

Key Native Ecosystem Operational Plan for Ōtaki Coast

2019-2024



greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao



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1. Purpose

The purpose of the five-year Key Native Ecosystem (KNE) Operational Plan for Ōtaki Coast KNE site is to:

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

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

This KNE Operational Plan is aligned to key policy documents that are outlined 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 Long Term Plan

The Long Term Plan (2018-2028)² outlines the long term direction of the Greater Wellington Regional Council (Greater Wellington) and includes information on all our major projects, activities and programmes for the next 10 years and how they will be paid for. This document outlines that Greater Wellington will actively manage selected high value biodiversity sites. Most of this work is undertaken as part of the KNE Programme.

Proposed Natural Resources Plan

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

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

Ōtaki Integrated Catchment Management Agreement

The purpose of the Integrated Catchment Management Agreement³ is to develop a partnership approach between Greater Wellington and Ngā Hapū o Ōtaki which identifies and agrees on activities that Catchment Management Groups (CMG) propose to undertake within the Ōtaki Catchment. It also explores opportunities to incorporate cultural values into CMG activities and processes. A Partnership Group and an Advisory Group comprise members from both organisations.

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

4. Ōtaki Coast Key Native Ecosystem

The Ōtaki Coast KNE site (119 ha) contains a number of interconnected coastal ecosystems extending along the coastline on the Kāpiti Coast from 500 m south of the Mangaone Stream estuary (at Te Horo Beach settlement) to 500 m north of the Ōtaki River Mouth Lagoon (see Appendix 1, Map 1).

The KNE site contains a dynamic and highly diverse mix of ecologically significant coastal and wetland ecosystems that are heavily influenced and shaped by complex geological and hydrological processes. These ecosystems include 5 km of gravel beaches, the lower reaches of the Ōtaki River braided river system and estuary, coastal turfs, the Ōtaki River Mouth Lagoon and Rangiora wetlands, the Katihiku freshwater wetlands, and the Mangaone Stream estuary and wetland. The KNE site supports a high concentration of indigenous fish, bird and plant species of conservation concern.

The ecosystems present are strongly influenced by frequent exposure and disturbance from ocean currents, tides and storms, and the impacts from flooding events. The Ōtaki River estuary and Ōtaki River Mouth Lagoon are collectively described as a hapua (see Appendix 1, Map 1), a distinct geological feature unique to braided rivers and coarse sediment coastlines. The estuary and associated habitats that comprise the hapua are characterised by outward flowing freshwater rather than saltwater typical of most tidal estuaries. This unique characterisation, in combination with the harsh coastal elements,

strongly influence the vegetation composition of the ecosystems surrounding the Ōtaki River mouth and continue to shape this dynamic landscape.

The KNE site is surrounded by farmland and urban development but provides an important role within the wider landscape context as it is located within close proximity to several other important wetlands and coastal sites including other KNE sites such as Waitohu Coast, Te Hapua Wetland Complex and Peka Peka Coast.

5. Parties involved

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

5.1. Mana whenua partners

The Ōtaki Coast KNE site is located within the rohe (district) of Ngā Hapū o Ōtaki who are Greater Wellington's mana whenua co-management partners at the site. In accordance with the Integrated Catchment Management Agreement⁵ for the Ōtaki River Catchment, Ngā Hapū o Ōtaki and Greater Wellington work in partnership to negotiate and plan annual operational work to be delivered within the KNE site.

Ngā Hapū o Ōtaki have identified the Ōtaki River, river mouth and gravel beach areas as having high cultural and spiritual significance for iwi (see Table 1)⁶. The cultural values to iwi and their tupuna (ancestors) include a former pā site (Pākātu) by the Ōtaki River, sites for cleaning (Wāhi Whakarite/ whakawātea), sites for cultural practice such as karanga and karakia, and other values relating to Mana and Te Mahi kai.

Table 1: Ngā Hapū o Ōtaki sites of significance in Ōtaki Coast KNE site⁷

Sites of significance	Mana whenua values
Schedule B – Ngā Taonga Nui a Kiwa: Te Awa o Ōtaki (Ōtaki River)	Ngā Mahi a ngā Tūpuna, Te Mahi Kai, Wāhi Whakarite, Te Mana o te Tangata, Te Manawaroa o te Wai, Te Mana o te Wai
Schedule C1: Ōtaki Pā (Ferry reserve)	wāhi tūpuna, pā, mahinga kai, urupā, tohu ahurea, ara waka, kauhoe, wai ora, wai tai, wāhi whakawātea, wāhi whakarite
Schedule C1: Ōtaki River – SH1 road bridge to river mouth	urupā, wai ora, wai tai, papa kāinga, mahinga kai, puna raranga, puna rongoā, ara waka, tohu ahurea, kauhoe, kaukau, ngā mahi pārekareka i/ke te wai
Schedule C1: Mangahānene Stream – Mangahānene	mahinga kai, wai ora, ara waka, papa kāinga, puna raranga, puna rongoā, pā, tohu ahurea, kauhoe, wāhi whakawātea, wāhi whakarite
Schedule C1: Rangiuru Stream – Pākātu	mahinga kai, ara waka, papa kāinga, puna raranga, pā, kauhoe, wai ora, tohu ahurea, wāhi whakawātea, wāhi whakarite
Schedule C1: Ngātoko Stream – spring to Rangiuru junction	waiora, papa kāinga, mahinga kai, ara waka, puna raranga, puna rongoā, wāhi whakawātea, wāhi whakarite

5.2. Landowners

The Ōtaki Coast KNE site has both private and public landowners:

- Greater Wellington own a total of 49 ha of the KNE site that includes the Ōtaki River and estuary, parts of the Rangiuru Stream and the river mouth lagoon. Greater Wellington's Flood Protection department manages these areas for flood protection purposes. In addition, 12 ha of untitled coastal land are also managed by Greater Wellington.
- Katihiku X Trust (who represent the Katihiku hapū) own 42 ha within the KNE site comprising the Katihiku freshwater wetlands and surrounds (which includes the Whakapawaewae, eastern and backwater wetlands), parts of the Ōtaki River, and most of the gravel and stony beaches south of Ōtaki River (known as the Ngakaroro 5B block). This property is leased to 'Stirling Dairy Farm' (Peter Wilson) who farms this property adjacent to the KNE site as winter dairy support.
- Kāpiti Coast District Council (KCDC) own 2 ha of the gravel beach within the KNE site at Te Horo Beach Settlement including the Mangaone Stream estuary. They also manage an additional 10ha of untitled coastal margins and the Ngakaroro 5B Block land at Te Horo gravel beaches.
- John Best, a private landowner, owns the Rangiuru wetland (1.5 ha).
- Far Fetched Ltd, (c/o Iain Cassels and Caitlin Taylor) own 2.5 ha of Te Horo gravel beach and stony ridge south of the Ōtaki estuary.

Land ownership boundaries are provided in Appendix 1, Map 2.

5.3. Stakeholders

A large part of the KNE site, the Ōtaki Rivermouth, is recognised by DOC as a Designated Ecological Site; however, they are not actively involved in the management of the site (See Appendix 1, Map 3).

5.4. Operational delivery

Within Greater Wellington, the Biodiversity, Biosecurity, Land Management and Flood Protection departments are responsible for delivering activities identified within this KNE operational plan. The Biodiversity department is the overarching lead department for Greater Wellington on the coordination of biodiversity management activities and advice within the KNE site. The Biosecurity department coordinates and carries out pest control activities. The Land Management department plans and advises on sustainable land use, soil conservation and water quality. The Flood Protection department works to the Environmental Strategy for Ōtaki River⁸ which is an outcome of the Ōtaki Floodplain Management Plan. This strategy seeks to co-ordinate opportunities for environmental enhancement and its vision is consistent with this KNE Plan. The Flood Protection department manages areas owned by Greater Wellington including the bed

of the Ōtaki River and associated flood control structures. They also undertake work to support biodiversity around the Ōtaki estuary and river mouth lagoon.

KCDC fund the management of parts of the KNE site as an Ecological Site of Significance (K027 Ōtaki River mouth) in accordance with the Kāpiti Coast District Plan⁹. KCDC also manage 17 ha of the Katihiku X Trust iwi-owned Ngakaroro 5B block for biodiversity. This comprises the raised stony ridges between Mangaone estuary and Ōtaki estuary.

The Katihiku X Trust manages the Katihiku wetlands in accordance with the recommendations outlined in the Restoration Plan for Katihiku¹⁰. The Katihiku hapū (represented by the Katihiku X Trust) are Ngāti Raukawa ki Te Tonga (and part of the wider representative iwi group Ngā Hapū o Ōtaki) and have mana whenua over the area.

The Friends of the Ōtaki River (FOTOR) is an incorporated community group which play an important role in representing the community in the management and development of the Ōtaki River and its environment as well as delivering work within the KNE site. The group has provided immeasurable assistance to Greater Wellington in their revegetation efforts which include planting up large areas of the river bank, lagoon edges and gravel beaches, both within and outside of the KNE site. The group is also responsible for the construction of the hapua viewing platform, as well as an interpretation panel at the river mouth lagoon and the boardwalk through the northern estuary area, both of which were co-designed with the Flood Protection department and KCDC.

The Mangaone Restoration Group is a restoration community group who undertake restoration planting activities along the Mangaone Stream estuary and is supported by KCDC.

Greater Wellington will continue to support these groups in the progression of their current projects as well as the development of appropriate new initiatives that the groups may propose.

6. Ecological values

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

6.1. Ecological designations

Table 2, below, lists ecological designations at all or part of the Ōtaki Coast KNE site.

Table 2: Designations at the Ōtaki Coast KNE site

Designation level	Type of designation
National	Parts of the Ōtaki Coast KNE site have been identified by DOC as a Designated Ecological Site (See Appendix 1, Map 3): <ul style="list-style-type: none"> 98: Ōtaki River mouth (56.02 ha)
Regional	Parts of the Ōtaki Coast KNE site are scheduled under Greater Wellington’s proposed Natural Resources Plan (PNRP) ¹¹ as Ecosystems and Habitats with Significant Indigenous Biodiversity Values: <ul style="list-style-type: none"> River with Significant Indigenous Ecosystems – high macroinvertebrate community health: The Ōtaki River and all tributaries (Schedule F1) River with significant indigenous ecosystems - Habitat for indigenous fish species of conservation interest: The Ōtaki River and all tributaries and, the Mangaone Stream and all tributaries (Schedule F1) River with significant indigenous ecosystems - Habitat for 6 or more migratory indigenous fish species: The Ōtaki River and all tributaries and, Mangaone Stream and all tributaries (Schedule F1) Known river and parts of the coastal marine area with īnanga spawning habitat: Ōtaki River, the Mangahānene Stream, and the Mangaone Stream (Schedule F1b) Habitats for indigenous birds in rivers: Ōtaki River from downstream end of gorge to coastal marine area boundary (Schedule F2a) Habitats for indigenous birds in the coastal marine area: Ōtaki River mouth - from CMA boundary to MHWS (Schedule F2c) Significant Natural Wetland: Ōtaki River Mouth South and, Ōtaki River Mouth Lagoon & Rangioru Wetland (Schedule F3) Sites with significant indigenous biodiversity values in the coastal marine area: Ōtaki River mouth/Estuary (Schedule F4)
District	Parts of the Ōtaki Coast KNE have been identified by KCDC as Ecological Sites of Significance (See Appendix 1, Map 4). They are listed in the KCDC District Plan Heritage Register ¹² as: <ul style="list-style-type: none"> K027: Ōtaki River mouth (69.03 ha) K231: Te Horo gravel beach (13.35 ha)
Other (non-ecological designations of relevance)	Parts of the Ōtaki Coast KNE site are scheduled under Greater Wellington’s proposed Natural Resources Plan (PNRP) ¹³ as: <ul style="list-style-type: none"> Contact recreation and Māori use: Regionally significant primary contact recreation rivers and lakes: Ōtaki River (Schedule H) A significant geological feature in the coastal marine area: The Ōtaki River Mouth Hapua/Lagoon (Schedule J) (See Appendix 1, Map 1). Community Drinking Water Surface Abstraction: Ōtaki River (Schedule M1)

6.2. Ecological significance

The Ōtaki Coast KNE site is considered to be of regional importance because:

- It contains highly **representative** ecosystems that were once typical or commonplace in the region
- It contains ecological features that are **rare or distinctive** in the region
- It contains high levels of ecosystem **diversity**, with several ecosystem types represented within the KNE site boundary, including several naturally uncommon ecosystems
- Its **ecological context** is valuable at the landscape scale as it contains a variety of inter-connected habitats and, provides core/seasonal habitat for threatened indigenous plant and animal species within the KNE site

Representativeness

The Threatened Environment Classification system¹⁴ indicates that a significant amount of the KNE site is considered Chronically Threatened (47 ha) with 10-20% indigenous cover remaining. A smaller portion of the KNE site (26 ha), comprising mostly wetland areas, is considered Acutely Threatened with less than 10% indigenous cover remaining and the habitat under-protected on a national scale (see Appendix 1, Map 5).

