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# OPERATIONAL PLAN REPORT 2021/22

REGIONAL PEST MANAGEMENT  
PLAN 2019-2039



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# **1. Introduction**

## **1.1 Background**

Greater Wellington Regional Council (Greater Wellington, or, 'GW') biosecurity activities involve the control of unwanted plants and animals for environmental, economic, social and cultural reasons:

- **Environmental**

Many of New Zealand's native plants and animals cannot co-exist with introduced species. In areas of high biodiversity value, pest plants and pest animals need to be controlled to protect vulnerable ecosystems.

- **Economic**

The impact of pest plants and pest animals leads to considerable economic loss in many of New Zealand's primary industries. Pest management is essential to the success of industries such as agriculture.

- **Social**

Pest organisms create a range of social problems within our communities. Pest plants and pest animals cause a considerable nuisance in many aspects of rural and urban life, inhibiting the ability of people to enjoy their property, lifestyle and wellbeing.

- **Cultural**

Activities carried out under the Greater Wellington Regional Pest Management Plan 2019-2039 (the RPMP) provide for the protection of the relationship between Māori and their ancestral lands, waters, sites, wahi tapu and taonga, and the protection of those aspects from the adverse effects of pests.

The RPMP was prepared in accordance with the Biosecurity Act 1993 and became operative on 2 July 2019.

## **1.2 Purpose of this Operational Plan Report**

This document reports against the achievements and outcomes of GW's biosecurity related activities. The work programme was set by the RPMP Operational Plan 2021/22 and aligns with the GW Annual Plan, which sets overall priorities and work programmes for the organisation.

Implementation of the RPMP requires resources. Our obligation to the community is to ensure these resources are used as efficiently and effectively as possible. This report provides some detail regarding how and where those resources were applied in the 2021/22 year.

The report is structured in two parts and should be read in conjunction with the RPMP Operational Plan 2021/22:

Part One - Pest Animals

Part Two - Pest Plants

## 2. Pest Animals

### 2.1 Programme results

Across the Wellington region, a significant amount of work went into pest animal control and the protection of new native revegetation plantings.

Pest animal control work reduces predator numbers and grazing impacts from targeted herbivores on native ecosystems, productive land and restoration plantings. Maintaining low numbers of pest animals helps the recovery of native and exotic plants and ground cover. This has positive impacts on ecosystem health and carbon sequestering ability in both the short and long term.

This work contributes to the objectives of Greater Wellington’s 2015 Climate Change Strategy to mitigate emissions and encourage climate change adaptation. The improvements to ecosystem health and carbon storage protection directly assist in ameliorating climate change impacts. Catchment resilience to the now inevitable increasing severity of climate change impacts is improved.

The following section uses data from several sources, including the website ‘[Trap.NZ](#)’ where many volunteer groups record results. The data covers a range of sites including Territorial Local Authority (TLA) reserve sites we have worked on, Key Native Ecosystem (KNE) and Wetland Programme sites, GW regional parks, GW forestry areas, Predator Free Wellington areas and the Pūkaha/Mt Bruce buffer.

We are grateful to the numerous dedicated volunteers who put in many hours over the year, checking traps and bait stations. They made an impact on pest numbers around the region and have helped to safeguard some of our more vulnerable native species.

Appendix 1 summarises the toxins used in the course of our work.

#### 2.1.1 Wallaby (*Macropus rufogriseus*, *Macropus eugenii*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>In late winter 2021 a dead Bennett’s wallaby (<i>Macropus rufogriseus</i>) was found shot on State Highway 2 at Kaitoke, which instigated an incursion response. This original animal may have been brought back from the South Island and dumped.</p> <p>A month later another wallaby sighting in the Kaitoke area was reported. This time a small population of dama wallabies were discovered.</p> <p>We worked with the Ministry of Primary Industries (MPI) throughout this response.</p> <p><b>Monitoring</b></p> <p>We set up an intensive surveillance regime including day inspections, eDNA water testing, night searches and trail camera installations, and responded to many other potential sightings in this area.</p>				

Between surveillance and reports from the public we determined that there were further live wallabies in the area.

Droppings were collected for DNA analysis. By comparing analysis of droppings against the animals we found, we could determine whether any other wallabies were still in the area.

Further surveillance will continue with dogs and cameras for some time.

**Control**

Bait stations were installed for control purposes and an indicator dog was used to search the area. Between November 2021 and May 2022 five dama wallabies were killed.

**2021/22 programme summary**

Five dama wallabies killed, and a surveillance program established.

2.1.2 Rook (*Corvus frugilegus*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Rooks are a resilient and tenacious species with the ability to quickly expand in numbers in the absence of programmed control.</p> <p><b>Monitoring</b></p> <p>Staff surveyed 111 historic rookeries across the Wairarapa by helicopter, finding only 10 active rookeries. All were relatively small in population size.</p> <p>Two rookeries were abandoned when we returned to undertake baiting, so were disregarded for control purposes. In the remaining eight active rookeries we counted 26 ‘active’ rook nests (holding eggs or chicks). While this is less rookeries than last year, there were more rooks and nests.</p> <p>Using the accepted industry method for estimating population size (see <a href="http://www.bionet.nz">www.bionet.nz</a> publication A6), it is estimated that the Wellington region has 117 rooks present, most of which are thought to be male and will eventually die out without breeding.</p> <p>In the mid 1990’s we were recording almost 900 active nests across the region. Currently, there are no breeding rookeries in the Wellington/Kāpiti Coast area and very few nests in Wairarapa.</p> <p>There were no instances of arable crop damage by rooks reported to GW in the past year. This is a significant achievement showing the merit of the current rook control methodology.</p> <p><b>Control</b></p> <p>In late October 2021, seven rookeries were visited for aerial baiting with 4 kg of toxic bait applied to a total of 69 nests, of which 21 contained eggs or chicks and 48 were empty (refer Map 1). One active rookery that had at least five nests holding eggs was missed from baiting this season due to access issues.</p>				

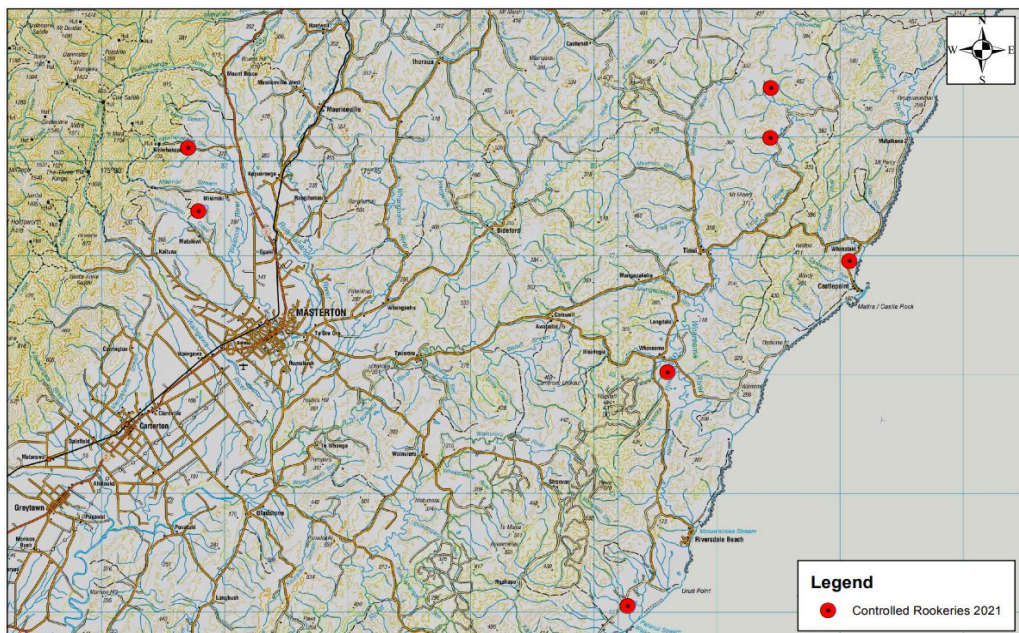
Nests were treated by placing gel bait (DRC 1339, also referred to as Starlicide) directly into nests by hand application from a crewman suspended beneath a helicopter. Fresh but unused nests were also treated in the hope that rooks would enter them and make contact with the gel toxin.

Poisoning nests targets females as they incubate the eggs. Male rooks build nests and it is thought that most of the unused nests we found may not have had a female bird present to lay eggs in them. Horizon’s Regional Council has described the same phenomenon occurring at many of their rookeries over the past few seasons.

See Graph 1 for control results over time.

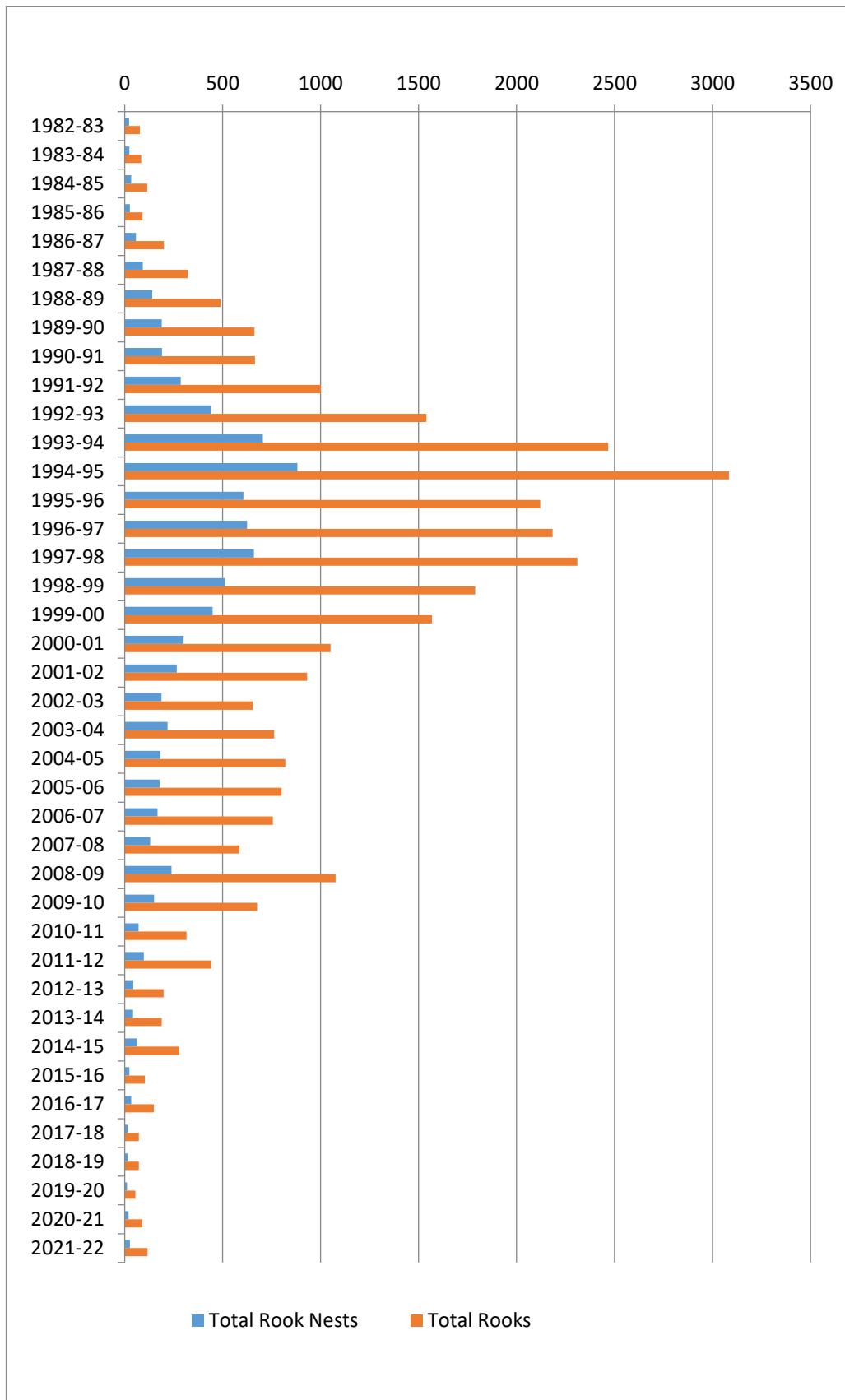
**2021/22 programme summary**

Toxic bait applied to 69 nests (21 containing eggs or chicks and 48 empty nests – one more active nest than in 2020/21).



