly higher ground and include remuremu (*Selliera radicans*), native musk (*Mimulus repens*) and bachelor's button (*Cotula coronopifolia*). Large amounts of driftwood are washed into the lower areas and line the eastern side of the estuary. Further upstream, bands of sea rush, oioi and giant umbrella sedge and patches of swamp flax dominate, demonstrating the degree of salinity and differing water levels.

Estuaries are classified as Nationally Vulnerable ecosystems and coastal turf is classified as Nationally Critical<sup>17</sup>.

Eleven native fish species have been recorded in the lower Waitohu Stream. These are shortjaw kōkopu (*Galaxias postvectus*), kōaro (*G. brevipinnis*), banded kōkopu, (*G. fasciatus*) giant kōkopu (*G. argenteus*), inanga (*G. maculatus*), lamprey (*Geotria australis*), common bully (*Gobiomorphus cotidianus*), redfin bully (*Gobiomorphus huttoni*), torrentfish (*Chiemarrichthys fosteri*), longfin eel (*Anguilla dieffenbachia*) and shortfin eel (*A. australis*)<sup>18</sup>.

Shorebirds such as pied stilt (*Himantopus himantopus*), variable oystercatcher (*Haematopus unicolor*), red-billed gull (*Larus novaehollandiae scopulinus*), banded dotterel, black-fronted dotterel (*Euseyornis melanops*), white-faced heron (*Egretta novaehollandia*) and royal spoonbill feed and roost in and around the estuary.

New Zealand fur seals (*Arctocephalus forsteri*) are seen in lower reaches of Waitohu Stream and on the beach.

#### **Area D – Waitohu wetlands**

Original vegetation types, prior to human settlement, would have comprised of oioi-knobby clubrush sedgeland grading into saltmarsh ribbonwood (*Plagianthus divaricatus*), coastal tree daisy (*Olearia solandri*), small-leaved pōhuehue (*Muehlenbeckia complexa* var. *complexa*) and mingimingi (*Coprosma propinqua*)<sup>19</sup>. Salinity and water levels influence vegetation types and as the soil becomes less saline,

the vegetation type would have graduated to flaxland, scrubland and eventually forest species.

The soil is saline in the lower lying areas as sea water periodically inundates the wetland then gradually flushes out<sup>20</sup>. Currently, in the more saline area the vegetation is dominated by sea rush (*Juncus kraussii*), three square, knobby clubrush (*Ficinia nodosa*) and giant umbrella sedge (*Cyperus ustulatus*). Saltmarsh ribbonwood and mingimingi dominate the remaining area of wetland apart from a large area of swamp flax and kahikatea (*Dacrycarpus dacrydioides*), which was planted by Waitohu Stream and Dune Care Group Inc.<sup>21</sup>. A large area of native musk (*Mimulus repens*), a nationally threatened plant, has been recorded in the wetland<sup>22</sup>.

The wetlands in the KNE site are hydrologically linked and are regionally significant<sup>23</sup>. Wetlands are classified as Nationally Critical ecosystem types as nationally there is less than 10% of their original extent remaining and many that do remain are heavily degraded. Wetlands of the Wellington region have been reduced to 2.3% of their original extent<sup>24</sup>.

A series of water bodies lying parallel to the current channel of Waitohu Stream in the Wootton, Winterburn and Sims properties are a former channel of the stream. As these hold water longer than the surrounding wetlands and have dense vegetation cover, they are prime wetland bird habitat. Although these areas may not be large enough to provide a permanent home for wetland birds, they form part of a network that is used by visiting birds. A recent survey of the wetlands in the KNE site recorded spotless crane (*Porzana tabuensis*) in the Sims wetland<sup>25</sup>. Bittern were recorded in 2012 in a narrow band of raupō (*Typha orientalis*) in the Wootton wetland<sup>26</sup> and in 2002 a marsh crane (*Porzana pusilla*) was found dead on the road adjacent to the wetland<sup>27</sup>. Brown mudfish (*Neochanna apoda*) have also been recorded in this area and may still be present<sup>28</sup>.

## 5. Key threats to ecological values at the site

Ecological values can be threatened by human activities, and by introduced animals and plants, that change the natural balance of native ecosystems. The key to protecting and restoring biodiversity as part of the KNE programme is to manage the threats to the ecological values at the site.

The Kāpiti Coast has been grazed and used as a transport route for stock movement for much of the past 150 years. Trampling and grazing of the native sand-binding species spinifex and pīngao caused these plants to become very uncommon and, because of their absence, the sand became highly mobile. Marram grass was subsequently planted to stabilise dunes. However, marram builds very steep dunes that are prone to blow away (blowout). A large marram dune close to the stream has been left by WSDCG for recreational use, and locals, particularly children, use it to run or sand surf down its face. This trampling of the vegetation has caused considerable die back of vegetation and this dune is now blowing away inland. The marram dune adjacent contains many sand daphne plants that need protection from trampling and erosion.

