

Key Native Ecosystem Programme – Small Mammal Monitoring Report

May 2017



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REGIONAL COUNCIL
Te Pane Matua Taiao





Key Native Ecosystem Programme – Small Mammal Monitoring Report

May 2017

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Uys RG. 2017. *Key Native Ecosystem Programme – Small mammal monitoring report – May 2017*. Greater Wellington Regional Council, Unpublished internal report, Document GW/ESCI-T-17/61, Wellington.

Summary

This report presents the results of the small mammal monitoring conducted at Key Native Ecosystem (KNE) sites in May 2017.

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 May 2017 are summarised below:

- The only site to meet its rat tracking target was the Baring Head/Ōrua-pouanui KNE site (1 percent tracking vs 10 percent target). The mice tracking rate increased from 56 to 64 percent.
- In the East Harbour Northern Forest KNE site the rat tracking rate approached the target in the Mainland Island (8 percent tracking vs 5 percent target). Rat tracking decreased in the Non-treatment area from 66 to 40 percent.
- In the Wainuiomata/Orongorongo KNE site the rat tracking rates declined in the Mainland Island (53 to 38 percent), and showed a slight increase in the Non-treatment area (83 to 88 percent).
- At the Belmont Korokoro KNE site rats tracked at 25 percent and mice at 37 percent.
- At the Queen Elizabeth Park KNE site rats tracked at 25 percent while the mice tracking rate continued to spike wildly, rising from 10 percent in November 2016 to 90 percent in this monitor.

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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 sites.

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 them, both the KNE sites and monitoring area boundaries 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 ([Gillies & Williams 2013](#))¹, 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.

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 May are reported here.

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 |

¹ Gillies CA and Williams D. 2013. *DOC tracking tunnel guide v2.5.2: Using tracking tunnels to monitor rodents and mustelids*. Department of Conservation, Science & Capability Group, Hamilton, New Zealand (<http://www.doc.govt.nz/Documents/science-and-technical/inventory-monitoring/im-toolbox-animal-pests-using-tracking-tunnels-to-monitor-rodents-and-mustelids.pdf>).

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 each area to give a TTI for the area.

Note that this 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 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%.

Note that there is no target 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.

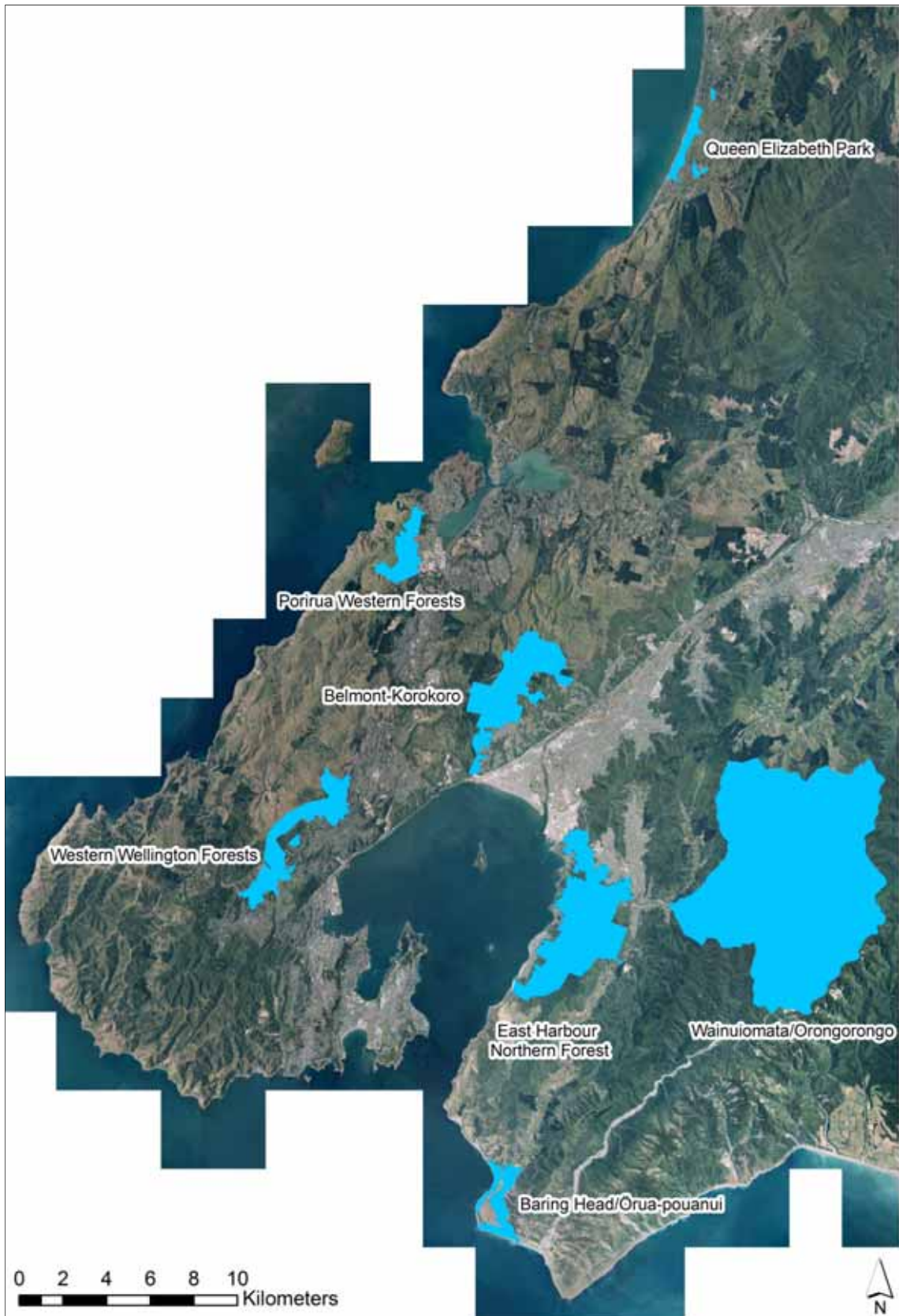


Figure 1: Key Native Ecosystem sites at which small mammal monitoring is conducted