**Map 1: Rookeries treated in October 2021**

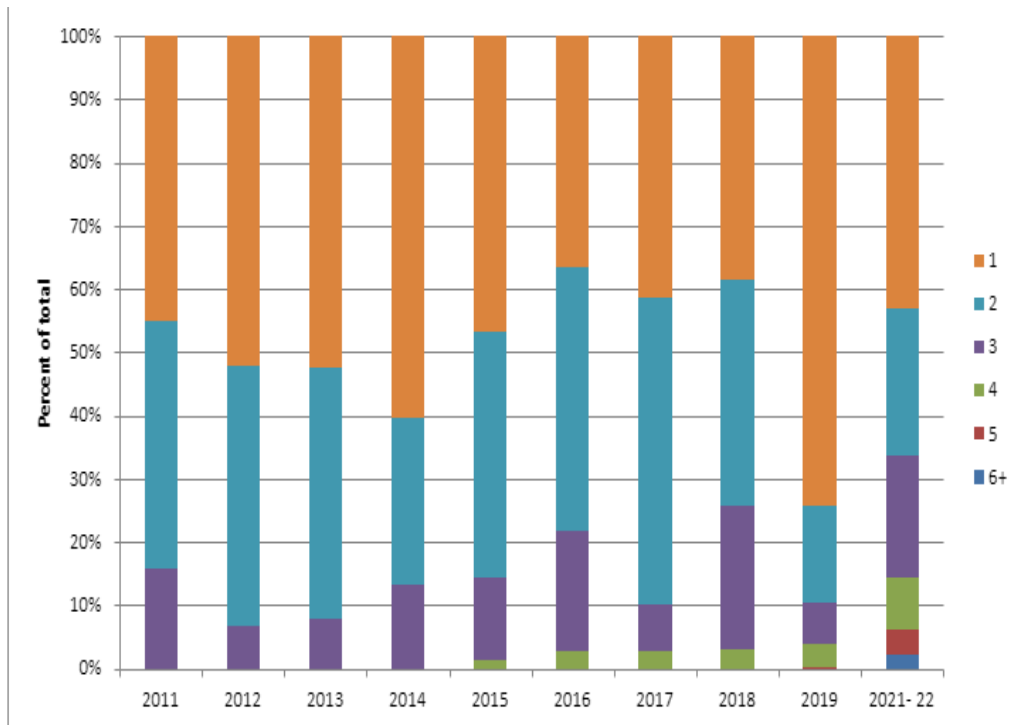




**Graph 1: Historical records of the number of rook nests controlled and number of rooks**

2.1.3 Feral rabbit (*Oryctolagus cuniculus*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Rabbit numbers have increased in the Wellington region over the past few years. Urban parks provide ideal habitat for feral rabbits due to mown grass where they feed, dense vegetation for cover and limited disturbance at night. There is concern that high numbers of rabbits not only damages native plants but may also lure predators such as stoats and ferrets into an area.</p> <p>We control rabbits using several methods, including poisoning with toxic Pindone carrots, burrow fumigation and shooting. In spring when there are high numbers of baby rabbits and fresh grass growing, shooting and fumigation are more effective control methods than toxic baiting which is used the rest of the year.</p> <p><b>Monitoring</b></p> <p>Following a few years without monitoring, we monitored rabbit densities around the region in May and June, using kilometre night counts for the first time, to establish baseline data. This is a method consistently used around New Zealand. Results need to be analysed over the long term to determine whether rabbit populations are decreasing, increasing or stable.</p> <p>There was an average of 1.1 rabbit per kilometre along the Te Awakairangi/Hutt River (very low levels), and 9.9 rabbits per kilometre along the Waikanae River (relatively low numbers but with patches where rabbit numbers are higher).</p> <p>We also used the Modified McLean Scale (See Appendix 2). In areas of concern where Level 5 was scored (or close it it), we followed up with the occupiers to implement control measures.</p> <p><b>Control</b></p> <p>Where Level 5 of the Modified McLean Scale is reached, the landowner is informed that they need to reduce their rabbit numbers, and we work through how to achieve this with them. We provide a cost recovery service if the landowner doesn't have the ability to do the work. No enforcement action was required this year.</p> <p>There was high demand for Pindone carrot operations to control rabbits. We applied 2,850kg of pindone carrot bait to both public and private properties. Often the enquiries we received were for large areas of land or where one landowner is co-ordinating on behalf of a group of neighbours. This is an approach we have encouraged as it brings about a better control result than by treating individual properties haphazardly.</p> <p>In the last year rules have changed around Pindone Handler certificates. These are now valid for a five year period and allow bait to be laid on the ground, which may account for the significant reduction in enquiries we received.</p> <p>We undertook night shooting for Hutt City Council (5 sites), Kāpiti Coast District Council (11 sites), Upper Hutt City Council (2 sites) and Wellington City Council (32 sites) and killed 2216 rabbits.</p> <p><b>2021/22 programme summary</b></p> <p>211 rabbit related enquiries received, compared to 745 during 2020/21.</p> <p>2,850kg of Pindone carrot bait applied.</p> <p>2216 rabbits shot for TLA's.</p>				



**Graph 2: Modified McLean Scale comparison of rabbit densities over time**

2.1.4 Wasps (common wasp – *Vespula vulgaris*, German wasp – *V. germanica*, Australian paper wasp – *Polistes humilis*, Asian paper wasp – *P.chinensis*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Members of the public who contacted us were given advice on how to manage problem wasp nests or were referred to a pest control contractor.</p> <p><b>2021/22 programme summary</b></p> <p>Fourteen enquiries were received, compared to 42 in 2020/21.</p>				



**Image 1: Treated wasp nest**

2.1.5 European hedgehog (*Erinaceus europaeus occidentalis*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led																		
<p>Hedgehogs are one of the targets of our predator control in Key Native Ecosystem (KNE) sites, especially when lizards and vulnerable ground nesting birds are known to be present.</p> <p>At Baring Head/Ōrua-pouanui regular servicing of our trap network contributes to the protection of nesting dotterel (12 nests produced eight fledgelings this year*) and lizard species (monitoring indicates an increase in northern grass skinks. The Raukawa gecko population seems relatively stable but copper skink numbers remain quite low**).</p> <p>In most other areas hedgehogs are by-kill in traps that prevent the predators we are targeting being caught. Therefore, alternative ways to reduce hedgehog numbers such as night shooting with thermal imaging or finding ways to exclude them from traps are helpful.</p> <p><b>Monitoring</b></p> <p>Small mammal monitoring occurs twice a year at five KNE sites. Table 1 below gives the results as percentages of all tracking tunnels in the monitoring area in which hedgehog prints were found in. We can maintain relatively low densities where we trap, but there is constant reinvasion into these areas.</p> <p><b>Table 1: Hedgehog tracking rates</b></p> <table border="1"> <thead> <tr> <th>Site</th> <th>November 2021</th> <th>February 2022</th> </tr> </thead> <tbody> <tr> <td>Wainuiomata Mainland Island</td> <td>0%</td> <td>3.8%</td> </tr> <tr> <td>WMI non-treatment area</td> <td>0%</td> <td>2.6%</td> </tr> <tr> <td>East Harbour Northern Forest Mainland Island</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>EHNF non-treatment area</td> <td>12%</td> <td>12%</td> </tr> <tr> <td>Baring Head/Ōrua-pouanui</td> <td>5%</td> <td>5%</td> </tr> </tbody> </table> <p>More information is available here: <a href="#">Key Native Ecosystem Programme - Small Mammal Monitoring   Greater Wellington Regional Council (gw.govt.nz)</a></p> <p><b>Control</b></p> <p>We trapped 2,255 hedgehogs over the year, between TLA sites, KNE sites, GW Parks and forestry areas. In addition, Predator Free Wellington trapped 274 hedgehogs, and 438 hedgehogs were trapped in the buffer area at Pūkaha/Mt Bruce.</p> <p><b>2021/22 programme summary</b></p> <p>2,967 hedgehogs trapped, compared to 3,429 in 2020/21.</p> <p>* McArthur, N. and Jones, P. 2022. Eastbourne - Wainuiomata tūturiwhatu / banded dotterel monitoring report for the 2021-2022 breeding season. Unpublished report, Mainland Island Restoration Organisation, Eastbourne.</p> <p>** Goldwater, N. 2020. Northern Spotted Skink Population Monitoring at Baring Head/Ōrua-pouanui, East Harbour Regional Park, Wellington. Contract Report No. 5595, Wildland Consultants Ltd.</p>					Site	November 2021	February 2022	Wainuiomata Mainland Island	0%	3.8%	WMI non-treatment area	0%	2.6%	East Harbour Northern Forest Mainland Island	0%	0%	EHNF non-treatment area	12%	12%	Baring Head/Ōrua-pouanui	5%	5%
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EHNF non-treatment area	12%	12%																				
Baring Head/Ōrua-pouanui	5%	5%																				

2.1.6 Feral deer (fallow deer – *Dama dama*, Red deer – *Cervus elaphus*, Sika – *C. nippon.*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Forest and Bird (<a href="#">New Report: Climate Crisis Fuelled Further by Introduced Pests   Forest and Bird</a>) estimate that the combined effect of invasive herbivores on native ecosystems is the equivalent of approximately 3.1 million tonnes of carbon dioxide per year.</p> <p>The effects of selective browsing by deer in native forest directly influence ecosystem processes such as nutrient cycling, soil carbon and nitrogen storage.*</p> <ul style="list-style-type: none"> <li>• Sika deer can survive on low quality forage, so at high densities they can have severe impacts on forest regeneration.**</li> <li>• Red and fallow deer at high densities both impact on regeneration of forest canopy species, and at lower densities will impact on regeneration of preferred broadleaved subcanopy trees.***</li> </ul> <p>Wild deer in New Zealand are carriers of bovine Tuberculosis, which they can catch from possums, and because they can survive infected for over a decade, this is a significant issue for the eradication of bovine Tb.</p> <p><b>Monitoring</b></p> <p>Photo points were monitored for the second time at key Hutt City Council (HCC) sites to assess vegetation recovery over time. There is little or no change since 2020.</p> <p>The observations of our staff are that deer numbers in the environment are higher this year, due to reinvasion from areas with no control or hunting pressure.</p> <p>Ungulate monitoring (deer and goats) is a part of our terrestrial ecology monitoring. More information is available here: <a href="#">Ungulates &amp; lagomorphs monitoring   2014/21 Terrestrial ecology monitoring   Greater Wellington Regional Council (gw.govt.nz)</a>.</p> <p><b>Control</b></p> <p>On HCC reserves and adjoining properties that provided safe control opportunities we carried out a combination of ground hunting with indicator dogs during the day and night hunting using thermal imaging equipment.</p> <p>Each reserve was assessed, and more time was spent at higher priority sites with high deer numbers. Our staff carried out 42 hours of hunting. Our external contractor carried out 256 hours of hunting – with 36 hours spent targeting pigs around Taita Cemetery and Haywards Reserve, following reports of pigs from the public.</p> <p>Most deer were shot near bush edges, with hinds being a priority for control. The shooter was often confronted by multiple animals in a small space and hinds were chosen over stags where possible to minimise future reproductive output. The first and main priority was safety and on number of occasions, it was not safe to shoot.</p> <p>GW staff began deer control at the Silverstream Landfill. It has been visited on two occasions with nine deer shot. This has been a highly productive site and we expect that this will have significant benefit for the surrounding forest. It is likely this site will continue to draw in deer from the wider area so we will continue to target it.</p>				

The third year of the HCC programme has resulted in the removal of 66 deer (and 10 pigs), which is an increase from the 56 deer and 1 pig in the previous year. The additional animals are likely proportionate to the amount of hunting effort, not an increase in pest numbers. At this stage we are noticing fewer large groups of deer and more localised distribution.

**KNE programme**

Hunting effort in our Regional Parks and other key areas resulted in a further 212 deer shot.

**2021/22 programme summary**

278 deer shot. Refer to Table 2.

\*Nugent G, Forsyth DM (2021) *Cervus elaphus*. In *The Handbook of New Zealand Mammals*. 3<sup>rd</sup> edn. (Eds CM King and DM Forsyth) Family Cervidae, pp 447-527. CSIRO Publishing, Melbourne.

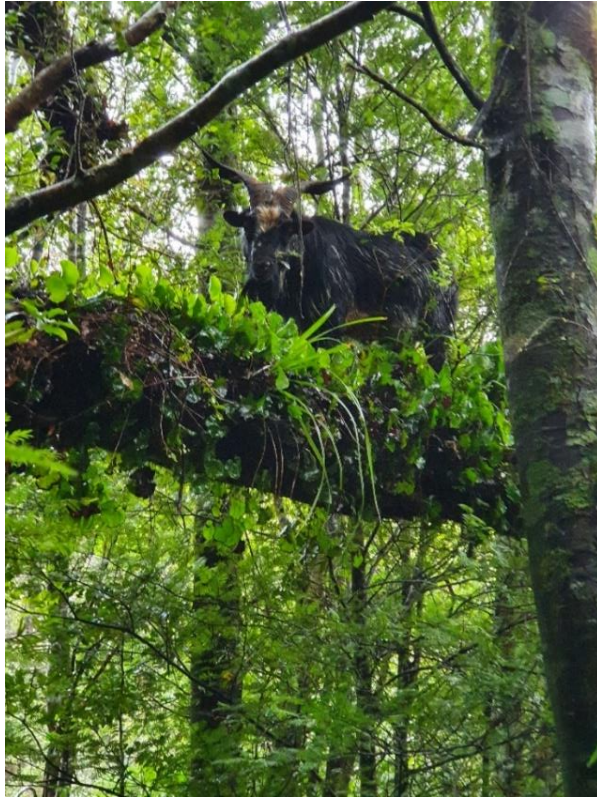
\*\*Nugent G, Speedy C (2021) *Cervus nippon*. In *The Handbook of New Zealand Mammals*. 3<sup>rd</sup> edn. (Eds CM King and DM Forsyth) Family Cervidae, pp 447-527. CSIRO Publishing, Melbourne.

\*\*\* Nugent G, Asher GW (2021) *Dama dama*. In *The Handbook of New Zealand Mammals*. 3<sup>rd</sup> edn. (Eds CM King and DM Forsyth) Family Cervidae, pp 447-527. CSIRO Publishing, Melbourne.

