Key Native Ecosystem Plan for Trentham Memorial Park

2018-2021

greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

Contents

1. The 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 (Greater Wellington) Biodiversity Strategy[1] sets a framework that guides how Greater Wellington protects and manages biodiversity in the Wellington region to work towards the vision below.

Greater Wellington'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 is generally excluded from this programme.

KNE sites are managed in accordance with three-year KNE plans, such as this one, prepared by Greater Wellington's Biodiversity department in collaboration with the landowners, tangata whenua and other partners. 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. Trentham Memorial Park Key Native Ecosystem

The Trentham Memorial Park KNE site (13 ha) is located within the larger Trentham Memorial Park Recreation Reserve, Upper Hutt (see Appendix 1, Map 1). The KNE site comprises two areas of lowland podocarp/broadleaf forest, known as Barton's Bush and Domain Bush, and a section of the Moehau Stream adjacent to Barton's Bush, where a restoration project is located.

Barton's Bush, the larger of the two forest remnants, was named after Richard Barton, an early settler who wished to see the native forest protected. The KNE site (both bush parcels) is surrounded by playing fields and recreational areas that comprise Trentham Memorial Park. Moehau Park is located adjacent to Barton's Bush and is bordered by residential properties on Holdsworth Avenue at its northern end. The KNE site is not contiguous with other native bush, but is part of a series of bush reserves within the Hutt Valley that are considered important foraging and breeding sites for native forest bird species.

2.1 Landowners, management partners and stakeholders

Greater Wellington 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 Greater Wellington has sought input from landowners and relevant stakeholders, and will continue to involve them as the plan is implemented.

Landowner

Trentham Memorial Park KNE site is located on land owned and administered as a Recreation Reserve by Upper Hutt City Council (UHCC) in keeping with the Council's Long Term Plan 2012-2022[2]. This plan aims to provide high quality parks and reserves that provide a range of passive and active leisure opportunities for the city's residents, as well as providing areas and associated facilities that contribute to a fun leisure destination image for the city.

Management partners and key stakeholders

The management partners for the KNE site are Greater Wellington, UHCC and the Upper Hutt branch of the Royal Forest and Bird Protection Society (UHF&B). Management partners have undertaken restoration planting, ecological weed control and pest animal control within the forest remnants and along the Moehau Stream for several years. UHCC fenced off the forest remnants from public access in 1995 to prevent damage by recreational users.

Within Greater Wellington, the Biodiversity and Biosecurity departments are actively involved with the management of the KNE site. The Biodiversity department plans and coordinates biodiversity management activities and provides biodiversity advice. The Biosecurity department carries out pest control activities.

2.2 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 KNE site is located in the Wellington Ecological District[3], and has a mild but windy climate with annual rainfall of 900-1400mm. The KNE site is representative of the forest that once dominated the lower terraces of the Hutt River valley, and Barton's Bush is the largest remaining area of lowland mixed podocarp/broadleaf forest on the Hutt Valley floor [4]. The largest kahikatea in the Wellington Region can be found close to Domain Bush[5].

Of note in recognising the ecological values at the Trentham Memorial Park KNE site are the following:

> **Threatened environments:** The entire Trentham Memorial Park KNE site is classified as Acutely Threatened having less than 10% of the original cover of indigenous vegetation remaining[6].
>
> **Threatened species:** One nationally At Risk plant species, white mistletoe (*Tupeia antarctica*), and one regionally uncommon plant species, green mistletoe (*Ileostylus micranthus*) have been recorded within the KNE site (See Appendix 2 and 3).

The Singers and Rogers (2014)[7] classification of pre-human vegetation indicates the area would have comprised predominately tawa, kamahi, podocarp forest (MF7). Trentham Memorial Park KNE site is still representative of this original forest type, which is estimated to have only 22% of its original extent remaining in the Wellington Region[8]. The KNE site is the only remaining significant remnant of lowland forest in the Hutt Valley, representing 0.14% of the original Hutt Valley vegetation cover[9].

