Key Native Ecosystem Programme – Small Mammal Monitoring Report

February 2018

greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

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Summary

This report presents the results of the small mammal monitoring conducted at Key Native Ecosystem (KNE) sites in February 2018.

The KNE programme aims to protect some of the best examples of native ecosystem types in the Wellington region by managing, reducing or removing threats to their values. Monitoring of pest animals is carried out to establish whether the control efforts are being effective.

Key results of the small mammal monitoring in February 2018 are summarised below:

- Rat tracking rates were on target for most of the managed KNE sites that were monitored except Johnsonville Park (35 percent) and Porirua Western Forests (13 percent).

- Mice tracking rates were low (i.e. <10 percent) or decreasing at all KNE sites except for Baring Head/Ōrua-pouanui (44 percent) and Queen Elizabeth Park (55 percent) where their tracking rates increased.

- Mustelid tracking rates were very low (i.e. <5 percent) at all KNE sites where they were monitored.

- Hedgehog tracking rates were very low (i.e. ≤5 percent) at Wainuiomata/Orongorongo, East Harbour Northern Forest and Otari/Wilton's Bush KNE sites, but moderately high at Baring Head/Ōrua-pouanui (54 percent) and Belmont Korokoro (33 percent) KNE sites.

Contents

Introduction

The Key Native Ecosystem (KNE) programme aims to protect some of the best examples of native ecosystems in the Wellington region. It is working to achieve this by managing, reducing, or removing threats to their values.

One of the primary threats to native plants and animals is introduced mammals, including rats and mustelids. Control of these pest animals is therefore undertaken at most KNE sites throughout the region. Regular monitoring is carried out to determine the effectiveness of these control efforts.

The purpose of this monitoring is to:

- Report on the effectiveness of small mammal control regimes in forest ecosystems.
- Gain a better understanding of small mammal population dynamics in coastal ecosystems.
- Provide a trigger for management to respond to changes in small mammal populations.
- Identify changes in small mammal populations over time.
- Compare the effectiveness of different control methods.

The information contained in this report is used to report on the KNE programme as a whole, inform the management of individual KNE sites and communicate the outcomes of pest animal control to stakeholders, such as land owners and community groups.

Monitoring sites

Monitoring is conducted in eight monitoring areas, across seven KNE sites (Figure 1). Six of these monitoring areas are dominated by forest and the other two are coastal.

The forest areas were chosen because they are important bird breeding areas. Two of the forest areas, Western Wellington Forests (Johnsonville Park) and Porirua Western Forests, are also being used to trial different control techniques.

The two coastal monitoring areas, at Baring Head/Ōrua-pouanui and Queen Elizabeth Park, were chosen to improve our understanding of pest animal dynamics in coastal environments.

The boundaries of the KNE sites have changed since the monitoring started, but the monitoring area boundaries within them have remained the same. This allows us to compare the data from the monitoring area over time, while still reflecting what is happening within the KNE site. To distinguish these boundaries, both the KNE sites and monitoring areas are shown on the maps.

Methods

The KNE programme monitors rodents (rats and mice), mustelids and hedgehogs. This is done using tracking tunnels, following the Department of Conservation's (DOC) protocol, with two exceptions:

1. The peanut butter used for rodent monitoring is placed in the centre of the tracking cards rather than at each end as specified in the DOC protocol.

   AND

2. The relatively small size of some monitoring areas has resulted in fewer than the recommended number of tracking lines. Consequently, the sample sizes are too small to meaningfully report standard error (SE) values. Monitoring areas affected include: Porirua Western Forest, Queen Elizabeth Park, and Johnsonville Park and Otari Wilton's Bush in the Western Wellington Forests KNE.

We report on the standard error (SE) as this is a measure of how accurately we are estimating the actual TTI for each site using the tracking tunnel lines we sample.

Note that field designs were set up using the latest version of the DOC protocol available at the time of establishment.

A summary of the monitoring schedule is presented in Table 1 below. Only those areas monitored in February are included in this report.

Table 1: Monitoring schedule for the KNE programme

KNE site	Rodent monitoring	Mustelid and hedgehog monitoring
Wainuiomata/Orongorongo	February, May, August, November	November, February
East Harbour Northern Forest	February, May, August, November	November, February
Baring Head/Ōrua-pouanui	February, May, August, November	November, February
Belmont Korokoro	February, May, August, November	February only
Queen Elizabeth Park	February, May, August, November	Nil
Western Wellington Forests – Otari/Wilton's Bush	February, August	February only
Western Wellington Forests – Johnsonville Park	February, August	Nil
Porirua Western Forest	February, August	Nil

Rodent monitoring

Rodent monitoring takes place over one dry night. The rodent tracking tunnel index (TTI) for each area is calculated as the percentage of tunnels that rats or mice were tracked at along each line of tracking tunnels. This is averaged across the lines monitored at most of the KNE sites to give a TTI for the area. At Otari/Wilton's Bush however, tracking tunnels were established on a grid and the TTI is calculated as a percentage of the total number of tunnels tracked.

Note that the tracking tunnel method only provides a coarse index of the relative abundance of rodents and is not a direct measure of their population density. The method is best suited to comparing:

1. Between treatment and control areas established to determine the effectiveness of pest animal control measures at the same site.

   OR

2. Gross changes in the relative abundance in the same area over time.

The relative abundance of rats is compared to management targets that have been set for the various KNE sites. For the Wainuiomata Mainland Island and East Harbour Northern Forest the target is a TTI of no more than 5%. For all the other KNE sites the target for rats is a TTI of no more than 10%.

No target is applied to mice because of the difficulty in controlling mice populations. Controlling rat numbers is considered to be more important than mice populations for protecting bird populations. Mice populations can also increase when rat numbers are controlled due to decreased competition for food.

Rodent tracking can give highly variable results. Consequently, these targets should be considered as aspirational rather than definitive. Management decisions should consider the degree of population change, time-of-year, or the prediction of a coming mast season.

Mustelid and hedgehog monitoring

Mustelid and hedgehog monitoring takes place over three dry nights. Mustelid and hedgehog tracking percentages are calculated based on the percentage of all the tunnels tracked in the monitoring area that these pests were encountered in, irrespective of tracking line. Unlike the rodent monitoring, this provides a single, un-replicated, sample for each monitoring area. Hence the standard error (SE) cannot be calculated for the relative abundance of mustelids or hedgehogs.

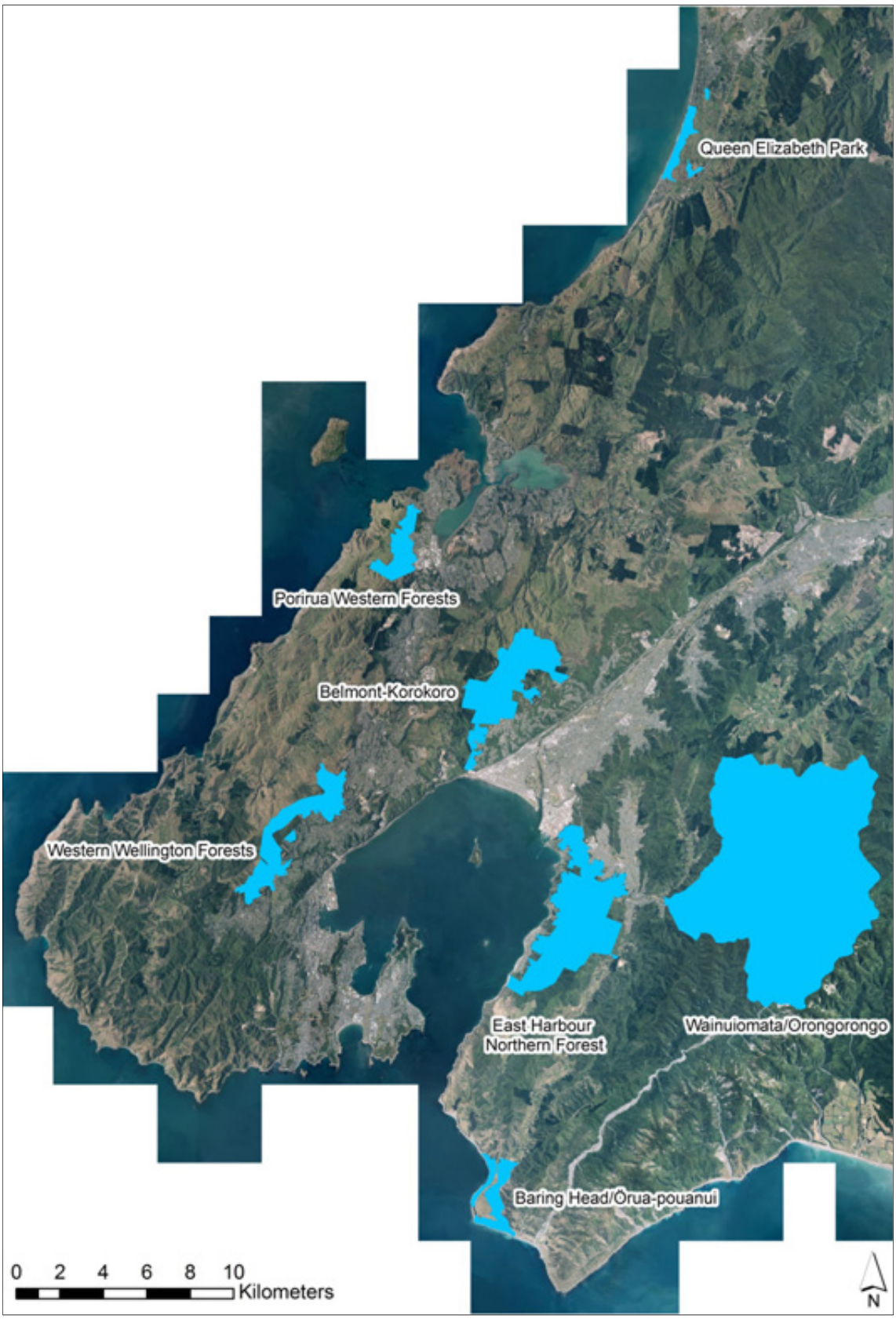

Figure 1: Key Native Ecosystem sites at which small mammal monitoring is conducted

Wainuiomata/Orongorongo

KNE area:	**7,364 ha**
Area monitored:	**Mainland Island: 1,200 ha**
	Non-treatment area: 659 ha
Vegetation type:	Lowland podocarp-rata/beech/broadleaf forest
Surrounding landscape:	Similar native forest/exotic forest/marginal farmland

1. Pest animal control regime

Current pest animal control regime

Possums are controlled over the entire Wainuiomata/Orongorongo KNE site using aerially sown 1080. Aerial 1080 operations are carried out when possum residual trap catch (RTC) results approach or exceed 5%, which occurs every five or six years. Additionally, possums are kept to very low levels within a 1,200 ha Mainland Island (located in the Wainuiomata River catchment) using a network of Warrior kill-traps. Traps within a 300 m inner buffer of the Mainland Island are on a 150 m x 100 m grid and the traps in the interior of the Mainland Island are on a 300 m x 300 m grid.

Rodent control is undertaken in the Mainland Island using Pelifeed bait stations on a 150 m x 100 m grid and at 50 m intervals around the Mainland Island boundary. Baits containing diphacinone or brodifacoum are used depending on rodent numbers.

Mustelids are controlled in the Mainland Island using DOC200 kill-traps spaced at 200 m intervals around the boundary and on lines through the interior that are approximately 1,000 m apart. All mustelid traps and all bait stations and possum traps around the boundary are serviced about every five weeks. The rest of the bait stations and possum traps are serviced about every ten weeks (five times a year).

Mustelids are controlled less intensively in the southern half of the KNE site, outside of the Mainland Island. DOC200 and Good Nature A24 kill-traps are positioned at 100 m intervals on some main ridgelines and spurs. This network of traps is operated by the Rimutaka Forest Park Trust to help protect North Island kiwi that are spreading from a core population in the Turere Valley south of the KNE site.

Pest animal control background

The bait station and possum trap network was installed in 2004 and activated in 2005. Mustelid traps were installed in 2005. In response to a mast year in 2014 hand laid 1080 cereal pellet bait and cholecalciferol paste was used within the Mainland Island to control the sharp increase in rat numbers that occurred. In response to consistently high rat tracking rates following the 2016 mast event diphacinone paste strikers were applied every 10m along bait station lines in

September/October 2017. Aerial 1080 operations were completed in 1999, 2005 and 2012.

