Key Native Ecosystem Plan for Rocky Bay Coast

2014-17

KNE
KEY NATIVE ECOSYSTEM

greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

Contents

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 2011-2021[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 recognizes 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. Rocky Bay Coast Key Native Ecosystem

The Rocky Bay Coast KNE is located 3.5 km north of Porirua City (see Appendix 1, Map 1). The northern end of the KNE site is contiguous with the western coastal boundary of Whitireia Park and follows the coastline, with the southern limit immediately north of Titahi Bay. Mana Island, with similar geography on its western edge, lies 4km off-shore to the north-west. Although the KNE site falls within the Wellington Ecological District[2], it has much stronger affinities with the Cook Strait Ecological District which runs from the Wellington south coast up to Titahi Bay and includes Mana and Kapiti Islands.

The KNE site covers 2.6 ha and is characterised by steep coastal cliffs with skeletal soils, a narrow rocky foreshore with gravel beaches, and offshore stacks and reefs. The site has dry salt-laden winds predominately from the north-west and an average annual rainfall of 1,200mm. A marine terrace, formed by sea level fluctuations and coastal uplift from tectonic activity, forms an almost flat platform on top of the steep sided cliffs. Centrally located within the KNE site on the marine terrace is Te Pā o Kapo. This pā was occupied by Ngāti Ira until the 1820s when Ngāti Toa arrived in the district[3]. It is registered in the Porirua City District Plan as HHS002: Te Pā o Kapo – Off Terrace Road, Titahi Bay[4].

The vegetation communities and geography have been modified by human activity over the past 400 years, first by Ngāti Ira who removed much of the land that linked the pā to the wider area to enhance the natural defences, then by farming practices and later by urbanisation. The cliffs are sparsely vegetated as a result of fire and dry salt-laden wind causing local erosion and allowing invasive plants to establish. Despite this, the KNE site retains many components of its former flora and fauna and contains some threatened plant species (see Appendix 2 and 2a).

Landowner and stakeholders

GWRC works in collaboration with landowners and other interested parties (management partners and 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.

Landowner

The Rocky Bay Coast KNE site consists of land classified as Recreation Reserve and Road Reserve administered by Porirua City Council (PCC). These reserves are subject to management plans prepared by PCC which provide for the protection and enhancement of heritage, natural and recreation values[5,6].

At the northern end of the KNE site the property boundary between PCC land and Whitireia Park divides the Northern Bay (see Appendix 1, Map 2). A large rocky spur at the northern end of the bay is a natural geographic boundary between the two sites. To facilitate holistic management of the bay, the operational plan for this KNE site includes this small area of Whitireia Park (see Appendix 1, Map 3).

Management partners and key stakeholders

The primary management partners within GWRC are the Biodiversity department, who coordinate biodiversity advice and management activities, and the Biosecurity department, who deliver pest control work at the site. The GWRC Parks department is a stakeholder in the small area at the northern end of the KNE site that overlaps with Whitireia Park.

PCC is an external management partner at the site, contributing funding to the environmental weed control and pest animal control operations.

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 Rocky Bay Coast KNE site is one of the top coastal ecosystem sites in the region[7]. The coastal cliffs from Titahi Bay to Onehunga Bay in Whitireia Park, including the salt turf, are identified as Eco-site 120 in the Inventory of Ecological Sites in Porirua City[8].

Of note in recognising the ecological values at the Rocky Bay Coast KNE site are the following:

> **Naturally Uncommon Ecosystems:** Naturally uncommon ecosystem types are present within the KNE site[9]. These include coastal turf at Rocky Bay (Nationally Critical) and shingle beaches (Nationally Endangered)[10].
>
> **Threatened Ecosystems:** The Land Environment New Zealand (LENZ) Threatened Environment classification rates the entire KNE site as Chronically Threatened, apart from the northern bay which is classified as Critically Underprotected[11].
>
> **Threatened species:** Four plant species in this KNE site have a national threat status and six have a regional threat status. Three coastal bird species are nationally threatened. Appendices 2 and 2a contain lists of all threatened species found within the KNE site.

