Key Native Ecosystem Operational Plan for Taupō Swamp Complex

2025-2030

Greater Wellington
Te Pane Matua Taiao

Contents

1. Purpose

The purpose of this five-year Key Native Ecosystem (KNE) operational plan for Taupō Swamp Complex KNE site is to:

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

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

The KNE operational plan is aligned to key policy documents outlined in Appendix 1.

2. Taupō Swamp Complex Key Native Ecosystem site

The Taupō Swamp Complex KNE site (52.7ha) is located 3km north of Plimmerton and 20km north-northeast of Wellington City (see Appendix 2, Map 1). The KNE site is mostly confined between State Highway 59 (SH59) and the North Island Main Trunk (NIMT) railway line. Two small wetland sections of the KNE site sit on the western side of the railway line. The KNE site is predominantly surrounded by drained farmland, forestry, an industrial area, and a new residential development (ie, Plimmerton Farm).

The KNE site comprises the largest remaining harakeke (*Phormium tenax*) swamp in the Wellington Region[1]. It is also regarded as being one of the few lowland topogenous mires in the Wellington Ecological District[2]. For these reasons, Taupō Swamp Complex is scheduled in the Natural Resources Plan for the Wellington Region (NRP)[3] as an Outstanding Natural Wetland for its representativeness and rarity.

While the KNE site has gone through several human-induced changes over the last 150 years (eg, farming), it has retained a largely indigenous vegetation cover. It contains regionally unique and diverse vegetation communities across different stages of natural succession[4], and supports several native fauna and flora species. In turn, it provides a habitat for threatened wetland bird species such as pūweto/spotless crake (*Zapornia tabuensis*), and mātātā/fernbird (*Poodytes punctatus*)[5].

The KNE site is situated within 5km of several other KNE sites. These are Karehana Bay Bush, Whitireia Coast, Battle Hill Bush, Raroa-Pukerua Coast, and Paekākāriki Escarpment. These KNE sites are thought to form an important network of habitat linkages within the wider ecological landscape. This enables coastal, wetland, and forest birds to forage, breed, and disperse throughout the local area.

3. Parties involved

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

3.1. Landowners

The Taupō Swamp Complex KNE site has both private and public landowners (see Appendix 2, Map 2):

- QEII National Trust (QEII) owns the majority of the land (~30ha). This area was afforded full protection by the QEII under their Act following its purchase in 1986[6].
- Porirua City Council (PCC) owns a total of ~12ha of the KNE site including:
  - The Whenua Tapu Swamp located at the northern end of the site and managed by PCC as part of Whenua Tapu Cemetery land.
  - The southern portion of the KNE, situated between the land owned by QEII and adjacent to Plimmerton Domain.
  - A small wetland to the west of the railway line in the Track Reserve (also known as Taupō Swamp Northwest).
- The New Zealand Transport Agency (NZTA) owns a ~7.5ha strip of land along the eastern boundary of Taupō Swamp adjacent to SH59. This land includes the Ara Harakeke pathway and is currently administered by PCC.
- The New Zealand Railways Corporation owns a ~3ha strip of land along the western boundary of the KNE site adjacent to the NIMT railway line. This land is currently managed by KiwiRail.
- Paul and Julia Botha, private landowners, own Taupō Swamp West B (0.9ha), a small wetland located on the western side of the NIMT railway line.

3.2. Operational delivery

Within Greater Wellington, the Environment Restoration, Pest Animals, and Pest Plants teams are responsible for delivering the Taupō Swamp KNE operational plan:

- The Environment Restoration team leads the strategic planning, funding and coordination of biodiversity management activities, and advice within the KNE site.
- The Pest Plant and Pest Animal teams coordinate and implement ecological weed and pest animal control measures at the KNE site with funding from the Environment Restoration team's KNE programme budget.

Friends of Taupō Swamp & Catchment (FOTSC), Pest Free Plimmerton (PFP), QEII, PCC, and KiwiRail play a key role in the management of the KNE site:

- FOTSC is a not-for-profit incorporated society and a registered charity. FOTSC is a community led group of volunteers who work alongside local authorities such as Greater Wellington, PCC, and QEII to restore and enhance the unique ecological values of the Taupō Stream catchment. FOTSC undertakes regular weed control and planting, as well as promoting and coordinating community discussions, and community planting days.

- PFP is a community-led volunteer group established to deliver on the national Predator Free 2050 programme in the local community. The group service parts of the pest animal network in the KNE site as well as undertaking trapping within the wider Plimmerton landscape.
- QEII undertakes management activities within the QEII owned block of the KNE site. These activities are scheduled year by year based on available resources and include ecological weed control, revegetation planting, and monitoring surveys to provide baseline data. QEII and Greater Wellington meet annually to decide on the priority management actions for the site.
- PCC delivers and provides Greater Wellington with funding towards biodiversity management activities in the southern portion of the KNE site (see Appendix 2, Map 2), in accordance with the Porirua City District Plan[7].
- KiwiRail provides Greater Wellington with funding towards ecological weed control operations undertaken along the western corridor of the KNE site. It also manages weed incursions along the railway line.

The Environmental Restoration team also provides advice to landowners adjacent to the KNE site on sustainable land use, soil conservation, and water quality. These land use activities are aligned with the broader ecological goals of the KNE programme in general, and the Taupō Swamp Complex KNE operational plan in particular.

The Greater Wellington Monitoring – Land Ecosystem and Air team coordinates the monitoring of five vegetation plots located within the KNE site every five years as part of Greater Wellington's State of the Environment Wetland Health Programme.

3.3. Mana whenua partners

The Taupō Swamp KNE site area is significant to Ngāti Toa Rangatira, who are mana whenua partners with Greater Wellington.

The area has been identified in the Natural Resources Plan for the Wellington Region (NRP)[8] as culturally important with particular reference to the Taupō Stream Mouth and the headland to the south of Taupō Swamp which is a significant pā site (fortified settlement) (see Table 1 below).

The Statutory Acknowledgements from the Ngāti Toa Rangatira Claims Settlement Act 2014[9] provides further details of the associations that Ngāti Toa Rangatira have with Te Awarua o Porirua Harbour. These include traditional, historical, cultural, and spiritual associations that Ngāti Toa Rangatira have with places and sites within Te Awarua o Porirua Harbour. This allows Ngāti Toa Rangatira to protect and enhance the biodiversity values associated with this area[10].

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

Table 1: Mana whenua sites of significance in Taupō Swamp KNE site[11]

Sites of significance	Mana whenua values
Te Awa me te Kukuwai o Taupō (Taupō Swamp and Stream) (Schedule B – Ngā Taonga Nui a Kiwa)	Ngā mahi a ngā Tūpuna, Te Mahi Kai, Te Mana o Te Tangata, Te Manawaroa o te Wai, Te Mana o Te Wai, Wāhi Mahara, Ngā mahi a ngā Tūpuna, Te Mahi Kai, Te Mana o Te Tangata, Te Manawaroa o te Wai, Te Mana o Te Wai, Wāhi Mahara
Taupō pā (Schedule C3)	pā (Taupō domestic & defensive), ara hikoi, wāhi tapu, tohu tupuna, taunga waka, Te Ara o Te, Rauparaha, tohu ahurea
Taupō Stream Mouth (Schedule C3)	mahinga kai, puna raranga, rongoā, wai māori, wai ora, wāhi tupuna, wāhi maumahara

3.4. Stakeholders

The Greater Wellington Flood Operations Delivery team is responsible for maintaining the capacity of the lower reaches of the Taupō Stream from Plimmerton Domain to the estuary for flood protection services. These include ensuring the channel is clear by removing any blockages and vegetation choking the stream, and maintaining the stream banks as required.

4. Ecological values

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

4.1. Ecological designations

Table 2, below, lists ecological designations at all or part of the Taupō Swamp Complex KNE site.

Table 2: Designations at the Taupō Swamp Complex KNE site

Designation level	Type of designation
National	Parts of the Taupō Swamp Complex KNE site are designated as a Recreation Reserve under the Reserves Act 1977: • Plimmerton Domain– Recreation Reserve, Local Purpose Reserve (Landscape and Environmental Protection) • The Track Reserve – Scientific Reserve, Local Purpose Reserve (Landscape and Environmental Protection) Parts of the Taupō Swamp Complex KNE site have been identified by DOC as a Designated Ecological Site (See Appendix 2, Map 3): • 140: Taupō Swamp (41.03ha) • 432: Whenua Tapu Swamp (1.09ha) • 365: Taupō Swamp West B (1.46ha) • 483: Taupō Swamp West D (1.03ha) • 486: Taupō Swamp East S (1.75ha)
Regional	Parts of the Taupō Swamp Complex KNE site are scheduled under Greater Wellington's Natural Resources Plan (NRP)[12] as ecosystems and habitats with significant indigenous biodiversity values: • Taupō Swamp Complex (35.52ha): Outstanding Natural Wetland (Schedule A3) • Taupō Stream/Catchment: River with significant indigenous ecosystems – Habitat for indigenous fish species of conservation interest (Schedule F1) • Taupō Stream and all tributaries: River with significant indigenous ecosystems – Habitat for 6 or more migratory indigenous fish species (Schedule F1)
District	Part of the Taupō Swamp Complex KNE site has been identified by PCC as an Outstanding Natural Feature: • Taupō Swamp: Outstanding Natural Feature (*Natural Science Value – Very high; Sensory Factor Value – Very high; Shared and Recognised Value – Very high*)

Other	Parts of the Taupō Swamp Complex KNE site are owned and legally protected by QEII (See Appendix 2, Map 2): • P22 (29.68ha) Parts of the Taupō Swamp Complex KNE site are legally protected by a QEII open space covenant and owned by QEII (See Appendix 2, Map 2): • 5-07-449 (0.0498ha) Part of the Taupō Swamp Complex KNE site is designated for cemetery purposes under the Public Works Act: • Whenua Tapu Swamp

4.2. Ecological significance

The Taupō Swamp Complex KNE site is considered to be of regional importance because:

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

Representativeness

The Singers and Rogers[13] classification of pre-human forest vegetation (see Appendix 2, Map 4) indicates the KNE site would have comprised three ecosystem types. These included flaxland (WL18) and raupō reedland (WWL19) within the swamp areas, and kohekohe-tawa forest (MF6) present on the swamp margins. Only 16% of the original extent of the kohekohe-tawa forest type remains in the Wellington region[14].

The dominant species of the KNE site would have included harakeke (*Phormium tenax*), raupō (*Typha orientalis*), and rautahi/cutty grass (*Carex lessoniana*). Although the existing ecosystem is modified, having experienced partial drainage and clearance for industry and farming, much of the KNE site is still representative of the original ecosystem type[15,16].

The Threatened Environment Classification system defines ecosystem and habitat threat categories nationally, based on percentage of indigenous cover remaining[17]. This system indicates that most of the KNE site is classified as Acutely Threatened because there is less than 10% of native vegetation remaining on these types of land in New Zealand[18]. Chronically Threatened environments in the KNE site are found within the drier, regenerating scrub edges, with less than 20% indigenous cover remaining on a national scale (see Appendix 2, Map 5).

Rarity/distinctiveness

The Taupō Swamp Complex is scheduled as an Outstanding Natural Wetland in the NRP[19] and comprises the largest remaining harakeke swamp in the Wellington Region[20]. It is also one of the best remaining examples of a topogenous lowland freshwater mire that has retained a largely indigenous vegetation cover in the Wellington Region[21,22]. A topogenous lowland mire is a type of bog that forms under climatic conditions of reduced rainfall, with consequent lower humidity and summer drought (eg, valley bottoms). Wetlands are now considered an uncommon habitat type in the Wellington Region with less than 3% remaining of their original extent[23].

Several indigenous plant, freshwater fish, and wetland bird species found within the KNE site are classified as nationally 'Threatened' or 'At Risk' through New Zealand's national threat classification system. Other species found within the KNE site are classified as regionally 'Threatened'. Appendix 3 contains lists of the nationally and regionally threatened species found within the KNE site.

Diversity

The most recent vegetation survey conducted within the KNE site shows that it is highly diverse with as many as thirty-seven vegetation types, and one aquatic habitat (open water) present[24]. The KNE site is described in seven operational areas based on these vegetation communities under "Flora" in section 4.3 below.

Ecological context

The KNE site is located within 5km of five other KNE sites, namely Karehana Bay Bush, Whitireia Coast, Battle Hill Bush, Raroa-Pukerua Coast, and Paekākāriki Escarpment. 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. In addition, the Taupō Stream and its tributaries are important habitat for migrating and spawning native fish[25].

4.3. Ecological features

The Taupō Swamp Complex KNE site is located within the Wellington Ecological District[26] which is characterised by steep, strongly faulted hills and ranges, with typically warm summers and mild winters. The climate is often windy with westerly to north-westerly winds prevailing with frequent gales and an annual rainfall ranging between 900-1400mm[27].

The Taupō Swamp Complex is a relict inlet of the Porirua Harbour which was formed via uplift during the 1855 earthquake[28,29]. This uplift and subsequent siltation formed a topographical barrier effectively excluding salt water and preventing natural drainage. This naturally transformed the area into a topogenous mire, a now rare ecological feature in the Wellington district. The swamp is covered by a silty peat, while the catchment area has a substratum of greywacke and sandstone overlain over much of the area by loess and sand. Water is supplied from a freshwater stream source, the Taupō Stream. This flows through the length of the wetland in a watercourse 1-2m wide and >1m deep. The natural stream meander

appears to have been modified in the past and is now confined to a channel stabilised by flax and other vegetation. The water table in the wetland is generally above the surface of the peat[30].

