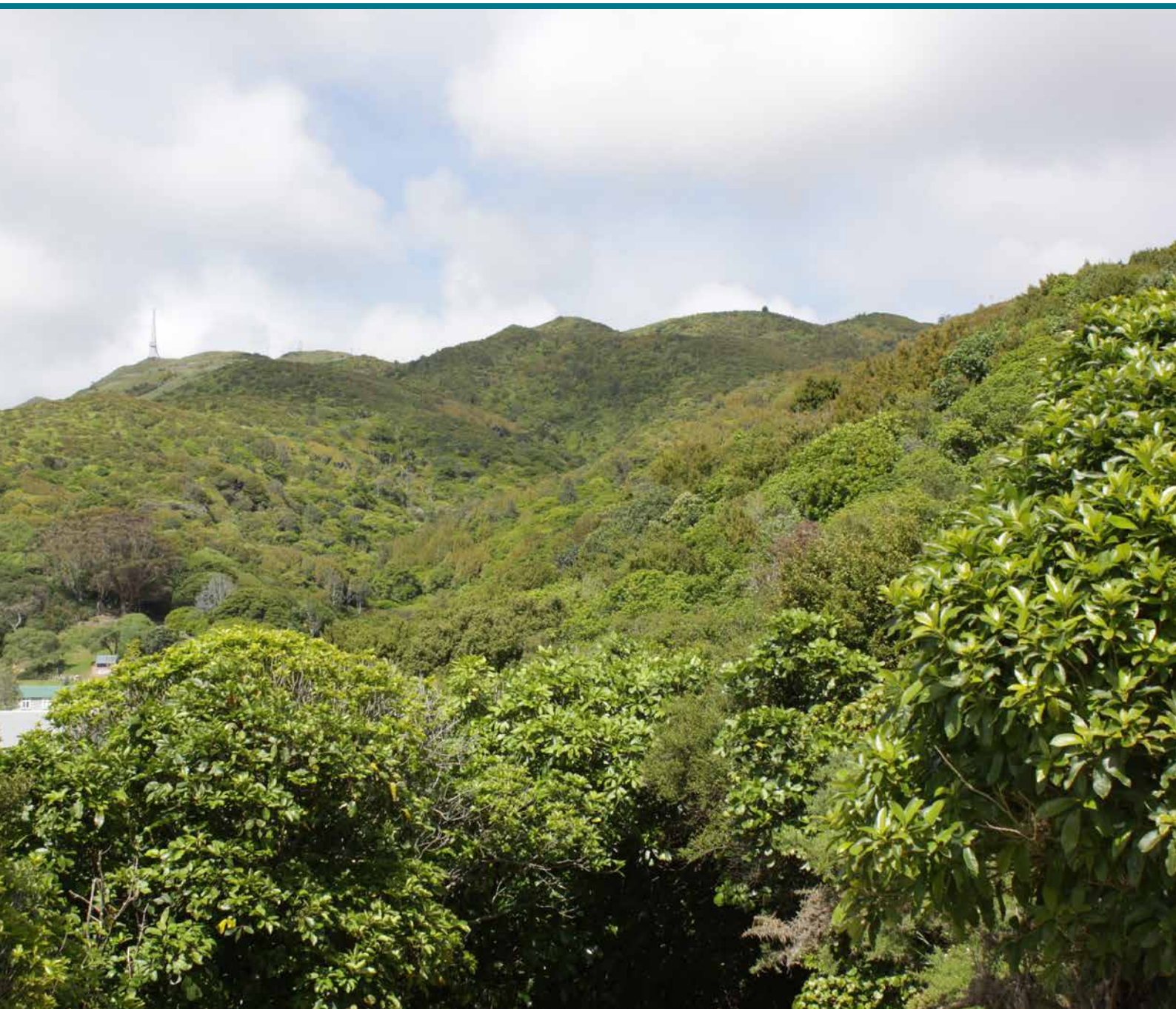
Key Native Ecosystem Plan
Porirua Western Forests

2015-2018

greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao



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1. Key Native Ecosystem plans

New Zealand's indigenous biodiversity continues to decline nationally, and in the Wellington region. Major reasons for the decline are that native species are preyed on or outcompeted by invasive species and ecosystems and habitats are lost or degraded through human resource use and development. Active management to control threats is required to protect indigenous biodiversity. Regional councils have responsibility to maintain indigenous biodiversity, as well as to protect significant vegetation and habitats of threatened species, under the Resource Management Act 1991 (RMA).

Greater Wellington Regional Council's (GWRC's) vision for biodiversity is:

"The Wellington region contains a full range of naturally occurring habitats and ecosystems that are in a healthy functioning state and supporting indigenous biodiversity"

GWRC's Biodiversity Strategy 2011-21[1] provides a common focus across the council's departments, and guides activities relating to biodiversity. One of its goals is: High value biodiversity areas are protected.

In order to achieve this vision and goal, the Key Native Ecosystem (KNE) programme seeks to protect some of the best examples of ecosystem types in the Wellington region by managing, reducing, or removing threats to their values. Sites with the highest biodiversity values have been identified and then prioritised for management. Active management of KNE sites can involve control of ecological weeds and pest animals, fencing to exclude stock, restoration planting and helping landowners to legally protect these areas.

KNE sites are managed in accordance with three-year KNE plans, such as this one, prepared for each area by the GWRC's Biodiversity department in collaboration with the landowners and other stakeholders. These plans outline the ecological values and threats specific to each KNE site, set out objectives for biodiversity management, and prescribe the operational actions and budget required to work towards achieving the objectives.

Much of the work planned in KNE sites will be carried out by GWRC staff or contractors engaged by GWRC. For example, the Biosecurity department carries out ecological weed and pest animal control to achieve the objectives set out in KNE plans.

GWRC also recognises that working relationships between the management partners are critical for achieving the objectives for the KNE site. Under the KNE programme, GWRC staff also work with landowners and volunteer community groups involved in protection or restoration work within KNE sites.

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

2. Porirua Western Forests Key Native Ecosystem

The Porirua Western Forests KNE site (315 ha) covers a series of forested ridges and valleys immediately west of Porirua City (see Appendix 1, Map 1). The KNE site is the largest remnant of indigenous forest in the Porirua City area and comprises coastal and lowland broadleaved-podocarp forest and regenerating scrub, which is at an advanced stage.

The KNE site is well connected within the wider ecological landscape. Most of the KNE site is within Porirua Scenic Reserve, one of several reserves in the western hills of Porirua. It is part of an important wildlife corridor that links the Wellington south coast to the Porirua coastline.

Landowners and stakeholders

GWRC works in collaboration with landowners and other interested parties (stakeholders) where appropriate to achieve shared objectives for the site. In preparing this plan GWRC has sought input from landowners and relevant stakeholders, and will continue to involve them as the plan is implemented.