Wetlands are now considered an uncommon habitat type in the Wellington Region with approximately 2.3% of their original extent remaining¹⁵. The Ōtaki River Mouth South Wetland (Katihiku Wetland) and the Ōtaki River Mouth Lagoon & Rangioru Wetland, located within the Ōtaki Coast KNE site, are some of the very few remnants of once widespread swamps on the Kāpiti Coast¹⁶.

Rarity/distinctiveness

The PNRP identifies the Ōtaki Coast as having nationally significant geological features in the marine coastal area¹⁷. The Ōtaki River mouth is one of the few examples of a fluvially dominated, river mouth lagoon and barrier spit system in the North Island known as a hapua¹⁸. These non-estuarine systems are globally rare but are locally more common in New Zealand, particularly on the West Coast of the South Island¹⁹. Hapua are different from more conventional river mouth estuaries in that they are unique to braided gravel rivers and coarse sediment coasts. These distinct landform features are also characterised by the absence of saltwater flushing with the tides and instead the flow is dominated by outward flowing freshwater²⁰. Hapua also have significant ecological and cultural value in that they provide key links for migrating fish, mahinga kai (traditional Māori food and resources) and are often associated with ecologically-significant wetlands²¹.

Several naturally uncommon ecosystem types^{22,23} are present within the KNE site. These include coastal turfs classified as 'Critically Endangered'; shingle beaches, coastal lagoons, stony beach ridges and braided river systems classified as 'Endangered'; and estuaries classified as 'Vulnerable'. Appendix 1, Map 6 depicts the habitat types present within the KNE site.

New Zealand's National Threat Classification System²⁴ lists 4 plant, 9 bird and 7 fish species as Nationally Threatened or At Risk within the KNE site. The Plant Conservation Strategy for the Wellington Conservancy²⁵ also lists 5 plant species as regionally threatened within the KNE site. Nationally threatened species are listed in Appendix 2 and regionally threatened species are listed in Appendix 3.

Diversity

At present, the KNE site contains numerous ecosystem types, ranging from the hapua, gravel beaches, raised stony ridges, estuarine habitat, freshwater wetlands and regenerating coastal forest. These varied ecosystem types and transitional ecotones provide a range of habitats to support a high diversity of flora and fauna.

The Singers and Rogers²⁶ classification of pre-human ecosystems in New Zealand indicates that seven ecosystem types were present within the KNE site. These were comprised of hard tussock, scabweed gravelfield/stonefield (BR1) around the lower reaches and surrounding gravel banks of the Ōtaki River. The gravel beaches comprised predominantly of spinifex, pīngao grassland/sedgeland (DN2) with a coastal sand dunes mosaic of spinifex, pīngao grassland/sedgeland (DN2) and oioi, knobby clubbrush sedgeland (DN5) more prominent around the wider Ōtaki River mouth margins. A swamp mosaic of flaxland (WL18), raupō reedland (WL19) and coprosma, twiggly tree daisy scrub (WL20) was prominent around the areas now recognised as wetlands. The swamp areas and river margins were fringed by tōtara, mataī, ribbonwood forest (WF2) and pukatea, kahikatea forest (WF8) however are no longer present within the KNE site.

Ecological context

The KNE site is considered an important seasonal breeding site for wetland and shorebirds, in particular pied stilts²⁷. Whilst the Ōtaki River and Mangaone Stream mouths are important habitat for migrating and spawning native fish, including a number of threatened species.

The KNE site is located within 3km of a number of other KNE sites, namely Peka Peka Coast, Te Hapua Wetland Complex, Waitohu Coast and Haruātai/Pareomatangae. These KNE sites are thought to form an important network of habitat linkages within the wider ecological landscape, enabling coastal, wetland and forest birds to forage, breed and disperse throughout the local area.

The site also forms part of the Ōtaki river corridor linking the coast with the Tararua mountain range through an otherwise agricultural or developed landscape.

6.3. Ecological features

The Ōtaki Coast KNE site is located within the Foxton Ecological District²⁸ which is characterised by Holocene sand-dune country. The climate is warm with westerly to north-westerly winds prevailing with frequent gales and an annual rainfall ranging between 800-1,000mm²⁹.

The features of the Ōtaki River and estuary have been extensively modified and constrained by flood protection works that have been ongoing since the 1930s³⁰. Works include the construction of stopbanks that have narrowed the river mouth as well as

lagoon and semi-regular mouth cutting which has restricted the growth and movement of the river mouthspits³¹. Greater Wellington has a responsibility for flood risk and erosion control management and currently manages the Ōtaki River, including the two lagoons on the north and south side and the sandspit, in accordance with the Ōtaki Flood Plain Management Plan³².

Habitats (inc. vegetation communities and plants)

The Ōtaki Coast KNE site contains a number of distinctly different habitat types. Exposure to harsh coastal elements such as salt from spume and spray-drift, combined with extreme wind exposure³³, have strongly influenced the native plant communities present at the site and continue to shape this dynamic landscape.

Appendix 1, Map 6 depicts the different habitat types present within the KNE site.

Ōtaki River Mouth Lagoon and Rangioru wetland (Operational area A)

The Ōtaki River Mouth Lagoon comprises predominantly of freshwater wetland species including areas of harakeke (*Phormium tenax*) flax tussockland with areas of toetoe (*Austroderia toetoe*) and *Coprosma repens*. A large stand of raupō (*Typha orientalis*) reedland dominates the central wetland area adjacent to a small tributary stream which feeds into the lagoon³⁴. The remaining vegetation comprises of *Carex geminata* and wīwī (*Juncus edgariae*) sedgeland with lake club rush (*Schoenoplectus tabernaemontani*) and *Isolepis prolifera* also present. Tall fescue is also abundant throughout the entire area, largely interspersed between the sedgeland and flax tussockland³⁵. The wetland was fenced off to prevent stock access in 2013.

The Rangioru wetland occupies the area beside the Rangioru Stream. The central wetland area is dominated by almost monospecific stands of raupō reedland, while the spring-fed stream supports a suite of native aquatic plants such as *Chara* and *Nitella* species.

Katihiku freshwater wetlands (Operational area B)

The Katihiku wetland area has three distinct freshwater wetland areas; Whakapawaewae wetlands, the backwater wetlands and the eastern wetlands. The Whakapawaewae wetlands are an ecologically important remnant of a once more extensive wetland which stretched across the coastal plain between the Ōtaki and Waikanae Rivers³⁶. The native vegetation is mainly characterised by harakeke, toetoe and tī kōuka (*Cordyline australis*) with a thick understorey of *Carex geminata* and *Carex lessoniana* interspersed with scattered tall fescue. Karamū (*Coprosma robusta*) and mingimingi (*Coprosma propinqua*) are sparsely scattered throughout the wetland and isolated patches of baumea (*Machaerina rubiginosa*), tall spike sedge (*Eleocharis sphacelata*), swamp fern (*Thelypteris confluens*), and tangle fern (*Gleichenia dicarpa*) are also present. The wetland margins contain occasional tussocks of fan-flowered rush (*Juncus sarophorus*) and soft rush (*Juncus effuses*) rushland^{37,38}.

The backwater wetlands are largely dominated by exotic woody species with some elements of regenerating coastal forest such as māhoe (*Melicactus ramiflorus*), karamū and tree fern species such as mamaku (*Cyathea dealbata*) and whekī (*Dicksonia squarrosa*).

The low statured eastern wetlands are dominated largely by harakeke with sedgeland and raupō also present.

The different wetland areas present within Operational Area A and B can be seen in more detail in Appendix 1, Map 7.

Ōtaki Braided River (Operational area C)

The lower reaches of the Ōtaki River is described as a fast-flowing gravel braided system. Vegetation communities within the tidal area of the river system are sparse whilst the gravel banks are largely dominated by exotic species such as crack willow (*Salix fragilis*), brush wattle (*Paraserianthes lophantha*) and pampas (*Cortaderia selloana*)³⁹.

Coastal turfs (Operational area D)

The intertidal zones with brackish influences, located on the southern side of the Ōtaki River mouth, contain significant areas of herbfield known as coastal turfs. The dominant native plant species present within these coastal turf areas include bachelors' button (*Cotula coronopifolia*), shore primrose (*Samolus repens*), halfstar (*Selliera radicans*), slender clubrush (*Isolepis cernua*) and mudwort (*Limosella lineata*)^{40,41}. Small populations of ōioi (*Leptocarpus similis*) and sand sedge (*Carex litorosa*) are also found on the estuarine margins.

North estuary gravel beach and Te Horo gravel beach (Operational area E)

The gravel beaches are located directly to the north and south of the Ōtaki River mouth. Both beaches are subject to strong tidal and wind influences and support sparse associations of pīngao (*Ficinia spiralis*), sand sedge (*Carex pumila*) and knobby clubrush/wīwī (*Ficinia nodosa*). Large piles of driftwood and gravel deposited on the shore south of the Ōtaki River by the river system and onshore currents, provide substrate for a special assemblage of native climbers such as pōhuehue (*Muehlenbeckia complexa*), New Zealand spinach/ kōkihi (*Tetragonia implexicoma*) and shore convolvulus (*Calystegia soldanella*)⁴².

Raised stony ridges are typically located inland from the gravel beaches and are rarely subject to the same level of coastal disturbance as gravel beaches. They have larger sized stones on average and typically support native scrub vegetation communities. The native vegetation within the KNE site's raised stony ridges is characterised by knobby clubrush/wīwī and isolated patches of harakeke, *Coprosma repens* and sand coprosma (*Coprosma acerosa*).

Mangaone Stream, estuary and wetland (Operational area F)

The Mangaone Stream flows through a highly modified reserve area. However, the Mangaone Restoration Group has been working since the early 2000s to restore the riparian strip along the stream with native species such as mānuka (*Leptospermum scoparium*), *Coprosma repens*, koromiko (*Hebe stricta*), coastal tree daisy (*Olearia solandri*), giant umbrella sedge (*Cyperus ustulatus*) and tī kōuka. The small artificially impounded wetland present to the south of the estuary comprises of a dense mosaic of ōioi (*Apodasmia similis*) and sea rush (*Juncus kraussii* var. *australiensis*) with patches of harakeke, giant umbrella sedge, *Coprosma repens* and toetoe also present⁴³.