Flora

Taupō Swamp is highly diverse and for this reason, it has been described below in seven operational areas based on vegetation communities observed (see Appendix 2, Map 6):

Whenua Tapu Swamp (Operational area A – 5.2ha)

Whenua Tapu Swamp is an example of a wetland in the later stages of succession toward regenerating the original forest. The swamp is comprised predominantly of diverse, seral-broadleaved forest species. These include kānuka (*Kunzea robusta*), whauwhaupaku/five-finger (*Pseudopanax arboreus*), mānuka (*Leptospermum scoparium*), māhoe/whitey wood (*Melicytus ramiflorus*), horoeka/lancewood (*Pseudopanax crassifolius*), tī kōuka/cabbage tree (*Cordyline australis*), kohekohe/New Zealand mahogany (*Didymocheton spectabilis*), tawa (*Beilschmiedia tawa*), and kōtukutuku/tree fuchsia (*Fuchsia excorticata*). Mixed shrubland and harakeke flax tussockland is also present and includes karamū (*Coprosma robusta*), hangehange (*Geniostoma ligustrifolium* var. *ligustrifolium*), toetoe (*Austroderia toetoe*), kiokio/palm leaf fern (*Parablechnum novae-zelandiae*), rarauhe/bracken fern (*Pteridium esculentum*), raupō/bullrush, and *Carex* spp.[31,32].

Ara Harakeke Walkway (Operational area B – 7.4ha)

The Ara Harakeke Walkway comprises a fringe of mostly planted mixed indigenous scrub between SH59 and the eastern edge of Taupō Swamp. The native vegetation composition includes māhoe, karamū, and mānuka scrubland. Other species present include: whauwhaupaku, tī kōuka, koromiko (*Veronica stricta* var. *stricta*), ngaio (*Myoporum laetum*), houhere/ribbonwood (*Hoheria populnea*), taupata/mirror plant (*Coprosma repens*) and kōhūhū/black matipo (*Pittosporum tenuifolium*). Regeneration is occurring in the understory and mostly comprises whauwhaupaku and young karo seedlings[33].

Main Taupō Swamp (Operational area C – 24.5ha)

The main body of Taupō Swamp comprises the largest harakeke flax swamp in the Wellington region[34]. The northernmost portion of the swamp is largely dominated by harakeke flaxland interspersed with frequent shrubs of karamū, whauwhaupaku, koromiko, and mānuka. Occasional toetoe and raupō are also present through the central wetter areas. This vegetation type grades into dominant homogenous harakeke flaxland with occasional emergent tī kōuka and comprises the majority of the central main Taupō Swamp area. Harakeke flaxland becomes less frequent within the southern portion of QEII land as it grades into raupō reedland over emergent *Carex* species[35]. The drier slopes on the eastern and western margin of the main swamp body comprise of kānuka dominant forest, which is likely trending to long term kohekohe forest[36].

Nationally and Regionally Threatened species have been recorded within the interiors of Taupō Swamp. These include swamp nettle (*Urtica perconfusa*), and

swamp buttercup (*Ranunculus macropus*)[37,38,39,40]. See Appendix 3 for details of the national and regional threat status of these species.

Western Corridor (Operational area D – 8.7ha)

Most of this area is dominated by diverse indigenous scrub and forest comprising predominantly mature mānuka, māhoe, and whauwhaupaku, and regenerating kohekohe. In more mature areas, māhoe and whauwhaupaku dominate the forest canopy with rangiora (*Brachyglottis repanda*), horoeka, and kānuka also present. These more mature areas have a relatively diverse understorey including ponga/silver fern (*Cyathea dealbata*), *Coprosma rhamnoides*, hangehange, and groundcover species such as huruhuruwhenua/shining spleenwort (*Asplenium oblongifolium*) and rarauhe/bracken fern (*Pteridium esculentum*). Towards the southern end of the KNE site, near the industrial area, the vegetation present mainly comprises coastal broadleaved species. These include māhoe, ngaio, and manuka[41]. The northeastern corner of the operational area is characterized by rautahi/cutty grass (*Carex geminata)*.

Taupō Swamp Northwest (Operational area E – 1.1ha)

This small, segmented wetland area is considered a representative and endangered flax-raupō-*Carex* wetland with surrounding scrub and treeland[42]. The wetland comprises predominantly harakeke flaxland with karamū scrub through the middle. Māhoe and hangehange occur occasionally with baumea (*Machaerina rubiginosa*) present in scattered locations, particularly toward the northeastern edge. To the northeast, the vegetation grades into dominant raupō reedland and harakeke flaxland with scattered hukihuki/swamp coprosma (*Coprosma tenuicaulis*), mānuka and occasional toetoe. Pukio (*Carex secta*) and rautahi are frequently present in open, wetter areas[43].

Historical records show some threatened species have been observed within this wetland fragment. These include marsh willowherb (*Epilobium chionanthum*), and swamp buttercup[44]. However, fire may have affected the presence of these species today. See Appendix 3 for details of the national and regional threat status of these species.

Taupō Swamp Southwest (Operational area F – 0.9ha)

Taupō Swamp Southwest is another small, segmented wetland area at the southern end of the KNE site comprised of representative flaxland and raupō-*Carex* reedland[45]. The interior and wetter areas are dominated by harakeke flaxland with mānuka and karamū commonly occurring. The southern portion of the wetland comprises a higher density of shrubs. These include hukihuki, pōhuehue, whauwhaupaku, hangehange, and occasional koromiko and wheki/harsh tree fern (*Dicksonia squarrosa*). The understory comprises frequent and dense baumea with swamp sedge (*Carex virgata*), and pukio. Occasional kiokio and swamp kiokio (*Blechnum minus*) are also present with toetoe occurring in more open areas. Māhoe and karamū are dominant on the drier wetland margins[46].

The Nationally and Regionally Threatened species, swamp buttercup has recently been found in this area[47]. Historical records show marsh willow weed has also been

observed within this wetland fragment[48]. See Appendix 3 for details of the national and regional threat status of these species.

Plimmerton Domain Wetland (Operational area G – 5.0ha)

The Plimmerton Domain Wetland area comprises the southernmost portion of the KNE site and is bounded by an industrial area on the eastern side. The northern part of this wetland area comprises of scrubland dominated by rautahi. Several small areas of open water are present in the wetland interior and are surrounded by *Isolepis prolifera*, *Persicaria decipiens*, and pukio. Central areas characterised by wet, open habitat are largely dominated by a sedgeland mosaic comprising pukio and rautahi. This vegetation type grades into a pocket of raupō reedland emergent over pukio, with scattered clumps of broom rush (*Juncus sarophorus*) and wiwi/Edgar's rush (*Juncus edgariae*). The southern KNE boundary, adjacent to the mown grassland of Plimmerton Domain, comprises a narrow strip of planted harakeke, tī kōuka, ngaio, māhoe, putaputawētā/marbleleaf (*Carpodetus serratus*) and native scrub which separates the amenity area from the wetland[49].

Fauna

Birds

The KNE site is known to provide seasonal or core habitat[50] for a range of native wetland bird species. These include the Nationally Critical matuku-hūrepu/Australasian bittern (*Botaurus poiciloptilus*); the At Risk – Declining pūwetu/spotless crake (*Porzana tabuensis*), mātātā/North Island fernbird (*Poodytes punctatus*), kotoreke/marsh crake (*Porzana pusilla affinis*), tōrea/South Island pied oystercatcher (*Haematopus finschi*); and the At Risk – Recovering tōrea pango/variable oystercatcher (*Haematopus unicolor*), karearea/New Zealand falcon (*Falco novaeseelandiae*). Some of these bird species have been recorded at the site in recent years (ie, pūwetu, karearea, tōrea, and tōrea pango)[51,52,53,54,55], and the last wetland birds survey conducted in 2023 for Greater Wellington confirmed the presence of eighteen pūwetu, nine mātātā, and one matuku-hūrepo.

A comprehensive list of threatened native bird species recorded within the KNE site is listed in Appendix 3.

Other more common bird species known to be present at the KNE site include kāhu/swamp harrier (*Circus approximans*), kawaupaka/little shag (*Microcarbo melanoleucos*), riroriro/grey warbler (*Gerygone igata*), kōtare/New Zealand kingfisher (*Todiramphus sanctus*), spur-winged plover (*Vanellus miles*), pūkeko (*Porphyrio melanotus*), pīwakawaka/fantail (*Rhipidura fuliginosa*); and pūtangitangi/paradise shelduck (*Tadorna variegata*)[56,57,58].

Reptiles

A lizard survey, funded by QEII, was undertaken in 2016 and found moko pāpā/Raukawa gecko (*Woodworthia maculata*) to be present within the KNE site[59]. Moko kākāriki/barking gecko (*Naultinus punctatus* | At Risk-Declining) has previously been recorded within the vicinity of the KNE site[60].

Freshwater fish

The Taupō Stream and its tributaries, which traverse the KNE site, provide habitat for a wide range of freshwater fish species, including four threatened species[61]. These are the At Risk – Declining giant kōkopu (*Galaxias argenteus*), īnanga (*Galaxias maculatus*), longfin eel (*Anguilla dieffenbachia*), and bluegill bully (*Gobiomorphus hubbsi*) [62,63,64,65].

A comprehensive list of threatened native fish species recorded within the KNE site is listed in Appendix 3.

Other non-threatened native fish species known to be present within the KNE site include shortfin eel (*Anguilla australis*); banded kōkopu (*Galaxias fasciatus*); common bully (*Gobiomorphus cotidianus*); giant bully (*Gobiomorphus gobioides)*; redfin bully (*Gobiomorphus huttoni*); and common smelt (*Retropinna retropinna)*[66,67,68,69].

The Taupō Swamp Complex KNE site contains a continuous water level monitoring station located within operational area D as part of Greater Wellington's Hydrology State of the Environment monitoring programme. The monitoring station has required the damming of the stream system and a "V" notch outfall which consequently impeded fish passage. To remedy this, a fish pass structure was installed in the outfall.

Two fish passage assessments have since been undertaken at the site, including a fish survey in 2005[70] and a visual assessment in 2019[71] using the National Institute of Water and Atmospheric Research (NIWA) Fish Passage Assessment Survey mobile application which is based on the New Zealand Fish Passage Guidelines[72]. A last visual assessment was conducted by Environment Restoration and Fish Passage programme staff in November 2024. This assessment found that, following remediation, the dam does not pose a barrier to fish passage.

5. Threats to ecological values at the KNE site

Ecological values can be threatened by human activities and by introduced animals and plants that change ecosystem dynamics. The key to protecting and restoring biodiversity as part of the KNE programme is to manage key threats to the ecological values at each KNE site. Key threats to the Taupō Swamp Complex KNE site are discussed below and all known threats to the KNE site are summarised in Appendix 4.

5.1. Key threats

The primary threats to the ecological values of the Taupō Swamp Complex KNE site are ecological weed species, pest animals, and altered hydrology and sedimentation resulting from surrounding land use and development activities.

Ecological weeds

Ecological weeds have a negative impact on the biodiversity values of a habitat and change the ecosystem structure and diversity by inhibiting seedling establishment, out-competing and displacing native plants, and reducing the availability of food resources for native animals. In addition, they can alter the hydrological conditions that sustain wetland ecology.

Ecological weeds are widespread throughout the KNE site. These include climbers such as Japanese honeysuckle (*Lonicera japonica*) and old man's beard (*Clematis vitalba*); ground-covering plants such as montbretia (*Crocosmia* × *crocosmiiflora*) and tradescantia (*Tradescantia fluminensis*); blackberry (*Rubus fruticosus)*, and arum lily (*Zantedeschia aethiopica*); exotic grasses such as pampas (*Cortaderia selloana/C. jubata*); woody tree species such as grey willow (*Salix cinerea*); and aquatic weeds such as water celery (*Apium nodiflorum*). In addition, the non-local native species, karo (*Pittosporum crassifolium*) and houpara (*Pseudopanax lessonii*) are also considered ecological weeds at the site as they are known to outcompete and hybridise with local native species.

Pest animals

Mustelids, such as stoats (*Mustela erminea*), weasels (*Mustela nivalis*), and ferrets (*Mustela furo*), as well as possums (*Trichosurus vulpecula*) and rats (*Rattus* spp.) are the biggest threats to the identified ecological values of the KNE site. These pest species are known to impact native regeneration, compete for food resources and prey on native invertebrates and wetland bird species (particularly nesting birds, chicks, and eggs). Pest animals are likely to reinvade from the surrounding landscape and therefore be an enduring threat to the biodiversity values within the KNE site.

Activities such as the construction of SH59 and the NIMT railway line, and industrial development have caused significant adverse effects to the ecological values of the KNE site. These have severed the wetland complex into multiple swamps and consequently altered its hydrology. Current surrounding land use poses ecological threats to the site including pollution from agricultural run-off and contaminated stormwater run-off (eg, waste products from motor vehicles); and rubbish discarded by passing travelers[73].

The nearby Plimmerton Farm housing development poses a significant risk to the KNE site. Potential ecological impacts of this development include increased sedimentation generated from earthworks; increased stormwater run-off; stormwater detention and management issues; introduction of additional weed species brought in on machinery; and increased pest animal species such as feral cats[74]. Some of these activities have the potential to affect the quantity and quality of water draining into Taupō Swamp[75]. In turn, changes in the water table may alter vegetation communities and composition and have a significant impact on native flora and fauna[76]. Resource consent for the housing development was approved subject to conditions by an expert consenting panel in 2024.

6. Vision and objectives

6.1. Vision

'Healthy wetland ecosystems are dominated by resilient and representative native vegetation communities that support a multitude of native wildlife'

6.2. Objectives

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

The following objectives will guide the operational activities at the Taupō Swamp Complex KNE site.

1. ***Protect, maintain, and enhance the KNE site's natural wetland ecosystem***
2. ***Protect and enhance habitat for threatened or regionally rare native wetland bird species***
3. ***Increase the diversity and regeneration of native plant communities present around the wetland margins***
4. ***Maintain and increase existing populations of threatened native plant species present within the KNE site***
5. ***Protect and enhance the natural processes in native fish habitats within the KNE site***
6. ***Support the community in their restoration objectives for the KNE site***

7. Operational activities

Operational activities are targeted at working towards the objectives listed in Section 6.2. The broad approach to operational activities is described below, and specific actions, with budget figures attached, are set out in the operational delivery schedule in Section 9, Table 3.