Landowners

Much of the KNE site is public land or reserve (263 ha) managed by Porirua City Council (PCC), including a small area of Crown Land. The Porirua Scenic Reserve has Scenic 'A' Reserve classification and is managed in accordance with PCC's Porirua City Reserves Management Plan which provides for the protection and enhancement of heritage, natural and recreation values[2].

The Department of Conservation own the Raiha Street Conservation Area (see Appendix 1, Map 2 for land ownership).

Dan and Prudence Stevenson own Pikarere Farm, of which 49 ha is included within the KNE site. There is an extensive pest animal control network beyond the KNE site boundary covering large parts of Pikarere Farm.

Management partners and key stakeholders

The primary management partners are GWRC and PCC, which jointly fund the management activities detailed in this plan. Within GWRC the Biodiversity department coordinate biodiversity management activities and provide biodiversity advice, and the Biosecurity department undertake pest animal and plant control.

Ngāti Toa is considered a stakeholder for the KNE site, given the area's cultural significance and long association with the Takapūwāhia Marae. The Porirua City Reserves Management Plan permits plant material to be collected from Porirua Scenic Reserve for rongoā Māori.

Ecological values

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

The Porirua Western Forests KNE site is significant because it comprises one of the best remaining representative examples of coastal kohekohe-podocarp and semi-coastal tawa-podocarp forest in the Wellington region. The KNE site is in the Wellington Ecological District[3], which is characterised by steep, strongly-faulted hills. It has a mild, humid coastal climate[4].

The Porirua Western Forests KNE site has good ecological linkages to other natural areas, providing opportunities for seed dispersal by birds. The Whitireia Coast KNE site lies 3 km north-east, and the Karehana Bay Bush and Taupo Valley Wetlands KNE sites are a further 2 km away. Mana Island is 4 km off shore to the north-west.

Of note in recognising the ecological values at the Porirua Western Forests KNE site are the following:

> **Threatened environments:** The Threatened Environment Classification system (LENZ)[5] indicates that the majority (307 ha) of the KNE site is classified as At-Risk with 20-30% indigenous vegetation remaining nationally within this type of land environment. Some areas of the KNE site are classified as Acutely Threatened (2.8 ha) and Chronically Threatened (9.4 ha), while some is regarded as Less Reduced and Better Protected (2.6 ha) (see Appendix 1, Map 3).
>
> **Threatened species:** The New Zealand Threat Classification system[6] lists three At Risk plant species within the KNE site. The fauna includes two Nationally Threatened species; five At Risk species; and one regionally uncommon species. In addition, seven regionally uncommon[7] plant species are found within the KNE site. Nationally Threatened species are listed in Appendix 2 and regionally threatened species in Appendix 3.

The Singers and Rogers (2014)[8] classification of pre-human vegetation indicates that the KNE site comprised kohekohe/tawa forest (MF6), and tawa/kamahi/podocarp forest (MF7). It is estimated that these forest types have only 15% (MF6) and 21% (MF7) of the original extent remaining in the Wellington region[9], making them regionally threatened and At Risk ecosystem types respectively.

The present day forest comprises coastal and semi-coastal tawa (*Beilschmiedia tawa*)-kohekohe (*Dysoxylum spectabile*) forest with podocarp species and indigenous scrub at a range of successional stages. The predominant vegetation type within Porirua Western Forests is tawa-kohekohe on the lower slopes, tawa-māhoe (*Melicytus ramiflorus*) on mid slopes, and māhoe-tawa on higher slopes. A variety of podocarp species occur in more mature forest pockets on the lower slopes, with some scattered higher up the hill.

The type of podocarp species depends on the local environment. Mataī (*Prumnopitys taxifolia*), miro (*Prumnopitys ferruginea*) and tōtara (*Podocarpus totara* var. *totara*) are found on the drier ridge above the Camp Elsdon track; large kahikatea (*Dacrycarpus dacrydioides*) occur around the meandering Mahinawa Stream at the Rangituhi Crescent entrance; and tōtara and some juvenile rimu (*Dacrydium cupressinum*) occur sporadically in other locations. The KNE site is known to support at least 180 plant species including more than 60 species of fern and 14 species of orchid[10].

The kohekohe canopy is in good condition and plentiful fruits and flowers support nineteen species of forest birds including large populations of tūī (*Prosthemadera novaeseelandiae*) and kererū (*Hemiphaga novaeseelandiae*). Red crowned kākāriki (*Cyanoramphus novaezelandiae*), yellow-crowned kākāriki (*Cyanoramphus auriceps*)[11], bellbirds (*Anthornis melanura*) and whiteheads (*Mohoua albicilla*) — all infrequent on the Wellington peninsula[12] — have recently established themselves within the KNE site. New Zealand falcons (*Falco novaeseelandiae*) have been regularly sighted near the KNE site since 2009[13].

Barking gecko (*Naultinus punctatus*) and ngahere gecko (*Mokopirirakau* "Southern North Island"), have been recorded in the KNE site[14]. The carnivorous snail *Wainuia urnula* is also present[15].

Longfin eel (*Anguilla dieffenbachii*) and redfin bully (*Gobiomorphus huttoni*) are the only fish species that have been recorded at the KNE site[16]. Streams within the KNE site include Urukahika Creek, Mahinawa Stream, Takapuwahia Stream, and Mill Creek. Takapuwahia Stream flows into Porirua Harbour.

Key threats to ecological values at the site

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

The main threats to the ecological values of the Porirua Western Forests KNE site are ecological weeds (including those spread by green waste and rubbish dumping), pest animals, and adverse impacts from human activities such as track building and land encroachment.

A wide range of ecological weeds are present throughout the KNE site and include climbers, groundcover and woody weed species that impact native forest regeneration. Ecological weed species and their priority for control are listed in Appendix 4.

Proposed track construction (and unauthorised track building), have the potential to increase ecological weed issues throughout the KNE site by creating light gaps where weeds can establish, and by transporting weeds to places where they currently do not occur. Track building will also cause habitat loss, potentially in high value areas, and greater disturbance of wildlife such as nest birds.

A range of pest animals are known to be present in the area, including possums (*Trichosurus vulpecula*), rats (*Rattus* spp.) and mustelids (*Mustela* spp.). These and other pest species are known to degrade habitats through over-browsing forest foliage

and preventing regeneration of the native forest cover. Some are also known to predate native birds, lizards and invertebrates.

While the key threats discussed in this section are recognised as the most significant, a number of other threats to the KNE site have also been identified. Table 1 presents a summary of all known threats to the KNE site (including those discussed above), detailing which operational areas they affect, how the threats impacts on ecological values, and whether they will be addressed by the proposed management activities.

Table 1: Threats to ecological values present at the Porirua Western Forests KNE site
The codes alongside each threat correspond to activities listed in the operational plan (Table 2), and are used to ensure that actions taken are targeted to specific threats. A map of operational areas can be found in Appendix 1 (see Map 4).