2.1.7 Feral goat (*Capra hircus*)

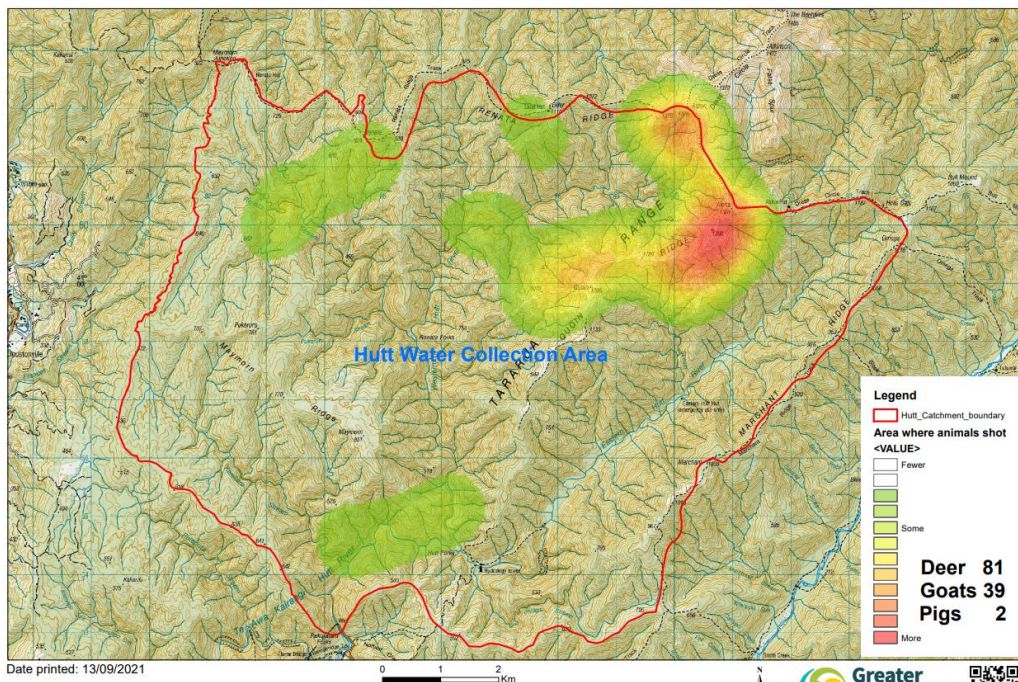
Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>We developed ‘hotspot’ maps to display information that will inform recreational hunters who can then assist us with goat control in high density areas (see Map 2).</p> <p>We have reduced goats to relatively low levels in the centre of the forest areas where we target goats. Around the boundaries of these areas, goats are constantly reinvading. With the resources available we must prioritise between reworking the blocks (see Map 3) with the highest numbers of goats and checking the other blocks within the target areas.</p> <p><b>Monitoring</b></p> <p>No direct monitoring of ungulate abundance was undertaken. However, forest plot monitoring as part of our Tier 2 State of the Environment reporting can be used as proxy for general forest health and condition. More information is available here: <a href="#">Ungulates &amp; lagomorphs monitoring   2014/21 Terrestrial ecology monitoring   Greater Wellington Regional Council (gw.govt.nz)</a></p> <p><b>Control</b></p> <p>We hunted goats in KNE sites, as per our KNE programme and in TLA reserve areas (as agreed with local authorities under our Biosecurity Services programmes). Hunting contractors cover the large forest blocks on a scheduled rotation, and our staff worked in smaller areas. A total of 409 goats were shot.</p> <p>We also assisted the Department of Conservation (DOC), Kiwirail and Waka Kotahi in a joint operation to carry out aerial and ground goat control in the Remutaka Range which saw four mornings of road closures and over 360 animals shot.</p> <p><b>2021/22 programme summary</b></p> <p>409 goats destroyed in the region. Refer to Table 2.</p>				





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Image 2: Goat in a tree, Akatarawa Forest, August 2020

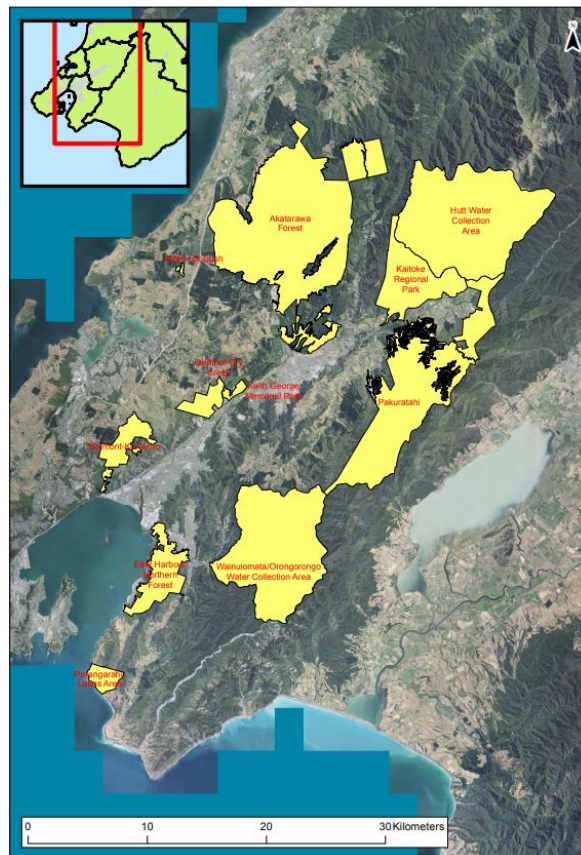


Areas where animals were shot by professional culling team 2020-2021

Map 2: Example of 'hot spot' map developed to assist recreational hunters

**Table 2: 2021/22 Summary of ungulate hunting effort**

Location	Pigs	Deer	Goats	Total
Akatarawa	8	3	79	90
Baring Head/Ōrua-pouanui	0	0	3	3
Belmont Regional Park	0	0	1	1
East Harbour Regional Park	7	7	0	14
Hutt City Council	10	66	0	76
Hutt Water Collection Area	2	40	27	69
Kaitoke Regional Park	0	25	10	35
Keith George Memorial Park	0	0	28	28
Pākuratahi	4	8	94	106
Parangarahu Lakes	1	1	94	96
Wainuiomata-Ōrongorongo	23	10	51	84
Wainuiomata Mainland Island	81	5	3	89
Other	3	113	19	135
<b>Total</b>	<b>134</b>	<b>278</b>	<b>409</b>	<b>826</b>



**Map 3: Key Native Ecosystem programme ungulate hunting areas**



2.1.8 Magpie (*Gymnorhina tibicen tibicen*, *G. tibicen hypoleuca*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Magpie attacks resulted in 13 enquiries from Wairarapa, Upper Hutt, Porirua and Kāpiti for us to deal with the aggressive birds causing the issues. Another 11 enquiries specifically related to loaning magpie traps.</p> <p><b>Control</b></p> <p>A mixture of firearms and trapping are used to control magpies in often very high-risk areas and situations. We loaned out live capture traps to many of the affected people during the nesting season.</p> <p>Outside the nesting season we have reduced the loaning trap service as occupiers can now purchase their own traps. This has allowed us to prioritise other activities.</p> <p><b>2021/22 programme summary</b></p> <p>44 magpie enquiries were received, compared to 142 the previous year.</p>				

2.1.9 Mustelids (ferrets – *Mustela furo*, stoats – *M. erminea*, weasels – *M. nivalis*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led																		
<p>Mustelids are landscape scale predators and as we are trapping such small sites there is constant reinvasion. Where a trap consistently catches mustelids, it may be that the trap is on an immigration pathway.</p> <p>At Baring Head/Ōrua-pouanui KNE site the conservation management actions undertaken during the 2021/22 breeding season, which included the removal of mammalian predators, have greatly increased tūturiwhatu/banded dotterel productivity, improving the chances that this population will continue to persist as a self-sustaining breeding population for the foreseeable future.*</p> <p>During the 2021/22 breeding season, 40 tūturiwhatu/banded dotterel nests were monitored along the Eastbourne – Wainuiomata coastline. Average hatching success among the three sites that were monitored was 41.6 percent, exceeding the annual management target of 40 percent set out in the Eastbourne – Wainuiomata coastline tūturiwhatu/banded dotterel management strategy.*</p> <p><b>Monitoring</b></p> <p>Mustelid monitoring occurs twice a year at several KNE sites as detailed below.</p> <p><b>Table 3: Mustelid tracking rates</b></p> <table border="1"> <thead> <tr> <th>Site</th> <th>November 2021</th> <th>February 2022</th> </tr> </thead> <tbody> <tr> <td>Wainuiomata Mainland Island</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>WMI non-treatment area</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>East Harbour Northern Forest Mainland Island</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>EHNF non-treatment area</td> <td>0%</td> <td>4%</td> </tr> <tr> <td>Baring Head/Ōrua-pouanui</td> <td>0%</td> <td>0%</td> </tr> </tbody> </table>					Site	November 2021	February 2022	Wainuiomata Mainland Island	0%	0%	WMI non-treatment area	0%	0%	East Harbour Northern Forest Mainland Island	0%	0%	EHNF non-treatment area	0%	4%	Baring Head/Ōrua-pouanui	0%	0%
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**Control**

We have now set up trapping networks in all GW managed Wairarapa forests (Tauanui, Hiwinui and Stoney Creek). At Hiwinui forestry area, predator trap servicing is carried out by volunteers, with GW staff managing the other two areas. We also have installed and maintain a trapping network at the Domain, Lake Wairarapa.

Regular servicing and maintenance of existing trap networks was carried out to schedule. We intensify work at certain times of year to coincide with the activities of native species to better protect them. For example, predator control efforts at Wairarapa Moana Wetlands and Boggy Pond are ramped up when bittern are breeding.

**2021/22 programme summary**

328 mustelids trapped compared to 509 in 2020/21.

- 51 ferrets, 146 stoats and 101 weasels trapped in KNE sites and TLA sites.
- 28 ferrets, one stoat and one weasel in the Pūkaha/Mt Bruce buffer area.
- Four weasels trapped in Miramar Peninsula as part of the PFW eradication programme.

\* McArthur, N. and Jones, P. 2022. Eastbourne - Wainuiomata tūturiwhatu / banded dotterel monitoring report for the 2021-2022 breeding season. Unpublished report, Mainland Island Restoration Organisation, Eastbourne.

2.1.10 Pest cat (*Felis catus*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p><b>Monitoring</b> No monitoring carried out.</p> <p><b>Control</b> We have over 900 targeted pest cat traps that are regularly serviced in KNE sites. We caught 304 pest cats at KNE sites, GW parks and forestry areas and 73 pest cats in the Pūkaha/Mt Bruce buffer area.</p> <p>We generally catch more pest cats in the Wairarapa than any other area as this is where targeted control occurs, with Pūkaha/Mt Bruce and the Hiwinui forestry area accounting for 162 alone.</p> <p><b>2021/22 programme summary</b> 377 pest cats caught compared to 393 in 2020/21. 24 public enquiries about pest cats, compared to 75 the previous year.</p>				

2.1.11 Possum (*Trichosurus vulpecula*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p><b>Monitoring</b></p> <p>Possum monitoring is a part of our terrestrial ecology monitoring and provides a snapshot of possum activity in the region.</p> <p>More information is available here: <a href="#">Possum monitoring   2014/21 Terrestrial ecology monitoring   Greater Wellington Regional Council (gw.govt.nz)</a>.</p> <p><b>Control - KNE programme</b></p> <p>An aerial possum control operation in the Kaitoke Regional Park/Hutt Water Collection Area using the biodegradable pesticide 1080 (sodium fluoroacetate) was successfully delivered in May 2022, covering 8,555 hectares. Low cloud meant a further 3000 hectares could not be treated and will be carried out in the next financial year. A strong PR campaign and riverbank/beach checks followed the four flood events which occurred post control. Staff carried out four full river and beach checks from Kaitoke Regional Park to Pencarrow lighthouse, including Petone beach and seven partial checks (beach only or river only), for carcasses after flooding events, responding to call outs as they came in.</p> <p><b>Control - Biosecurity Services programme</b></p> <p>A number of Hutt City Council parks and reserves are under long term possum control (Western Hutt Hills, Wainuiomata Hill West and Parkway – Waiau wetland). All of the sites were serviced during the year and possum numbers remain low.</p> <p>Long term possum control at the Kāpiti Coast District Council sites such as Waikanae River Corridor, Raumati Escarpment Reserve and Nikau Reserve have remained at low possum numbers.</p> <p>In Wellington City Council reserves the success of possum control work coincides with abundant birdlife.</p> <p><u>AT220 self-resetting trap installation at Te Kopahou</u></p> <p>The servicing and installation of further AT220 possum kill traps in Te Kopahou continued this year.</p> <p>Unfortunately, around half the traps have needed replacing or servicing (more than just a battery change) since the initial installation. In most cases they need to be pulled out of the field and sent back to the manufacturer to be fixed. The original lure used often congealed so we developed a more stable lure that will hopefully prevent this issue.</p> <p>We still believe these traps are worthwhile. When functioning correctly they are very efficient with a steady rate of kills evident.</p>				

#### Double Tap trial in Otaki

We set up a network of bait stations for possums and rats and kill traps for mustelids in a private forest in the Otaki Gorge. We also used this site to trial the new bait formulation Double Tap®. Double Tap® contains both diphacinone and cholecalciferol, which we already use separately – the combination is lot more effective and faster acting than brodifacoum, and therefore considered more humane.

A pre-control monitor was undertaken before control started. The bait station network was then installed and pre-fed twice with non-toxic bait. Double Tap® was then applied every month.

Post control monitoring indicated a small reduction in possum activity, and camera footage showed possums feeding from the bait stations but dropping the bait. This may indicate it is a bait that requires pre-feeding each time it is used to be effective.

#### **2021/22 programme summary**

235 possums trapped during the year compared to 489 in 2020/21.

8,555ha of aerial possum control delivered in Kaitoke Regional Park/Hutt Water Collection Area.

### 2.1.12 Regional Possum Predator Control Programme (RPPCP)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>This programme aims to maintain the benefits of long-term possum control achieved under the national pest management strategy for bovine Tb and to keep numbers of possums low (below 5% Residual Trap Catch 'RTC' index). Staff signed 389 properties up to the programme.</p> <p>To date the programme has built on work completed by OSPRI by moving into areas that have been declared bovine Tb free. However, possum numbers have been increasing in areas of the Wairarapa and Kāpiti that are receiving no possum control. From 2022/23 we will be changing the approach of our programme to allow flexibility in the areas where we will operate.</p> <p><b>Monitoring</b></p> <p>No possum monitoring (RTC) was carried out this year.</p> <p><b>Control</b></p> <p>Due to covid related complications, the possum control portion of the programme was reduced from 81,200 hectares to 56,533 hectares. Weather constraints caused us to reschedule the south Makara aerial possum control operation to April 2023.</p> <p>As part of the RPPCP, mustelid control was implemented along some river ways to provide protection to four regionally threatened shorebird species that breed on dry, un-vegetated gravels. (pōhowera/banded dotterels, black fronted dotterels, poaka/pied stilts and tarāpuka/black-billed gulls)</p> <p>While most of the operations use toxins, trapping resulted in the elimination of 695 hedgehogs, 44 pest cats, 15 ferrets, 6 stoats, 21 weasels and 204 rats.</p>				

**2021/22 programme summary**

62,717ha of possum control and 4,294ha of mustelid control completed.

South Makara aerial possum control operation postponed to April 2023.