Barton's Bush (8.5 ha) contains emergent matai (*Prumnopitys taxifolia*), tōtara (*Podocarpus totara*), kahikatea (*Dacrycarpus dacridioides*) and pukatea (*Laurelia novae-zelandiae*), over a canopy of tītoki (*Alectryon excelsus*), ribbonwood (*Plagianthus regius*), kowhai (*Sophora microphylla*) and tawa (*Beilschmiedia tawa*)[10]. White mistletoe and green mistletoe are present in Barton's Bush[11].

Domain Bush (2.9 ha) comprises emergent ribbonwood, tōtara, and kahikatea over a canopy of tawa, lemonwood (*Pittosporum eugenioides*), kaikōmako (*Pennantia corymbosa*), and tītoki[12]. A species of *Wainui* snail (*Wainui* sp.) has been recorded here[13]. A tributary of Māwaihākona Stream flows through Domain Bush.

The KNE site is thought to be an important bush reserve for native birds within a network of other reserves (eg, Trentham Scenic Reserve, Keith George Memorial Park KNE site and Wi Tako Ngatata KNE site) within the Hutt Valley. Combined, these sites are likely to form an important network for bird species to disperse and forage throughout the Hutt Valley. Native bird species recorded at Trentham Memorial Park

include kererū (*Hemiphaga novaeseelandiae*), fantail (*Rhipidura fuliginosa placabilis*), tūī (*Prosthemadera novaeseelandiae novaeseelandiae*), silvereye (*Zosterops lateralis*), grey warbler (*Gerygone igata*), kingfisher (*Todiramphus sanctus*), shining cuckoo (*Chrysococcyx lucidus*) and the New Zealand falcon (*Falco novaeseelandiae*)[14].

2.3 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 present at Trentham Memorial Park KNE site are ecological weeds and pest animals. However, the KNE sites small size and the high public use are also considered threats.

Ecological weed species have the ability to outcompete and smother indigenous species preventing natural regeneration, altering the structure of the forest and reducing the diversity of food sources available. Both bush remnants within the KNE site have well documented weed infestations that have been targeted through active weed control over many years by UHF&B. However, with the sites' small size and large edge, ecological weed reinvasion will always be an issue at this site. At the Moehau Stream Restoration Project site there are a number of weed species that, if left uncontrolled, will prevent the establishment of the restoration planting.

Pest animals affect forest habitat by over-browsing native foliage, out-competing native species for food and nesting resources, and through direct predation. Possums (*Trichosurus vulpecula*) and rats (*Rattus* spp.) are the biggest threat at the KNE site. These species are known to compete for food resources such as seed, consume large quantities of canopy foliage and eat birds, bird eggs and invertebrates. Other known animal pests such as stoats (*Mustela erminea*), cats (*Felis catus*), rabbits (*Oryctolagus cuniculus*), mice (*Mus musculus*) and hedgehogs (*Erinaceus europaeus*) are also thought to be present.

Both forest remnants are vulnerable to the impacts of edge effects due to their small size and relatively large forest edge. Some studies suggest that forest fragments less than 9 ha are strongly influenced by edge patterns and processes[15].

Whilst 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 threat impacts on ecological values, and whether they will be addressed by the proposed management activities.