Behind the dunes, pine trees (*Pinus radiata*) and macrocarpa (*Cupressus macrocarpa*) were planted to prevent the sand encroaching into farmland. Seedlings of these

species are appearing in the more stable backdunes on the northern side of the stream. Garden dumping from adjacent residential areas is a source of ecological weeds that displace local native species and can be difficult and costly to remove. *Gazania* (*Gazania rigens*) and agapanthus (*Agapanthus praecox* subsp. *orientalis*) are the most persistent garden weeds found in the southern dunes. Coastal turf areas are at risk from buck's horn plantain (*Plantago coronopus*), an invasive and salt-tolerant flat-leaved plant.

Most wetlands in the lower valley were drained and converted into pasture, and much of the vegetation has been grazed. All palatable species have disappeared, however following the fencing and partial planting of the Wootton wetland some natural regeneration is occurring.

Rabbits (*Oryctolagus cuniculus*) favour sand country as it is easy for them to dig burrows. Both rabbits and hares (*Lepus europaeus occidentalis*) invade dunes from the surrounding farmland and browse on low-growing native plants, particularly seedlings and in newly planted areas. Hedgehogs (*Erinaceus europaeus occidentalis*), rats (*Rattus* spp.) and mustelids (*Mustela* spp.) prey on eggs and chicks of ground-nesting birds in the wetlands and dunes. Possums (*Trichosurus vulpecula*) browse native plants and are also opportunistic predators of eggs and chicks. Feral cats (*Felix catus*) prey on ground-nesting chicks and can also take adult birds from the nest.

Although deposition of silt in the lower reaches of streams and on flood plains is part of the natural processes of riverine ecology, sedimentation of the river course is exacerbated by stream bank slumping. This can occur following the release of the stream when dammed for mouth cutting. Slumping not only contributes to the sedimentation of the stream, but also reduces native fish habitat. The stream has very little shade from overhanging plants, which may contribute to high water temperatures during summer. Tree roots, which provide sanctuary for native fish, are largely absent. The loss of native vegetation from the catchment and banks, sedimentation, high water temperatures, loss of spawning habitat and overfishing have all impacted on the abundance of native fish in the stream which are now found only in low numbers in its lower reaches.

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 2 presents a summary of all known threats to the Waitohu Coast and Wetlands 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 2: Key threats to ecological values present at Waitohu Coast and Wetlands KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
<b>Ecological weeds</b>		
<b>EW-1</b>	Ground covering ecological weeds smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species for control include: marram, buffalo grass ( <i>Stenotaphrum secundatum</i> ), pampas ( <i>Cortaderia selloana</i> ), <i>Juncus acutus</i> , ragwort ( <i>Senecio glastifolius</i> ), tall fescue ( <i>Schedonorus arundinaceus</i> ), fleabane ( <i>Conyza</i> sp.), flatweed species such as Catsear ( <i>Hypochaeris radicata</i> ), agapanthus, gazania, lupin ( <i>Lupinus arboreus</i> ), ice plant ( <i>Carpobrotus edulis</i> ), <i>Senecio elegans</i>	<b>A, B, C, D</b>
<b>EW-2</b>	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include: lupin, gorse ( <i>Ulex europaeus</i> ), pine, karo ( <i>Pittosporum crassifolium</i> ), silver poplars ( <i>Populus alba</i> )	<b>A, C, D</b>
<b>EW-3</b>	Climbing weeds smother and displace native vegetation often causing canopy collapse, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include: cape ivy ( <i>Senecio angulatus</i> ) and convolvulus ( <i>Convolvulus arvensis</i> )	<b>C, D</b>
<b>Pest animals</b>		
<b>PA-1*</b>	Possoms browse palatable canopy vegetation until it can no longer recover <sup>29,30</sup> . This destroys the forest's structure, diversity and function. Possoms may also prey on native birds and invertebrates <sup>31</sup>	<b>A, B, C, D</b>
<b>PA-2</b>	Rabbits and hares graze on palatable native vegetation and prevent natural regeneration in some environments <sup>32</sup> . 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	<b>A, B</b>
<b>PA-3</b>	Rats 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 <sup>33,34</sup>	<b>A, B, C, D</b>
<b>PA-4*</b>	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 <sup>35,36</sup>	<b>A, B, C, D</b>
<b>PA-5</b>	Mustelids (stoats <sup>37,38</sup> ( <i>Mustela erminea</i> ), ferrets <sup>39</sup> ( <i>M. furo</i> ) and weasels <sup>40,41</sup> ( <i>M. nivalis</i> )) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	<b>A, B, C, D</b>

