

Key Native Ecosystem Plan for Tora Coast Bush

2016-2019



greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao



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1. Key Native Ecosystem programme

The Wellington region's native biodiversity has declined since people arrived and the ecosystems that support it face ongoing threats and pressures. Regional councils have responsibility for maintaining indigenous biodiversity, as well as protecting significant vegetation and habitats of threatened species, under the Resource Management Act 1991 (RMA).

Greater Wellington Regional Council's (GWRC) Biodiversity Strategy (2016)¹ sets a framework that guides how GWRC protects and manages biodiversity in the Wellington region to work towards the vision below.

GWRC's vision for biodiversity

Healthy ecosystems thrive in the Wellington region and provide habitat for native biodiversity

The Strategy provides a common focus across the council's departments and guides activities relating to biodiversity. The vision is underpinned by four operating principles and three strategic goals. Goal One drives the delivery of the Key Native Ecosystem (KNE) programme.

Goal One

Areas of high biodiversity value are protected or restored

The KNE programme is a non-regulatory voluntary programme that seeks to protect some of the best examples of original (pre-human) ecosystem types in the Wellington region by managing, reducing, or removing threats to their ecological values. Sites with the highest biodiversity values have been identified and prioritised for management. Sites are identified as of high biodiversity value for the purposes of the KNE programme by applying the four ecological significance criteria described below.

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

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

KNE sites can be located on private or publically owned land. However, land managed by the Department of Conservation (DOC) is generally excluded from this programme.

KNE sites are managed in accordance with three-year KNE plans, such as this one, prepared by the GWRC's Biodiversity department in collaboration with the landowners and other stakeholders. These plans outline the ecological values, threats, and management objectives for sites and describe operational activities such as ecological weed and pest animal control. 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. Tora Coast Bush Key Native Ecosystem

The Tora Coast Bush KNE site (9.6ha) is a remnant of original bush located at Tora settlement in South Wairarapa, 32km south of Martinborough (see Appendix 1, Map 1).

The KNE site is a modified but regenerating remnant of the original tītoki (*Alectryon excelsus*) - ngaio (*Myoporum laetum*) forest type for this area. As little as 3% (or 1,077ha) of this forest type is thought to remain the Wellington region, and this KNE site is one of the largest and most intact examples remaining in the Wellington region². Most of the KNE site is legally protected under a QEII National Trust (QEII) open space covenant (Map 2, Appendix 1 shows the covenanted area) and has been fenced. Its location on a seaward-facing coastal escarpment within a warm, semi-arid climate zone has heavily influenced the KNE site.

The KNE site is relatively isolated in the landscape, being surrounded by pasture-land farming and adjacent to the settlement of Tora. However, important ecological linkages are provided by the nearby Āwhea River and Tora coast foreshore.

3. Landowners, management partners and stakeholders

GWRC works in collaboration with landowners, management partners and stakeholders where appropriate to achieve shared objectives for the site. GWRC also recognises that effective working relationships are critical for achieving the management objectives for each KNE site. In preparing this plan GWRC has sought input from landowners, management partners and relevant stakeholders, and will continue to involve them as the plan is implemented.

3.1. Landowners

The KNE site is spread across three different land titles (see Appendix 1, Map 1 for ownership boundaries), with the two largest farms having long family histories of land tenure. Mike and Debbie Doyle (Langsam Farm) own the eastern portion, which was covenanted with QEII in 2001. Alastair and Jenny Boyne (Tora Farm) own the western portion. Neil and Lea Bramley own a small part of the KNE site on the boundary. All three landowners are supportive of biodiversity restoration work and want to see the bush protected and restored.

3.2. Management partners

Management partners are those that fund or have an active role in the implementation of the KNE plan or the management of the site. The three management partners are GWRC, all three landowners and the QEII Trust.

Within GWRC, the management partners are the Biodiversity, Biosecurity and Land Management departments. The Biodiversity department is the overarching lead department for GWRC on the coordination of biodiversity management activities and advice within the KNE site. The Biosecurity department coordinates and carries out pest control activities. The Land Management department plans and advises on sustainable land use, soil conservation and water quality.