Surrounding pest control regimes

OSPRI's TBfree programme undertakes intermittent possum control in the area. The Rimutaka Forest Park Trust undertakes mustelid control south of the KNE site.

2. Rodent monitoring results

Rodent monitoring				
Date of monitor: 8-9 February 2018				
Species	Tracking rate (%TTI) Mainland Island	SE (%)	Tracking rate (%TTI) Non-treatment area	SE (%)
Rats	6	3	91	3
Mice	0	0	0	0

3. Mustelid and hedgehog monitoring results

Mustelid and hedgehog monitoring		
Date of monitor: 9-12 February 2018		
Species	% of tunnels tracked Mainland Island	% of tunnels tracked Non-treatment area
Mustelids	4	0
Hedgehogs	0	3

4. Analysis and comments

The rat tracking rate in the Mainland Island (6 percent) increased from 4 percent in the November 2017 monitor to around the five percent target. The rat tracking rate in the Non-treatment Area remained high at 91 percent (Figure 2).

No mice were recorded in either the Mainland Island or Non-treatment Area (Figure 3).

Mustelids tracked on four percent of the tunnels in the Mainland Island but were not recorded in the Non-treatment Area.

No hedgehogs were recorded in the Mainland Island. In the Non-treatment Area hedgehogs tracked at three percent, down from their 10 percent tracking rate in November 2017.

Possum were tracked on three tunnels on line C1 in the Non-treatment Area during the rodent monitor. Possum was also recorded on one card on the same line during the mustelid monitor.

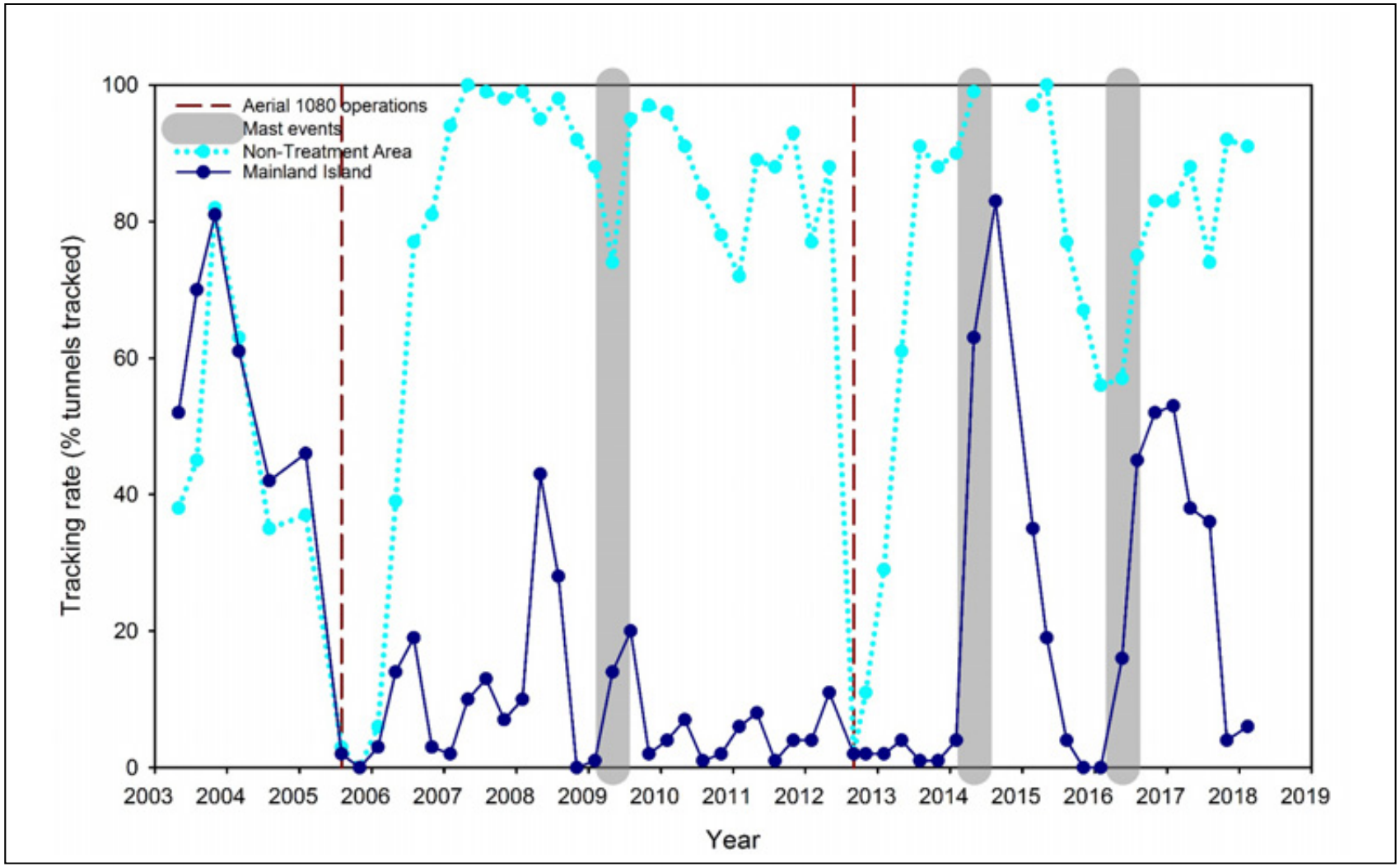

Figure 2: Rat tracking rates in the Wainuiomata/Orongorongo KNE site Mainland Island and Non-treatment Area

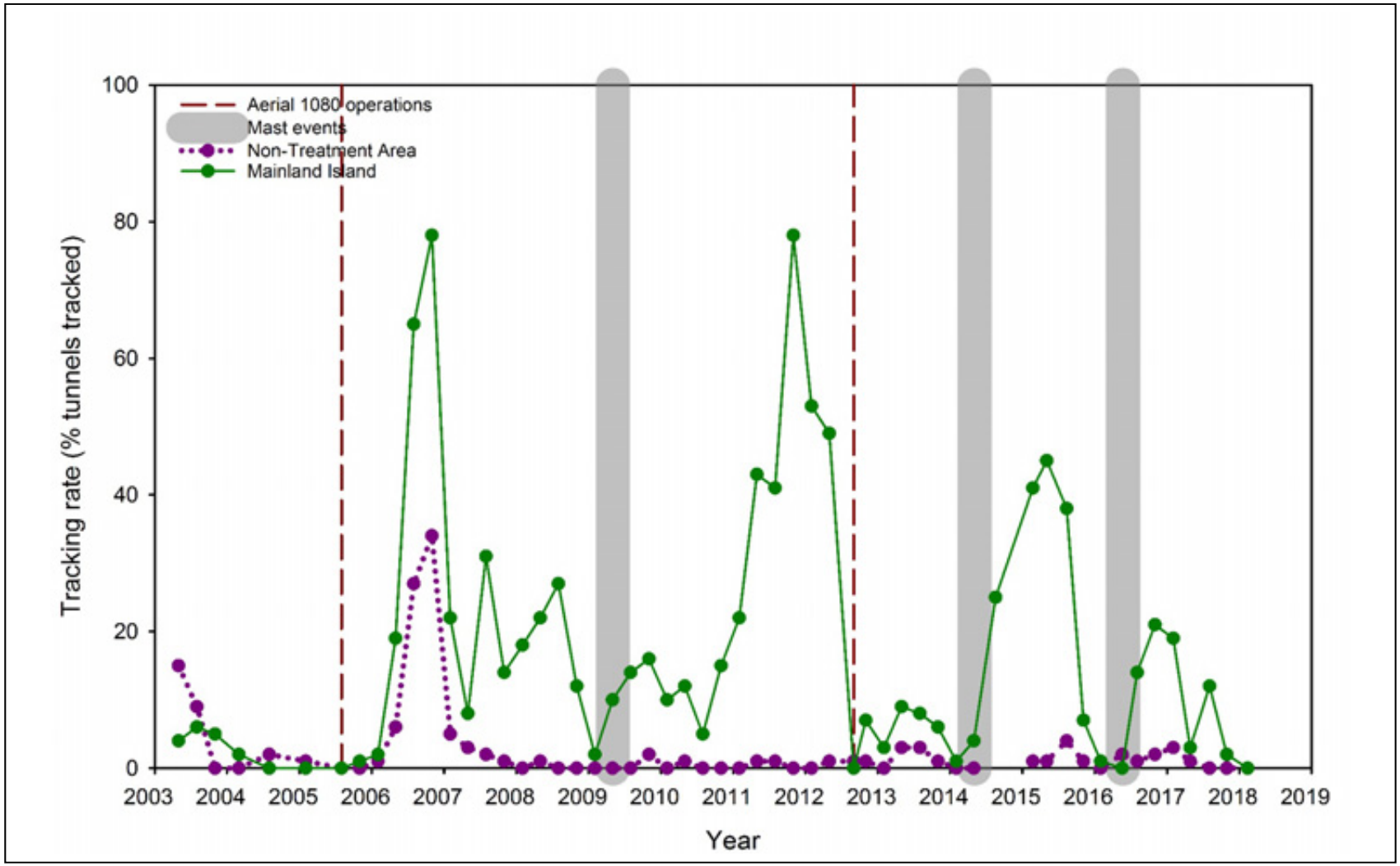

Figure 3: Mouse tracking rates in the Wainuiomata/Orongorongo KNE site Mainland Island and Non-treatment Area

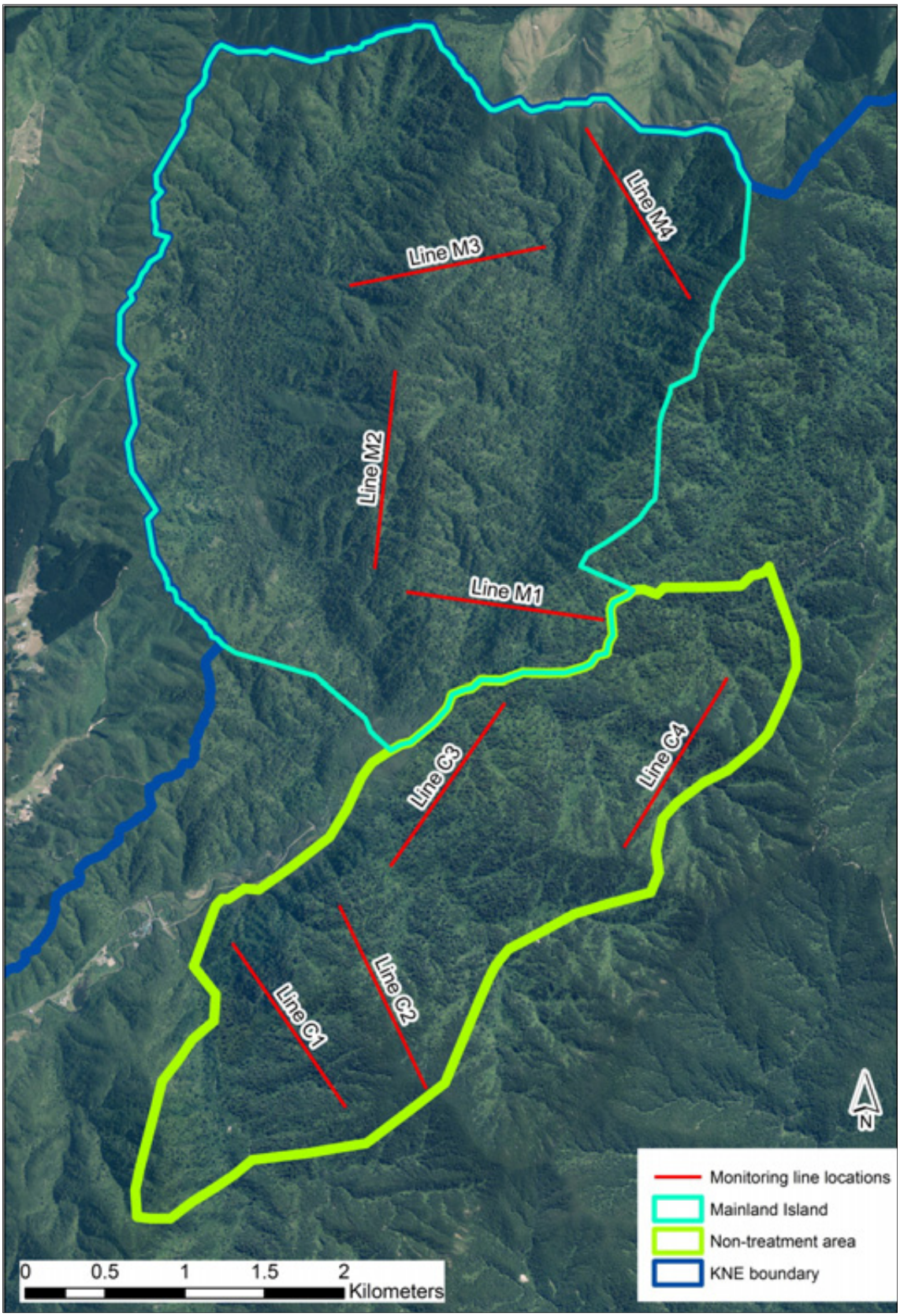

Figure 4: Wainuiomata/Orongorongo KNE site Mainland Island and Non-treatment Area, showing the locations of the tracking tunnel lines

