

Key Native Ecosystem Plan for Strang's Bush

2018-2021



greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao



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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 Strategy¹ 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. Of these, 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 or 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 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. Strang's Bush Key Native Ecosystem

Strang's Bush is a 30 ha forest remnant in the Eastern Wairarapa Ecological District². It is on a privately-owned sheep and beef farm at 1,683 Longbush Road near Gladstone (Appendix 1, Map 1) and is 13 km southeast of Carterton. The KNE site is approximately 200 m above sea level. The Makakahaka Stream runs through the middle of the KNE site. Originally the KNE site was part of three paddocks and much of it was grazed up until 2016 when it was fully fenced and retired. The north-western area contains significant tōtara (*Podocarpus totara*) and tītoki (*Alectryon excelsus*) forest remnants and has been retired from grazing for longer than the other two areas.

3. Landowner 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.

3.1. Landowner

This KNE site and surrounding farm is owned by the Strang family. Jamie and Marilyn Strang initiated the development of this plan and are enthusiastic about the long term protection of the bush. They are particularly keen to see an increase in bird numbers in the KNE site and surrounding area. They and the farm lessee will carry out pest control work to keep feral deer numbers low and maintain stock fencing.

3.2. Management partners and key stakeholders

The Greater Wellington Land Management department has developed a Farm Environment Plan³ for the wider Strang's Bush property that aims to reduce hill-slope soil erosion. They are considered stakeholders to this plan. While they will not be directly involved in implementing the KNE plan, their work on the wider property will have benefits for biodiversity by, for example, reducing silt loading in waterways.

4. 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.

Strang's Bush is one of the best examples of lowland podocarp forest remaining in the area, and while it has been modified by selective logging, grazing, pest animals and ecological weeds, it still retains most of its natural character.

Of note in recognising the ecological values at the Strang's Bush KNE site are the following:

Threatened environments: The Threatened Environment Classification classifies the KNE site in the highest threat category: Acutely Threatened. This means there is less than 10% of native vegetation remaining on this type of land in New Zealand⁴.

Threatened species: The site provides habitat for one threatened plant species and one threatened bird species (See Appendix 2).

The Singers and Rogers (2014)⁵ classification of pre-human vegetation indicates that Strang's Bush would have comprised two native forest types; tītoki/tōtara forest (MF1) and kahikatea (*Dacrycarpus dacrydioides*)/pukatea (*Laurelia novae-zelandiae*) forest (WF8). It is estimated that only 2% and 1% of the original extent of these forest types are remaining in the Wellington Region today, making them regionally threatened ecosystem types⁶.

The tītoki/tōtara forest dominates the drier and less fertile ridges and slopes of the site, and a pukatea/kahikatea community dominates the wetter and more fertile gullies. Scattered mataī (*Prumnopitys taxifolia*), kōwhai (*Sophora microphylla*), kānuka (*Kunzea ericoides*) and ngaio (*Myoporum laetum*) are also found across the KNE site amongst the dominant tītoki, tōtara, pukatea and kahikatea. The understory is dominated by a diverse range of small-leaved trees and shrubs, including the regionally uncommon korokio (*Corokia cotoneaster*)⁷.

A recent botanical survey of the KNE site⁸ found that it contains the Nationally Vulnerable slender bristle grass (*Rytidosperma merum*) (see Appendix 2). Unusually, it also contains three species of maire (*Nestegis cunninghamii*, *N. lanceolata* and *N. montana*) and a number of other locally uncommon native species, including rasp fern (*Doodia australis*), small maidenhair (*Adiantum diaphanum*), bamboo grass (*Microlaena polynoda*), twiggy tree daisy (*Olearia virgata*), leafless lawyer (*Rubus squarrosus*), trailing fuchsia (*Fuchsia perscandens*), jointed fern (*Arthropteris tenella*), dwarf mistletoe (*Korthalsella lindsayi*) and mikimiki (*Coprosma linariifolia*).