In the implementation of this plan, the Biodiversity department will work closely with the landowners on management issues such as weed control and pest animal control. A particular area for GWRC is working with the landowners on maintaining the perimeter fence and to keeping it stock-proof.

All three landowners take an active role in protecting biodiversity values of the site. The Doyle and Boyne families are supportive of biodiversity restoration work in general and intend to maintain the stock fencing around their parts of the KNE site. Mike Doyle was also involved with early possum control efforts on his property. The Bramley family are doing restoration planting and check bait stations in and around their property.

QEII is also a management partner as they have actively managed the KNE site in the past through fencing and weed control and still provide advice to their covenanted landowners.

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 at a regional scale and how managing it contributes to the maintenance of regional biodiversity.

4.1. Ecological designations

Table 1 below lists ecological designations over all or part of Tora Coast Bush KNE site.

Table 1: Designations at the Tora Coast Bush KNE site

Designation level	Type of designation
District	The KNE site is listed in DOC's Eastern Wairarapa Ecological District: Recommended Areas for Protection 2004 <ul style="list-style-type: none"> RAP47 Tora Coastal Bush³
Other	Part of the KNE site is legally protected by the QEII Open Space covenant 5-07-352

4.2. Ecological significance

The Tora Coast Bush 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
- Its **ecological context** is valuable at the landscape scale as it is one of the highest quality remaining examples of coastal forest in the area and is adjacent to several areas scheduled under GWRC's Proposed Natural Resources Plan for the Wellington Region (PNRP⁴)

Representativeness

The Threatened Environment Classification⁵ indicates most of the KNE site is ranked as Chronically Threatened, having less than 10% of its indigenous vegetation cover remaining on a national scale⁶.

The Singers and Rogers (2014)⁷ classification of pre-human forest vegetation indicates the site would have comprised tītoki - ngaio (WF1) forest type, with the main ecosystem drivers being temperature and moisture. The region is thought to have contained up to 34,000ha of this forest type prior to human habitation, and now as little as 1,077ha remains, most in a modified state⁸. The KNE site is considered one of the best, albeit modified, examples of the original tītoki - ngaio forest cover in the Wellington region.

Rarity/distinctiveness

The site provides seasonal and/or core habitat for the New Zealand falcon (*Falco novaeseelandiae*), which is listed in New Zealand's national threat classification system⁹ as a Threatened - Nationally Vulnerable species. The KNE also contains the

regionally endangered rengarenga lily (*Arthropodium cirratum*), whau (*Entelea arborescens*) and speargrass (*Aciphylla squarrosa*), though both rengarenga lily and whau were likely introduced by early Māori inhabitants of the area. It is an important site for whārangi (*Melicope ternata*), which is now much less common in other areas¹⁰. See Appendix 2 for nationally threatened species and Appendix 3 for regionally threatened species.

Ecological context

Only two other sites of similar coastal forest remnant are found in the Eastern Wairarapa Ecological District¹¹, both to the north of Tora at Pahaoa and Mātaikonā respectively. The KNE site contributes to a valuable habitat mosaic with other significant native forests in the area including the DOC-managed Tora Bush Scenic Reserve, Aorangi Forest Park and similar forest on private land at the Lagoon Hills and Te Awaiti properties. In addition, the nearby Āwhea River (an important habitat on the coast particularly for migratory and spawning fish) and the Tora foreshore (an important site for birds in the coastal marine area) have been identified as being regionally important for biodiversity.

4.3. Ecological features

Habitats

The lower slopes are dominated by karaka (*Corynocarpus laevigatus*, a non-local native likely introduced by early Māori), ngaio (*Myoporum laetum*) and whārangi canopy with an understorey of kawakawa (*Piper excelsum*) and māhoe (*Melicytus ramiflorus*).

Emergent rewarewa (*Knightia excelsa*) and cabbage tree or tī kōuka (*Cordyline australis*) are more prominent on the upper slopes, along with secondary regenerating species such as five finger or whauwhaupaku (*Pseudopanax arboreus*), akiraho (*Olearia paniculata*), tītoki (*Alectryon excelsus*) and kānuka (*Kunzea ericoides*). Much less common are species such as kahikatea (*Dacrycarpus dacridioides*), tree fuchsia or kōtukutuku (*Fuchsia excorticata*) and kōwhai (*Sophora microphylla*). The understorey contains various ferns, grasses and sedges, orchids (eg, *Pterostylis banksii*) and herbaceous plants.