East Harbour Northern Forest

KNE area:	**1,646 ha**
Area monitored:	**Mainland Island: 400 ha**
	Non-treatment area: 350 ha
Vegetation type:	Lowland podocarp/broadleaf/beech-rata forest
Surrounding landscape:	Urban residential, regenerating native scrub, and a small area of beech forest

1. Pest animal control regime

Current pest animal control regime

Possums are controlled throughout the KNE site using Possum Master and Timms kill-traps spaced at 150 m intervals along main ridges and gullies and by utilising official and unofficial walking tracks. Bait stations containing either bromadiolone or diphacinone are positioned at each trap site to reduce the consumption of trap baits by rodents. The possum traps and associated bait stations are serviced monthly by volunteers.

Rats are controlled within a 400 ha Mainland Island using bait stations, the southern half on a 100 m x 150 m grid and the northern half on a 50 m x 150 m grid. Bait stations are serviced six times a year. Baits (block, pellet or paste) containing diphacinone, bromadioline or brodifacoum are used. Mustelids are controlled within the mainland island using DOC200 kill-traps spaced at roughly 300 m intervals around the boundary of the Mainland Island and on the main internal ridgeline. Volunteers service the traps monthly.

Pest animal control background

Possum control was carried out in parts of the KNE site from 1997 to 2001 by contractors and volunteers. Control operations were extended to the whole KNE site in 2001 and 2003-04 using leg-hold and kill traps, encapsulated cyanide and cholecalciferol. Ongoing possum control continued from 2004 using kill-traps.

Bait stations were installed to control rats in an initial Mainland Island area of 300 ha in 2005-2006. Additional lines and bait stations were installed to expand the Mainland Island to 370 ha in 2009 and to 400 ha in 2010. Bait stations were intensified in the northern half of the Mainland Island to a 50 m x 150 m grid in 2010. The southern half was left at 100 m x150 m spacing. Mustelid traps have been installed within and around the Mainland Island incrementally since 2011.

Surrounding pest control regimes

There is possum and rat control using bait stations filled with brodifacoum adjacent to the northern tip of the site. OSPRI's TBfree programme undertakes intermittent possum control in the area, the latest of which in May 2017 included the KNE site.

2. Rodent monitoring results

Rodent monitoring				
Date of monitor: 29-30 February 2018				
Species	Tracking rate (%TTI) Mainland Island	SE (%)	Tracking rate (%TTI) Non-treatment area	SE (%)
Rats	0	0	28	17
Mice	0	0	4	4

3. Mustelid and hedgehog monitoring results

Mustelid and hedgehog monitoring		
Date of monitor: 30 February – 2 March 2018		
Species	% of tunnels tracked Mainland Island	% of tunnels tracked Non-treatment area
Mustelids	4	4
Hedgehogs	0	4

4. Analysis and comments

No rats were recorded in the Mainland Island for the second monitor in a row following the change to a stronger toxin, brodifacoum (Figure 5). The rat tracking rate in the Non-treatment Area (28 percent) continued its decreasing trend that started a year ago in February 2017 (66 percent).

The mice tracking rate continued to decrease in the Mainland Island (from 32 to 6 to 0 percent over the last three monitors). In the Non-treatment Area, the mice tracking rate increased slightly from the last monitor (from 6 to 0 to 4 percent) (Figure 6).

The mustelid tracking rate was four percent in the Mainland Island, but mustelids were not encountered in the Non-treatment Area. This translates to mustelid prints being recorded in one of the 25 tunnels tracked (5 lines of 5 tunnels each). So, although present, mustelids are at very low densities.

Hedgehogs were also recorded at very low densities, being tracked at four percent in both the Mainland Island and Non-treatment Area. Again, this amounted to hedgehog being tracked in only one of the 25 tunnels sampled in each area.

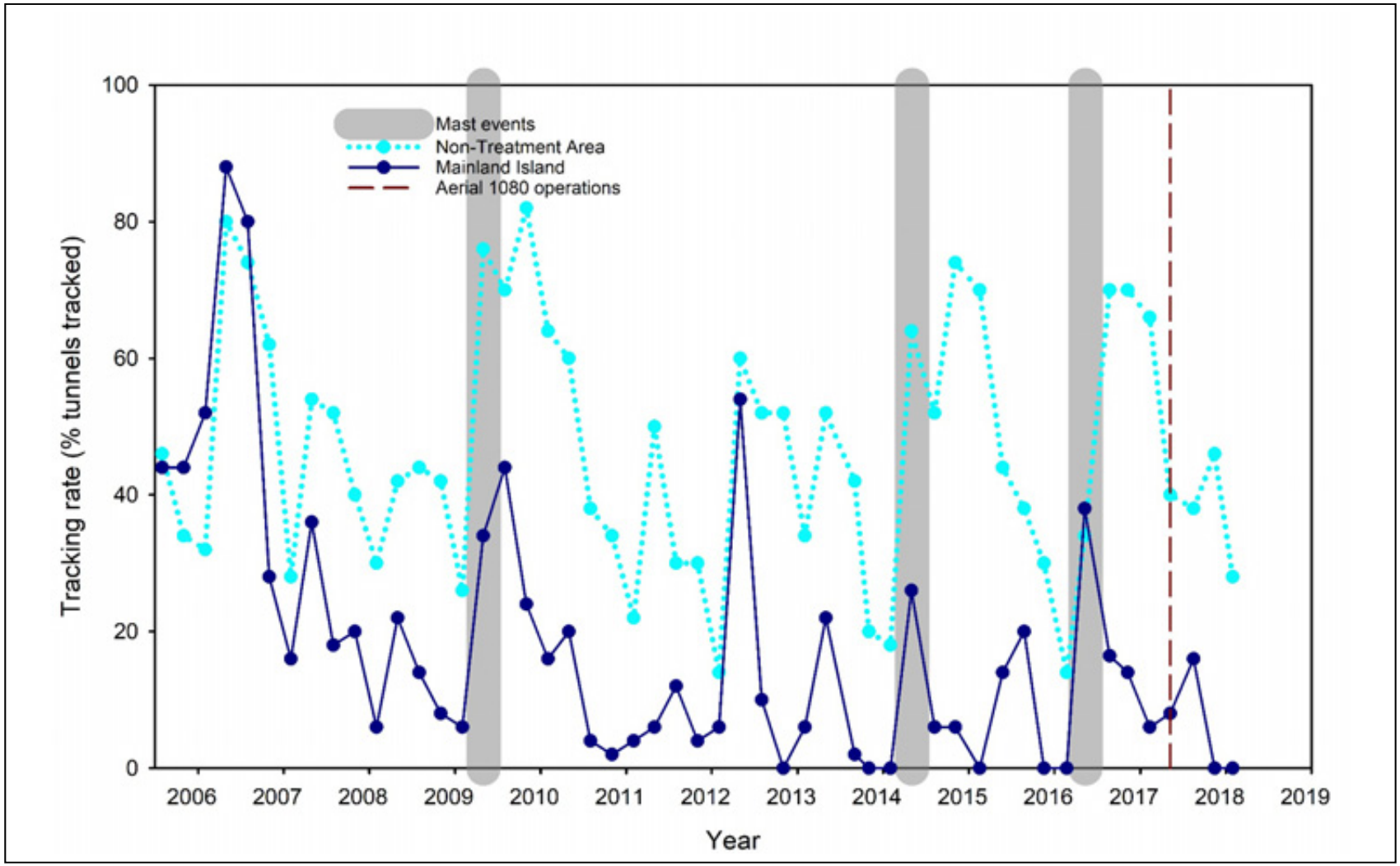

Figure 5: Rat tracking rates in the East Harbour Northern Forest KNE site Mainland Island and Non-treatment Area

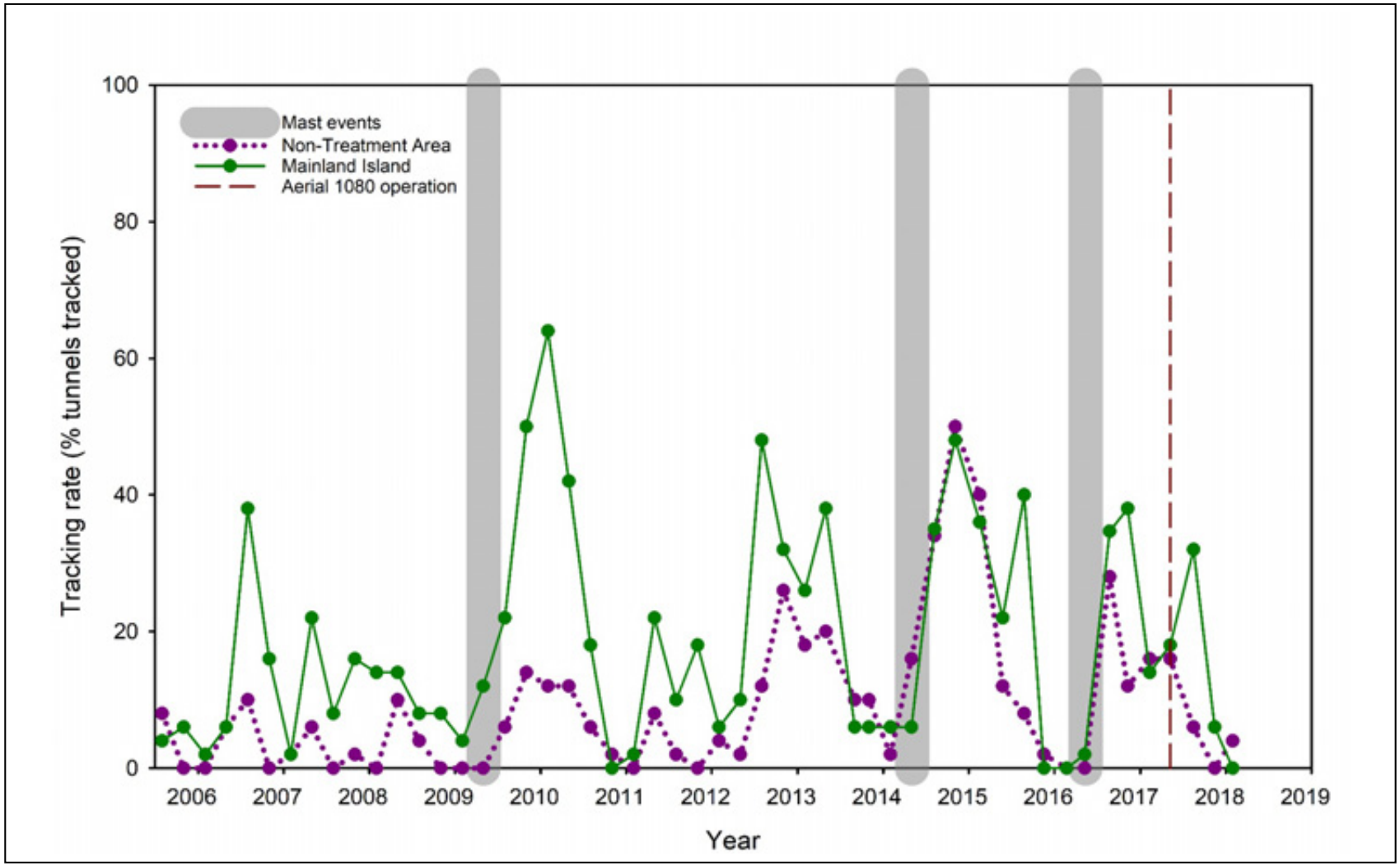

Figure 6: Mouse tracking rates in the East Harbour Northern Forest KNE site Mainland Island and Non-treatment Area