Species

Birds

The KNE site provides significant habitat for a range of native bird species, with the Ōtaki River and estuary in particular supporting a high diversity and abundance of native riverbed nesting shorebirds. The site has been recognised as providing important habitat for the largest breeding populations of banded dotterel (*Charadrius bicinctus*; Nationally Vulnerable) and black-fronted dotterels (*Elseyornis melanops*; Naturally Uncommon) on the west coast of the North Island south of the Manawatu River^{44,45}. These populations represent approximately 8% of the Wellington region's populations of both dotterel species which breed on the Ōtaki River each year⁴⁶. The KNE site also supports a large poaka/pied stilt (*Himantopus leucocephalus*; Not Threatened) colony with 3% of the Wellington region's population of pied stilts breeding on the Ōtaki River each year⁴⁷.

Other threatened bird species known to be present include; variable oystercatcher (*Haematopus unicolor*; Recovering), caspian tern (*Hydroprogne caspia*; Nationally Vulnerable), red-billed gull (*Chroicocephalus scopulinus*; Declining), black shag (*Phalacrocorax carbo*; Naturally Uncommon), pied shag (*Phalacrocorax varius*; Recovering), royal spoonbill (*Platalea regia*; Naturally Uncommon), wrybill (*Anarhynchus frontalis*; Nationally Vulnerable), NZ pipit (*Anthus novaeseelandiae*; Declining), and white-fronted tern (*Sterna striata*; Declining)^{48,49,50,51,52}.

A comprehensive list of threatened native bird species recorded within the KNE site are listed in Appendix 2.

Fish and kōura

The Ōtaki River supports a wide range of native fish species in a variety of habitats from the upper catchment to the river mouth⁵³. Thirteen native fish species have been recorded in the Ōtaki River and Mangaone Stream, most of which are diadromous⁵⁴. Nine species of fish classified as threatened have been recorded and include, short-jawed kōkopu (*Galaxias postvectis*; Nationally Vulnerable), lamprey (*Geotria australis*; Nationally Vulnerable), giant kōkopu (*Galaxias argenteus*; Declining), longfin eel (*Anguilla dieffenbachia*; Declining), torrentfish (*Cheimarrichthys fosteri*; Declining), kōaro (*Galaxias brevipinnis*; Declining), īnanga (*Galaxias maculatus*; Declining), bluebill bully (*Gobiomorphus hubbsi*; Declining) and dwarf galaxid (*Galaxias divergens*; Declining)^{55,56,57,58}. In addition, kōura/freshwater crayfish (*Paranephrops planifrons*; Declining) are common in the lower catchment of the Ōtaki River^{59,60}.

Other non-threatened native fish species known to be present within the KNE site include the shortfin eel (*Anguilla australis*), banded kōkopu (*Galaxias fasciatus*), common bully (*Gobiomorphus cotidianus*) and redfin bully (*Gobiomorphus huttoni*)^{61,62}.

A comprehensive list of threatened native fish species recorded within the KNE site are listed in Appendix 2.

Reptiles (herpetofauna)

Lizard surveys have not been undertaken specifically within the KNE site however, the northern grass skink (*Oligosoma polychroma*, Not Threatened) has previously been recorded at the river mouth^{63,64}. Other species such as the ornate skink (*Oligosoma*

ornatum; At risk-Declining) and the copper skink (*Oligosoma aeneum*; Not Threatened) have also been recorded in the vicinity⁶⁵. Additionally, the driftwood debris along the gravel beaches within the KNE site is believed to provide suitable habitat for lizard species commonly found along the coast⁶⁶.

7. Threats to ecological values at the KNE site

Ecological values can be threatened by human activities, and by introduced animals and plants that change ecosystem dynamics. The key to protecting and restoring biodiversity as part of the KNE Programme is to manage threats to the ecological values at each KNE site.

7.1. Key threats

The primary threats to the ecological values of the Ōtaki Coast KNE site are ecological weed species, pest animals, altered hydrology and off-road recreational driving.

Ecological weeds are widespread throughout the KNE site ranging from exotic climbers, ground-covering plants, exotic grasses and woody tree species. The presence of ecological weeds can affect the biodiversity values of the site by outcompeting and displacing native vegetation, affect the structure and composition of ecosystems and altering hydrological conditions that sustain the wetland ecology. This further hinders the natural regeneration of native vegetation and reduces species diversity and the availability of food resources for native animals. The estuary, freshwater wetlands and riparian edges are currently dominated by blackberry (*Rubus fruticosus* agg.), gorse (*Ulex europaeus*), Japanese honeysuckle (*Lonicera japonica*), willow species (*Salix* spp.), pampas grass (*Cortaderia* spp.) and brush wattle (*Paraserianthes lophantha*). Whilst the gravel beaches are impacted by ecological weeds such as iceplant (*Carpobrotus edulis*), gorse, spike rush (*Juncus acutus*) and the non-local native tree species, karo (*Pittosporum crassifolium*). These species readily colonise this harsh coastal environment and outcompete and displace local native species.

Pest animals affect the estuary and wetland habitat by over-browsing native vegetation, out-competing native species for food and resources, and through direct predation. Mustelids, such as stoats (*Mustela erminea*), weasels (*Mustela nivalis*) and ferrets (*Mustela furo*), as well as cats (*Felis catus*), rats (*Rattus* spp.) and hedgehogs (*Erinaceus europaeus*) are the biggest threats to the identified ecological values of the KNE site. These pest animal species can impact native regeneration, compete for food resources and are known to predate native lizards, invertebrates and coastal and wetland bird species, particularly nesting birds, chicks and eggs.

Altered hydrology negatively impacts the ecology of the river. Modified flow regimes as a result of flood protection management, new development (ie, roading), and industrial operations (ie, quarry mining) lead to changes in water velocity and the benthic structure of the stream bed. Examples of activities which modify flow regimes include water extraction, water diversion, installation of hard structures (ie, culverts, piping, flood gates, etc), and gravel extraction. All such activities occur on the Ōtaki River.

The gravel beaches and stony ridge systems on either side of the Ōtaki River are regularly accessed by vehicles. Off road vehicle use damages the gravel beach ecosystems causing accelerated erosion. Vehicles can also introduce ecological weeds and disturb nesting birds.

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 Ōtaki Coast KNE site (including those discussed above), detailing which operational areas they affect, how each threat impacts on ecological values, and whether they will be addressed by operational activities.

Table 3: Summary of all threats to ecological values present at the Ōtaki Coast KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
Ecological weeds		
EW-1	Climbing weeds smother and displace native vegetation often causing canopy collapse. They also inhibit native plant regeneration, and alter vegetation structure and composition. Key weed species include Japanese honeysuckle (<i>Lonicera japonica</i>), blackberry (<i>Rubus fruticosus</i> agg.) and German ivy (<i>Delairea odorata</i>) (see full list in Appendix 4)	Entire KNE site
EW-2	Ground covering ecological weeds smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include; iceplant (<i>Carpobretus edulis</i>), periwinkle (<i>Vinca major</i>), arum lily (<i>Zantedeschia aethiopica</i>) and Agapanthus (<i>Agapanthus praecox</i> subsp. <i>Orientalis</i>) (see full list in Appendix 4)	Entire KNE site
EW-3	Exotic grass species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include: pampas (<i>Cortaderia selloana/C. jubata</i>), kikuyu (<i>Pennisetum clandestinum</i>) and marram grass (<i>Ammophila arenaria</i>) (see full list in Appendix 4)	Entire KNE site
EW-4	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include willows (<i>Salix</i> spp.), brush wattle (<i>Paraserianthes lophantha</i>), boxthorn (<i>Lycium ferocissimum</i>) and karo (<i>Pittosporum crassifolium</i>) (see full list in Appendix 4)	Entire KNE site
EW-5	Aquatic weeds out-compete native aquatic species and choke watercourses. Key weed species include parrots feather (<i>Myriophyllum aquaticum</i>), reed sweet grass (<i>Glyceria maxima</i>) and cape pond lily (<i>Aponogeton distachyos</i>) (see full list in Appendix 4)	A, B and F
Pest animals		
PA-1	Mustelids (stoats ^{67,68} (<i>Mustela erminea</i>), ferrets ^{69,70} (<i>M. furo</i>) and weasels ^{71,72} (<i>M. nivalis</i>)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
PA-2	Rats (<i>Rattus</i> spp.) browse native fruit, seeds and vegetation. They compete with native fauna for food and can reduce forest regeneration. They also prey on invertebrates, lizards and native birds ^{73,74}	Entire KNE site
PA-3	Feral and domestic cats (<i>Felis catus</i>) prey on native birds ⁷⁵ , lizards ⁷⁶ and invertebrates ⁷⁷ , reducing native fauna breeding success and potentially causing local extinctions ⁷⁸	Entire KNE site
PA-4	Hedgehogs (<i>Erinaceus europaeus</i>) prey on native invertebrates ⁷⁹ , lizards ⁸⁰ and the eggs ⁸¹ and chicks of ground-nesting birds ⁸²	Entire KNE site
PA-6	Possums (<i>Trichosurus vulpecula</i>) browse palatable canopy vegetation until it can no longer recover ^{83,84} . This destroys the forest's structure, diversity and function. Possums may also prey on native birds ⁸⁵ and invertebrates	Entire KNE site
PA-6*	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 ^{86,87}	Entire KNE site
PA-7*	Rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus europaeus</i>) graze on palatable native vegetation and prevent natural regeneration in some environments ⁸⁸ . 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	Entire KNE site
PA-8*	Wasps (<i>Vespula</i> spp.) adversely impact native invertebrates and birds through predation and competition for food resources. They also affect nutrient cycles in beech forests ⁸⁹	Entire KNE site
PA-9*	Brown trout (<i>Salmo trutta</i>) and rainbow trout (<i>Oncorhynchus mykiss</i>) prey on native fish and compete with them for food resources ⁹⁰	C
Human activities		
HA-1*	Garden waste dumping often leads to ecological weed invasions into natural areas. Common weed species introduced at this KNE site include periwinkle (<i>Vinca major</i>) and Japanese honeysuckle (<i>Lonicera japonica</i>)	Entire KNE site
HA-2*	Recreational vehicles such as 4WDs and motorbikes can cause damage to dune systems and disturbance of the native ecosystem	A, B, D, E, F
HA-3*	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	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
HA-4*	Historic flood protection management including the installation of stopbanks and floodgates have altered the hydrological conditions of the estuaries. This has impacted on the long-term viability of some wetland habitats and restricted native fish passage	A, B, C, D, F
HA-5*	Encroachment of residential gardens into the KNE site from urban areas causes habitat loss and introduces ecological weeds	E, F
HA-6*	Barriers to native fish passage are present in streams within the KNE site preventing migrating fish from completing their life-cycle	A, B, C, D, F
HA-7*	Poor water quality affects a range of species in the estuary and stream. High nutrient levels and contaminants within watercourses are often caused by upstream land management practices and pollution events including development practices, forestry and agricultural practices, road run-off and storm water entering the watercourse, and septic tank leakages	A, B, C, D, F
HA-8*	Freshwater activities such as boating, fishing, white baiting and duck shooting can introduce aquatic weed species to waterways.	A, B, C
HA-9*	Over-fishing, particularly of whitebait, may reduce fish stocks to non-sustainable levels	A,B, C
Other threats		
OT-1*	Edge effects affect regenerating forests 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) ^{91,92}	Entire KNE site
OT-2*	Extreme environmental weather patterns or events such as sea level rise and storm surges can result in increased storm damage and/ or complete inundation of sea water into the KNE site dramatically affecting the condition of the vegetation communities and/or breeding succession of shorebirds within the KNE site	Entire KNE site

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

8. Vision and objectives

8.1. Vision

The Ōtaki Coast KNE site comprises fully functioning and interconnected coastal and wetland ecosystems dominated by healthy, regenerating native vegetation communities and supporting thriving native fauna.