Wainuiomata/Orongorongo

| | |
|-------------------------------|---|
| KNE area: | 7,364 ha |
| Area monitored: | Mainland Island: 1,200 ha Non-treatment area: 659 ha |
| Vegetation type: | Lowland podocarp-rata/beechn/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. 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: 27-28 April 2017 | | | | |
| Species | Tracking rate (%TTI) Mainland Island | SE (%) | Tracking rate (%TTI) Non-treatment area | SE (%) |
| Rats | 38 | 5 | 88 | 6 |
| Mice | 3 | 1 | 1 | 1 |

3. Analysis and comments

The rat tracking rate in the Mainland Island declined to 38 percent after having been at over 50 percent for the last three surveys (Figure 2). In contrast, the rat tracking rate in the Non-treatment Area continued to rise following the mast event in 2016. At the current rate of increase, the tracking rate in the Non-treatment Area is expected to be close to 100 percent at the next monitor in August 2017. Historically, pest management has been able to maintain low tracking rates in the Mainland Island independent of the densities in the surrounding Non-treatment Area. However, rat tracking rates in the Mainland Island remain high.

The mice tracking rate in the Mainland Island declined substantially to a very low level. The mice tracking rate in the Non-treatment Area remained low, possibly as a result of the high rat tracking rate (Figure 3).

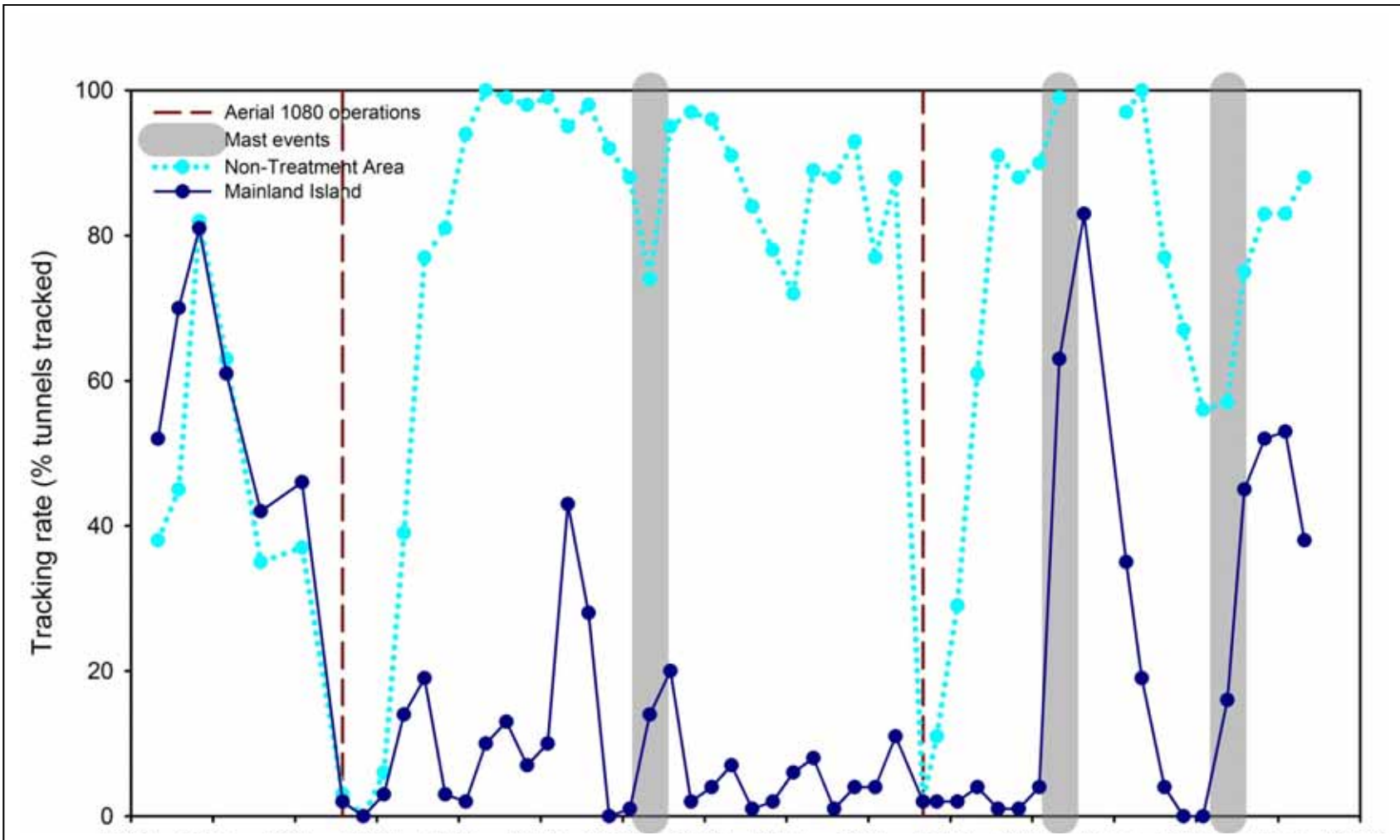


Figure 2: Rat tracking rates at the Wainuiomata/Orongorongo KNE site Mainland Island and Non-treatment Area