Cliff vegetation is varied ranging from small herbaceous plants such as Mercury Bay weed (*Dichondra repens*) and rauhuia (*Linum monogynum* var. *monogynum*) to salt-tolerant shrubs such as koromiko (*Hebe stricta* var. *atkinsonii*). Taller trees such as ngaio (*Myoporum laetum*) and taupata (*Coprosma repens*) are found in more sheltered areas of the bays. On the rocky coastal platform at Rocky Bay, coastal turf grades into a freshwater wetland which is inundated with salt water during storm events. Species such as three-square (*Schoenoplectus pungens*) in the freshwater wetland are therefore species which cope with brackish conditions.

Red-billed gull (*Larus novaehollandiae*) and white-fronted tern (*Sterna striata*) roost on the rocky platform in large numbers[12] and little penguin (*Eudyptula minor*) are often

sighted in the water around this coast[13] and use the bays of the KNE site to nest and moult[14].

There are three operational areas within the KNE site (see Appendix 1, Map 3). Threats and management requirements differ between them. The geography, salt burden, soil depth and soil moisture levels of each operational area are the biggest influence on the composition of plant communities. A description of each area follows.

Area A – Northern Bay

The bay at the northern end of the KNE site faces north-west and is enclosed by a rocky point at each end. Initially the beach is steep, reflecting the high energy environment, before sloping gently to the base of the cliff. The cliff behind the beach rises steeply to 48 metres at its highest point.

Prior to human settlement, the vegetation of the cliffs would have comprised of a *Coprosma*, *Muehlenbeckia* shrubland/herbfield/rockland[15]. Currently it is a mix of mingimingi (*Coprosma propinqua*), whaririki (*Phormium cookianum* subsp. *hookeri*), pōhuehue (*Muehlenbeckia complexa*), and thick-leaved māhoe (*Melicytus crassifolius*). Historic records show that plant species strongly associated with nesting seabird colonies, such as nau (*Lepidium oleraceum*)[16], shore cress (*Lepidium tenuicaule*) and guano groundsel (*Senecio sterquilinus*)[17] were formerly in the area but are now locally extinct.

The wide flat-topped marine terrace is dominated by native plants. Over much of the area, on the slightly higher slope of the terrace, speargrass (*Aciphylla squarrosa* var. *squarrosa*) emerges through a 20cm high canopy of mingimingi (*Coprosma propinqua*). The lower area has low-growing coastal turf plants on the thin soils. Remuremu (*Selliera radicans*), slender clubrush (*Isolepis cernua* var. *cernua*) and glasswort (*Sarcocornia quinqueflora* subsp. *quinqueflora*) are the most common species in this area.

On sheltered mid to lower slopes, where more humus has accumulated, the vegetation community includes higher stature plants such as the Cook Strait Melicytus, akiraho (*Olearia paniculata*), kōkōmuka (*Hebe elliptica*), ngaio and taupata. On disturbed lower slopes scabweed (*Raoulia hookeri* var. *hookeri*), pinātoro (*Pimelea prostrata* ssp.), silver tussock (*Poa cita*), and koromiko grow.

The cliffs and lower slopes behind the beach are dominated by silver tussock, wīwī (*Ficinia nodosa*), mingimingi (*Coprosma propinqua*) and taupata with a small population of kōkōmuka also present. Patches of woollyhead (*Craspedia uniflora* var. *maritima*) and native ice plant (*Disphyma australe* subsp. *australe*) are found on disturbed soil.

Behind the tidal rocky platform, driftwood accumulates in dense piles high up on the shingle beach, the result of extreme north-westerly storms. Lizard surveys in the adjacent Whitireia Park have shown that the rocky coast has good numbers of common skink (*Oligosoma polychroma*), common gecko (*Woodworthia maculata*) and copper skink (*Oligosoma aeneum*) present and although the surveys did not cover the KNE site, it is highly likely that the lizards are there also[18].

Coastal turf has formed between the driftwood and shrublands consisting of remuremu, slender clubrush and glasswort with New Zealand celery (*Apium prostratum* subsp*. prostratum v*ar*. filiforme*) and silver tussock and prostrate taupata between the turf and shrublands on the cliff.

Area B – Rocky Bay

Rocky Bay is a horseshoe-shaped bay with a tidal rocky platform enclosed by steep rocky spurs. The hill slope behind the beach is lower and more gently sloping than the cliffs on each side.