8.2. Objectives

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

The following objectives will guide the operational activities at the Ōtaki Coast KNE site.

1. **To increase the dominance, diversity and regeneration of native plant communities across the KNE site**
2. **To protect 'Threatened' and 'At Risk' native plant species present within the KNE site**
3. **Protect and enhance the condition of uncommon ecosystems present within the KNE site eg, wetlands and coastal turfs**
4. **Improve the resilience and function of the sand dunes ecosystems**
5. **To protect and enhance essential habitat for native coastal and wetland bird species, particularly threatened or regionally rare species**
6. **To enhance the values of the native fish habitat within the KNE site**

9. Operational activities

Operational activities are targeted to work towards the objectives above (Section 8) by responding to the threats outlined in Section 7. The broad approach to operational activities is described briefly below, and specific actions, with budget figures attached, are set out in the operational delivery schedule (Table 5).

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

The primary management activities undertaken in the KNE site are ecological weed control, pest animal control and revegetation.

For practicality of management, the KNE site has been divided into 6 operational areas based on their ecological features (See Appendix 1, Map 6). These are:

- A:** Ōtaki River Mouth Lagoon and Rangiora wetland and stream edge (17.8 ha)
- B:** Katihiku freshwater wetlands (25.3 ha)
- C:** Ōtaki Braided River (27.9 ha)
- D:** Coastal turfs (1.4 ha)
- E:** North estuary gravel beach and Te Horo gravel beach (Ōtaki Estuary to Mangaone Estuary 34.2 ha)
- F:** Mangaone Stream, estuary and wetland (7.4 ha)

The different wetland areas present within Operational Areas A and B are shown in more detail in Appendix 1, Map 7.

9.1. Ecological weed control

The aim of weed control at the Ōtaki Coast KNE site is to reduce the distribution and density of existing weed populations, prevent the incursion of new weed species, increase native plant dominance and facilitate natural regeneration of native plant species, in line with objectives 1, 2, 3, 4 and 5 of this plan.

The priority ecosystems targeted for weed control include the Ōtaki River Mouth Lagoon and wetland and Rangiora wetland (Operational Area A), the Katihiku freshwater wetlands (Operational Area B) and the North estuary and Te Horo gravel beaches (Operational Area E). Greater Wellington will undertake weed control on an annual basis in these priority areas targeting species that have the highest ecological impact.

Ecological weed species recorded at the KNE site and a ranking of the potential ecological impact of each are listed in Appendix 4.

Northern side of the Ōtaki River mouth

Ongoing multi-species ecological weed control within the Ōtaki River Mouth Lagoon and wetland and Rangiora wetland (Operational Area A), and the North estuary gravel beach (Operational Area E) will be undertaken on a weekly or fortnightly basis. Priority target weed species include but are not limited to; Japanese honeysuckle (*Lonicera japonica*),

convolvulus (*Calystegia silvatica*), karo (*Pittosporum crassifolium*), arum lily (*Zantedeschia aethiopica*), montbretia (*Crocasmia × crocosmiiflora*) and gorse (*Ulex europaeus*). This work is funded by Greater Wellington's Flood Protection department with FOTOR and KCDC field staff assistance.

Crack willow control will also be undertaken on the margins of the Rangiora wetland (Operational Area A) within the term of this plan. This work will be undertaken by Greater Wellington's Biosecurity department.

Southern side of the Ōtaki River mouth

Ongoing strategic control of ecological weeds located around associations of mature native tree species will be undertaken within the Katihiku freshwater wetlands (Operational Area B) with the intention of releasing these trees from the competitive pressure of woody weed species. This approach will facilitate natural regeneration of native vegetation by enabling these small islands or nodes of established native vegetation to disperse seed across the KNE site. Priority target weed species include but are not limited to; pampas (*Cortaderia* spp.), willows (*Salix* spp.), blackberry (*Rubus fruticosus* agg.), gorse (*Ulex europaeus*) and brush wattle (*Paraserianthes lophantha*). This work will be undertaken by Greater Wellington's Biosecurity department.

A multi-species weed sweep will also be undertaken in the Whakapawaewae wetlands within the Katihiku freshwater wetlands area (Operational Area B) annually for the first three years of this plan. Priority target weed species include but are not limited to; blackberry (*Rubus fruticosus* agg.), convolvulus (*Calystegia silvatica*) and gorse (*Ulex europaeus*) which occur around the wetland margins. This work will be funded by the Biodiversity department's Wetland Programme.

Annual pampas (*Cortaderia* spp.) control will also be undertaken on the northern side of the stopbank within the Katihiku freshwater wetlands area (Operational Area B). Pampas is widespread throughout this area and therefore control will be undertaken in a step-wise approach over the duration of this plan. To achieve this, four distinct sections for pampas control have been defined (Areas 1, 2, 3 and 4) (see Appendix 1, Map 8). Each year, only one section will be targeted for pampas control, starting on the eastern, upstream side of the river and progressively working downstream. This work will be undertaken by Greater Wellington's Biosecurity and Flood Protection departments. Additionally, the river margins on the northern side of the stopbank in this area are designated for gravel extraction to be undertaken by Greater Wellington's Flood Protection department for flood management purposes (Area 5) (see Appendix 1, Map 8). Therefore, pampas control in this area will only be undertaken as required to prevent incursions into other control areas. Revegetation planting will also be undertaken after weed control efforts have been completed within each section to reduce pampas regrowth and incursion of other weed species. Further detail regarding revegetation of this area is outlined in Section 9.3.

Multi-species ecological weed control will also be undertaken on the Coastal Turfs (Operational Area D) and along the North estuary and Te Horo gravel beaches (Operational Area E) on an annual basis. Priority target weed species include but are not limited to; blackberry (*Rubus fruticosus* agg.), Japanese honeysuckle (*Lonicera japonica*); boxthorn (*Lycium ferocissimum*), gorse (*Ulex europaeus*), karo (*Pittosporum*

crassifolium), iceplant (*Carpobretus edulis*) and sharp rush (*Juncus acutus*). This work will be undertaken by Greater Wellington's Biosecurity department.

9.2. Pest animal control

The aim of pest animal control at the KNE site is to increase native plant regeneration and the abundance of threatened plants through the control of mammalian browsers, and increase populations of native shorebirds and wetland birds through the control of mammalian predators, in line with objectives 1, 2, 3 and 5 of this plan.

KNE Pest Animal Control Network

Pest animal control is undertaken in Operational Areas A and B to protect native birds from predation that utilise the gravel islands and freshwater wetland areas within the Ōtaki River corridor. 35 DOC 250 kill-traps, 12 Timms traps and 14 bait-stations are located around the Ōtaki River mouth and surrounding areas (see Appendix 1, Map 9).

Greater Wellington service and maintain the majority of the pest animal trapping network on the northern side of the Ōtaki estuary on a monthly basis. The Flood Protection department services the 14 kill-traps whilst the Bioworks department service 1 of the traps along the public road. The remaining 3 kill-traps as well as one Timms trap and 3 bait stations are serviced and maintained by the landowner of the Rangiuuru wetland on a monthly basis. Bait for traps and bait stations is provided by Greater Wellington.

The pest animal control network on the southern side of the Ōtaki estuary, comprising 17 kill-traps, 10 Timms traps and 11 bait stations, has been serviced and maintained by Katihiku hapū representatives in the past. However, the network is currently in disrepair and in need of refurbishment. Within the term of this plan, the entire pest animal control network on the southern side will be refurbished with funding provided by the Greater Wellington Wetland Programme. On completion of the refurbishment, Katihiku hapū will resume servicing the network on a monthly basis and bait will be provided by Greater Wellington.

TBFree Programme

OSPRI⁹³ controls possums within the wider Kāpiti Coast area with a low density poison bait-station network as part of their vector control programme that aims to eradicate bovine tuberculosis across the landscape by 2032. The KNE site lies within the programme's 'buffer zone' that aims to control possums to <5% Residual Trap Catch (RTC). This programme, although less intensive than that within the KNE site, will assist in reducing possum incursions in to the KNE site.

9.3. Revegetation

The aim of revegetation at the Ōtaki Coast KNE site is to increase native plant species dominance, increase the resilience, structure and natural function of native plant communities, provide a seed source to aid natural regeneration and to enhance essential habitat for native birds in line with objectives 1, 3, 4, 5 and 6 of this plan.

A list of suitable plant species to be used in any revegetation planting at the KNE site can be found in Appendix 5. All plants will be eco-sourced from the Foxton Ecological District.

Northern side of the Ōtaki River mouth

The Ōtaki River estuary is recognised as containing some of the highest ecological values along the Ōtaki River and has been identified as a priority area for restoration. FOTOR have been working in partnership with Greater Wellington’s Biodiversity and Flood Protection departments for a number of years to undertake extensive revegetation plantings on the northern side.

In addition, FOTOR have developed the Friends of Ōtaki River Restoration Planting Plan 2017-2020⁹⁴ in association with Greater Wellington. This plan outlines the restoration planting activities undertaken by FOTOR within the northern Ōtaki River estuary area and also within other areas along the Ōtaki River outside of the KNE site.

The Ōtaki River estuary and River Mouth Lagoon areas are subject to harsh and dynamic conditions such as frequent flood events, extreme wind exposure and erosion. Consequentially, these conditions reduce survival rates of native plantings making the establishment of large, permanent areas of native vegetation difficult. Therefore revegetation in this area will focus on creating numerous ‘nodes’ of native plants with the aim of re-establishing and enhancing natural processes, such as seed dispersal, to enable natural regeneration of native species across the site.

FOTOR will continue to plant approximately 300 eco-sourced plants each year within Planting Zones A, B and C around the margins of the Ōtaki River mouth (Operational Area A) (see Appendix 1, Map 10). Planting Zone A, located toward the public road, comprises nodes of well-established native plantings from previous revegetation efforts. Planting Zone B is characterised by two nodes which comprise of harakeke, toetoe (*Austroderia toetoe*), swamp maire (*Syzygium maire*), māhoe (*Melicytus ramiflorus*) and kōkihi from previous plantings. The aim of revegetation in Planting Zones A and B is to infill gaps and replace lost plants from previous plantings. Planting Zone C, located along the western lagoon edge, is a new node to be planted and will be planted predominantly with mingimingi (*Coprosma propinqua*) and saltmarsh ribbonwood (*Plagianthus divaricatus*). Funding for this planting will be provided by Greater Wellington’s Flood Protection department.

The river cross section sightlines (see Appendix 1, Map 10) must remain clear of vegetation to allow the Flood Protection department an unobstructed view of the river. Therefore no plantings will be undertaken with a 2 m corridor on either side of the sightline survey markers.

Revegetation of the riparian margin of the Ngātoko Stream, adjacent to the Rangiuuru wetland (Planting Zone D) (see Appendix 1, Map 10), will also be undertaken within the term of this plan. Potential inanga spawning locations have been identified in this area⁹⁵ and therefore, revegetation planting should consider plant species that would enhance spawning habitat. The plants will be provided by KCDC and the landowner will undertake the planting.