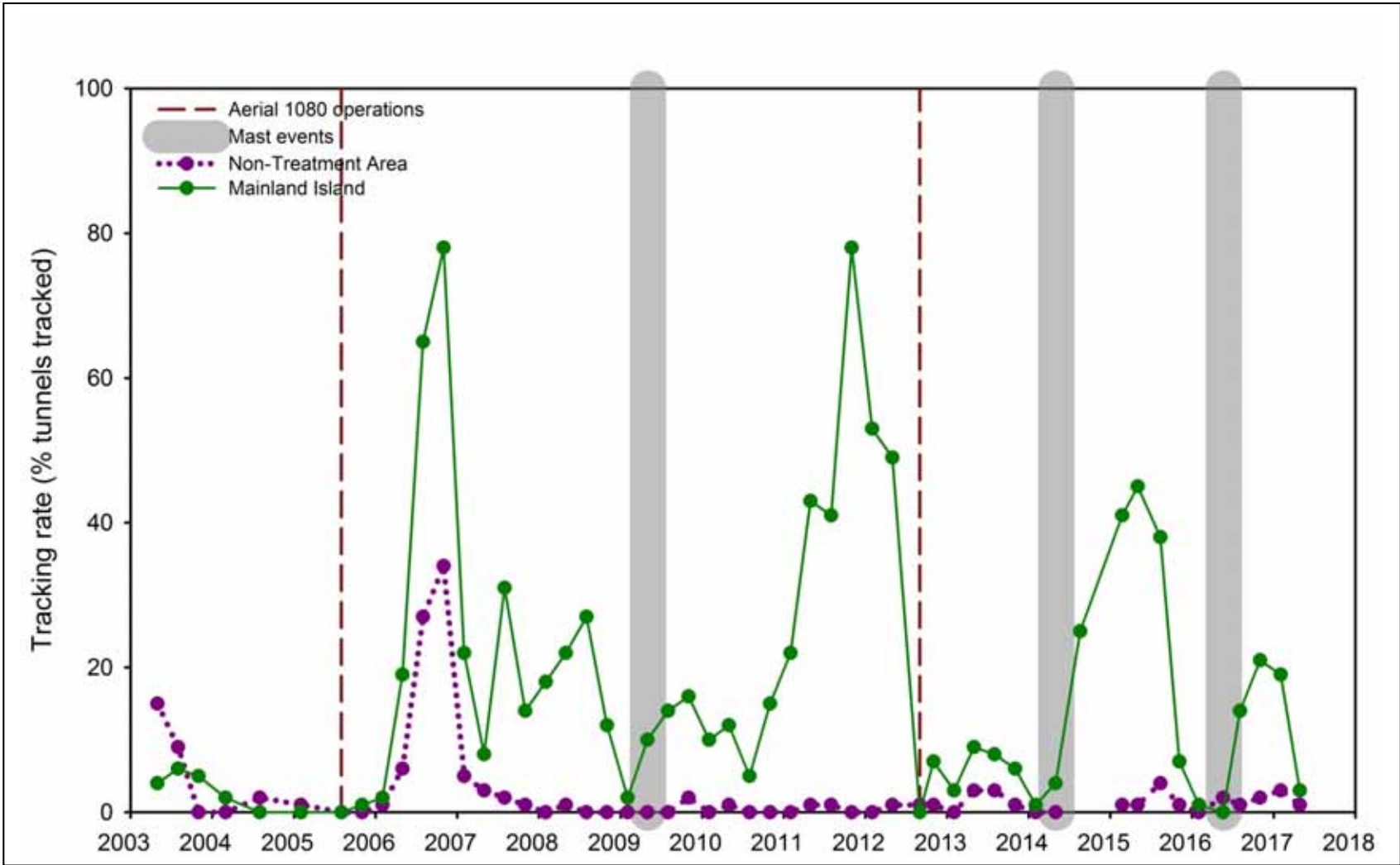


Figure 3: Mouse tracking rates at the Wainuiomata/Orongorongo KNE site Mainland Island and Non-treatment Area