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

For practicality of management, the KNE site has been divided into seven operational areas based on their ecological features (See Appendix 2, Map 6). These are:

A: Whenua Tapu Swamp (5.2ha)

B: Ara Harakeke Walkway (7.4ha)

C: Main Taupō Swamp (24.5ha)

D: Western Corridor (8.7ha)

E: Taupō Swamp Northwest (1.1ha)

F: Taupō Swamp Southwest (0.9ha)

G: Plimmerton Domain Wetland (5.0ha)

7.1. Ecological weed control

The aim of ecological weed control at the KNE site is to protect the wetland by reducing the distribution and density of existing weed populations and preventing the incursion of new weed species. This is expected to increase native plant dominance, facilitate natural regeneration of native plant species, and provide a habitat for native wildlife, in line with all objectives outlined in this plan.

Ecological weed control has been undertaken at the site since 1981. However, ongoing work is required to minimise the regeneration and spread of priority weed infestations. Both ground and aerial-based control methods may be required to ensure the biodiversity values present are protected and maintained. Ecological weed species recorded at the KNE site and a ranking of the potential ecological impact of each are listed in Appendix 5.

Ground-based weed control

Multi-species weed control

The Greater Wellington Pest Plants team undertakes multi-species ecological weed control on an annual basis within Whenua Tapu Swamp (operational area A), Ara Harakeke Walkway (operational area B), the Western Corridor (operational area D), Main Taupō Swamp (operational area C), and Plimmerton Domain Wetland (operational area G). Priority target weed species include but are not limited to Japanese honeysuckle (*Lonicera japonica*), blackberry (*Rubus fruticosus*), pampas (*Cortaderia selloana*), climbing asparagus (*Asparagus scadens*), cape ivy (*Senecio angulatus*), old man's beard (*Clematis vitalba*), willow (*Salix* spp.), brush wattle

(*Paraserianthes lophantha*), sycamore (*Acer pseudoplatanus*), and silver poplar (*Populus alba*).

The Greater Wellington Pest Plants team, PCC, and FOTSC have been controlling ecological weeds such as blackberry, pampas, old man's beard, convolvulus (*Calystegia sepium*), willow, ivy species, and wattle within the Plimmerton Domain Wetland area (operational area G). Blackberry was prevalent throughout this area, and it took a multi-step approach to control the largest infestations. Blackberry was sprayed and then mulched on an annual basis over the last five years. Any regrowth was dug out and spot sprayed by FOTSC.

In addition, FOTSC has been undertaking revegetation planting to increase native vegetation dominance and reduce blackberry regrowth and the incursion of other weed species (in line with objectives 1, 2 and 3 on this plan). Further detail regarding revegetation of this area is outlined in Section 7.3.

Ongoing control of reed sweet grass (*Glyceria maxima*) and reed canary grass (*Phalaris arundinacea*) within the Main Taupō Swamp (operational area C) and the Plimmerton Domain Wetland area (operational area G) will be undertaken as required to target new growth and prevent the establishment of large infestations.

QEII may undertake weed control within Ara Harakeke Walkway, Western Corridor, and the Main Taupō Swamp operational areas. This work is considered annually and is dependent on resource availability. Greater Wellington and QEII will conduct an annual onsite meeting to review the progress of weed control and discuss the planned work for the following year. This will ensure that a coordinated approach to weed control is achieved.

Management of Threatened native plant species

The Pest Plants team manages native plant species classified as Threatened to maintain or increase their existing populations present within the KNE site, in line with objective 4 of this plan.

Threatened species such as swamp nettle[77] and swamp buttercup have been known to occur within Taupō Swamp Northwest (operational area E) and Taupō Swamp Southwest (operational area F). The Pest Plant team will use a fine scale management approach to undertake weed control in the vicinity of these threatened plant communities to protect their high ecological value. This will include the use of selective herbicides and hand weeding where herbicide use in not appropriate. Threatened plant populations will be monitored annually by the Environment Restoration Advisor after weed control works are completed. If these plant populations indicate decline, plantings may be required to sustain their population numbers.

Aerial-based weed control

The purpose of aerial spray operations is to reduce the negative impacts of weed species in areas where access is not possible on foot.

Greater Wellington conducted an aerial application of herbicide by helicopter in the 2016/17 financial year to target willow, pampas, and blackberry within operational area B.

More aerial control operations will be required within the term of this plan to control priority weed species across inaccessible areas of the KNE site. A drone may be used instead of a helicopter to increase the cost-effectiveness of spray operations. Any follow-up aerial control operation must be agreed to by the landowners involved and will only be undertaken if access is not permissible by foot and there is enough regrowth to warrant such an operation. This will be determined by the Greater Wellington Pest Plants team prior to any aerial control operation being agreed.

Aerial control operations will be undertaken during the drier months of the year (January to March), when the water levels are at their lowest and young native wetland birds have fledged (eg, spotless crake). Resource consent was granted for a 10-year period to allow for this activity (2017-2027).

7.2. 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 wetland birds through the control of mammalian predators, in line with objectives 1, 2 and 3 of this plan.

Pest animal control has been undertaken around the margins of the KNE site and in a northern buffer zone area since 2006. At present, 23 DOC 200 kill-traps, and 35 bait-stations are located around the KNE site margins, whilst 5 DOC 200 kill-traps and 20 bait-stations are in the northern buffer zone area. The pest animal species targeted are mustelids, hedgehogs, possums, and rats (see Appendix 2, Map 7).

The Greater Wellington Pest Animals team services and maintains this pest animal control network on a three-monthly basis. Additionally, Pest Free Plimmerton (PFP) services the kill-traps along the Ara Harakeke Walkway (operational area B), around the Plimmerton Domain Wetland (operational area G), and within the buffer zone area on a fortnightly basis. PFP have deployed several supplementary kill-traps in those operational areas to further enhance the trapping network. Bait for traps and bait stations is provided by Greater Wellington.

7.3. Revegetation

The aim of revegetation work at the 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 wetland birds, in line with objectives 1, 2 and 3 listed in section 6.2. All plants are eco-sourced from the Wellington Ecological District.

QEII coordinates and funds all revegetation planting across QEII-owned land within the KNE site. The extent of revegetation undertaken by QEII is determined on an annual basis and subject to change year to year depending on the needs of the site and resource availability.

FOTSC undertakes restoration planting within the Plimmerton Domain Wetland (operational area G). Revegetation of this area is carried out in accordance with a restoration planting plan prepared annually by FOTSC[78,79]. Each plan outlines the

plant species that will be used for revegetation in this area as well as specifying the number of plants and designated planting locations. Greater Wellington will support FOTSC in the development of subsequent restoration planting plans to assist in the ongoing revegetation of this area.

Appendix 2 Map 8 shows the areas that have already been planted (D, E, F, G, H) and the ones that will be planted over the next two years (A and B).

7.4. Monitoring

QEII funded monitoring

QEII have previously funded the delivery of wetland bird and lizard monitoring, weed surveying, and vegetation mapping within the Taupō Swamp Complex KNE site. This was to determine the condition of the site, identify trends over time, and identify threats to the ecological values present. The QEII regional representative undertakes an annual monitoring visit to the QEII owned part of the KNE site and this work will continue. Additional ad-hoc monitoring occurs when the QEII representative is onsite to undertake restoration actions.

Freshwater fish monitoring

Taupō Swamp is connected to Porirua Harbour and has continuous native vegetation cover. As such, the site has the potential to contain a diverse range of indigenous fish species, including species that have not yet been observed. Previous fish surveys undertaken have recorded several freshwater fish species present. However, much of this data is now considered historical having been collected in the early 1980s. More fish surveys are required to inform future management activities to protect and maintain freshwater fish habitat at the site, in line with objective 5 of this plan. This baseline fish survey will be funded by Greater Wellington and undertaken by an approved external contractor during the period of this plan.

State of the Environment Wetland Health Monitoring Programme

The Taupō Swamp Complex KNE site is part of Greater Wellington's State of the Environment Wetland Health Monitoring Programme. Monitoring is undertaken by the Monitoring – Land Ecosystems and Air team on a five-yearly basis at key wetland sites in the region. The Taupō Swamp Complex KNE site was first surveyed in 2018/2019 and again in 2023/2024. The next survey is scheduled for the 2028/29.

As part of these surveys, the vegetation composition, soil condition, plant nutrient status, wetland condition and wetland pressure index are recorded at five plots throughout the KNE site. An indicator wetland bird survey is also undertaken, surveying for Australasian bittern, spotless crake, and marsh crake. The survey in 2023/2024 was used to identify trends in wetland health and areas for improvement to guide management activities at the KNE site. The monitoring results are provided to all KNE landowners once completed.

7.5. Community engagement

The purpose of community engagement at the Taupō Swamp Complex KNE site is to support existing groups engaging in biodiversity projects and to raise awareness of the site's ecological and cultural values within the community to protect those values in line with objective 6 of this plan.

Greater Wellington supports FOTSC in undertaking restoration activities within the Plimmerton Domain Wetland (operational area G) in accordance with their 'Taupō Swamp & Catchment Strategic Operational Plan 2023-2028'. Restoration activities FOTSC undertake in the area include ecological weed control, revegetation planting, and ongoing pest animal control through PFP. Greater Wellington will continue to support FOTSC and provide advice as required to assist in the ongoing protection of the values in this area.

8. Future opportunities

There are numerous potential opportunities for Greater Wellington, landowners, iwi, community groups, and/or other agencies to explore and be involved in the biodiversity management of the site. Greater Wellington would welcome and support future involvement in any identified activities within this KNE operational plan from other parties. Some future opportunities include:

- Targeted control of karo throughout the KNE site to reduce competition and hybridisation with local native species.

- Investigation and implementation of a cape pondweed (*Aponogeton distachyos*) eradication or management plan to target infestations located within Taupō Stream south of the KNE site. Investigation should include consultation with PCC, the Pest Plants team, the Flood Operations Delivery, FOTSC, and industry experts on various eradication and management methods.

- Undertake a follow-up bird monitoring survey. A baseline survey of wetland birds present within the KNE site was undertaken by Greater Wellington in 2023 and found spotless crake, Australian bittern, and fern bird to be present indicating that this is a possible refuge site for these species. A follow-up bird survey would allow for the reconfirmation of these species and would enable a comprehensive dataset to be compiled over time which could be used to inform future management activities, particularly pest animal control, to better protect wetland bird species present at the site.

- Development and implementation of a restoration planting plan in conjunction with the ecological weed control programme. This would enhance the regeneration of native plants and reduce the likelihood of weed re-establishment.

9. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for the Taupō Swamp Complex KNE site, and their timing and cost over the five-year period from 1 July 2025 to 30 June 2030. The budgets for years 2026/27 to 2029/30 are indicative only and subject to change. Operational areas (see Appendix 2, Map 6) are also subject to change according to operational needs over the course of the operational plan.

Table 3: Five-year operational delivery schedule for the Taupō Swamp Complex KNE site

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2025/26	2026/27	2027/28	2028/29	2029/30
1, 2, 4	**Ground-based weed control** Control priority weed species on the wetland margins to prevent any new weed incursions, and the spread of existing weed infestations into the main Taupō Swamp (Op. Areas A, B, D) Control priority weed species in the main Taupō Swamp and Plimmerton Domain Wetland (Op. Areas C, G)	A, B, C, D, G	Increase of native plant regeneration along the wetland margins and in the main wetland complex Protection and enhancement of the fish habitat Protection and enhancement of the wetland bird species habitat	GW – Pest Plants team (Funded by GW Environment Restoration)	✓ $18,875	✓ $19,825	✓ $20,800	✓ $21,850	✓ $22,950

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2025/26	2026/27	2027/28	2028/29	2029/30
1, 2, 3	**Aerial-based weed control** Control willow, blackberry, and pampas via aerial control to reduce the negative impacts of weed species in areas where access is not possible on foot	C	Protection and enhancement of wildlife habitats	GW – Pest Plants team	† ^	† ^	† ^	† ^	† ^
1, 2, 3	**Ecological weed control** Control blackberry and other target weed species to prevent regeneration of blackberry and other weed species around planting areas	G	Abundance and diversity of native plants are increased to preserve the ecosystem's integrity	GW – Pest Plants team (Funded by PCC)	$2,260	$2,370	$2,488	$2,613	$2,744
1, 2, 3	**Ecological weed control** Control blackberry and other target weed species to prevent regeneration of blackberry and other weed species around planting areas	G	Abundance and diversity of native plants are increased to preserve the ecosystem's integrity	FOTSC	✓ †	✓ †	✓ †	✓ †	✓ †

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2025/26	2026/27	2027/28	2028/29	2029/30
1, 2, 3	**Ecological weed control** Control target weeds along the railway corridor to prevent weed incursion into the wetland	D	Increase of native plant regeneration along the wetland margins	GW – Pest Plants team (Funded by KiwiRail)	✓ $7,350	✓ $7,718	✓ $8,104	✓ $8,509	✓ $8,935
1, 2, 3	**Ecological weed control** TBC	TBC	TBC	QEII	# †	# †	# †	# †	# †
1, 2, 3, 4	**Pest animal control** Control mustelids and mammalian browsers on a three-monthly basis	KNE site margins and buffer zone area	Increase of native plant regeneration Increase of wetland bird species	GW – Pest Animals team (Funded by Environment Restoration and PCC)	✓ $5,790	✓ $6,190	✓ $6,625	✓ $7,090	✓ $7,590
1, 2, 3, 4	**Pest animal control** Control mustelids and mammalian browsers on a fortnightly basis	B, C, G	Increase of native plant regeneration Increase of wetland bird's species	PFP	✓ Volunteer time	✓ Volunteer time	✓ Volunteer time	✓ Volunteer time	✓ Volunteer time
1, 3, 4	**Revegetation** Undertake revegetation planting in areas where blackberry control and mulching efforts have been completed	G	Regeneration and diversity of native plant communities is increased	FOTSC	✓ † Volunteer time	✓ † Volunteer time	✓ † Volunteer time	✓ † Volunteer time	✓ † Volunteer time

