

Key Native Ecosystem Operational Plan for Fensham

2022-2027



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1. Purpose

The purpose of the five-year Key Native Ecosystem (KNE) Operational Plan for Fensham KNE site is to:

- Identify the parties involved
- Summarise the ecological values and identify the threats to those values
- Outline the vision and objectives to guide management decision-making
- Describe operational activities to improve ecological condition (eg, ecological weed control) that will be undertaken, who will undertake the activities and the allocated budget

KNE Operational Plans are reviewed every five years to ensure the activities undertaken to protect and restore the KNE site are informed by experience and improved knowledge about the site.

This KNE Operational Plan is aligned to key policy documents that are outlined below (in Section 2).

2. Policy Context

Under the Resource Management Act 1991 (RMA)¹ Regional Councils have responsibility for maintaining indigenous biodiversity, as well as protecting significant vegetation and habitats of threatened species.

The KNE programme funding is allocated for under The Greater Wellington Long Term Plan (2021-2031)² and is managed in accordance with The Greater Wellington Biodiversity Strategy³ that sets a framework for how Greater Wellington protects and manages biodiversity in the Wellington region. Goal One of the Biodiversity Strategy - *Areas of high biodiversity value are protected or restored* - drives the delivery of the KNE Programme.

Other important drivers for the KNE programme include the Proposed Natural Resources Plan⁴, the Regional Pest Management Plan 2019-2039⁵ and Toitū Te Whenua Parks Network Plan⁶.

3. The Key Native Ecosystem Programme

The KNE Programme is a non-regulatory programme. The programme seeks to protect some of the best examples of original (pre-human) ecosystem types in the Wellington region. Sites with the highest biodiversity values have been identified and prioritised for management.

KNE sites are managed in accordance with five-year KNE plans prepared by Greater Wellington's Biodiversity department. Greater Wellington works with the landowners, mana whenua and other operational delivery providers to achieve mutually beneficial goals.

KNE sites can be located on private or publicly owned land. Any work undertaken on private land as part of this programme, it is at the discretion of landowners, and their involvement in the programme is entirely voluntary. Involvement may just mean allowing work to be undertaken on that land. Land managed by the Department of Conservation (DOC) is generally excluded from this programme.

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

4. Fensham Key Native Ecosystem site

The Fensham KNE site is a 45.6-hectare area composed of primary and regenerating beech/podocarp forest and wetlands 3.5km north-west of Carterton in the Mangatarere Stream catchment. The site takes its name from the Royal Forest and Bird Protection Society (Forest & Bird) reserve which makes up the majority of the KNE site, while two neighboring landowners also contribute to the KNE site. Much of the KNE site is publicly accessible and serves as a significant local recreation site. A long history of conservation management has led to high floral diversity within the site and surrounding pasture is being retired and returned to native vegetation. There is considerable public volunteer activity performing trail maintenance and ecological restoration at the Fensham site.

5. Parties involved

There are many organisations, groups and individuals that play important roles in the care of the KNE site.

5.1. Landowners

The main landowner of Fensham KNE site is the Royal Forest and Bird Protection Society (Forest & Bird) who own 40 ha, of which 9 ha is primary forest, 3 ha is wetlands, and 28 ha is regenerating forest. The history of the reserve began in 1943 when 55 ha of forest and pastoral land was gifted to Forest & Bird in John Fensham's will. It stipulated that the 9 ha of primary forest be preserved and that the reserve be named after him. The remaining pastoral land was to be leased for grazing to support his four sisters and in 1978 the land was passed to Forest & Bird. Two further parcels of land on the south-eastern boundary were gifted by neighbouring landowners to Forest & Bird in 2013. Forest & Bird are supportive of the KNE plan and Forest & Bird volunteers are responsible for most of the pest plant and animal control within this section of the KNE.

The remaining 10.8 ha of the KNE site is owned by two private landowners: Aidan Bichan (Zabell Farms Ltd) and Graeme Bell (see Appendix 1, Map 2 for landowner boundaries). These areas are contiguous with and extend out from the Forest & Bird reserve into surrounding farmland and all are fenced and retired from grazing. The Bichan blocks include remnant and regenerating forest, grassland, and wetlands. Aidan Bichan is fully supportive of the plan and is already carrying out a programme of weed and animal pest control and revegetation, based on a management plan drafted in 2015 and updated in 2020. Graeme Bell's property contains remnant and regenerating forest on the boundary with the Forest & Bird reserve. He is supportive of the KNE plan.

5.2. Operational delivery

Within Greater Wellington, two departments are responsible for delivering the Fensham KNE operational plan.

The Biodiversity department is the overarching lead department for Greater Wellington on the longer term planning and coordination of biodiversity management activities and advice within the KNE site. The Biodiversity department's KNE budget funds the Biosecurity department to coordinate and implement pest control activities at the KNE site.

The Fensham Group is a locally coordinated group of volunteers that operate under the auspices of the Forest & Bird Society and conduct weed control, animal pest control and monitoring, track maintenance, and revegetation within the Forest & Bird property.

Parts of the Fensham KNE site are covered by QEII covenants (see Appendix 1, Map 3), and QEII have previously assisted with weed control within these covenants on a biennial basis.

6. 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.

6.1. Ecological designations

Table 1, below, lists ecological designations at all or part of the Fensham KNE site.

Table 1: Designations at the Fensham KNE site

Designation level	Type of designation
Regional	Parts of the Fensham KNE site are designated under GW's Proposed Natural Resources Plan (PNRP) as ecosystems and habitats with significant indigenous biodiversity (Schedule F) ⁷ : <ul style="list-style-type: none"> • Waiohine River and all tributaries (habitat for indigenous fish species of conservation interest; Schedule F1) • Fensham and Cobden Bush and Wetland (significant natural wetland; Schedule F3)
District	Parts of the Fensham KNE site are designated as Reserve in the Wairarapa Combined District Plan ⁸
Other	Parts of the KNE are under a QEII covenant (5-07-769, 5-07-353). Parts of the KNE have been identified as a DOC recommended area for protection ⁹ .