Southern side of the Ōtaki River mouth

Approximately 200 eco-sourced plants will be planted annually along the gravel beach area (Operational Area E) between the southern Ōtaki River estuary and the Sims Road entrance. The plants will be provided by KCDC and the landowner will undertake the planting and maintenance thereafter.

Revegetation planting will also be undertaken on the northern side of the stopbank within the Katihiku freshwater wetlands area (Operational Area B) following the completion of pampas control within each section. Revegetation will be undertaken in a step-wise approach and will only commence in a given section once pampas has been reduced significantly (see Appendix 1, Map 8 for location of sections to be planted). Vegetation in this area will focus on creating 'nodes' of native plants similarly to those established on the northern side of the river. Consideration should also be given to planting native species that provide for and enhance suitable spawning habitat in areas around the blind braid channel which has been identified as a possible spawning location⁹⁶. The revegetation activity will be funded by Greater Wellington's Biodiversity department and is subject to change annually according to funding availability.

Additionally, revegetation planting will be undertaken on the riparian margins around the Eastern wetlands within the Katihiku freshwater wetlands area (Operational Area B) (see Appendix 1, Map 7) in accordance with ecological mitigation requirements for the Peka Peka to Ōtaki expressway project. This revegetation activity will be funded by New Zealand Transport Agency (NZTA) and the planning and implementation will be undertaken by Katihiku X Trust and WSP OPUS.

The Mangaone Restoration Group will continue to maintain and release previous plantings undertaken around the Mangaone Stream, estuary and wetland (Operational area F) on an annual basis to ensure successful establishment. Work undertaken by this group is supported by KCDC.

9.4. Management of 'Threatened' native plant species

Management of specified native plant species classified as 'Threatened' will be undertaken to maintain or increase existing populations present within the KNE site in line with objectives 2 and 3 of this plan.

Sand coprosma (*Coprosma acerosa*; Declining) occurs in association with knobby clubrush around the Ōtaki River Mouth Lagoon and Rangiuru wetland (Operational Area A), Katihiku freshwater wetlands (Operational Area B) and Ōtaki River (Operational Area C). Whilst populations of sand sedge (*Carex litorosa*; Declining) occur around the coastal turfs (Operational Area D). A fine scale management approach will be used to undertake weed control in the vicinity of these threatened plant communities to protect their high ecological value and reduce potential non-target exposure to herbicide. Such management methods will include use of selective herbicides only and hand weeding where herbicide use is not appropriate. Threatened plant populations will be monitored annually after weed control works. If these plant populations indicate decline, plantings may be required to sustain their population numbers. Ecological weed control in these areas is funded by KCDC.

10. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for the Ōtaki Coast KNE site, and their timing and cost over the five-year period from 1 July 2019 to 30 June 2024. The budget for years 2020/21 to 2023/24 are indicative only and subject to change. A map of operational areas can be found in Appendix 1 (see Map 6).

Table 5: Five-year operational delivery schedule for Ōtaki Coast KNE site

Objective	Management activity	Operational area	The Actions: Description/detail	Intended 5 year outcomes	Delivery	Frequency				
						2019/20	2020/21	2021/22	2022/23	2023/24
1, 2, 3, 5	Ecological weed control	A, E (Northern side of Ōtaki River mouth)	Control of priority ecological weed species	Reduction in distribution and abundance of priority weed species	GWRC Flood Protection department, FOTOR, KCDC	✓ \$3,000 [†]	✓ \$3,000 [†]	✓ \$3,000 [†]	✓ \$3,000 [†]	✓ \$3,000 [†]
1, 3, 5	Ecological weed control	A (Rangiuru wetland)	Control of priority ecological weed species – crack willow	Reduction in distribution and abundance of priority weed species	GWRC Biosecurity department	✓ \$500	✓ \$250	-	-	-
1, 2, 3, 5	Ecological weed control	B	Control of priority woody weed species to release associations of mature native trees	Reduction in distribution and abundance of priority weed species and an increase in native plant dominance	GWRC Biosecurity department	✓ \$5,700	✓ \$5,950	✓ \$5,000	✓ \$5,000	✓ \$5,000
1, 2, 3, 5	Ecological weed control	B (northern side of stopbank)	Progressive control of pampas	Reduction in distribution and abundance of priority weed species	GWRC Flood Protection department	✓ \$3,500 [†]	✓ \$3,500 [†]	✓ \$3,500 [†]	✓ \$3,500 [†]	✓ \$3,500 [†]

Objective	Management activity	Operational area	The Actions: Description/detail	Intended 5 year outcomes	Delivery	Frequency				
						2019/20	2020/21	2021/22	2022/23	2023/24
1, 2, 3, 5	Ecological weed control	B (Whakapa waewae wetlands)	Control of priority ecological weed species	Reduction in distribution and abundance of priority weed species	GWRC Biosecurity department	✓ \$2,000 ⁺⁺	✓ \$2,000 ⁺⁺	✓ \$2,000 ⁺⁺	-	-
1, 2, 3, 4, 5	Ecological weed control	D, E (Southern side of Ōtaki River mouth)	Control of priority ecological weed species	Reduction in distribution and abundance of priority weed species	GWRC Biosecurity department	✓ \$5,000	✓ \$5,000	✓ \$5,000	✓ \$5,000	✓ \$5,000
1, 2, 3, 5	Pest animal control	A (Ōtaki River mouth)	Traps and bait stations serviced on a three monthly basis and annual audit	Possums <5% RTC* Rats <10% TTI** Mustelids <2% TTI*	GWRC Flood Protection and Bioworks departments	✓	✓	✓	✓	✓
1, 2, 3, 5	Pest animal control	A (Rangiuru wetland only)	Traps and bait stations serviced on a monthly basis	Possums <5% RTC* Rats <10% TTI** Mustelids <2% TTI*	Landowner	✓	✓	✓	✓	✓
1, 2, 3, 5	Pest animal control	B	Traps and bait stations serviced on a monthly basis	Possums <5% RTC* Rats <10% TTI** Mustelids <2% TTI*	Landowner	-	✓	✓	✓	✓
1, 2, 3, 5	Pest animal control	A (Rangiuru wetland only), B	Annual audit and bait provision	A functioning and well maintained pest animal control network	GWRC Biosecurity department	-	✓ \$1,200	✓ \$1,200	✓ \$1,200	✓ \$1,200

Objective	Management activity	Operational area	The Actions: Description/detail	Intended 5 year outcomes	Delivery	Frequency				
						2019/20	2020/21	2021/22	2022/23	2023/24
1, 2, 3, 5	Pest animal control	B	Refurbishment of pest animal control network	A functioning pest control network and an increase in catch rates of target pest species	GWRC Biosecurity department	✓ \$2,100 ⁺⁺	-	-	-	-
1, 3, 5	Revegetation	A (Ōtaki River mouth)	Planting of ~300 native plants within three sites around the margins of Ōtaki River mouth	Over 80% survival of planted plants	FOTOR	✓ \$3,000 ⁺	✓ \$3,000 ⁺	✓ \$3,000 ⁺	✓ \$3,000 ⁺	✓ \$3,000 ⁺
1, 3, 4, 5, 6	Revegetation	A (Rangiuru wetland), E	Planting riparian margins of the Ngātoko Stream and planting ~200 native plants along the gravel beach between southern Ōtaki River estuary and Sims Road entrance	Over 80% survival of planted plants	KCDC and Landowners	✓ \$500 [^]	✓ \$500 [^]	✓ \$500 [^]	✓ \$500 [^]	✓ \$500 [^]
1, 3, 5, 6	Revegetation	B (northern side of stopbank)	Progressive revegetation following pampas control	Over 80% survival of planted plants	GWRC Biosecurity department and Landowner		✓	✓	✓	✓
1, 3, 5	Revegetation	B (Eastern wetlands)	Ecological mitigation planting of the riparian margins for the Peka Peka to Ōtaki expressway project	Over 80% survival of planted plants	NZTA; WSP OPUS and Landowner	✓	✓	✓	✓	✓
1, 3, 4, 5	Revegetation	F	Maintenance and release of previous plantings on an annual basis	Over 80% survival of planted plants	Mangaone Restoration Group	✓	✓	✓	✓	✓

Objective	Management activity	Operational area	The Actions: Description/detail	Intended 5 year outcomes	Delivery	Frequency				
						2019/20	2020/21	2021/22	2022/23	2023/24
2, 3	Management of Threatened native plant species	A, B, C, D	Fine scale ecological weed control around threatened plant associations	Existing populations of 'Threatened' plant species are maintained and there is an increase in their distribution across the site	GWRC Biosecurity department	✓ \$300 [^]	✓ \$300 [^]	✓ \$300 [^]	✓ \$300 [^]	✓ \$300 [^]

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

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

[†] = Funding provided by GWRC Flood Protection department

^{††} = Funding provided by GWRC Biodiversity department's Wetland Programme

[^] = Subject to continued funding by KCDC through their coastal restoration fund

11. Funding contributions

11.1. Budget allocated by Greater Wellington

The budget for the years 2020/21 to 2023/24 are indicative only and subject to change.

Table 6: Greater Wellington allocated budget for the Ōtaki Coast KNE site

Management activity	Timetable and resourcing				
	2019/20	2020/21	2021/2022	2022/23	2023/24
Ecological weed control	\$6,200	\$5,000	\$5,000	\$5,000	\$5,000
Pest animal control	-	\$1,200	\$1,200	\$1,200	\$1,200
Revegetation and weed control [†]	\$9,500	\$9,500	\$9,500	\$9,500	\$9,500
Pest animal trap network refurbishment and weed control ^{††}	\$4,100	\$2,000	\$2,000	-	-
Total	\$19,800	\$17,700	\$17,700	\$15,700	\$15,700