<b>PA-6</b>	Feral, stray and domestic cats ( <i>Felis catus</i> ) prey on native birds <sup>42</sup> , lizards <sup>43</sup> and invertebrates <sup>44</sup> , reducing native fauna breeding success and potentially causing local extinctions <sup>45</sup>	<b>A, B, C, D</b>
<b>PA-7</b>	Hedgehogs prey on native invertebrates <sup>46</sup> , lizards <sup>47</sup> and the eggs <sup>48</sup> and chicks of ground-nesting birds <sup>49</sup>	<b>A, B, C, D</b>
<b>Human activities</b>		
<b>HA-1*</b>	Recreational vehicles such as 4WDs and motorbikes can cause damage to dune systems and disturbance of the native ecosystem	<b>A, B, C</b>
<b>HA-2</b>	Recreational use such as tramping, 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	<b>A, B, C</b>
<b>HA-3*</b>	Freshwater activities such as boating, fishing, whitebaiting and duck shooting can introduce aquatic weed species to waterways	<b>C</b>
<b>HA-4*</b>	Dogs ( <i>Canis lupus familiaris</i> ), if uncontrolled/unleashed can disturb or kill nesting birds and chicks, and lizards within the KNE site, particularly in close proximity to walking tracks <sup>50</sup>	<b>A, B</b>
<b>HA-5*</b>	Fire both deliberately lit, permitted or not, and accidental can cause damage and disturbance of the native ecosystem	<b>A, B, D</b>

\*Threats marked with an asterisk are not addressed by actions in the operational delivery schedule. Not all threats can be adequately addressed. Threats might not be managed for a number of reasons including financial, legal, or capacity restrictions. However, in order to manage the KNE site as a whole, it is important to be aware of all threats to ecological values.

## 6. Objectives

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

The following objectives will guide the operational activities at the Waitohu Coast and Wetlands 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.



## 7. Operational activities

Operational activities are targeted to work towards the objectives above by responding to the threats outlined in Table 2. The broad approach to operational activities is described briefly below, and specific actions, with budget figures attached, are set out in the operational delivery schedule (Table 3).

It is important to note that not all threats identified in Table 2 can be adequately addressed. This can be for a number of reasons including financial, legal, or capacity restrictions.

Protection and restoration of much of the Waitohu Coast and Wetlands KNE site has been ongoing for many years. KCDC, Greater Wellington, and landowners have been working together to control marram grass on the northern dunes as well as a suite of other weeds in the backdunes. Future management of the northern dunes includes continuing the control of ecological weeds and pest animals and the planting of native species that were historically found in the area.

### Ecological weed control

The aim of weed work is to control ecological weeds to enable existing native plant species to regenerate, obtain their natural range, and to aid the survival of restoration plantings. The priority weed control areas are operational areas A, B and C (see Appendix 1, Map 3).

The KNE site has four operational areas, A-D, (see Appendix 1, Map 3), where the highest priority weeds species will be controlled. Each operational area will be monitored by Greater Wellington annually and target weeds will be treated with a suitable herbicide. Once the highest priority weed species have been eliminated or controlled to a low density, the lower priority weed species will be targeted.

The operational areas and highest priority species for control in each area are as follows:

**Operational area A (Northern dune system):** The priority species for control are marram, pampas, buffalo grass, gorse, lupin, flatweeds, ice plant, gazania and pines.

**Operational area B (Southern dune system):** The priority species for control are ivy, gorse, lupin, karo, flatweeds, ice plant and *Juncus acutus*.

**Operational area C (Lower Waitohu stream and estuary):** The priority species for control are tall fescue, buffalo grass, marram, flatweeds, cape ivy and convulvulus.

**Operational area D (Waitohu wetland area):** The priority species for control are *Juncus acutus*, buffalo grass, tall fescue, marram, convulvulus, cape ivy, pampas, gorse, and lupin.

WSDCG members and KCDC staff spend many hours controlling weeds including lupin, purple ragwort, agapanthus, gazania, marram, karo, buffalo grass and ice plant in operational area B.

### **Pest animal control**

DOC 200 kill-traps have been installed across the KNE site and Timms kill-traps positioned in key locations to improve the nesting success of shorebirds and wetland bird species by targeting feral / stray cats, mustelids, rats and hedgehogs.

WSDCG volunteers service the traps in the southern dunes and Greater Wellington's Biosecurity department will service the traps on the Sims and Winterburn properties. See Appendix 1, Map 2 for property boundaries.

During 2014/15 Greater Wellington's Regional Possum Predator Control Programme (RPPCP) installed poison bait stations across the wider landscape along the Kāpiti Coast. The RPPCP aims to control possums to low densities across the landscape and is expected to benefit the KNE site by reducing the occurrence of possum reinvasions.