6.2. Ecological significance

The Fensham KNE site is considered regionally important 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
- It contains high levels of ecosystem **diversity**, with several ecosystem types represented within the KNE site boundary, including several naturally uncommon ecosystems
- Its **ecological context** is valuable at the landscape scale as it contains a variety of inter-connected habitats and, provides core/seasonal habitat for threatened indigenous plant, bird, reptile and fish species within the KNE site

Representativeness

The Singers and Rogers¹⁰ classification of pre-human forest vegetation of the KNE site predicts a mixed forest composition of predominantly black beech forest (MF5), with small areas of kahikatea, pukatea forest (WF8) and tōtara, tītoki forest (MF1) in the north-west end of the KNE (see Appendix 1, Map 4). Only 57.3%, 1.1%, and 4.1% of MF5, WF8, and MF1 forest respectively remains of the original extent in the Wellington region¹¹.

The Threatened Environment Classification system¹² defines ecosystem and habitat threat categories nationally based on percentage indigenous cover remaining. Land in the Fensham KNE site in the two highest threat categories: Category 1 and Category 2.

This means there is less than 10% or 10-20%, respectively, of original cover of indigenous vegetation remaining on these types of land in New Zealand.

Rarity/distinctiveness

The New Zealand Threat Classification System¹³¹⁴¹⁵ lists four plant, one bird, two reptile and one fish species as nationally Threatened or At Risk within the KNE site. One plant, two bird, and three reptile species present in the KNE site have also been listed as regionally threatened. Nationally Threatened species are listed in Appendix 2 and regionally threatened species in Appendix 3.

Diversity

The KNE site is composed of several ecosystem types, including a variety of distinct forest and wetland ecosystems.

Ecological context

The Fensham KNE site comprises a diverse, contiguous, and highly interconnected set of ecosystems which makes it valuable for regional biodiversity at the habitat and species level. This includes benefits for forest and wetland birds, lizards, invertebrates, and terrestrial and aquatic plants. Proximity to the Tararua forest may allow for seasonal bird migration and reciprocal bird-mediated plant dispersal, increasing ecological function.

6.3. Ecological features

Vegetation communities and plants

Fensham contains mature and regenerating black beech (*Nothofagus solandri*), kahikatea (*Dacrycarpus dacryoides*), pukatea (*Laurelia novae-zelandiae*), tōtara (*Podocarpus totara*), and tītoki (*Alectryon excelsus*). Other plants present that are uncommon in the ecological district include swamp maire (*Syzygium maire*), rimu (*Dacrydium cupressinum*), red beech/tāwhairāunui (*Nothofagus fusca*), rōhutu (*Lophomyrtus obcordata*), ramarama (*Lophomyrtus bullata*) and small-leaved milk tree/tūrepo (*Streblus heterophyllus*)¹⁶.

Two species of mistletoe have been translocated to the Forest & Bird reserve and are still present, having likely occurred here naturally in the past: yellow-flowered mistletoe (*Alepis flavida*) which is in decline nationally and planted here in 2012, and green or small-flowered mistletoe (*Ileostylus micranthus*) which is in gradual decline in the region and planted here in 2009¹⁷.

Species

Birds

Native birdlife includes New Zealand falcon/karearea (*Falco novaeseelandiae*), New Zealand kingfisher/kotare (*Todiramphus sanctus*), New Zealand pigeon/kererū (*Hemiphagus novaeseelandiae*), tūi (*Prothemadera novaeseelandiae*), bellbird (*Anthornus melanura*), fantail (*Rhipidura fuliginosa*), grey warbler (*Gerygone igata*), silvereye (*Zosterops lateralis*) and shining cuckoo (*Chrysococcyx lucidus*), paradise shelduck (*Tadorna variegata*), swamp harrier (*Circus approximans*), pukeko (*Porphyrio melanotus*), spur-winged plover (*Vanellus miles*), and welcome swallow (*Hirundo neoxena*)¹⁸.

Reptiles

Reptiles observed include Ngahere gecko (*Mokopirirakau* 'southern North Island'), copper skink (*Oligosoma aeneum*), Raukawa gecko (*Woodworthia maculata*), barking gecko (*Naultinus punctatus*), and northern grass skink (*Oligosoma polychroma*)^{19,20}.

Fish

The Fensham and Cobden Bush wetlands are home to the endemic brown mudfish/waikaka (*Neochanna apoda*)²¹.

7. Threats to ecological values at the KNE site

Ecological values can be threatened by human activities, and by introduced animals and plants that change 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. Appendix 4 presents a summary of all known threats to the Fensham KNE site.

7.1. Key threats

The main threats to the ecological values of Fensham KNE site are ecological weeds and introduced predators and browsers.

Old man's beard (*Clematis vitalba*), English ivy (*Hedera helix*) and Japanese honeysuckle (*Lonicera japonica*) are the most ecologically-damaging pest plants found in this KNE site.

Pest animals are present throughout the KNE site and are known to damage native vegetation and prey on native animals. Pest animals known to be present include possums (*Trichosurus vulpecula*), mustelids (*Mustela* spp.), Ship and Norway rats (*Rattus* and *R. norvegicus*), mice (*Mus musculus*), hedgehogs (*Erinaceus europaeus*), feral cats (*Felis catus*), and rabbits (*Oryctolagus cuniculus*).

8. Vision and objectives

8.1. Vision

A healthy mosaic of wetlands and diverse forest providing habitat to support thriving populations of native animals and plants.

8.2. Objectives

The following objectives will guide the operational activities at the Fensham KNE site.

1. Protect and enhance the forest biodiversity by protecting native species

2. Protect wetland biodiversity values

3. Protect and encourage the regeneration of rare and threatened native species populations

9. Operational activities

Operational activities are actions to achieve the set objectives.

Operational activities are targeted to work towards the objectives above (Section 8). The broad approach to operational activities is described briefly below, and specific actions, with budget figures attached, are set out in the operational delivery schedule (Section 11, Table 4).

9.1. Ecological weed control

The aim of ecological weed control undertaken at the KNE site is to limit the impact of ecological weed species to maintain the existing native biodiversity values present and facilitate the natural functioning and regeneration of the native ecosystems.

Greater Wellington will undertake surveillance and control of high priority weeds such as old man's beard and wilding pines annually, focusing on the Bichan and Bell properties. If required, Greater Wellington will also assist the Fensham Group to control gorse (prior to revegetation), holly, wilding pines and any other high priority species found within the reserve area. Greater Wellington's Biodiversity Advisor will coordinate weed reports between Greater Wellington Biosecurity teams and Fensham Group to ensure comprehensive monitoring and reduce operational overlap.