Threat code	Threat and impact on biodiversity in the KNE	Operational area/location
Ecological weeds		
EW-1	Ground covers, scrambling and climbing weeds have the potential to smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include climbing asparagus (*Asparagus scandens*), old man's beard (*Clematis vitalba*), jasmine (*Jasminum polyanthum*), blackberry (*Rubus fruiticosa* agg.) everlasting pea (*Lathyrus latifolius*), Japanese honeysuckle (*Lonicera japonica*), periwinkle (*Vinca major*), banana passionfruit (*Passiflora tripartita* var. *mollissima*), rose, (*Rosa* sp.), Cape ivy (*Senecio angulatus*), German ivy (*Delairea odorata*), greater bindweed (*Calystegia silvatica*), tradescantia (*Tradescantia fluminensis*), pellitory of the wall (*Parietaria judaica*), onion weed (*Allium triquetrum*), stinking iris (*Iris foetidissima*), montbretia (*Crocosmia* × *crocosmiiflora*), oxeye daisy (*Leucanthemum vulgare*) and pampas (*Cortaderia selloana*)	A, B,C, D, E
EW-2	Woody weed species have the potential to displace native vegetation, out-compete indigenous regeneration, and alter vegetation structure and composition. Key weed species include boneseed (*Chrysanthemoides monilifera*), evergreen buckthorn (*Rhamnus alaternus*), cotoneaster (*Cotoneaster glaucophylla*), holly (*Ilex aquifolium*), oak (*Quercus* sp.), Tasmanian ngaio (*Myoporum* aff. *insulare*), willow (*Salix* spp.), brush wattle (*Paraserianthes lophantha*), and ornamental cherry (*Prunus* sp.)	A, B, C, D, E
EW-3	Non-local native tree species suppress native regeneration. Parts of the KNE site are dominated by the non-local native tree karaka (*Corynocarpus laevigatus*). Karaka is native only to the northern half of the North Island[17] but was planted as a food source around areas of occupation by Māori[18]. Other non-local native species include karo (*Pittosporum crassifolium* and *P. ralphii*), lacebark (*Hoheria populnea*), pōhutukawa (*Metrosideros excelsa*) and *Pseudopanax* hybrids	A, B, C, D, E
Pest animals		
PA-1	Possums browse palatable canopy vegetation until it can no longer recover[19,20]. This destroys the forest's structure, diversity and function. Possums may also prey on native birds[21] and invertebrates	Entire KNE site
PA-2*	Feral and domestic cats (*Felis catus*) prey on native birds[22], lizards[23] and invertebrates[24], reducing native fauna breeding success and potentially causing local extinctions[25]	Entire KNE site (esp. near urban edge)

Threat code	Threat and impact on biodiversity in the KNE	Operational area/location
PA-3	Mustelids (stoats[26,27] (*Mustela erminea*), ferrets[28,29] (*M. furo*) and weasels[30,31] (*M. nivalis*)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	Entire KNE site
PA-4	Hedgehogs (*Erinaceus europaeus*) prey on native invertebrates[32], lizards[33] and the eggs[34] and chicks of ground-nesting birds[35]	Entire KNE site
PA-5	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[36,37]	Entire KNE site
PA-6*	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[38,39]	Entire KNE site
PA-7*	Goats (*Capra hircus*) browsing affects the composition and biomass of native vegetation in the understory tiers of forest habitats, preventing regeneration of the most palatable understory species and reducing species diversity[40]	Entire KNE site
PA-8*	Feral pigs (*Sus scrofa*) root up the soil and eat roots, invertebrates, seeds and native plants preventing forest regeneration[41]	Entire KNE site
Human activities		
HA-1*	Illegal collection of orchids can cause local extinctions	Entire KNE site
HA-2	Garden escapes and garden waste dumping can spread weeds into the KNE site. Areas of native vegetation have been removed by landowners adjacent to the KNE site, creating open grassed areas and opening the forest up to weed and edge effects	KNE boundary (urban sections)
HA-3	Grazing by stock escaped from adjoining farmland will inhibit natural regeneration, reduce indigenous plant species richness, and cause local extinctions of palatable indigenous shrubs, terrestrial orchids and ferns[42]	KNE boundary (rural sections)
HA-5*	Creation of new tracks contributes to habitat loss and degradation and has the potential to introduce weeds to areas that are currently weed-free and create canopy gaps than allow ecological weeds to establish and can cause wind throw	Entire KNE site
HA-6*	Recreational use such as tramping, mountain biking and horse riding can cause damage and disturbance of the native ecosystem. It is also likely to disturb native fauna and introduce ecological weeds	Entire KNE site
HA-7	Fish barriers such as Wastops on stream outlets into Porirua Harbour can prevent fish migration within the KNE site. As some of the streams are culverted through the residential areas below the KNE site, there may also be fish passage barriers between the KNE site and the sea	Waterways outside the KNE site
Other threats		
OT-1*	A lack of legal protection of private land within the KNE site boundary can leave the site at risk of development in the future and resources invested in the site may be lost	Private land within the KNE site
OT-2*	Fire can contribute to habitat loss and degradation by destroying native vegetation opening it up to weed invasion and edge effects	Entire KNE site

*Threats marked with an asterisk are not addressed by actions in the operational plan.

3. Objectives and management activities

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

Objectives

The following objectives will guide the management activities at the Porirua Western Forests KNE site.

1. **To improve the structure* and function† of native plant communities**
2. **To improve the habitat for native birds**
3. **To improve the habitat for native lizards**
4. **To improve the habitat for native fish**
5. **To raise community awareness of the ecological values of the KNE site**
6. **To engage the community in management of the KNE site**

***** The living and non-living physical features of an ecosystem. This includes the size, shape, complexity, condition and the diversity of species and habitats within the ecosystem.
† The biological processes that occur in an ecosystem. This includes seed dispersal, natural regeneration and provision of food and habitat for animal species.

Management activities

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

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

Ecological weed control

The aim of weed control is to reduce the distribution and density of weeds to maintain native plant dominance and increase native plant regeneration. The priority weed control areas are adjacent to the residential boundary of the KNE site where many gardens cultivate weed species, and/or dump green waste within the KNE site.

The KNE site has five operational areas, A-E (see Appendix 1, Map 4), where the highest priority species will be controlled. Each operational area will be monitored annually and target weeds treated with a suitable herbicide. Once the highest priority weed species have been eliminated or controlled to very low density, the lower priority species will be targeted commencing from Pikarere Street (operational area E).

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

Operational area A (Raiha–Colonial Knob walkway): Mid to late succession forest edge along Camp Elsdon and Urukahika Creek margins. Priority species for control are flowering cherry, blackberry, Japanese honeysuckle, ivy, tradescantia,

montbretia, onion weed, stinking iris, greater bindweed and karo (taller than 1 m and less than 100 mm diameter at breast height).