### 2.1.13 Rats (*Rattus norvegicus*, *R. rattus*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led																																			
<p>We target rats to reduce their impact on native species.</p> <p><b>Monitoring</b></p> <p>Rat tracking occurs four times a year at a number of KNE sites. Table 4 shows tracking tunnel results as percentages of the total number of tunnels in the monitoring area with rat prints present.</p> <p>More information is available here: <a href="#">Key Native Ecosystem Programme - Small Mammal Monitoring   Greater Wellington Regional Council (gw.govt.nz)</a>. This monitoring tells us directly that the methods we are using to control rats are working at the sites we have monitored.</p> <p><b>Table 4: Rat tracking rates</b></p> <table border="1"> <thead> <tr> <th>Site</th> <th>August 2021</th> <th>November 2021</th> <th>February 2022</th> <th>May 2022</th> </tr> </thead> <tbody> <tr> <td>Wainuiomata Mainland Island (5% target)</td> <td>6%</td> <td>4%</td> <td>5%</td> <td>29%</td> </tr> <tr> <td>WMI non-treatment area</td> <td>79%</td> <td>82%</td> <td>75%</td> <td>88.9%</td> </tr> <tr> <td>East Harbour Northern Forest Mainland Island (5% target)</td> <td>8%</td> <td>2%</td> <td>0%</td> <td>2%</td> </tr> <tr> <td>EHNF non-treatment area</td> <td>48%</td> <td>32%</td> <td>20%</td> <td>30%</td> </tr> <tr> <td>Baring Head/Ōrua-pouanui (10% target)</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Queen Elizabeth Park (10% target)</td> <td>10%</td> <td>5%</td> <td>10%</td> <td>-</td> </tr> </tbody> </table> <p><b>Control – Wainuiomata Mainland Island</b></p> <p>We first trialled Double Tap® in 2020/21 in the Wainuiomata Mainland Island. Initial results in 2020/21 did not show any significant difference between this product and our usual methods. However, rat numbers were low when the bait was applied, so it was hard to say if it would have a more dramatic effect when populations were higher.</p> <p>Further baiting is planned for the spring of 2022 when rat numbers are predicted to be higher due to a heavy podocarp fruiting event occurring in this area. It will be interesting to observe the bait effectiveness in this situation.</p> <p><b>Control - Predator Free Wellington eradication project</b></p> <p>The team gained permission from over 7,000 occupiers to install predator control devices. An online system was set up to allow residents to sign themselves up to the project, and we trained over 50 volunteers to complete work in the Phase two (Island Bay to CBD) operational zone.</p>					Site	August 2021	November 2021	February 2022	May 2022	Wainuiomata Mainland Island (5% target)	6%	4%	5%	29%	WMI non-treatment area	79%	82%	75%	88.9%	East Harbour Northern Forest Mainland Island (5% target)	8%	2%	0%	2%	EHNF non-treatment area	48%	32%	20%	30%	Baring Head/Ōrua-pouanui (10% target)	0%	0%	0%	0%	Queen Elizabeth Park (10% target)	10%	5%	10%	-
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The team used innovative techniques and methods including new uses of toxins, a rat detector dog, and new processes that have combined to show marked results over the last year.

Orouaiti Reserve in the Phase one area (Miramar Peninsula) is used as a location to trial novel traps and methods and was successful in recording zero predators in the site. The results of the trials have informed us of the best techniques to use for expanding into new areas and for driving the predator numbers down to zero. Considerable progress has been made towards elimination of rats on the Miramar Peninsula.

At the end of the 2021/22 year, we had a total of 10,224 devices installed in the Phase one area, as detailed below. Between volunteers and our team 74,306 trap checks were carried out.

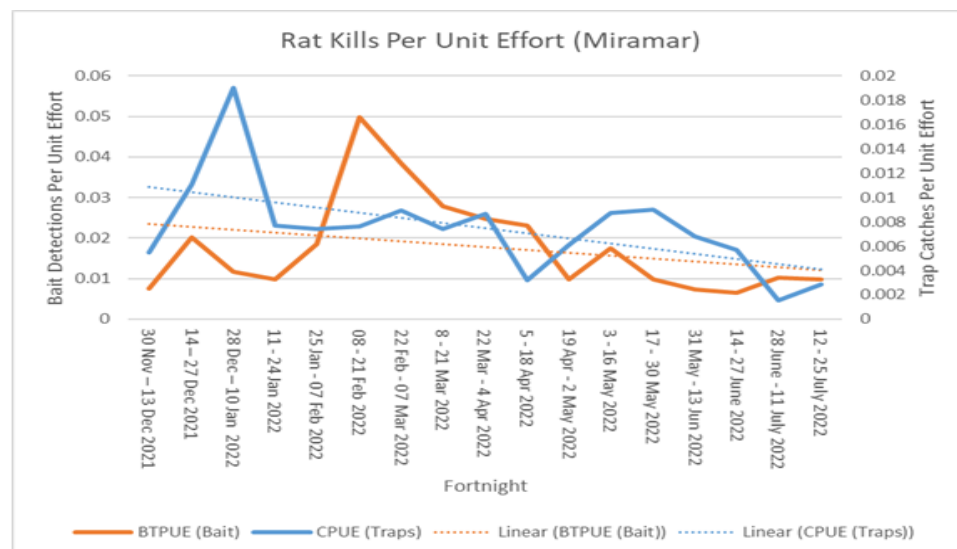
**Table 5: Devices currently installed in the Phase one (Miramar) area**

Device type	2021/22
Bait stations	6713
Rat traps	1575
Mustelid traps	1714
Camera Traps	222

Norway rats have been eradicated from the operational area. While there have been several incursions, these rats were caught in our network.

Numbers of ship rats are at an all-time low. This is recorded through camera images, chew card detections, bait take, trap checks and intensive use of a rat detection dog.

On average, by the end of the 2021/22 year, it took 351 trap checks to find one rat. See Graph 3 below, in which unit effort is one service of one device.



**Graph 3: PFW trends in rat kill numbers on Miramar Peninsula. Both numbers of rats trapped and evidence of rats feeding on bait decrease for the same amount of effort**

We received anecdotal feedback indicating an abundance of weta and lizard sightings, and overall, there has been a 51% increase in native birds on the Miramar Peninsula:

- Pīwakawaka/fantails increased by 550%
- Riroriro/grey warbler increased by 275%
- Tūi increased by 49%

**2021/22 programme summary**  
 1,690 rats trapped in the region. 909 rats trapped in the PFW project areas. This compares to 2,543 and 889 respectively in 2020/21.

2.1.14 Advice, Education and Engagement

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p><b>Advice</b></p> <p>We have provided technical advice on the proposed Wainuiomata fenced sanctuary, as well as other large scale community driven restoration/enhancement projects like the Wairarapa P2K Alliance.</p> <p>We have a staff member on the national Wallaby Operations Advisory Group.</p> <p><b>Public Enquiries</b></p> <p>This year we processed a total of 775 public enquiries for pest animals compared to 2,147 last year.</p> <p>Of these, a quarter related to sales of equipment and services, mainly for possums, rabbits and rats. Almost a third of our enquiries were about rabbits, closely followed by possums, and then to a lesser extent mustelids and rats.</p> <p>See Graph 4 for a breakdown by species or issue.</p> <p><b>Engagement</b></p> <p>Our website statistics are only applicable for the period January-June 2022 as our new website went live in January.</p> <p>This year the 1080 operation was the most visited page with 23 percent of all views. Pest animal trapping (an upgraded webpage), brodifacoum and pindone were the next most viewed pages, which ties in with their use for rodent and rabbit control in the region. See Graph 5 for further detail.</p> <p>We launched a new platform called Pest and Weed Central during the year, which gives information and advice on hundreds of invasive pest plants and animals (a number of other regional councils also use this platform on their websites).</p> <p>This has proven quite popular with almost 9,000 hits via our website, compared to the almost 14,000 hits for all our other Biosecurity webpages combined. This is really pleasing as we hoped the platform would be well utilised and would raise interest and awareness. It can also be accessed by the website <a href="https://pestweedcentral.com">Pests &amp; Weeds (pestweedcentral.com)</a>.</p>				



### Species of Interest

Noteworthy species that are not part of RPMP species programmes, but present threats to sites of high native biodiversity values (e.g., KNE and TA reserve sites) are dealt with or drawn to our attention:

#### Red eared slider turtle

A red eared slider turtle found in an Upper Hutt waterway was removed by a reptile rescue group for rehoming.

#### Argentine ant

Control work at Queen Elizabeth Park and Kāpiti Boat Club was completed in April. Preventing Argentine ants reaching Kāpiti Island is important, as is supporting local residents in their coordinated Argentine ant control by carrying out baiting around the Queen Elizabeth Park wetland KNE. As part of the protection of Kāpiti Island, bait was supplied free to boat operators permitted to take boats to Kāpiti Island.

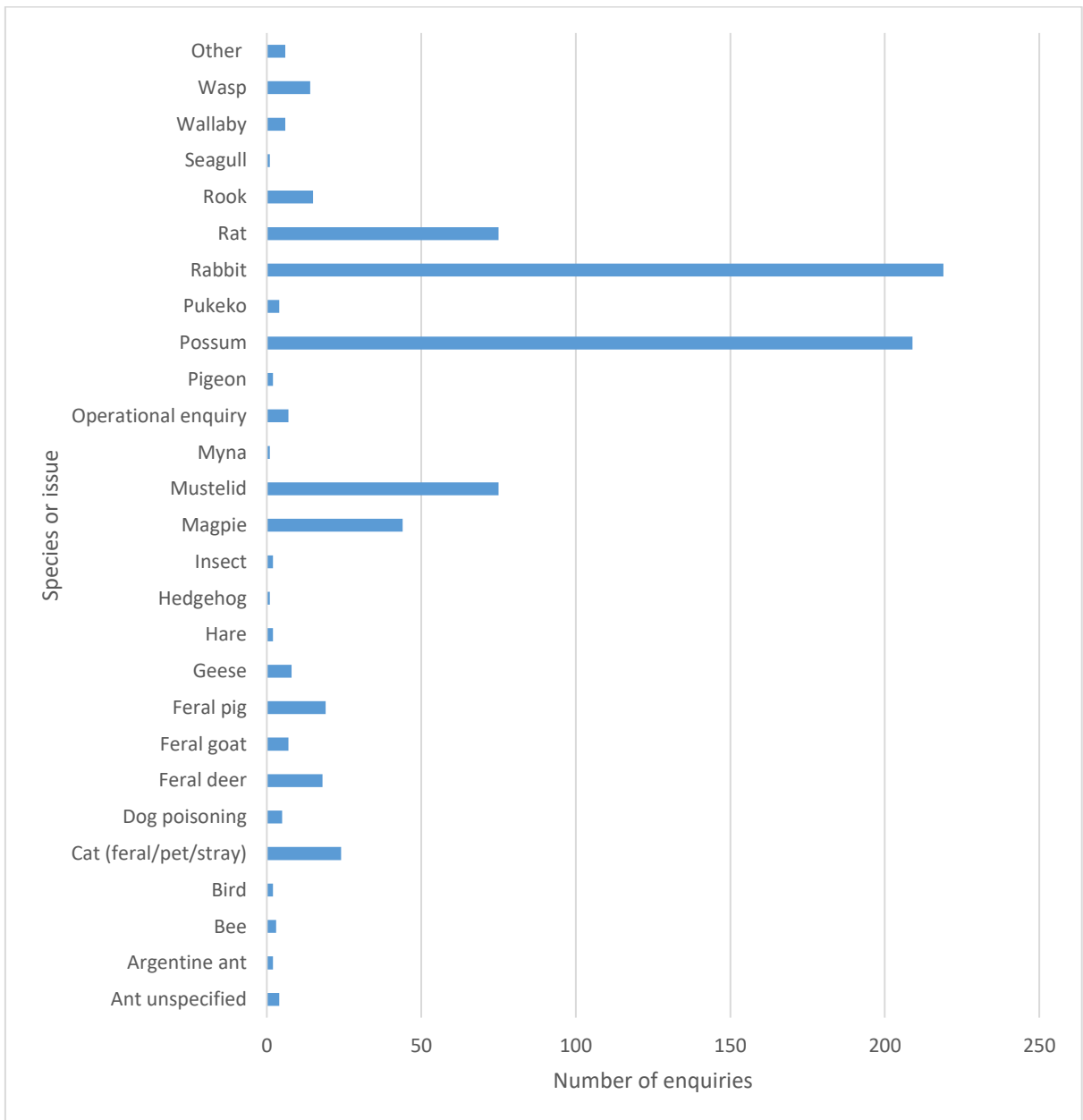
#### Mice

Mice are listed on our Harmful Organism list in the RPMP and are targeted in several locations such as Queen Elizabeth Park where the trap boxes serviced by volunteers include a specific mouse trap, and Baring Head/Ōrua-pouanui where the aim is to protect lizards in key areas of habitat.