The site's south-eastern edges contain dense pōhuehue (*Muehlenbeckia australis*) while the north-western edges contain species such as tauhinu (*Ozothamnus leptophyllus*), coastal flax (*Phormium cookianum*), koromiko (*Hebe stricta*) and speargrass.

Species

Birds

The site provides seasonal or core habitat for the threatened New Zealand falcon or kārearea (*Falco novaeseelandiae*), with records from 2007 and regular sightings made by residents to the present day¹². A likely sighting of whitehead (*Mohoua albicilla*), a species in serious decline over much of its former range was made in 2007¹³.

The KNE site provides seasonal or core habitat for a range of more common forest birds including tūi (*Prosthemadera novaeseelandiae*), fantail (*Rhipidua fuliginosa*), morepork (*Ninox novaeseelandiae*), silvereye (*Zosterops lateralis*), bellbird (*Anthornis*

melanura), kererū (*Hemiphaga novaeseelandiae*), grey warbler (*Gerygone igata*) and Australasian harrier (*Circus approximans*).

Reptiles

The landowners have reported seeing lizards in the past but the species has not yet been determined¹⁴. An unidentified skink was recorded in 2016¹⁵.

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 the ecosystem dynamics. The key to protecting and restoring biodiversity as part of the KNE programme is to manage threats to the ecological values at each KNE site.

5.1. Key threats

The Tora Coast Bush KNE site has been modified over time by selective logging, fire and surrounding vegetation clearance, pest animals and stock grazing. Today the primary threats to the KNE site are considered to be pest animals, stock grazing and to a lesser extent pest plants.

Pest animals such as possums (*Trichosurus vulpecula*), mustelids (*Mustela* spp.), rodents (rats (*Rattus rattus* and *R. norvegicus*) and mice (*Mus musculus*)) and feral cats (*Felis catus*) are present and may damage native vegetation and prey on native animals, in particular birds.

Possum numbers were historically very high prior to control beginning in 1998, with a pre-control initial residual trap catch index (RTC) of 65%¹⁶. Since then control work has kept numbers below the acceptable threshold of 5% RTC. The habitat is recovering but continual reinvasion of possums from surrounding areas means ongoing control is necessary throughout the site.

A perimeter stock fence was completed around the time of the site being covenanted in 2001. Prior to this, fences of varying age and integrity were in place. On the Doyle property the fences are generally sound and well-maintained. The fence along the Bramley property is a four-wire electric batten fence that requires ongoing maintenance to clear vegetation and maintain the electrical current flow. The Boyne fence is also a 4-wire electric batten fence but is currently in disrepair and the electrical current has been turned off at the Bramley boundary. This has allowed sheep and cattle to enter the lower slopes of the KNE site, and once in they often push through an older internal boundary fence into the covenanted area.

Pest plants are largely restricted to the edges of the KNE site, with boxthorn (*Lycium ferocissimum*), elderberry (*Sambucus nigra*) and arum lily (*Zantedeschia aethiopica*) common along the south-eastern lower edge. Gorse (*Ulex europaeus*) is scattered along the north-western top perimeter, while marram (*Ammophila arenaria*) is spreading into the open areas along the south-eastern lower edge from the paddocks below. Pest plant control has been done in the past by the landowners and the QEII representative.

While the key threats discussed in this section are recognised as the most significant, a number of other threats to the KNE site's values have also been identified. Table 2 presents a summary of all known threats to the KNE site (including those discussed above), detailing which operational areas they affect, how each threat impacts on ecological values, and whether they will be addressed by the management activities.

The codes alongside each threat correspond to activities listed in the operational plan (Table 3), and are used to ensure that actions taken are targeted to specific threats.