Operational area B (Aparangi-Waiho): Lower stature māhoe-gorse between Camp Elsdon and Waiho Terrace entrance. Priority species for control are karo, flowering cherry, tradescantia, climbing asparagus and Japanese honeysuckle.

Operational area C (Waiho-Ngahue): Forest margin between Waiho Terrace entrance and Rangituhi Cresent. Priority species for control are Cape ivy, Japanese honeysuckle, oak, tradescantia, flowering cherry, convolvulus, montbretia, periwinkle, jasmine and willow.

Operational area D (Rangituhi): Forest margin along Rangituhi Cresent. Priority species for control are tradescantia, pellitory of the wall, banana passionfruit and jasmine.

Operational area E (Pikarere): Regenerating indigenous bush between Rangituhi Cresent and Pikarere Street. Priority species for control are blackberry, gorse, pine, Cape ivy, wild rose, Tasmanian ngaio, karo and pōhutukawa.

Pest animal control

The aim of pest animal control is to reduce canopy browsers to protect the forest and to reduce predators to maintain populations of native birds.

Possum control was initiated by GWRC in 1996 and was intensified to include mustelids and rats from 2001. Within the KNE site there is a network of 214 poison bait stations that target possums and rats and 31 DOC200 kill-traps that target mustelids and hedgehogs. Poison bait stations and kill-traps are serviced every three months by GWRC.

A large number of poison bait stations and kill-traps are located outside the KNE site boundary on Pikarere Farm to target possums and mustelids (see Appendix 1, Map 5). This network is serviced by GWRC on a monthly basis (except in pasture areas during lambing season between August and October) to account for the greater density of possums and mustelids known to be present in this area. This network provides a pest animal control buffer zone for the KNE site, reducing reinvasion of pest animals into the KNE site from neighbouring lands.

During 2014/15 GWRC's Regional Possum Predator Control Programme (RPPCP) installed poison bait stations across the wider landscape between Makara and Porirua (see Appendix 1, Map 5). The RPPCP aims to control possums to low densities across the landscape and is expected to benefit the KNE site by reducing the occurrence of possum reinvasions.

The bait uptake and kill-trap catch results of the RPPCP and KNE site pest animal control network will be reviewed by year 3 of this KNE plan to establish whether such an intensive service regime is still required on Pikarere Farm.

Kill-traps have also been installed on the northern edge of Colonial Knob Parkland and are serviced and maintained by the Mana Cycle Group. These traps will help reduce reinvasion of predators into the KNE site. These not included in the appended map.

Small mammal monitoring

GWRC funds small mammal monitoring which is undertaken twice a year in the KNE site. Tracking tunnels are used to monitor the presence of small mammal species – primarily rats, but also mice and hedgehogs. The results of this monitoring will provide an indication of the effectiveness of the pest animal control network.

Possum monitoring

In 2015/16 GWRC will commence possum monitoring within the KNE site. Monitoring will continue on a four-yearly cycle, with the results used to provide an indication of the effectiveness of the possum control regime.

Fish passage assessments

Streams within the KNE site will be assessed for barriers to fish passage. If barriers are present, fish passage restoration options will be investigated with Porirua City Council.

Boundary fence line survey

GWRC will complete a survey of the KNE site's boundary fencing to check for potential pest animals breach sites and land encroachments.

Community engagement

Joint press releases (by PCC and GWRC) will be undertaken as opportunities arise to raise community awareness of the ecological values at the KNE site. These may also encourage community involvement in managing the KNE site to protect those values.

4. Operational plan

The operational plan shows the actions planned to achieve the stated objectives for the Porirua Western Forests KNE site, and their timing and cost over the three-year period from 1 July 2015 to 30 June 2018. The budget for the 2016/17 and 2017/18 years are indicative only and subject to change. A map of operational areas can be found in Appendix 1 (see Map 4).

Table 2: Three-year operational plan for the Porirua Western Forests KNE site

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2015/16	2016/17	2017/18
1	EW-1,2,3	Ecological weed control	A	Biosecurity department	Follow-up control of all areas treated in 2014/15. Species include flowering cherry, blackberry, ivy, tradescantia, Japanese honeysuckle, montbretia, onion weed, stinking iris, convolvulus and karo	Reduce distribution and density of target species	$800	$600	$600
1	EW-1,	Ecological weed control	A	Biosecurity department	Control new sites of tradescantia	Reduce distribution and density of target species	$400	$400	$400
1	EW-1,2,3	Ecological weed control	B	Biosecurity department	Follow-up control of karo, cherry and tradescantia. Sweep for climbing asparagus and Japanese honeysuckle. Use mountain bike track cuts for access	Reduce distribution and density of target species	$4,800	$3,200	$3,200
1	EW-1,2	Ecological weed control	C	Biosecurity department	Sweep for Cape ivy, Japanese honeysuckle, oak, tradescantia, cherry, convolvulus, montbretia, periwinkle, jasmine and willow	Reduce distribution and density of target species	$3,500	$2,000	$1,000
1	EW-1	Ecological weed control	D	Biosecurity department	Sweep for tradescantia, pellitory of the wall, banana passionfruit and jasmine	Reduce distribution and density of target species	Nil	$500	$300
1	EW-1,2,3	Ecological weed control	E	Biosecurity department	Sweep for blackberry, cape ivy, rose, Tasmanian ngaio, karo and pōhutukawa	Reduce distribution and density of target species	Nil	$2,800	$4,000

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2015/16	2016/17	2017/18
1,2,3	PA-3,4,5	Small mammal monitoring	Whole KNE site	Biodiversity department	Small mammal monitoring and reporting completed twice per year	Rats <10% TTI* Mustelids <5% TTI**	$1,980	$1,980	$1,980
1,2,3,	PA-1,3,4,5	Pest animal control	Whole KNE site	Biosecurity department	Continue the pest animal control programme over the KNE site and buffer areas	Mustelids <5% TTI** Possums <5%RTC* Rats <10% TTI*	$35,600	$35,600	$35,600
1,2,3	PA-1	Possum monitoring	Whole KNE site	Biodiversity department	Possum monitoring and reporting	Possums <5%RTC*	$3,940	Nil	Nil
5,6	HA-2	Community engagement	Whole KNE site	Biodiversity department	Joint press releases with PCC when opportunities arise to publicise values and threats	At least one press release per annum	Nil	Nil	Nil
1	HA-3	Boundary fence line survey	KNE site boundary	Biodiversity department	Assess fences along the KNE site boundary	Assessment completed by 30 June 2016	Nil	Nil	Nil
4	HA-7	Fish passage assessments	E	Biodiversity department	Assess priority steams for barriers to fish passage	Stream assessed and inputted into fish passage programme GIS model by 30 June 2018	Nil	Nil	Nil
						Total	**$51,020**	**$47,080**	**$47,080**

***RTC = Residual Trap Catch. The control regime has been designed to control possums to this level. Experience in the use of this control method indicates this target will be met.