[†]Funding provided by GWRC Flood Protection department

^{††}Funding provided by GWRC Biodiversity department's Wetland Programme

11.2. Budget allocated by KCDC

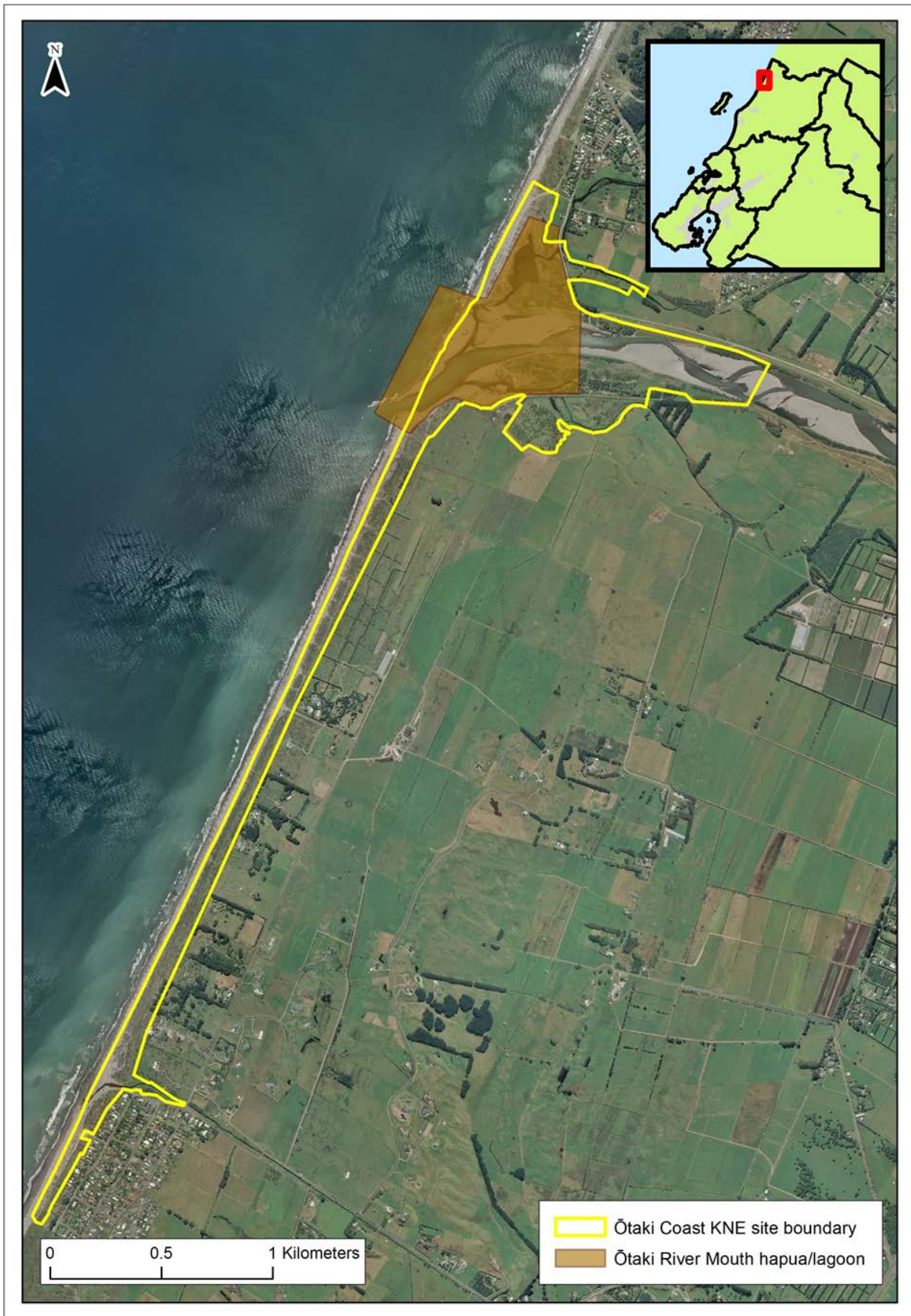
The budget is subject to confirmation through a ten-year planning process.

Table 7: KCDC allocated budget for the Ōtaki Coast KNE site

Management activity	Timetable and resourcing				
	2019/20	2020/21	2021/2022	2022/23	2023/24
Ecological weed control	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
Revegetation	\$500 [^]	\$500 [^]	\$500 [^]	\$500 [^]	\$500 [^]
Threatened species management (weed control)	\$300 [^]	\$300 [^]	\$300 [^]	\$300 [^]	\$300 [^]
Total	\$5,800	\$5,800	\$5,800	\$5,800	\$5,800

[^]Subject to continued funding by KCDC through their coastal restoration fund

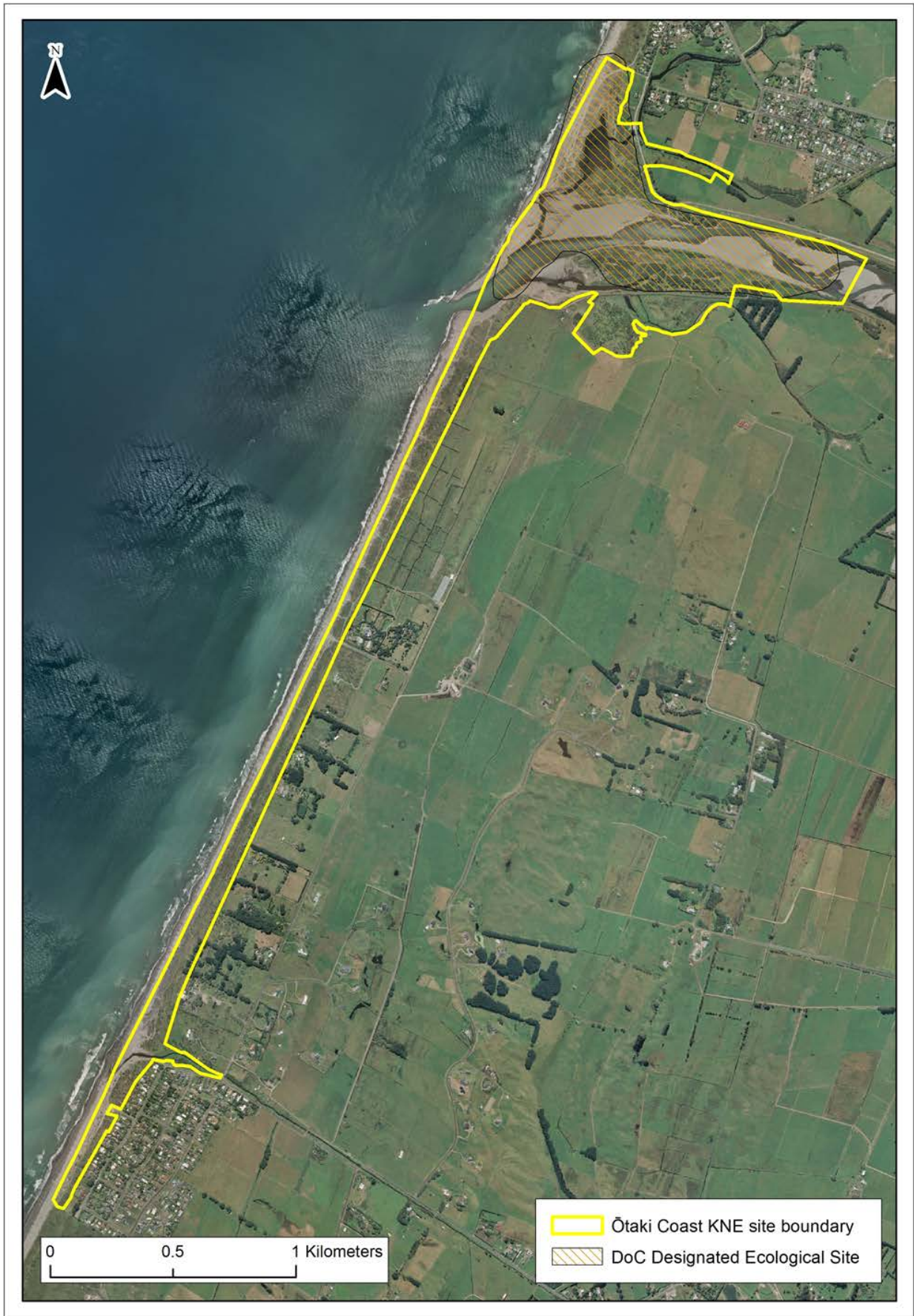
Appendix 1: Site maps



Map 1: The Ōtaki Coast KNE site boundary and location of the Ōtaki River Mouth Hapua



Map 2: Ōtaki Coast KNE site land ownership boundaries



Map 3: DOC Designated Ecological Site areas at the Ōtaki Coast KNE site



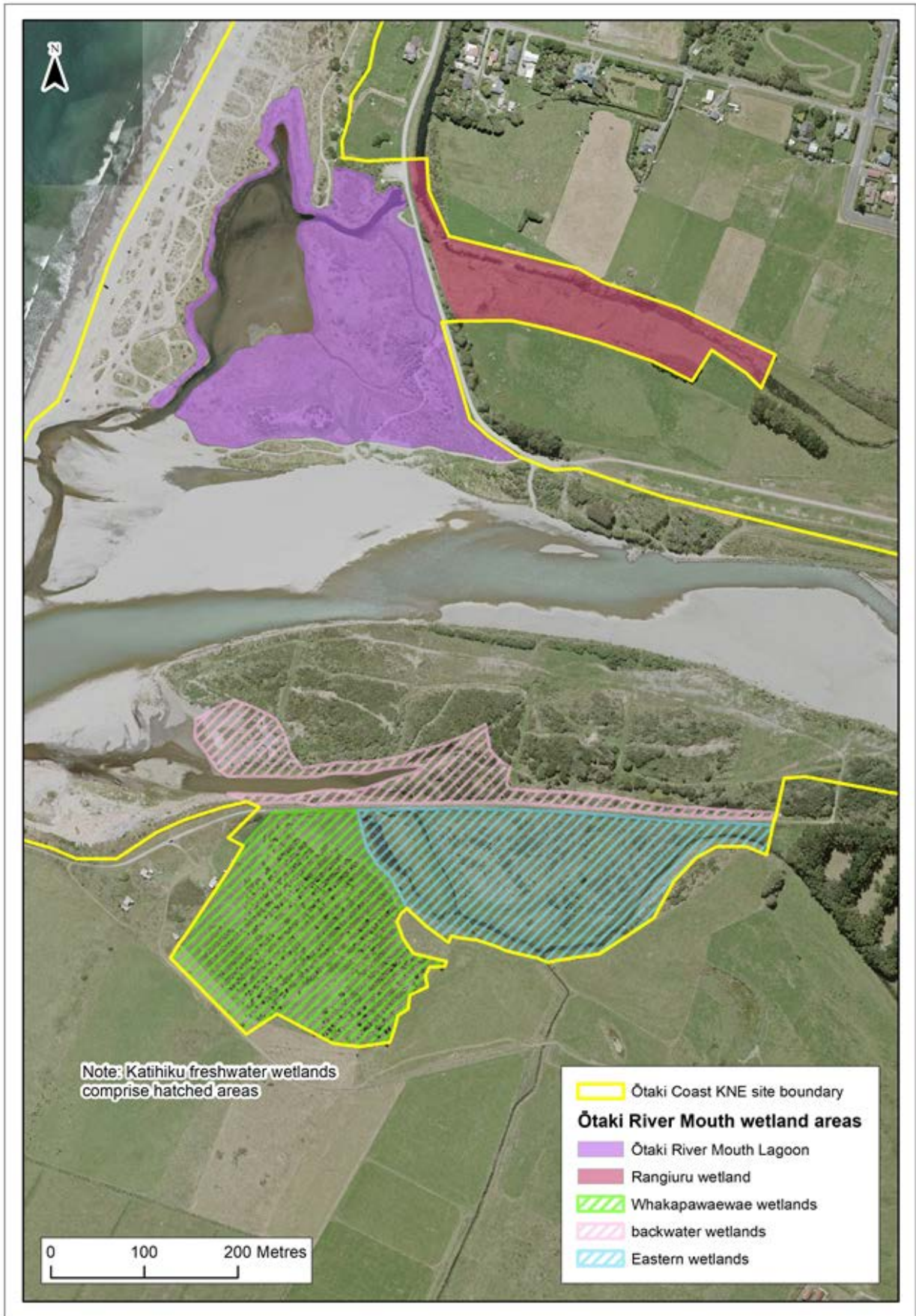
Map 4: Designated KCDC Ecological Site of Significance areas within the Ōtaki Coast KNE site