### **Re-vegetation**

Management of the Waitohu Coast and Wetlands KNE site aims to not only protect the existing ecological values, but also restore plant species to enable healthy functioning ecosystems.

The WSDCG has an extensive dune restoration programme. The group eco-source seeds and grow them in an onsite nursery. The group hopes to plant between 600-1,000 plants within the KNE per year.

Greater Wellington's Biodiversity department supports WSDCG by providing them with a stipend to assist in the purchase of nursery supplies and fencing materials. Appendix 3 provides a plant list for their re-vegetation work.

In 2017, WSDCG planted 1,090 of their plants in operational area B and provided Greater Wellington with 120 to be planted by contractors. In 2018, Caleb Royal from Ngā Hapu o Ōtaki will receive 150 plants from WSDCG to plant along the Waitohu Stream, north of the KNE site.

Waitohu Stream and Dune Care Group also assist Greater Wellington with the ongoing marram control on the dunes to assist this planting.

Spinifex and/or pīngao will be planted in operational area A each year, helping to roll back the marram targeted by the pest plant team. Like the weed control, this work begins on the public beach side of operational area A and works inwards towards Ted Sim's property.

Following planned stream works to alleviate flooding risk, Greater Wellington's Flood Protection department is considering proposals for upgrading the lower reaches of the Waitohu Stream. The proposals will likely include activities such as planting along the stream banks to encourage it to be continuously vegetated.

Because rabbits will continue to invade the area, it may be difficult to establish new plantings without rabbit control. All planting sites, therefore, will use plant protectors to protect them from browse.

## 8. Operational delivery schedule

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

**Table 3: Three-year operational delivery schedule for Waitohu Coast and Wetlands KNE site**

Objective	Threat	Operational areas	Activity	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
1,2	HA - 2	B, C, D	Revegetation	Biodiversity department	GW stipend for the WSDCG nursery supplies and fence repair materials	GW supports WSDCG in their restoration efforts	\$2,500	\$2,150	\$2,150
1	EW - 1	A,B	Ecological weed control	Biosecurity department	Continue rollback of marram and targeted areas of backdunes for planting	Reduce distribution and density of target species	\$1,650	\$1,650	\$1,650
1	EW - 1 EW - 2 EW - 3	A	Ecological weed control	Biosecurity department	Weed sweep through backdunes targeting marram, pampas, buffalo grass, gorse, lupin, ice plant, gazania and pines. Control <i>Juncus acuta</i> to protect the turf community	Reduce distribution and density of target species	\$1,350	\$1,500	\$1,500
1	EW - 1 EW - 2 EW - 3	C,D	Ecological weed control	Biosecurity department	Control poplar, willow, karo, pampas, gorse and tall fescue along stream margins and riparian revegetation areas	Reduce distribution and density of target species	NIL	\$500	\$500
1	EW - 1 EW - 3	C,D	Ecological weed control	Biosecurity department	Reduce the extent of tall fescue in the wetlands and control convolvulus	Reduce distribution and density of target species	NIL	\$500	\$500
2	PA - 2 PA - 4 PA - 6	The entire KNE site	Pest animal control	Biosecurity department	Audit of the entire predator control network annually	Audit completed	\$500	\$500	\$500

Objective	Threat	Operational areas	Activity	Delivery	Description/detail	Target	Timetable and resourcing		
							2017/18	2018/19	2019/20
2	PA -2 PA -4 PA -6	A, C, D	Pest animal control	Biosecurity department	Service the traps on the Wootton, Sims and Winterbourne properties four times per year	Possums <5% RTC * Rats < 10% TTI**	\$2,500	\$2,500	\$2,500
2	PA -2 PA -4 PA -6	B, D	Pest animal control	WSDCG	WSDCG service the traps on the southern dunes	Possums <5% RTC * Rats < 10% TTI**	Nil	Nil	Nil
2	PA -2 PA -4 PA -6	B, D	Pest animal control	Biosecurity department	GW provide WSDCG with bait	Used to service traps throughout the year	\$200	\$200	\$200
1	HA -2	A	Revegetation	GW	Plant spinifex and/or pīngao in the northern dunes to help push back marram	75% survival 2 years after planting	\$1,450	\$650	\$650
1, 2	HA -2	B,C,D	Revegetation	WSDCG	Continue with their dune revegetation/restoration project	Change the dominance of dune species from exotic to native	NIL	NIL	NIL
1	HA –2	C	Revegetation	Flood protection	Revegetation following planned stream works to alleviate flooding of Waitohu stream	75% survival rate	NIL	NIL	NIL
<b>Total</b>							<b>\$10,150</b>	<b>\$10,150</b>	<b>\$10,150</b>