****TTI = Tracking Tunnel Index. The control regime has been designed to control rats and mustelids to this level. Experience in the use of this control method indicates this target will be met.

5. Funding contributions

GWRC budget

The budget for the 2016/17 and 2017/18 years are indicative only and subject to change.

Table 3: GWRC allocated budget for the Porirua Western Forests KNE site

Management activity	Timetable and resourcing		
	2015/16	2016/17	2017/18
Ecological weed control	$7,500	$7,500	$7,500
Pest animal control	$22,700	$22,700	$22,700
Small mammal monitoring	$1,980	$1,980	$1,980
Possum monitoring	$3,940	Nil	Nil
Total	**$36,120**	**$32,180**	**$32,180**

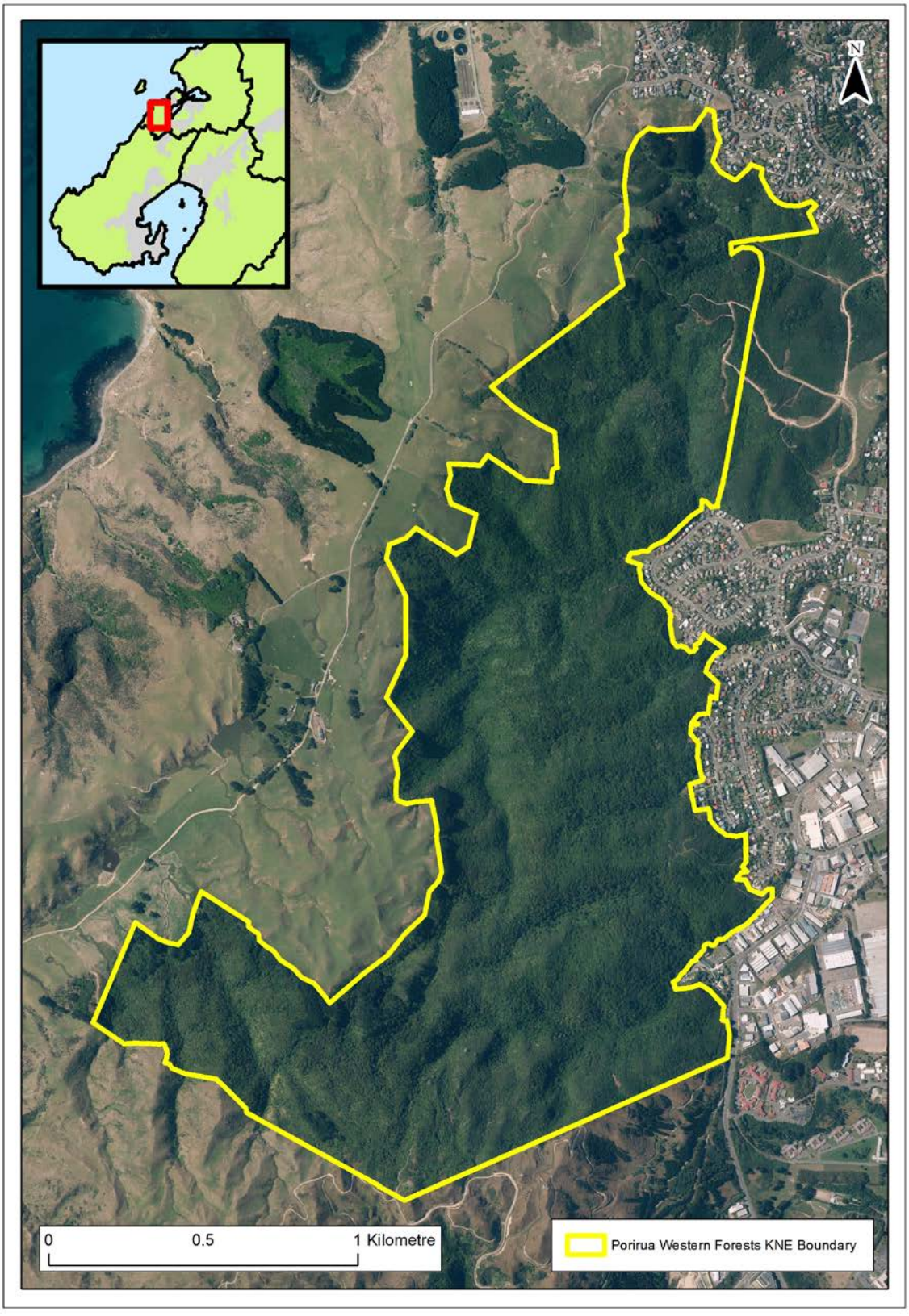
Porirua City Council budget

The budget is subject to confirmation through the Porirua City Council's long term planning process.