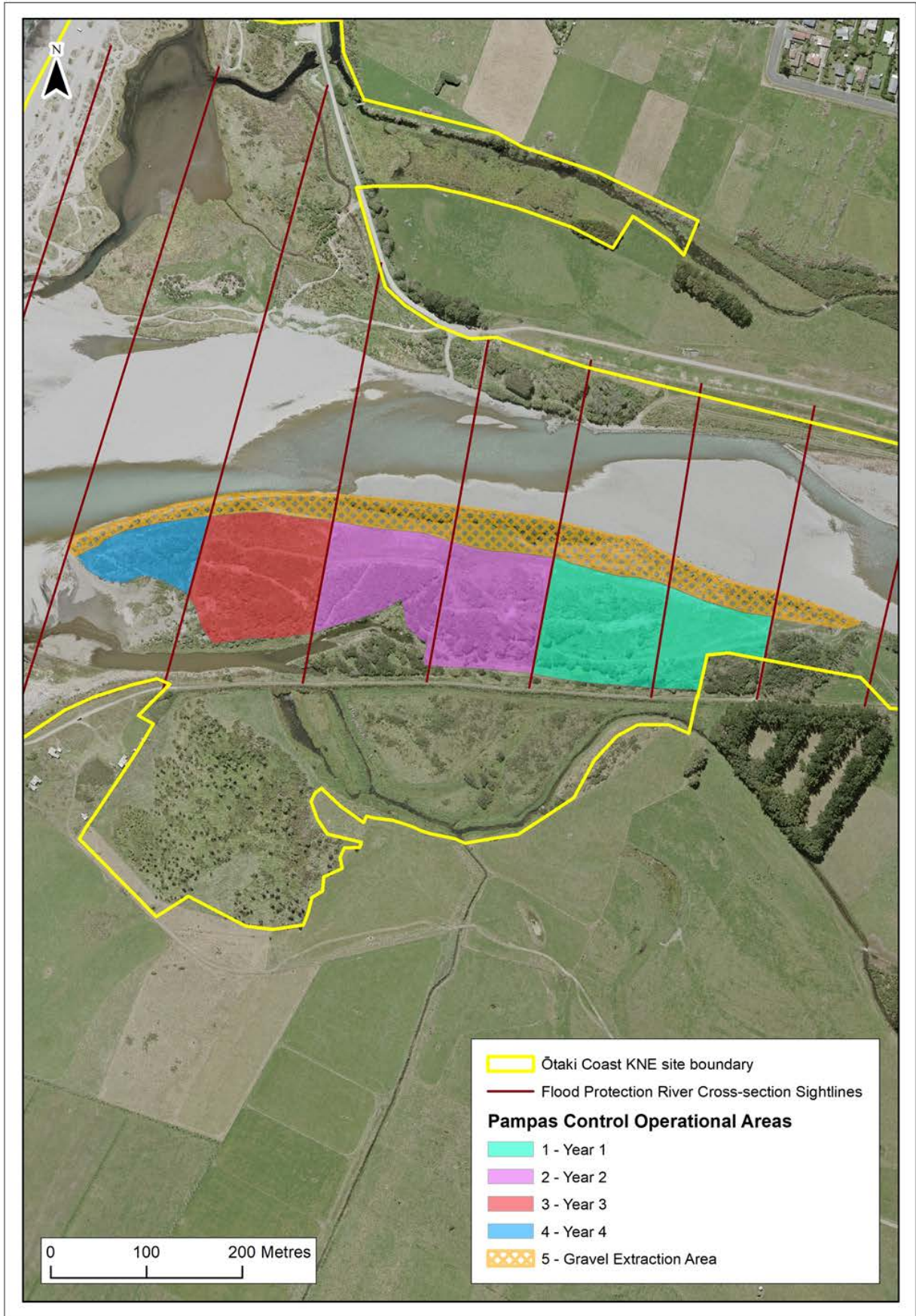
Map 5: Land Environment New Zealand threat classifications for the Ōtaki Coast KNE site



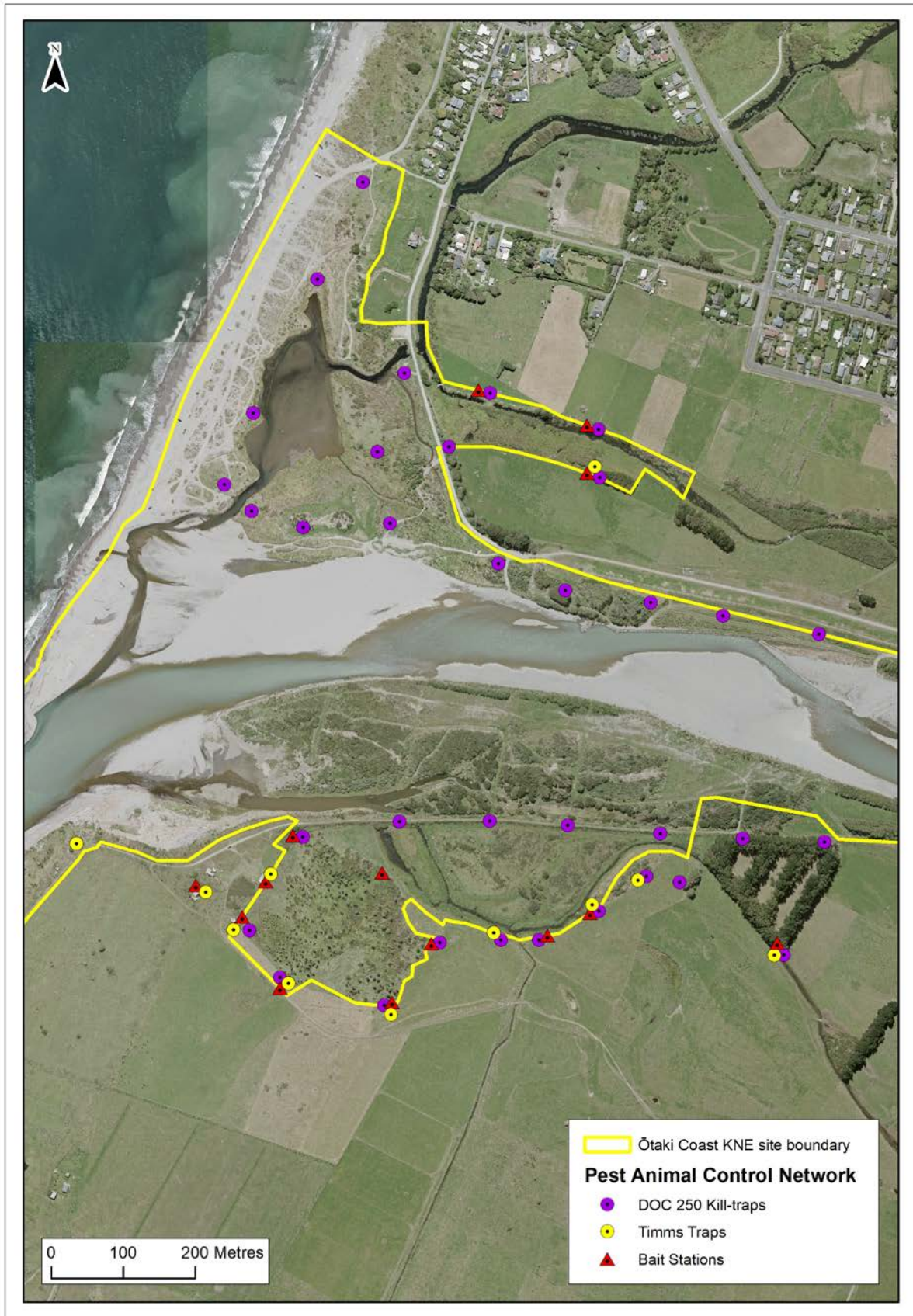
Map 6: Operational areas in the Ōtaki Coast KNE site



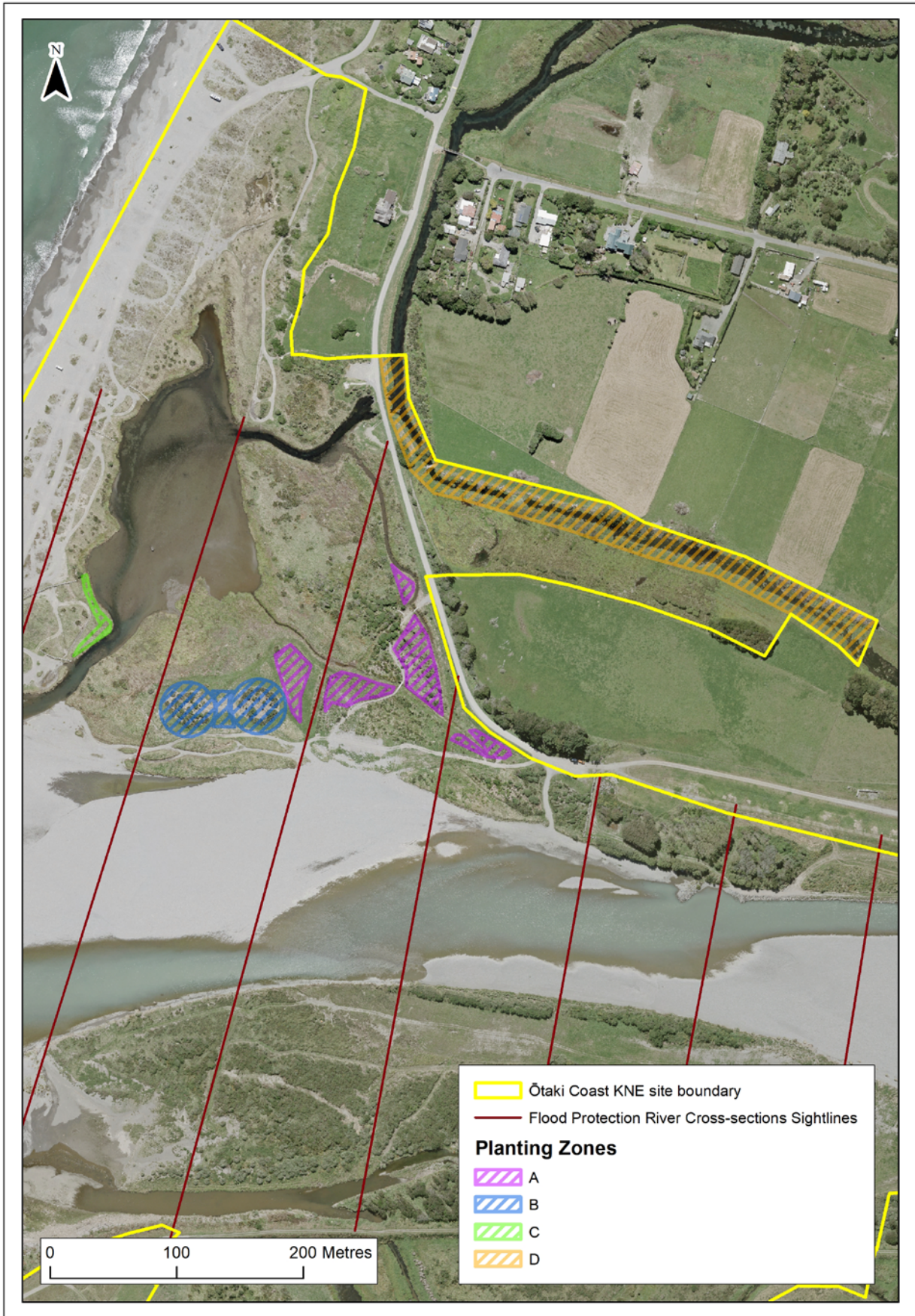
Map 7: Different wetland habitats located around the Ōtaki river mouth at Ōtaki Coast KNE site



Map 8: Progressive pampas control and revegetation areas located on the northern side of the stopbank within Operational Area B in the Ōtaki Coast KNE site



Map 9: Location of the pest animal control network within the Ōtaki Coast KNE site



Map 10: Location of revegetation areas on the northern side of the Ōtaki River mouth within Operational Area A in the Ōtaki Coast 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 cycle⁹⁷. 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 Ōtaki Coast KNE site.