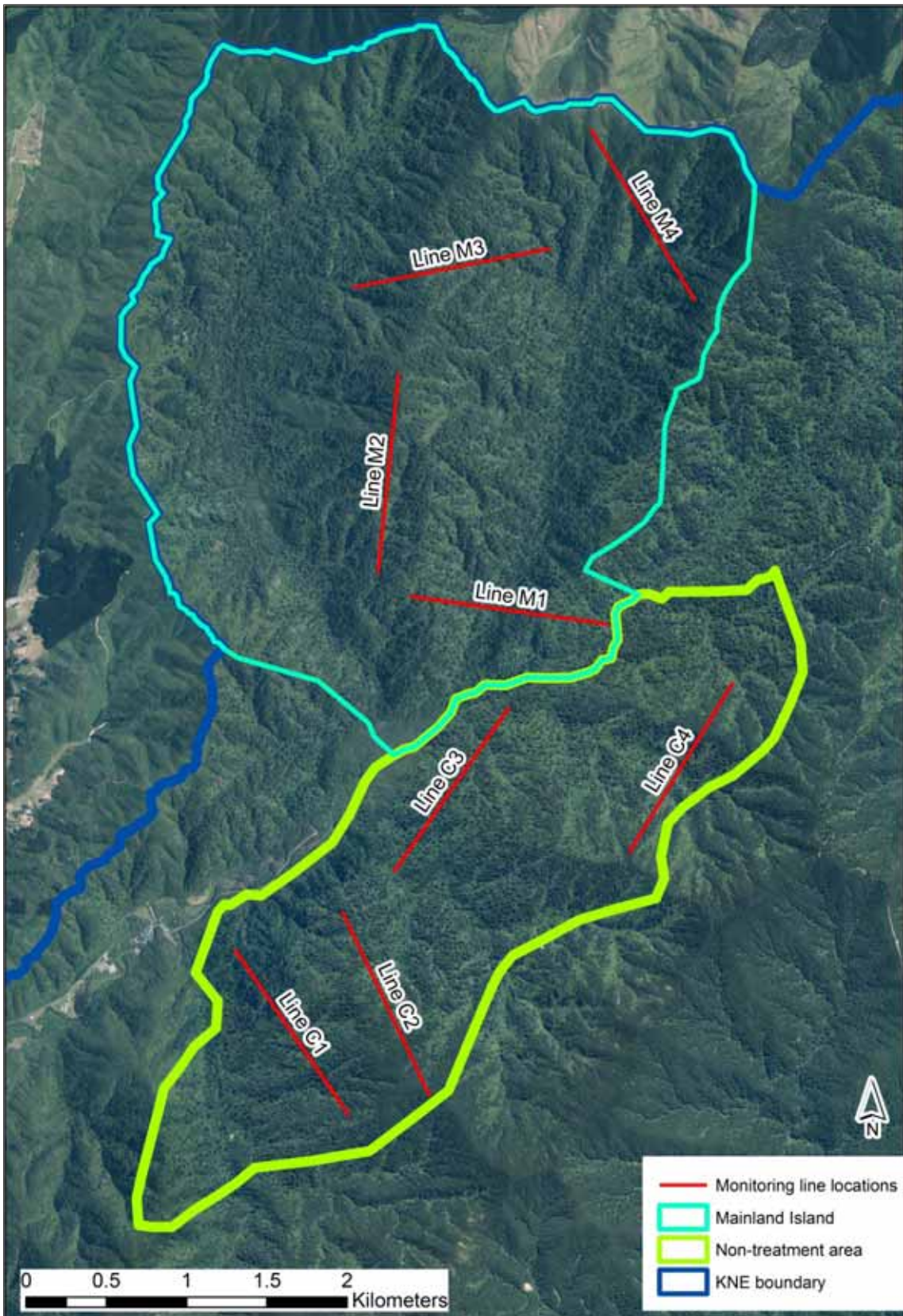


Figure 4: Wainuiomata/Orongorongo KNE site Mainland Island and Non-treatment Area, showing the locations of the tracking tunnel lines

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, bromadiolone 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 x 150 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.

2. Rodent monitoring results

| Rodent monitoring | | | | |
|-------------------------------|---|--------|--|--------|
| Date of monitor: 8-9 May 2017 | | | | |
| Species | Tracking rate (%TTI) Mainland Island | SE (%) | Tracking rate (%TTI) Non-treatment area | SE (%) |
| Rats | 8 | 8 | 40 | 14 |
| Mice | 18 | 8 | 16 | 9 |

3. Analysis and comments

The rat tracking rate in the Mainland Island was slightly higher than in the last monitor, but not significantly so given the standard error (Figure 5). The rat tracking rate in the Non-treatment Area decreased notably (66 to 40 percent) and returned to just below the long-term average for the Non-treatment Area (47 percent).

The mice tracking rates were similar for both the Mainland Island and Non-treatment Area, having changed little since the last monitor (Figure 6).