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2025/26	2026/27	2027/28	2028/29	2029/30
1, 2, 3, 4	**Revegetation** Undertake revegetation planting of open areas	B, C	Regeneration and diversity of native plant communities is increased	QEII	# †	# †	# †	# †	# †
1, 3, 4	**Revegetation** Undertake revegetation planting of open areas and stream edges	B	Regeneration and diversity of native plant communities is increased	GW – Environment Restoration team	# †	# †	# †	# †	# †
1, 5	**Monitoring** Collect baseline information on the presence/absence and abundance of native fish species to identify future management requirements	Wetland, Taupō Stream	Management of the wetland and Taupō Stream is improved, and native fish habitats are preserved and enhanced	GW – Environment Restoration team GW – Fish Passage programme staff	# † Staff time	# † Staff time	# † Staff time	# † Staff time	# † Staff time
1, 2, 4, 5	**Monitoring** Conduct State of the Environment Wetland Health Monitoring Programme surveying to measure the state and trend of wetland health	Entire KNE site	The decision-making process to protect and improve the KNE site is improved and areas for improvement are identified	GW – Knowledge and Insight team				✓ †	

Objective	Activity	Operational area	Intended 5-year outcome	Implementing party	Timetable and resourcing where allocated				
					2025/26	2026/27	2027/28	2028/29	2029/30
1, 6	**Community engagement** Support community groups by providing advice on biodiversity management activities	Entire KNE site	Support of community groups is maintained for an improved management of the KNE site	GW – Environment Restoration team	✓ Staff time	✓ Staff time	✓ Staff time	✓ Staff time	✓ Staff time
Total					$34,275	$36,103	$38,017	$40,062	$42,219

† = The budget for this work is reviewed annually and subject to change year to year depending on the needs of the site

^ = The need for an aerial operation within the term of this plan will be determined and confirmed by the Environment Restoration Advisor

✓= This action is undertaken this financial year

= The timeframe for this action is indicative only and may be undertaken at any time over the duration of this plan

10. Funding contributions

10.1. Budget allocated by Greater Wellington

The budgets for the years 2026/27 to 2029/30 are indicative only and subject to change.

Table 4: Greater Wellington allocated budget for the Taupō Swamp Complex KNE site

Management activity	Timetable and resourcing				
	2025/26	2026/27	2027/28	2028/29	2029/30
Ground-based weed control	$18,875	$19,825	$20,800	$21,850	$22,950
Pest animal control	$4,175	$4,475	$4,775	$5,115	$5,475
Total	**$23,050**	**$24,300**	**$25,575**	**$26,965**	**$28,425**

10.2. Budget allocated by Porirua City Council

The budget is subject to confirmation through Porirua City Council long-term planning process.

Table 5: Porirua City Council allocated budget for the Taupō Swamp Complex KNE site

Management activity	Timetable and resourcing	
	2025/26	2026/27
Ecological weed control	$2,260	$2,370
Pest animal control	$1,610	$1,740
Total	**$3,870**	**$4,110**

10.3. Budget allocated by KiwiRail

The annual resourcing is indicative only and subject to change.

Table 6: KiwiRail allocated budget for the Taupō Swamp Complex KNE site

Management activity	Timetable and resourcing	
	2025/26	2026/27
Ecological weed control	$7,350	$7,718
Total	$7,350	$7,718

Appendix 1: Policy context and the Key Native Ecosystem programme

Policy context

Under the Resource Management Act 1991 (RMA)[80] regional councils have responsibility for maintaining indigenous biodiversity, as well as protecting significant vegetation and habitats of threatened species.

Funding for the KNE programme is allocated under the Greater Wellington Long Term Plan (2024-2034)[81] and is managed in accordance with the Greater Wellington Biodiversity Strategy[82]. This sets a framework for how Greater Wellington protects and manages biodiversity in the Wellington region. Goal One of the Biodiversity Strategy – *"Areas of high biodiversity value are protected or restored"* – drives the delivery of the KNE programme.

Other important drivers for the KNE programme include the Natural Resources Plan for the Wellington Region (NRP)[83] and the Regional Pest Management Plan 2019-2039[84].

Key Native Ecosystem programme

The KNE programme is a non-regulatory programme. The programme seeks to protect some of the best examples of original (pre-human) ecosystem types in the Wellington region. Greater Wellington has identified sites with the highest biodiversity values and prioritized them for management[85].

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

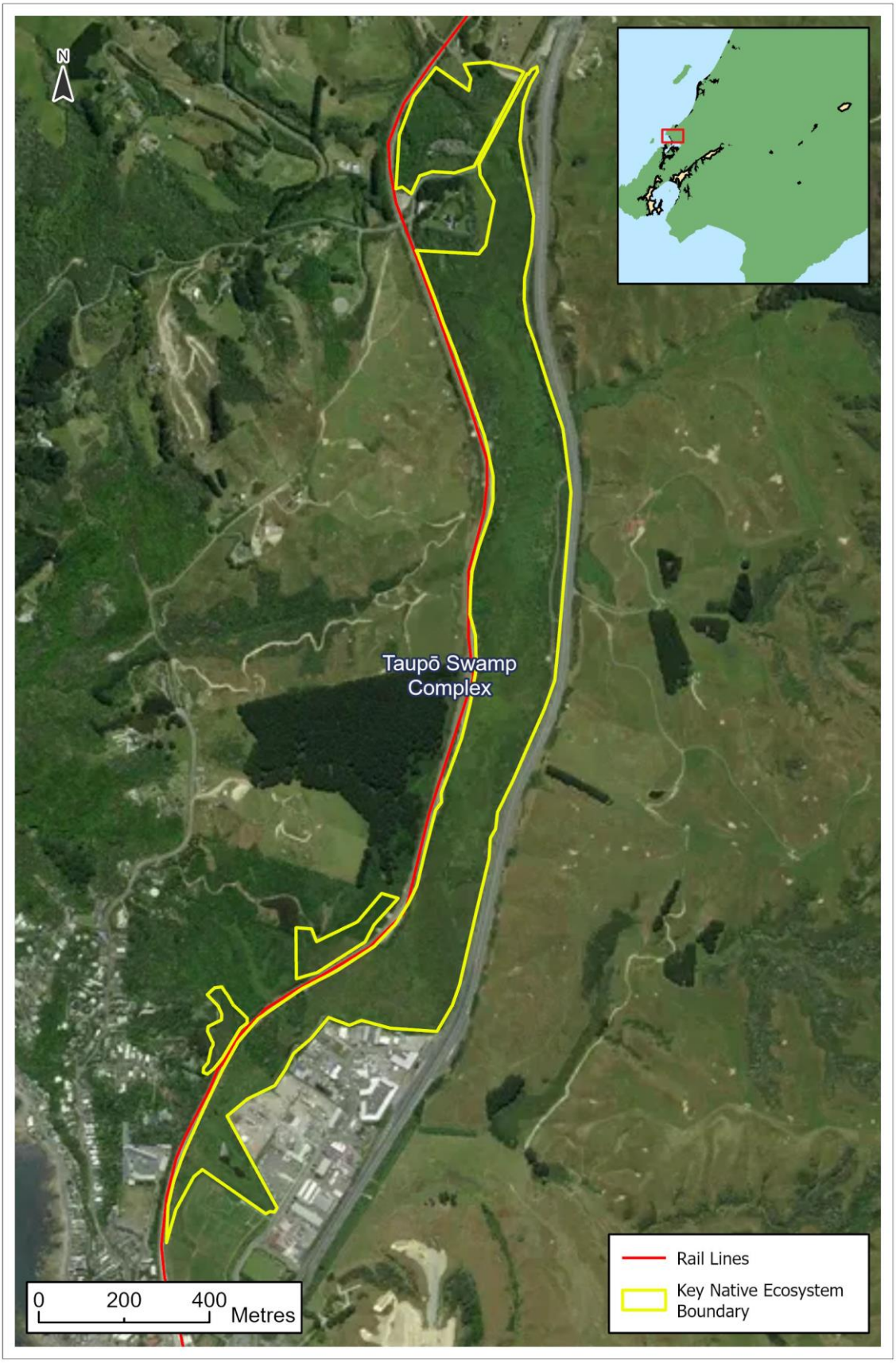
KNE sites can be located on private or publicly owned land. Any work undertaken on private land as part of this programme is at the discretion of landowners and their involvement in the programme is entirely voluntary. Involvement may just mean allowing work to be undertaken on that land. Land managed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

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

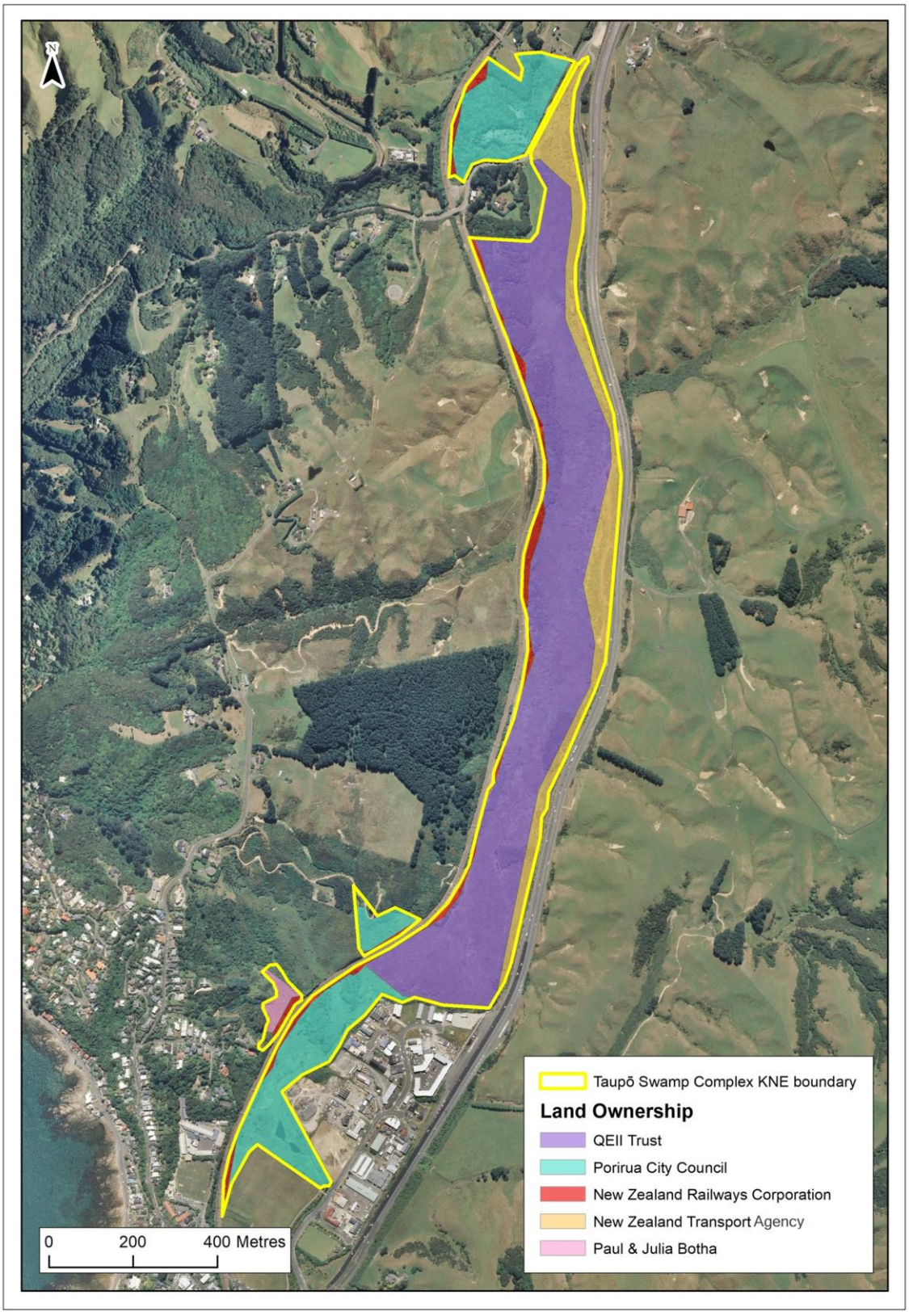
Representativeness	Rarity/ distinctiveness	Diversity	Ecological context
The extent to which ecosystems and habitats represent those that were once typical in the region but are no longer commonplace	Whether ecosystems contain Threatened/At Risk species, or species at their geographic limit, or whether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