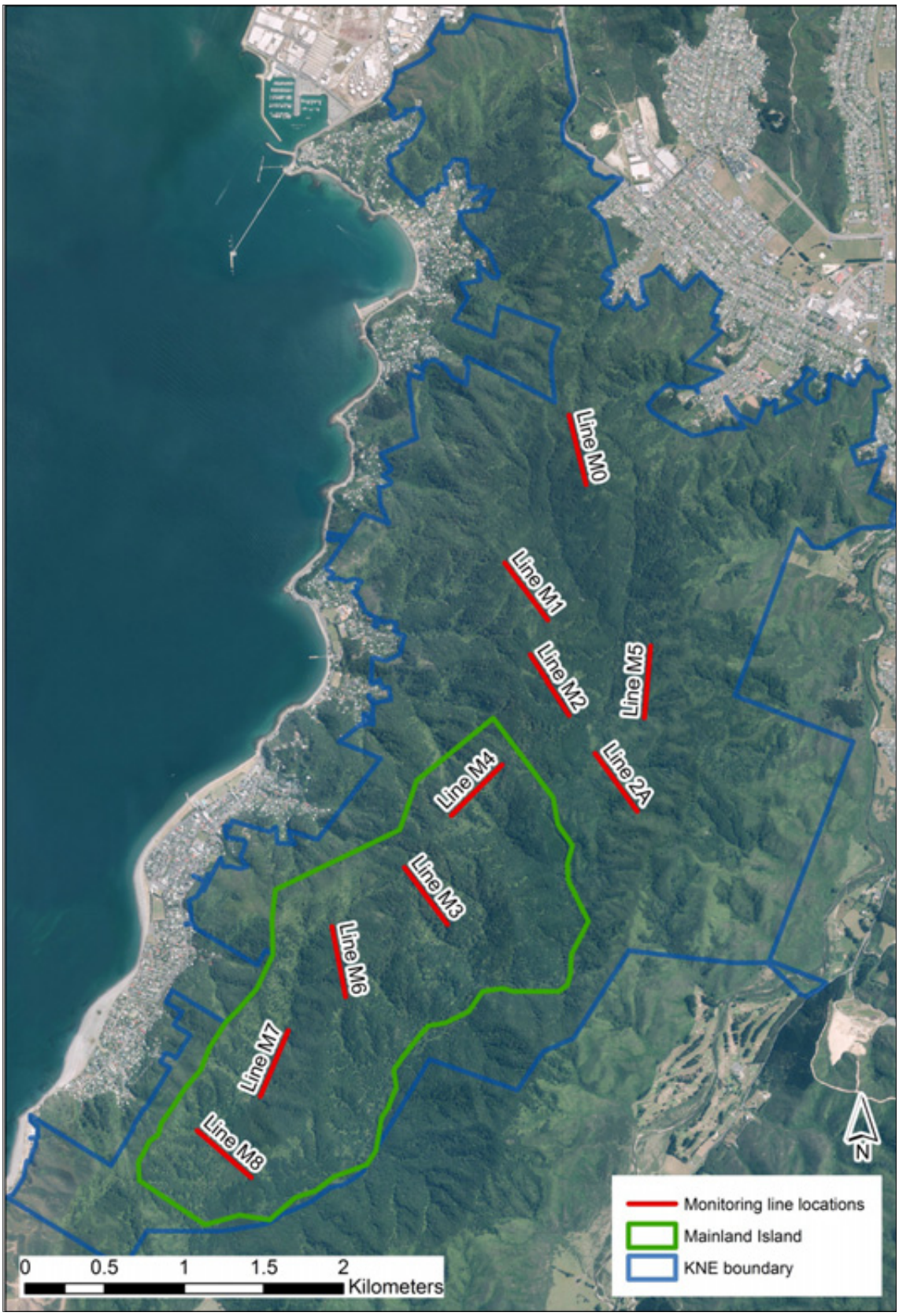

Figure 7: East Harbour Northern Forest KNE site Mainland Island and Non-treatment Area, showing the location of tracking the tunnel lines

Baring Head/Ōrua-pouanui

KNE area:	**278 ha**
Area monitored:	**295 ha**
Vegetation type:	Coastal grey scrub, marram-spinifex dunes and semi coastal forest
Surrounding landscape:	Coast, farmland, grey scrub

1. Pest animal control regime

Current pest animal control regime

Possums are controlled across the site using Timms traps where stock grazing occurs and Pelifeed bait stations elsewhere. Traps and bait stations are spaced at approximately 150 m intervals. Pellet baits containing brodifacoum are used in the bait stations.

Mustelids are controlled using DOC200 kill-traps at 100 m spacing on lines across the site. More intensive predator control is undertaken behind the banded dotterel habitat on the coastal platform with a line of DOC200 kill-traps and Timms traps spaced 50 m apart. Traps are serviced fortnightly by volunteers.

Mice and cats are controlled in five core areas of lizard habitat on the Wainuiomata River escarpment. Mice are controlled using block baits containing brodifacoum in wooden tunnel bait stations spaced at 25 m intervals. Each core area has two Timms traps for controlling cats.

Pest animal control background

Timms and DOC200 kill-traps were installed in 2013. Pelifeed and wooden tunnel bait stations were installed in 2016. The site is part of an OSPRI (formerly TBfree New Zealand) control area for possums.

Surrounding pest control regimes

DOC200 kill-traps are present in the adjacent property to the east. OSPRI's TBfree programme undertakes intermittent possum control in the area.

2. Rodent monitoring results

Rodent monitoring		
Date of monitor: 3-4 February 2018		
Species	Tracking rate (%TTI)	SE (%)
Rats	5	4
Mice	44	7

3. Mustelid and hedgehog monitoring results

Mustelid and hedgehog monitoring	
Date of monitor: 4-7 February 2018	
Species	% of tunnels tracked
Mustelids	3
Hedgehogs	54

4. Analysis and comments

Rats were tracked on one tunnel on line 3 and three tunnels on line 4, both lines being on the beach.

The mice tracking rate increased again to 44 percent after having decreased from 64 to 28 percent over winter 2017 (Figure 8).

Mustelids tracked in one tunnel (of 37 returned), with a weasel being recorded on line 8.

The hedgehog tracking rate (54 percent) increased from the previous monitor where they tracked at their lowest recorded rate (35 percent) (Figure 9). Hedgehog tracking rates have oscilated between an upper average of 80 percent and a lower average of 52 percent since the start of sampling in November 2011. The February 2018 record therefore sees their tracking rate return to their lower average. The results are not consistent for season, but hedgehog tracking rates have more often been higher in February than November which is to be expected as they come out of hibernation.

Skinks were encountered in 10 tunnels across lines 3-7 during the rodent monitor. Skinks were again encountered during the mustelid and hedgehog monitor in seven tunnels across lines 3-6 and 8. No skinks were recorded on lines 1 or 2 in the exotic grasslands on the central plateau.