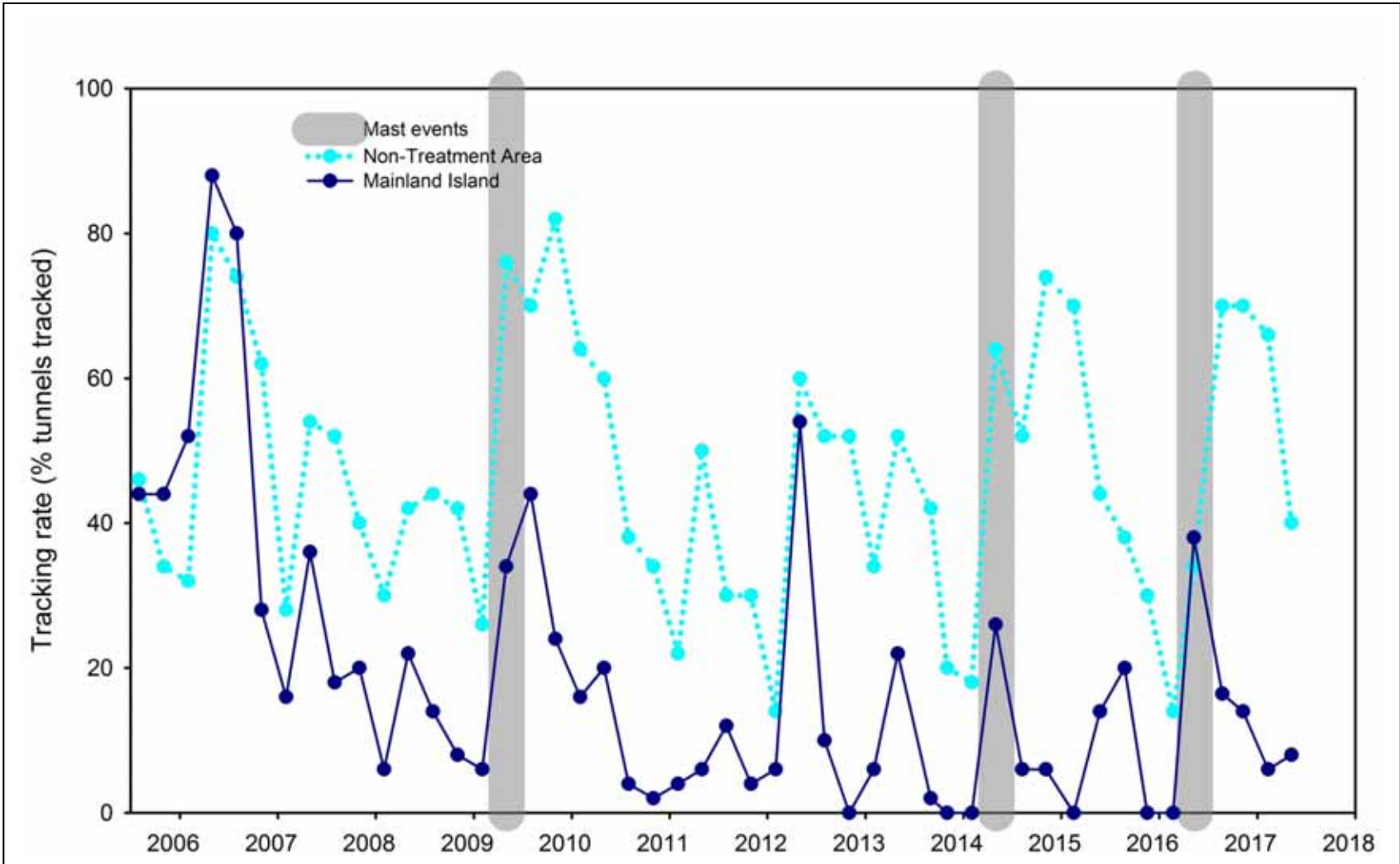


Figure 5: Rat tracking rates in the East Harbour Northern Forest KNE site Mainland Island and Non-treatment Area

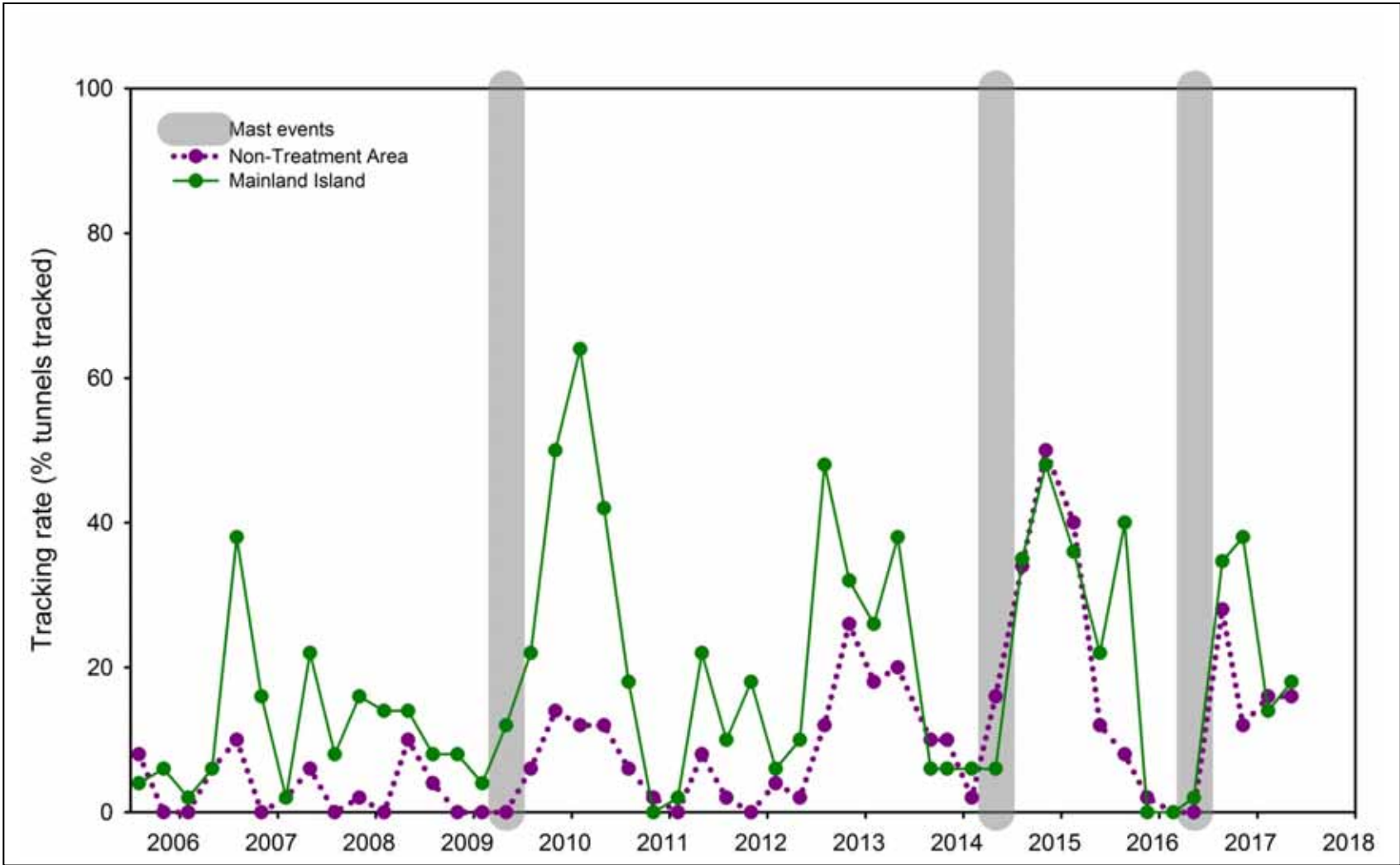


Figure 6: Mouse tracking rates in the East Harbour Northern Forest KNE site Mainland Island and Non-treatment Area



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: 6-7 May 2017 | | |
| Species | Tracking rate (%TTI) | SE (%) |
| Rats | 1 | 1 |
| Mice | 64 | 8 |

3. Analysis and comments

Rat tracks were reported from one tunnel on line five closest to the river. In contrast, the mice tracking rate remained high (64 percent) approaching the record high recorded in February 2015 (67 percent) (Figure 8).