Table 1: Threats to ecological values present at the Trentham Memorial Park KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
Ecological weeds		
EW-1	Ground-covering ecological weeds such as tradescantia (*Tradescantia fluminensis*), ivy (*Hedera helix subsp. helix*) and convolvulus (*Convolvulus* sp.) smother and inhibit regeneration of indigenous species	Entire KNE site
EW-2	Climbing and rambling ecological weed species, particularly old man's beard (*Clematis vitalba*), Japanese honeysuckle (*Lonicera japonica*) and blackberry (*Rubus fruticosus* agg.) smother and out-compete native forest, preventing regeneration	Entire KNE site
EW-3	Woody tree and shrub weed species such as Jerusalem cherry (*Solanum pseudocapsicum*), cherry (P*runus* spp.), sycamore (*Acer pseudoplatanus*), gorse (*Ulex europaeus*), Montpellier broom (*Genista monspessulana*) and the non-local native karaka (*Corynocarpus laevigatus*) establish under a forest canopy and outcompete indigenous vegetation	Entire KNE site
Pest animals		
PA-1	Possums browse palatable canopy vegetation until it can no longer recover[16,17]. This destroys the forest's structure, diversity and function. Possums may also prey on native birds[18] and invertebrates	Entire KNE site
PA-2	Rats 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[19,20]	Entire KNE site
PA-3(*)	Mustelids (stoats[21,22], ferrets[23,24] (*M. furo*) and weasels[25,26] (*M. nivalis*)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	Entire KNE site
PA-4*	Mice 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[27,28]	Entire KNE site
PA-5*	Rabbits and hares (*Lepus europaeus*) graze on palatable native vegetation and prevent natural regeneration in some environments[29]	Entire KNE site
PA-6*	Hedgehogs prey on native invertebrates, lizards[30], and the eggs and chicks of ground-nesting birds[31].	Entire KNE site
PA-7*	Feral, stray and domestic cats prey on native birds[32], lizards[33] and invertebrates[34], reducing native fauna breeding success and potentially causing local extinctions[35]	Entire KNE site
PA-8*	Wasps (*Vespula* spp.) adversely impact native invertebrates and birds through predation and competition for food resources. They also affect nutrient cycles in beech forests[36]	Entire KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
PA-9*	Australasian magpies are known to modify the behaviour of native birds, which could inhibit the ability of native birds to feed and breed freely	Forest margins
Human activities		
HA-1	Garden waste dumping causes reinvasion and competition from ecological weed species	A & C
HA-2*	A lowered water table through flood protection works (eg, stop banks) and domestic water take from the Hutt River poses a threat to the forest composition, particularly affecting tawa, podocarps and kahikatea	Entire KNE site
HA-3*	Recreational activities such as horse riding, dog walking and off-road driving can adversely affect the succession of the forests understory, disturb native wildlife and inhibit the establishment of restoration planting	Entire KNE site
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)	A & B

***Threats marked with an asterisk are not addressed by actions in the Operational Plan**

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 2).

3. Management objectives and activities

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

3.1 Management objectives

The following objectives will guide the management activities at the Trentham Memorial Park 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, and condition of plant communities, and the diversity of species and habitats within them.

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

3.2 Management activities

Management activities contribute to 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 discussed in the broad management approach.

Greater Wellington's primary focus at the KNE site is ongoing ecological weed control and pest animal control in Barton's Bush and Domain Bush. Greater Wellington will also continue to support UHF&B at the Moehau Stream Restoration Project primarily with ecological weed control. These management activities have been undertaken since 1998 and have proved successful with clear improvement of the canopy and understory within Barton's Bush and Domain Bush. Additional benefits have included providing better foraging and nesting opportunities for native birds and the success of the restoration project along the Moehau Stream.

UHCC will continue to support the management activities within the KNE site as set out in this plan, and wider Memorial Park where separately funded restoration planting exists. UHCC will be the primary contact for UHF&B supporting their restoration planting and undertaking ecological weed control.

UHF&B undertake restoration planting and ecological weed control and service the pest animal bait stations throughout the KNE site and wider Memorial Park. UHF&B are the coordinators of the Moehau Stream Restoration Project management activities, having previously secured funding from the Department of Conservation for extensive willow (*Salix* sp.) control.

Ecological weed control

Ecological weed control will be undertaken in Operational Areas A-C to maintain native plant dominance and encourage native forest regeneration.