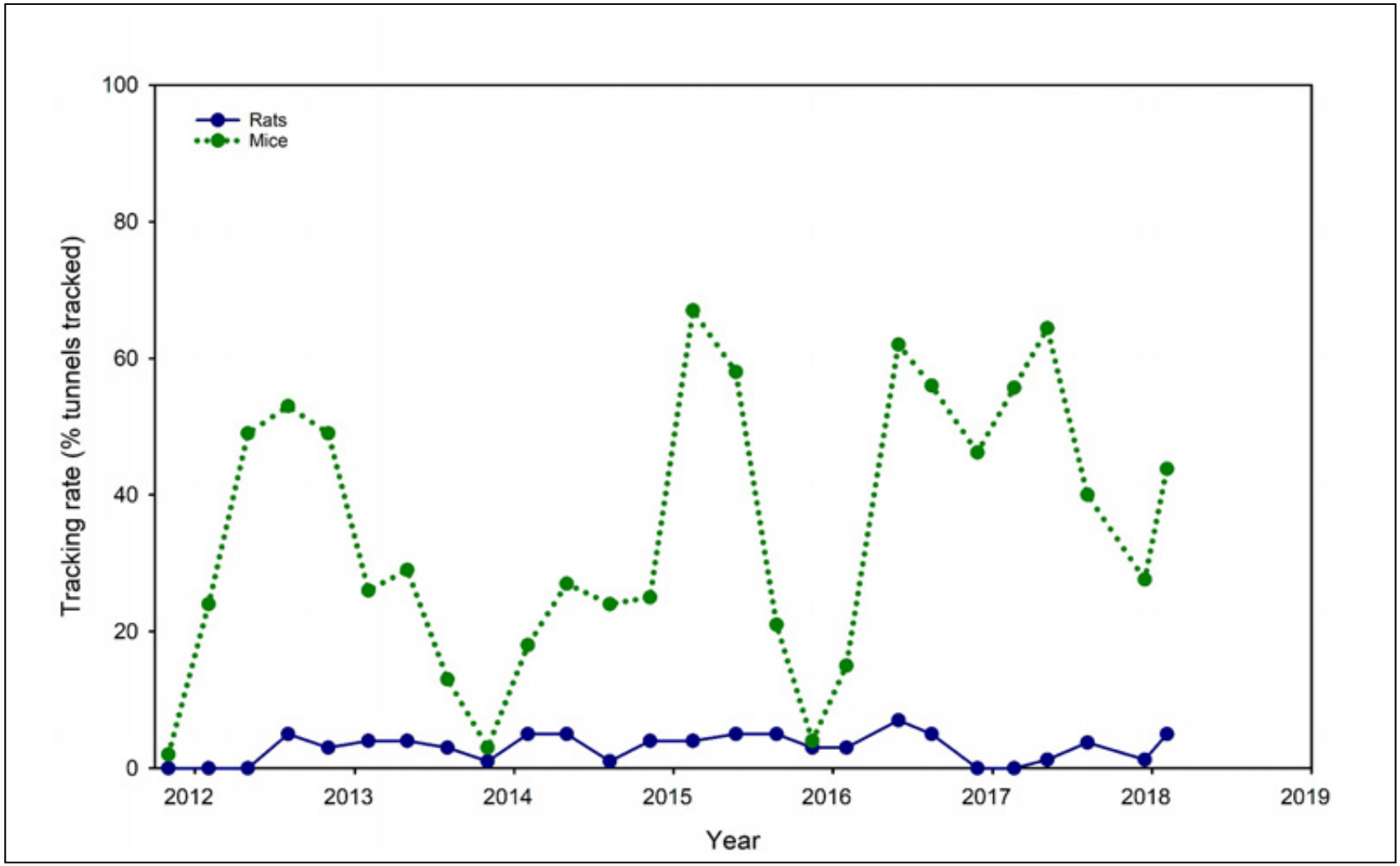

Figure 8: Rat and mouse tracking rates in the Baring Head/Ōrua-pouanui KNE site

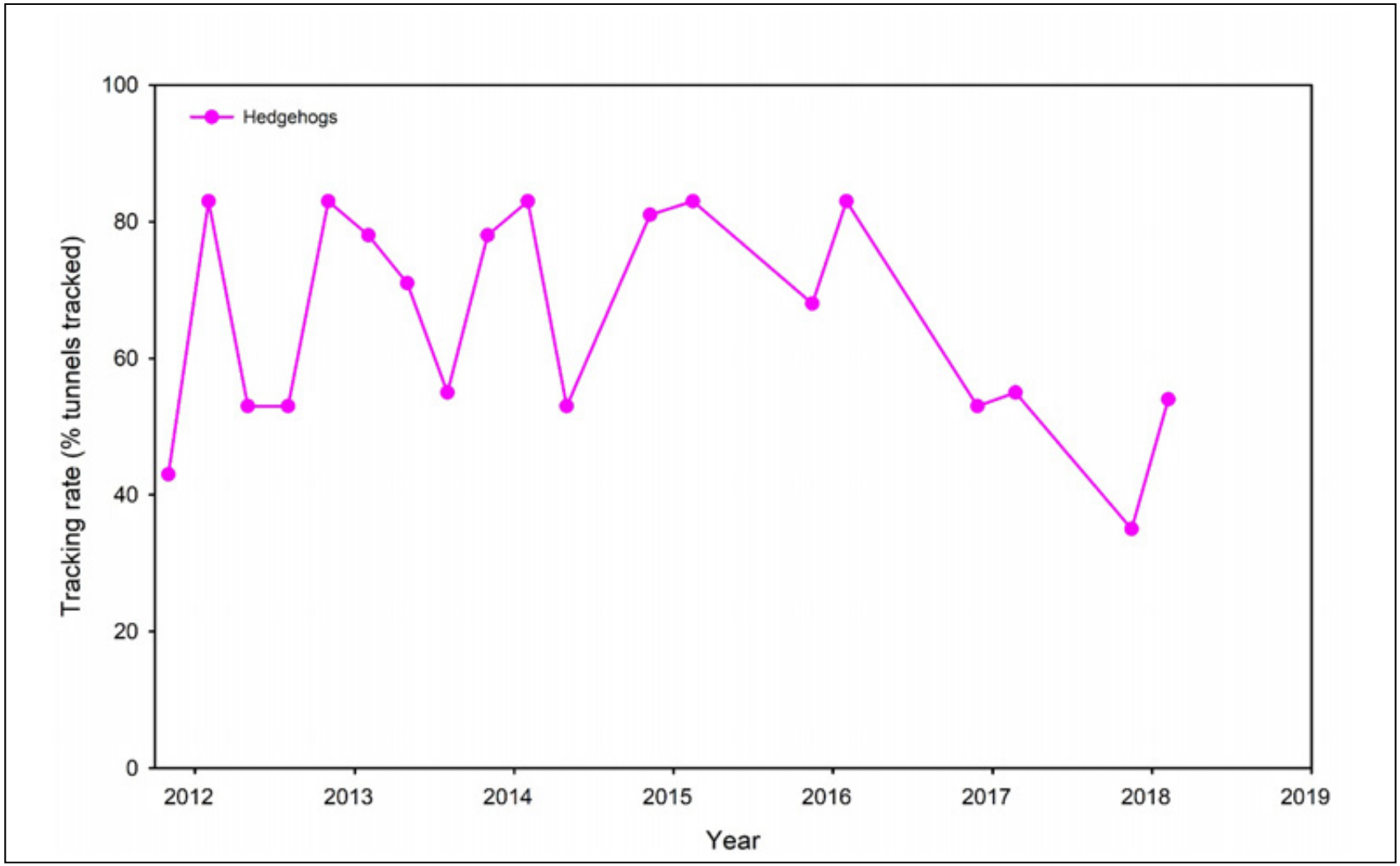

Figure 9: Hedgehog tracking rates in the Baring Head/Ōrua-pouanui KNE site

Figure 10: Baring Head/Ōrua-pouanui KNE site, showing the location of the tracking tunnel lines

Belmont Korokoro

KNE area:	**1,084 ha**
Area monitored:	**444 ha**
Vegetation type:	Rimu-rata/tawa-kohekohe forest and regenerating broadleaf forest
Surrounding landscape:	Urban and peri-urban residential, and farmland

1. Pest animal control regime

Current pest animal control regime

Possums and rats are controlled in about 490 ha (the southern half of the KNE site) using a combination of bait stations and Warrior kill traps on a 150 m x 150 m grid. Bait stations and traps are serviced four times a year using baits containing brodifacoum and bromadiolone in the bait stations. Possums are controlled in the rest of the KNE site periodically by OSPRI's TBfree programme.

Pest animal control background

An initial possum and rat control operation was carried out in 2004. This covered about 340 ha of the south eastern part of the KNE site using encapsulated cyanide and cholecalciferol. Ongoing control using bait stations, brodifacoum, and pindone then proceeded. A further 150 ha on the western side of the KNE site was added to the control regime in 2009. Toxins were replaced with kill-traps for possum control and bromadiolone blocks were used for rat control in about half of the site (eastern) from 2011 to increase the efficiency of servicing the control network. Brodifacoum use throughout the control area was recommenced in 2014 to restrain increasing rat numbers. A possum control operation was carried out in the northern half of the KNE site in 2014 by OSPRI's TBfree programme.

Surrounding pest control regimes

OSPRI's TBfree programme undertakes intermittent possum control in the area. Ongoing possum control using brodifacoum in bait stations is carried out in urban reserves to the west and east by Wellington and Lower Hutt City Councils respectively.

2. Rodent monitoring results

Rodent monitoring		
Date of monitor: 17-18 February 2018		
Species	Tracking rate (%TTI)	SE (%)
Rats	5	5
Mice	12	7

3. Mustelid and hedgehog monitoring results

Mustelid and hedgehog monitoring	
Date of monitor: 18-21 February 2018	
Species	% of tunnels tracked
Mustelids	0
Hedgehogs	33

4. Analysis and comments

After reaching its highest recorded tracking rate in August 2017 (32 percent), the rat tracking rate continued to decrease from eight percent in November 2017, to a five percent tracking rate recorded in this monitor (Figure 11).

The mice tracking rate showed a similar decrease, from 30 percent in August 2017, to 13 percent in November 2017, to 12 percent in this monitor (Figure 11).

No mustelids were encountered in the monitor.

Hedgehogs were first monitored in February 2010 when a tracking rate of 17 percent was recorded. Hedgehogs have been monitored every February since, increasing steadily to 50 percent tracking rate in 2013. After the Brodifacoum application in 2014 no hedgehog tracking was recorded in the 2015 monitor. Since 2015 their tracking rate has been steadily climbing (13 percent in 2016 to 23 percent in 2017), to the most recent monitor (in 2018) where hedgehogs were tracked at 33 percent. The steady increase of 12-15 percent tracking rate each year in the first years of monitoring is being repeated in recent years (since 2015). Based on the earlier experience, we can expect the population to continue to increase unless numbers are brought under control.

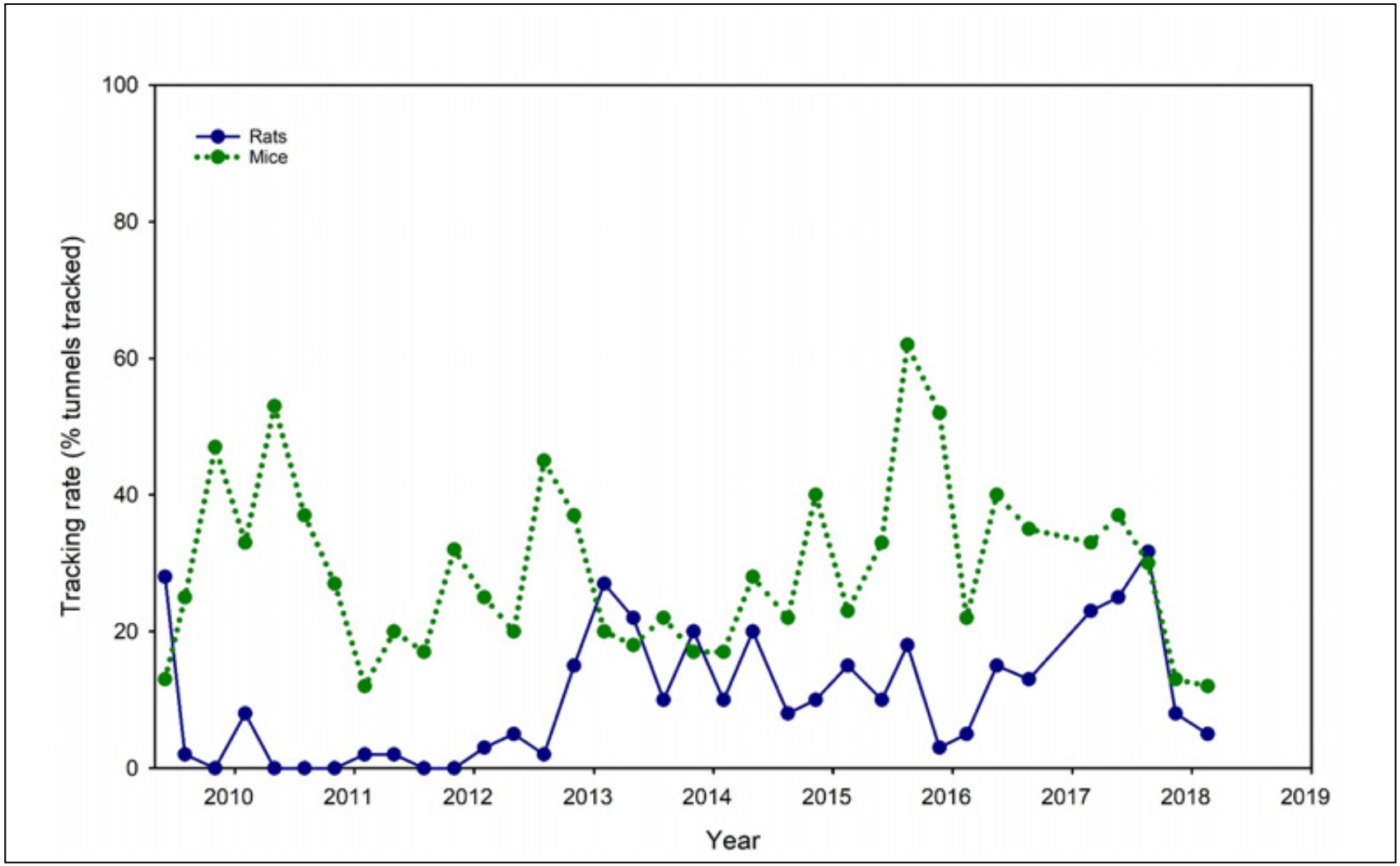

Figure 11: Rat and mouse tracking rates in the Belmont Korokoro KNE site

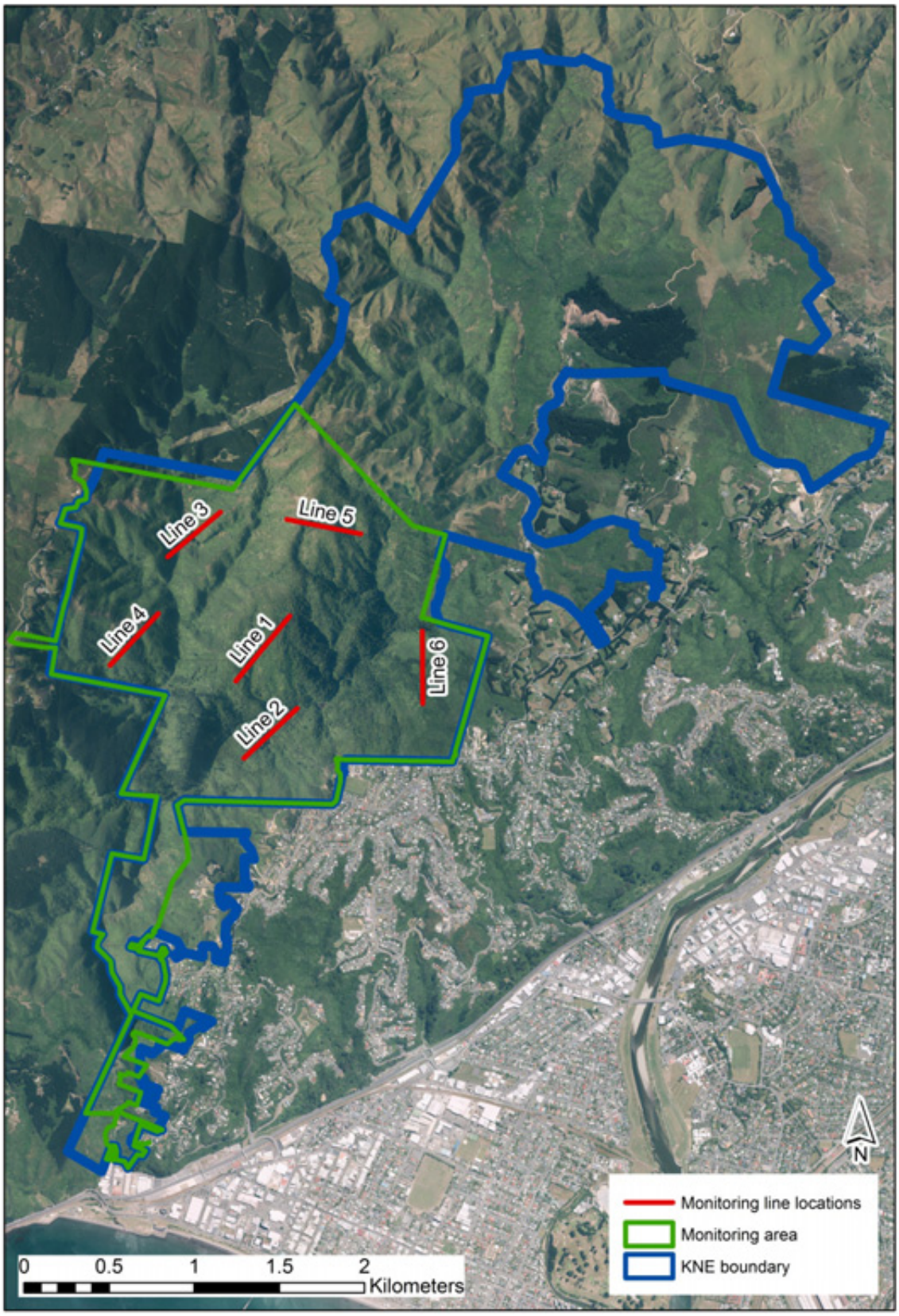

Figure 12: Belmont Korokoro KNE site, showing the location of the tracking tunnel lines