Table 2: Summary table of all threats to ecological values present at the Tora Coast Bush KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
Ecological weeds		
EW-1	Ground covering and scrambling ecological weeds smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species for control include arum lily (<i>Zantedeschia aethiopica</i>) and marram (<i>Ammophila arenaria</i>)	KNE edges
EW-2	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key weed species include elderberry (<i>Sambucus nigra</i>) and boxthorn (<i>Lycium ferocissium</i>)	KNE edges
EW-3*	The non-local native karaka (<i>Corynocarpus laevigatus</i>) can outcompete original native forest and form dense stands, altering ecosystem function and composition	Lower slopes
Pest animals		
PA-1	Possums (<i>Trichosurus vulpecula</i>) browse palatable canopy vegetation until it can no longer recover ^{17,18} . This destroys the forest's structure, diversity and function. Possums may also prey on native birds ¹⁹ and invertebrates	Entire KNE site
PA-2	Rats (<i>Rattus spp.</i>) 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 ^{20,21}	Entire KNE site
PA-3	Mustelids (stoats ^{22,23} (<i>Mustela erminea</i>), ferrets ^{24,25} (<i>M. furo</i>) and weasels ^{26,27} (<i>M. nivalis</i>)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	Entire KNE site
PA-4*	Feral and domestic cats (<i>Felis catus</i>) prey on native birds ²⁸ , lizards ²⁹ and invertebrates ³⁰ , reducing native fauna breeding success and potentially causing local extinctions ³¹	Entire KNE site
PA-5	Hedgehogs (<i>Erinaceus europaeus</i>) prey on native invertebrates, lizards and the eggs and chicks of ground-nesting birds	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
PA-6*	Rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus europaeus</i>) are known to graze on palatable native vegetation and prevent natural regeneration in some environments ³²	Entire KNE site
PA-7*	Red deer (<i>Cervus elaphus</i>) and fallow deer (<i>Dama dama</i>) browse the forest understory and can significantly change vegetation composition by preferential browsing and preventing regeneration ^{33,34,35}	Entire KNE site
PA-8*	Feral pigs (<i>Sus scrofa</i>) root up the soil and eat roots, invertebrates, seeds and native plants thereby preventing forest regeneration ³⁶	Entire KNE site
Human activities		
HA-1	Grazing livestock can result in pugging soils, grazing native vegetation inhibiting regeneration, wildlife disturbance and increasing nutrient content of soils and watercourses ³⁷	KNE edges
Other threats		
OT-1*	Edge effects affect forest remnants by changing environmental conditions (eg soil moisture or temperature levels), changing physical environment (eg different plant assemblages compared to the interior) and changing species interactions (eg increased predation by invasive species) ^{38,39,40}	KNE edges

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

6. Management objectives

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

The following objectives will guide the management activities at the Tora Coast Bush KNE site.

1. To improve the structure* and function† of native plant communities
2. To improve the habitat for native birds

* The living and non-living physical features of an ecosystem. This includes the size, shape, complexity, condition and the diversity of species and habitats within the ecosystem.

† The biological processes that occur in an ecosystem. This includes seed dispersal, natural regeneration and the provision of food and habitat for animals.

7. Management activities

Management activities are targeted to work towards the objectives above (Section 6) by responding to the threats outlined in Section 5. 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 3).

It is important to note that not all threats identified in Section 5 can be adequately addressed. This can be for a number of reasons including financial, legal, and/or capacity restrictions.

7.1. Ecological weed control

The aim of weed control is to reduce the density and distribution of pest plants in order to improve the structure and function of native plant communities. It will focus on boxthorn, elderberry, arum lily and gorse, which are known to be impacting on these factors across the KNE site.

Boxthorn, elderberry, and arum lily will be controlled on an annual basis by the GWRC Biosecurity department along the south-eastern boundary of the KNE site.

Gorse is scattered along the north-western perimeter and will be jointly controlled by GWRC and the landowners on an annual basis.

Should these priority species be effectively controlled within the three years of this KNE plan, marram grass will then be progressively controlled by GWRC's Biosecurity department in the grassy open edges along the south-eastern boundary of the KNE site where it is competing with native coastal forest plants.

7.2. Pest animal control

The aim of the pest animal control is to reduce the abundance of these animals. This is critical to protecting the values present and achieving the two objectives for this KNE site.