An annual ecological weed sweep regime targeting a range of ecological weed species (See Table 1 for key weed species for control) will be undertaken by Greater Wellington in Operational Areas A and B using a broad-spectrum herbicide. An annual weed sweep through Operational Area C (the Moehau Stream Restoration Project) will be conducted by Greater Wellington targeting ecological weeds that are preventing the plantings from establishing, such as blackberry, convolvulus, Japanese honeysuckle and tradescantia. Records will be kept of what has been controlled each year and will inform the identified priorities for the following season's ecological weed control.

UHCC and UHF&B will continue undertaking ecological weed control throughout the KNE site. This includes monthly working bees in the summer months in Operational Area C to control weeds affecting plantings associated with the restoration project and removing karaka seedlings and other invasive species encountered when servicing the bait stations in Operational Areas A and B.

Pest animal control

Pest animal control is primarily targeted at controlling possums and rats and secondarily at controlling stoats within the KNE site. A network of 32 Pelifeed bait stations were installed in 1998 to target possums and rats, and six DOC 200 traps were installed in 2016 to target stoats, in Operational Areas A and B (see Appendix 1, Map 3). The bait stations and traps are serviced by UHF&B volunteers on a three-monthly basis with brodifacoum bait supplied by Greater Wellington.

These control methods are known to keep possums, rats and stoats to low densities, aiding native forest regeneration and providing a safer habitat for foraging and nesting native birds.

Greater Wellington Biosecurity staff will undertake an annual service of the trap and bait station network to undertake any maintenance required and to ensure they are able to be operated in a safe and effective manner by the UHF&B volunteers.

Revegetation

Restoration planting has been undertaken by UHF&B at the KNE site since 1994. Plants are grown by UHF&B's local nursery (using locally sourced seed) and are planted by volunteers. Planting originally focused on Barton's Bush, Domain Bush and buffer areas between the two bush blocks but, has since focused on the Moehau Stream Restoration Project area (Operational Area C). It is expected that restoration planting will continue to focus on infill planting of Moehau Stream (Operational Area C) within this three-year plan, with planting of other areas in the Trentham Memorial Park as required.

Planting is coordinated and undertaken by UHF&B throughout the winter months with volunteer working bees. The exact location, species and numbers of plantings are dependent on plant availability and volunteer assistance. As a result, no detailed planting plan can be provided at this stage, however, it will be contiguous with previous year's plantings at Moehau Stream using wetland sedges (*Carex* spp.), harakeke flax (*Phormium tenax*), kahikatea, pukatea, and cabbage trees (*Cordyline australis*) in the wetter areas with tōtara, mataī, and other forest trees in the drier areas.

The planting within Barton's Bush and Domain Bush will be focused on developing a forest understory and providing canopy and emergent species for forest succession. While Operational Areas A & B are no longer the primary focus of revegetation plans within the KNE site, in-fill planting may be undertaken by UHF&B within the three-year cycle of this plan.

Bird Monitoring

UHCC funds bird monitoring in a number of reserves in Upper Hutt, including at Trentham Memorial Park KNE, to monitor the success of the biodiversity management activities undertaken at these sites. UHCC will continue to fund this monitoring.

Fence monitoring and repair

The high recreational use by walkers, dog-walkers, runners and horse riders has previously contributed to damaging both forest remnants and affecting the values of the KNE site. UHCC fenced off Barton's Bush and Domain Bush to prevent trampling of the understory and accidental disturbance of the fauna. UHCC will continue to monitor the condition of fences and repair as necessary.

Other restoration activities

UHCC and UHF&B will continue to undertake restoration planting within the wider Memorial Park, with the aim of creating more native cover and connecting the remnant forest bush reserves. This is undertaken separately from the KNE Programme and is separately funded. Locations of these plantings are determined on an annual basis.

4. Operational plan

The operational plan shows the actions planned to achieve the stated objectives for the Trentham Memorial Park KNE site, and their timing and cost over the three-year period from 1 July 2018 to 30 June 2021. The budget for each year is indicative only.