Some of the plants that are found within the KNE site (eg rasp fern) are often associated with the limestone and exposed fossil shell outcrops found here. The

Makahakaha Stream feeds a small wetland area which contains a number of pūkiō (*Carex secta*) sedges.

New Zealand pipit (*Anthus novaeseelandiae*), a threatened species (see Appendix 2), has been observed at Strang's Bush along with a number of more common native forest birds, including kererū (*Hemiphaga novaeseelandiae*), tūī (*Prothemadera novaeseelandiae*), grey warbler (*Gerygone igata*), fantail (*Rhipidura fuliginosa placabilis*) and silvereye (*Zosterops lateralis*)⁹. Wellington tree wētā (*Hemidenina crassidens*) have also been observed¹⁰.

Raukawa gecko (*Woodworthia maculata*) is the only lizard species observed at Strang's Bush¹¹. The Ngahere gecko (*Mokopirirakau* "Southern North Island"), barking gecko (*Naultinus punctatus*), spotted skink (*Oligosoma lineoocellatum*) and northern grass skink (*Oligosoma polychroma*) have been recorded within a few kilometres and may also be present within the KNE site boundary¹².

5. Threats to ecological values

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.

Ecological pest plants displace native plant species performing important structural and ecological functions such as providing food sources, shelter, roosts and refuge from predators for native fauna. They also inhibit the natural regeneration of native plant species. Old man's beard (*Clematis vitalba*) and English ivy (*Hedera helix*) are the highest priority species for control.

Pest animals are present throughout the KNE site and include possums (*Trichosurus vulpecula*), mustelids (*Mustela* spp.), ship and Norway rats (*Rattus rattus* and *R. norvegicus*), mice (*Mus musculus*), hedgehogs (*Erinaceus europaeus*), feral cats (*Felis catus*) and rabbits (*Oryctolagus cuniculus*).

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 Strang's Bush 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 management activities.

Table 1: Threats to ecological values present at the Strang's Bush KNE site

The codes alongside each threat correspond to activities listed in the operational plan (Table 2), and are used to ensure that actions taken are targeted to specific threats

| Threat code | Threat and impact on biodiversity in the KNE | Location |
|-------------------------|--|--|
| Ecological weeds | | |
| EW-1 | Climbers such as old man's beard smother native vegetation and prevent natural regeneration of native plants. They also reduce the area of habitat and amount of food available for native wildlife | Whole KNE |
| EW-2 | Woody weeds such as hawthorn (<i>Crataegus monogyna</i>), elderberry (<i>Sambucus nigra</i>), silver poplar (<i>Populus alba</i>), briar rose (<i>Rosa rubiginosa</i>), wild cherry (<i>Prunus</i> spp.) and Darwin's barberry (<i>Berberis darwinii</i>) can outcompete native vegetation and prevent regeneration | Bush edges |
| EW-3 | Ground covers such as English ivy and aluminium plant (<i>Lamium galeobdolon</i>) can smother native vegetation and prevent native regeneration | Southern end of the KNE near the house |
| Pest animals | | |
| PA-1 | Possums browse palatable canopy vegetation until it can no longer recover ^{13,14} . This destroys the forest's structure, diversity and function. Possums may also prey on native birds ¹⁵ and invertebrates | Entire KNE site |