Poison bait-stations (primarily targeting possums) were initially installed and serviced by the landowner and volunteers with GWRC assistance but have been serviced by GWRC Biosecurity department since 2009/2010. The network of Sentry bait-stations targeting possums and rats are located around the perimeter of the KNE site. These stations will continue to be serviced every three months by GWRC Biosecurity department.

With the aim of reducing the predation of native birds, a best practice multi-species approach to predator control⁴¹ was recently initiated by GWRC at the KNE site. This involved a line of DOC250 kill-traps, which were installed primarily to target mustelids, with hedgehogs also expected to be controlled (see Appendix 1, Map 3 for pest animal control site locations). This network will be serviced every three months by the GWRC Biosecurity department.

Incursions of feral deer (red deer (*Cervus elaphus*) and fallow deer (*Dama dama*)) and pigs (*Sus scrofa*) are rare but if they do occur the landowners will control these animals by shooting.

7.3. Fencing

To ensure that grazing livestock are kept out of the KNE site, the GWRC Biodiversity and Land Management departments will work with all three landowners to ensure the KNE site's fencing remains stock-proof.

In 2016/17 GWRC will undertake maintenance of the electric fence on Tora Farm with Alastair Boyne to ensure the whole KNE site is fully fenced off.

In addition, as Mike Doyle has agreed to allow an electric fence connection to be maintained from a power source on his property, on an annual basis GWRC will undertake weed control along Mike Doyle's electric fence line to ensure the electric connection is maintained for all three landowners. If necessary, similar weed control will be done along the Bramley property. Mike Doyle will be responsible for any other maintenance of the Langsam Farm fencing as is agreed under the terms of the QEII covenant.

8. Operational plan

The operational plan shows the actions planned to achieve the stated objectives for the Tora Coast Bush KNE site and their timing and cost over the three-year period from 1 July 2016 to 30 June 2019. The budget for the 2017/18 and 2018/19 years are indicative only and subject to change.

Table 3: Three-year operational plan for the Tora Coast Bush KNE site

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2016/17	2017/18	2018/19
1, 2	EW-1 EW-2	Ecological weed control	Entire KNE site	GWRC Biosecurity	Target elderberry, boxthorn and arum lily on southern edge. Target gorse control on northern boundary Marram will be controlled as resources allow	All species controlled to low levels	\$2,000	\$2,000	\$2,000
1, 2	PA-1, 2, 3 and 5	Pest animal control	Entire KNE site	GWRC Biosecurity	Service bait stations and predator traps on a three-monthly basis	Possums <5% RTC* Rats <10% TTI**	\$3,700	\$3,700	\$3,700
1, 2	HA-1	Fencing	KNE site perimeter	GWRC Biodiversity and Land Management Landowner	Perimeter fence infrastructure repaired and maintained and vegetation controlled to keep the fence stock-proof	No stock incursions into the KNE site	\$2,000	\$2,000	\$2,000
Total							\$7,700	\$7,700	\$7,700