Table 2: Three year operational plan for the Trentham Memorial Park KNE site

Objective	Threat	Activity	Operational area	Delivery	Description/detail	Target	Timetable and resourcing		
							2018/19	2019/20	2020/21
1,2	EW-1,2,3	Ecological weed control	A & B	GW Biosecurity department	Weed sweep targeting a range of species using a broad-spectrum herbicide (see Table 1 for key species to control)	Reduction in the distribution and abundance of ecological weed species	$1,700	$1,700	$1,700
1,2	EW-1,2 & 3	Ecological weed control	C	GW Biosecurity department	Weed sweep targeting blackberry, convolvulus, tradescantia, old man's beard and Japanese honeysuckle to aid release of plantings	Reduction in the distribution and abundance of ecological weed species	$800	$800	$800
1,2	PA-1,2,3	Pest animal control	A & B	UHF&B	Greater Wellington provision of brodifacoum bait to UHF&B volunteers who service bait stations and DOC 200 traps quarterly to control possums, rats and stoats	Bait stations serviced quarterly. Possums <5% RTC * Rats < 10% TTI** Stoats <5% TTI**	$600	$600	$600
1,2	PA-1,2,3	Pest animal control	A & B	GW Biosecurity department	Annual maintenance service and safety audit of bait station and trap network to ensure safe and effective operation	Fully functioning pest animal network	$500	$500	$500
1,2	OT-1	Revegetation	A, B & C	UHF&B	Annual programme of in-fill planting in winter months	>75% planting survival success rate	***	***	***
						Total	$3,600	$3,600	$3,600

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

***Variable costs determined annually that cannot be detailed at this time

5. Funding summary

5.1 Greater Wellington budget

The budget for each year is indicative only and subject to change.

Table 3: Greater Wellington allocated budget for the Trentham Memorial Park KNE site

Management activity	Timetable and resourcing		
	2018/19	2019/20	2020/21
Ecological weed control	$1,250	$1,250	$1,250
Pest animal control	$550	$550	$550
Total	**$1,800**	**$1,800**	**$1,800**