| Threat code | Threat and impact on biodiversity in the KNE | Location |
|-------------|--|-----------------|
| 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 ^{16,17} | Entire KNE site |
| PA-3 | Mustelids (stoats ^{18,19} (<i>Mustela erminea</i>), ferrets ^{20,21} (<i>M. furo</i>) and weasels ^{22,23} (<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 | Hedgehogs (<i>Erinaceus europaeus</i>) prey on native invertebrates ²⁴ , lizards ²⁵ and the eggs ²⁶ and chicks of ground-nesting birds ²⁷ | Entire KNE site |
| PA-5 | Feral, stray 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-6* | House 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 ^{32,33} | Entire KNE site |
| PA-7 | Rabbits and hares (<i>Lepus europaeus</i>) graze on palatable native vegetation and prevent natural regeneration in some environments ³⁴ . Rabbits are particularly damaging in sand dune environments where they graze native binding plants and restoration plantings. In drier times hares especially, will penetrate into wetland and forest areas browsing and reducing regeneration of native seedlings | Entire KNE site |
| PA-8* | Wasps (<i>Vespula</i> spp.) adversely impact native invertebrates and birds through predation and competition for food resources | Entire KNE site |
| PA-9 | 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 ^{35,36,37} | Entire KNE site |

*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 Strang's Bush KNE site:

1. To improve the structure* and function† of native plant communities

* 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 objective 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, or capacity restrictions.

7.1 Ecological weed control

The aim of ecological weed control undertaken at the KNE site is to limit the impact of exotic species, maintaining the native biodiversity values and facilitating more natural functioning of the native ecosystem. Widespread species will be controlled first and longer-term as work progresses and resources allow, weed control work may expand to include other species.

A weed distribution map can be found in Appendix 1 (Map 2)³⁸ and has informed plans for ongoing ecological weed control.

Old man's beard is the highest priority species and will be controlled during all three years covered by this plan. This will build on the work completed in the previous three year KNE plan. Any remaining or regrowing large vines will be cut and stump-treated with herbicide. Smaller vines and seedlings will be sprayed with herbicide. Ongoing surveillance and follow up control will be undertaken to prevent re-establishment and allow native regeneration.

English ivy, aluminium plant and Darwin's barberry can be very damaging to New Zealand ecosystems; however in this KNE site they are currently restricted to a few small areas. The one known Darwin's barberry site has been controlled in the past and is thought to be eradicated, but ongoing surveillance will be required. The English ivy and aluminium plant sites have also been controlled in the previous three years and follow-up control work will be required across the three years of this plan.

Should budget allow, control of woody weeds such as hawthorn, elderberry, silver poplar, briar rose and wild cherry will be done using the cut and stump-treat method. At their current densities they are a lower priority for control at this KNE site.

Hawthorn, elderberry and cherry are all spread by birds and are likely to reinvade. Poplar generally spreads by suckering but may be spread by seed. It is unlikely that poplar will reinvade once it has been eradicated. Briar rose generally spreads by suckers but may also be bird-dispersed. Its seeds are long-lived and it is likely that it will reappear.

7.2 Pest animal control

Pest animal control is critical to protecting the values present and achieving the management objective for this KNE site.

A multi-species approach to animal pest control³⁹ was installed in 2015 and reviewed in 2017, with 21 control locations installed across the KNE site. Each control location contains a Sentry bait station, DOC250 kill-trap and a Timms kill-trap. This system collectively targets possums, mustelids, feral cats, rats and hedgehogs. The Greater Wellington Biosecurity department services all hardware at the control locations on a monthly basis. See Appendix 1, Map 3 for pest animal control locations.

Feral red deer (*Cervus elaphus*) and fallow deer (*Dama dama*) are present in low numbers across the landscape. These deer species can significantly damage forest understory and composition through selective browsing. Deer, rabbits and hares will be controlled by the landowner with Greater Wellington providing ongoing advice and technical support if required.

7.3 Stock exclusion and fencing

A farm track is being maintained for stock movement through the KNE site. All fencing maintenance is the responsibility of the landowner.

7.4 Revegetation

A small programme of enrichment replanting will be carried out each year throughout the KNE site. This will be carried out by the landowner with approximately 70 eco-sourced plant species provided by Greater Wellington.

8. Operational plan

The operational plan shows the actions planned to achieve the stated objectives for the Strang's Bush KNE site, and their timing and cost over three-year period from 1 July 2018 to 30 June 2021. The budget for the 2019/20 and 2020/21 years are indicative only and subject to change.