The Fensham Group carries out regular surveillance in the Forest & Bird reserve and controls high priority species like gorse, holly and old man's beard. Following the felling of mature pines on the site, Fensham Group has been controlling emergent pine seedlings and regrowth. The Fensham Group will work to control any incursions into the KNE site from the neighbouring gardens and properties such as old man's beard, tradescantia and elaeagnus.

Aidan Bichan of Zabell Farms Ltd carries out regular weed control work on his property with support from QEII, targeting species such as old man's beard and wilding pines.

9.2. 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 control is currently in place (see Appendix 1, Map 5) using a range of management methods.

Within the KNE site, the Forest & Bird Fensham Group volunteers services 45 Sentry bait stations on a monthly basis for the control of possums and rodents, with bait supplied by Greater Wellington.

The Greater Wellington Biosecurity department services 16 DOC250/Timms trap stations 12 times annually, targeting mustelids, feral cats, and hedgehogs.

Aidan Bichan of Zabell Farms Ltd has several bait stations and traps on his property (included in Map 5) that are regularly serviced, with bait supplied by Greater Wellington.

Possum numbers are likely to be low across the landscape following long-term suppression (starting in 2008) and recent regional ground control work (2019-2021) by OSPRI's TBfree programme²². The GWRC Regional Possum Predator Control Programme is scheduled to begin long-term possum suppression in the area surrounding the Fensham KNE site in 2022.

Rabbit control (by poison bait and night shooting) is conducted by Greater Wellington Biosecurity staff on an intermittent timeframe according to local rabbit population density and available budget.

9.3. Revegetation

The aim of revegetation work is to increase the extent of native forest cover and prevent the ingress of ecological weed species.

The Fensham Group has a restoration and development programme as part of their Fensham Reserve Management Plan (2000). They have identified various areas of surrounding pasture that will be retired from grazing and replanted with natives (including the block gifted in 2013). Plants are grown by Forest & Bird and a nearby nursery from eco-sourced seeds and planted each winter. They also want to continue the reintroduction of rare or threatened native plant species.

Both Fensham Group and Aidan Bichan have expressed intentions to continue revegetation along riparian areas on the northwestern and southeastern edges of the KNE site²³, and Greater Wellington will support the planning of this work if required. Other previously-planted areas such as the wetlands in the north will be infilled with new and replacement plants by Forest & Bird.

9.4. Small mammal monitoring

The Fensham Group undertakes small mammal monitoring (quarterly for rodents and six-monthly for mustelids/hedgehogs) in the KNE site. The Tracking Tunnel Index (TTI) method is used to monitor the presence of small mammal species. The results of this monitoring will provide an indication of the effectiveness of the pest animal control network. This monitoring was briefly suspended due to COVID-19 lockdown restrictions, but Forest & Bird intend to resume monitoring in 2022.

Fensham Group also plans to undertake bioacoustics monitoring for bats in the coming years, utilizing loaned equipment from Greater Wellington. Greater Wellington Environmental Science department funds and assists the Fensham Group with these activities.

10. Operational delivery schedule

The operational delivery schedule shows the actions planned to achieve the stated objectives for the Fensham KNE site, and their timing and cost over the five-year period from 1 July 2022 to 30 June 2027. The budget for years 2023/24 to 2026/27 are indicative only and subject to change and adjusted for inflation in accordance with the Long Term Plan. Operational areas are defined on Appendix 1 – Map 6.

Table 2: Five-year operational plan for the Fensham KNE site

Objective	Activity/Actions	Operational area (see Map 6)	Intended outcome	Implementing party	Annual budget and sourcing
1	Ecological Weed Control	A	Suppress and control invasive weeds within forest ecosystems	GWRC Biosecurity	\$1,500
1,2	Ecological weed control	B	Suppress and control invasive weeds	Forest & Bird Volunteers	Forest & Bird funded and supported by volunteer effort
3	Pest animal control	Entire KNE	Service kill-traps on a two-monthly basis Possums <5% RTC*, Rats <10% TTI**	GWRC Biosecurity	\$5,800
3	Pest animal control	B	Service bait station network Possums <5% RTC*, Rats <10% TTI**	Forest & Bird Volunteers	Bait provided by GWRC from pest animal budget (above) and serviced by Forest & Bird volunteers
3	Pest animal control	D	Suppress and control rabbit populations on an intermittent basis	GWRC Biosecurity	Subject to funding availability and population density
1, 2, 3	Revegetation	D	Introduce threatened species and encourage natural ecosystem regeneration	Forest & Bird, Aidan Bichan	Private funding and independent timetable
1, 3	Small mammal monitoring	B, C	Yearly mammal density report	Forest & Bird volunteers	Privately funded