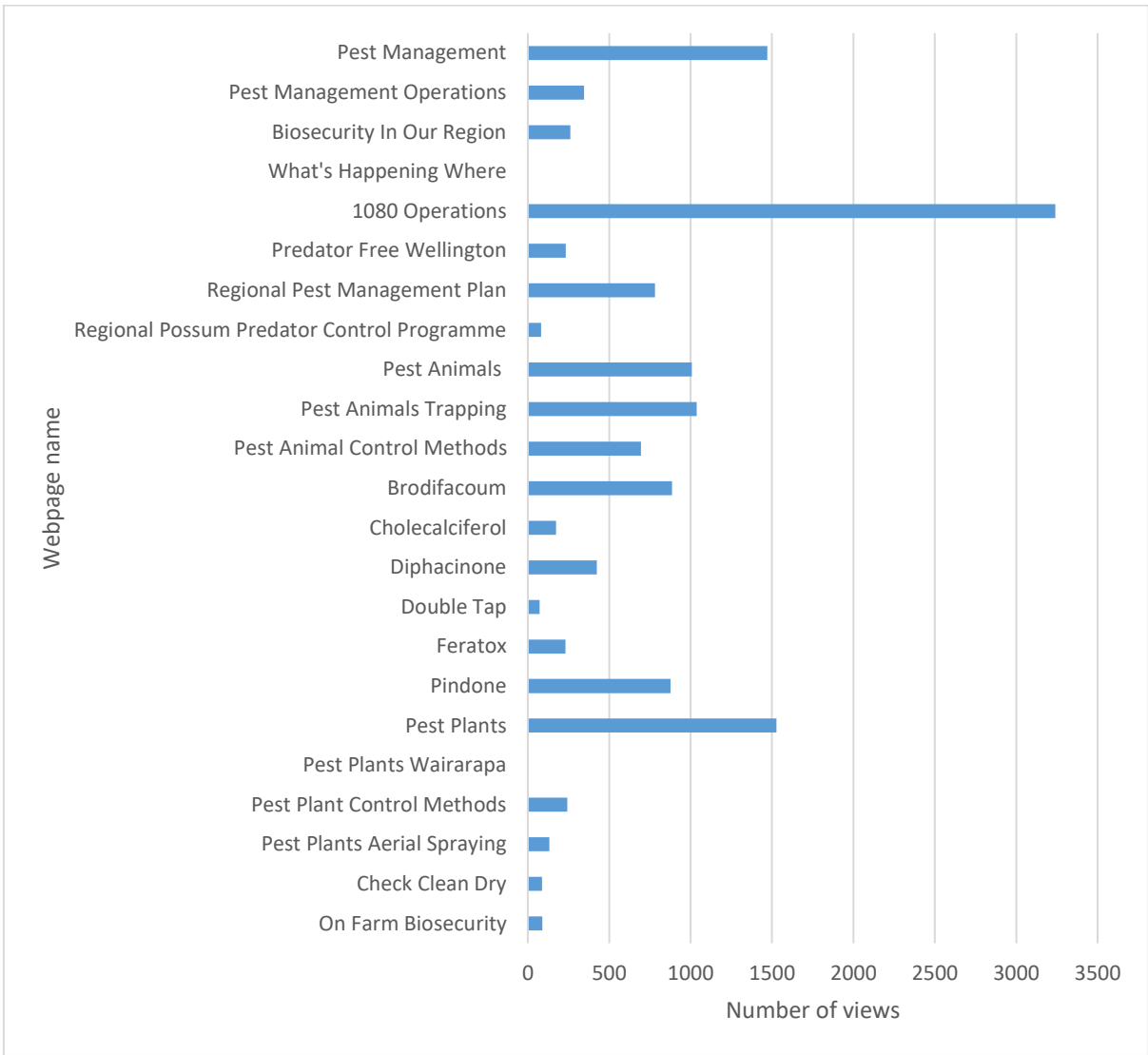
Mice remain at moderate and are difficult to suppress. However, as mentioned previously, northern grass skink numbers have increased noticeably, and the Raukawa gecko population seems relatively stable.\*

\* Goldwater, N. 2020. Northern Spotted Skink Population Monitoring at Baring Head/Ōrua-pouanui, East Harbour Regional Park, Wellington. Contract Report No. 5595, Wildland Consultants Ltd.





**Graph 4: Pest Animal related enquiries received through the year by category**



**Graph 5: Biosecurity webpage trends for the period January to June 2022**

### 3. Pest Plants

#### 3.1 Programme results

We carried out annual inspections on 672 ha of land and carried out intensive 'delimiting' surveys on 984 ha of land, searching for RPMP species. Our team surveyed another 930 ha of land in regional parks and KNE sites, looking for other plants of concern (see the [RPMP Harmful organism list](#)).

We compare the management outcomes of our pest plant programmes by species for the duration of the RPMP implementation (Graph 6). Note that year 1 (2019/20) and year 2 (2020/21) results were affected by Covid-19 lockdowns, with numerous sites not getting inspected.

We aim for the proportion of eradicated sites to increase over time. If this doesn't happen then it indicates we need to reconsider our management practices for the species. If a change in practice does not alter the trend, then we need to re-evaluate our management objectives for the species.

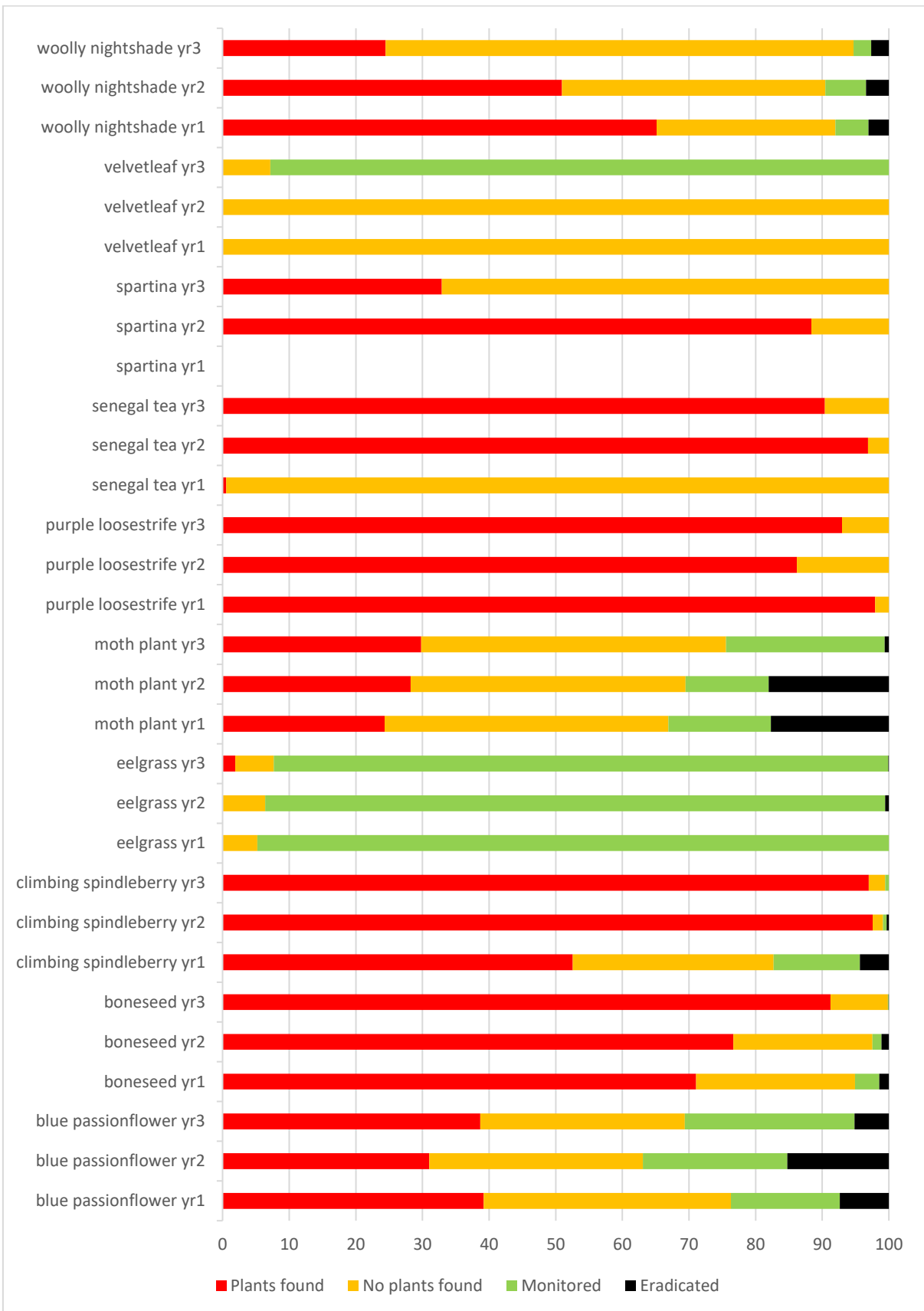
The following terminology is used:

Active sites ('plants found') are those where we find plants of the species being searched for.

Active sites ('no plants found') are those sites where we find **no** plants of the species being searched for. The site must remain clear of plants for four years before advancing to Monitored status.

Monitored sites have no plants of the target species present. We monitor these sites for another four years, checking for new plants or regrowth.

Eradicated sites have been monitored for sufficient time that we are satisfied the species has been eradicated from that particular site.



**Graph 6: Proportional annual site status trends for RPMP pest plant species over the 20 year period**

3.1.1 Alligator weed (*Alternanthera philoxeroides*), Chilean needle grass (*Nassella neesiana*), Nassella tussock (*Nassella trichotoma*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
No incursions of any of these species were detected this year.				

3.1.2 Moth plant (*Araujia hortorum*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Twelve new sites of moth plant (733 m<sup>2</sup> of infested land) were discovered: seven in Lower Hutt, three in Kāpiti and two in Wairarapa.</p> <p>We now have 159 sites infested with moth plant, at which we controlled 41 adult plants this year. We declared moth plant to be eradicated at one site in Carterton.</p> <p><b>2021/22 programme summary</b> 159 sites (1.8ha) infested with moth plant.</p>				

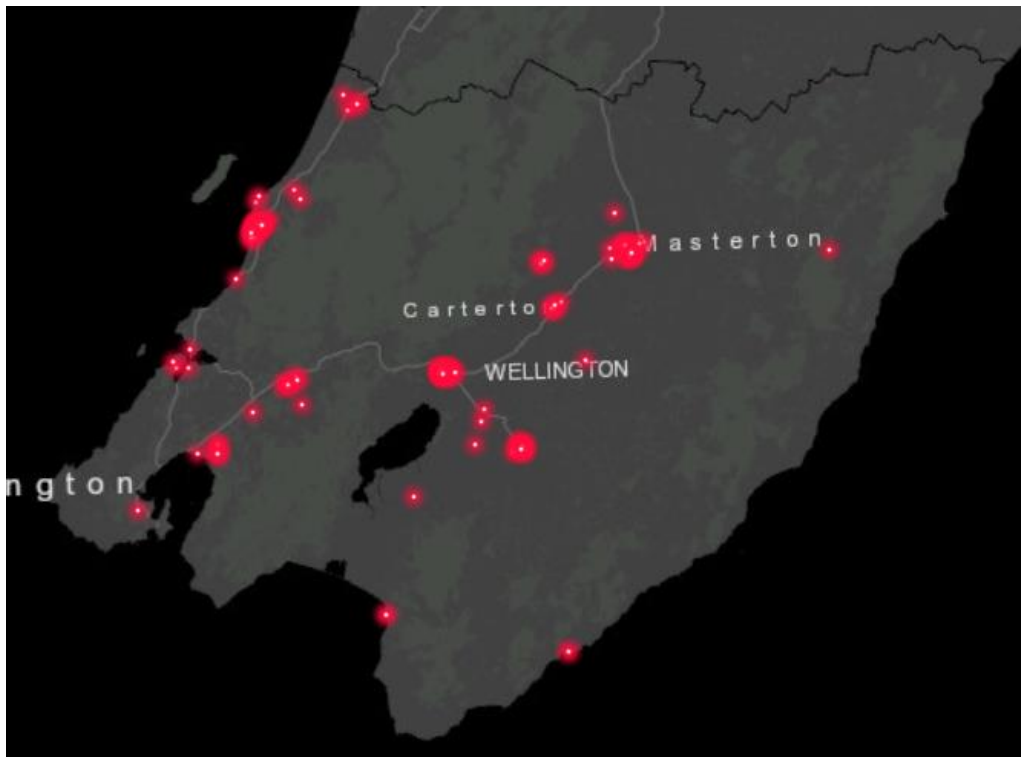


Image 3: All Active and Monitored moth plant site locations

### 3.1.3 Senegal tea (*Gymnocoronis spilanthoides*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>One new Senegal tea site (66 m<sup>2</sup> of infested land) was discovered in Raumati South. We now have 18 sites infested with Senegal tea, all in the early stages of management, where we found and removed 812 adult plants this year.</p> <p>Spraying with herbicides is not an option for eradication because the recommended foliar spray (glyphosate) does not kill the extensive underground network of rhizomes. Digging Senegal tea out of ponds and waterways is time consuming but has been much more successful.</p> <p><b>2021/22 programme summary</b> 18 sites (8.5 ha) infested with Senegal tea.</p>				



**Image 4: All Active and Monitored Senegal tea site locations**

### 3.1.4 Spartina (*Spartina anglica*, *S. alterniflora*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>No new Spartina sites were discovered this year.</p> <p>We have seven sites infested with spartina, all in the early stages of management, at which we controlled 26 adult plants.</p> <p><b>2021/22 programme summary</b> Seven sites (1.8 ha) infested with spartina.</p>				



**Image 5: All Active and Monitored Spartina site locations**



**Image 6: Indicator dog at Lake Onoke showing a single Spartina plant**



3.1.5 Velvetleaf (*Abutilon theophrasti*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>There is only a very small amount of land that was infested with velvetleaf in the region. Annual inspections were completed, and no plants or new sites were found.</p> <p><b>2021/22 programme summary</b>                      Four sites (30 m<sup>2</sup>) infested with velvetleaf.</p>				



Image 7: All Active and Monitored velvetleaf site locations



Image 8: Practical industry advice available at [www.mpi.govt.nz](http://www.mpi.govt.nz)



3.1.6 Woolly nightshade (*Solanum mauritianum*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Forty-nine new Woolly nightshade sites (5,293 m<sup>2</sup> of infested land) were discovered: 27 in Lower Hutt, three in Masterton and the remainder in Kāpiti.</p> <p>We now have 146 sites infested with woolly nightshade, at which we controlled 44 adult plants. We declared woolly nightshade to be eradicated from 13 sites this year.</p> <p><b>2021/22 programme summary</b> 146 sites (9 ha) infested with woolly nightshade.</p>				