Table 2: Three year operational plan for the Strang's Bush KNE site

| Objective | Threat | Activity | Operational area | Delivery | Description/detail | Target | Timetable and resourcing | | |
|-----------|------------------|-------------------------|------------------|---|--|--|--------------------------|------------------|------------------|
| | | | | | | | 2018/19 | 2019/20 | 2020/21 |
| 1 | EW-1, 2, 3 | Ecological weed control | Whole KNE | GW Biosecurity department | Weed control will target old man's beard, English ivy, aluminium plant and Darwin's barberry | No more than 10m ² of each target species remaining in the KNE site each year | \$6,000 | \$6,000 | \$6,000 |
| 1 | PA-1, 2, 3, 4, 5 | Pest animal control | Whole KNE | GW Biosecurity department | Bait stations and kill-traps serviced on a monthly basis | Possums < 5% RTC* Rats < 10% TTI** | \$4,000 | \$4,000 | \$4,000 |
| 1 | PA-7, 9 | Pest animal control | Whole KNE | Landowner | Control rabbits, hares and deer as required and funded by the landowner | Rabbits, hares, deer and pigs controlled as required and records kept | Nil [‡] | Nil [‡] | Nil [‡] |
| 1 | EW-1, 2, 3 | Revegetation | Whole KNE | GW Biodiversity department Landowner | Approximately 70 eco-sourced plants planted each year, supplied by GW and planted by the landowner with guidance from GW | Survival target of 70% in year one | \$750 | \$750 | \$750 |
| | | | | | | Total | \$10,750 | \$10,750 | \$10,750 |

[‡]Costs incurred by landowner

*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.