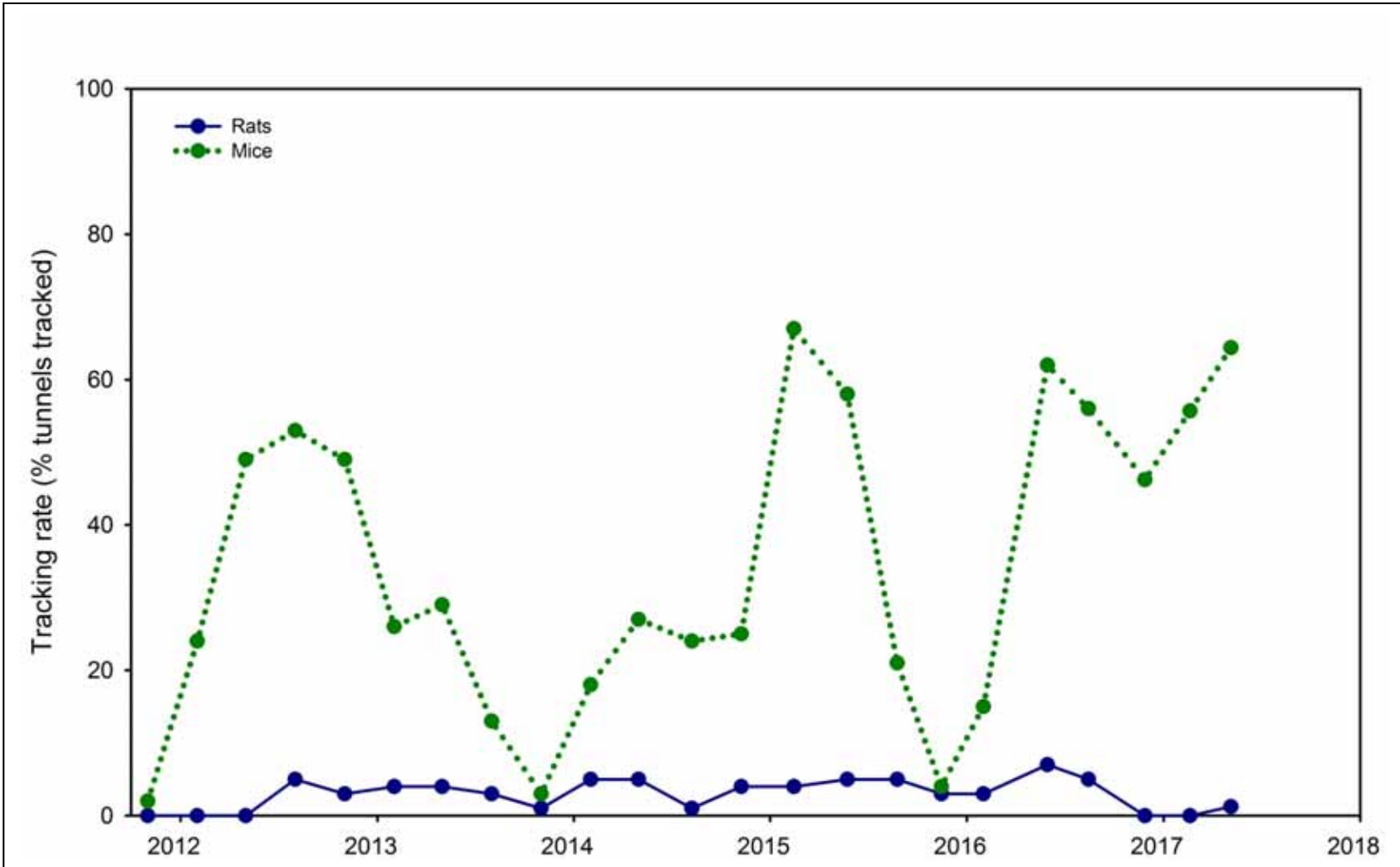


Figure 8: Rat and mouse tracking rates at Baring Head/Ōrua-pouanui KNE site



Figure 9: 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

Possoms 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: 20-21 May 2017 | | |
| Species | Tracking rate (%TTI) | SE (%) |
| Rats | 25 | 11 |
| Mice | 37 | 9 |

3. Analysis and comments

The rat tracking rate has increased over the last five monitors from the previous low in November 2015 (Figure 10). Rat tracking is now within the range of the previous high at this site recorded in February 2013 (27 percent).

The mice tracking rate remained fairly constant, only showing a slight increase (Figure 10).