*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

11. Funding contributions

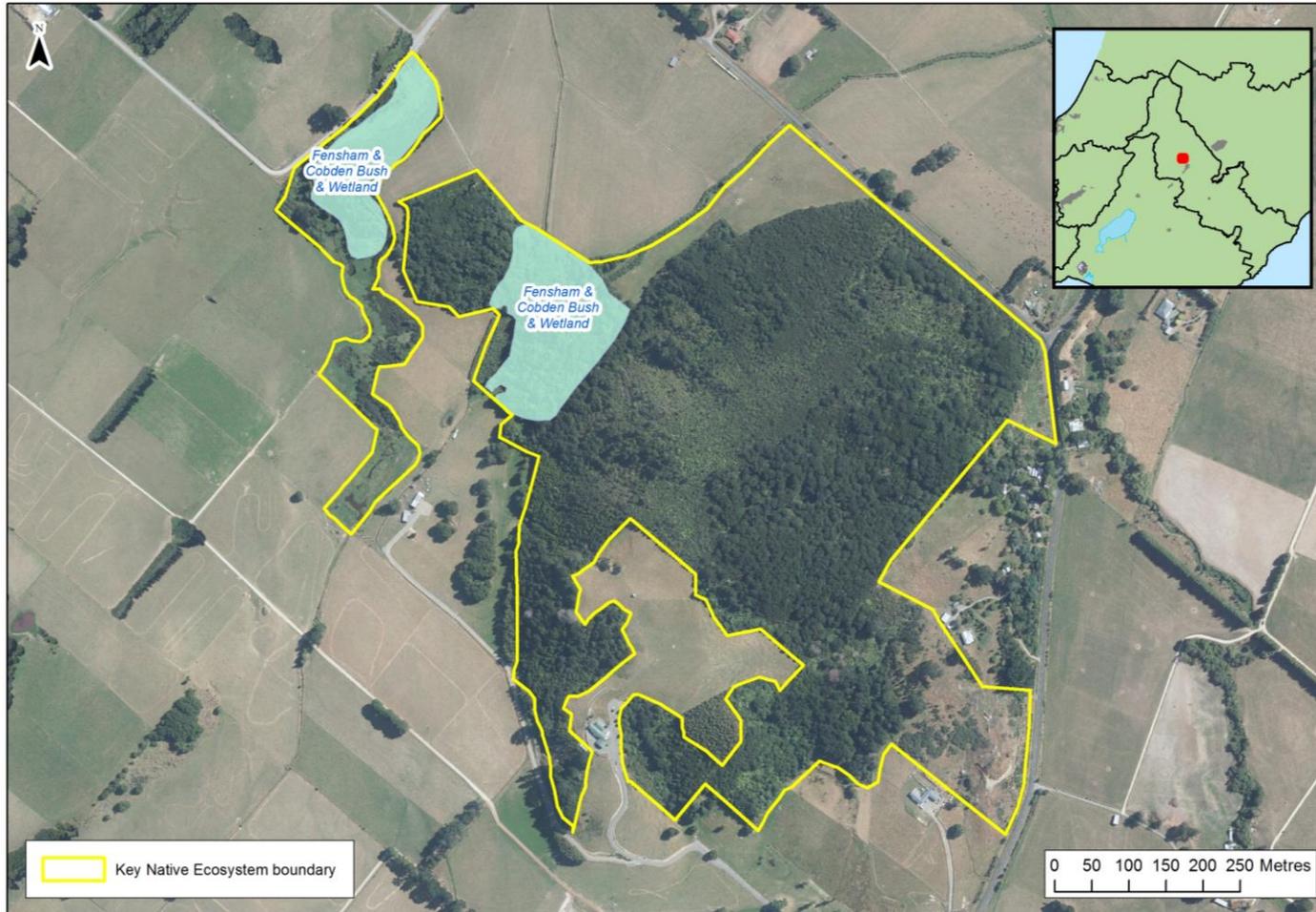
11.1. Budget allocated by Greater Wellington

The budget for the years 2023/24 through 2026/27 are indicative only and subject to change.

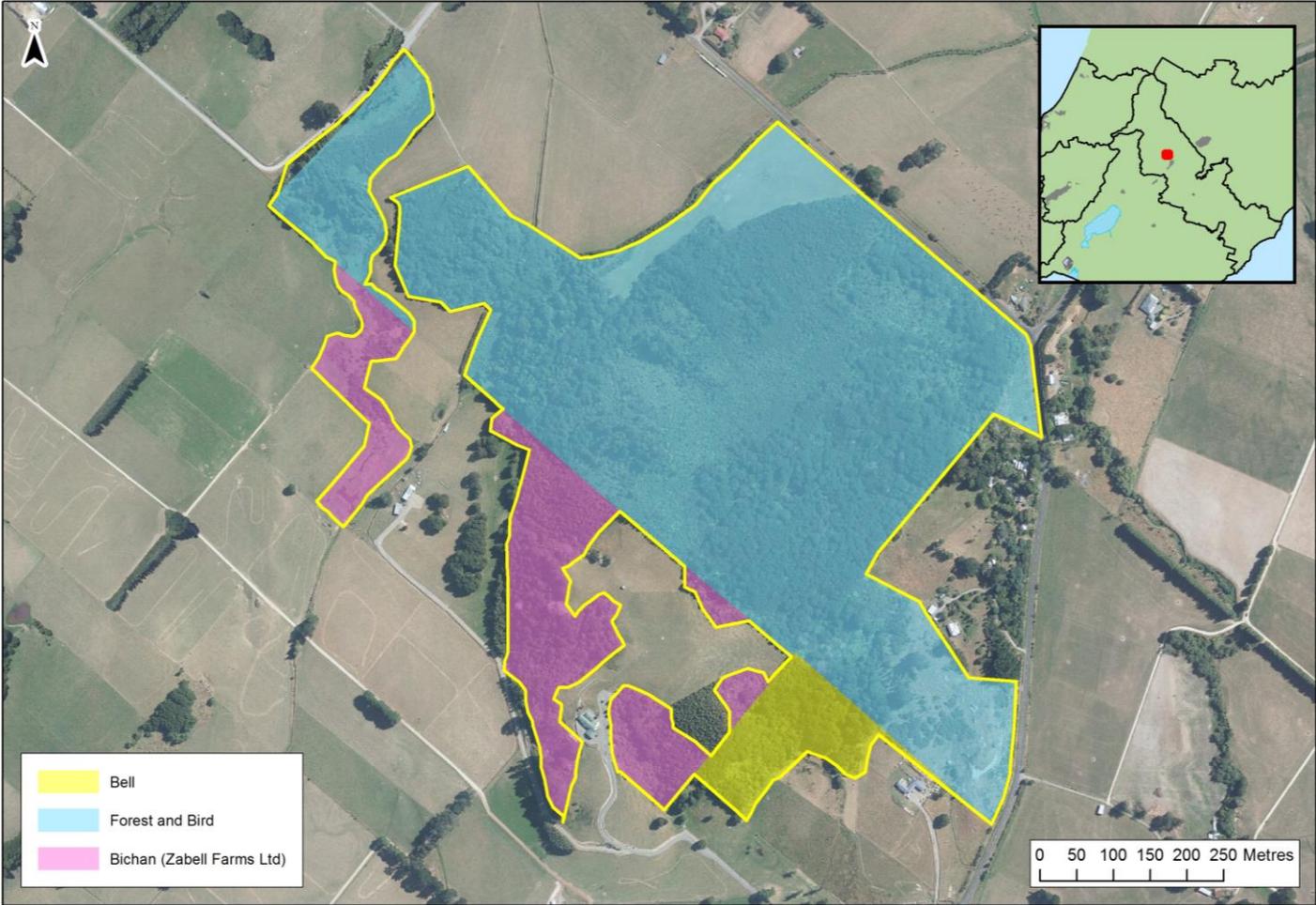
Table 3: Greater Wellington allocated budget for the Fensham KNE site