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

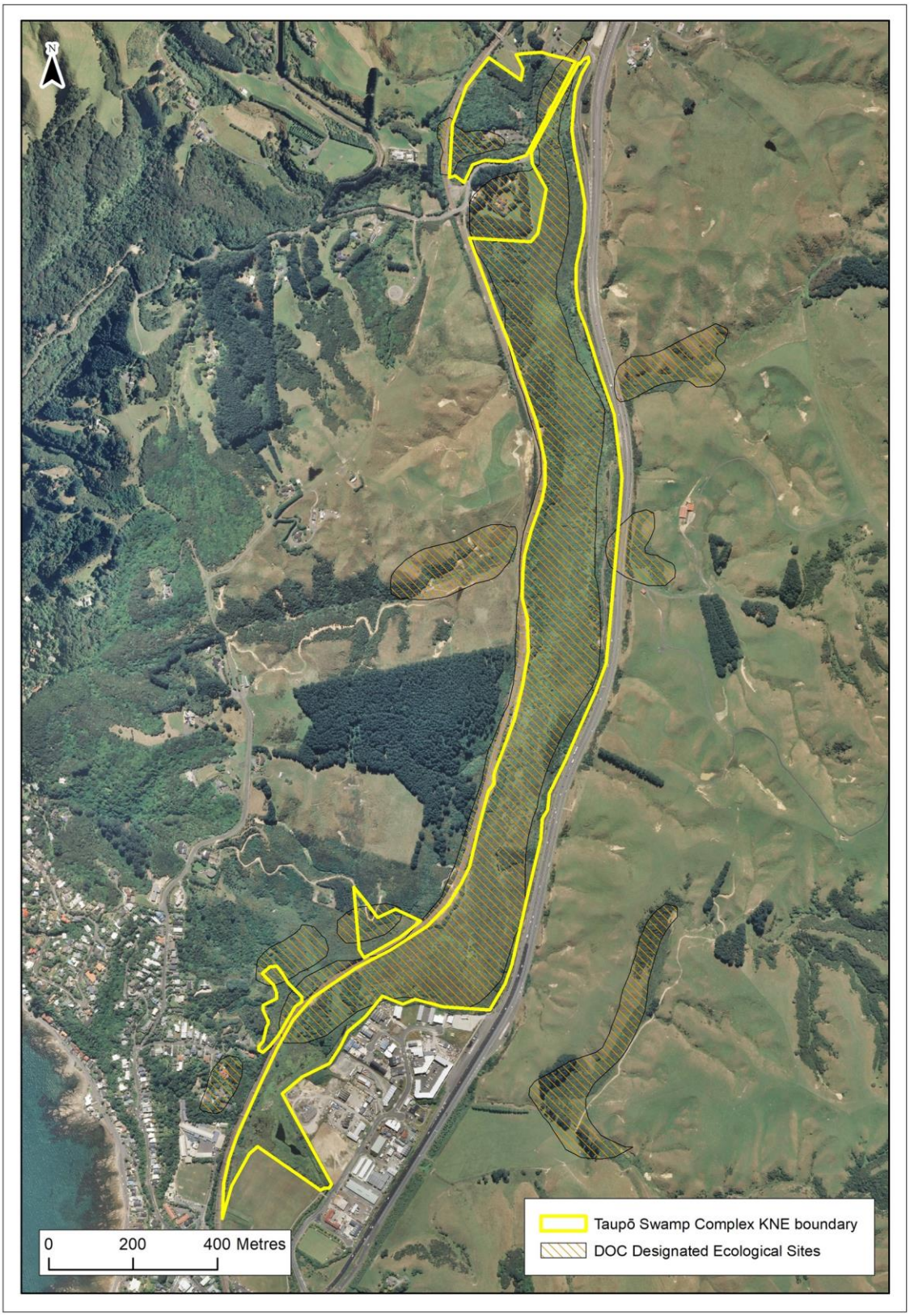
Appendix 2: Taupō Swamp Complex KNE site maps



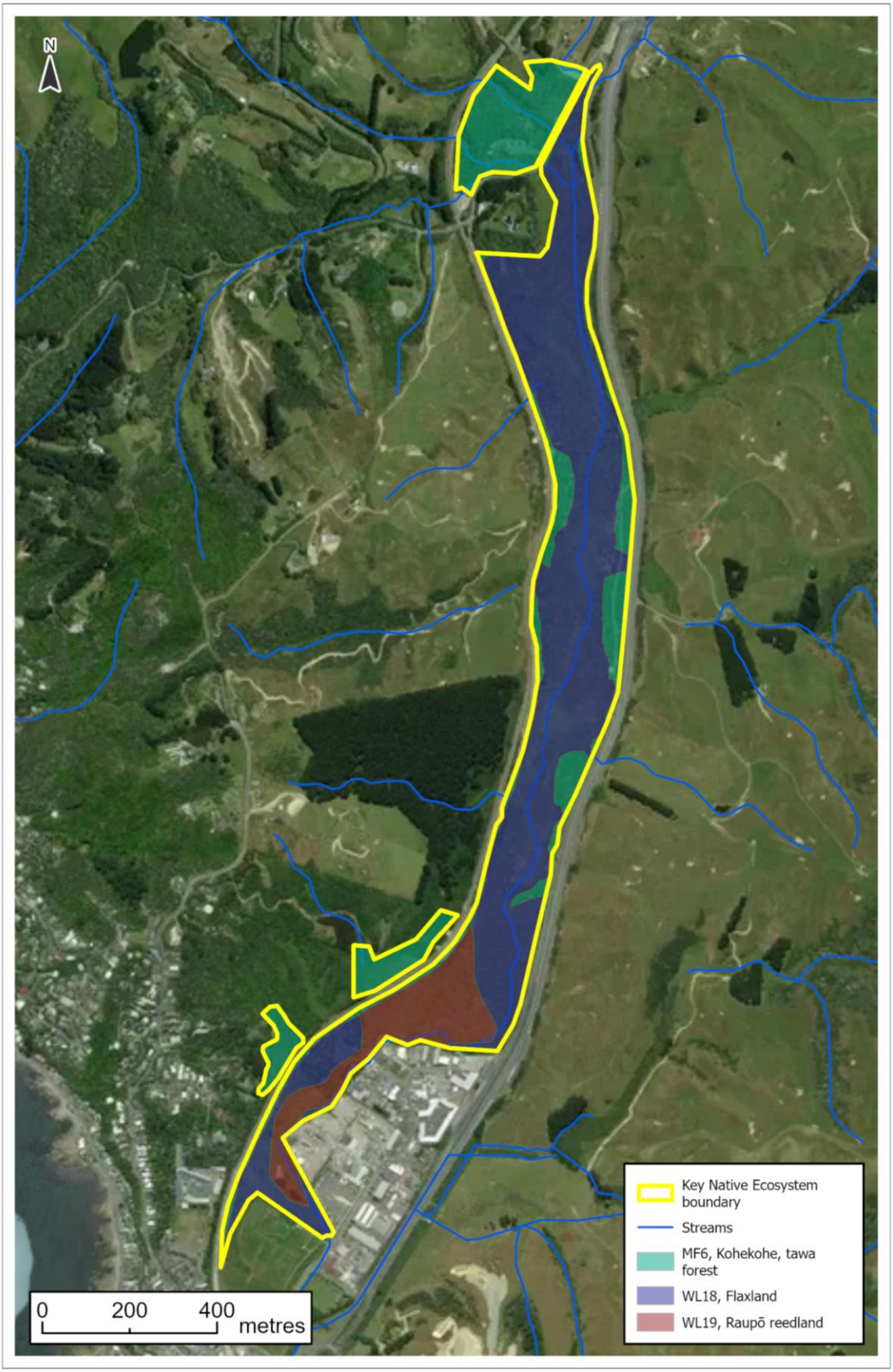
Map 1: Taupō Swamp Complex KNE site boundary



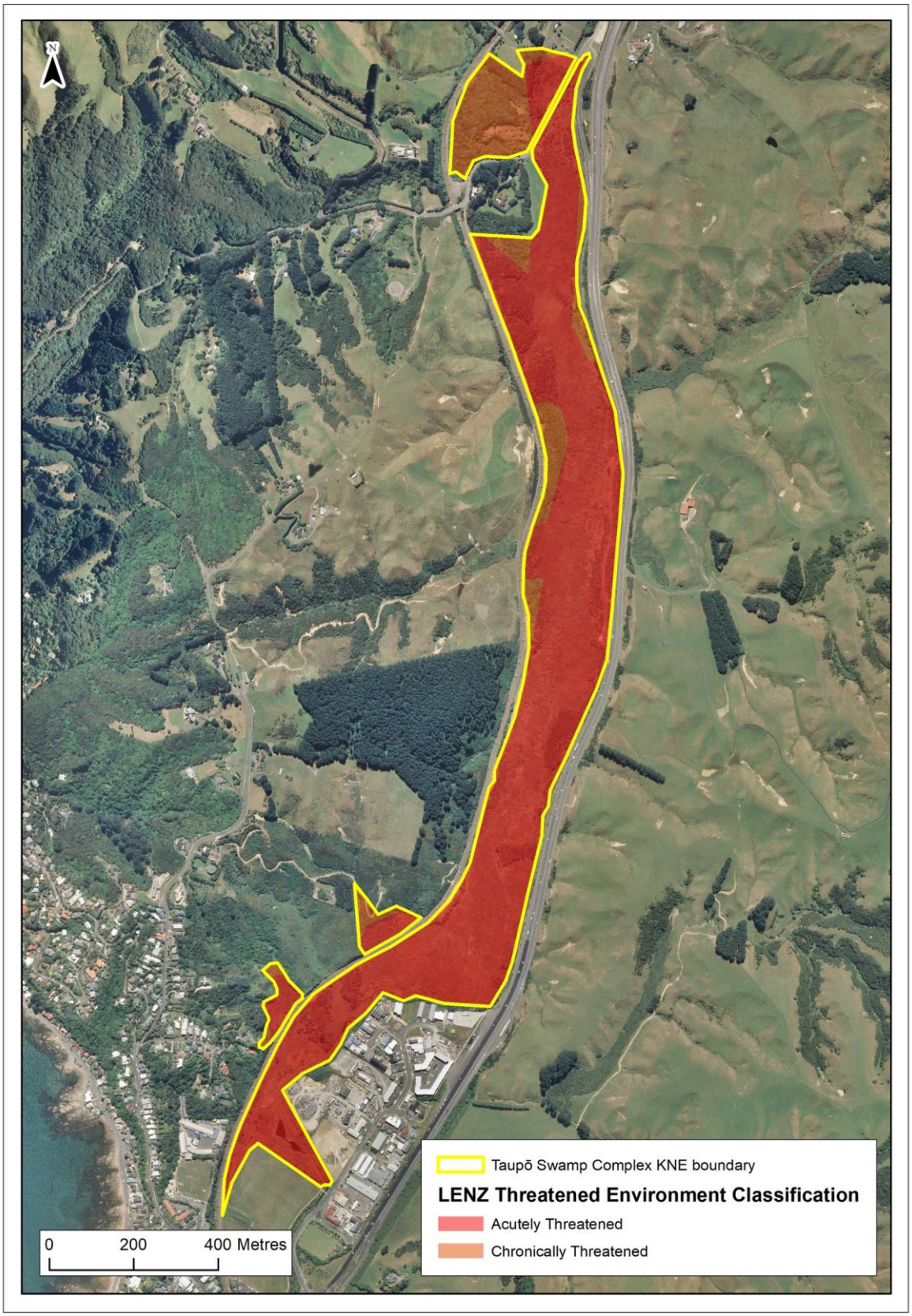
Map 2: Land ownership for the Taupō Swamp Complex KNE site



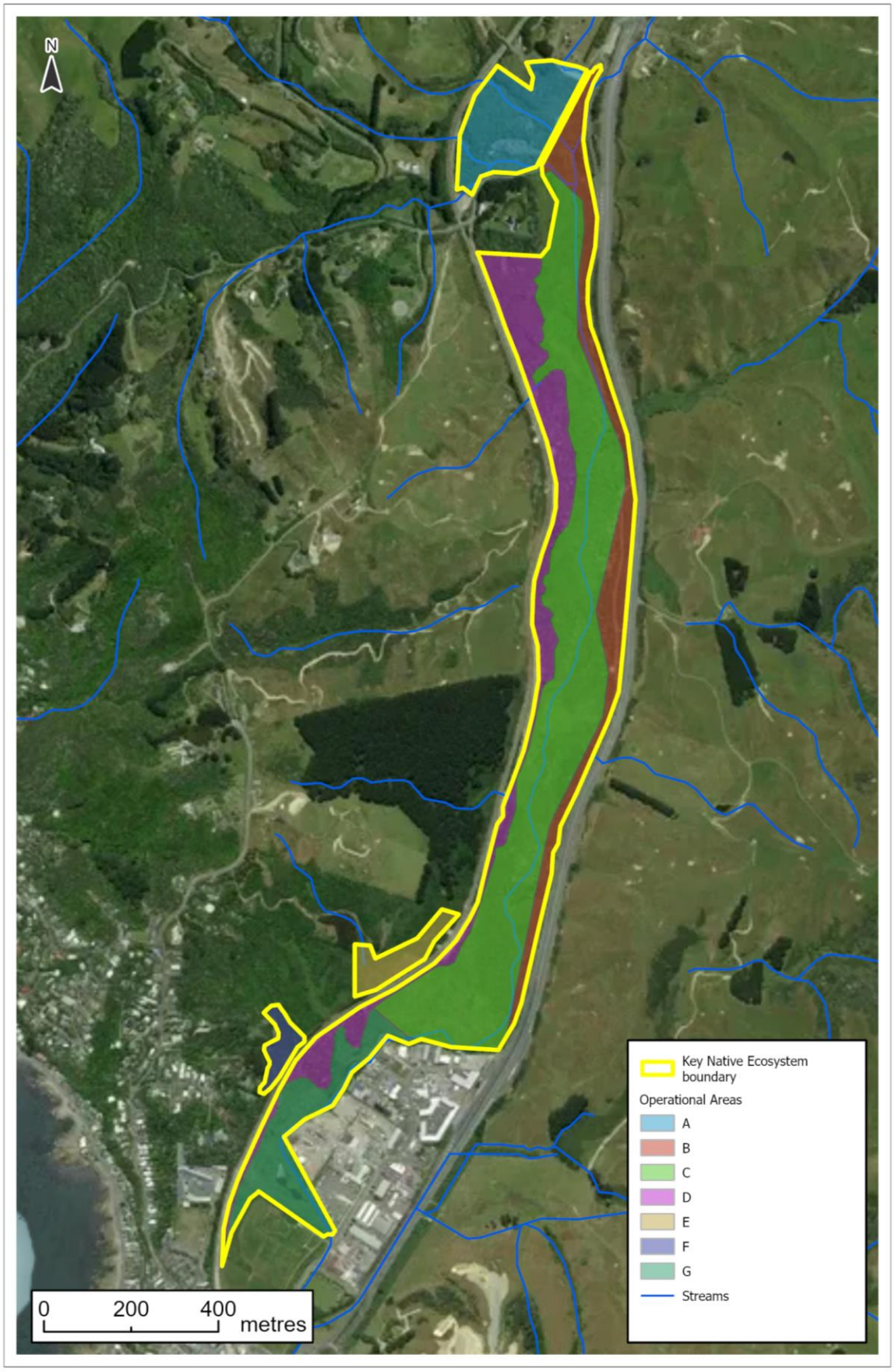
Map 3: DOC designated Ecological Sites within the Taupō Swamp Complex KNE site