5.2 Other contributions

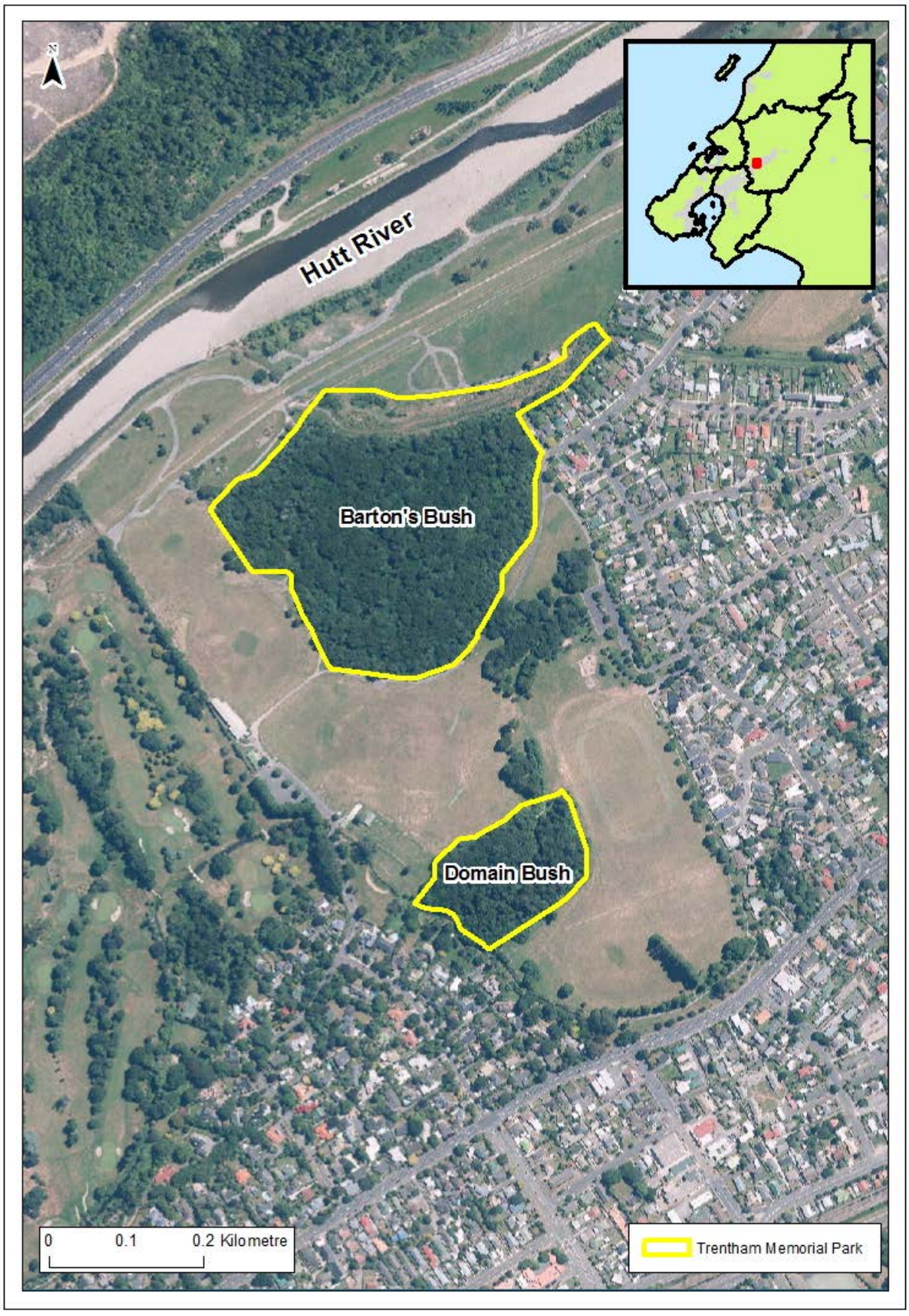
The budget for each year is indicative only and subject to change.

Table 4: Additional allocated budget for the Trentham Memorial Park KNE site from other management partners (shown in brackets)