Management activity	Timetable and resourcing
Ecological weed control	\$1,500
Pest animal control	\$5,800
Total	\$7,300

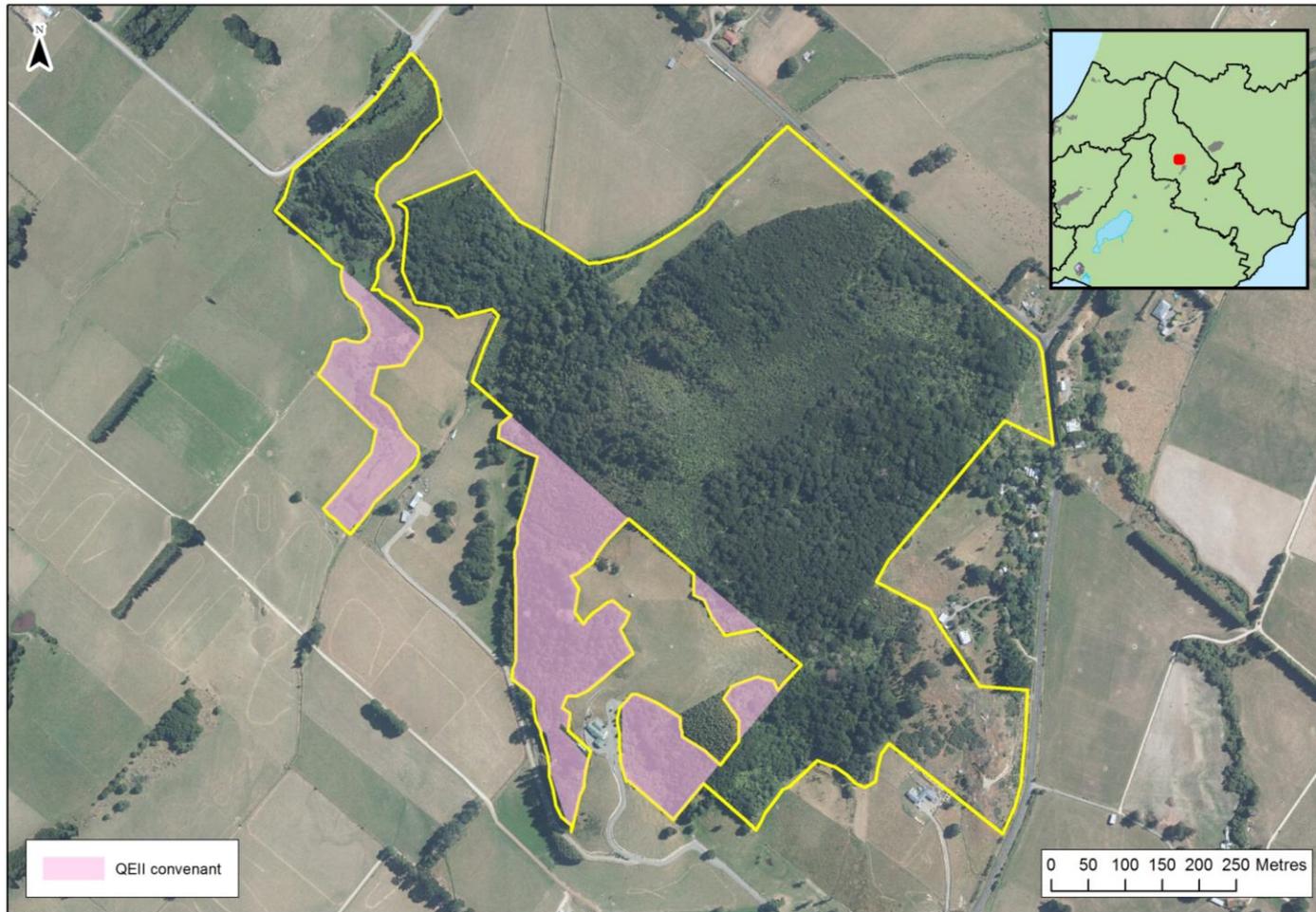
Appendix 1: Site maps