The rocky cliff vegetation is a continuation of operational area A. Instead of shingle beach, however, peat has formed on top of a rocky platform and is covered with coastal turf. This consists of a thick thatch of shore lobelia (*Lobelia anceps*), sea primrose (*Samolus repens*), Mercury Bay weed (*Dichondra repens*), arrow grass (*Triglochin striatum*), remuremu, slender clubrush and glasswort.

Landward, where the peat is deeper, wetter and less saline, an oioi-rushland reedland would have been present, comprising of oioi (*Apodasmia similis*), three-square, giant umbrella sedge (*Cyperus ustualtus*) and harakeke (*Phormium tenax*)[19]. This assemblage has continued to the present day. A notable species in the wetland is shore pūhā (*Sonchus kirkii*), a nationally threatened species in decline.

The lower slope behind the beach has taupata, ngaio and is dominated by karo (*Pittosporum crassifolium*).

The marine terrace at the southern end of Rocky Bay is predominately vegetated with native species. Silver tussock, speargrass, taupata, koromiko and a few plants of *Carex* "Raotest" are present. *Carex* "Raotest" is an undescribed species thought to be an uncommon but natural hybrid of *C. testacea* and *C. raoulii*.

Area C (C1-C5) – Coastal cliffs and beaches

The remaining area of the KNE site includes the coastal cliffs, rocky spurs and shallow bays to the west and south of Rocky Bay. Each bay between the rocky spurs is defined as a subgroup of the total area to more easily describe the location of specialised work to be carried out there. The bays have small areas of flat or gentle slopes tucked into the cliffs, and although the cliffs are very steep, they are well vegetated, particularly where humus has been able to accumulate. The tidal rocky platform extends around this whole area and beaches accumulate driftwood during storm events. The historic vegetation communities would have been similar to operational areas A and B, with the most sheltered parts of the bays home to the higher stature plants as in area A.

Of note is a small community of kōkōmuka on the western cliffs of the pā site and several plants of *C.* "Raotest". The population of kōkōmuka is one of only two populations on the mainland in the Wellington region, the other being 250m north in Whitireia Park.

The open areas of the cliffs are a local stronghold for the nationally threatened coastal grass, *Trisetum antarcticum.* C1 has a small community of Cook Strait Melicytus (*Melicytus* aff. *obovatus*). This population (Colony A) was first recorded by B. Aston in 1907[20]. Another community of Cook Strait Melicytus (Colony B) on the cliff in C2 was

first recorded in 1990 by P.J. deLange and was recently rediscovered[21]. This is the only site where this species is found outside the Cook Strait Ecological District and has a regional threat status of Regionally Critical[22].

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 ecological values at the site.

The Rocky Bay Coast KNE site sits on the fringe of a suburban area and has been modified by human activities since the area was first settled. Early Māori occupation modified the landform and subsequent fires, environmental weeds and pest animals have diminished native plant and animal communities.

There are many ecological weeds which threaten local native plant species and the natural character of the KNE site. The range of woody weeds includes gorse (*Ulex europaeus*), boxthorn (*Lycium ferocissimum*) and boneseed (*Chrysanthemoides monilifera* subsp. *monilifera*), as well as some non-local native species such as karo and pōhutukawa (*Metrosideros excelsa*). These displace native plant species, prevent natural regeneration, and alter the natural values of the KNE site.

Invasive species such as cape ivy (*Senecio angulatus*), kikuyu (*Pennisetum clandestinum*) and buffalo grass (*Stentotraphrum secundatum*) smother low-growing native species.

Many garden plants such as stock (*Matthiola incana* subsp. *incana*), agapanthus (*Agapanthus praecox*) and alyssum (*Lobularia maritima*) have spread from garden waste dumped over the cliff tops. These species displace small native coastal species such as shore spleenwort (present locally only in very small numbers), coastal harebell (*Wahlenbergia ramosa*) and peperomia (*Peperomia urvilleana*).