Queen Elizabeth Park

KNE area:	**161 ha**
Area monitored:	**146 ha**
Vegetation type:	Coastal dune scrub and regenerating coastal broadleaf forest
Surrounding landscape:	Farmland, coastline and urban residential

1. Pest animal control regime

Current pest animal control regime

Possum control is undertaken in duneland using 14 Timms traps and in the remnant forest using two Pelifeed bait stations loaded with brodifacoum pellets. Mustelids are controlled throughout the KNE site using DOC200 kill-traps spaced at about 200 m intervals. Rats are controlled through the dunelands using 20 Good Nature A24 kill-traps positioned in the most mature patches of coastal bush. A volunteer services all of the traps every two to three weeks.

Pest animal control background

Mustelid control in the KNE site commenced in 2008 as part of a control operation across Queen Elizabeth Park. Between 2008 and 2016 more DOC200 traps were added to the mustelid control network and Timms traps were added for possum control. Good Nature rat traps were installed in the dunelands in 2016.

Surrounding pest control regimes

Possums are controlled on adjacent farmland within Queen Elizabeth Park using widely spaced bait stations loaded with Brodifacoum every six months. Mustelids are controlled within this same area with DOC200 traps spaced at 100m-200 m intervals on lines positioned about 500 m apart. Mustelids are also controlled with traps on the adjacent Whareroa Farm and Raumati escarpment.

2. Rodent monitoring results

Rodent monitoring	
Date of monitor: 27-28 February 2018	
Species	Tracking rate (%TTI)
Rats	5
Mice	55

3. Analysis and comments

The rat tracking rate has dropped within the target range, while the mice tracking rate continues to fluctuate widely, increasing again in this monitor from 30 percent recorded to 55 percent (Figure 13).

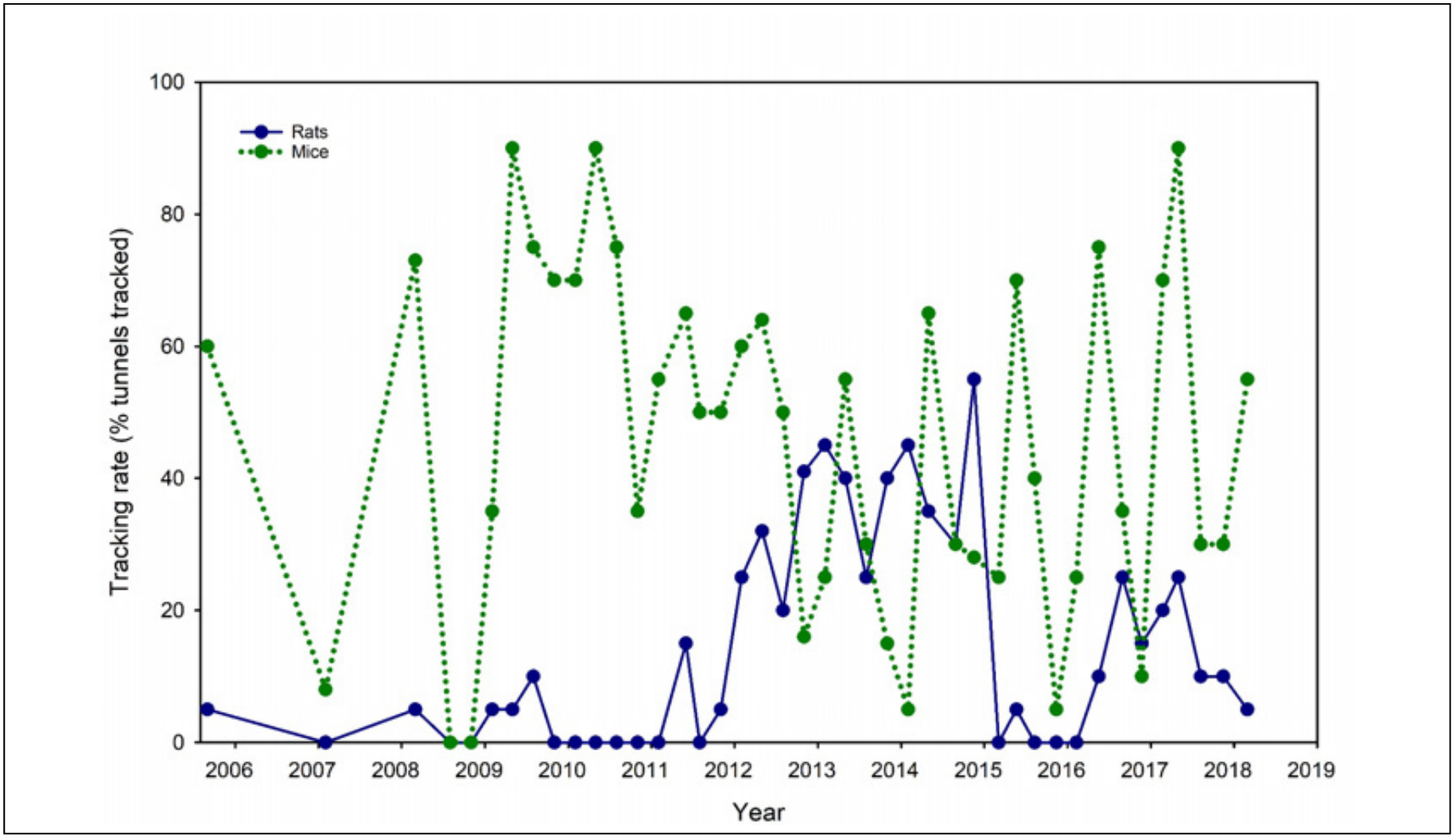

Figure 13: Rat and mouse tracking rates in the Queen Elizabeth Park KNE site

Figure 14: Queen Elizabeth Park KNE site, showing the location of the tracking tunnel lines

Wellington Western Forests – Otari/Wilton's Bush

KNE area:	**714 ha**
Area monitored:	**85 ha**
Vegetation type:	Regenerating broadleaved and podocarp forest
Surrounding landscape:	Urban/residential and exotic dominated vegetated hills

1. Pest animal control regime

Current pest animal control regime

Possum and Rodent control is undertaken with 82 Pelifeed bait stations using brodifacoum poison bait on a 150m x 150m grid. The network is serviced four times a year at intervals of three months by Biosecurity staff.

Mustelid control using 44 DOC 200 kill-traps is undertaken on off main walking tracks. Volunteers service this four times a year at three monthly intervals.

Pest animal control background

Cyanide paste and baits containing brodifacoum were initially used in 1993. The bait station network was installed in 1997 on a 150m x 150m grid using brodifacoum cereal pellets. Biosecurity staff serviced the network four times a year. The DOC200 kill-traps were installed in 2007 and are serviced by volunteers.

Surrounding pest control regimes

Timms traps targeting re-invading possums on skyline track. Bait stations and DOC 200 kill-traps in neighbouring Chartwell/Johnston Hill reserve areas are contiguous with the Otari trapping regime. The Regional Possum Predator Control Programme is operating to the west of the KNE site.

2. Rodent monitoring results

Rodent monitoring	
Date of monitor: 28 February – 1 March 2018	
Species	Tracking rate (%TTI)
Rats	3
Mice	22

3. Mustelid and hedgehog monitoring results

Mustelid and hedgehog monitoring	
Date of monitor: 1-3 March 2018	
Species	% of tunnels tracked
Mustelids	0
Hedgehogs	5

4. Analysis and comments

The rat tracking rate has remained low (3 percent) below the ten percent target (Figure 15).

The mice tracking rate decreased slightly from its highest recorded level (32 percent) in August 2017 to 22 percent in the recent monitor (Figure 15).

No cats were recorded, but hedgehogs were tracked on five of the 59 tunnels that returned cards. One skink was also encountered during the mustelid and hedgehog monitor.

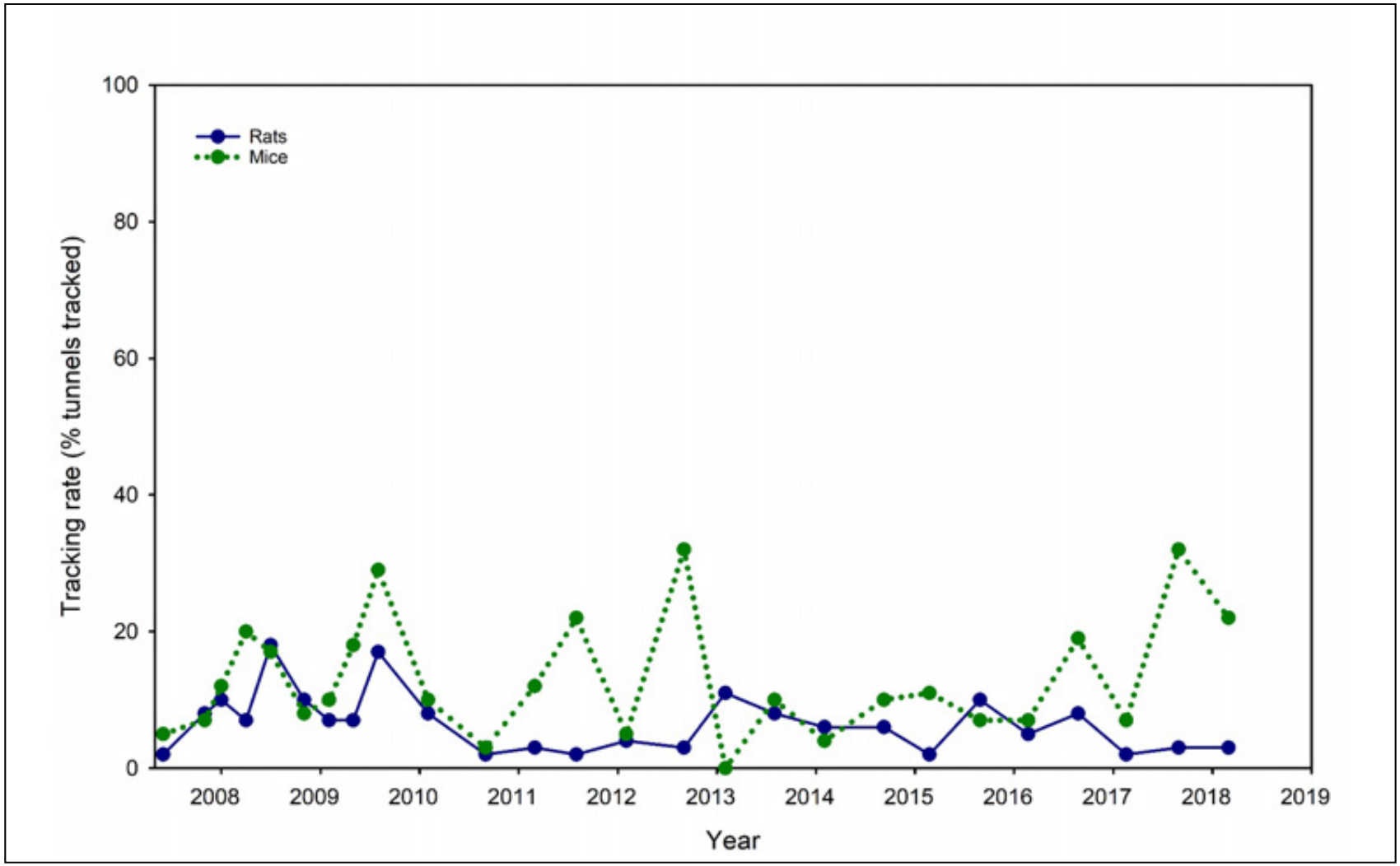

Figure 15: Rat and mouse tracking rates in the Western Wellington Forest KNE site (Otari/Wilton's Bush)