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

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

9. Funding contributions

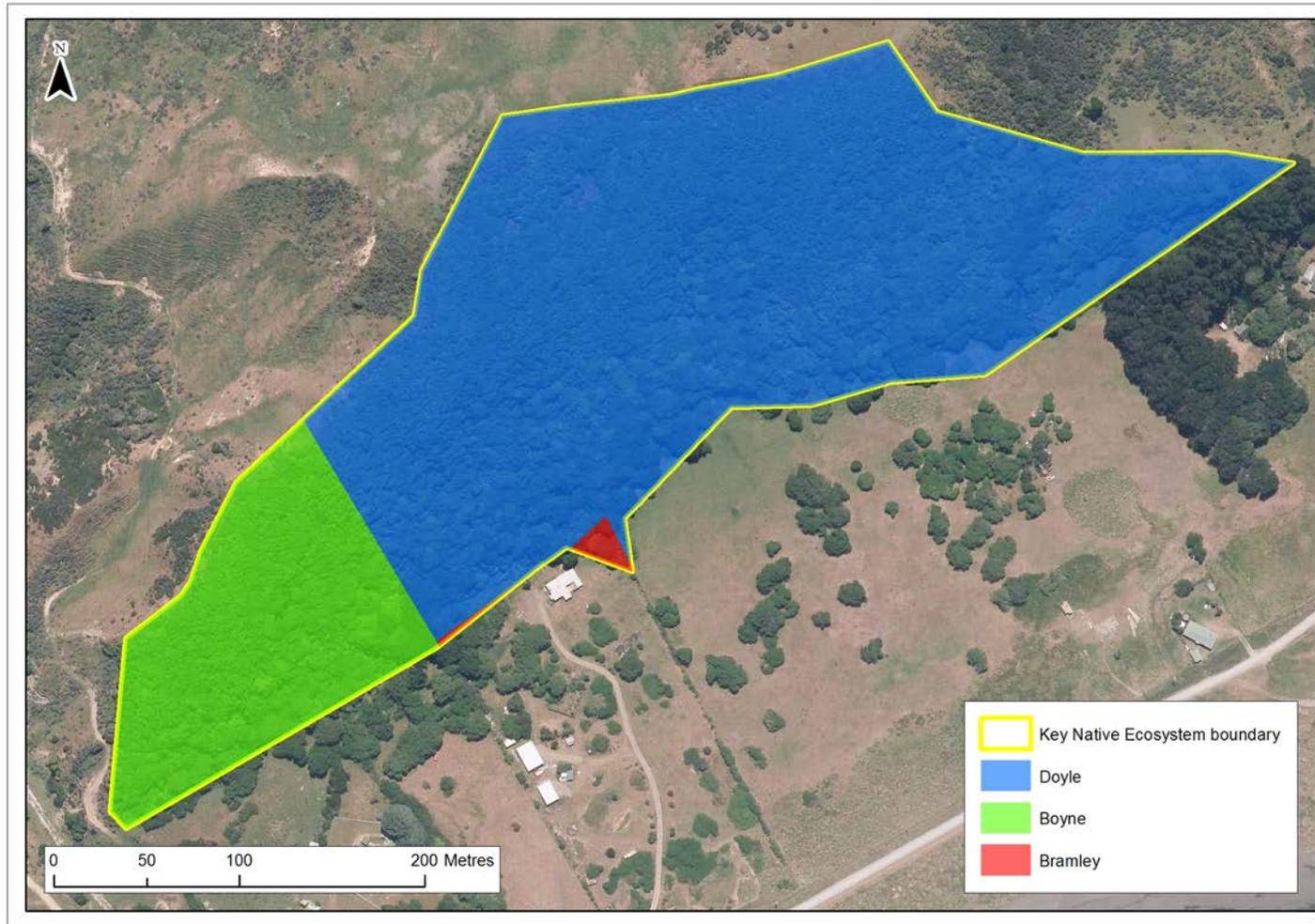
9.1. Budget allocated by GWRC

The budget for the 2017/18 and 2018/19 years are indicative only and subject to change.