9. Funding summary

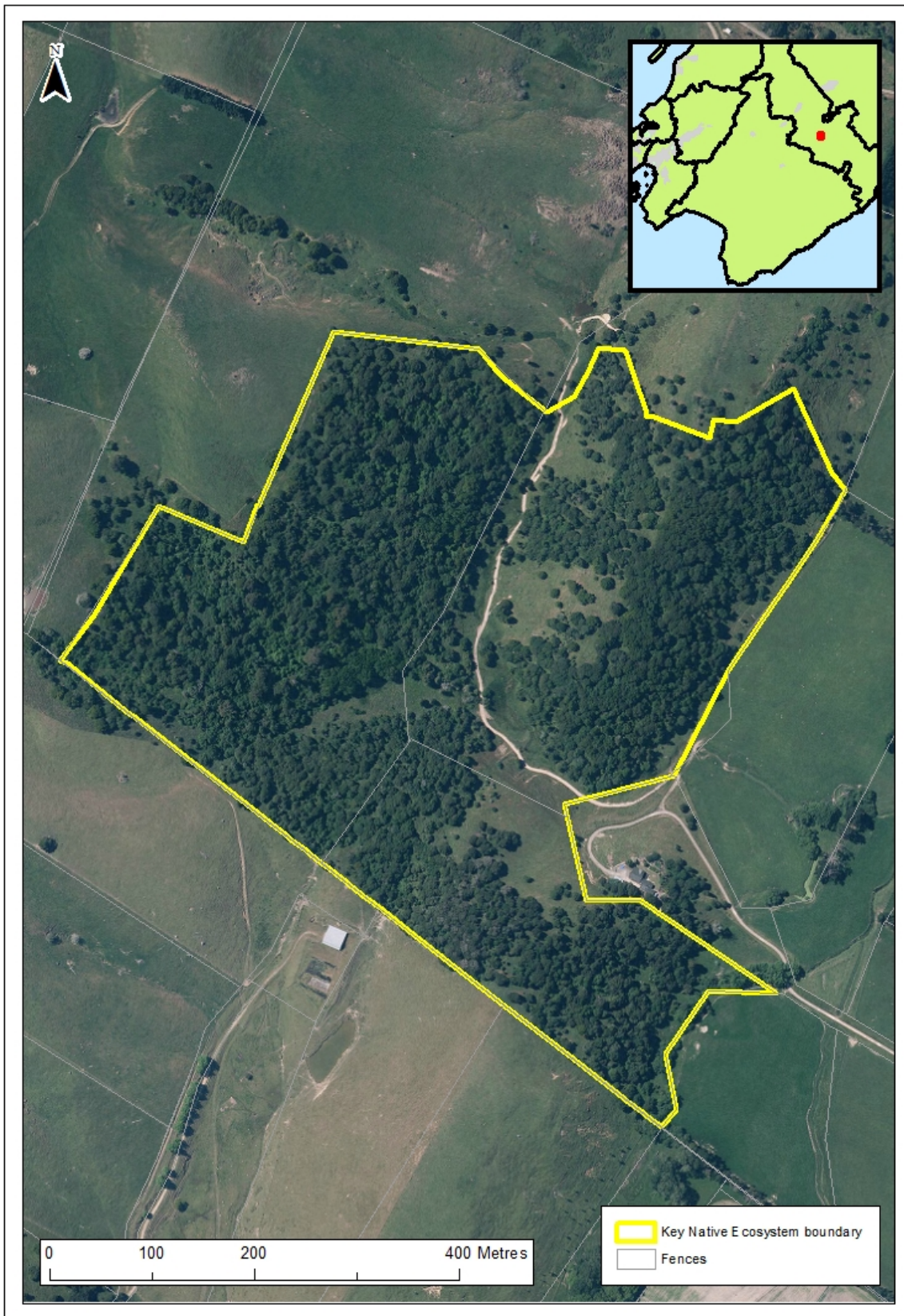
9.1. Greater Wellington budget

The budget for the 2019/20 and 2020/21 years are indicative