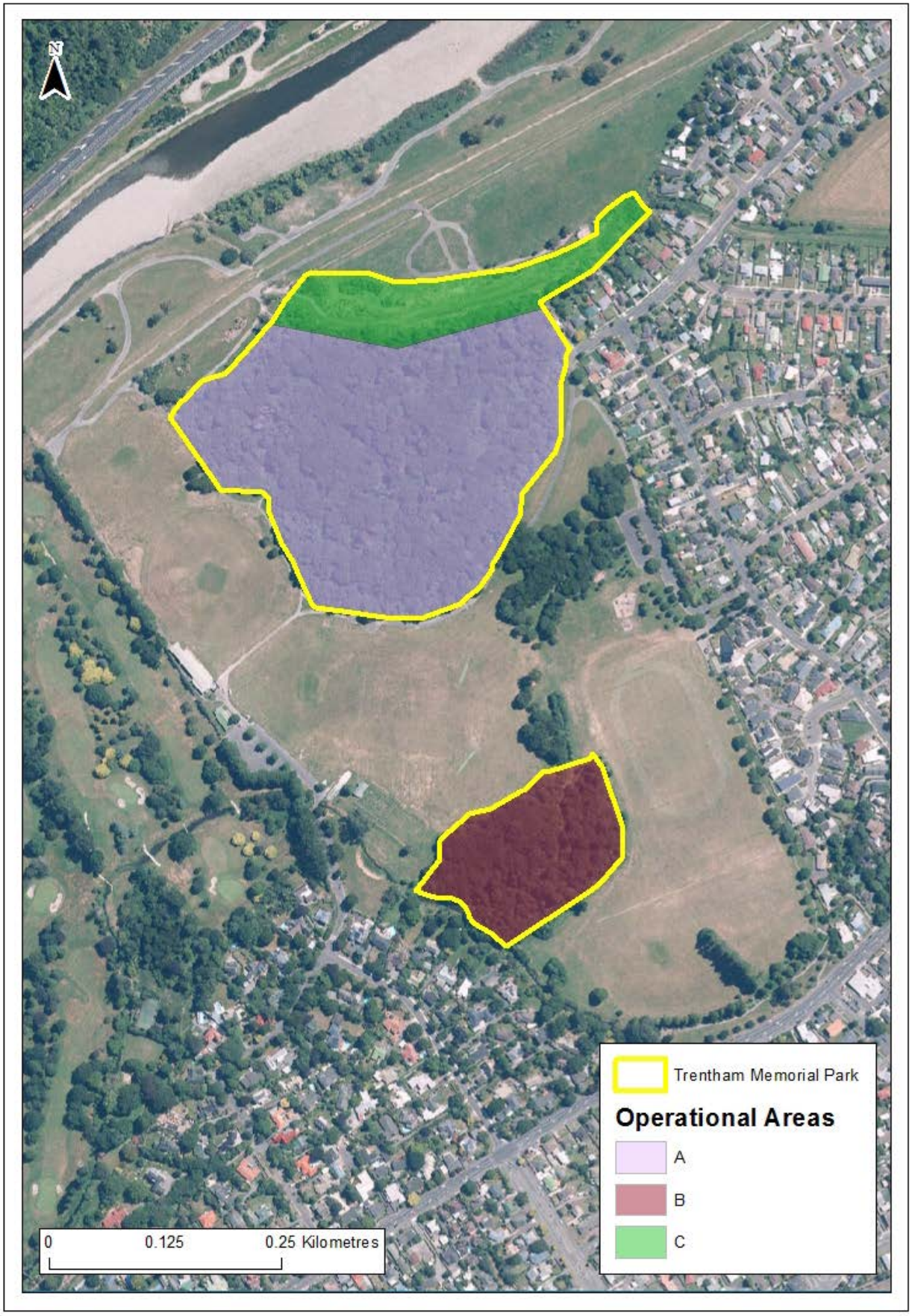
Management activity	Timetable and resourcing		
	2018/19	2019/20	2020/21
Ecological weed control (UHCC)	$1,250	$1,250	$1,250
Pest animal control (UHCC)	$550	$550	$550
Re-vegetation (UHF&B)	***	***	***
Total	**$1,800**	**$1,800**	**$1,800**