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

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

## 9. Funding summary

### Greater Wellington budget

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

**Table 4: Greater Wellington allocated budget**

Management activity	Timetable and resourcing		
	2017/18	2018/19	2019/20
WSDCG budget	\$2,500	\$2,150	\$2,150
Pest animal control	\$2,200	\$2,200	\$2,200
Ecological weed control	\$1,500	\$2,650	\$2,650
Revegetation	\$1,450	\$650	\$650
<b>Total</b>	<b>\$7,650</b>	<b>\$7,650</b>	<b>\$7,650</b>

### Kāpiti Coast District Council budget

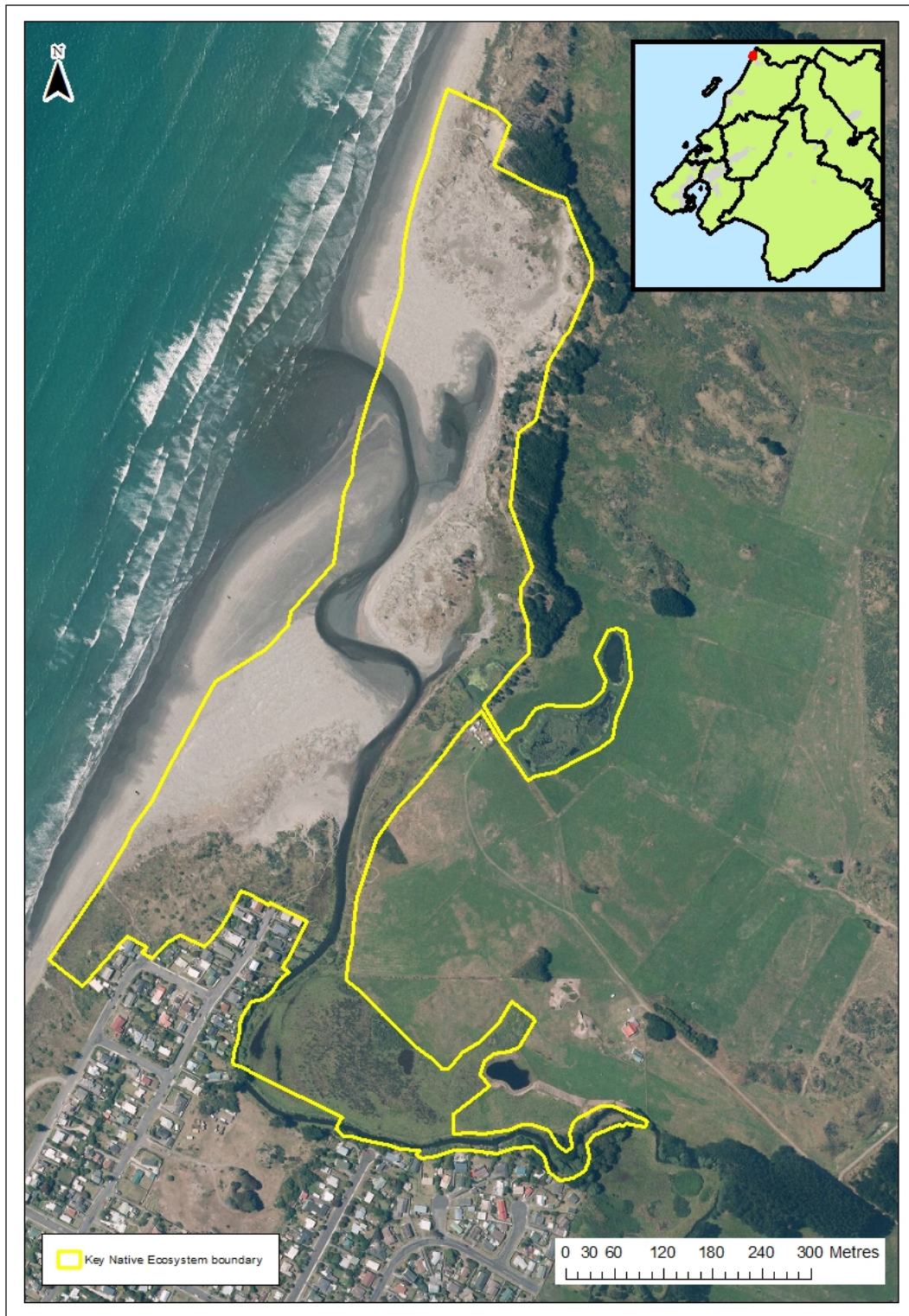
This budget is subject to confirmation through the KCDC long term planning process.