Buck's horn plantain (*Plantago coronopus*) and orache (*Atriplex prostrata*) are naturalising amongst bare patches in the coastal turf. A small infestation of *Carex otrubae* is present in the wetland at Rocky Bay and is capable of displacing native species such as three-square. The coastal turf plant community is particularly vulnerable to damage from large driftwood forced into the ground by large waves during storm events. Many people use the area to access the sea for diving and others use the area for recreation. Trampling of the coastal turf is causing damage to the plants, creating disturbed areas which are vulnerable to weed invasion.

Possums (*Trichosurus vulpecula*) may be present in the adjacent suburban area and could move into the KNE site occasionally. Mustelids, hedgehogs (*Erinaceus europaeus*), domestic cats (*Felis catus*) and rats (*Rattus* spp.) are also present. These animals prey on invertebrates, lizards and ground-nesting birds. Mice (*Mus musculus*) prey on invertebrates and lizards and eat seeds of native species, slowing regeneration and reducing food availability for lizards. Domestic dogs (*Canis lupus familiaris*) can kill little penguin who are particularly vulnerable when nesting or moulting.

Fires are lit on the beach using wood from the driftwood piles. A fire spreading to the vegetation could cause local plant extinctions, create new areas for environmental weeds, and kill lizards and invertebrates.

Table 1 below shows the identified threats at the site, which operational areas of the KNE site they affect, and how the threats impact on ecological values. 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.

Table 1: Threats to ecological values present at the Rocky Bay Coast KNE site.

Threat code	Threat and impact on biodiversity in the KNE site	Operational area
Ecological weeds		
EW-1	The woody weeds boxthorn, gorse, boneseed, Montpellier broom (*Genista monspessulana*) and banksia (*Banksia integrifolia*) are present over the KNE site. Non-local natives such as karo and pōhutukawa displace local native plant species and prevent natural regeneration. Taupata, although a local native species, dominates some threatened native plants and needs limited control in a few small areas	Whole KNE site
EW-2	Cape ivy (*Senecio angulatus*) smothers native species	Whole KNE site
EW-3	Groundcover weeds such as kikuyu grass, buffalo grass, marram grass (*Ammophila arenaria*) and Carex otrubae smother low growing native species. *Sedum* spp., agapanthus, montbretia (*Crocosmia* x *crocosmiiflora*), *Echium* spp., onion weed (*Allium triquetrum*), angelica (*Angelica pachycarpa),* arum lily (*Zantedeschia* aethiopica) wild turnip (*Brassicarapa* sp.), fennel (*Foeniculum vulgare*), pig's ear (*Cotyledon orbiculata* var. *orbiculata*), tree mallow (*Malva dendromorpha*) and alyssum (*Lobularia maritima*) displace small stature native plants. Buck's horn plantain (*Plantago coronopus*), orache and asthma weed (*Parietaria judaica*) displace native coastal turf species	Whole KNE site
Pest animals		
PA-1*	Possums browse preferred species altering species composition of ecosystems	Whole KNE site
PA-2	Possums, hedgehogs, rats, mice*, mustelids and cats prey on native lizards, insects, nesting birds, chicks and eggs	Whole KNE site
PA-3	Rats and mice* eat seeds, slowing regeneration of native plant species and altering the structure and diversity of vegetation communities	Whole KNE site
PA-4	Rabbits browse low-growing native plants, particularly seedlings and plants in newly planted areas. Rabbit numbers can increase if mustelids are controlled	Whole KNE site
PA-5*	Dogs can injure or kill little penguins especially when birds are nesting or moulting	Whole KNE site
PA-6*	Pest animal species may reinvade from land outside the KNE site	Whole KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area
Human activities		
HA-1*	Camp fires on the beach are a danger to the native flora and fauna and create conditions for ecological weed invasion	Whole KNE site
HA-2*	People accessing the sea via the coastal turf unintentionally trample plants leading to plant death causing bare areas that are subsequently vulnerable to weed invasion	B
HA-3	People dumping garden waste contribute significantly to the environmental weeds within the KNE site	Whole KNE site
HA-4*	Recreational use of the KNE site disturbs shorebirds roosting or nesting	Whole KNE site
Other threats		
OT-1*	Storm events combined with spring tides deposit large driftwood up into the freshwater wetland area causing considerable damage to the coastal turf	B
OT-2*	Natural regeneration of native plants is restricted by limited distribution of native plant species due to the presence of ecological weeds	Whole KNE site

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

3. Objectives and management activities

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

Objectives

The following objectives will guide the management activities at Rocky Bay Coast KNE site.