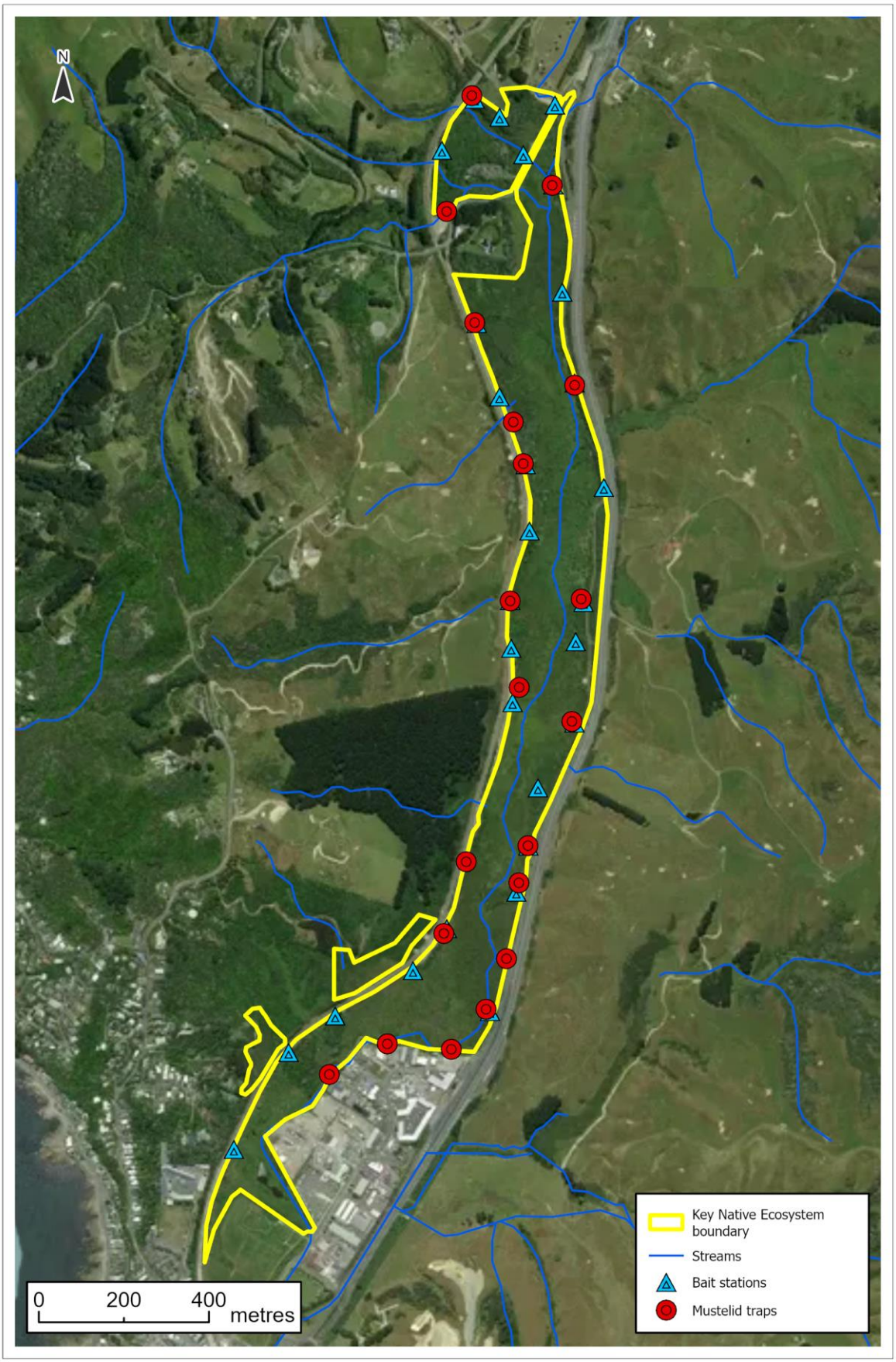
Map 4: Singers and Rogers classification of pre-human forest vegetation types for the Taupō Swamp Complex KNE site



Map 5: Land Environment New Zealand (LENZ) threat classifications for the Taupō Swamp Complex KNE site



Map 6: Ecological weed control operational areas in the Taupō Swamp Complex KNE site



Map 7: Pest animal control in the Taupō Swamp Complex KNE site

Map 8: Revegetation areas in the Taupō Swamp Complex KNE site

Appendix 3: Nationally and regionally threatened species list

The following table lists nationally and regionally Threatened and At Risk species that are resident in, or regular visitors to, the Taupō Swamp Complex KNE site.

The New Zealand Threat Classification System (NZTCS) lists species nationally according to their threat of extinction. The status of each species group (plants, reptiles, etc.) is assessed over a five-year cycle[86]. Species are regarded as Threatened if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable[87]. They are regarded as At Risk if they are classified as Declining, Recovering, Relict or Naturally Uncommon. A limited set of taxonomic groups have also been assigned a regional threat status. The regional threat status methodology was developed by a collaborative group comprising representatives from DOC, regional councils and a local authority. The resulting regional threat listing methodology leverages off the NZTCS, but applies a species population threshold adjusted to the regional land area under consideration (relative to the national land area) for species that are not nationally threatened. The assigned regional threat status cannot be lower than that of the national threat status, but can be higher, (eg, a Nationally Vulnerable species could be assessed as being Regionally Critical). Other assessments made in the regional threat listing process include identifying populations that are national strongholds and the use of regional qualifiers, such as natural or historic range limits.

Table 7: Nationally and regionally Threatened and At Risk species in the Taupō Swamp Complex KNE site

Scientific name	Common name	National threat status	Regional threat status	Observation
Plants (vascular) – National[88] and Regional[89] Threat Status				
Diplazium australe	Austral Lady Fern	Not Threatened	Threatened – Regionally Vulnerable	Enright and Smith, 2015[90]; Wildlands, 2016[91]
Epilobium chionanthum	Marsh willowherb	At Risk – Declining	At Risk – Naturally Uncommon	Ogle, 1978[92]; Enright and Smith, 2015
Lindsaea linearis	n/a	Not Threatened	At Risk – Naturally Uncommon	Wildlands, 2016

Scientific name	Common name	National threat status	Regional threat status	Observation
Ranunculus macropus	Swamp buttercup	At Risk – Declining	Data Deficient	Ogle, 1978[93]; Bagnall & Ogle, 1981[94]; Enright and Smith, 2015[95]; Wildlands, 2016[96]
Urtica perconfusa	Swamp nettle	At Risk – Naturally Uncommon	Threatened – Regionally Critical	Bagnall & Ogle, 1981
Birds – National[97] and Regional[98] Threat Status				
Botaurus poiciloptilus	Matukui-hūrepo | Australasian bittern	Threatened – Nationally Critical	Threatened – Regionally Critical	Parrish, 1984[99]; Cromarty & Scott 1996[100]; Todd et al. 2013[101]
Bowdleria punctata vealeae	Mātātā | North Island fernbird	At Risk – Declining	Threatened – Regionally Critical	Parrish, 1984
Falco novaeseelandiae	Kārearea | New Zealand falcon	At Risk – Recovering	Threatened – Regionally Critical	Porirua City Council, 2019
Haematopus finschi	Tōrea | South Island pied oyster catcher	At Risk – Declining	Regionally Migrant	Small, 2015[102]
Haematopus unicolor	Tōrea pango | variable oystercatcher	At Risk – Recovering	Threatened – Regionally Vulnerable	Small, 2015
Hemiphaga novaeseelandiae	Kererū | New Zealand pigeon	Not Threatened	At Risk – Recovering	Robertson et al., 2021[103]
Porzana pusilla affinis	Kotoreke | marsh crake	At Risk – Declining	Threatened – Regionally Critical	Parrish, 1984; Todd et al. 2013
Porzana tabuensis	Pūweto | spotless crake	At Risk – Declining	Threatened – Regionally Endangered	Parrish, 1984; Small, 2015; http://ebird.org/content/newzealand/ (accessed July 2019)[104]
Freshwater fish – National[105] and Regional[106] Threat Status				
Anguilla dieffenbachia	Ōrea | longfin eel	At Risk – Declining	At Risk – Declining	Porirua City Council, 1980[107]; Hicks, 1980[108]

Scientific name	Common name	National threat status	Regional threat status	Observation
Galaxias argenteus	Kōkopu | giant kōkopu	At Risk – Declining	Threatened – Regionally Vulnerable	Porirua City Council, 1980; Hicks, 1980
Galaxias maculatus	Īnanga | common galaxias	At Risk – Declining	At Risk – Declining	Hicks, 1980
Gobiomorphus hubbsi	Bluegill bully	At Risk – Declining	At Risk – Declining	Hicks, 1980; Leigh, 2005[109]

Appendix 4: Threat table

The following table presents a summary of all known threats to the Taupō Swamp Complex KNE site including those discussed in Section 5.

Table 8: Threats to the Taupō Swamp Complex KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area
Ecological weeds (EW)		
EW-1	Ground covering ecological weeds smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key ground covering ecological weed species for control in the KNE site include tradescantia (*Tradescantia fluminensis*) and periwinkle (*Vinca major*) (see full list in Appendix 5).	A, B, D
EW-2	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key woody ecological weed species for control in the KNE site include willow species (*Salix spp*.), and wattle species (*Acacia spp.)* (see full list in Appendix 5).	A, B, C, D
EW-3	Climbing weeds smother and displace native vegetation often causing canopy collapse, inhibit indigenous regeneration, and alter vegetation structure and composition. Key climbing ecological weed species for control in the KNE site include Japanese honeysuckle (*Lonicera japonica*), old man's beard (*Clematis vitalba*), and climbing asparagus (*Asparagus scadens*) (see full list in Appendix 5).	A, B, C, D, G
EW-4*	Aquatic weeds outcompete native aquatic species and choke watercourses. Key aquatic ecological weed species include reed sweet grass (*Gliceria maxima*), reed canary grass (*Phalaris arundinacea)* and cape pondweed (*Aponogeton distachyos*) (see full list in Appendix 5).	B, C, G
Pest animals (PA)		
PA-1	Possums (*Trichosurus vulpecula*) browse palatable canopy vegetation until it can no longer recover[110,111]. This destroys the forest's structure, diversity and function. Possums may also prey on native birds and invertebrates[112].	A, B, C, D, E, F G
PA-2	Rats (*Rattus* 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[113,114] .	A, B, C, D, E, F G
PA-3	Mustelids (stoats[115,116] (*Mustela erminea*), ferrets[117,118] (*M. furo*) and weasels[119,120] (*M. nivalis*)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions.	A, B, C, D, E, F G
PA-4	Hedgehogs (*Erinaceus europaeus*) prey on native invertebrates[121], lizards[122] and the eggs[123] and chicks of ground-nesting birds[124] .	A, B, C, D, E, F G

Threat code	Threat and impact on biodiversity in the KNE site	Operational area
PA-5*	House mice (*Mus musculus)* 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[125,126].	A, B, C, D, E, F G
PA-6*	Pest and domestic cats (*Felis catus*) prey on native birds[127], lizards[128] and invertebrates[129], reducing native fauna breeding success and potentially causing local extinctions[130].	A, B, C, D, E, F G
PA-7*	Wasps (*Vespula* spp.) adversely impact native invertebrates and birds through predation and competition for food resources. They also affect nutrient cycles in beech forests[131].	A, B, C, D, E, F G
PA-8*	Brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) prey on native fish and compete with them for food resources[132].	Taupō stream and open water areas
Human activities (HA)		
HA-1	Garden waste dumping often leads to ecological weed invasions into natural areas. Common weed species introduced at this KNE site include Japanese honeysuckle (*Lonicera japonica*), old man's beard (*Clematis vitalba*), and ivy species (*Hedera spp*.).	G, margin of the KNE site
*HA-2	Agricultural practices, particularly grazing livestock, can result in pugged soils, grazed native vegetation inhibiting regeneration, wildlife disturbance and increased nutrient content of soils and watercourses[133].	A, B, C, D, E, F G
*HA-3	Plantation forestry on adjoining land parcels to the KNE site has the potential to cause habitat loss or degradation, disturb native wildlife, damage boundary fencing and increase sediment load in watercourses via surface run-off during harvesting operations.	E, F, G
*HA-4	Barriers to native fish passage are present in streams within the KNE site preventing migrating fish from completing their life-cycle.	G
*HA-5	Land use activities that alter the local hydrology, such as development schemes and sub-divisions can affect the water levels that sustain wetland ecosystems.	A, C, D, E, G
*HA-6	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 sceptic tank leakages.	A, C, D, E, G
*HA-7	Dogs (*Canis lupus familiaris*), if uncontrolled or unleashed can disturb or kill nesting birds and chicks, and lizards, particularly in close proximity to walking tracks[134].	A, C, D, E, G
Other threats		
*OT-1	A lack of legal protection can leave a site at risk of future development or destruction and resources invested in the site may be wasted. Part of this KNE site is private property and uncovenanted, having no protection status.	A, B, C, D, E, F G

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

Appendix 5: Ecological weed species

The following table lists key ecological weed species that have been recorded in the Taupō Swamp Complex KNE site.