**Table 5: KCDC allocated budget**

Management activity	Timetable and resourcing		
	2017/18	2018/19	2019/20
Ecological weed control	\$1,500	\$1,500	\$1,500
Pest animal control	\$1,000	\$1,000	\$1,000
<b>Total</b>	<b>\$2,500</b>	<b>\$2,500</b>	<b>\$2,500</b>

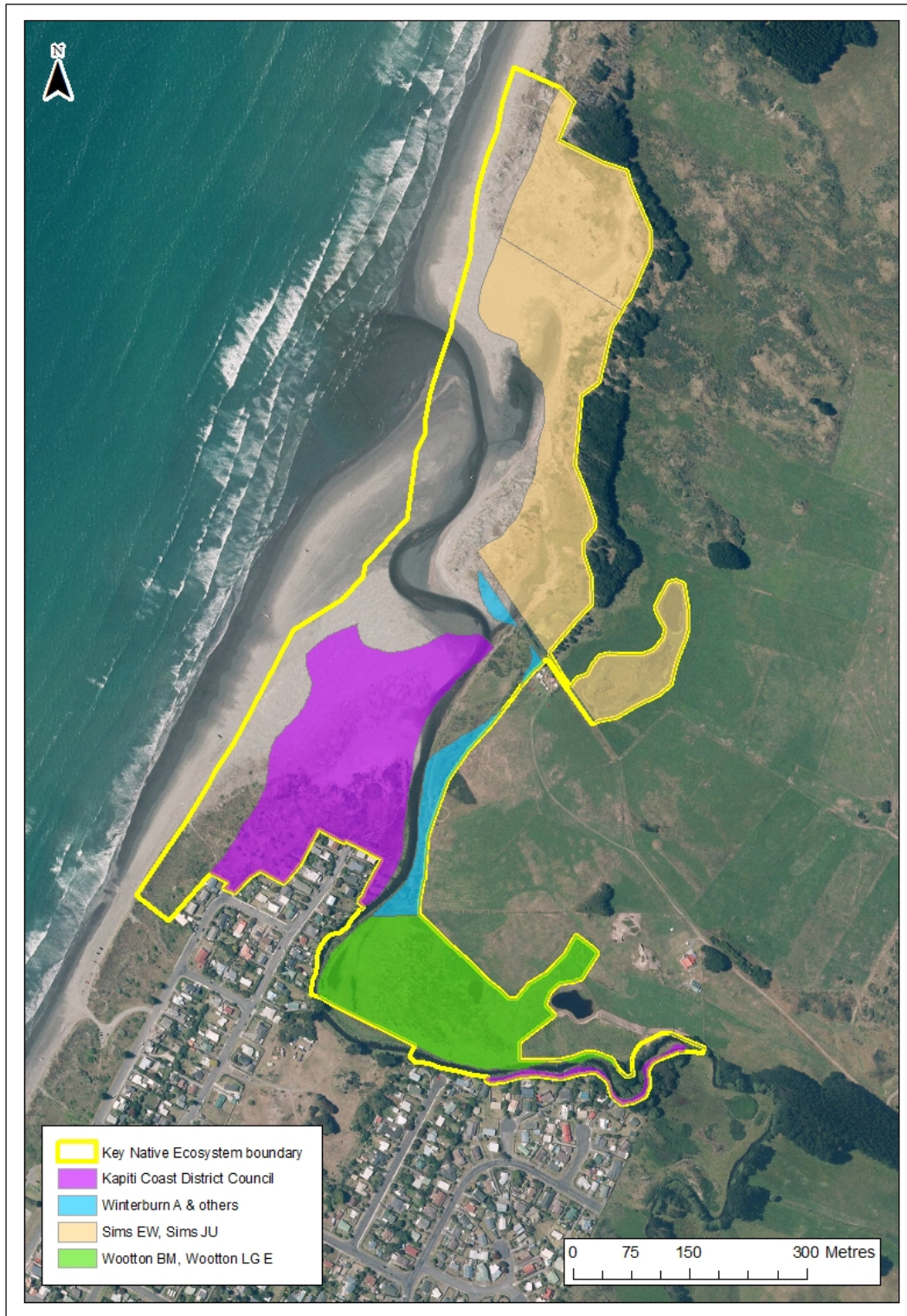


## Appendix 1: Site maps



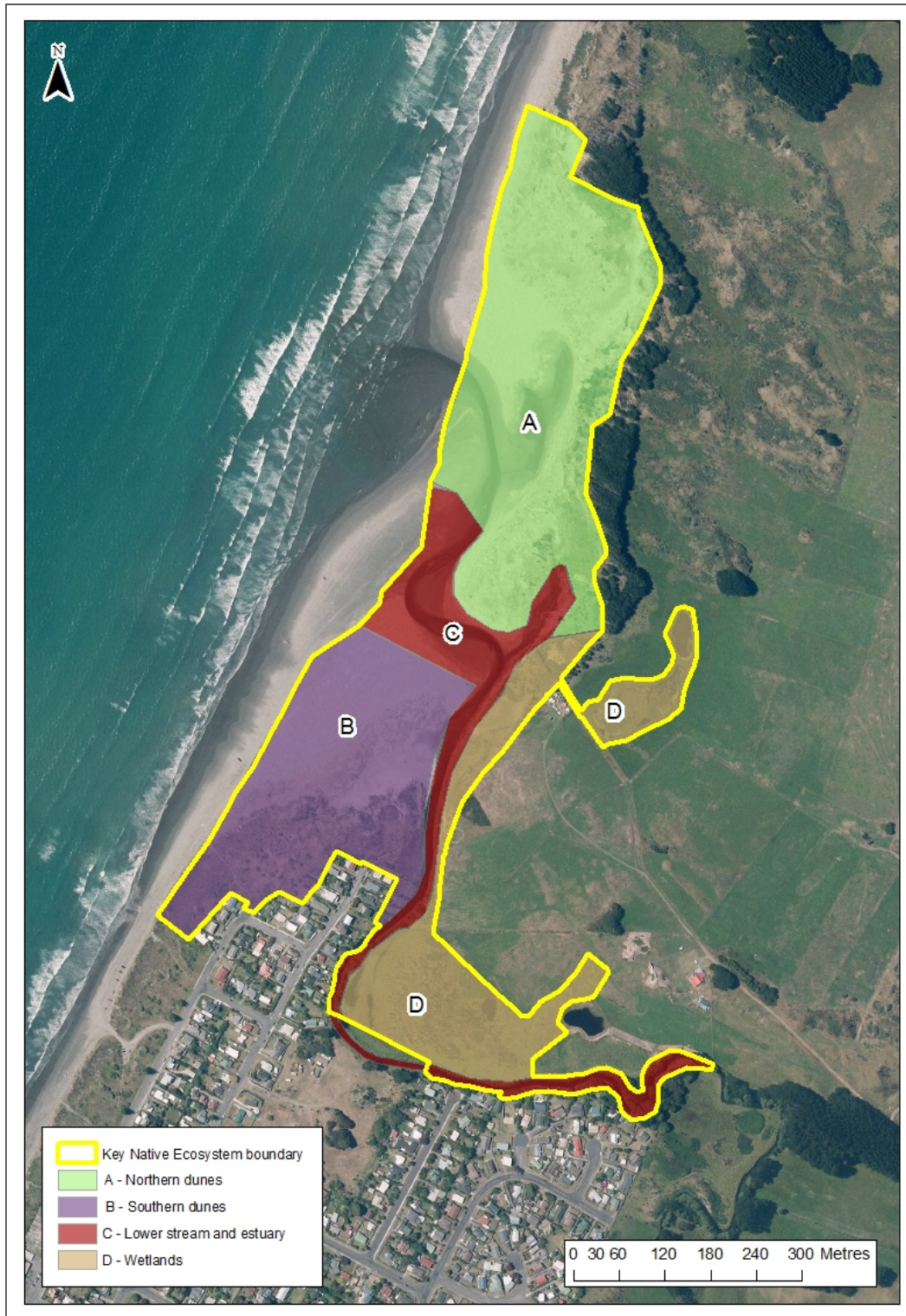
Map 1: The Waitohu Coast and Wetlands KNE site boundary





Map 2: Landowners of the Waitohu Coast and Wetlands KNE site





Map 3: Operational areas in the Waitohu Coast and Wetlands KNE site





Map 4: Pest animal control in the Waitohu Coast and Wetlands KNE site

## Appendix 2: Threatened species list

The New Zealand Threat Classification System lists extant species according to their threat of extinction. The status of each species group (birds, plants, reptiles, etc) is assessed over a five-year cycle. Species are regarded as Threatened if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable, and 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 have been recorded in the Waitohu Coast and Wetlands KNE site.