1. **To increase native plant dominance**
2. **To increase native plant regeneration**
3. **To increase abundance of threatened plants**
4. **To reintroduce plant species to the site**
5. **To maintain populations of native fauna**
6. **To raise community awareness of the ecological values of the KNE site**

Management activities

Management activities are targeted to work towards the objectives above by responding to the threats outlined in Table 1. The management activities are described

briefly below, and specific actions, with budget figures attached, are set out in the operational plan (Table 2).

Ecological weed control

Pest plants must be controlled to very low numbers to enable existing native plant species to regenerate and attain their natural range. Control of ecological weeds that are outcompeting threatened species will be targeted initially and followed by a more systematic approach. This will involve working from both ends of the KNE site to the most infested area, C5. Regular follow-up of areas previously controlled is important to avoid reinvasion from any untreated plants or seed bank.

The coastal turf is under threat from several salt-tolerant invasive species. These are becoming more widespread, particularly around the edges of the turf and near to tracks. Control, by way of a combination of hand digging and careful spraying, is needed to reduce the abundance of these ecological weeds.

Invasive woody weeds and grasses in and around the margins of the freshwater wetland in Rocky Bay are threatening shore pūhā, three-square and other low-growing native species. Staged control that focuses initially on mature plants then progresses to control of juveniles and seedlings, will support native plants to regenerate naturally.

Cape ivy covers areas of the coastal cliff and some hand weeding (pulling it away from native plants) will be required prior to spraying. Woody weeds and groundcover plants on the cliffs will need to be controlled by specialist contractors who can access them by abseiling. Contractors will be supplied with maps of sensitive plant areas and photos of threatened species to minimise unintentional damage to them.

Non-local native plant species such as karo dominate the KNE site and out-compete local native plant species, changing the natural character of the landscape. Pōhutukawa seedlings are also present in increasing numbers. Some of the species at risk are kōkōmuka, thick-leaved māhoe, pinātoro, scabweed, *Melicytus* aff. *obovatus* and *Trisetum antarcticum*. Careful removal of non-local plant species from the KNE site is a priority, however only pōhutukawa up to 3-metres tall will be controlled. Some of this work has already been started in 2014 and will require follow up in subsequent years. Once the weeds are removed, local species will have the opportunity to regenerate naturally.

Pest animal control

Three DOC 200 traps to control mustelids, hedgehogs and rats are spaced at 200m intervals along the coast of the Rocky Bay Coast KNE site (see Appendix 1, Map 4). These are checked by local volunteers. Possums have also been known to invade the area through the suburban area of Titahi Bay[23]. To prevent this, two bait stations to target possums and rats have been installed in the KNE site. Traps and bait stations are serviced as part of Whitireia Park operations so there is no cost for this in the KNE budget for Rocky Bay Coast.

Revegetation

Very little revegetation work is recommended as native plant species are well represented in the KNE site. Following the control of ecological weeds, native species

may re-colonise the site. However, species that are locally extinct, threatened, or that are only present in small numbers, such as ngaio, akiraho and *Carex* "Raotest", will benefit from some supplementary plantings.

Planting will be undertaken in operational Area A and C1 to provide a seed source for natural regeneration. A detailed planting plan and map is provided in Appendix 3.

Community engagement

Garden waste dumping is a serious problem along the road edge and cliff top, with many of the environmental weeds in the KNE site originating from this ongoing weed plant and seed source. It is important to inform local residents and visitors to the site of the values of the KNE site. This may lower the incidence of garden dumping.

Signage around the top of the cliffs and interpretative signs at operational areas A, B and C1 are proposed to help minimise human impacts.

PCC and GWRC will raise public awareness of the values and threats to the biodiversity of the KNE site and how people can help protect it.

4. Operational plan

The operational plan shows the actions planned to achieve the stated objectives for Rocky Bay Coast KNE site and their timing and cost over the three-year period from 1 July 2014 to 30 June 2017. The budgets for the 2015/16 and 2016/17 years are indicative only and subject to change as a result of the 2015-25 Long Term Plan process.