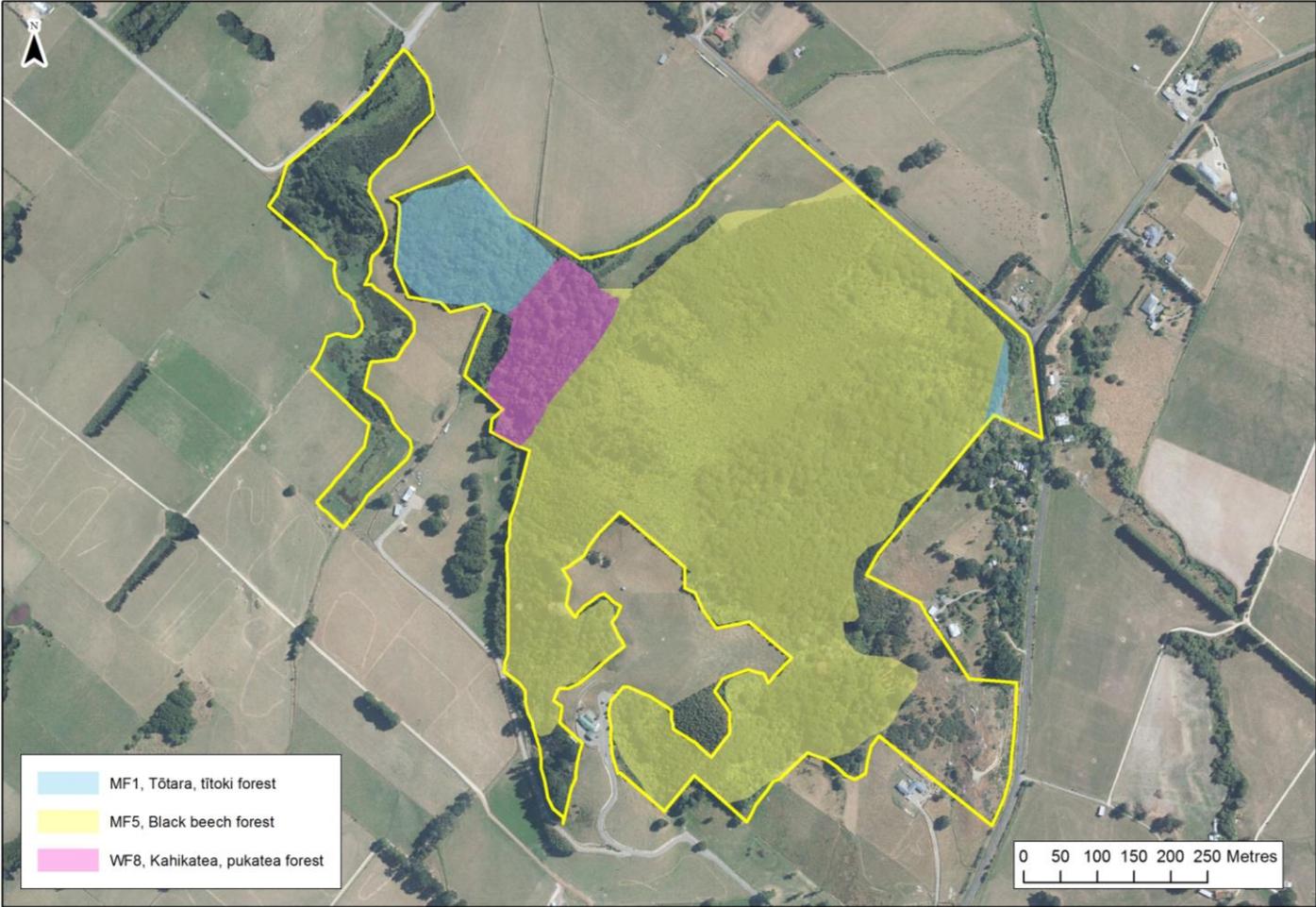
Map 1: The Fenham KNE site boundary, showing the location of wetlands



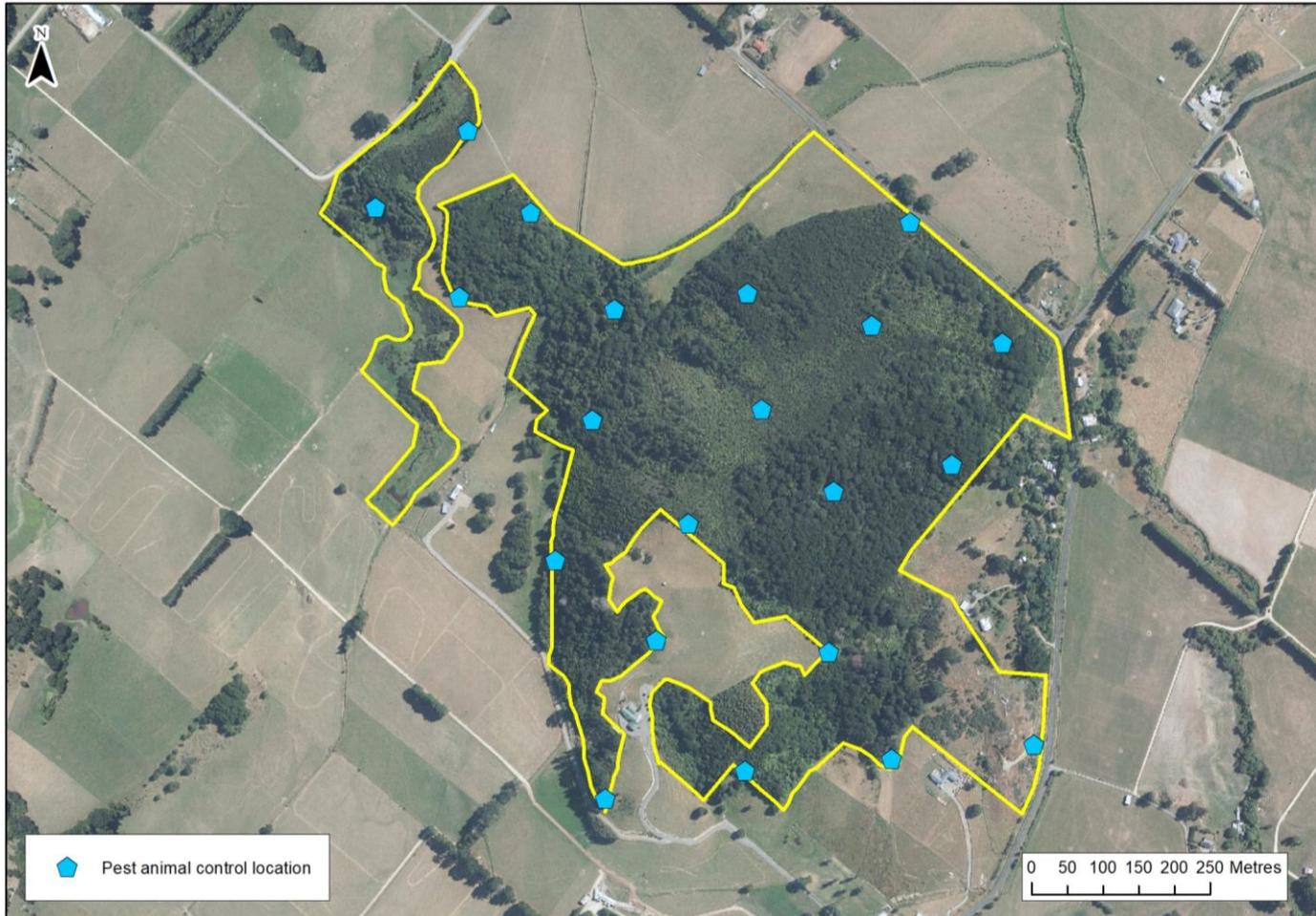
Map 2: Land ownership for the Fensham KNE site