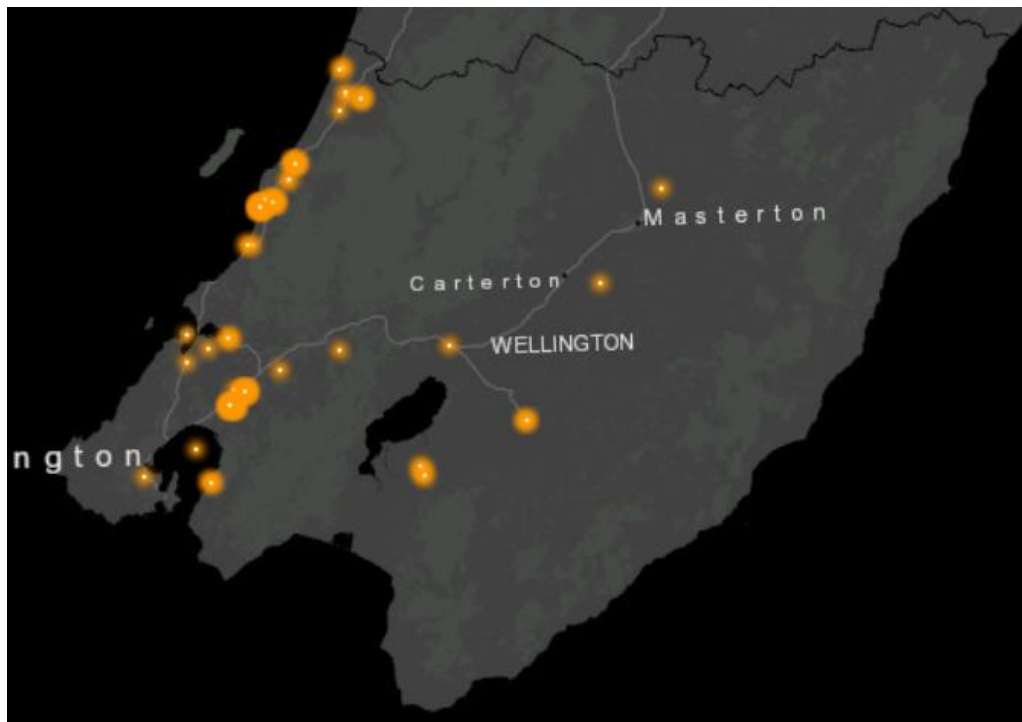


Image 9: All Active and Monitored woolly nightshade site locations

3.1.7 Purple loosestrife (*Lythrum salicaria*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>No new purple loosestrife sites were discovered this year.</p> <p>There are currently 19 sites, all in the early stages of management. This year we found and controlled 316 adult plants. The total area, 106.5 ha, has changed as the site boundaries have been adjusted from the previous year.</p> <p><b>2021/22 programme summary</b> 19 sites (106.5 ha) infested with purple loosestrife.</p>				



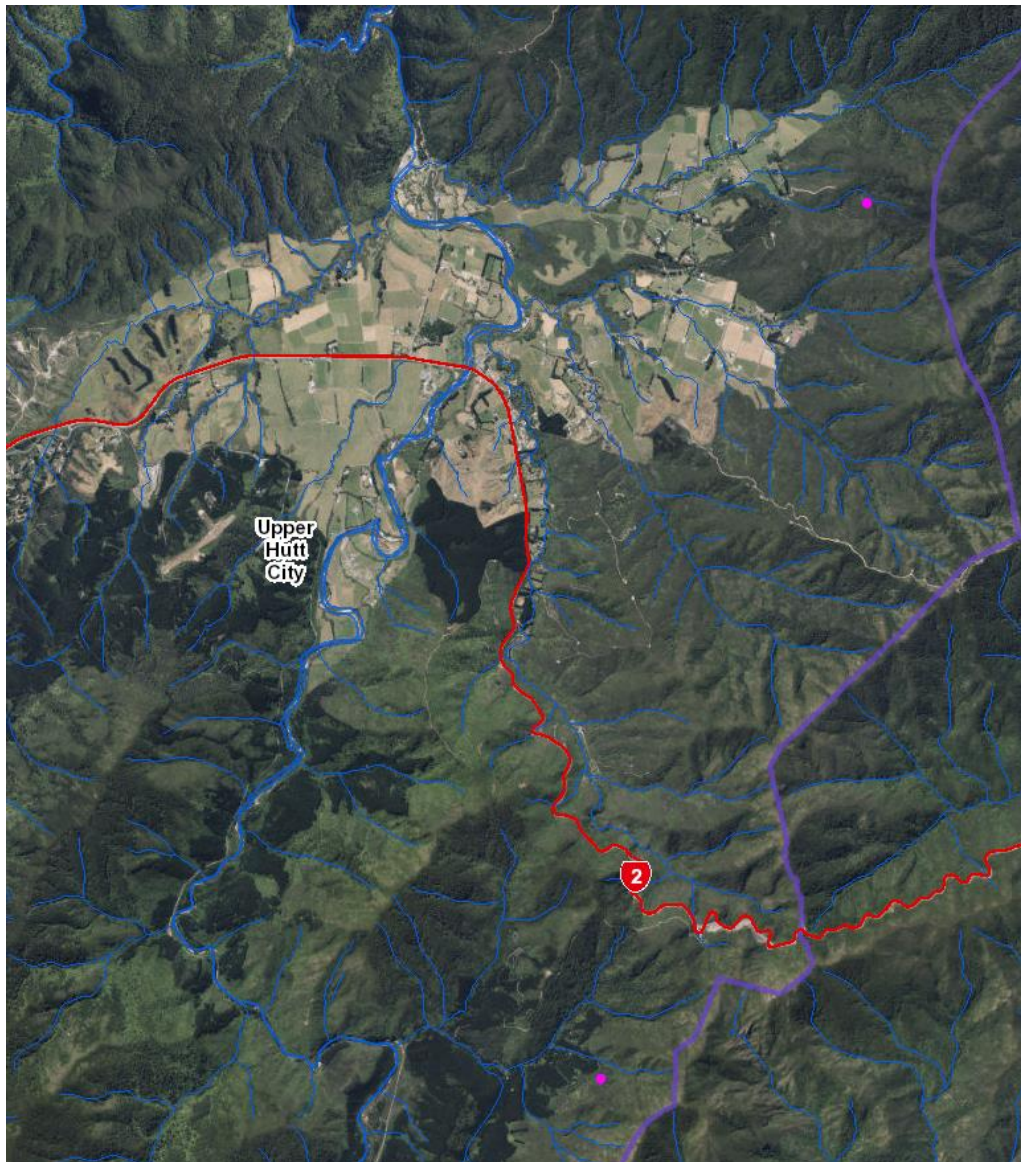
**Image 10: All Active and Monitored purple loosestrife site locations**



**Image 11: Purple loosestrife control site**

3.1.8 Wilding conifers – European larch (*Larix decidua*), Douglas fir (*Pseudotsuga menziesii*) and pine species (*Pinus spp.*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>We have added in a new 12 hectare control area of <i>Pinus contorta</i>, in the Marchant Ridge (Kaitoke) area. This means there are two sites of wilding pine control in the region, the other one in the Remutaka ranges.</p> <p>We have controlled scattered wilding <i>Pinus contorta</i> around the new Kaitoke site but have not yet begun on the core area. Contractors made significant progress in the control of <i>Pinus contorta</i> in the Pakuratahi Forest and near the Remutaka Rail trail</p> <p><b>2021/22 programme summary</b> Two sites (16.6 ha) infested with wilding pines.</p>				



Map 4: Locations of the two wilding pine control areas

3.1.9 Blue passionflower (*Passiflora caerulea*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Twenty-three new blue passionflower sites (1,792 m<sup>2</sup> of infested land) were discovered: one in Wairarapa, three in Wellington and the remainder in Kāpiti. Several new sites were found due to iNaturalist notifications.</p> <p>This year we put in place a more strategic control approach, utilising contractors for delimiting surveys while focussing on control work and revisiting old sites ourselves. We are managing 305 sites infested with blue passionflower where we found and controlled 75 adult plants. We declared blue passionflower to be eradicated at 17 sites.</p> <p><b>2021/22 programme summary</b> 305 sites (4.6 ha) infested with blue passionflower.</p>				

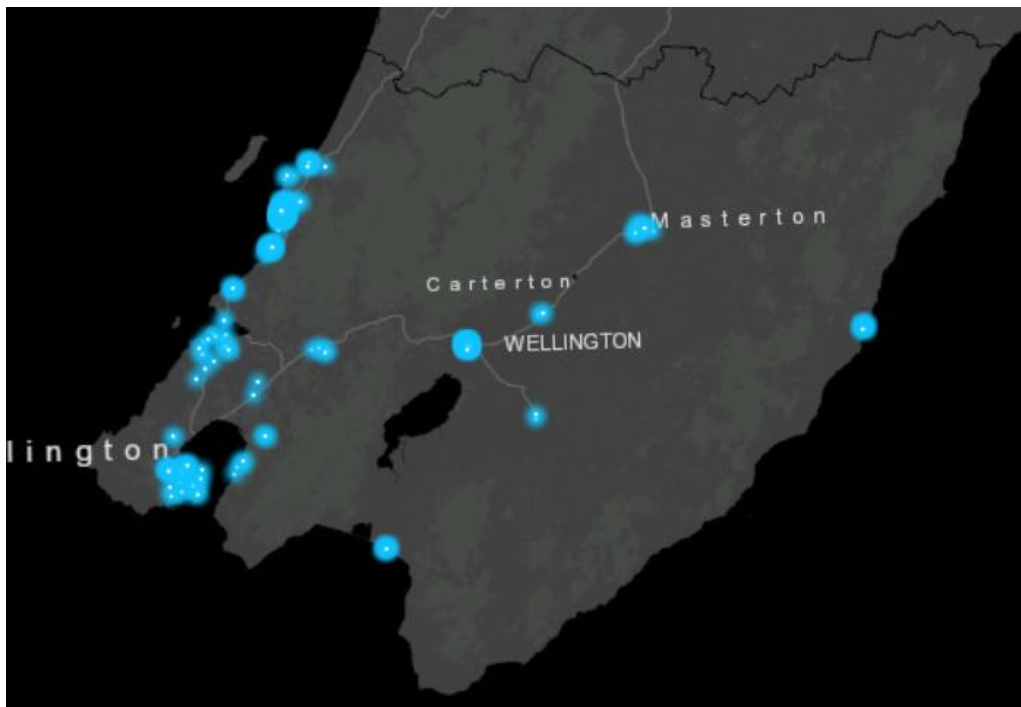


Image 12: All Active and Monitored blue passionflower site locations



3.1.10 Boneseed (*Chrysanthemoides monilifera*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>We discovered six new boneseed sites (485 m<sup>2</sup> of infested land): two in Kāpiti and four in Wairarapa.</p> <p>We managed 195 sites infested with boneseed, controlling 942 adult plants by hand. We declared boneseed eradicated from 16 sites. We also continue to survey and control plants in townships to create a buffer for high value sites.</p> <p>We control boneseed only in the region’s highest value coastal sites. Most of the work is done aurally. Te Kopahau reserve (Wellington south coast) has been under control for 12 years now. As previously, we used a helicopter with an attached anterior wand to accurately spot spray boneseed plants on the otherwise inaccessible cliff. At Ngawi we used a drone to aerial spray plants on cliffs.</p> <p><b>2021/22 programme summary</b> 195 sites (509 ha) infested with boneseed.</p>				

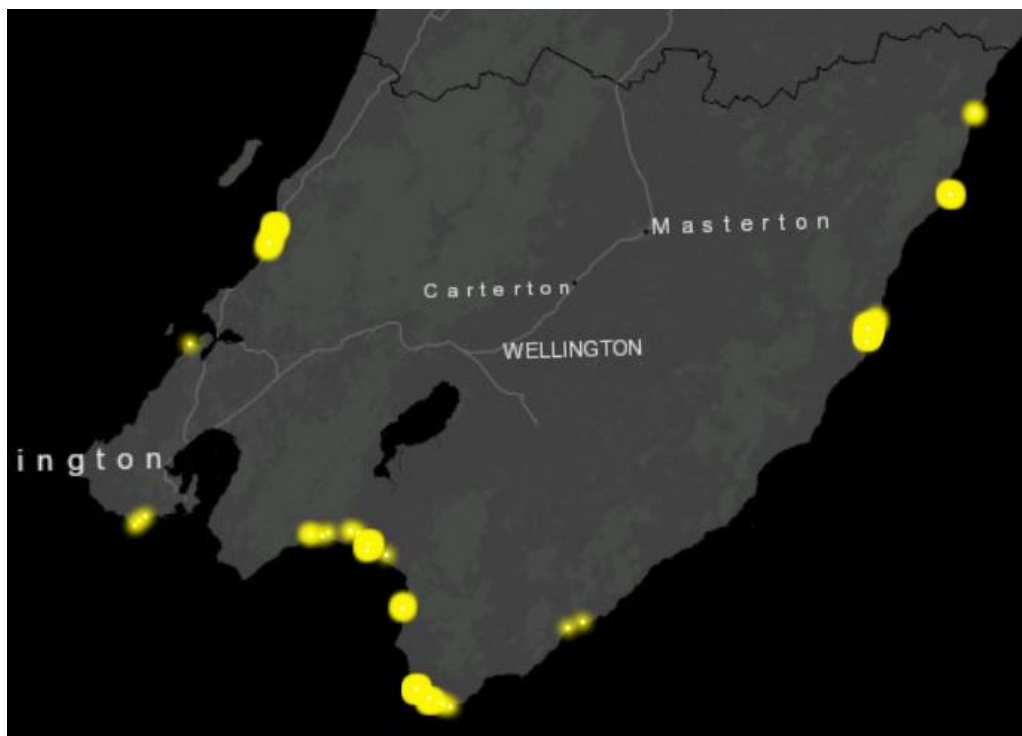
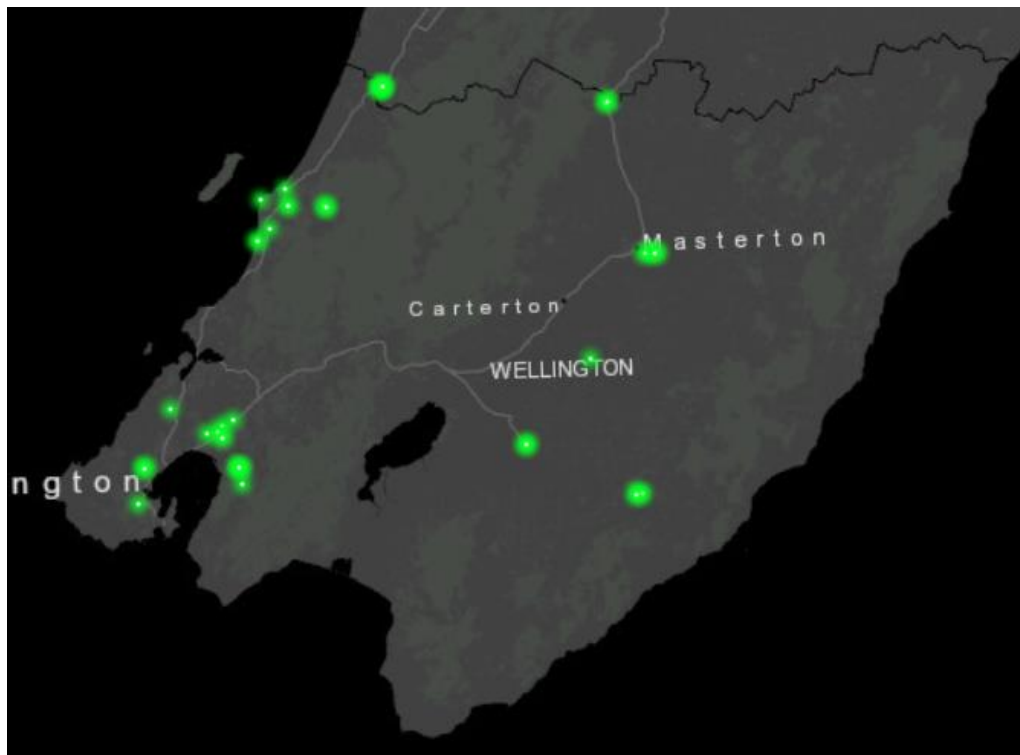