Table 9: Ecological weed species recorded in the Taupō Swamp Complex KNE site

Scientific name	Common name	Priority	Weed type	Management aim
Asparagus scandens	Climbing asparagus	Severe	Climber	Eradication
Calystegia silvatica	Bindweed	Severe	Climber	Suppression
Clematis vitalba	Old man's beard	Severe	Climber	Eradication
Lonicera japonica	Japanese honeysuckle	Severe	Climber	Suppression
Passiflora spp.	Banana passionfruit	Severe	Climber	Eradication
Rubus fruticosus agg.	Blackberry	Severe	Climber	Suppression
Salix cinerea	Grey willow	Severe	Woody	Suppression
Salix fragilis	Crack willow	Severe	Woody	Suppression
Aponogeton distachyos	Cape pondweed	Severe	Aquatic	Suppression
Acer pseudoplatanus	Sycamore	High	Woody	Eradication
Apium nodiflorum	Water celery	High	Marginal aquatic	Suppression
Cortaderia jubata	Purple pampas grass	High	Exotic grass	Suppression
Cortaderia selloana	Pampas	High	Exotic grass	Suppression
*Corynocarpus laevigatus**	Karaka	High	Woody	No management
Delairea odorata	German Ivy	High	Climber	Suppression
Erica lusitanica	Spanish heath	High	Woody	Surveillance
Glyceria maxima	Reed sweetgrass	High	Marginal aquatic	Suppression
Hedera helix	Ivy	High	Climber	Suppression
Hedychium spp.	Ginger	High	Groundcover	Eradication
Ilex aquifolium	Holly	High	Woody	Surveillance
Ipomoea indica	Blue morning glory	High	Climber	Surveillance
Phalaris arundinacea	Reed canary grass	High	Marginal aquatic	Suppression
*Pittosporum crassifolium**	Karo	High	Woody	Suppression
Prunus spp.	Cherry	High	Woody	Suppression
Selaginella kraussiana	African club moss	High	Groundcover	Surveillance

Scientific name	Common name	Priority	Weed type	Management aim
Senecio angulatus	Cape ivy	High	Climber	Eradication
Zantedeschia aethiopica	Arum lily	High	Groundcover	Suppression
Acacia spp.	Wattle	Moderate	Woody	Suppression
Agapanthus praecox subsp. *orientalis*	Agapanthus	Moderate	Groundcover	Eradication
Bidens frondosa	Beggars' ticks	Moderate	Marginal aquatic	Surveillance
Chrysanthemoides monilifera	Boneseed	Moderate	Woody	Surveillance
Cotoneaster spp.	Cotoneaster	Moderate	Woody	Surveillance
Crataegus monogyna	Hawthorn	Moderate	Woody	Surveillance
Gunnera tinctoria	Chilean rhubarb	Moderate	Groundcover	Surveillance
Leycesteria formosa	Himalayan honeysuckle	Moderate	Climber	Surveillance
Lycium ferocissimum	Boxthorn	Moderate	Woody	Surveillance
Paraserianthes lophantha	Brush wattle	Moderate	Woody	Suppression
Populus alba	Silver poplar	Moderate	Woody	Surveillance
Populus nigra	Lombardy poplar	Moderate	Woody	Surveillance
Rhododendron ponticum	Rhododendron	Moderate	Woody	Surveillance
Rumex sagittatus	Climbing dock	Moderate	Climber	Surveillance
Solanum chenopodioides	Velvety nightshade	Moderate	Climber	No management
Solanum nigrum	Black nightshade	Moderate	Groundcover	No management
Tradescantia fluminensis	Tradescantia	Moderate	Groundcover	Suppression
Ulex europaeus	Gorse	Moderate	Woody	Eradication
Vinca major	Periwinkle	Moderate	Groundcover	Suppression
Agrostis stolonifera	Creeping bent	Low	Exotic grass	No management
Anthoxanthum odoratum	Sweet vernal	Low	Exotic grass	No management
Berberis glaucocarpa	Barberry	Low	Woody	Surveillance
Buddleja davidii	Buddleia	Low	Woody	Surveillance
Cenchrus clandestinus	Kikuyu grass	Low	Exotic grass	No management
Chamaecytisus palmensis	Tree lucerne	Low	Woody	No management
Crocosmia × *crocosmiiflora*	Montbretia	Low	Groundcover	No management
Cupressus macrocarpa	Macrocarpa	Low	Woody	No management
Cytisus scoparius	Broom	Low	Woody	No management
Dactylis glomerata	Cocksfoot	Low	Exotic grass	No management

Scientific name	Common name	Priority	Weed type	Management aim
Ehrharta erecta	Veldt grass	Low	Exotic grass	No management
Erythranthe guttata	Monkey musk	Low	Marginal aquatic	Surveillance
Eucalyptus spp.	Gum trees	Low	Woody	Surveillance
Foeniculum vulgare	Fennel	Low	Groundcover	No management
Genista monspessulana	Montpellier broom	Low	Woody	No management
Glyceria fluitans	Floating sweetgrass	Low	Aquatic	No management
Holcus lanatus	Yorkshire fog	Low	Exotic grass	No management
Hydrangea macrophylla	Hydrangea	Low	Groundcover	Surveillance
Iris pseudacorus	Yellow flag	Low	Groundcover	Surveillance
Jacobaea vulgaris	Ragwort	Low	Groundcover	No management
Juncus articulatus	Jointed rush	Low	Groundcover	No management
Lavatera arborea	Tree mallow	Low	Groundcover	No management
Lolium perenne	Rye grass	Low	Exotic grass	No management
Lupinus arboreus	Tree lupin	Low	Woody	Surveillance
*Metrosideros excelsa**	Pohutukawa	Low	Woody	Surveillance
Phalaris sp.	Canary grass	Low	Exotic grass	No management
Pinus nigra	Black pine	Low	Woody	Surveillance
Pinus radiata	Radiata pine	Low	Woody	Surveillance
Poa annua	Annual poa	Low	Exotic grass	No management
Prunus × domestica	Plum	Low	Woody	Surveillance
Quercus spp.	Oak	Low	Woody	Surveillance
Sambucus nigra	Elder	Low	Woody	Surveillance
Schedonorus arundinaceus	Tall fescue	Low	Exotic grass	No management
Solanum pseudocapsicum	Jerusalem cherry	Low	Woody	Surveillance

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

References

[1] Wildlands Consultants Ltd. 2015. Ecological Evaluation of Taupō Swamp, Plimmerton. S157Queen-Elizabeth-II-National-Trust.pdf
[2] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf
[3] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023.
[4] Bagnall, R.G. and Ogle, C.C. 1981. The changing vegetation structure and composition of a mire at Plimmerton, North Island, New Zealand. New Zealand Journal of Botany 19:371-387.
[5] McArthur, N. and Lawson, J. 2013. Coastal and freshwater habitats of significance for rare and threatened bird species in the Wellington region. Greater Wellington Regional Council.
[6] Queen Elizabeth National Trust.1989. Taupo Swamp Plimmerton Management Plan.
[7] Porirua City Council. 2023. Porirua City District Plan. Porirua City Operative District Plan Volume 1
[8] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023.
[9] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Final Operative Version – 28 July 2023. Schedule D2.
[10] Te Arawhiti. (2012). Deed of Settlement between the Crown and Ngāti Toa Rangatira.
[11] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023. Schedule C.
[12] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Final Operative Version – 28 July 2023.
[13] Singers, N.J.D, and Rogers, G.M. 2014. A classification of New Zealand's terrestrial ecosystems. Science for Conservation. 325(325):87.
[14] Singers, N., Crisp, P. and Spearpoint O. 2018. Forest ecosystems of the Wellington Region.
[15] Wildlands Consultants Ltd. 2015. Ecological Evaluation of Taupō Swamp, Plimmerton. S157Queen-Elizabeth-II-National-Trust.pdf
[16] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf
[17] Walker, S., Cieraad, E. and Barringer, J. 2015. The Threatened Environment Classification for New Zealand 2012: a guide for users. Landcare Research. The Threatened Environment Classification for New Zealand 2012: a guide for users
[18] Cieraad, E., Walker, S., Price, R. and Barringer, J. 2015. An updated assessment of indigenous cover remaining and legal protection in New Zealand's land environments. New Zealand Journal of Ecology. 39(2): 309-315.
[19] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Final Operative Version – 28 July 2023.
[20] Wildlands Consultants Ltd. 2015. Ecological Evaluation of Taupō Swamp, Plimmerton. S157Queen-Elizabeth-II-National-Trust.pdf
[21] Wildlands Consultants Ltd. 2015. Ecological Evaluation of Taupō Swamp, Plimmerton. S157Queen-Elizabeth-II-National-Trust.pdf
[22] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf
[23] Ausseil, A-G., Gerbeaux, P., Chadderton, W., Stephens, T., Brown, D. and Leathwick, J. 2008. Wetland ecosystems of national importance for biodiversity: Criteria, methods and candidate list of nationally important inland wetlands. Landcare Research. Wetland ecosystems of national

importance for biodiversity: Criteria, methods and candidate list of nationally important inland wetlands

[24] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020. Prepared for QEII National Trust.

[25] Boffa Miskell Ltd. 2018. Porirua Landscape Evaluation – Draft Technical Assessment. Porirua City Council.

[26] McEwen, M. (compiler). 1987. Ecological Regions and Districts of New Zealand. Department of Conservation. Ecological regions and districts of New Zealand

[27] McEwen, W.M. (Ed.). 1987. Booklet to accompany SHEET 3. Descriptions of Districts in central New Zealand, from Eastern Wairarapa to Akaroa; also Chathams, not shown on map. Ecological Regions and Districts of New Zealand. Department of Conservation. Ecological regions and districts of New Zealand

[28] Porirua City Council. 2023. Porirua City District Plan. Porirua City Operative District Plan Volume 1

[29] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf

[30] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf

[31] Urlich, M. 2016. Personal observation. Greater Wellington Regional Council.

[32] Porirua City Council. 2023. Porirua City District Plan. Porirua City Operative District Plan Volume 1

[33] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020.

[34] Wildlands Consultants Ltd. 2015. Ecological Evaluation of Taupō Swamp, Plimmerton. S157Queen-Elizabeth-II-National-Trust.pdf

[35] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020.

[36] Thompson, T. 2020. QEII National Trust, pers comms.

[37] Ogle, C. 1978. Vegetation of Swamp Pockets near Plimmerton. *Wellington Botanical Society Bulletin*, No 40: 24-29. well_1978_40__24-29.pdf

[38] Bagnall, R.G. and Ogle, C.C. 1981. The changing vegetation structure and composition of a lowland mire at Plimmerton, North Island, New Zealand. New Zealand Journal of Botany, 19: 371-387.

[39] Enright, P. and Smith, R. 2015. Personal observation.

[40] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020.

[41] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020.

[42] Porirua City Council. 2023. Porirua City District Plan. Porirua City Operative District Plan Volume 1

[43] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020.

[44] Ogle, C. 1978. Vegetation of Swamp Pockets near Plimmerton. *Wellington Botanical Society Bulletin*, No 40: 24-29. well_1978_40__24-29.pdf

[45] Porirua City Council. 2023. Porirua City District Plan. Porirua City Operative District Plan Volume 1

[46] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020.

[47] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020.

[48] Ogle, C. 1978. Vegetation of Swamp Pockets near Plimmerton. *Wellington Botanical Society Bulletin*, No 40: 24-29. well_1978_40__24-29.pdf

[49] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020.
[50] McArthur, N. and Lawson, J. 2013. Coastal and freshwater habitats of significance for rare and threatened bird species in the Wellington region. Greater Wellington Regional Council.
[51] Small, D. 2015. Final report on the baseline survey of wetland birds at Taupo Swamp, Plimmerton, Wellington. Prepared for the Queen Elizabeth II National Trust.
[52] Porirua City Council. 2023. Porirua City District Plan. Porirua City Operative District Plan Volume 1
[53] Small, D. 2015. Final report on the baseline survey of wetland birds at Taupo Swamp, Plimmerton, Wellington.
[54] eBird. Accessed February 2025. Plimmerton – Taupō Swamp bird list. Plimmerton--Taupo Swamp, Porirua City, Wellington, New Zealand – eBird Hotspot
[55] Cotter, S. 2023. Pūwetu/spotless crake, mātātā/firnbird and matuku-hūrepu/Australian bittern survey at selected wetlands (Plimmerton and Taupo Swamp in Plimmerton, Opau Stream wetlands A and B and Quartz Hill swamp in Makara and Ladel Bend wetland in Pakuratahi) within the Wellington region. Spring 2023.
[56] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf
[57] Small D. 2015. Final report on the baseline survey of wetland birds at Taupo Swamp, Plimmerton, Wellington.
[58] eBird. Accessed February 2025. Plimmerton – Taupō Swamp bird list. Plimmerton--Taupo Swamp, Porirua City, Wellington, New Zealand – eBird Hotspot
[59] Ecogecko. 2016. Lizard survey of Taupo Swamp. Unpublished report.
[60] Department of Conservation. 2015. New Zealand Herpetological Internal Database. Department of Conservation. Record observed 1986.
[61] Boffa Miskell Ltd. 2018. Porirua Landscape Evaluation – Draft Technical Assessment. Porirua City Council.
[62] Leigh, S. 2005. Fish Pass Evaluation – Taupō Stream.
[63] Porirua City Council. 1980. 118/80 Proposed Change to District Scheme (Pukekura Bay Section). Report of Town Planner 8 September 1980. pp. 24-34
[64] Hicks, B. 1980. Submission on the Fisheries of the Flax Swamp between Plimmerton and Pukerua Bay. Porirua District Scheme Change No. 80-1.
[65] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Final Operative Version – 28 July 2023.
[66] Leigh, S. 2005. Fish Pass Evaluation – Taupō Stream.
[67] Porirua City Council. 1980. 118/80 Proposed Change to District Scheme (Pukekura Bay Section). Report of Town Planner 8 September 1980.
[68] Hicks, B. 1980. Submission on the Fisheries of the Flax Swamp between Plimmerton and Pukerua Bay. Porirua District Scheme Change No. 80-1.
[69] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Final Operative Version – 28 July 2023.
[70] Leigh, S. 2005. Fish Pass Evaluation – Taupō Stream.
[71] National Institute of Water & Atmospheric Research Ltd (NIWA). 2025. New Zealand Fish Passage Assessment Tool Database. Available: https://fishpassage.niwa.co.nz/. (Accessed March 2025).
[72] National Institute of Water & Atmospheric Research Ltd (NIWA). 2018. New Zealand Fish Passage Guidelines. For structures up to 4 metres. New-Zealand-fish-passage-guidelines-for-structures-up-to-four-metres.pdf
[73] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf
[74] Blaschke, P. 2018. Plimmerton Farm, Porirua City: Ecological Assessment Summary for Draft Precinct Plan: Appendix 5 – Plimmerton Ecological Assessment. Blaschke and Rutherford Environmental Consultants.