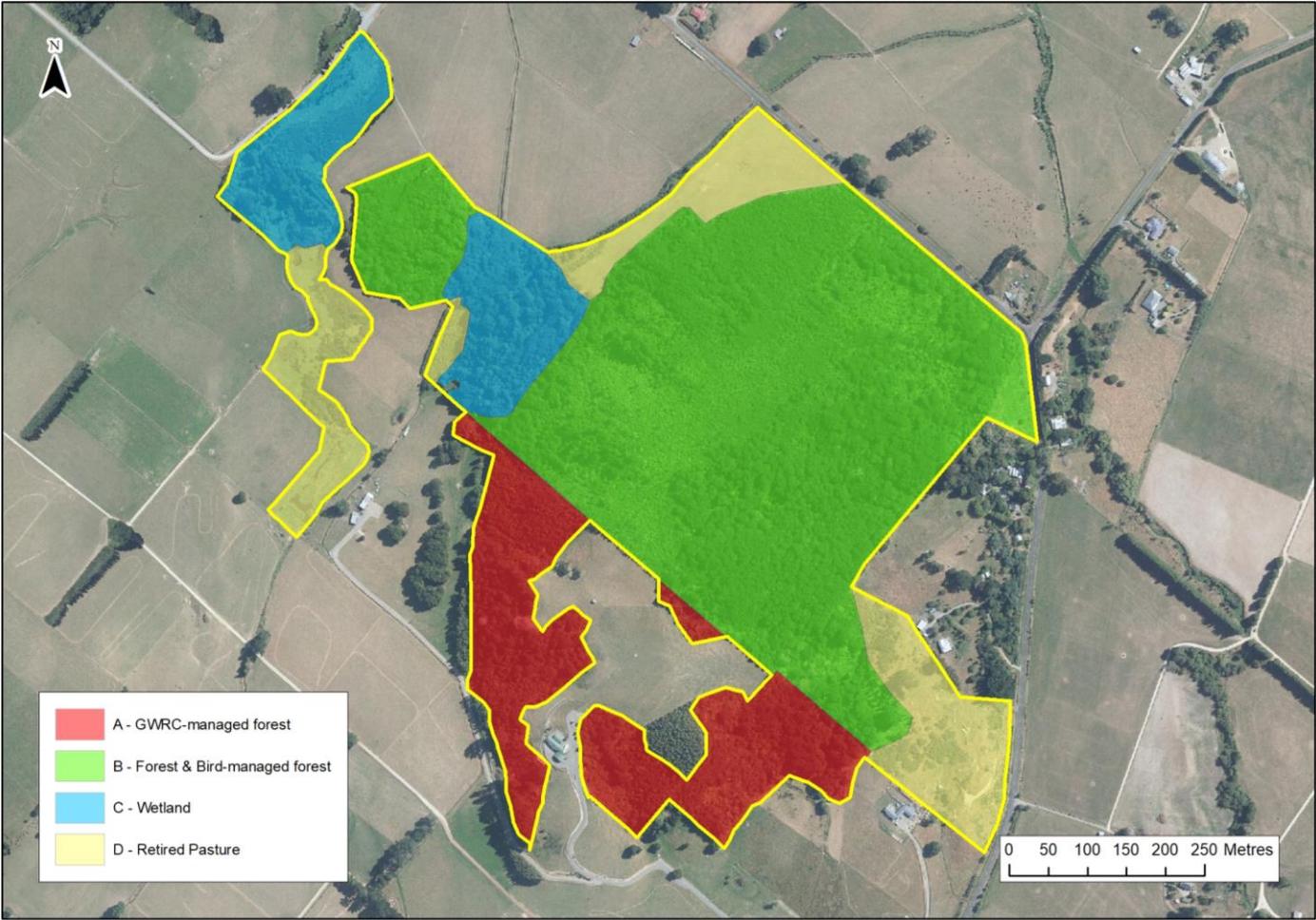
Map 3: QEII covenants in the Fensham KNE site



Map 4: Existing forest types in the Fensham KNE site



Map 5: Pest control locations in the Fensham KNE site



Map 6: Operational Areas in the Fensham KNE site

Appendix 2: Nationally threatened species list

The New Zealand Threat Classification System (NZTCS) lists species according to their threat of extinction. The status of each species group (plants, reptiles, etc.) is assessed over a five-year cycle. 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 Uncommon²⁴²⁵²⁶. The following table lists Threatened and At Risk species that are resident in, or regular visitors to, the Fensham KNE site.

Table 4: Nationally Threatened and At Risk species at the Fensham KNE site

Scientific name	Common name	Threat status	Observation
Plants(vascular)²⁷			
<i>Alepis flavida</i>	Yellow-flowered mistletoe	At Risk – Declining	Thompson T 2013, 2015 ²⁸
<i>Lophomyrtus obcordata</i>	Rōhutu	Threatened – Nationally Critical	Sawyer et al. 1997
<i>Lophomyrtus bullata</i>	Ramarama	Threatened – Nationally Critical	Sawyer 1997 ²⁹
<i>Syzygium maire</i>	Swamp maire	Threatened – Nationally Critical	Sawyer et al. 1997
Birds³⁰			
<i>Falco novaeseelandiae ferox</i>	Karearea; BushFalcon	At Risk – Recovering	French, C. 2020 ³¹
Reptiles³²			
<i>Mokopirirakau</i> ‘southern North Island’	Ngahere gecko	At Risk – Declining	White, P. 2000. F&B Management Plan ³³
<i>Naultinus punctatus</i>	Barking gecko	At Risk – Declining	Bell, T. 2018 ³⁴
Freshwater fish³⁵			
<i>Neochanna apoda</i>	Waikaka; brown mudfish	At Risk – Declining	Bell, T. 2017 ³⁶

Appendix 3: Regionally threatened species list

In addition to NZTCS status, Greater Wellington assesses species conservation status at a regional level. The following table lists regionally threatened species that have been recorded in the Fensham KNE site.