Table 2: Three-year operational plan for the Rocky Bay Coast KNE site.

Objective	Threat	Operational areas	Activity	Delivery	Description/detail	Target	Timetable and resourcing		
							2014/15	2015/16	2016/17
1,2,3	EW-1,2	Whole KNE site prioritising areas A and B, then working from C1 to C5	Ecological weed control	Biosecurity department	Control cape ivy, gorse, karo, pōhutukawa, boxthorn, boneseed, Montpellier broom, *Acacia* spp., banksia, montbretia, agapanthus, angelica, *Sedum* spp, *Echium* spp., pigs ear and stock	Reduce distribution and density of target species	$7,350	$6,500	$6,500
1,2,3	EW-3	B	Ecological weed control	Biosecurity department	Follow-up sweep of kikuyu, marram and *Carex otrubae* in wetland and extend sweep further south to include Arum lily	Reduce distribution and density of target species	$500	$500	$500
1,2	EW-3	B	Ecological weed control	Biosecurity department	Spot spray/hand weed Buck's horn plantain, orache and asthma weed in and around the coastal turf	Reduce distribution and density of target species	$500	$500	$500
1,2,3	EW-1	C2	Ecological weed control	Biosecurity department	Remove woody weeds from within Cook Strait Melicytus colony (Colony B)	Reduce distribution and density of target species	$500	Nil	Nil

Objective	Threat	Operational areas	Activity	Delivery	Description/detail	Target	Timetable and resourcing		
							2014/15	2015/16	2016/17
1,2,3	EW-1	C1, C2	Ecological weed control	Biosecurity department	Follow up control of Montpellier broom, karo and stock close to the Cook Strait Melicytus in Colony A in 2015/16 and Colony B in 2016/17	Reduce distribution and density of target species	Nil	$500	$500
1,2,3,4	EW-3	C1, A	Ecological weed control	Biosecurity department	Control all weeds in revegetation area	No more than 5% of target species remain	$850	$850	$850
1,2,3,4	OT-2	C1, A	Revegetation	Biodiversity department contractor	Plant selected native plants	50 plants planted before 30 June annually	Nil	$850	$850
1,2,5	PA-1, PA-3	Whole KNE site	Pest animals	Volunteers	Service Pelifeed bait stations	Bait stations are serviced annually	Nil	Nil	Nil
5	PA-2	Whole KNE site	Pest animals	Volunteers	Service DOC200 traps	Traps are serviced 4 times annually	Nil	Nil	Nil
6	HA-1,2,3,4	Whole KNE site	Human activities	Biodiversity department & Porirua City Council	Appropriate signage is placed along the cliffs and in operational areas A, B and C1	Signs are installed by 30 June 2015	Nil	Nil	Nil
6	EW 1-3 PA 1-6 HA 1-4	Whole KNE site	Communications	Biodiversity department & Porirua City Council	Joint press releases when opportunities arise to publicise values and threats	At least one press release per annum	Nil	Nil	Nil
						Total	**$9,700**	**$9,700**	**$9,700**

5. Funding summary

GWRC budget

The budget for the 2015/16 and 2016/17 years is indicative only and subject to change as a result of the 2015-25 Long Term Plan process.

Table 3: Three year operational plan for Rocky Bay Coast KNE site.

Management activity	Timetable and resourcing		
	2014/15	2015/16	2016/17
Pest plant control	$7,700	$6,850	$6,850
Revegetation	Nil	$850	$850
Total	**$7,700**	**$7,700**	**$7,700**