**Table 6: Threatened and At Risk species at Waitohu Coast and Wetlands KNE site**

Scientific name	Common name	Threat status	Observation
<b>Plants(vascular)<sup>51</sup>(lichens)<sup>52</sup>(bryophytes)<sup>53</sup></b>			
<i>Coprosma acerosa</i>	Sand coprosma	At Risk - Declining	Robyn Smith, GW, pers obs 2007
<i>Ficinia spiralis</i>	Pingao	At Risk – Nationally Vulnerable	Robyn Smith, GW, pers obs 2007
<i>Mimulus repens</i>	Native musk	At Risk - Naturally Uncommon	Matt Ward, botanist, pers comm 2013
<i>Pimelea aff. arenaria</i>	Sand daphne	At Risk - Declining	Robyn Smith, GW, pers obs 2007
<i>Poa billardierei</i> (syn <i>Austrofestuca littoralis</i> )	Sand tussock	At Risk - Declining	Robyn Smith, GW, pers obs 2007
<b>Birds<sup>54</sup></b>			
<i>Botaurus poiciloptilus</i>	Australasian bittern	Threatened - Nationally Critical	Geoff Monk, WSDCG, pers comm 2010
<i>Charadrius bicinctus</i>	Banded dotterel	Threatened - Nationally Vulnerable	Robyn Smith, GW, pers obs 2010
<i>Haematopus finschi</i>	South Island pied oystercatcher	At Risk - Declining	Sue McIntosh, WSDCG, pers comm 2014
<i>Haematopus unicolor</i>	Variable oystercatcher	At Risk - Recovering	Robyn Smith, GW, pers obs 2010
<i>Hydroprogne caspia</i>	Caspian tern	Threatened - Nationally Vulnerable	Robyn Smith, GW, pers obs 2010
<i>Larus novaehollandiae scropulinus</i>	Red-billed gull	At Risk - Declining	Robyn Smith, GW, pers obs 2010
<i>Phalacrocorax carbo</i>	Black shag	At Risk - Naturally Uncommon	Sue McIntosh, WSDCG, pers comm 2013
<i>Phalacrocorax sulcirostris</i>	Little black shag	At Risk - Naturally Uncommon	Sue McIntosh, WSDCG, pers comm 2013
<i>Phalacrocorax varius</i>	Pied shag	At Risk - Recovering	Sue McIntosh, WSDCG, pers comm 2013

<i>Platalea regia</i>	Royal spoonbill	At Risk - Naturally Uncommon	Robyn Smith, GW, pers obs 2011
<i>Porzana tabuensis</i>	Spotless crane	At Risk - Declining	John Cheyne, Wetland Works, pers comm 2013
<i>Sterna striata striata</i>	White-fronted tern	At Risk - Declining	Robyn Smith, GW, pers obs 2010
<b>Freshwater fish<sup>55</sup></b>			
<i>Anguilla dieffenbachii</i>	Longfin eel	At Risk - Declining	New Zealand Freshwater Fish Database 2013
<i>Chiemarrichthys fosteri</i>	Torrentfish	At Risk - Declining	New Zealand Freshwater Fish Database 2013
<i>Galaxias argenteus</i>	Giant kōkopu	At Risk - Declining	Graeme 2003
<i>Galaxias brevipinnis</i>	Kōaro	At Risk - Declining	New Zealand Freshwater Fish Database 2013
<i>Galaxias maculatus</i>	Inanga	At Risk - Declining	Graeme 2003
<i>Galaxias postvectus</i>	Shortjaw kōkopu	Nationally Vulnerable	New Zealand Freshwater Fish Database 2013
<i>Geotria australis</i>	Lamprey	Nationally Vulnerable	New Zealand Freshwater Fish Database 2013
<i>Gobiomorphus huttoni</i>	Redfin bully	At Risk - Declining	Graeme 2003
<i>Neochanna apoda</i>	Brown mudfish	At Risk - Declining	New Zealand Freshwater Fish Database 2013

## Appendix 2a: Regionally threatened species list

The following table lists regionally threatened species that have been recorded in the KNE site. These have been identified in the Plant Conservation Strategy, Wellington Conservancy 2004-2010<sup>56</sup>.

**Table 7: Regionally threatened species at the Waitohu Coast and Wetland KNE site**

Scientific name	Common name	Threat status	Source
<i>Coprosma acerosa</i>	Sand coprosma	Gradual Decline	Robyn Smith, GW, pers obs 2010
<i>Ficinia spiralis</i>	Pīngao	Gradual Decline	Robyn Smith, GW, pers obs 2010
<i>Mimulus repens</i>	Native musk	Regionally Endangered	Matt Ward, pers obs 2012
<i>Pimelea aff. arenaria</i>	Sand daphne	Regionally Vulnerable	Robyn Smith, GW, pers obs 2010
<i>Poa billardierei</i>	Sand tussock	Gradual decline	Robyn Smith, GW, pers obs 2010



## Appendix 3: Planting plan

Below are the plant species recommended for WSDCG to grow and then plant in operational areas B, C, and D.

**Table 8: Plant species for the dune planting areas**

Scientific name	Common Name
<i>Carex testacea</i>	Speckled sedge
<i>Coprosma acerosa</i>	Sand coprosma
<i>Ficinia nodosa</i>	Wīwī
<i>Ficinia spiralis</i>	Pīngao
<i>Lachnagrostis billardierei</i> susp. <i>billardierei</i>	Sand wind grass
<i>Libertia peregrinans</i>	New Zealand iris
<i>Mimulus repens</i>	Native musk
<i>Ozothamnus leptophyllus</i>	Tauhinu
<i>Muehlenbeckia complexa</i> var. <i>complexa</i>	Small-leaved pōhuehue
<i>Pimelea arenaria</i>	Sand pimelea
<i>Poa billardierei</i>	Sand tussock
<i>Spinifex sericeus</i>	Spinifex

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