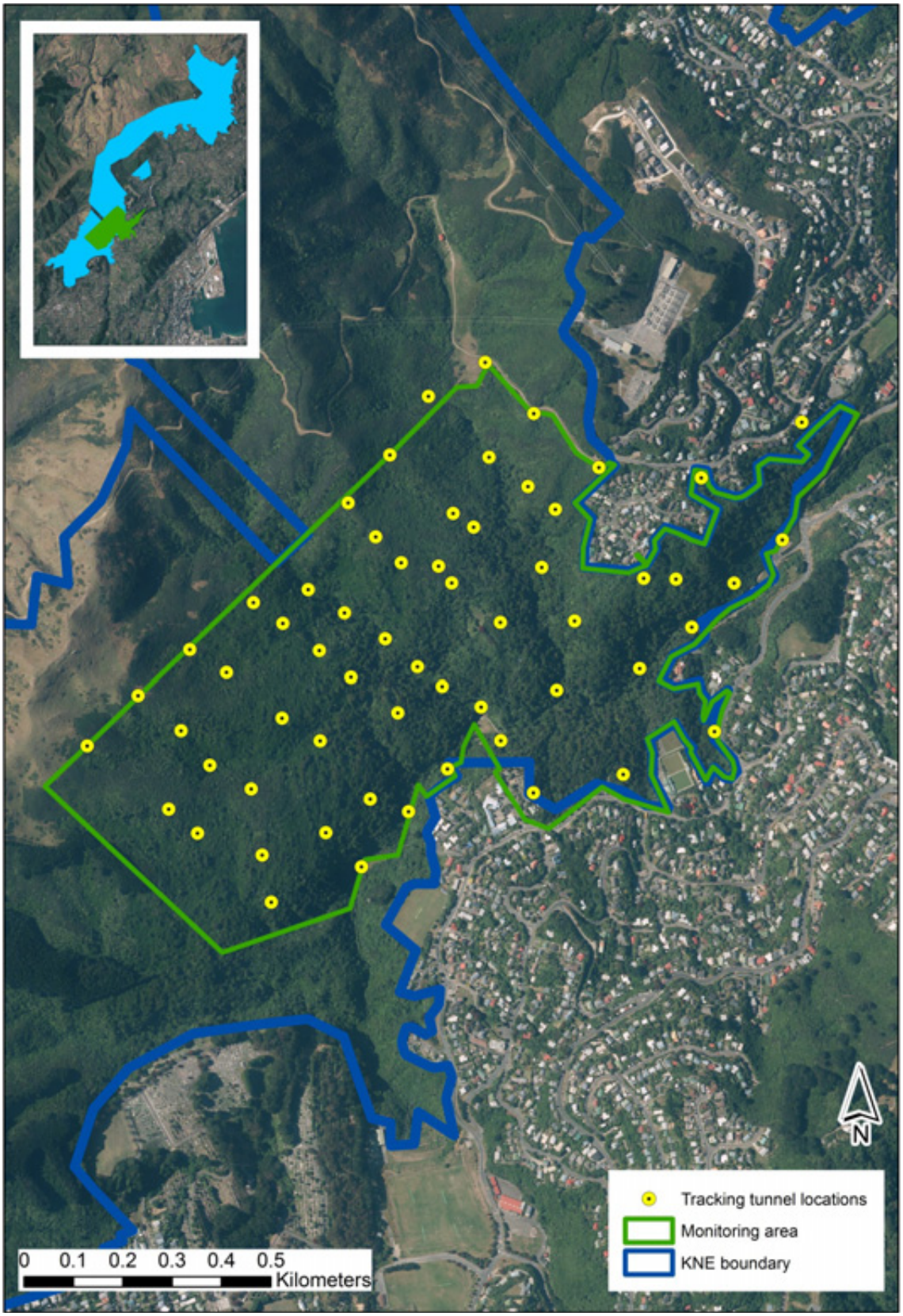

Figure 16: Western Wellington Forest KNE site (Otari/Wilton's Bush), showing the location of the tracking tunnels

Pest Animal Control test site – Western Wellington Forests – Johnsonville Park

KNE area:	**714 ha**
Area monitored:	**118 ha**
Vegetation type:	Regenerating broadleaved and podocarp forest
Surrounding landscape:	Urban/residential and exotic dominated vegetated hills

1. Pest animal control regime

Current pest animal control regime

This site is now a trial site and is used to test the efficacy of new pest control techniques. Between 2010 and 2012 Diphacinone pellet and pindone pellet baits were trialled and since 2012 A24 Good Nature gas operated rat traps have been trialled using trap spacings greater than the manufacturer's recommendation. The network is serviced four times per year, at intervals of three months, by Biosecurity staff.

Pest animal control background

Bait stations for rodent and possum control were installed in 1998 on a 150m x 150m grid and were serviced four times a year. Baits containing brodifacoum, feratox and cholecalciferol were initially used, but between 2003 and 2010, Brodifacoum cereal pellets were used.

Surrounding pest control regimes

The Regional Possum Predator Control Programme is operating to the west of the KNE site.

2. Rodent monitoring results

Rodent monitoring	
Date of monitor: 1-2 March 2018	
Species	Tracking rate (%TTI)
Rats	35
Mice	15

3. Analysis and comments

The rat tracking rate increased from 15 percent in August 2017 to 35 percent in the February 2018 monitor (Figure 17). This increase was the third in a series of fluctuations since the tracking rate peaking at its highest recorded level (50 percent) in August 2015. Such fluctuations are more typical of mice tracking rates (see for example Queen Elizabeth Park). They are, however driven, in part, by the low sampling intensity (2 lines) and frequency (2 monitors per year). Nevertheless, the rat tracking rate remains well above the target level of 10 percent.

In contrast, the mice tracking rate showed a marked decrease from 40 to 15 percent (Figure 17). The fluctuations in the mice tracking rates have not been synchronised with the rat tracking rate, suggesting that competition and predation by rats is not driving mice tracking rates.

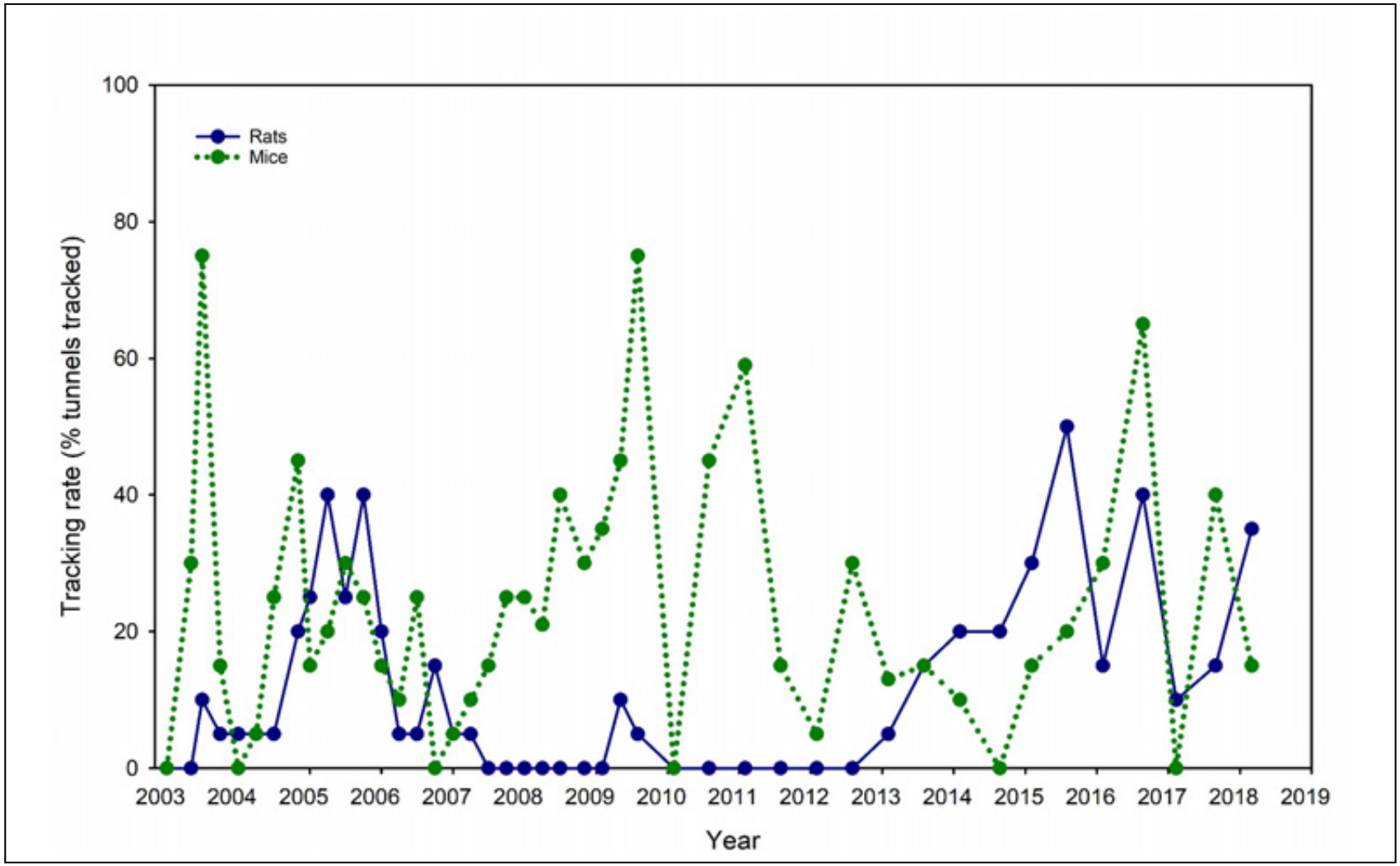

Figure 17: Rat and mouse tracking rates in the Western Wellington Forests KNE site (Johnsonville Park)