***Variable costs determined annually that cannot be detailed at this time

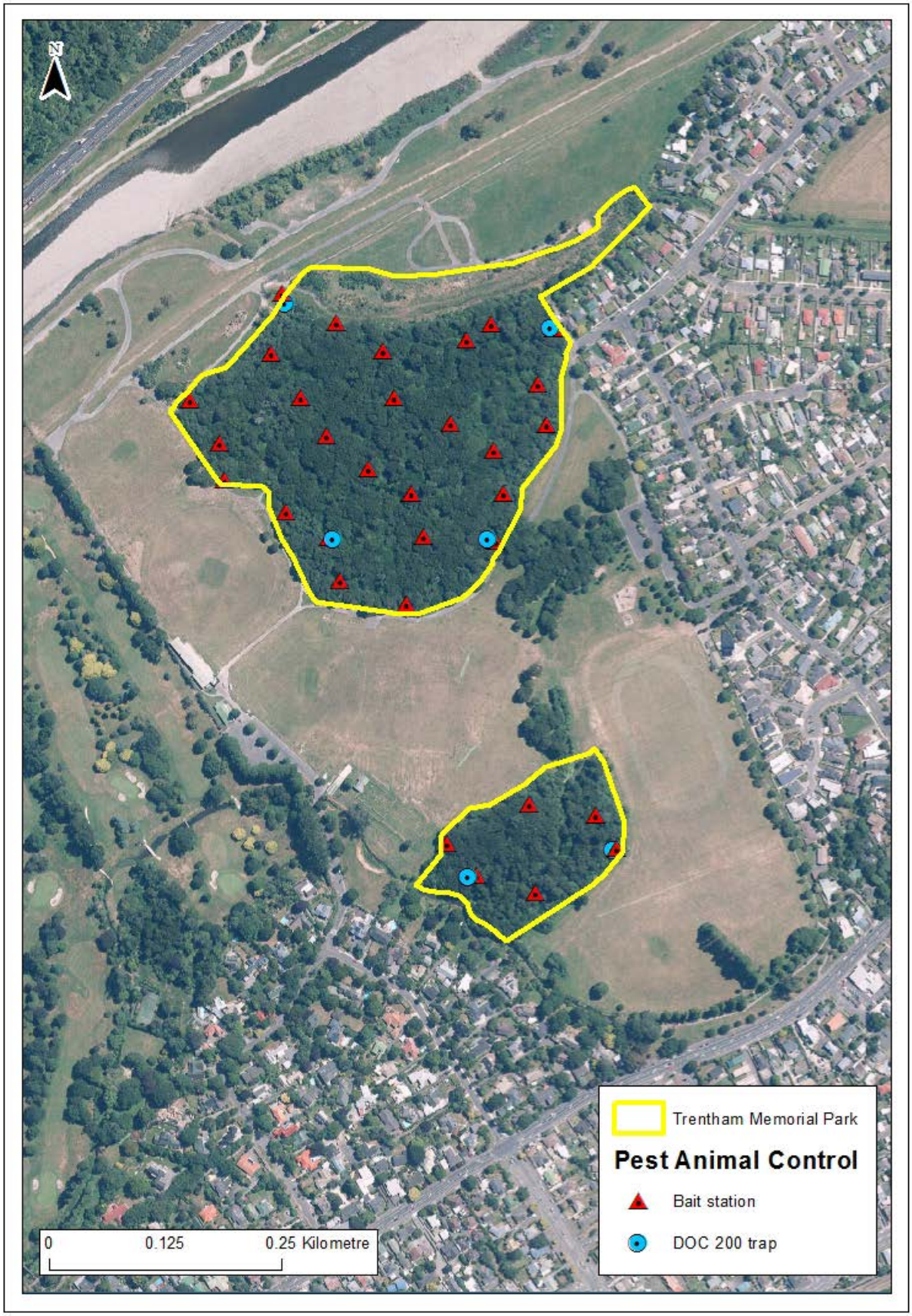
Appendix 1: Site maps



Map 1: The Trentham Memorial Park KNE site boundary



Map 2: Operational areas in the Trentham Memorial Park KNE site



Map 3: Pest animal control in the Trentham Memorial Park KNE site

Appendix 2: Nationally threatened species list

The New Zealand Threat Classification System lists extant species according to their threat of extinction. The status of each species group (plants, reptiles, etc) is assessed over a five-year cycle[37]. Species are regarded as At Risk if they are classified as Declining, Recovering, Relict or Naturally Uncommon. The following table lists At Risk species that are resident in, or regular visitors to, the Trentham Memorial Park KNE site.

Table 5: At Risk species at the Trentham Memorial Park KNE site

Scientific name	Common name	Threat status	Observation
Plants(vascular)[38]			
Tupeia antarctica	White mistletoe	At Risk-Declining	NZPCN 2015[39]

Appendix 3: Regionally threatened species list

The following table lists regionally threatened species that have been recorded in the Trentham Memorial Park KNE site. Native plant species have been identified in the Plant Conservation Strategy, Wellington Conservancy 2004-2010[40].

Table 6: Regionally threatened plant species recorded in the Trentham Memorial Park KNE site

Scientific name	Common name	Threat status	Observation
Tupeia antarctica	White mistletoe	Regionally critical	NZPCN 2015[41]
Ileostylus micranthus	Green mistletoe, pirita	Gradual decline	NZPCN 2015[42]

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