[75] Wildlands Consultants Ltd. 2015. Ecological Evaluation of Taupō Swamp, Plimmerton. Contract report No. 3678.
[76] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf
[77] Bagnall, R.G. and Ogle, C.C. 1981. The changing vegetation structure and composition of a lowland mire at Plimmerton, North Island, New Zealand. New Zealand Journal of Botany, 19: 371-387.
[78] Friends of Taupō Swamp and Catchment. 2019. Planting plan for the friends of Taupō Swamp and catchment – stage one 2019-2020.
[79] Friends of Taupō Swamp and Catchment. 2020. Update and planting plan for 2020 (19/20 budget, 20/21 budget).
[80] New Zealand legislation. 1991. Resource Management Act 1991.
[81] Greater Wellington Regional Council. Long Term Plan Ko Te Pae Tawhiti. Te Pane Matua Taiao Greater Wellington 2024 – 2034.
[82] Greater Wellington Regional Council. 2016. Greater Wellington Regional Council Biodiversity Strategy. http://www.gw.govt.nz/assets/council-publications/Biodiversity-Strategy-2016.pdf
[83] Greater Wellington Regional Council. 2023. Natural Resources Plan for the Wellington Region, Te Tikanga Taiao o Te Upoko o te Ika a Maui. Operative Version – 28 July 2023.
[84] Greater Wellington Regional Council. 2019. Greater Wellington Regional Pest Management Plan 2019–2039.
[85] Crisp, P., Govella, S. and Crouch, L. 2016. Identification and prioritisation of high value terrestrial biodiversity sites for selection within the Key Native Ecosystems Programme in the Wellington region. Greater Wellington Regional Council. Microsoft Word – Key Native Ecosystem Prioritisation for the Wellington region November.docx
[86] Townsend, A.J, de Lange, P.J., Duffy, C.A.J., Miskelly, C.M., Molloy, J. and Norton, D.A. 2008. New Zealand Threat Classification System manual. Department of Conservation. New Zealand Threat Classification System manual
[87] Rolfe, J., Makan, T. and Tait, A. 2021. Supplement to the New Zealand Threat Classification System manual 2008. New qualifiers and amendments to qualifier definitions, 2021. Department of Conservation. Supplement to the New Zealand Threat Classification System manual 2008: new qualifiers and amendments to qualifier definitions, 2021
[88] de Lange, P.J., Rolfe, J.R., Barkla, J.W., Courtney, S.P., Champion, P.D., Perrie, L.R., Beadel, S.M., Ford, K.A., Breitwieser, I., Schonberger, I., Hindmarsh-Walls, R., Heenan ,P.B. and Ladley, K. 2018. Conservation status of New Zealand indigenous vascular plants, 2017. Department of Conservation. Conservation status of New Zealand indigenous vascular plants, 2017
[89] Crisp, P. 2020. Conservation status of indigenous vascular plant species in the Wellington region. Greater Wellington Regional Council. Microsoft Word – Conservation status of indigenous vascular plant species in the Wellington region.doc
[90] Enright, P. and Smith, R. 2015. Personal observation.
[91] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020. Prepared for QEII National Trust.
[92] Ogle, C. 1978. Vegetation of Swamp Pockets near Plimmerton. *Wellington Botanical Society Bulletin*, No 40: 24-29. well_1978_40__24-29.pdf
[93] Ogle, C. 1978. Vegetation of Swamp Pockets near Plimmerton. *Wellington Botanical Society Bulletin*, No 40: 24-29. well_1978_40__24-29.pdf
[94] Bagnall, R.G. and Ogle, C.C. 1981. The changing vegetation structure and composition of a lowland mire at Plimmerton, North Island, New Zealand. New Zealand Journal of Botany, 19: 371-387.
[95] Enright, P. and Smith, R. 2015. Personal observation.
[96] Wildlands Ltd. 2016. Assessment of Vegetation Change in Taupō Swamp, 1949-2016. Contract Report No. 4020. Prepared for QEII National Trust.

[97] Robertson, H.A., Baird, K.A., Elliot, G.P., Hitchmough, R.A., McArthur, N.J., Makan, TD., Miskelly, C.M., O'Donnell, C.F.J., Sagar, P.M., Scofield, R.P., Taylor, G.A. and Michel, P. 2021. Conservation status of birds in Aotearoa New Zealand, 2021. Department of Conservation.
[98] Crisp, P., Robertson, H., McArthur, N. and Cotter, S. 2024. Conservation status of birds in the Wellington Region, 2023. Greater Wellington Regional Council. Conservation-status-of-birds-species-in-the-Wellington-Region-Final-draft-6-Feb-2024.pdf
[99] Parrish, G. 1984. Wildlife and wildlife sites of the Wellington region. Fauna survey unit Report No. 38. New Zealand Wildlife Service.
[100] Cromarty, P. and Scott, D.A. (eds). 1996. A Directory of Wetlands in New Zealand. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nzwetlands08.pdf
[101] Todd, M., Kettles, H., Graeme, C., Sawyer, J., McEwan, M. and Adams, L. 2013. Estuarine systems in the lower North Island. Ranking of significance, current status and future management options. Department of Conservation. Estuarine systems in the lower North Island/Te Ika-a-Māui
[102] Small D. 2015. Final report on the baseline survey of wetland birds at Taupo Swamp, Plimmerton.
[103] Robertson et al. 2021. Conservation status of birds in Aotearoa New Zealand, 2021.
[104] eBird. Accessed February 2025. Plimmerton – Taupō Swamp bird list. Plimmerton--Taupo Swamp, Porirua City, Wellington, New Zealand – eBird Hotspot
[105] Dunn, N.R., Allibone, R.M., Closs, G.P., Crow, S.K., David, B.O., Goodman, J.M., Griffiths, M., Jack, C.D., Ling, N., Waters, J.M. and Rolfe, J.R. 2018. Conservation status of New Zealand freshwater fishes, 2017. Department of Conservation.
[106] Crisp, P., Perrie, A. and Morar, S. 2022. Conservation status of indigenous freshwater fish in the Wellington region. Greater Wellington Regional Council.
[107] Porirua City Council. 1980. 118/80 Proposed Change to District Scheme (Pukekura Bay Section). Report of Town Planner 8 September 1980.
[108] Hicks B. 1980. Submission on the Fisheries of the Flax Swamp between Plimmerton and Pukerua Bay. Porirua District Scheme Change No. 80-1.
[109] Leigh, S. 2005. Fish Pass Evaluation – Taupō Stream.
[110] Pekelharing, C.J., Parkes, J.P. Barker, R.J. 1998. Possum (*Trichosurus vulpecula*) densities and impacts on fuchsia (*Fuchsia excorticata*) in South Westland, New Zealand. New Zealand Journal of Ecology 22(2): 197–203.
[111] Nugent, G., Sweetapple, P., Coleman, J. and Suisted, P. 2000. Possum feeding patterns. Dietary tactics of a reluctant folivore. In: Montague TL ed. The brushtail possum: Biology, impact and management of an introduced marsupial. Lincoln, Manaaki Whenua Press.
[112] Sweetapple, P.J., Fraser, K.W. and Knightbridge, P.I. 2004. Diet and impacts of brushtail possum populations across the invasion front in South Westland, New Zealand. New Zealand Journal of Ecology 28(1): 19–33.
[113] Daniel, M.J. 1973. Seasonal diet of the ship rat (*Rattus r. rattus*) in lowland forest in New Zealand. Proceedings of the New Zealand Ecological Society 20: 21–30.
[114] Innes, J.G. and Russell, J.C. 2021. *Rattus rattus*. In The handbook of New Zealand mammals. 3rd Ed. (Eds C.M. King, and D.M. Forsyth) Family Muridae.
[115] Murphy, E., Maddigan, F., Edwards, B. and Clapperton, K. 2008. Diet of stoats at Okarito Kiwi Sanctuary, South Westland, New Zealand. New Zealand Journal of Ecology 32(1): 41–45.
[116] King, C. and Veale, A.J. 2021. *Mustela erminea*. In The handbook of New Zealand mammals. 3rd Ed. (Eds C.M. King, and D.M. Forsyth) Family Mustelidae.
[117] Ragg, J.R. 1998. Intraspecific and seasonal differences in the diet of feral ferrets (*Mustela furo*) in a pastoral habitat, east Otago, New Zealand. New Zealand Journal of Ecology 22(2): 113–119.
[118] Garvey, P.M. and Byrom, A.E. 2021. *Mustela furo*. In The handbook of New Zealand mammals. 3rd Ed. (Eds C.M. King, and D.M. Forsyth) Family Mustelidae.
[119] King, C. and Murphy, E.C. 2021. *Mustela nivalis vulgaris*. In The handbook of New Zealand mammals. 3rd Ed. (Eds C.M. King, and D.M. Forsyth) Family Mustelidae.

[120] King, C.M., Flux, M., Innes, J.G. and Fitzgerald, B.M. 1996. Population biology of small mammals in Pureora Forest Park: 1. Carnivores (*Mustela erminea, M.furo, M.nivalis* and *Felis catus*). New Zealand Journal of Ecology 20(2): 241–251.
[121] Jones, C. 2021. *Erinaceus europaeus occidentalis*. In The handbook of New Zealand mammals. 3rd Ed. (Eds C.M. King, and D.M. Forsyth) Family Erinaceidae.
[122] Spitzen-van der Sluijs, A.M., Spitzen, J., Houston, D. and Stumpel, A.H.P. 2009. Skink predation by hedgehogs at Macraes Flat, Otago, New Zealand. New Zealand Journal of Ecology 33(2): 205–207.
[123] Jones, C., Moss, K. and Sanders, M. 2005. Diet of hedgehogs (*Erinaceus europaeus*) in the upper Waitaki Basin, New Zealand. Implications for conservation. New Zealand Journal of Ecology 29(1): 29–35.
[124] Jones, C. 2021. *Erinaceus europaeus occidentalis*. In The handbook of New Zealand mammals. 3rd Ed. (Eds C.M. King, and D.M. Forsyth) Family Erinaceidae.
[125] Murphy, E.C. and Nathan, H.W. 2021. *Mus musculus*. In The handbook of New Zealand mammals. 3rd Ed. (Eds C.M. King, and D.M. Forsyth) Family Muridae.
[126] Newman, D.G. 1994. Effect of a mouse *Mus musculus* eradication programme and habitat change on lizard populations on Mana Island, New Zealand, with special reference to McGregor's skink, *Cyclodina macgregori*. New Zealand Journal of Ecology 21: 443–456.
[127] King, C.M., Flux, M., Innes, J.G. and Fitzgerald, B.M. 1996. Population biology of small mammals in Pureora Forest Park: 1. Carnivores (*Mustela erminea, M.furo, M.nivalis* and *Felis catus*). New Zealand Journal of Ecology 20(2): 241–251.
[128] Reardon, J.T., Whitmore, N., Holmes, K.M., Judd, L.M., Hutcheon, A.D., Norbury, G. and Mackenzie, D.I. 2012. Predator control allows critically endangered lizards to recover on mainland New Zealand. New Zealand Journal of Ecology 36(2): 141–150.
[129] King, C.M., Flux, M., Innes, J.G. and Fitzgerald, B.M. 1996. Population biology of small mammals in Pureora Forest Park: 1. Carnivores (*Mustela erminea, M.furo, M.nivalis* and *Felis catus*). New Zealand Journal of Ecology 20(2): 241–251.
[130] Gillies, C.A. and van Heezik, Y. 2021. *Felis catus*. In The handbook of New Zealand mammals. 3rd Ed. (Eds C.M. King, and D.M. Forsyth) Family Felidae.
[131] Beggs, J.R. 2001. The ecological consequences of social wasps (Vespula spp.) invading an ecosystem that has an abundant carbohydrate resource. Biological Conservation 99: 17–28.
[132] McIntosh, A.R., McHugh, P.A., Dunn, N.R., Goodman, J.M., Howard, S.W., Jellyman, P.G., O'Brien, L.K., Nystrom, P. and Woodford, D.J. 2010. The impact of trout on galaxiid fishes in New Zealand. New Zealand Journal of Ecology 34(1): 195–206.
[133] Smale, M.C., Dodd, M.B., Burns, B.R. and Power, I.L. 2008. Long-term impacts of grazing on indigenous forest remnants on North Island hill county, New Zealand. New Zealand Journal of Ecology 32(1): 57–66.
[134] Holderness-Roddam, B. 2011. The effects of domestic dogs (*Canis familiaris*) as a disturbance agent on the natural environment. Thesis submitted at University of Tasmania, Hobart.

Greater Wellington Regional Council:

Wellington office
PO Box 11646
Manners Street
Wellington 6142

T 04 384 5708
F 04 385 6960

Upper Hutt office
PO Box 40847
Upper Hutt 5018

T 04 526 4133
F 04 526 4171

Masterton office
PO Box 41
Masterton 5840

T 06 378 2484
F 06 378 2146

Follow the Wellington Regional Council

info@gw.govt.nz
www.gw.govt.nz

August 2025
GW/BD-G-25-19

Please recycle
Produced sustainably