only and subject to change.

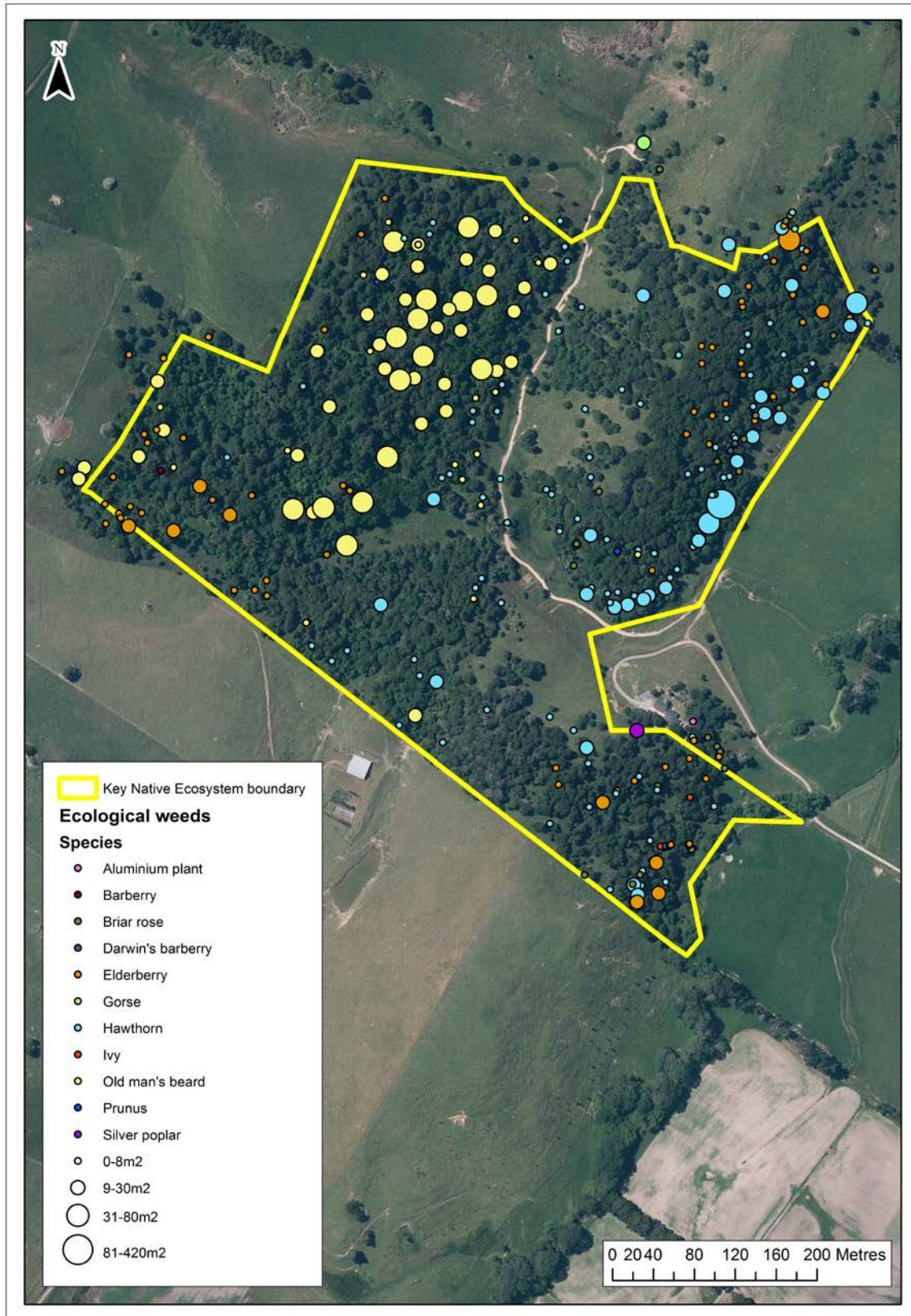
Table 3: Greater Wellington allocated budget for the Strang's Bush KNE site