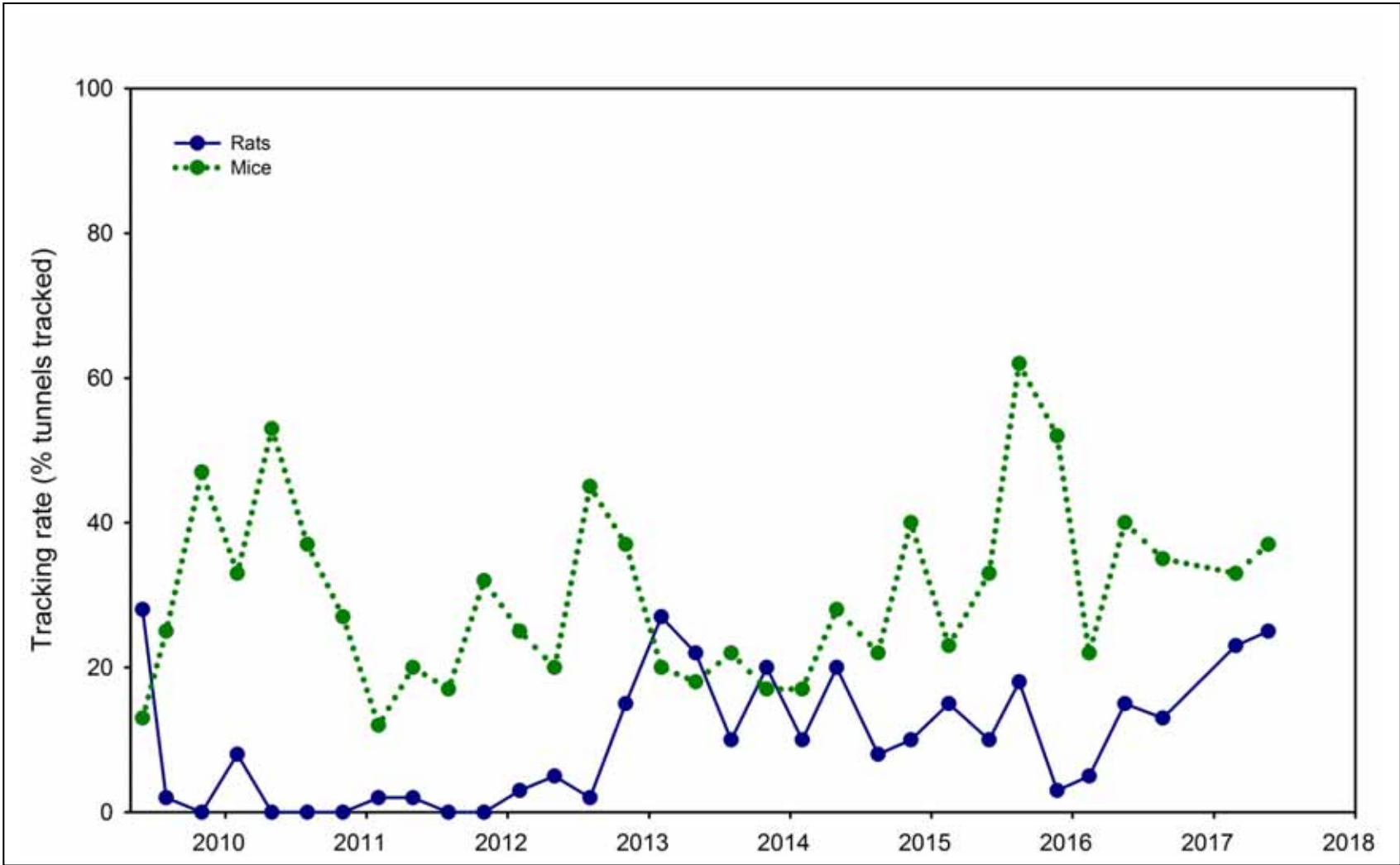


Figure 10: Rat and mouse tracking rates at the Belmont Korokoro KNE site

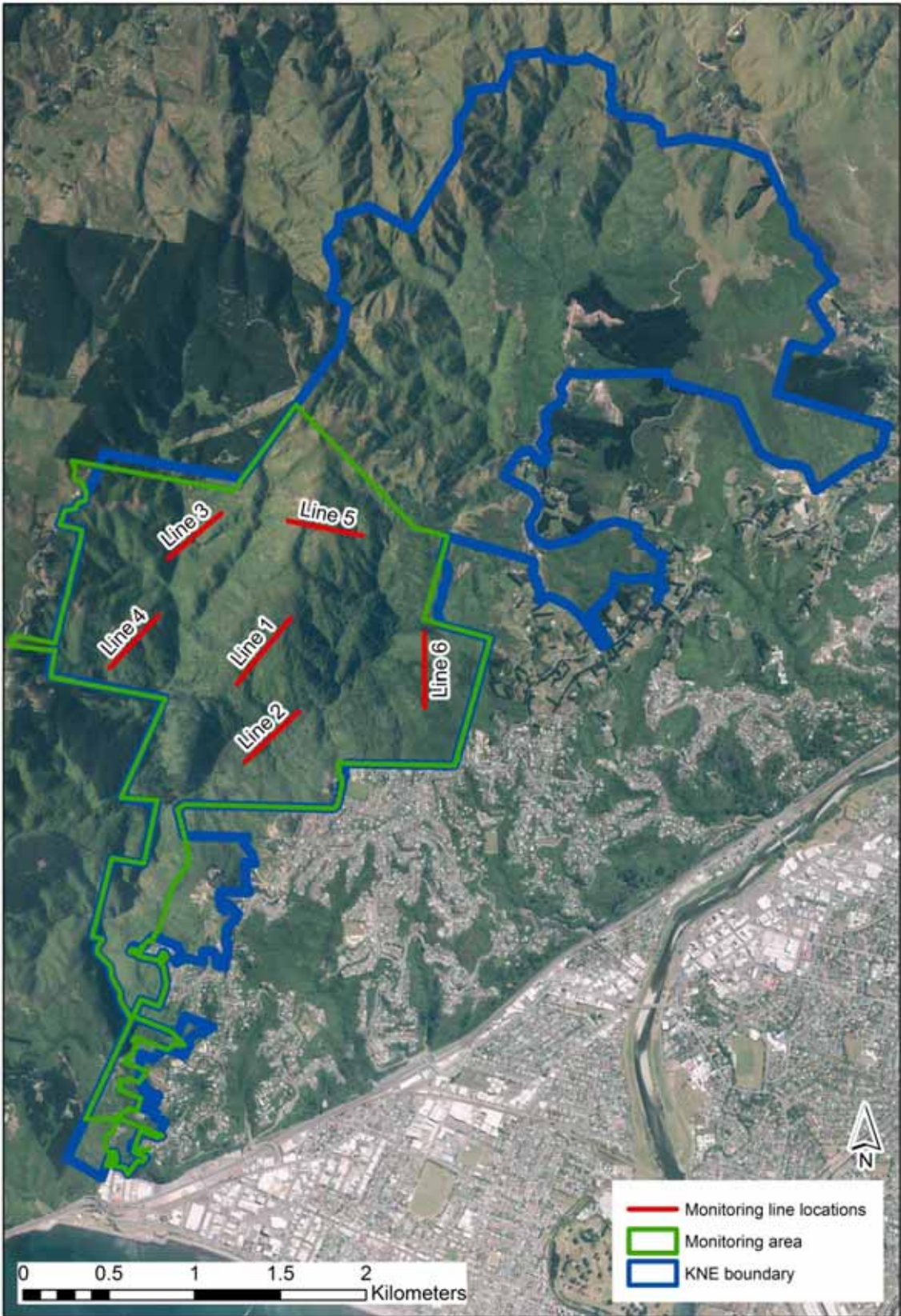


Figure 11: Belmont Korokoro KNE site showing the location of the tracking tunnel lines