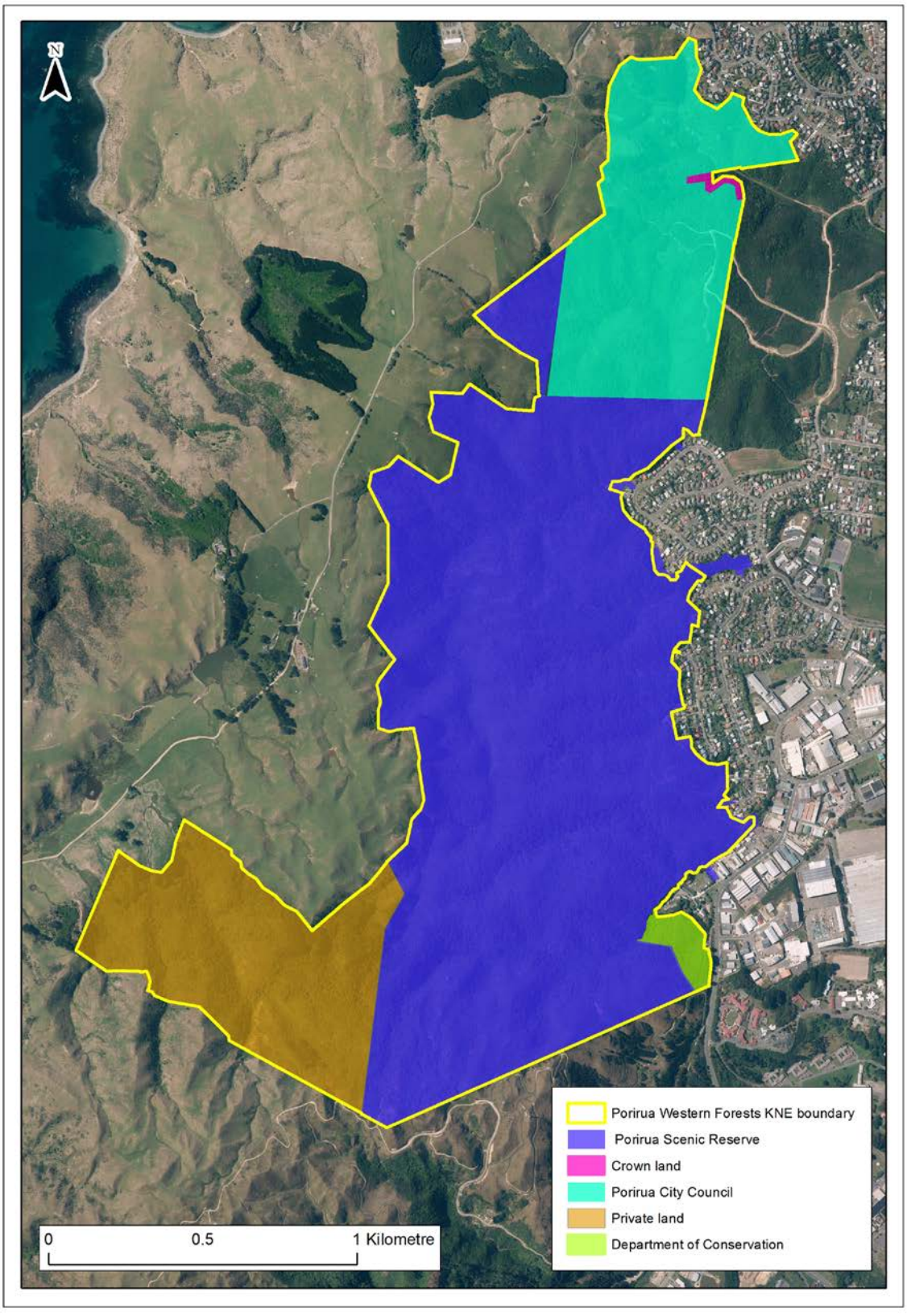
Table 4: Additional allocated budget for the Porirua Western Forests KNE site by PCC

Management activity	Timetable and resourcing		
	2015/16	2016/17	2017/18
Ecological weed control	$2,000	$2,000	$2,000
Pest animal control	$12,900	$12,900	$12,900
Total	**$14,900**	**$14,900**	**$14,900**