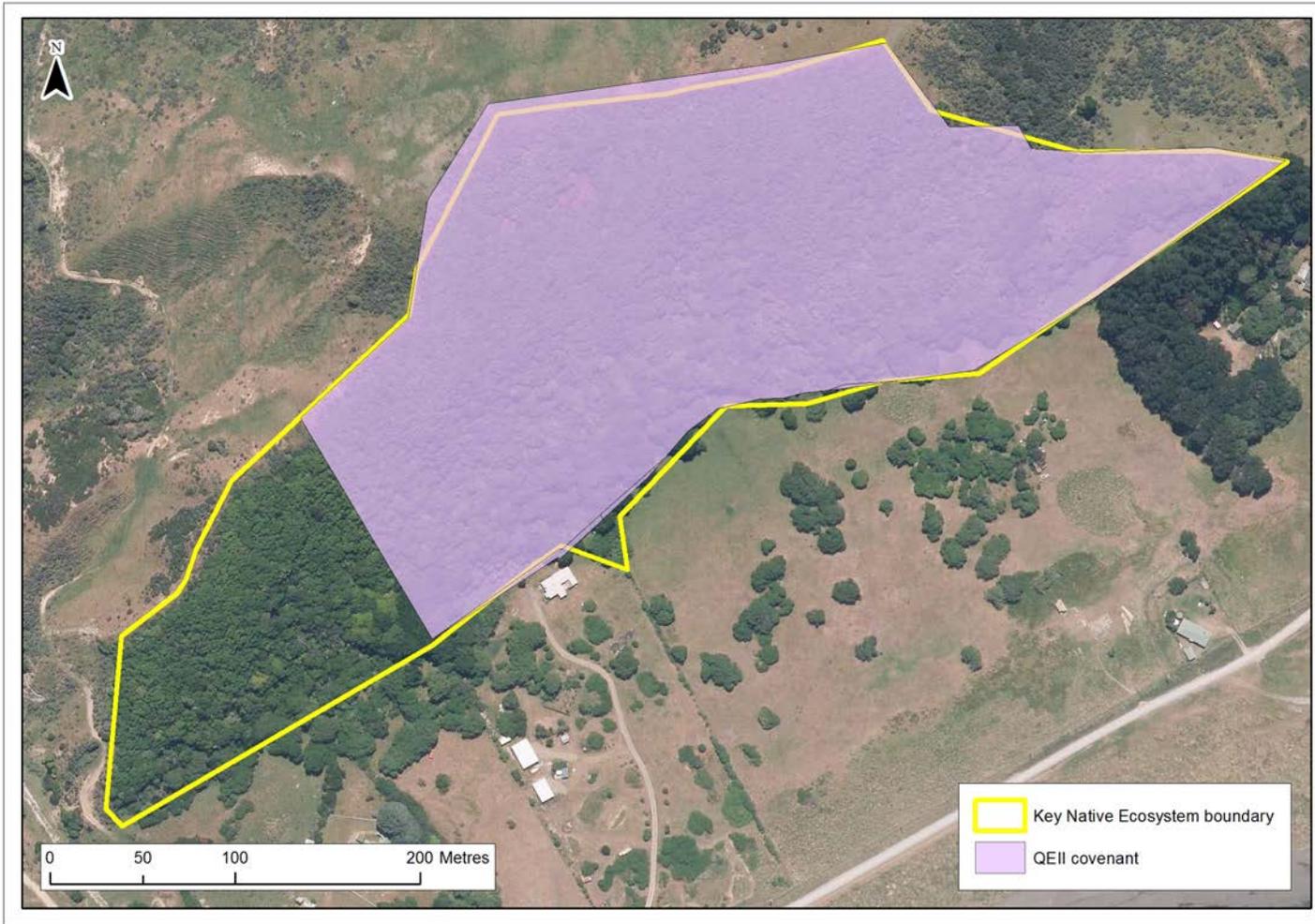
Table 4: GWRC allocated budget for the Tora Coast Bush KNE site

Management activity	Timetable and resourcing		
	2016/17	2017/18	2018/19
Ecological weed control	\$2,000	\$2,000	\$2,000
Pest animal control	\$3,700	\$3,700	\$3,700
Fencing	\$2,000	\$2,000	\$2,000
Total	\$7,700	\$7,700	\$7,700