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: 1 May 2017 | | |
| Species | Tracking rate (%TTI) | SE (%) |
| Rats | 25 | 15 |
| Mice | 90 | 10 |

3. Analysis and comments

The rat tracking rate has shown small increases over the last three monitors (from 15 to 20 to 25 percent) (Figure 12). This equates to an increase in rats being tracked from three, up to four of the 20 tunnels (split across two lines)

and so should not be considered significant. It is, nevertheless, concerning that the rat tracking rate has risen from a level where almost no rats were being encountered throughout 2015 up to the 20 percent range now being recorded.

The mice tracking rate continued its dramatic increase from 10 percent in November 2016 to 90 percent tracking rate in this monitor (Figure 12). The dramatic nature of these spikes may be partly due to the low number of lines (i.e. two) being monitored. However, the repeatedly high tracking rate over the last two monitors confirms an abundance of mice.

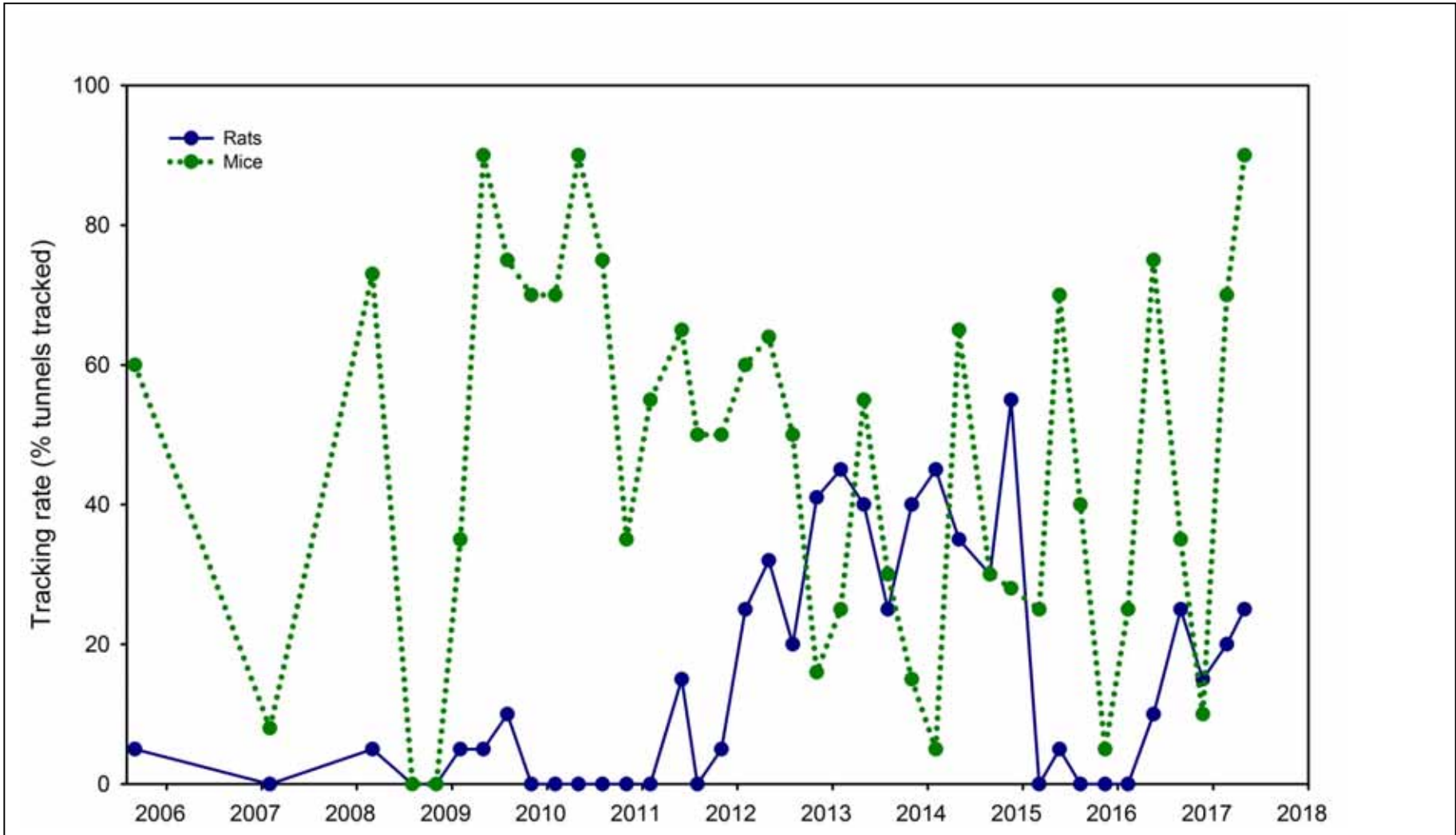


Figure 12: Rat and mouse tracking rates at the Queen Elizabeth Park KNE site



Figure 13: Queen Elizabeth Park KNE site showing the location of the tracking tunnel lines

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