Image 13: All Active and Monitored Boneseed treatment areas

### 3.1.11 Climbing spindleberry (*Celastrus orbiculatus*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>We discovered seven new climbing spindleberry sites (1,366 m<sup>2</sup> of infested land): five in Kāpiti and two in Wairarapa.</p> <p>We managed 46 sites infested with climbing spindleberry at which we found and controlled 54 adult plants.</p> <p><b>2021/22 programme summary</b> 46 sites (27 ha) infested with climbing spindleberry.</p>				



**Image 14: All Active and Monitored Climbing spindleberry site locations**

### 3.1.12 Eelgrass (*Vallisneria spiralis*, *V. gigantea*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>Following the eDNA testing for <i>Vallisneria</i>, three new sites situated in between existing sites have been identified in Masterton (658 m<sup>2</sup> of infested waterways).</p> <p>We manage 12 sites infested with eelgrass. We declared eelgrass eradicated at one site this year.</p> <p><b>2021/22 programme summary</b> 12 sites (3.5 ha) infested with eelgrass.</p>				



**Image 15: All Active and Monitored Eelgrass site locations**



**Image 16: Hand removal of eelgrass in a Wairarapa waterway**

3.1.13 Banana passionfruit (*Passiflora mixta*, *P. mollissima*, *P. tripartita*), Cathedral bells (*Cobaea scandens*), Old man’s beard (*Clematis vitalba*)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
This programme is undertaken by the Hutt City Council. Our assistance (and only GW involvement with the programme) was not required to gain access to the properties under the programme.				

3.1.14 Key Native Ecosystems, Reserves and Forest Health (Pest Plants)

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>We carried out control work or managed contractors to undertake work in 57 Key Native Ecosystem sites, as well as in Regional Parks and a number of wetlands. Exotic species are prioritised for control in the KNE operational management plans. The representative list of species controlled can be seen in our <a href="#">RPMP list of harmful organisms</a>.</p> <p>Other work of note included assisting DOC with arranging aerial willow control for Wairarapa Moana. This is an area where GW conduct willow control operations as well so co-ordinating efforts leads to better outcomes.</p> <p>Our staff use some interesting methods to determine what work needs doing, such as a weed surveillance rafting trip in the Kaitoke Gorge and down the Te Awakairangi/Hutt River from Kaitoke.</p>				

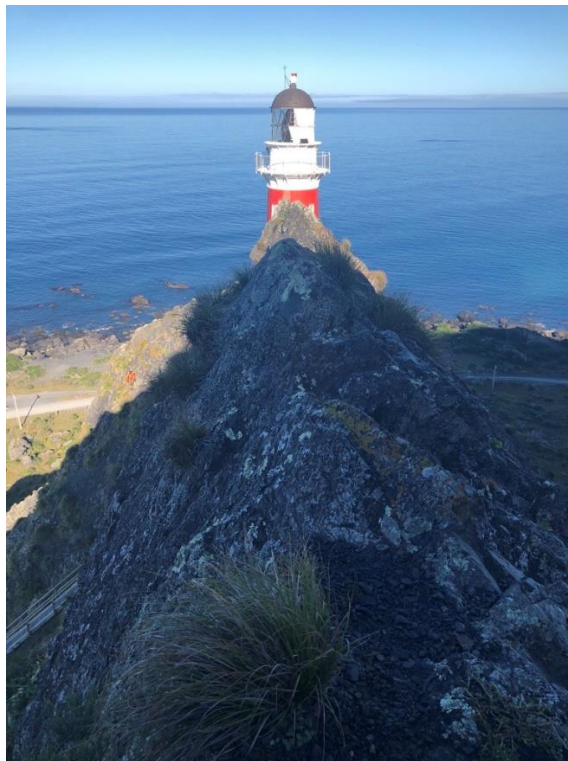


Image 17: Cape Palliser KNE invasive succulent control



### 3.1.15 Biocontrol

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p>See Appendix 3 for a full description of the status of biocontrol agents in our region.</p> <p><b>Biocontrol agent releases</b></p> <p>Biocontrol agent ‘releases’ are supplied by Manaaki Whenua Landcare Research (Manaaki Whenua) and ensure there are enough individuals to form a viable population. This year three agents were released:</p> <ul style="list-style-type: none"> <li>• Japanese Honshu white admiral butterfly were released in Wairarapa, Wellington and Raumati. We also received a boost for the existing Upper Hutt population.</li> <li>• Old man’s beard gall mite were released at two sites north of Masterton, and two sites in Wellington city.</li> <li>• Tradescantia yellow leaf spot fungus were released at sites in Paekakariki, Featherston and Carterton.</li> </ul> <p><b>Biocontrol agent transfers</b></p> <p>Biological agent ‘transfers’ are where we have biocontrol agent populations sufficiently abundant that we are able to harvest enough individuals to release as a viable population elsewhere. This year we transferred one agent.</p> <ul style="list-style-type: none"> <li>• Ragwort plume moth transfers from Horizons Regional Council were released to two existing sites in Kāpiti and one new site in Wellington.</li> </ul> <p>This year we assessed green thistle beetle requests and located potential harvesting sites for translocation. This species has spread considerably without human intervention and we found that many sites on the waiting list already had the beetle! Heavy rain in February interfered with site checks so no transfers were completed.</p> <p><b>Monitoring</b></p> <p>We are actively monitoring release sites for multiple agents to determine whether populations are establishing, and whether the population is abundant enough that we can take some of the agents to transfer elsewhere in the region.</p> <ul style="list-style-type: none"> <li>• Fourteen broom gall mite sites were chosen by Manaaki Whenua for monitoring, which began in November 2021. At six sites galls were present, and at four sites galls were present in the surrounding area.</li> <li>• Manaaki Whenua also monitored all four of our release sites of Darwin’s barberry seed weevil, finding adults at two of the sites.</li> <li>• Ragwort plume moth monitoring has started (this continues until failure or establishment is determined). One site in Kāpiti that initially appeared a very successful site is now showing no sign of the moth but did have three other biocontrol agents present (cinnabar moth, flea beetle, blue stem borer).</li> </ul>				

- An assessment of nodding thistle was conducted this year. We visited one Wairarapa site, finding neither nodding thistle plants, nor biocontrol agents (crown weevil, gall fly, receptacle weevil). Gall Fly was released at the site in 1991/92: reduction of nodding thistle has been a big success nation-wide due to the agents.

#### **Other news**

Staff attended the annual National Biocontrol Collective meeting, where a nationwide strategic approach is taken to help decide how funding can be directed to best effect. Species of interest for our region that Manaaki Whenua are currently researching biocontrol agents for are:

- banana passionfruit
- Darwin's barberry
- moth plant
- old man's beard
- Sydney golden wattle
- yellow flag iris
- woolly nightshade

Some of these species already have biocontrol agents in place, but in some cases successful suppression of an invasive plant comes from a multi-agent approach. One agent may not have a significant impact, but a combination of several agents may have a greater effect.

A number of the species mentioned above require thorough host-range testing to be carried out. This is generally first carried out in the target plant and biocontrol agent's country of origin, with non-target species of concern imported to that country for testing. Once satisfied that the agent is 100% specific to the host, the potential biocontrol agent is imported to New Zealand for further testing, followed by breeding up populations for release. The whole process can take many years.

Manaaki Whenua has an application for a moth plant fruit fly awaiting processing by EPA and is awaiting a decision on an application to release a Sydney golden wattle biocontrol agent (a flower bud galling wasp), which would be released in the Manawatu-Whanganui area. The decision is expected late 2022.



**Image 18: Release site: Japanese Honshu white admiral butterfly pupae glued to string as a release method**

### 3.1.16 Surveillance and Engagement

Exclusion	Eradication	Progressive containment	Sustained control	Site-led
<p><b>Engagement</b></p> <p>Our staff worked with WCC to run a ‘Weedbusters’ Wellington Hui, which was a big success with a good turnout.</p> <p>Throughout the year GW’s Customer Engagement team worked on social media pest plant related posts. These were popular and received a lot of feedback, especially the post featuring pampas grass. Posts were published according to the time of year when the particular RPMP plant species would be most visible.</p> <p><b>Public enquiries</b></p> <p>We received 208 enquiries during the year, with the majority regarding old man’s beard. RPMP species accounted for 38 percent of enquiries with old man’s beard still the most enquired about species at 26 percent, followed by blackberry at 11 percent. A small number of aquatic plant enquiries came through with people interested in long term solutions for controlling aquatic pest species and seeking advice on riparian planting. (Refer Graph 9).</p> <p><b>Species of Interest</b></p> <p>In the course of our work, we noted locations and infestations of invasive plants that are not part of RPMP species programmes, but which pose serious threats to our operations in sites of high native biodiversity values (e.g., KNE and TA reserve sites).</p>				

#### White edged nightshade

We worked with a landowner to put in place a control programme for the one existing Wairarapa site of white edged nightshade (*Solanum marginatum*), an invasive agricultural weed which is on our Harmful Organism list.

#### Phragmites karka

We have a handful of known sites of *Phragmites karka* which are all under control programmes. This species is closely related to *Phragmites australis* and shares the invasive characteristics. *P.australis* is listed in our RPMP as a Harmful Organism, and is managed by the Ministry for Primary Industries (MPI) under the National Interest Pest Response (NIPR) programme.

#### Sea spurge

Sea Spurge (*Euphorbia paralias*) was confirmed at two sites in Paraparaumu which is the first occurrence of this invasive species in our region. We have removed all plants from the known sites, along with sand sifting to remove seeds. This is a joint project with MPI and DOC as the species is not yet part of the NIPR programme. We will continue to monitor the site every four months and remove any plants found.

#### Field horsetail

Field horsetail was reported and confirmed at Ocean Beach – there are anecdotal reports of several sites in the Wairarapa. We are not controlling this species currently, but Horizons Regional Council released a biocontrol agent for field horsetail this year – if successful, we could ask for a transfer in future years.

### **Ministry for Primary Industries programmes supported by GW**

#### Check Clean Dry Programme

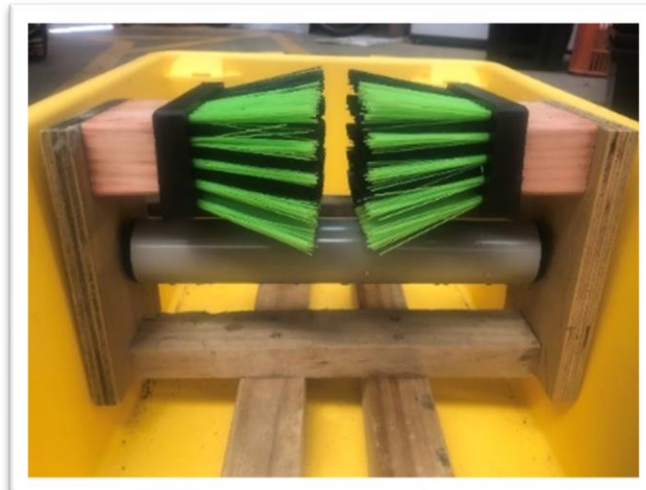
The aim of this MPI funded programme is to increase public awareness of CCD hygiene practices and freshwater pest species. We have delivered this programme for over a decade on behalf of MPI, and now have 48 signs at swimming and boating locations that we maintain.

Over the summer we attended outdoor events and gave media releases. These tactics successfully promoted the CCD campaign and the message was well received in the region, although the COVID-19 pandemic significantly impacted the program this year. Many events were cancelled but a total of four sporting/outdoor events were attended. Other in person advocacy such as waterside advocacy was significantly reduced due to the risk to staff and public.

To improve CCD awareness and compliance at events, we approached every TLA in the region and requested that they add a CCD condition (when applicable) to any concessions granted in public parks. The 4 TLAs that granted concessions in or around freshwater all agreed to include this condition in future.

CCD-related social media posts going out multiple times per week over summer got a good number of impressions and shares. Some pests in specific waterways were reported to us as a result of people seeing the posts.

Public knowledge of freshwater pests is still limited, although awareness of some of the more common pests such as didymo, 'oxygen weed' and koi carp is increasing. Most people we approached wanted to know more about freshwater pests, with a particular interest in how they can be removed from waterways.



**Image 19: Biosecurity Officer Lawrence Davenhill designed this system for easy cleaning of bike tyres at events like the Karapoti Classic**

National Pest Plant Accord

We inspected a number of plant nurseries and sale outlets such as the Martinborough community market, and the annual plant sale in Wellington, checking for plants listed on the NPPA.