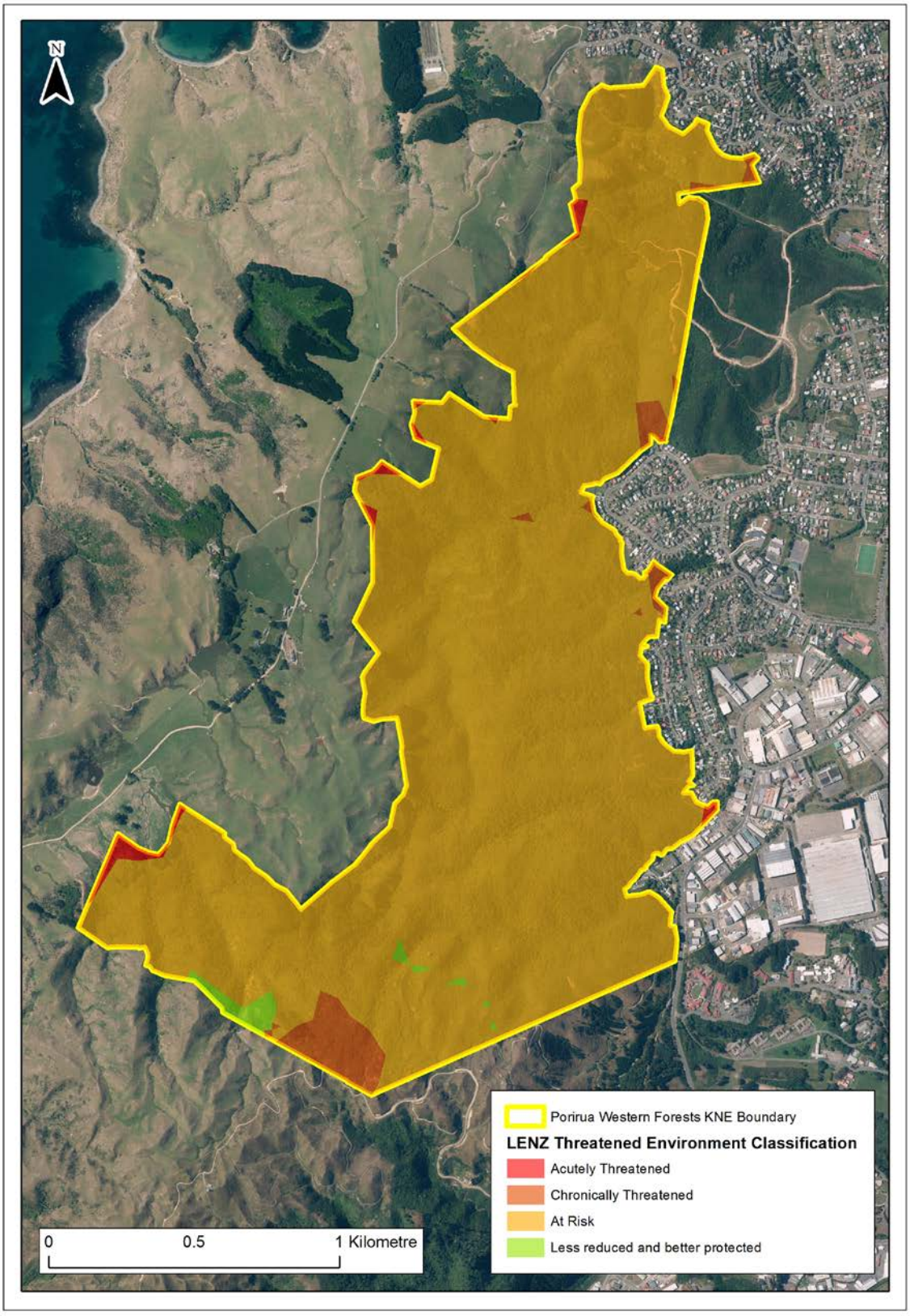
Appendix 1: Site maps



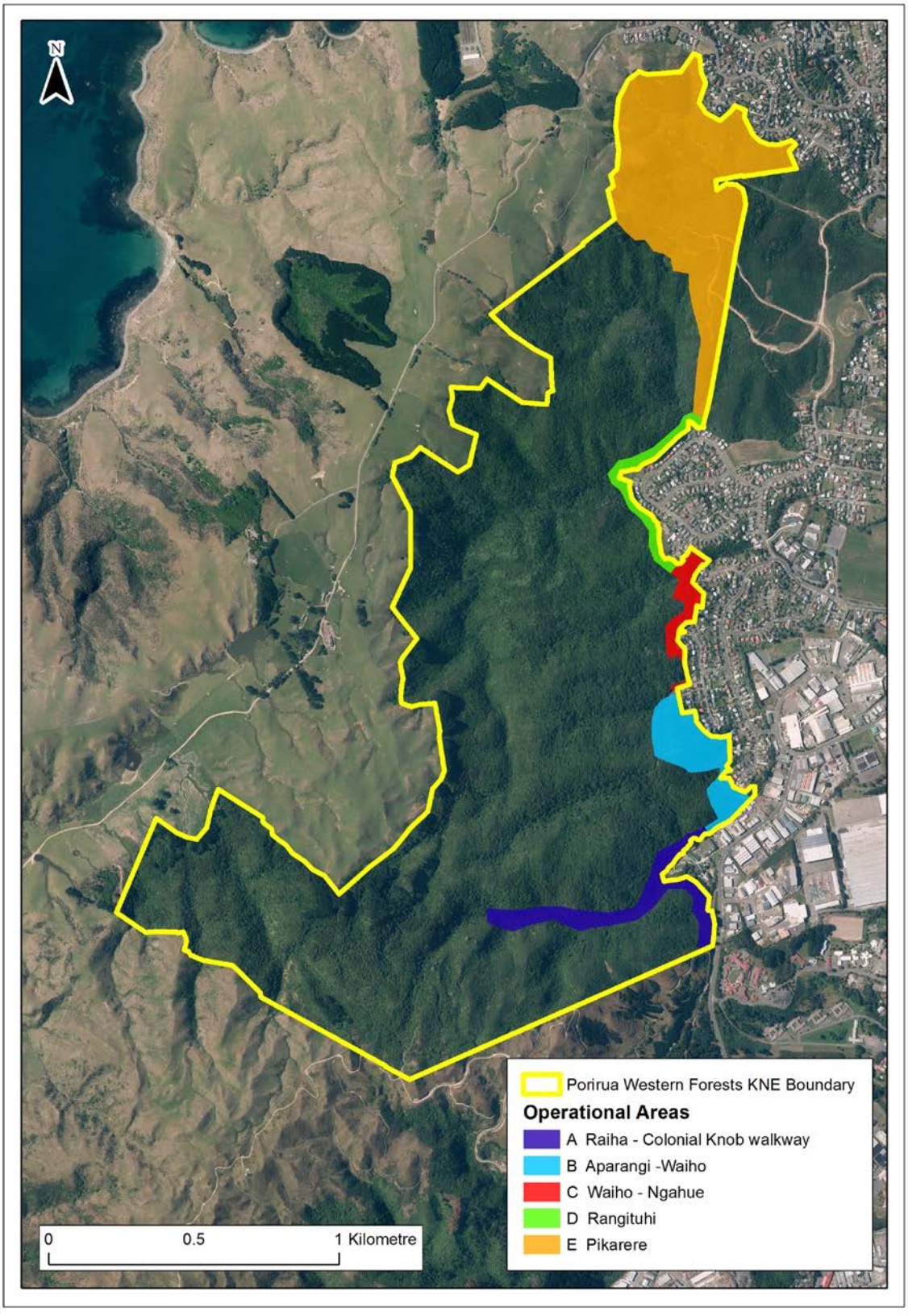
Map 1: The Porirua Western Forests KNE site boundary



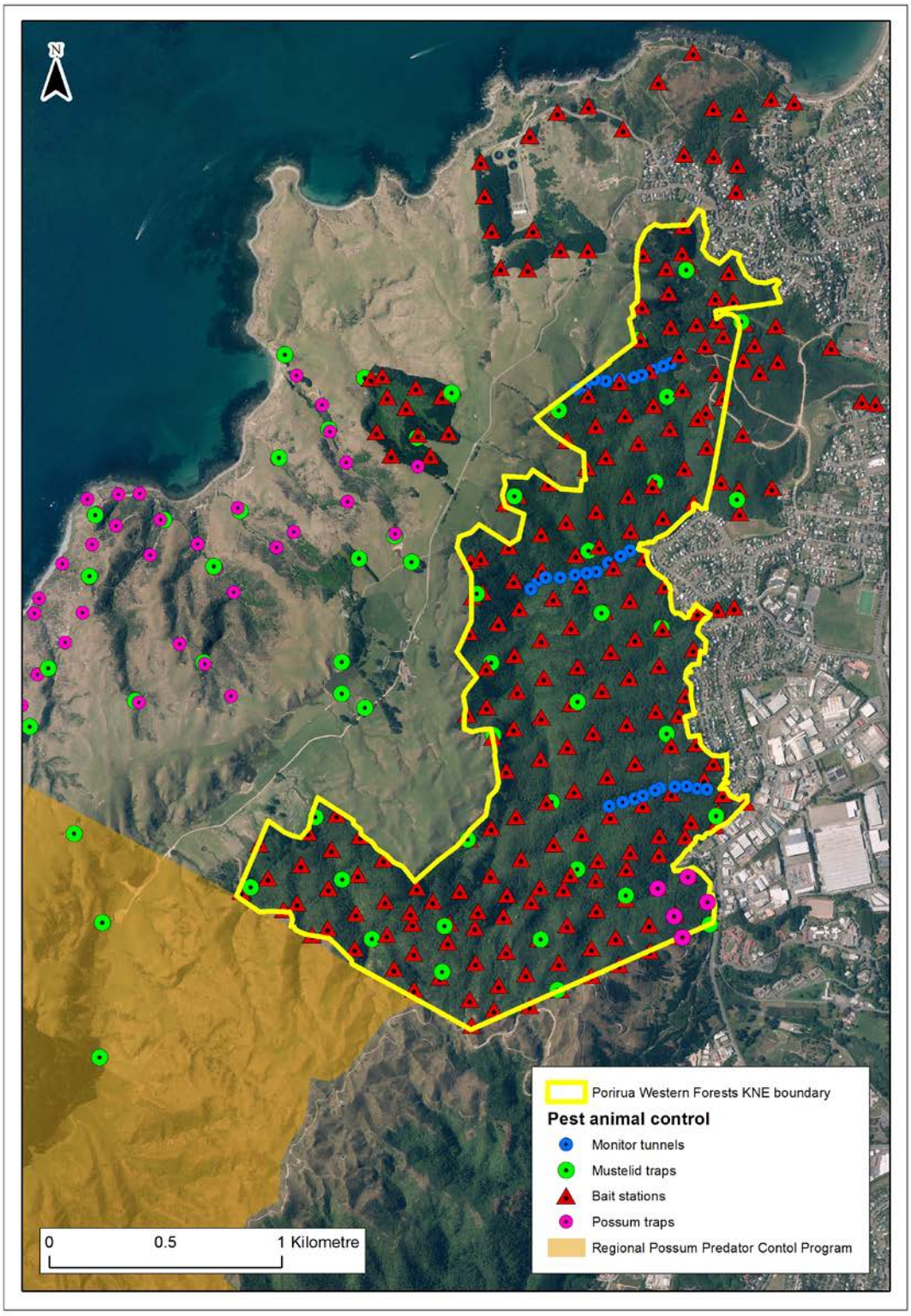
Map 2: Landowners at the Porirua Western Forests KNE site



Map 3: Land Environment New Zealand threat classifications for the Porirua Western Forests KNE site



Map 4: Operational areas in the Porirua Western Forests KNE site



Map 5: Pest animal control at the Porirua Western Forests KNE site
This shows bait stations, traps and monitoring lines within the KNE site boundary and the pest animal buffer area. The area where pest animal control is undertaken by the Regional Possum Predator Control Program area is also shown.