Table 8: Threatened and At Risk species at the Ōtaki Coast KNE site

Scientific name	Common name	Threat status	Observation
Plants(vascular) ⁹⁸			
<i>Carex litorosa</i>	Sea sedge	At Risk-Declining	Ulrich and Carter 2013 ⁹⁹
<i>Coprosma acerosa</i>	Sand coprosma	At Risk-Declining	Rob Cross, KCDC, pers obs 2018; Alex Hurley, GWRC, pers obs 2019
<i>Pimelea villosa</i>	Sand pimelea	At Risk-Declining	(as <i>Pimelea</i> aff. <i>arenaria</i>) Milne and Sawyer 2002 ¹⁰⁰
<i>Tetragonia tetragonoides</i>	Kōkihi / New Zealand spinach	At Risk-Naturally Uncommon	Sara Stuart, GWRC, pers obs 2018
Birds ¹⁰¹			
<i>Anarhynchus frontalis</i>	Wrybill	Threatened-Nationally Vulnerable	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019) ¹⁰²
<i>Anthus novaeseelandiae</i>	NZ pipit	At Risk-Declining	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Charadrius bicinctus</i>	Banded dotterel	Threatened-Nationally Vulnerable	McArthur et al, 2015 ¹⁰³ ; http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Chroicocephalus scopulinus</i>	Red-billed gull	At Risk-Declining	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Euseyornis melanops</i>	Black-fronted dotterel	At Risk-Naturally Uncommon	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Haematopus unicolor</i>	Variable oystercatcher	At Risk-Recovering	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Himantopus leucocephalus</i>	Pied stilt	At Risk-Declining	http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Hydroprogne caspia</i>	Caspian tern	Threatened-Nationally Vulnerable	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)

Scientific name	Common name	Threat status	Observation
<i>Phalacrocorax carbo</i>	Black shag	At Risk-Naturally Uncommon	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Phalacrocorax varius</i>	Pied shag	Recovering	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Platalea regia</i>	Royal spoonbill	At Risk-Naturally Uncommon	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)
<i>Sterna striata</i>	White-fronted tern	At Risk-Declining	McArthur et al, 2015; http://ebird.org/content/newzealand/ (accessed April 2019)
Freshwater fish ¹⁰⁴			
<i>Anguilla dieffenbachii</i>	Longfin eel	At Risk-Declining	Thompson, 2011 ¹⁰⁵ ; Caleb Royal, Ngā Hapū o Ōtaki, pers obs 2018; NIWA freshwater fish database 2018 ¹⁰⁶
<i>Cheimarrichthys fosteri</i>	Torrentfish	At Risk-Declining	Thompson, 2011; Caleb Royal, Ngā Hapū o Ōtaki, pers obs 2018; NIWA freshwater fish database 2019 ¹⁰⁷
<i>Galaxias argenteus</i>	Giant kōkopu	At Risk-Declining	Thompson, 2011; Caleb Royal, Ngā Hapū o Ōtaki, pers obs 2019
<i>Galaxias brevipinnis</i>	Kōaro	At Risk-Declining	Thompson, 2011; NIWA freshwater fish database 2018
<i>Galaxias divergens</i>	Dwarf galaxias	At Risk-Declining	Thompson, 2011
<i>Galaxias maculatus</i>	Īnanga	At Risk-Declining	Boffa Miskell Ltd, 2001 ¹⁰⁸ ; Taylor & Kelly, 2001 ¹⁰⁹ ; Caleb Royal, Ngā Hapū o Ōtaki, pers obs 2018; NIWA freshwater fish database 2019
<i>Galaxias postvectis</i>	Shortjaw kōkopu	Threatened-Nationally Vulnerable	Thompson, 2011; Caleb Royal, Ngā Hapū o Ōtaki, pers obs 2018
<i>Geotria australis</i>	Lamprey (Piharau)	Nationally Vulnerable	Thompson, 2011; Caleb Royal, Ngā Hapū o Ōtaki, pers obs 2018
<i>Gobiomorphus hubbsi</i>	Bluegill bully	At Risk-Declining	Caleb Royal, Ngā Hapū o Ōtaki, pers obs 2018
<i>Gobiomorphus huttoni</i>	Redfin bully	At Risk-Declining	Thompson, 2011; Caleb Royal, Ngā Hapū o Ōtaki, pers obs 2018; NIWA freshwater fish database 2019

Appendix 3: Regionally threatened plant species list

The following table lists regionally threatened species that have been recorded in the Ōtaki Coast KNE site. Native plant species have been identified in the Plant Conservation Strategy, Wellington Conservancy 2004-2010¹¹⁰.

Table 9: Regionally threatened plant species recorded in the Ōtaki Coast KNE site

Scientific name	Common name	Threat status	Observation
Plants ¹¹¹			
<i>Carex litorosa</i>	Sand sedge	Regionally Critical	Mike Ulrich, GWRC, pers obs 2013
<i>Coprosma acerosa</i>	Sand coprosma	Gradual Decline	Rob Cross, KCDC, pers obs 2018
<i>Ficinia spiralis</i>	Pīngao	Gradual Decline	Planted by FOTOR 2016
<i>Plagianthus divaricatus</i>	Saltmarsh ribbonwood	Sparse	Sara Stuart, GWRC, pers obs 2018
<i>Tetragonia tetragonoides</i>	Kōkihi, New Zealand spinach	Sparse	Sara Stuart, GWRC, pers obs 2018

Appendix 4: Ecological weed species

The following table lists key ecological weed species that have been recorded in the Ōtaki Coast KNE site.

Table 10: Ecological weed species recorded in the Ōtaki Coast KNE site

Scientific name	Common name	Weed type	Priority	Notes
<i>Carpobretus edulis</i>	Iceplant	Groundcover	Very high	Widespread and abundant
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	Boneseed	Woody weed	Very high	Localised and sparse
<i>Cortaderia</i> spp.	Pampas	Exotic grass	Very high	Widespread and abundant
<i>Lycium ferocissimum</i>	Boxthorn	Woody weed	Very high	Scattered and abundant
<i>Paraserianthes lophantha</i>	Brush wattle	Woody weed	Very high	Scattered and abundant
* <i>Pittosporum crassifolium</i>	Karo	Woody weed	Very high	Localised and abundant
<i>Rhamnus alaternus</i>	Evergreen buckthorn	Woody weed	Very high	Localised and sparse
<i>Salix cinerea</i>	Grey willow	Woody weed	Very high	Localised and abundant
<i>Agapanthus praecox</i> subsp. <i>orientalis</i>	Agapanthus	Groundcover	High	Localised and sparse
<i>Ammophila arenaria</i>	Marram	Exotic grass	High	Scattered and abundant
<i>Aponogeton distachys</i>	Cape pond lily	Aquatic	High	Localised and abundant
<i>Correa alba</i>	Correa	Woody weed	High	Scattered and sparse
<i>Crocasmia</i> × <i>crocosmiiflora</i>	Montbretia	Groundcover	High	Localised and abundant
<i>Glyceria maxima</i>	sweet grass	Marginal aquatic	High	Localised and abundant
<i>Juncus acutus</i>	Sharp rush	Marginal aquatic	High	Localised and abundant
<i>Lonicera japonica</i>	Japanese honeysuckle	Climber	High	Widespread and sparse
<i>Lupinus arboreus</i>	Lupin	Woody weed	High	Localised and abundant
<i>Pennisetum clandestinum</i>	Kikuyu	Exotic grass	High	Scattered and abundant
<i>Rubus fruticosus</i> agg.	Blackberry	Climber	High	Localised and sparse
<i>Salix fragilis</i>	Crack willow	Woody weed	High	Localised and abundant
<i>Ulex europaeus</i>	Gorse	Woody weed	High	Widespread and abundant
<i>Vinca major</i>	Periwinkle	Groundcover	High	Scattered and abundant
<i>Zantedeschia aethiopica</i>	Arum lily	Groundcover	High	Scattered and abundant

Scientific name	Common name	Weed type	Priority	Notes
<i>Acacia sophora</i>	Acacia	Woody weed	Moderate	Scattered and sparse
<i>Allium triquetrum</i>	Onion weed	Groundcover	Moderate	Localised and abundant
<i>Apium nodiflorum</i>	Water celery	Marginal aquatic	Moderate	Localised and sparse
<i>Arctotis stoechadifolia</i>	Arctotis	Groundcover	Moderate	Scattered and sparse
<i>Artemisia sp.</i>	Artemisia	Woody weed	Moderate	Localised and sparse
<i>Banksia integrifolia</i>	Banksia	Woody weed	Moderate	Scattered and sparse
<i>Cotyledon orbiculata</i>	Pig's ear	Groundcover	Moderate	Localised and abundant
<i>Delairea odorata</i>	German ivy	Climber	Moderate	Scattered and sparse
<i>Gazania rigens</i>	Gazania	Groundcover	Moderate	Scattered and sparse
<i>Genista monspessulana</i>	Montpellier broom	Woody weed	Moderate	Localised and abundant
<i>Lathyrus latifolius</i>	Everlasting pea	Climber	Moderate	Scattered and sparse
<i>Lolium arundinaceum subsp. arundinaceum</i>	Tall fescue	Exotic grass	Moderate	Widespread and abundant
<i>Cupressus macrocarpa</i>	Macrocarpa	Woody weed	Low	Localised and sparse
<i>Galega officinalis</i>	Goat's rue	Groundcover	Low	Localised and sparse
<i>Malva arborea</i>	Tree mallow	Groundcover	Low	Localised and sparse
<i>Orobanche minor</i>	Broomrape	Groundcover	Low	Localised and sparse
<i>Pinus radiata</i>	Radiata pine	Woody weed	Low	Scattered and abundant
<i>Rumex sagittatus</i>	Climbing dock	Climber	Low	Scattered and sparse
<i>Senecio elegans</i>	Purple groundsel	Groundcover	Low	Scattered and sparse
<i>Tropaeolum majus</i>	Nasturtium	Climber	Low	Localised and sparse
<i>Yucca sp.</i>	Yucca	Groundcover	Low	Scattered and sparse

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

Appendix 5: Revegetation plant list

Plants from the following table will be used in any revegetation planting as per Section 9.3. Any plantings undertaken must use eco-sourced native stock (from the Foxton Ecological District).

Table 11: Revegetation plant list for use within the Ōtaki Coast KNE site

Scientific name	Common name	Operational Area
<i>Austroderia toetoe</i>	Toetoe	A, B, C
<i>Coprosma acerosa</i>	Sand coprosma	A, B, C, E
<i>Coprosma propinqua</i>	Mingimingi	A, C, D
<i>Coprosma repens</i>	Taupata	C, D
<i>Cordyline australis</i>	Cabbage tree/ Tī kōuka	A, B
<i>Dacrycarpus dacrydioides</i>	Kahikatea	B
<i>Ficinia nodosa</i>	Wīwī	A, B, E
<i>Ficinia spiralis</i>	Pīngao	A, B
<i>Hebe stricta</i>	Koromiko	B, C
<i>Meliccytus ramiflorus</i>	Māhoe	A, B, C
<i>Muehlenbeckia complexa</i>	Pōhuehue	A, B, E
<i>Olearia paniculata</i>	Akiraho	E
<i>Olearia solandri</i>	Coastal tree daisy	E
<i>Ozothamnus leptophylla</i>	Tauhinau	A, B, E
<i>Phormium tenax</i>	Harekeke	A, B, C, E
<i>Pittosporum tenuifolium</i>	Kohuhu	E
<i>Plagianthus divaricatus</i>	Saltmarsh ribbonwood	A, B, C
<i>Syzygium maire</i>	Swamp maire	A, B, C
<i>Tetragonia implexicoma</i>	New Zealand spinach/ kōkihi	A, B, E

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