| Management activity | Timetable and resourcing | | |
|-------------------------|--------------------------|-----------------|-----------------|
| | 2018/19 | 2019/20 | 2020/21 |
| Ecological weed control | \$6,000 | \$6,000 | \$6,000 |
| Pest animal control | \$4,000 | \$4,000 | \$4,000 |
| Revegetation | \$750 | \$750 | \$750 |
| Total | \$10,750 | \$10,750 | \$10,750 |

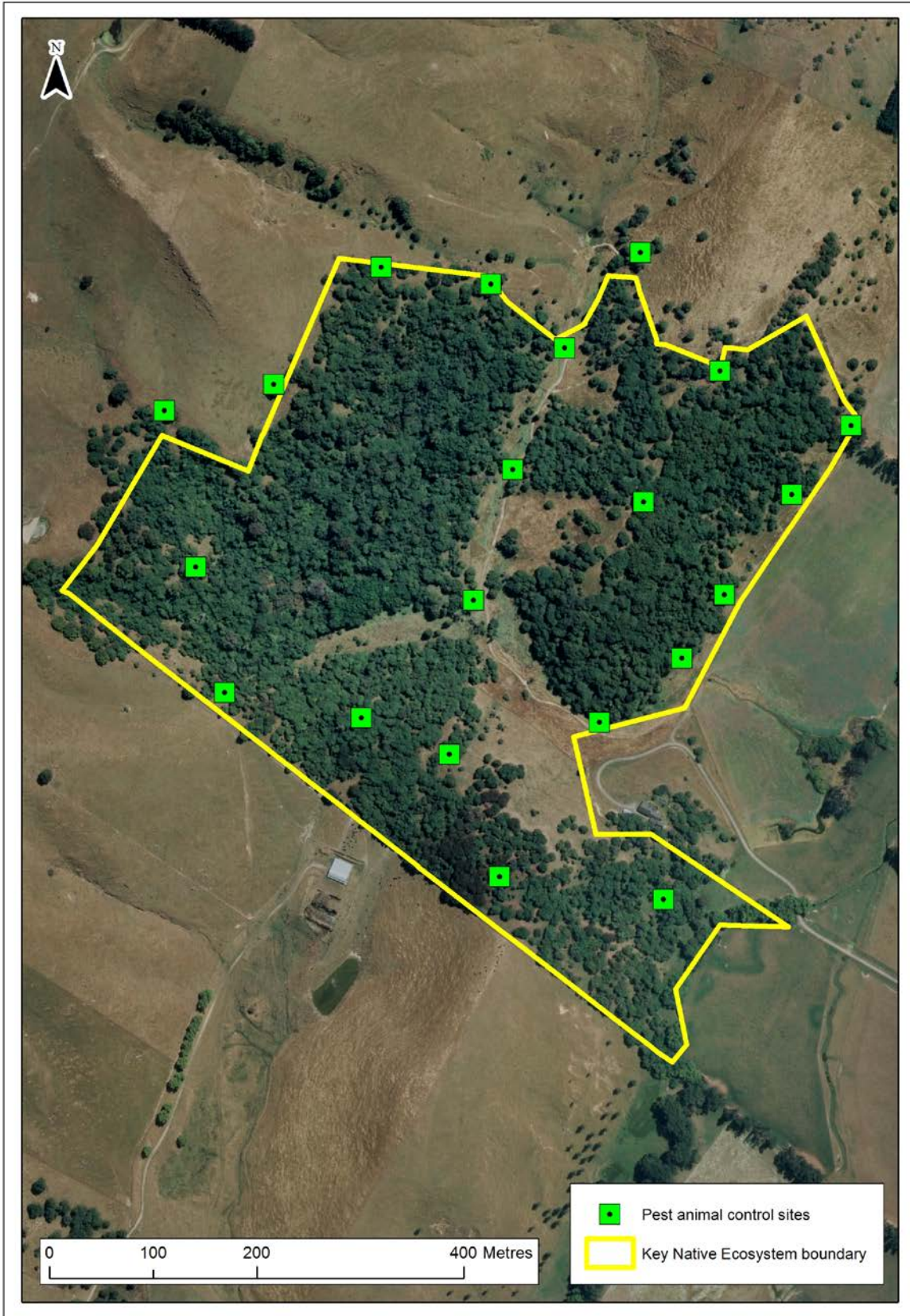
Appendix 1: Site maps



Map 1: Strang's Bush KNE site boundary



Map 2: Strang's Bush KNE site ecological weed distribution map (2013)



Map 3: Pest animal control in the Strang's Bush KNE site

Appendix 2: Threatened species list

The New Zealand Threat Classification System lists species according to their threat of extinction. The status of each species group (plants, reptiles, etc) is assessed over a five-year cycle⁴⁰. Species are regarded as Threatened if they are classified as Nationally Critical, Nationally Endangered or Nationally Vulnerable. They are regarded as At Risk if they are classified as Declining, Recovering, Relict or Naturally Uncommon. The following table lists Threatened and At Risk species that are resident in or regular visitors to the Strang's Bush KNE site.

Table 4: Threatened and At Risk species at the Strang's Bush KNE site

| Scientific name | Common name | Threat status | Source |
|--------------------------------------|-----------------------|------------------------------------|----------------------------------|
| Plants(vascular)⁴¹ | | | |
| <i>Rytidosperma merum</i> | Slender bristle grass | Threatened - Nationally Vulnerable | Enright et al 2014 ⁴² |
| Birds⁴³ | | | |
| <i>Anthus novaeseelandiae</i> | New Zealand pipit | At Risk - Declining | Marilyn Strang pers comm. 2014 |

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The Greater Wellington Regional Council's purpose is to enrich life in the Wellington Region by building resilient, connected and prosperous communities, protecting and enhancing our natural assets, and inspiring pride in what makes us unique

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