Appendix 2: Threatened species list

The New Zealand Threat Classification System lists species according to their threat of extinction. The status of each species group (plants, reptiles, etc.) is assessed over a three-year cycle[43] with the exception of birds which are assessed on a five-year cycle[44]. Species are regarded as Threatened if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable. They are regarded as At Risk if they are classified as Declining, Recovering, Relict or Naturally Uncommon. The following table lists Threatened and At Risk species that are resident in, or regular visitors to, the KNE site.

Table 5: Nationally threatened species at Porirua Western Forests KNE site

Scientific name	Common name(s)	Threat status	Source
Plants(vascular)[45]			
Streblus banksii	Large-leaved milk tree, tūrepo	At Risk – Relict	Enright *et al.* 1997-2000[46]
Pterostylis porrecta	Shrimp-flowered greenhood orchid	At Risk - Naturally Uncommon	Enright *et al.* 1997-2000
Solanum aviculare var. *aviculare*	Poroporo	At Risk - Declining	Enright *et al.* 1997-2000
Birds[47]			
Falco novaeseelandiae	New Zealand falcon, kārearea	Threatened Nationally – Vulnerable	Wildland Consultants 2014[48]
Nestor meridionalis	North Island kākā	Threatened-Nationally Vulnerable	Wildland Consultants 2014
Cyanoramphus novaezelandiae	Red-crowned parakeet, kākāriki	At Risk – Relict	ebird database[49]
Reptiles[50]			
Naultinus punctatus	Barking gecko	At Risk - Declining	Department of Conservation 2014[51]
Mokopirirakau "Southern North Island"	Ngahere gecko	At Risk - Declining	Department of Conservation 2014
Freshwater fish[52]			
Anguilla dieffenbachii	Longfin eel	At Risk - Declining	NIWA 2014[53]
Gobiomorphus huttoni	Redfin bully	At Risk - Declining	NIWA 2014

Appendix 3: Regionally threatened species list

The following table lists regionally threatened species that have been recorded in the KNE site. Native plant species have been identified in the Plant Conservation Strategy, Wellington Conservancy 2004-2010[54].

Table 6: Regionally threatened species at Porirua Western Forests KNE site

Scientific name	Common name(s)	Threat status	Source
Plants [55]			
Aciphylla squarrosa var. *squarrosa*	Speargrass, taramea	Regionally Vulnerable	Enright *et al.* 1997-2000[56]
Adiantum fulvum	Maidenhair	Regionally Sparse	Enright *et al.* 1997-2000
Adiantum viridescens	Maidenhair	Regionally Sparse	Enright *et al.* 1997-2000
Drymoanthus adversus	Drymoanthus	Regionally Critical	Enright *et al.* 1997-2000
Pterostylis porrecta	Shrimp-flowered greenhood	Regionally Critical	Enright *et al.* 1997-2000
Raukaua edgerleyi	Raukaua	Regionally Sparse	Enright *et al.* 1997-2000
Streblus banksii	Large-leaved milk tree, tūrepo	Regionally Endangered	Enright *et al.* 1997-2000
Invertebrates			
Wainuia urnula	Carnivorous snail	Regionally Sparse	Molluscs of New Zealand database[57]

Appendix 4: Ecological weeds

Ecological weeds within the Porirua Western Forests KNE site. Plant species are listed in priority order for control.

Table 7: Ecological weeds within the Porirua Western Forests KNE site.

Scientific Name	Common Name	Priority	Operational area
Asparagus scandens	Climbing asparagus	1	B, C, D, E
Chrysanthemoides monilifera	Boneseed	1	B, E
Clematis vitalba	Old man's beard	1	C, D, E
Jasminum polyanthum	Jasmine	1	C, D
Lathyrus latifolius	Everlasting pea	1	C, D, E
Lonicera japonica	Japanese honeysuckle	1	B, C, D, E
Parietaria judaica	Pellitory of the wall	1	A, C, D
Passiflora tripartita var. *mollissima*	Banana passionfruit	1	C, D, E
Rhamnus alaternus	Evergreen buckthorn	1	A, B, E
Senecio angulatus	Cape ivy	1	B, C, D
Tradescantia fluminensis	Tradescantia	1	A, B, C, D, E
Cotoneaster glaucophylla	Cotoneaster	2	A, B, C
Crocosmia × *crocosmiiflora*	Montbretia	2	B, C, D, E
Hedera helix subsp. *helix*	Ivy	2	B, C, D
Ilex aquifolium	Holly	2	A, B, C
Leucanthemum vulgare	Oxeye daisy	2	B, C, D
Myoporum aff. *insulare*	Tasmanian ngaio, boobialla	2	B, E
Paraserianthes lophantha	Brush wattle	2	B, C
Prunus sp.	Ornamental cherry	2	A, B, C, D
Calystegia silvatica	Greater bindweed	3	A, B, C, D, E
Cortaderia selloana	Pampas	3	B, C, D, E
Cupressus macrocarpa	Macrocarpa	3	B, E
Cytisus scoparius	Broom	3	A, B, C, D, E
Erica lusitanica	Spanish heath	3	A, B, C
Laurus nobilis	Bay tree, sweet bay	3	B, C, D
Pinus radiata	Radiata pine	3	A, B, E (except for wilding pines priority = 2)
Pittosporum crassifolium	Karo	3	A, B, C, D, E
Pittosporum ralphii	Karo	3	E

Scientific Name	Common Name	Priority	Operational area
Rubus fruticosus agg.	Blackberry	3	A, B, C, D, E
Senecio glastifolius	Purple ragwort	3	B, C, D, E
Zantedeschia aethiopica	Arum lily	3	B, C, D
Actinidia deliciosa	Kiwifruit	4	C, D
Allium triquetrum	Wild onion	4	A, B, C, D
Foeniculum vulgare	Fennel	4	B, C, D
Ulex europaeus	Gorse	4	A, B, C, D, E

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