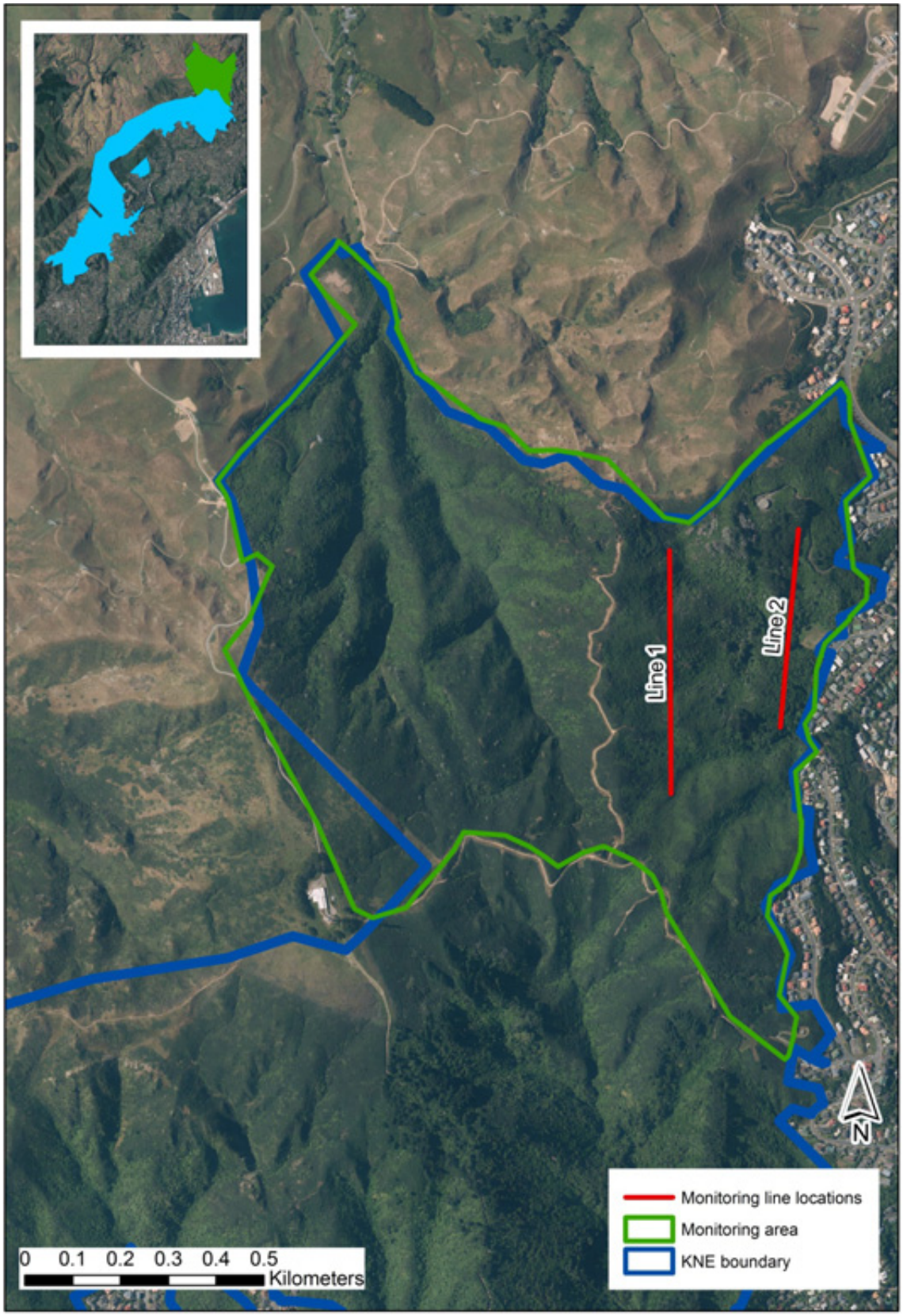

Figure 18: Western Wellington Forest KNE site (Johnsonville Park), showing the location of the tracking tunnel lines

Pest Animal Control test site – Porirua Western Forests

KNE area:	**315 ha**
Area monitored:	**360 ha**
Vegetation type:	Semicoastal kohekohe/tawa forest
Surrounding landscape:	Farmland, urban, exotic vegetated hills

1. Pest animal control regime

Current pest animal control regime

Possum and Rodent control is undertaken with 216 Pelifeed bait stations using brodifacoum poison bait on a 150m x 150m grid. The network is serviced four times a year at intervals of three months by Biosecurity staff. The area is currently undertaking a bait trial using only one cap of brodifacoum poison (170gms) in all bait stations regardless of bait take.

Mustelid control using 31 DOC 200 kill-traps is undertaken on an approximate 300-400m grid. This is serviced by Biosecurity staff four times a year at intervals of three month when the bait stations are being serviced.

Pest animal control background

The bait station network was installed in 1996. Baits containing brodifacoum, feratox and cholecalciferol were initially used, but since 2003 brodifacoum and small amounts of pindone have mainly been used. Mustelid control began in in 2003 using SAF predator traps that were replaced by DOC200 traps in 2008.

Surrounding pest control regimes

Bait stations, predator traps and possum traps in Pikarere Farm, bait stations at Stuart Park and Whitireia Park (which is possum free). The Regional Possum Predator Control programme is controlling possums in the Ohariu area and DOC have a network of baitstations at Colonial Knob.

2. Rodent monitoring results

Rodent monitoring	
Date of monitor: 1-2 March 2018	
Species	Tracking rate (%TTI)
Rats	13
Mice	7

3. Analysis and comments

The rat tracking rate increased to its third highest peak (13 percent) since monitoring began in January 2003 (Figure 19). The two equal higher peaks of 17 percent were recorded in November 2004 and August 2009. To put this in context, the highest peaks represented rats being tracked in five of the fifteen

tunnels monitored, while in the most recent monitor, rats tracked in four tunnels on one line. The target, however is to have, on average, no more than one tunnel per line tracking rats to have a 10 percent or less tracking rate. So, although the February monitor returned variable results across the three tracking tunnel lines, it can be argued that the target for rat control is not being met.

After two monitors through 2017 with no mice recorded, the mice tracking rate increased to seven percent in the February 2018 monitor. This is however in line with the average of eight percent tracking rate for this decade to date (2011-2017) (Figure 19).

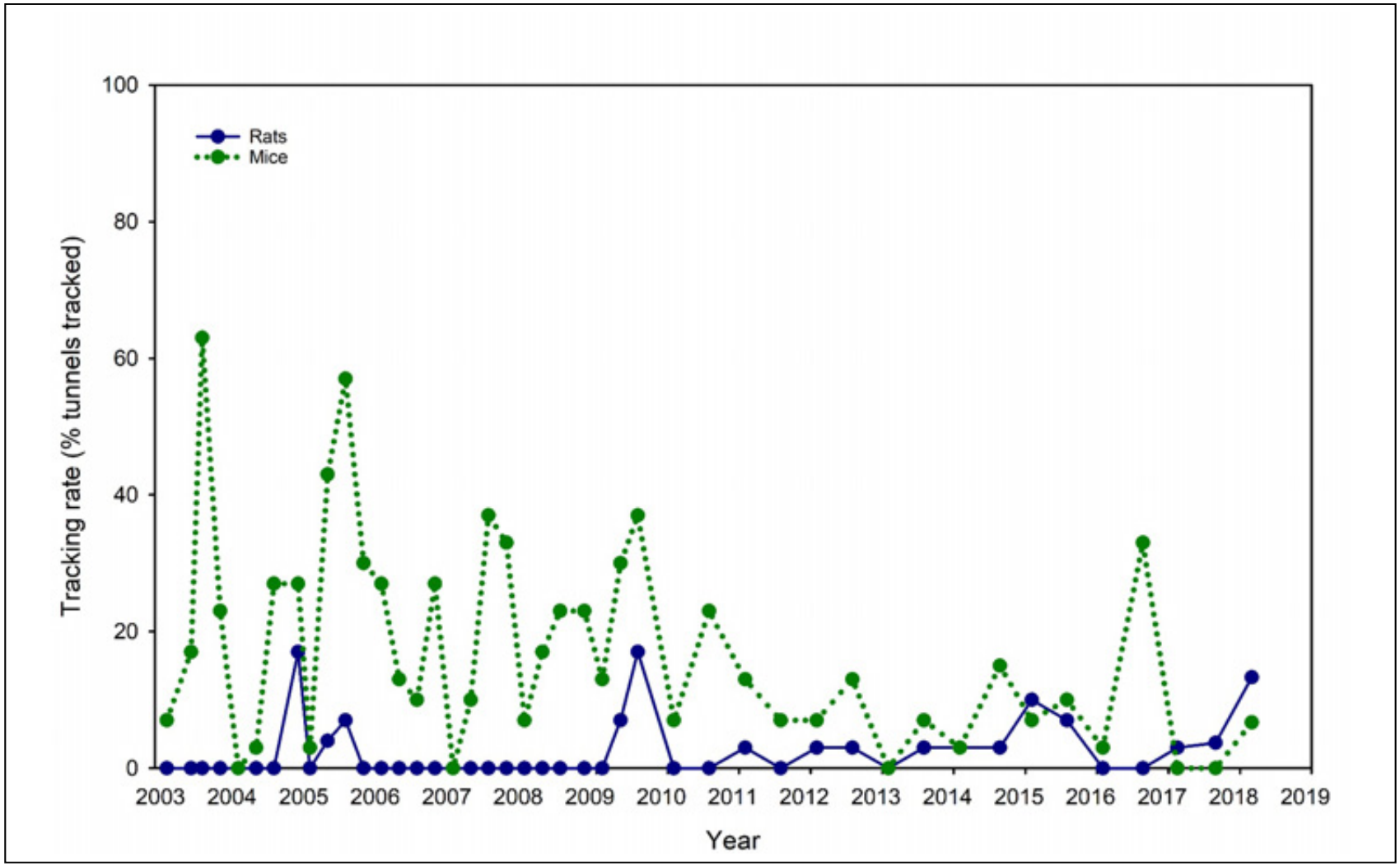

Figure 19: Rat and mouse tracking rates in the Porirua Western Forests KNE site

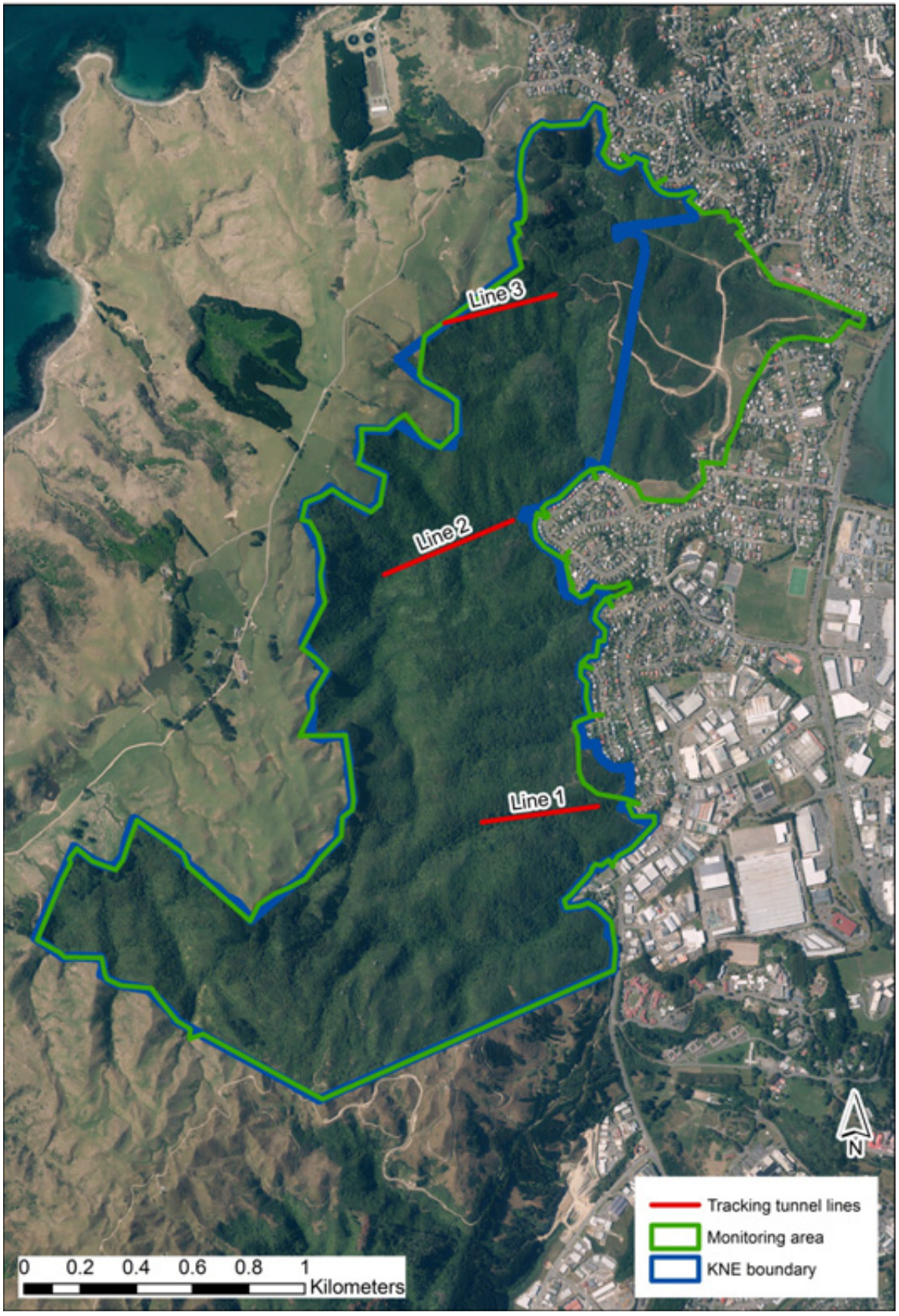

Figure 20: Porirua Western Forests KNE site, showing the location of the tracking tunnel lines

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

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