Table 5: Regionally threatened species recorded in the Fensham KNE site

Scientific name	Common name	Threat status	Observation
Plants ³⁷			
<i>Alepis flavida</i>	Yellow-flowered mistletoe	Threatened – Critical	Thompson, T. 2013, 2015
Birds ³⁸			
<i>Falco novaeseelandiae</i>	Karearea; New Zealand Falcon	Threatened – Critical	French, C. 2020
<i>Hemiphaga novaeseelandiae</i>	New Zealand Pigeon	At Risk – Recovering	French, C. 2020
Reptiles ³⁹			
<i>Mokopirirakau</i> 'southern North Island'	Ngahere gecko	At Risk – Declining	White, 2000. F&B Management Plan
<i>Naultinus punctatus</i>	Barking gecko	Threatened – Vulnerable	Bell, T. 2018
<i>Oligosoma aeneum</i>	Copper skink	Threatened – Critical	Bell, T. 2018

Appendix 4: Threat table

Table 6: Threats to the Fensham KNE site

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
Ecological weeds		
EW-1	Ground covering ecological weeds smother and displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key ground covering ecological weed species for control include tradescantia (<i>Tradescantia fluminensis</i>) and perennial nettle (<i>Urtica dioica</i>). (see full list in Appendix 5)	Entire KNE
EW-2	Woody weed species displace native vegetation, inhibit indigenous regeneration, and alter vegetation structure and composition. Key woody ecological weed species include gorse (<i>Ulex europaeus</i>), wilding conifers (<i>Pinus</i> spp. and <i>Cupressus macrocarpa</i>), holly (<i>Ilex aquifolium</i>), hawthorn (<i>Crataegus monogyna</i>), common barberry (<i>Berberis glaucocarpa</i>), cotoneaster (<i>Cotoneaster glaucophyllus</i>), Spanish heath (<i>Erica lusitanica</i>), elaeagnus (<i>Elaeagnus reflexa</i>) and elderberry (<i>Sambucus nigra</i>). (see full list in Appendix 5)	Entire KNE
EW-3	Climbing weeds smother and displace native vegetation often causing canopy collapse, inhibit indigenous regeneration, and alter vegetation structure and composition. Key climbing ecological weed species include old man's beard (<i>Clematis vitalba</i>), Japanese honeysuckle (<i>Lonicera japonica</i>) and English ivy (<i>Hedera helix</i>). (see full list in Appendix 5)	Entire KNE
Pest animals		
PA-1	Possums (<i>Trichosurus vulpecula</i>) browse palatable canopy vegetation until it can no longer recover ^{40,41} . This destroys the forest's structure, diversity and function. Possums may also prey on native birds and invertebrates ⁴²	Entire KNE
PA-2*	Rats (<i>Rattus</i> spp.) browse native fruit, seeds and vegetation. They compete with native fauna for food and can reduce forest regeneration. They also prey on invertebrates, lizards and native birds ^{43,44}	Entire KNE
PA-3	Mustelids (stoats ^{45,46} (<i>Mustela erminea</i>), ferrets ^{47,48} (<i>M. furo</i>) and weasels ^{49,50} (<i>M. nivalis</i>)) prey on native birds, lizards and invertebrates, reducing their breeding success and potentially causing local extinctions	Entire KNE
PA-4	Hedgehogs (<i>Erinaceus europaeus</i>) prey on native invertebrates ⁵¹ , lizards ⁵² and the eggs ⁵³ and chicks of ground-nesting birds ⁵⁴	Entire KNE

Threat code	Threat and impact on biodiversity in the KNE site	Operational area/location
PA-5*	House mice (<i>Mus musculus</i>) 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 ^{55,56}	Entire KNE
PA-6*	Pest and domestic cats (<i>Felis catus</i>) prey on native birds ⁵⁷ , lizards ⁵⁸ and invertebrates ⁵⁹ , reducing native fauna breeding success and potentially causing local extinctions ⁶⁰	Entire KNE
PA-7	Rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus europaeus</i>) graze on palatable native vegetation and prevent natural regeneration in some environments ⁶¹ . 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 forest areas browsing and reducing regenerating native seedlings	Entire KNE
PA-8	Wasps (<i>Vespula</i> spp.) adversely impact native invertebrates and birds through predation and competition for food resources. They also affect nutrient cycles in beech forests ⁶²	Entire KNE
Human activities		
HA-1	Agricultural practices, particularly grazing livestock can result in pugging soils, grazing native vegetation inhibiting regeneration, wildlife disturbance and increasing nutrient content of soils and watercourses ⁶³	KNE site edges
HA-2*	Recreational use such as tramping, mountain biking and horse riding can cause damage and disturbance of the native ecosystem. It is also likely to disturb native fauna and introduce ecological weeds	Forest & Bird
HA-3	Land use activities that alter the local hydrology, such as development schemes and sub-divisions can affect the water levels that sustain wetland ecosystems.	Entire KNE
Other threats		
OT-1	Small forest remnants are affected by environmental impacts on their edges such as 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) ^{64,65}	Entire KNE
OT-2	Fires caused by deliberate acts and uncontrolled campfires can quickly spread and burn large areas of vegetation and threaten buildings and assets.	Entire KNE

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

Appendix 5: Ecological weed species

The following table lists key ecological weed species that have been recorded in the Fensham KNE site by Greater Wellington biosecurity staff and Forest & Bird volunteers.

Table 7: Ecological weed species recorded in the Fensham KNE site

Scientific name	Common name	Level of Distribution	Management Aim
<i>Berberis glaucocarpa</i>	Common Barberry	Localised and sparse	Suppression
<i>Clematis vitalba</i>	Old man's beard	Widespread and sparse	Suppression
<i>Cotoneaster glaucophyllus</i>	Cotoneaster	Localised and sparse	Suppression
<i>Crataegus monogyna</i>	Hawthorn	Localised and sparse	Suppression
<i>Cupressus macrocarpa</i>	Wilding Cypress	Localised and sparse	Eradication
<i>Elaeagnus reflexa</i>	Elaeagnus	Localised and sparse	Suppression
<i>Erica lusitanica</i>	Spanish heath	Localised and sparse	Eradication
<i>Hedera helix</i>	English ivy	Localised and sparse	Suppression
<i>Ilex aquifolium</i>	Holly	Localised and sparse	Suppression
<i>Lonicera japonica</i>	Japanese honeysuckle	Localised and sparse	Suppression
<i>Pinus</i> spp.	Wilding Pines	Localised and sparse	Eradication
<i>Sambucus nigra</i>	Elderberry	Localised and sparse	Suppression
<i>Tradescantia fluminensis</i>	Tradescantia	Localised and sparse	Suppression
<i>Ulex europaeus</i>	Gorse	Localised and sparse	Suppression
<i>Urtica dioica</i>	Perennial nettle	Localised and sparse	Suppression

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