Other contributions

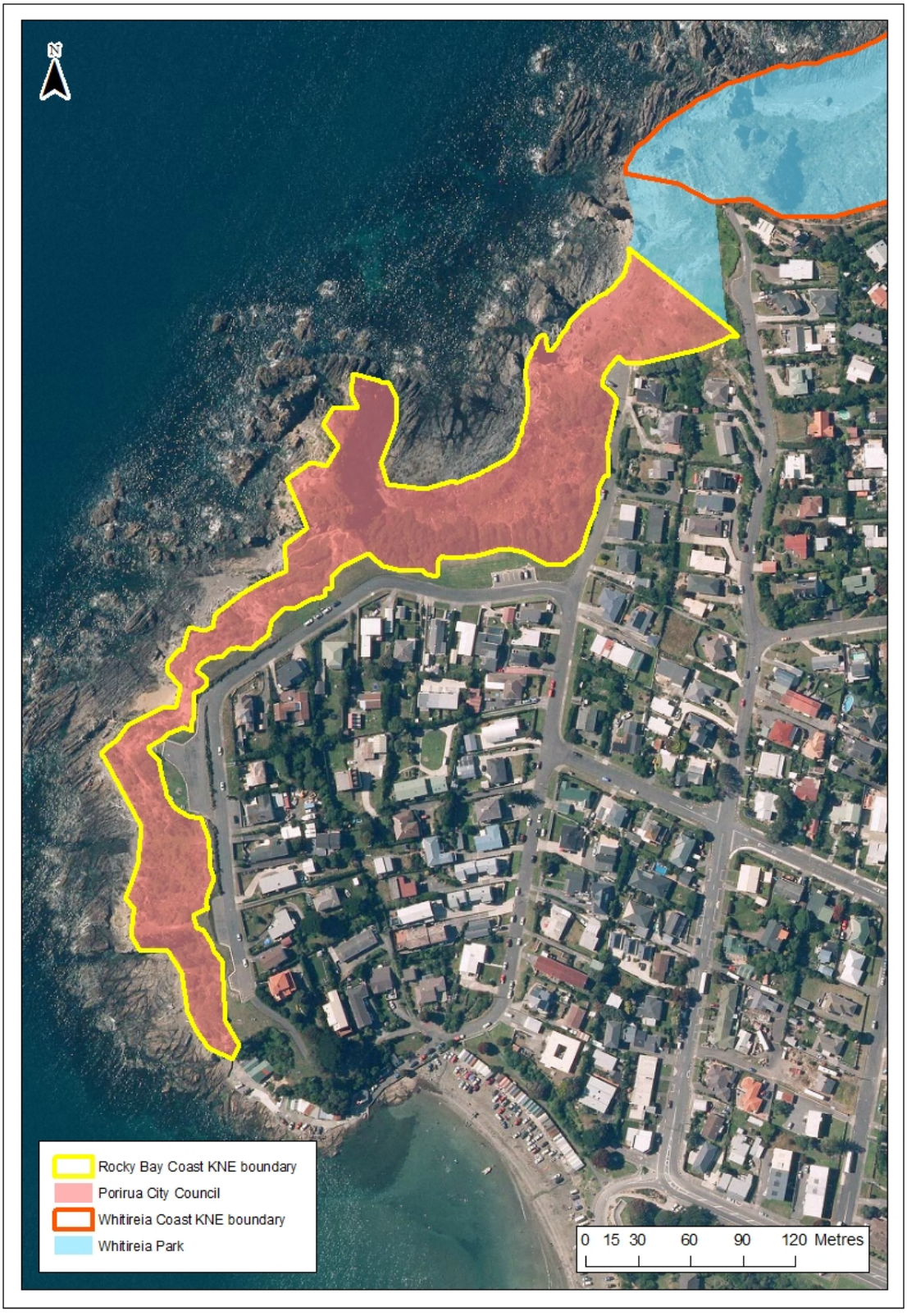
This budget is subject to confirmation through the Porirua City Council Long Term Plan process.

Table 4: Additional allocated budget from Porirua City Council.

Management activity	Timetable and resourcing		
	2014/15	2015/16	2016/17
Pest plant control	$2,000	$2,000	$2,000
Total	**$2,000**	**$2,000**	**$2,000**

Appendix 1: Site maps

Map 1: The Rocky Bay Coast KNE site boundary.



Map 2: Land ownership at the Rocky Bay Coast KNE site.

Map 3: Operational areas in the Rocky Bay Coast KNE site. In operation area C, each bay between the rocky spurs is defined as a subgroup of the total area to more easily define specialised work to be carried out.

Map 4: Pest animal control in the Rocky Bay Coast KNE site.