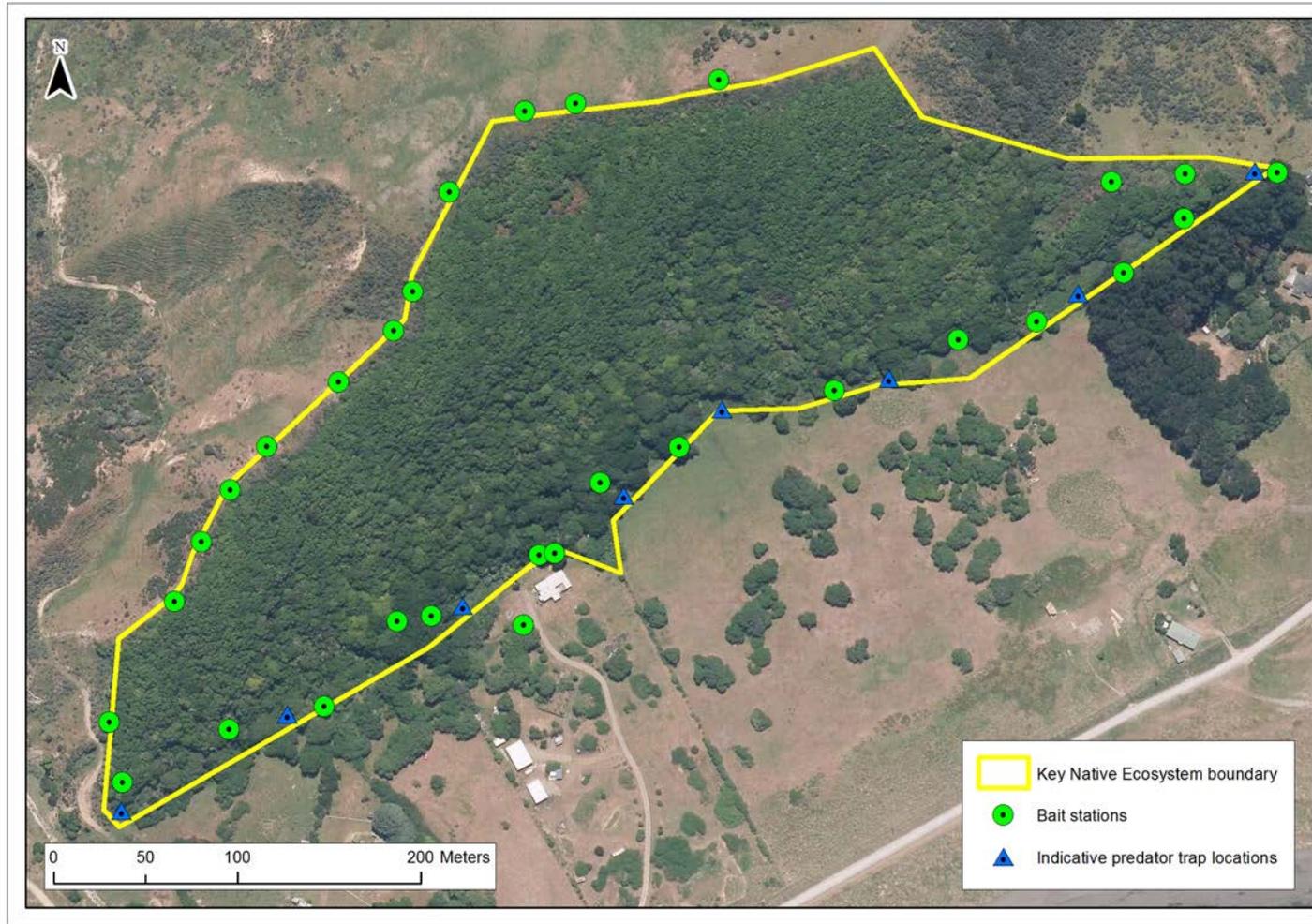
Appendix 1: Site maps



Map 1: The Tora Coast Bush KNE site and land ownership boundaries



Map 2: QEI Trust open space covenant at the Tora Coast Bush KNE site



Map 3: Pest animal control in the Tora Coast Bush KNE site

Appendix 2: Nationally threatened species list

The New Zealand Threat Classification System lists species according to their threat of extinction. The status of each species group (plants, reptiles, etc) is assessed over a three-year cycle⁴², with the exception of birds which are assessed on a five-year cycle⁴³. 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 the Threatened species that is resident in or regularly visit to the Tora Coast Bush KNE site.

Table 5: Threatened and At Risk species at the Tora Coast Bush KNE site

Scientific name	Common name	Threat status	Observation
Birds⁴⁴			
<i>Falco novaeseelandiae</i>	NZ falcon, kārearea	Threatened – Nationally Vulnerable	Playle S, 2016 ⁴⁵

Appendix 3: Regionally threatened species list

The following table lists regionally threatened species that have been recorded in the Tora Coast Bush KNE site.

Table 6: Regionally threatened species recorded in the Tora Coast Bush KNE site

Scientific name	Common name	Threat status	Observation
Plants⁴⁶			
<i>Aciphylla squarrosa</i>	Speargrass	Range restricted	Justin McCarthy, GWRC, pers.obs 2015
<i>Arthropodium cirratum</i>	Rengarenga lily	Regionally endangered	Beadel et al, 2004 ⁴⁷
<i>Entelea arborescens</i>	Whau	Regionally critical	Silbery T & Enright P, 2008 ⁴⁸

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