National Interest Pest Response programme

Cape Tulip

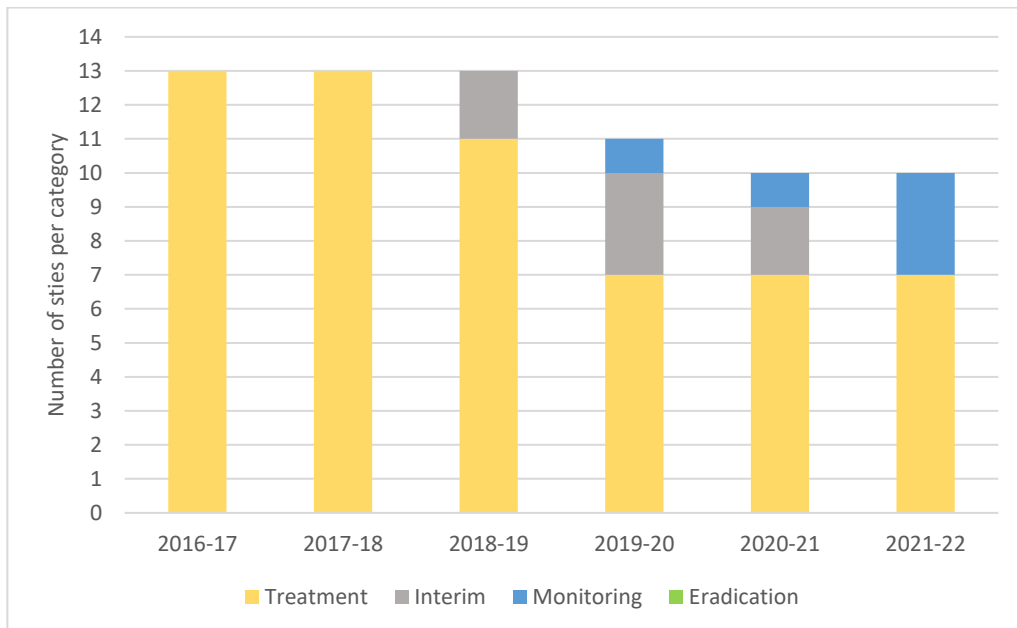
A new site of cape tulip (scientific name) was discovered at Ocean Beach and the information was passed on to MPI.

Manchurian Wild Rice

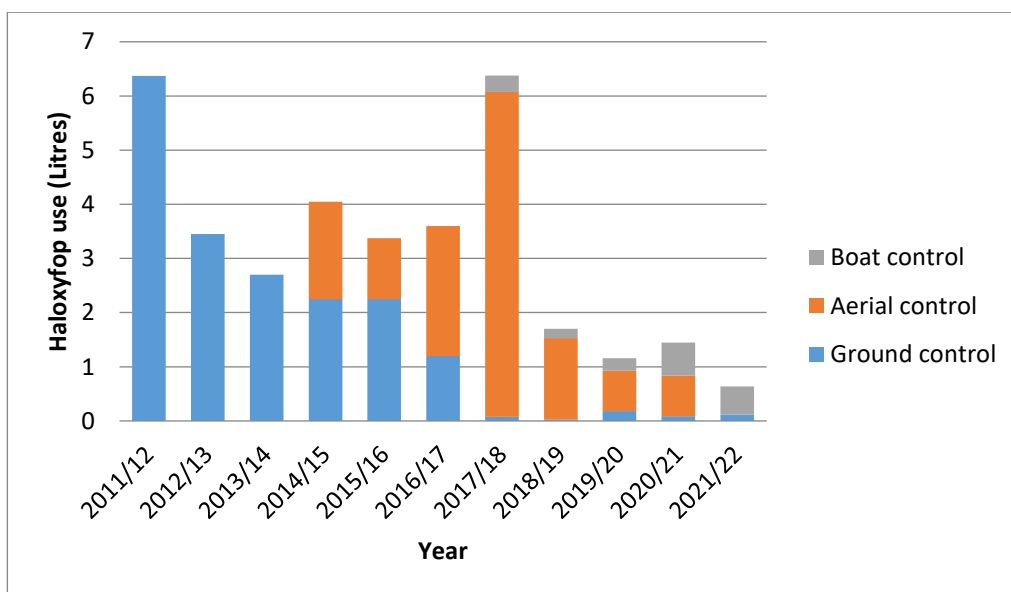
We continued control of Manchurian wild rice (MWR) at Pharazyn Reserve in Waikanae and an adjacent wetland with two ground and boat control spraying operations (no aerial spraying).

While we are making a good progress in controlling MWR (Graph 7), a new plant was found slightly beyond the current area which led us to increase the total site size of the infestation from 14.07ha to 14.24ha.

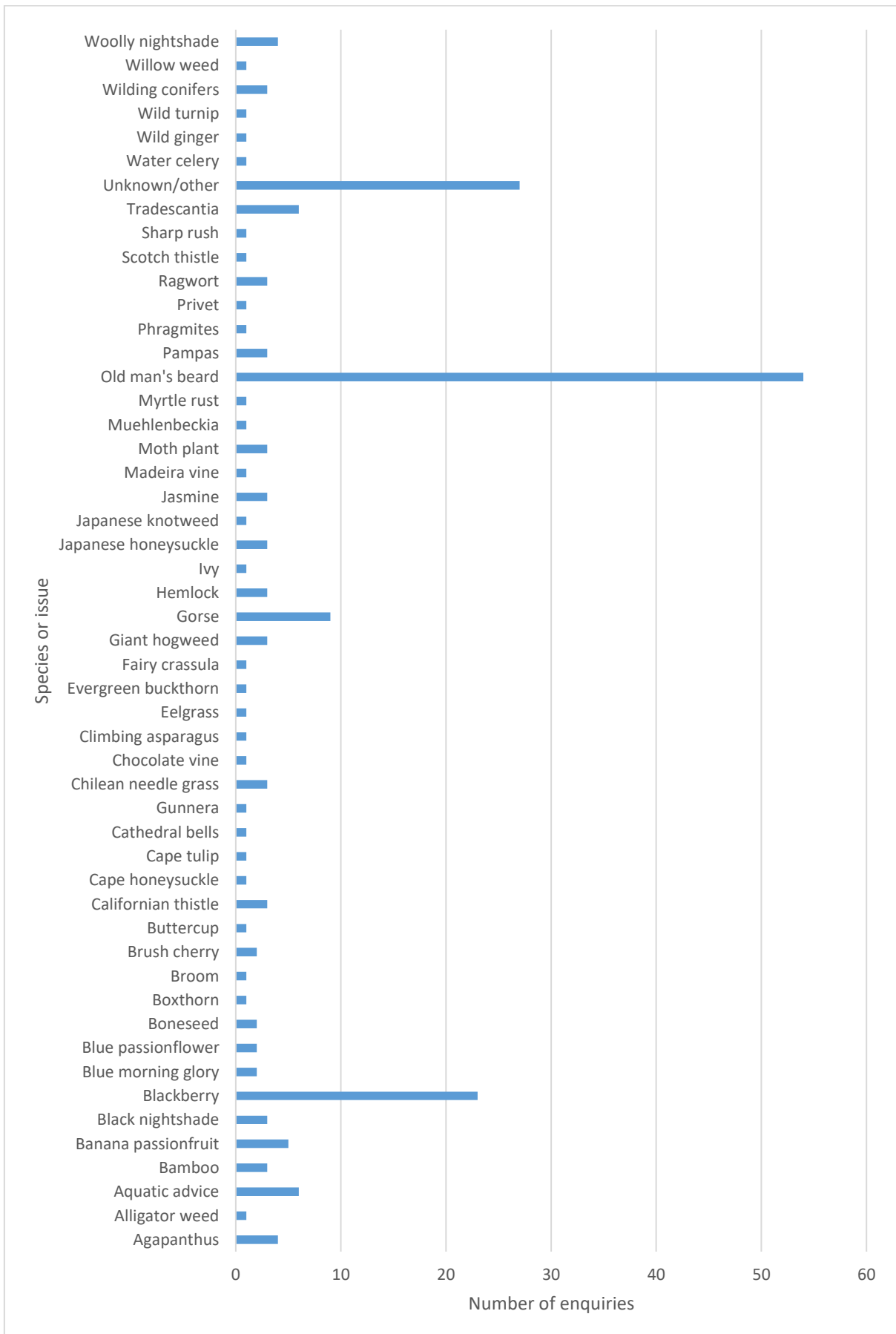
The amount of herbicide (haloxyfop) concentrate used decreased from 1.447L the previous year to 0.6375L due to the lack of aerial spraying (see Graph 8).



**Graph 7: Reduction of Manchurian wild rice sites over time in the Wellington region.**  
 (Treatment sites: live foliage present. Interim sites: no live foliage for up to two years. Monitored sites: no live foliage for 2-10 years)



**Graph 8: Comparison of herbicide volume used and control methods for the last 11 years.**



**Graph 9: Plant related enquiries received through the year by category**



**4. Actual costs**

The table below summarises the costs of implementing the Plan in 2021/22:

	<b>Species-Led</b>	<b>Site-Led KNE and TA</b>	<b>Total</b>
<b>Pest Animals</b>	\$1,722,491	\$873,294	\$2,595,785
<b>Pest Plants</b>	\$1,158,948	\$581,802	\$1,740,750
<b>Biocontrol</b>	-	-	\$60,000
<b>Landscape RPPCP</b>	-	-	\$1,309,840
<b>Predator Free Wellington</b>	-	-	\$3,890,327
<b>Total</b>	<b>\$2,881,439</b>	<b>\$1,455,096</b>	-
			<b>\$9,596,702</b>

## **Appendices:**

### **Appendix 1: Chemical Controls in use by GW to implement the Plan in 2021/22.**

#### **Herbicides:**

Amitrole

Clopyralid (Void)

Diquat (Reglone)

Glyphosate 360, 450, 510, 540 (Roundup, Agpro Glyphosate, Cut and Treat Gel)

Haloxypop-P-Methyl (Agpro Haloxypop 100, Ignite)

Metsulfuron-Methyl 600 (Escort, Agpro Meturon, Zeal, Met Gel)

Picloram (Tordon Brushkiller XT, Vigilant II Gel, Tordon 2G granules)

Triclopyr 600 EC (Grazon, Agpro Triclopyr 600, X-Tree Wet & Dry)

Triclopyr 360 Triethylamine (Garlon 360)

#### **Vertebrate Toxic Agents:**

1080 pellets (RS5, No 7)

1080 Paste

Brodifacoum (Pestoff pellets, Pestoff High Strength, Final blocks)

Bromadiolone (Confrac blocks)

Cholecalciferol (cereal pellets and Feracol paste)

Cyanide (Feratox bait bags and pellets)

Diphacinone (50D, Ratabate - Strikers and paste, Ditrac)

Diphacinone and Cholecalciferol (Double Tap)

DRC 1339 paste (rook nest baiting)

Magtoxin (fumigant pellets)

Pindone (rabbit pellets, liquid concentrate)

## Appendix 2: Modified McLean Scale

Scale	Rabbit Infestation
1	No sign seen. No rabbits seen.
2	Very infrequent sign seen. Unlikely to see rabbits.
3	Sign infrequent with faecal heaps more than 10 metres apart. Odd rabbit may be seen.
4	Sign frequent with some faecal heaps more than 5 metres apart, but less than 10 metres apart. Groups of rabbits may be seen.
5	Sign very frequent with faecal heaps less than 5 metres apart in pockets. Rabbits spreading.
6	Sign very frequent with faecal heaps less than 5 metres apart over the whole area. Rabbits may be seen over whole area.
7	Sign very frequent with 2-3 faecal heaps often less than 5 metres apart over the whole area. Rabbits may be seen in large numbers over the whole area.
8	Sign very frequent with 3 or more faecal heaps less than 5 metres apart over the whole area. Rabbits likely to be seen in large numbers over the whole area.

### Appendix 3: Biocontrol agents released in the Wellington region

Agent species name	First released	Total number of known sites	Overall agent status
<b>Boneseed agents</b>			
Boneseed leaf roller	2007	8	suspect failure
<b>Broom agents</b>			
Broom gall mite	2009	800+	established
Broom leaf beetle	2009	3	uncertain
Broom psyllid	1995	1000+	widespread
Broom seed beetle	1994	600+	widespread
Broom shoot moth	2008	3	uncertain
<b>Buddleia agents</b>			
Buddleia leaf weevil	2007	100+	widespread
<b>Darwin's barberry agents</b>			
Darwin's barberry seed weevil	2016	4	present
<b>Gorse agents</b>			
Gorse colonial hard shoot moth	2002	5	failed
Gorse pod moth	1997	abundant	widespread
Gorse soft shoot moth	2007	12	uncertain
Gorse spider mite	1989	abundant	widespread
Gorse thrips	1990	abundant	widespread
<b>Hemlock</b>			
Hemlock moth	-	-	widely established
<b>Japanese Honeysuckle</b>			
Japanese Honshu white admiral butterfly	2017	11	uncertain
<b>Mistflower agents</b>			
Mistflower gall fly	2001	3	established
Mistflower fungus	2009	1	established

<b>Old man's beard agents</b>			
Old man's beard leaf fungus	1997	3	failed
Old man's beard leaf miner	1995	abundant	widespread
Old man's beard sawfly	2002	2	failed
Old man's beard gall mite	2022	4	uncertain, new release
<b>Privet agents</b>			
Privet lace bug	2015	1	failed
<b>Ragwort agents</b>			
Cinnabar moth	2006	abundant	widespread
Ragwort plume moth	2012	11	established
Ragwort flea beetle	1988	abundant	widespread
<b>Smilax agents</b>			
Smilax rust	2020	19	uncertain
<b>Thistle agents</b>			
Californian thistle flea beetle	1994	2	failed
Californian thistle gall fly	2006	1	failed
Californian thistle leaf beetle	1993	3	failed
Californian thistle stem miner	2010	2	uncertain
Green thistle beetle	2008	200+	widespread
Nodding thistle receptacle weevil	1972	9	widespread
Nodding thistle crown weevil	1990	4	established
Nodding thistle gall fly	2005	12	established
Scotch thistle gall fly	2005	79	established
<b>Tradescantia agents</b>			
Tradescantia leaf beetle	2011	12	established
Tradescantia stem beetle	2012	10	uncertain
Tradescantia tip beetle	2013	9	uncertain
Tradescantia yellow leaf spot fungus	2018	10	uncertain, new release
<b>TOTALS:</b>		<b>3000+</b>	



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