Appendix 2: Nationally threatened species list

The New Zealand Threat Classification System lists extant native species according to their threat of extinction. The status of each species group (birds, plants, reptiles, etc.) is assessed over a three-year cycle[24]. Species are regarded as 'Threatened' if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable, or 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 known to live within the KNE site.

Table 5: Threatened and At Risk species at the Rocky Bay Coast KNE site.

Scientific name	Common name	Threat status	Observation
Plants(vascular)[25]			
Craspedia uniflora var. *maritima*	Woollyhead	Declining	R. Smith, pers obs 2013
Melicytus crassifolius	Thick-leaved māhoe	Declining	R. Smith, pers obs 2013
Sonchus kirkii	Shore pūhā	Declining	R. Smith, pers obs 2013
Trisetum antarcticum	None known	Declining	R. Smith, pers obs 2013
Birds[26]			
Eudyptula minor	Little penguin	Declining	B. Thomas, pers obs 2013
Larus novaehollandiae	Red-billed gull	Nationally Vulnerable	R. Smith, pers obs 2013
Sterna striata	White-fronted tern	Declining	R. Smith, pers obs 2013

Appendix 2a: Regionally threatened species list

The following table lists regionally threatened species that have been recorded in the KNE site. Threatened native plant species have been identified in the Plant Conservation Strategy, Wellington Conservancy 2004-2010[27].

Table 6. Regionally threatened species at the Rocky Bay Coast KNE site.

Scientific name	Common name	Threat status	Observation
Vascular plants			
Aciphylla squarrosa	Spaniard	Regionally Vulnerable	R. Smith, pers obs 2013
*Anthosachne solandri (*syn. *Elymus solandri)*	Blue wheatgrass	Data Deficient	R. Smith, pers obs 2013
Asplenium obtusatum	Shore spleenwort	Regionally Critical	R. Smith, pers obs 2013
Hebe elliptica	Kōkōmuka	Range Restricted	R. Smith, pers obs 2013
Melicytus aff. *obovatus* (a) (AK 235617; Cook Strait)*	Cook Strait Melicytus	Regionally Critical	R. Smith, pers obs 2013
Raoulia hookeri	Scabweed	Gradual Decline	R. Smith, pers obs 2013

*The name of the plant reflects its herbarium reference and that it is a Cook Strait endemic species.

Appendix 3: Planting plan

Below are the details of the revegetation work that will be undertaken in the Rocky Bay Coast KNE site (refer to Map 5). Plant species to be used are listed and the table identifies numbers of plants that will be used and all costs associated with the planting programme.

Planting plan for Areas A and C1

Plants for these areas will be chosen from the following species:

Scientific name	Common Name
Aciphylla squarrosa var *squarrosa*	Taramea
Atriplex cinerea	Grey saltbush
Carex maorica	Māori sedge
Carex "Raotest"	
Clematis forsteri	Small white clematis
Euphorbia glauca	Shore spurge
Hebe elliptica	Kōkōmuka
Lepidium oleraceum	Cooks scurvy grass
Machaerina rubiginosa	Baumea
Melicytus aff. *obovatus* (a) (AK 235617; Cook Strait)	Cook Strait Melicytus
Melicytus crassifolius	Thick-leaved māhoe
Myoporum laetum	Ngaio
Olearia paniculata	Akiraho
Phormium cookianum subsp. *hookeri*	Coastal flax
Pimelea prostrata	Pinātoro
Poa billardierei	Sand tussock
Sonchus kirkii	Pūhā

Table 7: Planting cost for Areas A and C1

	2015/16 (C1)		2016/17 (A)	
	Number	**Total ($)**	**Number**	**Total ($)**
Plants	50	200	50	200
Other material costs for planting (stakes, guards, fertilizer tablets etc.)		60		60
Site preparation spray		250		250
Planting labour		90		90
Maintenance spray		250		250
Total		**850**		**850**

Table 8: Revegetation calendar

Planting site	2015/16			2016/17		
	Sept-Nov 2015	March-May 2016	May-June 2016	Sept-Nov 2016	March-May 2017	May-June 2017
C1	Spot spray for planting	Plant	Maintenance Spray			
A					Spot spray for planting	Plant

Map 5: Planting areas in the Rocky Bay Coast KNE site.

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